ENVIRONMENTAL SUSTAINABILITY COMMITTEE AGENDA

CITY OF NOVI
June 17, 2024 | 5:30 PM
Mayor's Conference Room
Novi Civic Center | 45175 Ten Mile Road
(248) 347-0445

CALL TO ORDER

ROLL CALL - Council Members Heintz, Gurumurthy, and Smith

APPROVAL OF AGENDA

June 17, 2024 Agenda

REMARKS FROM THE CHAIRPERSON

MATTERS FOR COMMITTEE DISCUSSION

Meeting Schedule and Norms

ROUNDTABLE DISCUSSION

Roundtable Discussion: Outside Resources

Roundtable Discussion: Long- and Short-term goals

PUBLIC COMMENT

ADJOURNMENT

NOTICE: People with disabilities needing accommodations for effective participation in this meeting should contact the City Clerk (248) 347-0456 at least two working days in advance of the meeting. An attempt will be made to make reasonable accommodations.

MEMORANDUM

TO: ENVIRONMENTAL SUSTAINABILITY COMMITTEE

SUBJECT: PEER COMMUNITY ENVIROMENTAL PLANS

DATE: JUNE 13, 2024

To help facilitate the roundtable discussion on outside resources the following environmental action and strategic plans from peer communities were identified for review:

Neighboring Communities in Michigan

1) Oakland County
2) Ann Arbor
3) Detroit
4) Grand Rapids (External Link)
5) Rochester
6) Troy

Peer Cities in other States

1) Cary, North Carolina (External Link)
2) Lenexa, Kansas (External Link)
3) Fishers, Indiana (External Link)

c:

OAKLAND COUNTY SUSTAINABILITY PLAN

OAKLAND COUNTY MICHIGAN

A Message from David Coulter, Oakland County Executive

To the residents of Oakland County,

I am pleased to share the Oakland County Sustainability Plan prepared by AECOM with you. This comprehensive plan represents one of the first steps toward our goal of reducing greenhouse gas emissions on Oakland County's government campus, as well as implementing sustainable strategies for our buildings and operations.

It allows us to measure our progress to achieve net zero carbon emissions by 2050 with an interim benchmark of 50% carbon emission reduction by 2035.

With this plan's recommendations in hand, we can be more intentional about achieving more energy-efficient buildings on the county's campus and fewer gas-guzzling cars in the county's fleet, more environmentally friendly grounds, and foster a workforce culture that embodies the county's commitment to a more sustainable Oakland County.

The Sustainability Plan is key to the seven goals we've identified as top priorities for the county. And these goals are all linked. You can't have healthy residents without clean and safe water and air.

Livable neighborhoods can't be fully achieved without access to non-motorized trails, public transportation and open green spaces for recreation.

Equipped with the recommendations in this report, we can in All Ways, Move Forward in a proactive way to address the inequities that underserved communities experience on issues such as climate change and access to public transportation and green spaces.

I promise you, this is not a plan that will sit on a shelf. With the help of some federal funding, we have a real opportunity to make transformational, once-in-a-generation changes. And that's what I intend to do.

It's the right thing to do, it's the moral thing to do and it's the thing that we're going to do to ensure future generations have a safe and clean county where they can live, succeed and thrive.

With gratitude

David Coulter

Acknowledgments

Indigenous Land Acknowledgment

Oakland County resides on the ancestral, traditional, and contemporary lands of the Anishinaabe, known as the Three Fires Confederacy, comprised of the Ojibwe, Odawa, and Potawatomi. The land was ceded in the 1807 Treaty of Detroit and makes up southeast Michigan.

In recognizing the history and respecting the sovereignty of Michigan's Indian Nations, Oakland County honors the heritage of Indigenous communities and their significant role in shaping the course of this region. Further, the county recognizes the wrongs done to those forcibly removed from their homelands, separated from their families, deprived of their natural resources, prohibited their use of spiritual and traditional practices, and restricted from expressing their cultural identity. The county commits to fostering an environment of diversity, equity, and inclusion that is responsive to the needs of the First Peoples through our words, policies, and actions.

The acknowledgment, preservation, and perpetuation of customs and traditions of Indigenous nations are essential to our shared cultural heritage. A deep understanding of Native peoples' past and present informs the policy creation, partnerships, and community engagement of the county in its ongoing effort to elevate the dignity of all people and serve as shared stewards of the land.

Thank You

Thank you to all who have collaboratively developed the county's Sustainability Plan, including Steering Committee members, Focus Group and technical interview participants, and other staff. This Plan and its future implementation will advance the sustainability of the county's sites and operations, further enabling the county's government to serve the community now and into the future.

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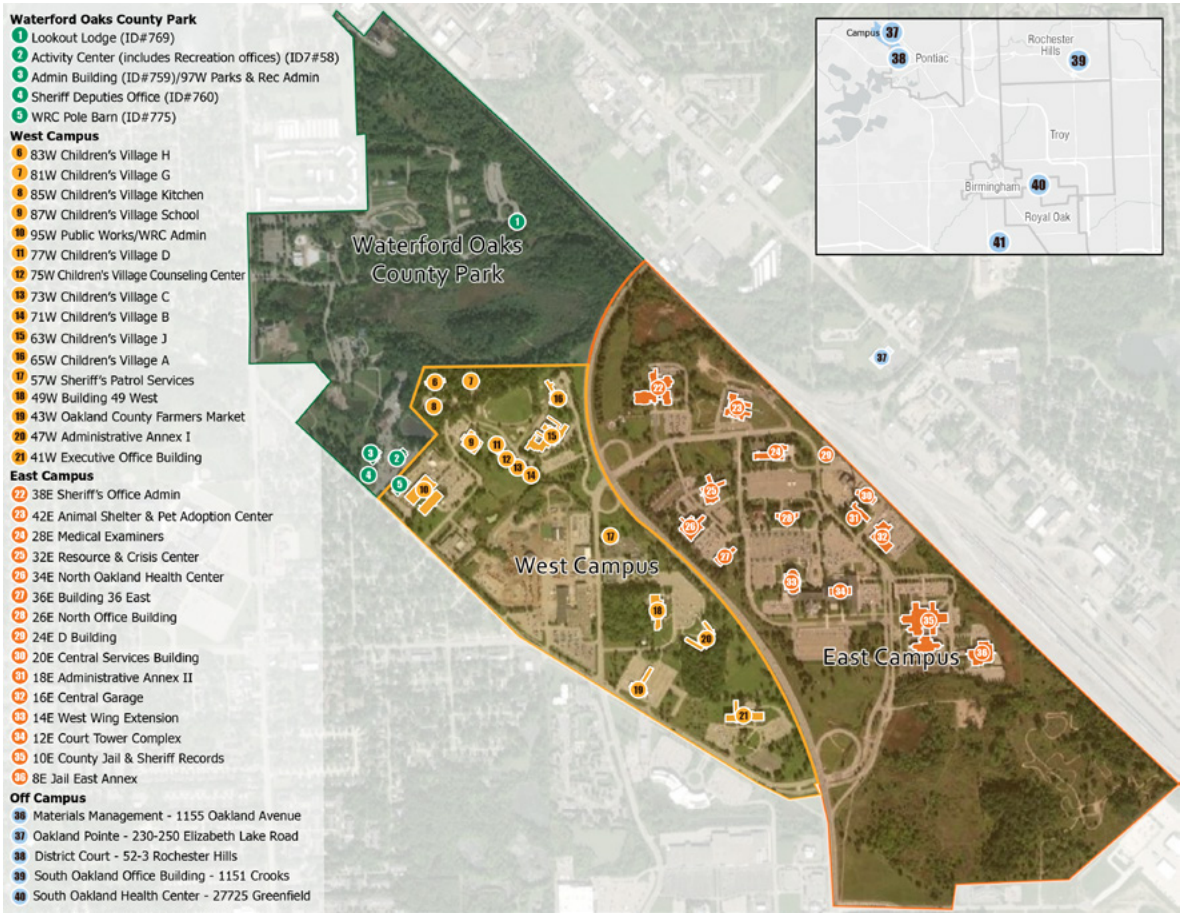
Introduction

Leading by Example

Oakland County is committed to fostering social equity, economic prosperity, and environmental sustainability. By modelling transparent, innovative, and achievable actions to improve sustainability within county sites and operations, the county aims to lead by example for the greater Oakland County community to advance social, economic, and environmental sustainability. Contained in this Sustainability Plan, there are recommended strategies that the county can implement to become more sustainable and an associated Framework to guide county decisions into the future.

The sustainability strategies focus on the Oakland County campus, select off-campus facilities, and Waterford Oaks County Park (see Figure 1). These strategies can also apply to specialty facilities and operations, like those at the county airport – however, these types of sites and operations will require more nuanced sustainability planning. The county's Greenhouse Gas Inventory includes all the county-owned sites and operations and will inform further decarbonization planning across the county's operational portfolio.

Figure 1. Sustainability Plan Sites and Facilities



A Framework was developed to guide this work. It includes the sustainability Vision, Guiding Principles, Focus Areas, Objectives, and Key Performance Indicators (KPIs). While Focus Areas are defined separately, they are all interconnected. The success of the county's sustainability efforts hinges on holistically advancing the Focus Areas together. The Framework is supported by a collective definition of sustainability and diversity, equity, and inclusion. The Sustainability Plan and Framework are complimented by a three phase Change Management Plan to support successful implementation of the sustainability strategies (See Appendix D: Change Management Plan).

What is Sustainability?

Sustainability is creating common good for all by protecting the environment and supporting the needs of the present without compromising the needs of the future. It considers the intersection of protecting the environment, protecting people, and supporting an equitable and inclusive economy. It is specifically defined through the three subjects below:

Environmental Sustainability

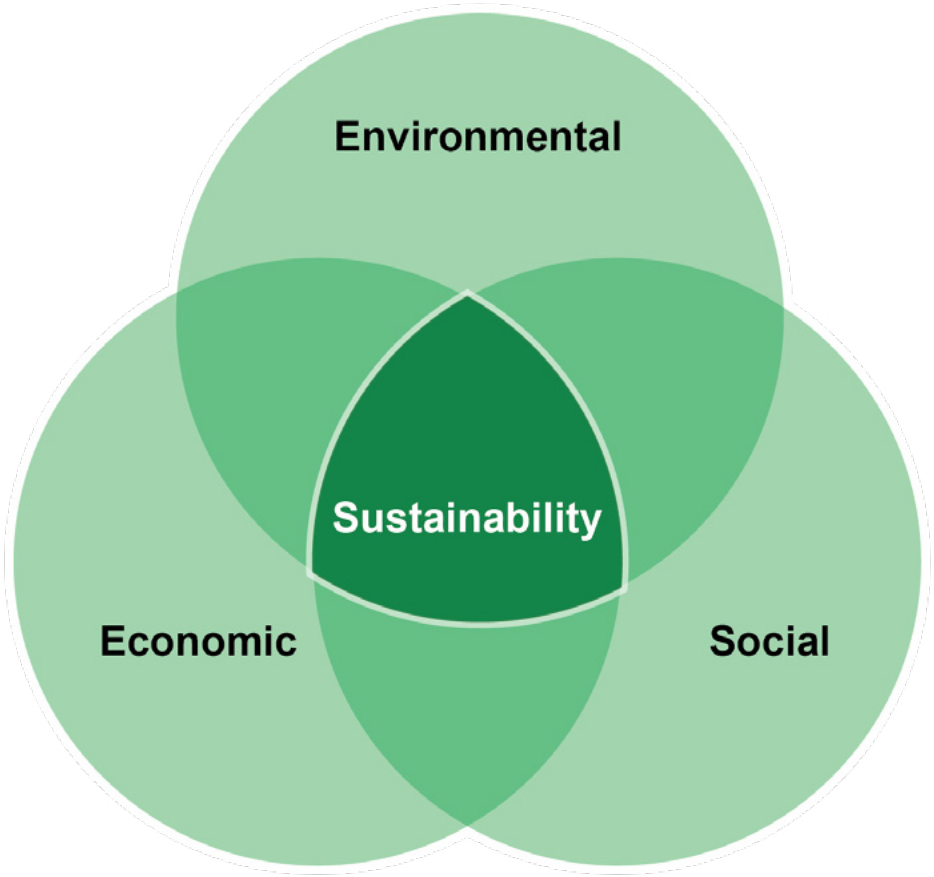
Environmental sustainability focuses on the natural environment and includes factors such as air and water quality, waste reduction and recycling, emission reduction, and ecosystem preservation and enhancement.

Social Sustainability

Social sustainability focuses on people and communities and includes factors such as diversity, equity and inclusion, access to education and training, and health and wellness resources.

Economic Sustainability

Economic sustainability focuses on finances and transactions of goods and services, and includes factors such as procurement, cost savings, revenue, and economic growth.



How does Diversity, Equity, and Inclusion relate to Sustainability?

Oakland County is a member of the Urban Sustainability Directors Network (USDN), an organization for sustainability practitioners in government. In 2019, USDN developed equity principles and commitments.[1] The county aligns with those principles and commitments, and specifically recognizes the following:

Equity is a professional competency. The skills associated with advancing equity make us better public servants, preparing us to deal with the complex nature of the social, economic, and environmental challenges Oakland County communities face.

The government has a fiscal and moral responsibility to address the long-term implications that inequity has on prosperity, health, and safety for residents, community members, and stakeholders. Governments can either create or eliminate barriers for better outcomes through their policies, programs, and relationships.

Increasing diversity, and promoting inclusion, within the sustainability field, and particularly in decision-making positions within government, will increase the long-term relevance of accountability of the county's work to communities who have been systematically denied influence. Diverse perspectives produce more sophisticated solutions. The sustainability field must consciously build a diverse and inclusive culture.

More information on the USDN Equity Principles and Commitments can be found in Appendix A.

What is Diversity, Equity, and Inclusion?

Equity means that everyone has access to resources and the support to reach each person's full potential. Creating a diverse, equitable, and inclusive county environment means that the county's workforce and visitors are valued, respected, included, and heard. Oakland County is committed to the goal of operationalizing equity by taking actions to integrate diversity, equity, and inclusion within all county operations. As a government organization with a commitment to public service and influence on public decision-making, Oakland County has a responsibility to identify, challenge, and change systems that perpetuate injustices and create disparate outcomes for marginalized and disadvantaged individuals and communities.

Action

Oakland County is continuously taking action to integrate diversity, equity, and inclusion into all county operations as well as setting measurements to identify progress or areas of opportunity.

Accountability

The county will hold all parties accountable to this commitment through continuous education around structural and systemic inequities and intentional incorporation of equity and inclusion in all policies, practices, and programs.

Strategies

Throughout this Sustainability Plan, look for sustainability strategies tagged with the county sustainability Guiding Principle of "Operationalize diversity, equity, and inclusion" for strategies that advance this value

1 Urban Sustainability Directors Network, https://www.usdn.org/about/usdn-equity-principles-and-commitments.html#/

Sustainability Framework

The Sustainability Framework includes the Vision, Guiding Principles, and Focus Areas to guide Oakland County's sustainability efforts and decision making. Each strategy is accompanied by objectives and KPIs to measure performance.

Guiding Principle: Value that is important to advance through sustainability strategies

Focus Area: Area for achievement that sustainability strategies are organized into

Objective: Indicator of progress toward advancing a Focus Area

Key Performance Indicator: Measure of performance toward an objective

Vision

Oakland County demonstrates leadership in social, environmental, and economic sustainability through modelling transparent, innovative, and achievable action. The county creates an accessible, safe, and welcoming campus that contributes to a positive service experience for all, through efficient, equitable, and low-carbon operations.

Guiding Principles

Operationalize diversity, equity, and inclusion

Integrate diversity, equity, and inclusion as core components of county operations, policies, and procedures.

Provide accessible services and campus environment

Create an accessible, safe, and welcoming county campus, and continue to enable county staff to better serve residents, businesses, and local governments.

Create education and engagement opportunities

Provide education, training, and engagement opportunities for staff as well as for campus visitors.

Advance the net zero carbon goal

Achieve net zero carbon emissions by 2050 with an interim benchmark of 50% carbon emission reduction by 2035 from a 2018 baseline.

Improve air and water quality

Mitigate the release of air and water pollutants and invest in technologies and infrastructure that improve air and water quality.

Maximize resource efficiency

Maintain quality while optimizing the use of financial, material, staff and other resources.

Focus Areas, Objectives and Key Performance Indicators

Sustainable Governance

Embed environmental, social, and fiscal sustainability into county operations.

- **Align the county's purchasing power with county sustainability values**, as measured by the percentage of county contracts awarded to vendors that scored highest against the sustainability- and equity- related bid evaluation criteria laid out in each request for proposal (RFP).[2]
- **Uphold the county's Asset Management Plan**, as measured by the percentage of critical assets that are tagged, integrated into the county's asset management databases, and undergo regular condition assessments and proactive maintenance.

Health and Wellness

Foster physiological, social, purposeful, ethical, mental, emotional, and intellectual wellness.

- **Improve staff mental health**, as measured by use of the Employee Assistance Program (EAP) program and percentage of staff diagnosed with mental health conditions documented in annual reports from the county's health consultant.
- **Improve staff physical health**, as measured by percentage of staff diagnosed with "lifestyle conditions" (i.e., diabetes, coronary artery disease, and hypertension) documented in annual reports from the county's health consultant.
- **Increase access to equitable and healthy workspaces**, as measured by percentage of workspaces and facilities that adhere to workplace standards.[3]
- **Increase employee connection with wellness initiatives at Oakland County**, as measured by participation rates in OakFit wellness programs annually.

Facility and Fleet Decarbonization

Expand the county's clean energy generation capabilities, convert the county's fleet to clean-energy vehicles, and advance decarbonization goals.

- **Expand carbon neutral energy generation and use**, as measured by the carbon emissions from energy consumption (CO_2e).
- **Decarbonize county vehicle fleet**, as measured by the percentage of internal-combustion engine (ICE) vehicles to non-combustion engine vehicles within the fleet.
- **Promote cleaner transportation alternatives**, as measured by the percentage of staff commuting to work by a transportation mode other than a single occupancy ICE vehicle.

2 Sustainability-related bid evaluation criteria may vary across RFPs. For a set of example criteria, please refer to strategy S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities. This KPI is also inclusive of the county's strategic objective and KPI to increase opportunities in county procurement, as measured by the percentage of county contracts awarded to minority-, woman-, disabled-, veteran-owned businesses.

3 Workplace standards are to be determined through implementation of strategy W3. Enact Healthy Workplace Guidelines and Standards.

Focus Areas, Objectives and Key Performance Indicators

High Performance Buildings

Maximize efficient and low-carbon use of energy, water, and material resources within county facilities to the highest degree possible, while considering the design, facility operation and use, and maintenance requirements.

- **Reduce building energy use**, as measured by building energy use intensity (kWh or MMBtu/ square foot).
- **Increase building water efficiency**, as measured by gallons of potable water use per square foot.
- **Electrify county buildings**, as measured by the percentage of buildings fully electrified.
- **Increase construction waste diversion rate**, as measured by percent of construction waste diverted from landfills.

Waste Reduction and Diversion

Reduce the amount of waste generated and sent to landfills through increased material reuse, recycling and composting, and implementing other strategies to reduce overall material consumption.

- **Increase the non-construction waste diversion rate**, as measured by percent of waste generated on campus diverted from landfills; and percent of material recycled or composted.
- **Decrease non-construction waste generation**, as measured by the total tonnage of waste generated.

Open Space, Ecosystems, and Connectivity

Protect and enhance the natural and built environments of Oakland County Campus and Waterford Oaks County Park through ecological restoration, accessible design and connectivity, and restorative landscaping and planting areas.

- **Convert lawns to native meadows or forest**, as measured by acres of lawn converted to native meadows or forest.
- **Reduce run off**, as measured by gallons of stormwater captured.
- **Enhance the connectivity of campus through non-motorized paths**, as measured by linear feet of pathways.
- **Increase county tree canopy**, as measured by number of trees planted per year.
- **Reduce impermeable surfaces**, as measured by the square footage of impermeable surfaces removed.

Moving Sustainability Forward: Oakland County Sustainability Progress

Oakland County continues to demonstrate commitment to sustainability through strategic planning, resolutions, and actions. On Earth Day, April 22, 2021, the county announced the proposed resolution to achieve net zero emissions from county operations by 2050 with an interim goal of 50% carbon emission reduction by 2035. The County Board of Commissioners adopted this resolution on May 13, 2021. The Greenhouse Gas Inventory, created as part of this Sustainability Plan, sets a baseline of calendar year 2018 for the emissions target. The County Executive developed a Strategic Framework[4] to define the priorities, guide the work, and help measure the impact over the next five years.

In line with the Strategic Framework and one of the key priorities for County Executive David Coulter's administration, the county established the Office of Environmental Sustainability led by the county's first Chief Environmental Sustainability Officer to move sustainability forward. New initiatives led by the Office of Environmental Sustainability to date include drafting building standards that align with Leadership in Energy and Environmental Design (LEED), drafting and discussion of plans for vehicle electrification and required charging infrastructure, participating in various community-wide resilience and climate action planning efforts, and local partnerships for sustainability.

Also, in line with the Strategic Framework, the county continues to demonstrate commitment to enabling community members and staff to reach their full potential through establishing the Office of Diversity, Equity, and Inclusion led by the first Chief Diversity, Equity, and Inclusion Officer. Further, the county is implementing the recently developed community-wide roadmap for equitable programming, Strategies for Equitable Programs and Services, and conducted a Workplace Cultural Assessment, with both efforts led by the Office of Diversity, Equity, and Inclusion. Alignment and collaboration between county departments is critical to implementing sustainability initiatives with diversity, equity, and inclusion at the heart of all county priorities.

4 https://www.oakgov.com/StrategicFramework

Aligning the Sustainability Plan with the Strategic Framework

The County Executive Strategic Framework established community objectives and KPIs in the following eight goal areas: Thriving and Inclusive Economy, Healthy Residents, Skilled and Educated Workforce, Livable Neighborhoods, Environmental Sustainability, Public Safety and Fairness in the Criminal Justice System, Organizational Excellence, and Diversity, Equity, and Inclusion. These goal areas collectively touch on each component of sustainability – social, economic, and environmental – and the strategies within the Sustainability Plan can advance the strategic goal areas at the government site and operation level.

The Oakland County Sustainability Plan coincides with the County Executive Strategic Framework for the county.[5] The Strategic Framework guides the county's actions to accomplish its mission to serve through collaborative leadership and to help support communities where residents flourish and businesses thrive. The county's vision is to be a healthy, safe, and thriving place where everyone is valued, quality of life is high, and economic opportunity abounds.

Advancing equity through sustainability initiatives at county-owned sites and through county operations is key to advancing the strategic vision at the government scale. Advancing equity is core to making sure county-owned sites are healthy, safe, and accommodating to all users and abilities. When equity is advanced through government sustainability initiatives, the effect will extend through the services provided to community members. Therefore, a Guiding Principle of this Sustainability Plan is to operationalize diversity, equity, and inclusion.

VISION

To be a healthy, safe, and thriving place where everyone is valued, qualityof life is high and economic opportunity abounds.

MISSION

To serve through collaborative leadership and to help support communities where residents flourish and businesses thrive.

5 https://www.oakgov.com/StrategicFramework/Pages/default.aspx

Strategic Framework Goals

Thriving and Inclusive Economy

Oakland County cultivates entrepreneurs, attracts talent and investment, promotes cutting-edge technology, and strives for an economy that works for all people and businesses of all sizes.

Healthy Residents

Oakland County works to ensure access to quality affordable health care, including mental health services, to improve health outcomes for all residents.

Skilled and Educated Workforce

Oakland County provides residents the education, training, and support they need to get good paying jobs while assisting businesses in retention and recruitment efforts.

Diversity, Equity, and Inclusion

Oakland County celebrates and embraces its diversity and is committed to ensuring that all residents feel a sense of belonging, are valued, their voices uplifted, and are included in the efforts to close social, economic and well-being gaps that exist in our county.

Livable Neighborhoods

Oakland County offers residents quality, affordable housing in welcoming neighborhoods with access to parks and recreation, public transportation, and healthy food.

Environmental Sustainability

Oakland County seeks to protect the environment, reduce carbon pollution, keep our water and lakes safe, and conserve natural resources.

Public Safety and Fairness in the Criminal Justice System

Oakland County keeps residents safe from crime, ensures that all people are treated fairly by the criminal justice system, and helps put offenders on the path to productive lives.

Organizational Excellence

Oakland County government values its employees, responsibly manages taxpayer dollars, and delivers innovative and effective services to Oakland County residents.

Throughout this Sustainability Plan, look for sustainability strategies tagged with the Strategic Framework goal area icons for strategies that advance each goal.

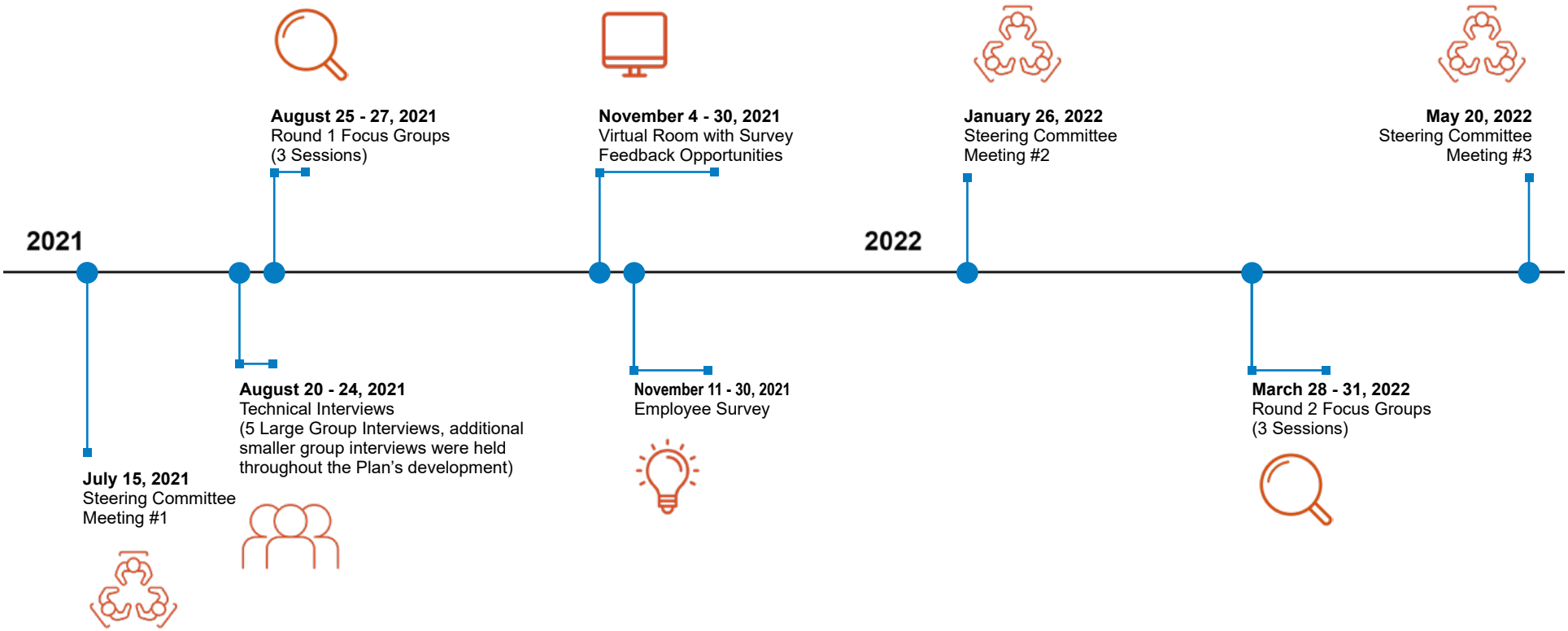
Stakeholder Engagement

The individuals and teams who work and run the county campus and facilities hold pivotal insights and are crucial to both the development and implementation of an impactful sustainability plan. Their input helped develop sustainability goals and provided technical information regarding operations. An employee Steering Committee made up of employees with a keen interest in sustainability provided overall guidance as the project moved forward.

Engagement allowed employees the opportunity to learn about and shape the Sustainability Plan in a meaningful way. Approximately 100 employees from 50 departments, programs, and service areas were engaged through virtual meetings. Employees were also provided additional opportunities to provide input on the Sustainability Plan development through a Virtual Engagement Room and survey, but participation through these mediums was limited.

A timeline of Engagement activities is here and are described in more detail in Appendix C: Stakeholder Engagement.

Timeline of Engagement Activities



Engagement activities provided a significant amount of technical information that was utilized to develop and refine potential strategies and inform approaches for successfully embedding sustainability into county operations. Qualitative information was also collected via employee engagement which provided background and personal views on sustainability in Oakland County. The transparent and honest communication received from county staff provided direction for implementation planning that acknowledges employees' views regarding sustainability. Several key insights gathered included:

Lead by Example

- Oakland County employees are proud of the work they do and the service they provide to county residents, both in the area of sustainability and elsewhere. They feel that leading by example is a priority for the success of the county's sustainability efforts.

Sustainability Priorities

- Employees feel that Health and Wellness is the most important sustainability Focus Area.
- Providing a healthy and safe work environment ranked as the top priority for sustainability efforts.
- The Focus Area of Open Space, Ecosystems, and Connectivity was also seen as a priority for the success of the county's sustainability efforts.

Barriers

- Resource constraints, including budget and staff capacity, are seen as the greatest barrier to sustainability.
- Focus group members were concerned that future administrations will not continue to move sustainability projects forward.

Equity and Access

- Those engaged generally stated that diversity, equity, and inclusion are important; however, this was not consistent among all engagement activities.
- There is a need for common definition and understanding of the impacts of accessibility and the connection of diversity, equity, and inclusion to sustainability.
- Employees do not feel that all employee groups have equal access to a healthy workplace in terms of OakFit Wellness Program activities and the availability of equipment, such as sit/stand desks, and facilities such as breakrooms and locker rooms.

Carbon Reduction

- Focus group members saw carbon reduction as less important to the success of the county's sustainability efforts compared to Steering Committee and county leadership.
- Focus group members generally felt that the county's actions in these areas would have limited impacts and/or that policies set outside of the county's control would address these needs.
- The net zero carbon goal was seen as less achievable and less tangible than other Guiding Principles. Greater understanding of the net zero carbon goal is needed among employees.

Acceptance of Sustainability

- Employees want acknowledgment of their sustainability efforts and achievements made to date.
- Focus Group members were excited about sustainability from a visionary perspective, but at times appeared resistant to change in areas related to their jobs.
- Engagement participants were eager to provide feedback on sustainability matters and want to have input on planning and implementation.

Greenhouse Gas Inventory

Net Zero

The county set a goal to achieve net zero emissions for county government operations by 2050 with an interim goal of 50% emissions reduction by 2035 compared to 2018 emissions. The 2018 baseline year was selected as it corresponds with other local government targets and GHG inventories. As there are different pathways for meeting a net zero carbon goal, the definition of net zero in the context of Oakland County's operations and Sustainability Plan is as follows:

Net zero is achieved when the net GHG emissions associated with county government operations are zero. This is achieved through ambitious local climate action that reduces GHG emissions to the extent feasible combined with implementation of local and regional carbon dioxide removal (CDR) opportunities to remove any remaining emissions estimated to occur in the target years. CDR opportunities can include natural strategies, such as forest restoration and agricultural soil management, or high-tech strategies, such as direct air capture.

The county conducted a greenhouse gas (GHG) inventory to understand the sources of county operational GHG emissions and to identify priority actions that can advance its net zero carbon goal. The GHG inventory results presented in this section highlight the sectors in which the county will need to focus GHG reduction efforts to achieve the net zero carbon goal. While the sustainability strategies in this Plan focus on the county campus, select off site facilities, and Waterford Oaks County Park, the inventory accounts for emissions across all sites, facilities, and operations to represent the full spectrum of county operational emissions. Strategies set forth in the Sustainability Plan will support the county in pursuing the goal of net zero carbon. However, a decarbonization strategy is needed to chart the path for achieving that target. The Decarbonization Framework serves as a base roadmap to develop a full decarbonization strategy.

This government operations GHG inventory follows the guidance outlined in the Local Government Operations Protocol (LGOP), developed by ICLEI – Local Governments for Sustainability, the California Air Resources Board, and the California Climate Action Registry. As an ICLEI member, the county selected ICLEI's ClearPath tool as the primary GHG inventory tracking tool. ClearPath is an online application for the calculation, tracking, and management of GHG emissions inventories at the government operations and community scales. ClearPath allows users to create government operations inventories that are in line with the Local Government Operations Protocol (LGOP). The tool accounts for the GHGs recognized under the Kyoto Protocol, including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). These GHGs have varying levels of climate impact and are represented as carbon dioxide equivalents (CO_2e) in the GHG inventory to allow for comparison. Each GHG has a global warming potential (GWP) that represents its heat-trapping ability relative to that of CO_2. Quantities of different GHGs are converted to CO_2e using their 100-year GWP values from the Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report.[6]

What is CO_2e?

CO_2e is a metric used to represent CO_2 emissions along with other harmful greenhouse gas emissions all in one number.

6 https://www.ipcc.ch/assessment-report/ar5/

Table 1. IPCC Fifth Assessment Report GWP Values

GHG*	GWP
CO_2	1
CH_4	28
N_2O	265

* Due to Oakland County's inventory boundary and reporting protocol requirements, only CO_2, CH_4, and N_2O emissions were relevant to the county's operations and are included in this table.

The LGOP recommends GHG inventories be developed based on calendar year data. The county's base year inventory represents calendar year 2018 as it is the most recent year that reflects normal, pre-COVID-19 operating conditions. The inventory is organized into five sectors: Buildings and Facilities, Vehicle Fleet, Solid Waste Facilities, Wastewater Facilities, and Fugitive Emissions.

Generally, the inventory includes emissions from sources over which the county has operational control, except for solid waste disposal. The county has operational control in instances where there is full authority to introduce and implement operating policies at the operation. If services are contracted to other organizations who maintain operational control, any emissions resulting from the service are considered "outside" of the county's control and can be optionally reported. Even though solid waste disposal operations would be considered an optional emissions source, these emissions have been included in the 2018 inventory to better represent total GHG emissions due to county operations.

To reach the net zero carbon goal, sector-specific strategies and targets can be identified to ensure sector reductions are progressing in line with the net zero carbon goal. However, there may be technological or political barriers to meeting these sector targets or reducing remaining emissions.

GHG Inventory Summary

In calendar year 2018, government operations generated 56,411 metric tons (MT) of CO_2e. Approximately 75% of these emissions are from building and facility electricity and natural gas use. The remaining emissions are primarily from on-road fleet vehicles followed by wastewater treatment processes, solid waste disposal, and off-road vehicles and equipment. The following sections detail municipal emissions in each of the five sectors (see Figure 2 and Table 2).

Figure 2. 2018 GHG Inventory: Municipal CO_2e Emissions by Sector

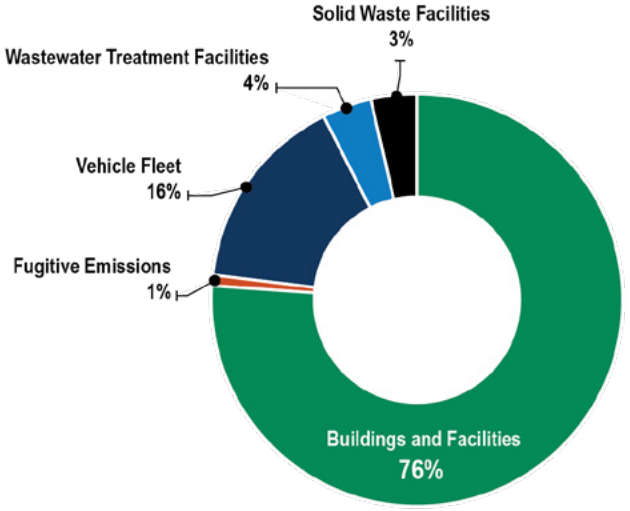


Table 2. 2018 Municipal Activity Data and Emissions

CLEARPATH CATEGORY	CY2018	ACTIVITY DATA	UNIT	CLEARPATH EMISSIONS ($MTCO_2E$)	% TOTAL
BUILDINGS AND FACILITIES	Natural Gas	2,460,769	therms	13,088	23%
	Generator Fuel Oil	1,587	gallons	16	<1%
	Electricity	49,829,981	kWh	29,857	53%
VEHICLE FLEET	On-road Vehicles – Diesel	39,163	gallons	400	<1%
	On-road Vehicles – Gasoline	891,677	gallons	7,864	14%
	Off-road Vehicles – Diesel	31,144	gallons	321	<1%
	Off-road Vehicles – Biodiesel	451	gallons	4	<1%
	Off-road Vehicles – Gasoline	28,292	gallons	250	<1%
SOLID WASTE FACILITIES	Campus Solid Waste	5,014	short tons	1,627	3%
	Park Waste – Landfill	1,129	short tons	366	<1%
	Park Waste – Compost	49	short tons	3	<1%
WASTEWATER TREATMENT FACILITIES	Conventional WWTP Process Emissions	221,112	people	513	<1%
	Conventional Aerobic WWTP Effluent Discharge	96,112	people	589	1%
	Conventional Anaerobic WWTP Effluent Discharge	125,000	people	910	2%
	Conventional Anaerobic WWTP Digester Gas Combustion	125,000	people	8	<1%
	Septic Systems	1,379	people	168	<1%
PROCESS AND FUGITIVE EMISSIONS	Fugitive Emissions from Natural Gas Distribution	2,460,769	therms	427	<1%
TOTAL				**56,411**	

Buildings and Facilities

Buildings and facilities generate GHG emissions from on-site energy use. Electricity consumption is the single largest contributor to county GHG emissions, generating roughly 53% of total local government operations emissions. The county uses a third-party choice purchaser, Executive Energy, to purchase electricity, but does not currently participate in any green power purchasing, which could serve to reduce the county's electricity emissions in the future. Natural gas consumption generates approximately 23% of total GHG emissions, while fuel oil used in generators contributes less than one percent.

The Central Steam Plant uses natural gas to generate steam. The steam is distributed to the main campus buildings to provide space heating/cooling and water heating. Though the Central Steam Plant occasionally uses fuel oil, none was consumed in calendar year 2018. In addition, three campus buildings do not use central steam and are served directly by utility-provided natural gas. The county also operates three airports and multiple wastewater treatment facilities, septic systems, and retention treatment basins that use natural gas and electricity. Streetlight electricity consumption was excluded from this inventory as direct electricity consumption data was not available and GHG emissions are likely negligible based on the small number of streetlights within county control.

The county operates 35 emergency generators that use #2 dyed ultra-low sulfur diesel. The county's wastewater treatment facilities also use separate generators, but the fuel consumption information for these systems is not currently tracked and has not been included in the 2018 inventory.

Fugitive Emissions

Fugitive emissions include the intentional or unintentional releases of GHGs commonly arising from the production, processing, transmission, storage, and use of fuels and other substances. This includes refrigerant leakage from air conditioners or natural gas leakage from distribution pipelines.

Municipal operations fugitive emissions include those from natural gas distribution and represent less than 1% of the county's total GHG emissions. Calculating refrigerant leakage emissions depends on knowing the timing and quantity of refrigerant recharge. The county hires contractors to re-charge refrigerants in chiller systems but the amount of added refrigerant is not tracked. The county is currently working to create a refrigerant tracking system for large chillers, which could help inform future GHG inventories.

Vehicle Fleet

The county's vehicle fleet includes on-road and off-road vehicles and equipment. The on-road vehicle fleet generates nearly 15% of total GHG emissions while off-road vehicles and equipment contribute approximately 1%.

On-road and off-road vehicles and equipment both use gasoline and diesel fuels while some off-road equipment also uses biodiesel. While on-road vehicle fleet fuel use could not be disaggregated by county department, off-road emissions included in the inventory were from Parks and Recreation and Airport Administration equipment, such as lawnmowers, all-terrain vehicles, snowblowers, plows, runway brooms, fire trucks, and tractors. The Water Resources Commissioner's (WRC) Office also uses gasoline, diesel, and liquified petroleum gas (LPG) powered off-road vehicles and equipment, such as forklifts, pumps, rough terrain vehicles (RTV), telehandlers, snow blowers, and pressure washers. However, WRC does not specifically track off-road fuel consumption, so emissions from their off-road vehicles and equipment were excluded from the 2018 inventory.

The Sheriff's Office helicopters are the only source of aviation fuel consumption in county municipal operations. During inventory development, county staff considered this fuel use to be negligible and this activity was excluded from the inventory.

What are Fugitive Emissions?

Fugitive emissions are unintended or unmonitored greenhouse gases or other emissions that escape into the atmosphere. These emissions are not a result of an intentional or necessary function of the system, they are instead the result of leaking valves, seals, or fittings, evaporation losses, or other weaknesses in the system.

Wastewater Treatment Facilities

Wastewater generates GHG emissions during its treatment and discharge. The county operates multiple wastewater treatment facilities, septic systems, and retention treatment basins. These systems serve residents, businesses, parks, and golf courses. Wastewater treatment and discharge from these systems generates nearly 4% of total county emissions.

This category represents process emissions that occur from wastewater treatment and discharge. Any electricity and natural gas use from county-operated wastewater facilities is reflected in the Buildings and Facilities sector. Wastewater produced by municipal operations, such as in bathrooms, is primarily sent to wastewater facilities outside of the county's operational control (e.g., Clinton River Water Resource Recovery Facility). Therefore, these emissions are considered optional sources for reporting purposes and are not included in the 2018 inventory.

Solid Waste Facilities

Solid waste disposal generates GHG emissions based on its treatment process, such as through the decomposition of organic matter. This typically occurs in landfills where fugitive methane emissions are released. Composting organic waste can drastically reduce these emissions, while recycling waste typically produces no GHG emissions that are reflected in the GHG inventory. Using estimated waste quantities, landfilled waste from the campus and parks generates almost 4% of total government operations emissions. Composting green waste from county parks generates less than 1%. Around 13% of total waste is estimated to be diverted to recycling or compost.

The county does not own or operate any landfills and therefore does not report any direct landfill fugitive GHG emissions. The county does generate solid waste though and contracts waste disposal services. Even though contracted solid waste disposal operations are considered optional emissions sources, they are included in the 2018 inventory to better represent total GHG emissions from municipal operations.

Empirical data on solid waste disposal in 2018 was not available. However, a campus operations diversion rate analysis was conducted as part of the sustainability planning process with 2020 data that showed estimated campus and park waste quantities and destinations. These estimates were developed based on information gathered from department interviews, dumpster sizes, and pick-up schedules. The 2020 estimated waste quantities were used as a proxy for calendar year 2018. Notably, these waste values reflect pandemic-related operational impacts while the rest of the 2018 GHG inventory data does not. In addition, the specific receiving landfills and composting sites for the campus and park waste are unknown, so default assumptions were made to support the GHG emissions calculations.

To improve future solid waste tracking and emissions reporting, the county should require waste quantity and disposal destination reporting from its waste contractors (see the strategy D1. Review and Renegotiate Waste Hauling Contracts for more detail).

Decarbonization Framework

To ultimately reach the net zero carbon goal, a series of actions will need to be undertaken over the short-, medium-, and long-term to electrify fleets and facilities, pursue carbon neutral energy sources, and drive energy efficiency to reduce overall energy need. The following framework outlines how the county may tackle each of the main emissions sectors. The framework is divided between high priority actions and ongoing actions.

High priority actions are needed in the near-term to guide long term planning and the most significant capital investments and operational changes needed for net zero carbon operations. Ongoing actions can be adopted incrementally and as needed to drive down remaining emissions. This framework is intended as a starting point for future strategic planning and to guide near-term decision-making to support the interim and long-term net zero goals.

What is Decarbonization?

Decarbonization is any process that aims to reduce the carbon dioxide and other greenhouse gases produced or released into the atmosphere by an energy process. This can mean shifting energy systems that produce carbon dioxide to systems that do not or using carbon capture strategies to prevent the carbon produced from entering the atmosphere.

High Priority Actions

- Identify Pathways to Facility Fuel Decarbonization
- Pursue Fleet and Equipment Electrification

Ongoing Actions

- Invest in Efficient Operations
- Decarbonize Electric Supply
- Pursue Offsets or Partnerships for Remaining Emissions Sources

High Priority Actions

Identify Pathways to Facility Fuel Decarbonization

Decarbonization of the Central Steam Plant is a high priority action, as potential alternative fuels or systems will require significant capital investment and planning. Further, the decarbonization strategy selected will inform prioritization of other actions the county will undertake around energy efficiency and adoption of renewable energy. The alternative system will also need to align with future new developments, either through ability to scale capacity or through expanded use of decentralized systems. This high priority action aligns with the strategy F1. Conduct a Decarbonization Feasibility Study for Central Steam Plant.

Following identification of a Steam Plant decarbonization pathway, options for electrification or fuel alternatives for other equipment may be reviewed, including ground or air source heat pumps for distributed heating and cooling systems and efficient electric appliances such as heat pump dryers and induction cooktops.

Pursue Fleet and Equipment Decarbonization

Decarbonization of fleet and off-road equipment may occur concurrently to facilities decarbonization and efficiency measures. Ongoing review of new alternative vehicles and equipment will be needed in order to ensure the county is maximizing opportunities to continue to reduce carbon emissions in this sector.

A first step in electrification will be development of an electric vehicle (EV) plan which identifies a clear pathway for fleet conversion and infrastructure investment needs to ensure sufficient charging capacity, as discussed in the strategy F3. Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus. Off-road equipment will be harder to electrify than on-road vehicles, but are associated with a small (1%) of total GHG emissions. Therefore, the initial study focus should be electrifying on-road vehicles (15% of total emissions) while monitoring emerging zero emission vehicle off-road technology solutions.

Ongoing Actions

Invest in Efficient Operations

Energy efficiency is a core strategy for reducing overall energy and carbon needs and can be applied to achieve short term energy and cost savings in pursuit of net zero carbon operations. Consideration should be given to long term plans for use of fossil fuels and the Central Steam Plant when selecting capital efficiency projects to avoid investment in technologies not compatible with the county's broader decarbonization strategy.

To ensure persistence of efficiency measures and to maintain high performance, energy audits are advised on a 5-year cycle for all county campus facilities. Additionally, the county may seek to invest in high return measures across all facilities to quickly scale impact, such as completion of the campus's light-emitting diode (LED) lighting conversion. Efficiency measures will reduce overall renewable energy needed, either through on-site generation or off-site purchasing arrangements. This ongoing action aligns with multiple strategies, including: H1. Perform Energy Audits at Target Facilities, H2. Complete Campus-Wide LED Lighting Conversion, H3. Continue Investment In Energy Efficiency Measures, H4. Perform a Campus-Wide Water Audit, H5. Continue Investment in Water Efficiency and Conservation Measures, and H6. Develop Sustainable New Construction and Major Renovation Standards.

Decarbonize Electric Supply

Electric power may be decarbonized through adoption of on-site renewable or off-site renewable supply. In addition to providing routine operational power, on-site renewable generation can be paired with battery or other onsite storage to decarbonize back-up generators. This will ultimately be a core element of the decarbonization strategy as electricity currently generates about half of the total emissions, a fraction that will likely increase as electrification is pursued. On-site solar opportunities on the campus are discussed more in strategy F2. Pursue On-Site Solar Generation at Key Campus Locations.

The county may seek to develop long term electric supply outlooks, considering decarbonization of its current fleet and facilities to properly plan for renewable procurement volumes.

Pursue Offsets or Partnerships for Remaining Emissions Sources

While the main decarbonization focus will be on addressing fleet and facility emissions, some smaller sources will need to be addressed over the long term to achieve net zero carbon operations. Smaller emissions sources, such as wastewater treatment and effluent, may be addressed through forming partnerships with providers to support reduced carbon emissions in these external processes or by securing carbon offsets for these smaller, difficult to decarbonize processes.

Local carbon sequestration measures such as tree planting should be prioritized for such emissions to address any residual emissions in 2050 (see strategies O3. Strategically Convert Lawns to Forest or Meadow and O4. Implement Ecological Restoration Projects for more). As a next-best strategy, industrial carbon capture technology is still in its infancy but is showing promise for efficiently removing large volumes of CO_2 from the atmosphere. The county can continue to assess these technologies. Finally, purchasing carbon offsets should be considered as a last resort for meeting the net zero carbon goal.

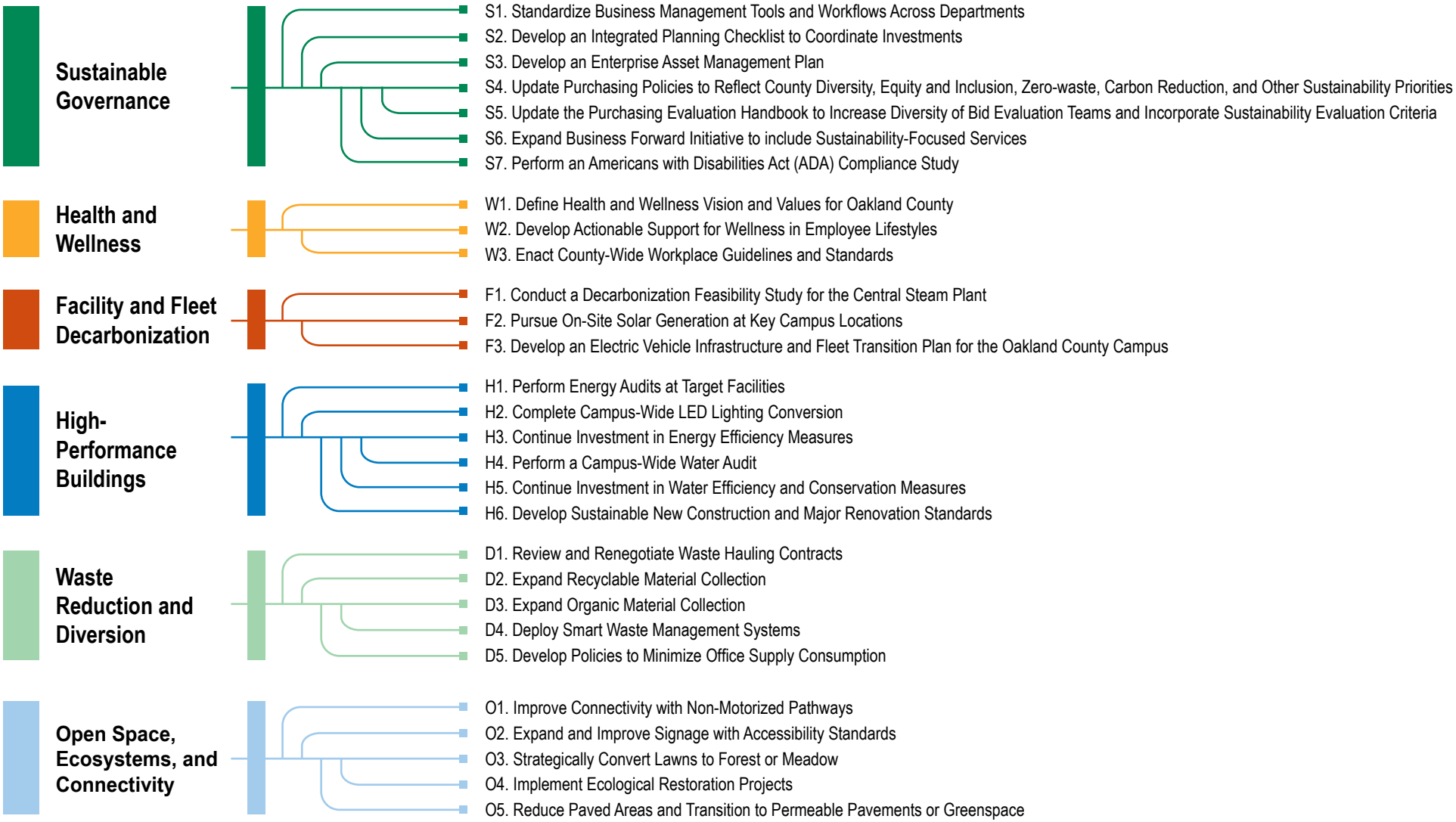
Keep Moving Sustainability Forward

To develop this Plan, the county reviewed sustainability progress to date, identified opportunities for improvement, and engaged with county staff. After the county reviewed the current state of sustainability for energy, fleet, operations, health and wellness, nature, and ecosystems, the county identified areas for improvement aligned with the county's social, economic, and environmental priorities. Throughout the Plan development process, collaborative conversations were held with staff to gather insights to inform the Plan (see the Stakeholder Engagement section). The county identified 29 strategies to advance over the six Focus Areas.

Oakland County's Sustainability Vision

Oakland County demonstrates leadership in social, environmental, and economic sustainability through modelling transparent, innovative, and achievable action. The county creates an accessible, safe, and welcoming campus that contributes to a positive service experience for all, through efficient, equitable, and low-carbon operations.

Sustainability Strategies



Strategy Implementation Sequence

Due to staff capacity and funding availability, the county cannot implement all strategies at once – instead, the county must sequence the implementation of strategies. Figure 3 serves as a guiding roadmap for how the county can sequence strategy implementation according to sustainability priorities and potential equity and decarbonization impacts. The "immediate," "next," and "future" priority zones serve as guideposts for implementation sequencing. The county can review and alter strategy sequencing as new priorities, resources, or KPI performance trends emerge.

Three of the sustainability strategies are foundational strategies, in that they will increase the county's ability to efficiently coordinate efforts, make decisions guided by county priorities, and track performance towards the Objectives. These strategies should be prioritized for implementation, as they will enable more effective implementation of other strategies identified in this Plan. Five additional strategies are informative strategies, in that they will uncover additional sustainability opportunities for consideration. These five strategies include studies, plans, or audits and will collectively help target and plan for high impact investments in energy, mobility, water, and waste systems. Implementation of informative strategies should start in the "immediate" priority zone.

The remaining strategies are targeted policies and initiatives that the county can implement directly. Most policies should be developed in the "immediate" priority zone as they establish guidelines and processes that will set the county up for success in aligning future actions with sustainability priorities. Similarly, initiatives that prioritize equity, diversity, inclusion, and employee wellness should be prioritized for implementation. Initiatives that can have decarbonization impact in the county's largest emitting sectors – Buildings and Facilities and Vehicle Fleet – should be prioritized and start implementation in the "immediate" and "next" priority zones (see the Greenhouse Gas Inventory section for more information). Namely, high priority actions identified in the Decarbonization Framework section should start implementation in the "immediate" priority zone. Remaining strategies, though important, should be prioritized for a future date as more resources become available or as implementation of other actives are completed.

Foundational Strategies

- **S1** Standardize Business Management Tools and Workflows Across Departments
- **W1** Define Health and Wellness Vision and Values for Oakland County
- **H6** Develop Sustainable New Construction and Major Renovation Standards

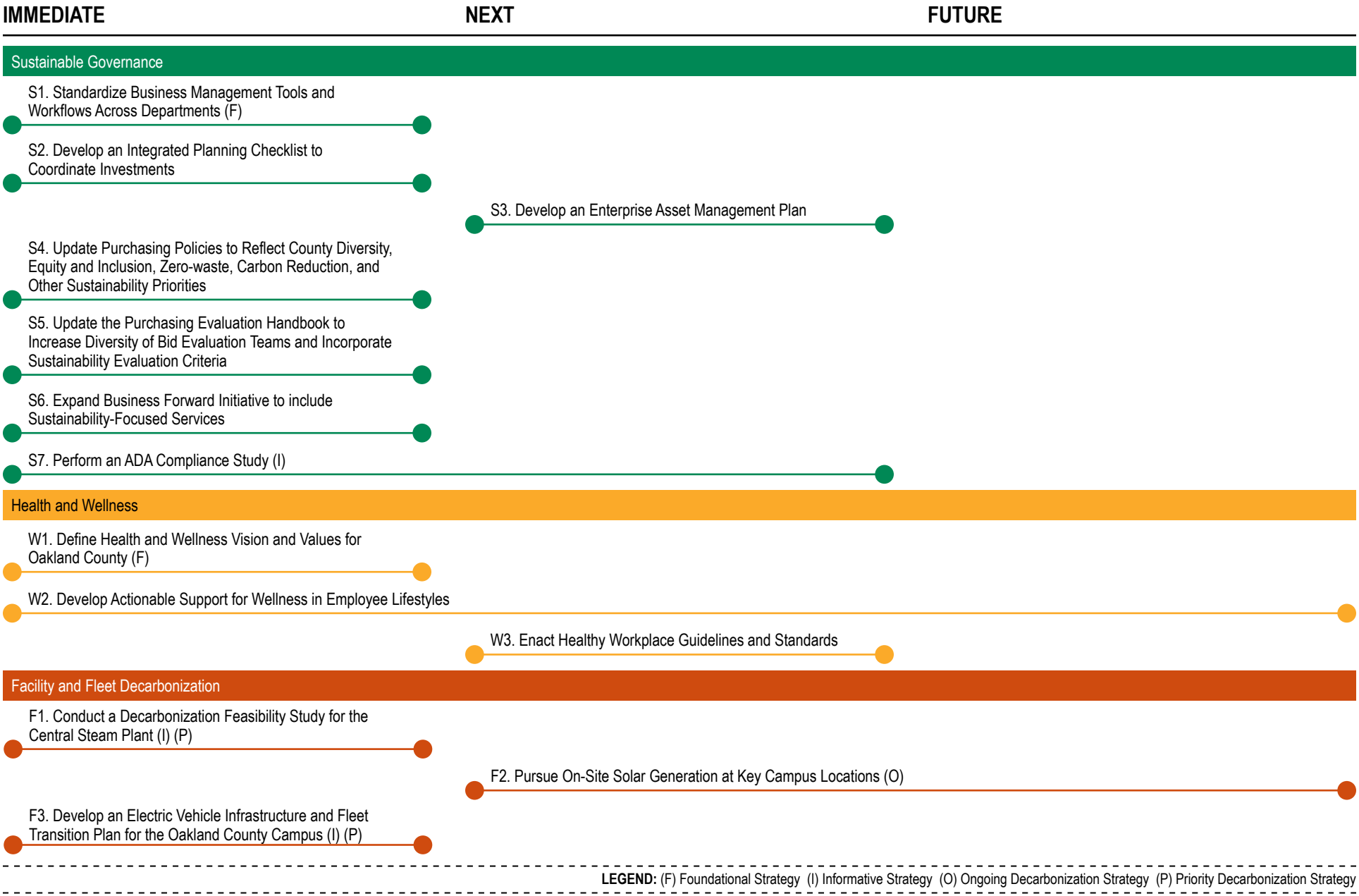
Informative Strategies

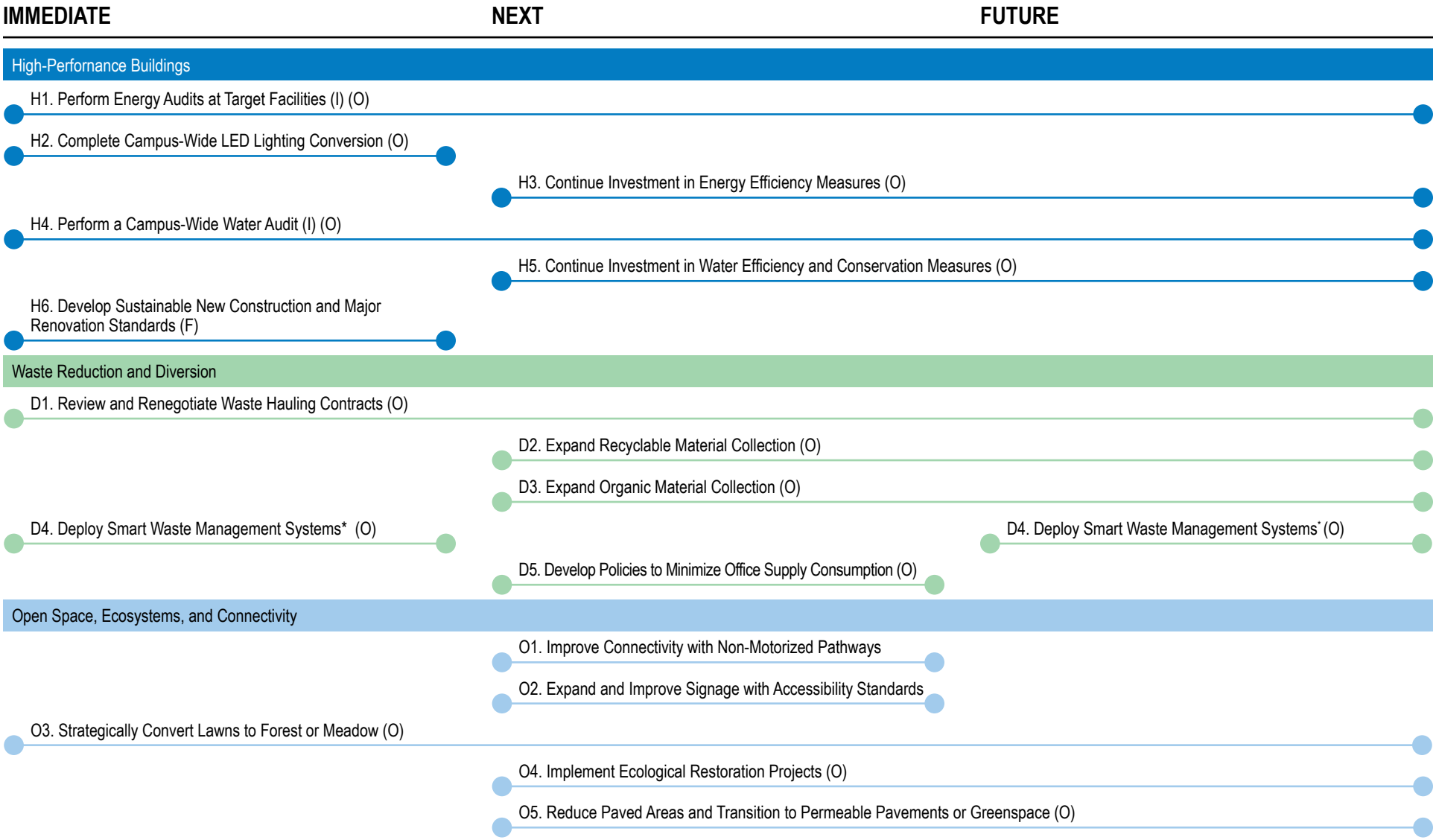
- **S7** Perform an Americans with Disabilities Act (ADA) Compliance Study
- **F1** Conduct a Decarbonization Feasibility Study for the Central Steam Plant
- **F3** Develop an Electric Vehicle Infrastructure and Fleet Transition Plan for the Oakland County Campus
- **H1** Perform Energy Audits at Target Facilities
- **H4** Perform a Campus-Wide Water Audit

Priority Decarbonization Strategies

- **F1** Conduct a Decarbonization Feasibility Study for the Central Steam Plant
- **F3** Develop an Electric Vehicle Infrastructure and Fleet Transition Plan for the Oakland County Campus

Figure 3. Strategy Implementation Sequence





*The county has approved installing solar-power trash compactor bins and, at the time of this writing, is negotiating a contract with BigBelly. The county can install solar-power trash compactor bins in the "immediate" prioritization zone as a quick win. The county can consider installing dumpster monitoring systems in the "future" priority zone as the next iteration of its strategy to deploy smart waste management systems (see strategy D4. Deploy Smart Waste Management Systems for more detail).

LEGEND: (F) Foundational Strategy (I) Informative Strategy (O) Ongoing Decarbonization Strategy (P) Priority Decarbonization Strategy

How to Read the Strategies

Each Focus Area section includes an introduction that explains the Strategic Framework goals and sustainability Guiding Principles advanced through strategies within the Focus Area. Objectives and KPIs to track performance within each Focus Area are also included.

Each strategy is presented in the following format. Along with each strategy approach, development stage, strategy type, internal teams, external partners, the county Strategic goals, and Guiding Principles advanced by the strategy are identified.

FOCUS AREA

STRATEGY ID AND NAME

GUIDING PRINCIPLES
Guiding Principle advanced through the strategy

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities
- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

COUNTY STRATEGIC GOALS
County strategic goal advanced through strategy

- Thriving and Inclusive Economy
- Healthy Residents
- Skilled and Educated Workforce
- Livable Neighborhoods
- Environmental Sustainability
- Public Safety and Fairness in the Criminal Justice System
- Organizational Excellence
- Diversity, Equity, and Inclusion

DEVELOPMENT STAGE
Current development stage for the strategy

In Progress: The county is currently planning or implementing this strategy

Future: The county is not yet planning or implementing this strategy

STRATEGY TYPE

Foundational: Increases the ability to efficiently coordinate, make decisions guided by priorities, and track performance towards Objectives

Informative: Helps target and plan for high impact investments

PARTNERS
External organizations contributing to strategy planning or implementation

TEAMS
County teams involved in strategy planning and implementation

Lead: Lead county team responsible for strategy planning and implementation

Support: Supporting county team contributing to strategy planning and/or implementation

FINANCIAL ANALYSIS
To explore the financial viability of select strategies, Oakland County's consultants, Eminence Partners and AECOM, conducted preliminary financial analyses using rough order of magnitude costs and reasonable assumptions for six strategies. These six strategies are:

F2. Pursue On-Site Solar Generation at Key Campus Locations

F3. Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

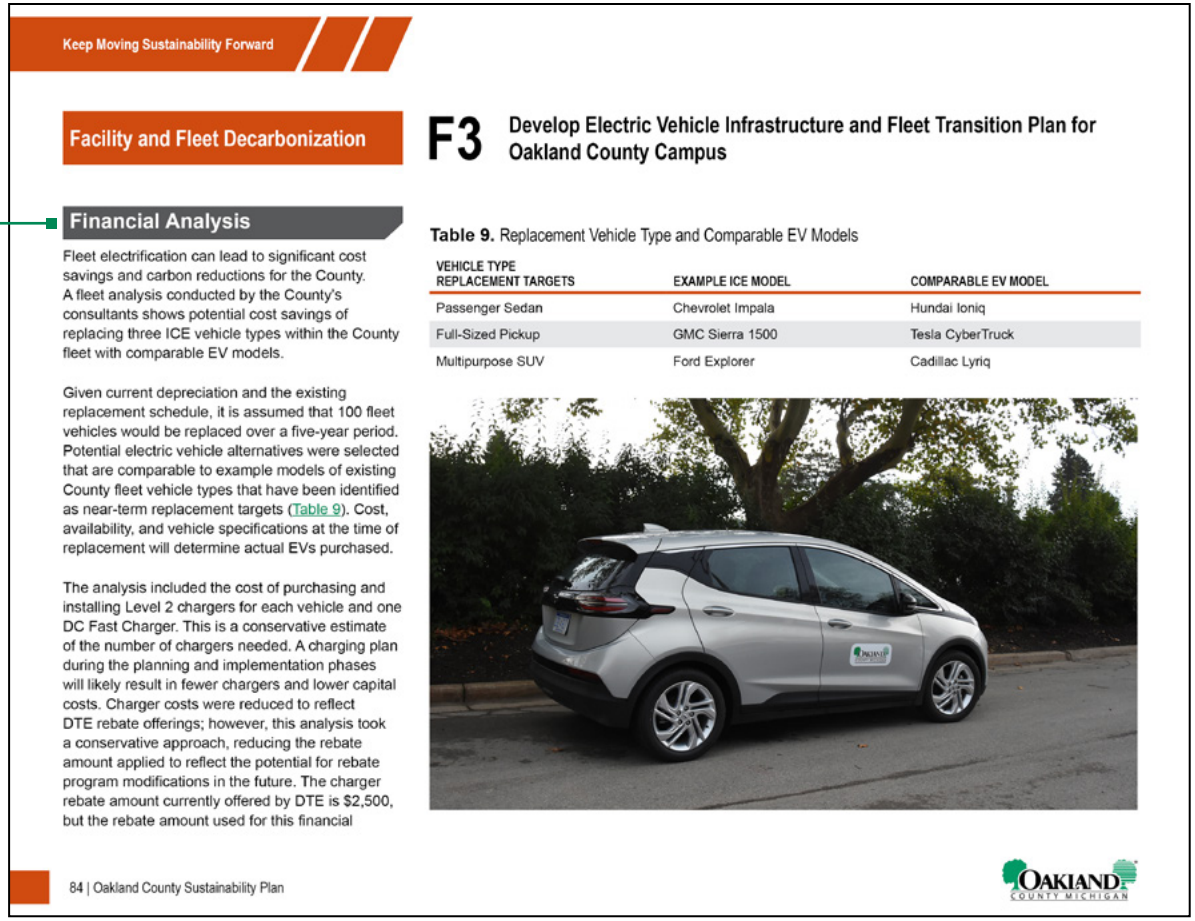
H2. Complete Campus-Wide LED Lighting Conversion

D2. Expand Recyclable Material Collection

D3. Expand Organic Material Collection

O1. Improve Connectivity with Non-Motorized Pathways

The analyses illustrate potential upfront costs, return on investment (ROI), and payback periods and were used to identify potentially applicable funding and financing mechanisms. Examples of the identified funding and financing mechanisms are described on the next page. The county should continue to explore investing in sustainability and potential funding mechanisms as they implement sustainability strategies.



Funding and Financing Mechanisms

Examples of types of funding and financing mechanisms available to implement sustainability-related initiatives are described on this page. Where applicable, these are expanded upon within the six strategies for which preliminary financial analysis was conducted.

Capital and Operating Budgets

When planning for future fiscal year budgets, the county can build funds into the capital and operating budgets to cover the cost of sustainability strategies. Capital Budgets are used for the acquisition, installation, and, at times, major repair of assets such as land, buildings, and equipment or installations. Operating Budgets include funds allocated to the ongoing maintenance and operation of assets, programs, and services. These budgets may contain a variety of funds, such as Sustainability Revolving Funds, which are dedicated for specified purposes.

Tax Exempt Bond Financing

The county could fund many sustainability improvements through the proceeds of a tax-exempt bond issuance. The bonds would be sold to investors to raise funds for the project. It may also be possible to fund multiple smaller projects through one bond issuance, which could make the transaction more cost effective. When bonds are sold, the county agrees to repay the investors principal plus interest, which is generally exempt from federal, state, and local taxes. These bonds may qualify as green bonds to attract additional types of investors and potentially lower interest rates.

There are two types of bonds distinguished by the source of repayment. General obligation bonds are secured by the county's pledge to repay from their taxing authority. Repayment of revenue bonds is from a specified revenue, often associated with the project being financed. Revenue bonds can be issued with the savings, such as energy savings, generated by the project pledged to repay the debt. The county will work with its financial advisor and other professionals to determine the appropriate structure and type of bonds for each project or group of projects if bonds are issued to fund strategies.

Federal, State, and Regional Funding Programs

At the Federal, State, and regional levels, there are a variety of grants and programs available to governmental entities, including the county, to help advance sustainability-related strategies. Specifically, with the passing of the Infrastructure Investment and Jobs Act (IIJA), several existing programs have received renewed funding and many new programs have been created

Collective Buying Power

To reduce the capital or operating costs of strategies, the county can explore the ability to form coalitions with other counties or cities, villages, and townships to increase buying power and negotiate lower rates and costs for strategy the implementation. For example, bulk procurement of electric vehicles for several jurisdictions could help reduce per-unit costs or coordinating with other entities for waste and recycling collections could reduce hauling rates.

Public Private Partnerships (P3)

Through a P3, the county would partner with private investors, developers, and/or operators who would shoulder a portion of the development, capital, or operating costs in exchange for (a portion of) operating revenues (including advertising rights), valuable biproducts (e.g., renewable natural gas or fertilizer), and/or tax benefits. The agreement could also be structured to allow us to repay a partner through operational savings such as through a Guaranteed Energy Savings Performance Contracting arrangement.

Sustainable Governance

Embed environmental, social, and fiscal sustainability into county operations.

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities
- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Thriving and Inclusive Economy
- Skilled and Educated Workforce
- Environmental Sustainability
- Organizational Excellence
- Diversity, Equity, and Inclusion

Objectives and KPIs

Align the county's purchasing power with county sustainability values, as measured by the percentage of county contracts awarded to vendors that scored highest against the sustainability- and equity- related bid evaluation criteria laid out in each request for proposal (RFP).[7]

Uphold the county's Asset Management Plan, as measured by the percentage of critical assets that are tagged, integrated into the county's asset management databases, and undergo regular condition assessments and proactive maintenance.

County policies and procedures impact all county services, projects, and programs, as well as the experience of county staff and visitors. As demonstrated in the County Strategic Framework, the county is focused on advancing a Thriving and Inclusive Economy and Organizational Excellence. The county can leverage its purchasing power to support the local economy by developing sustainability- and equity- focused purchasing policies and supporting local businesses in building skills and services within these areas. Every strategy within the Sustainable Governance Focus Area can advance the Organizational Excellence goal through increasing opportunities in county procurement, improving service delivery, and responsibly and efficiently managing assets and taxpayer dollars.

7 Sustainability-related bid evaluation criteria may vary across RFPs. For a set of example criteria, please refer to strategy S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities. This KPI is also inclusive of the county's strategic Objective and KPI to increase opportunities in county procurement, as measured by the percentage of county contracts awarded to minority-, woman-, disabled-, veteran-owned businesses.

Table 3. Sustainable Governance Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
S1	Standardize Business Management Tools and Workflows Across Departments							X			X	X			X	County Executive	Information Technology, Management and Budget, Office of Sustainability, Purchasing, Departmental Leadership	
S2	Develop an Integrated Planning Checklist to Coordinate Investments							X							X	Facilities Management, Parks and Recreation	Office of Sustainability, WRC, Information Technology, Management and Budget, Planning Division	DTE Energy, Consumers Energy, City of Pontiac, Waterford Township, Plante Moran, Oakland County Road Commission
S3	Develop an Enterprise Asset Management Plan							X	X	X	X	X	X	X	X	Facilities, Operations, and Maintenance	Office of Sustainability, Information Technology, Parks and Recreation, Water Resources Commissioner	Cityworks
S4	Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities	X				X		X	X	X			X		X	Purchasing	Office of Sustainability, Office of Diversity, Equity, and Inclusion	

LEGEND: (*) In Progress

ID	NAME	County Strategic Goal: THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	Sustainability Guiding Principle: OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	Teams: LEAD	SUPPORT	Partners
S5	Update the Purchasing Evaluation Handbook to Increase Diversity of Bid Evaluation Teams and Incorporate Sustainability Evaluation Criteria							X	X	X						Purchasing	Office of Diversity, Equity, and Inclusion, Office of Sustainability	
S6	Expand Business Forward Initiative to include Sustainability-Focused Services	X		X				X	X	X	X					Economic Development	Office of Diversity, Equity, and Inclusion, Purchasing	
S7	Perform an ADA Compliance Study*							X	X	X	X					Facilities Management	Office of Sustainability, Office of Diversity, Equity, and Inclusion, Parks and Recreation, Risk Management Department	

LEGEND: (*) In Progress

Sustainable Governance

S1 Standardize Business Management Tools and Workflows Across Departments

Guiding Principles

- Provide accessible services and campus environment
- Create education and engagement opportunities
- Maximize resource efficiency

County Strategic Goals

- Organizational Excellence

Development Stage: Future

Strategy Type: Foundational

Partners: N/A

Teams

Lead: County Executive

Support: Information Technology, Management and Budget, Office of Sustainability, Purchasing, Departmental Leadership

County departments and teams currently utilize different tools and workflows to perform the same functions and, within individual departments, not all teams have established consistent workflows and centralized documentation for implementing and tracking projects. Where feasible, using the same tools enterprise-wide and establishing uniform workflows and data standards for these tools can help to streamline the county's operations and improve the services provided to county residents. As it applies to the Sustainability Plan's Guiding Principles, standardizing business management tools and workflows across departments can:

- **Provide accessible services and campus environment and create education and engagement opportunities** by setting one standard for management and workflow so that information is more accessible and useful to employees at all levels.
- **Maximize resource efficiency** by streamlining management and operational practices to save employee time and money and prevent unnecessary losses.

One area with significant opportunity for standardization is asset management. For example, while many county departments and teams that maintain critical county assets have adopted Cityworks to manage asset maintenance, not all departments and teams use the platform—or use it to its full extent. Additionally, assets are assigned different identifiers (IDs) across software platforms (e.g., Cityworks and the county's financial information software) and departments use different taxonomies to generate asset identifiers (i.e., asset identifiers have different composition of numbers/letters and a varying number of characters).

A more comprehensive list of strategies for improving asset management practices can be found in S3. Develop an Enterprise Asset Management Plan, but other opportunities for standardization include:

- Developing an asset management charter to tie departmental roles to specific workflows and responsibilities.
- Defining common assumptions for calculating asset deterioration curves and lifecycle value, with consideration to enterprise departments such as Parks and Recreation or the Water Resources Department for specific guidelines.
- Determining recurring condition assessment cycles based on asset criticality and the level of risk associated with asset depreciation and deterioration.

Sustainable Governance

S1 Standardize Business Management Tools and Workflows Across Departments

- Providing structured templates for condition assessments that clearly dictate how assets should be evaluated (e.g., documents that should be consulted to support the assessment, guidance to distinguish between "good," "average," and "poor" condition).

Opportunities to standardize business practices expand past asset management. More broadly, facility improvements—such as implementation of energy efficiency measures and workstation improvements—have historically been completed in an ad hoc manner. There is a need to standardize and centralize communication or documentation of past efforts, including what and where improvements have been made and who was involved in implementing these improvements. Building a clear record of progress and centralized database of resources (e.g., vendor contacts and lessons learned) as projects are completed will increase transparency and enable county organizations to move through workflows more efficiently and effectively.

To kick-off implementation of this strategy, the county should identify a multi-disciplinary group of departmental representatives to sit on a workgroup charged with identifying the business processes that would most benefit from standardization, developing resources to support adoption of new tools and workflows, and advocating for change within their department. A cross-departmental approach will promote broader consideration of lessons learned from a more diverse set of tools and processes and lead to solutions that can be adapted to departments and teams' different needs. In other words, all solutions and resources should balance standardization with flexibility to ensure departments can right size the use of tools and workflows to fit their mission, critical functions, and organizational capacity.

In establishing the workgroup, the county can look to the interdepartmental Property Acquisition and Management Work Group (staffed by Oakland County Parks and Recreation, Facilities Maintenance and Operations, Corporation Counsel staff) for best practices on identifying participants and defining their individual roles and responsibilities. As the county begins to approach potential participants, the county should clearly articulate the expected level of commitment to ensure active participation.

Finally, implementation can expand past internal organizations to include cities, villages, and townships (CVTs) and peer counties. The U.S. General Service Agreement's (GSA) Cooperative Purchasing Programs[8] enables local governments to jointly-purchase IT products and services, and the county's own G2G Marketplace[9] (an online procurement center for government agencies) supports collective purchase of software systems. The county should consider leveraging these programs to coordinate a joint purchase of business management tools that would benefit its network. Standardization across the county and its CVTs could streamline transfer of non-proprietary data and create a more cohesive service experience for residents.

8 https://www.gsa.gov/buying-selling/purchasing-programs/gsa-multiple-award-schedule/schedule-buyers/state-and-local-governments/cooperative-purchasing

9 https://www.oakgov.com/purchasing/G2GMarket/Pages/default.aspx

Sustainable Governance

S2 Develop an Integrated Planning Checklist to Coordinate Investments

Guiding Principles

Maximize resource efficiency

County Strategic Goals

Organizational Excellence

Development Stage: Future

Partners: DTE Energy, Consumers Energy, City of Pontiac, Waterford Township, Plante Moran, Oakland County Road Commission

Teams

Lead: Facilities Management, Parks and Recreation

Support: Office of Sustainability, Water Resources Commissioner, Information Technology, Management and Budget, Planning Division

The county has identified and begun to plan for millions of dollars of capital improvement and maintenance projects but are often met with funding and other resource limitations when translating ideas into action. Coordinating implementation of multiple improvement projects can consolidate costs, breakdown siloed workstreams, encourage cross-departmental communication, and accelerate progress towards multiple sustainability objectives. For example, installing EV-ready utility infrastructure concurrently with new fiberoptics and transitioning pavement construction to the use of porous materials to reduce maintenance (thereby reducing costs and visitor frustration at the lack of parking during construction maintenance). In addition, identifying opportunities to coordinate implementation of a single measure (e.g., LED lighting conversion) across multiple locations at once—rather than on a location-by-location basis—can enable the county to leverage economies of scale more effectively. As it applies to the Sustainability Plan's Guiding Principles, developing an integrated planning checklist to coordinate investments can:

- **Maximize resource efficiency** because a standardized checklist ensures that investments are being made strategically and working together to prevent excess costs or time wasted.

To support identification of synergistic capital projects or maintenance initiatives, the county should develop an integrated planning checklist that requires project sponsors to evaluate the viability of implementing multiple sustainability improvements simultaneously or expand implementation past an initially identified location. In completing the checklist, the project sponsor should seek support from stakeholders that may become involved in the design, financing, implementation, and maintenance phases of the project lifecycle to ensure the form fully reflects the project's needs and opportunities. This collaborative process can be integrated into the existing capital and maintenance planning workflow and will not only ensure decision makers continue to have access to a consolidated list of wants and needs, but also enable long-term sustainability benefits to remain a priority as decision makers come and go.

The checklist can start with a list of Guiding Principles (like those at the foundation of this Plan) that should be reflected in all future investments, at both the capital planning and maintenance budget scales, and may also integrate requirements from new construction buildings that may be established in the future (see strategy H6. Develop Sustainable New Construction and Major Renovation Standards). Principles may include a commitment to improving accessibility, increasing efficiency, and decreasing carbon impact. In practice, this would ensure that all streetscape and building renovation projects include Americans with Disabilities Act (ADA) accessibility and mobility improvements, for example, and that critical equipment are replaced with more efficient models as they reach the end of their service life.

Sustainable Governance

S2 Develop an Integrated Planning Checklist to Coordinate Investments

The county can also work towards developing a "menu" of sustainable infrastructure improvements that must be incorporated into larger capital projects. The Boston Smart Utilities Program[10] can serve as a model: The Program identified five smart utility technologies (SUTs)—district energy microgrid, green infrastructure, traffic signal enhancements, smart streetlights, and telecom utilidors—and criteria for when and what SUTs must be considered for a project. For example, any development project greater than 100,000 square feet must conduct a feasibility study to consider including green infrastructure that can retain 1.25 inches of rainfall. Applying this concept to the county's predominant spending categories and sustainability priorities, the county could require that, for a parking lot with a critical number of spaces, repaving projects would also include installation of an EV-ready utility infrastructure.

For more urgent projects or projects that are already in the planning phase, the county can create an abbreviated checklist with foundational sustainability practices such as:

- Upgrading equipment to more efficient models (with respect to both energy and water use)
- Electrifying equipment that combusts fossil fuels
- Modernizing infrastructure to be ADA code compliant and integrating universal design principles
- Transitioning paved areas to permeable pavements and lawns to native plantings

The abbreviated checklist would first prompt project sponsors to provide justification for its use (e.g., to explain the need for urgency) and should still require sponsors to indicate project alignment with integrated planning Guiding Principles. However, more extensive review of alignment with other planned projects and the menu of sustainable infrastructure improvements would not be required.

10 http://www.bostonplans.org/planning/planning-initiatives/boston-smart-utilities-program

Sustainable Governance

S3 Develop an Enterprise Asset Management Plan

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities
- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: Cityworks

Teams

Lead: Facilities, Operations, and Maintenance

Support: Office of Sustainability, Information Technology, Parks and Recreation, Water Resources Commissioner

An enterprise-wide Asset Management Plan would provide county organizations with uniform and structured guidance for operation and maintenance (O&M) of assets, capital planning for new and existing assets, and evaluating asset performance in line with the sustainability Vision. As it relates to the Sustainability Plan's Guiding Principles, an Asset Management Plan can:

- **Operationalize diversity, equity, and inclusion** through rooting decision-making processes in data and organizational values to remove potential bias in asset planning and enable equitable distribution of O&M resources.
- **Create education and engagement opportunities** through creating opportunities for increased exposure to content relating to asset performance and the county's asset management practices—for asset managers and asset users alike.
- **Provide accessible services and campus environment, advance the net zero carbon goal, and improve air and water quality** through proactively identifying opportunities to improve asset efficiency, emissions, and accessibility throughout their lifecycle, not just at end of life.
- **Maximize resource efficiency** through not only optimizing county assets' performance over their entire lifecycle, but also optimizing the use of county personnel and financial resources for asset management.

The Asset Management Plan should build upon the Four Pillars of asset management (organization, data, workflows, and technology) and actions already described in S1. Standardize Business Management Tools and Workflows Across Departments.

The Asset Management Plan can be used to train new staff and refresh existing staff on the county's asset management organizational structures, data

Sustainable Governance

S3 Develop an Enterprise Asset Management Plan

streams, workflows, and tools. For example, as Cityworks is updated, the Asset Management Plan can provide guides for system configuration and customization, user administration, field staff setup, asset data entry and data updates, asset hierarchy management, map and graphical features, analytical features, report generation, and mobile applications. User guides should also dictate how often systems and information should be updated, how data should be entered (i.e., define data standards), and designate staff administrators to field questions from users.

Increasing staff familiarity and comfort with asset management data, workflow, and tools and clear delineation of roles and responsibilities through an Asset Management Plan can result in operational efficiencies, uniformity across departments, and automated workflows. Federal infrastructure funding often requires asset management plans. Establishing an Asset Management Plan may position the county to become more competitive for future federal funding opportunities.

A Sustainability Asset Management Framework is provided in Appendix E: Sustainability Asset Management Framework to guide the development of Oakland County's comprehensive Asset Management Plan. The county should identify a group of internal departmental partners that operate and maintain the county's critical assets to sit on a workgroup to develop this plan. The workgroup should meet regularly to incorporate lessons learned from its implementation, connect to the budget cycle, and audit performance and implantation of the plan to ensure the plan remains a living document. To further inspire regular updates, a member of the working group can apply to join the Michigan Infrastructure Council's Asset Management Champion Program.[11] The Program was established to share best practices to strengthen asset management programs across the state.

11 https://www.michigan.gov/mic/am-champions

Sustainable Governance

S4 Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Thriving and Inclusive Economy
- Environmental Sustainability
- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: N/A

Teams

Lead: Purchasing

Support: Office of Sustainability, Office of Diversity, Equity, and Inclusion

The county's purchasing policy was last updated in 2004 and, in summary, guides personnel to contract vendors that would provide the best overall value to the county. The definition of "best overall value" is flexible depending on the product purchased or contracted service, and bid evaluators are encouraged to consider the entire lifecycle cost of a bid and other metrics, which may—but do not have to—include environmental and social considerations.

Release of this Sustainability Plan and transitioning to a new financial information system presents the Purchasing Department with an opportunity to comprehensively update its procedures, including county purchasing policies. As it relates to the Sustainability Plan's Guiding Principles, updating purchasing policies could:

- **Operationalize diversity, equity, and inclusion** by setting standards and metrics to award more contracts to minority-, woman-, or disabled veteran-owned businesses.
- **Advance the net zero carbon goal** by incorporating sustainability considerations into all purchasing policies or developing an overarching sustainable purchasing guide.
- **Maximize resource efficiency** by addressing how county assets are disposed of and developing policies to promote reuse, sharing between departments, and other strategies to minimize excess purchasing.

Further, the county's strategic goal area of Organizational Excellence includes the KPI to increase opportunities in county procurement, as measured by the percentage of county contracts awarded to minority-, woman-, or disabled veteran-owned businesses.

The county may either amend existing sections of its purchasing policy to incorporate specific sustainability considerations unique to each section, or draft new Special Considerations or Other section(s) that broadly apply sustainability principles to all sections within the county policy. Updates may include but should not be limited to:

- Reviewing existing eligibility criteria that may be prohibitive to small or micro businesses, such as the county's insurance requirements (Section 2300.4).

Sustainable Governance

S4 Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities

- Specifying baseline eligibility standards, preferential criteria, or guidelines for vendors that reflect the county's sustainability goals. Guidelines could include vendor pledges to mitigate carbon emissions, actions to reduce or eliminate packaging (or only accept 100% recyclable packaging), B-corporation certification or other similar certifications, regular release of environmental, social, and governance (ESG) reports, active support of social justice initiatives, investment in historically disadvantaged communities, and/or other demonstrations of environmental and social care. These types of "sustainability guidelines" could be added as considerations for development of bid specifications (Section 2300.3). In cases where a primary vendor might have subcontractors, the county should consider extending these guidelines to both the primary vendor and its subcontractors.
- Adding a "Made in Michigan" or "Made in Oakland County" consideration for products manufactured locally when they are offered at a competitive price and quality, and similar "Based in Michigan" or "Based in Oakland County" considerations for rendered services. The county's existing policy gives similar preference to products made in the United States for purchases valued greater than $10,000 (Section 2400.1). Narrowing the focus to local products will reduce GHG emissions associated with the county supply chain and expand economic development opportunities for local businesses.
- Strengthening the county's policies informing proper disposal of county assets (Section 3000.3) to encourage material reuse, either through identifying opportunities to trade equipment between county organizations or auctioning to the public. For goods that cannot be reused, consider specifying preferences for durable goods, certified sustainably produced paper and wood products, products with recycling content and made of recyclable materials, used, refurbished, and/or remanufactured goods, non-toxic or organic materials, and any additional products that result in minimal/zero waste production throughout their life cycle (e.g., packaging, services). The latter may be accomplished through expanding the county's Policy to Promote Recycling (Section 3000.7).
- Expanding authorization for cooperative purchasing (Section 3000.11). Buying products in larger quantities can enable the county to leverage economies of scale and reduce supply chain emissions.

The county may seek other ideas through joining the Sustainable Purchasing Leadership Council.[12] The Council provides support toward developing sustainable purchasing practices to government, higher education, corporate, and non-profit organizations. Regional government members include Dakota County (MN), Fairfax County (VA), Hennepin County (MN), King County (WA), and Multnomah County (OR).

Ultimately, all updates to the county's purchasing policies should remain in compliance with Article I § 26 of the State Constitution, which prevents public organizations from using affirmative action in procurement (i.e., giving preference to vendors on the basis of race, sex, color, ethnicity, or national origin). Intentional marketing efforts or service provision that target small, micro, sustainable, or minority-, women-, disabled- or veteran-owned businesses is permitted by Article I § 26 and can support this strategy by increasing and strengthening the pipeline of these businesses. For example, the county established the Business Forward initiative to support small businesses and expanding this program to provide sustainability-focused services could further align with this recommendation (see strategy S6. Expand Business Forward Initiative to include Sustainability-Focused Services).

12 https://www.sustainablepurchasing.org/

Sustainable Governance

S4 Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities

While enforcing updated policies, the county should add a database or catalog of products or vendors that are well-aligned with the county's sustainability priorities to its G2G Marketplace and institute a tracking system to evaluate the sustainability impact of updated procurement policies and processes. To start, the county could track the number of contracts that are awarded to local bidders and bidders that, for their given Request for Proposal (RFP), performed best against the county's sustainability-oriented bid evaluation criteria (in addition to tracking the number of county contracts that are awarded to disadvantaged business owners).

Sustainable Governance

S5 Update the Purchasing Evaluation Handbook to Increase Diversity of Bid Evaluation Teams and Incorporate Sustainability Evaluation Criteria

Guiding Principles

Operationalize diversity, equity, and inclusion

County Strategic Goals

Organizational Excellence

Diversity, Equity, and Inclusion

Development Stage: Future

Partners: N/A

Teams

Lead: Purchasing

Support: Office of Diversity, Equity, and Inclusion, Office of Sustainability

A core component of the county's purchasing policy is its bid evaluation process. Each bid submitted in response to a county Request for Proposal (RFP) is evaluated by a team of three to five subject matter experts. The bid evaluation team is provided with a Handbook that defines the expectations for team members (e.g., to maintain impartiality) and the process through which bids are scored.

Once the county's broader purchasing policy is updated (see strategy S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities), the Handbook should similarly be revised to reflect the sustainability priorities. As it relates to the Sustainability Plan's Guiding Principles, updating the Purchasing Evaluation Handbook could:

- **Operationalize diversity, equity, and inclusion** by standardizing the process with which the county evaluates bids to prioritize partnerships with minority-, woman-, disabled veteran-owned businesses.

The Handbook should establish clear guidelines to center diversity, equity, and inclusion through all stages of the procurement process, including formation of bid review teams to mitigate explicit or implicit bias towards potential bidders. Potential bias could be resolved through appointing a member of the Purchasing Department to serve as a team "foreman" (like a jury foreman) and moderate discussions, as Purchasing Department staff are less likely to be familiar with the subject of each proposal and thus more likely to remain impartial. Increasing diversity of the evaluation team—such as through requiring, instead of recommending, that teams include representatives from different county organizations—can also mitigate potential biases.

In addition, the scoring process should be revised to explicitly require that sustainability metrics be used to evaluate bids. The existing Handbook states that cost should only be considered after other qualitative criteria are evaluated but does not provide examples of such qualitative criteria, nor does the Handbook define lifecycle cost analysis as the standard financial assessment. The Handbook can establish a baseline set of sustainability criteria that is used to evaluate every bid—such as lifecycle cost, anticipated carbon impact, and strength of the company's diversity, equity, and inclusion policy—as well as more aggressive criteria reserved for larger contract values. All proposed criteria should be reviewed for compliance with Article I § 26 of the State Constitution, which prohibits the county from establishing preference on the basis of race, sex, color, ethnicity, or national origin (e.g., the county cannot establish a quota for contracts held by disadvantaged business owners).

Sustainable Governance

S6 Expand Business Forward Initiative to include Sustainability-Focused Services

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment

County Strategic Goals

- Thriving and Inclusive Economy
- Skilled and Educated Workforce
- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: N/A

Teams

Lead: Economic Development

Support: Office of Diversity, Equity, and Inclusion, Purchasing

In March 2022, the county's Economic Development Department established "Business Forward," an initiative to provide resources and services to local small businesses, with a focus on minority-, women-, and veteran-owned businesses. Business Forward Consultants embedded in county communities will provide entrepreneurial services through individual consultations, workshops, training sessions, and other engagements. Support services cover, but are not limited to, accounting, legal support, digital marketing and advertising, eCommerce, government contracting, language translation services, food services, and market analysis. Through this initiative, the county hopes to expand support to 4,000 small businesses per year, which is 10 times more small businesses served than in the past.

As it relates to the Sustainability Plan's Guiding Principles, expanding the Business Forward Initiative to include sustainability-focused services could:

- **Operationalize diversity, equity, and inclusion** by providing education and outreach services to small businesses that can then increase the number of small businesses enterprises in the county's procurement pipeline. As a result, the number of contracts the county holds with underrepresented small business owners could be increased.
- **Provide accessible services and campus environment** by connecting small businesses to the resources and business opportunities provided by the county.

More broadly, support for small businesses increases equity in both county procurement and community economic development. Notably, these efforts can directly impact the following County Strategic Framework KPIs: increase business investment, improve minority business development, increase opportunities in county procurement, and demand the highest customer service.

The county could expand the Business Forward program to further align with county strategic priorities and Sustainability Plan strategies and Guiding Principles. To start, the county can expand outreach to a wider audience, and tailor existing services to disabled business owners, micro-businesses, and others that could benefit from targeted support.

Then, once the program is established for a broad audience, the county could expand the types of services rendered by the program. One area

Sustainable Governance

S6 Expand Business Forward Initiative to include Sustainability-Focused Services

of focus could be to advance businesses' focus on and capabilities to promote environmental sustainability, such as through providing guidance related to reducing supply chain emissions and material waste, utility efficiency incentives, etc. In addition, once the county's broader purchasing policy is updated (see strategy S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities), the county can focus new Business Forward services on educating and preparing entrepreneurs to be able to fulfill these requirements and thus become more competitive in the county's procurement process. For example, Business Forward consultants could provide guidance on various business sustainability certifications (such as B-corps certified), environmental, social, and government (ESG) impact report development, and best practices for incorporating sustainability standards into work products and obtaining related professional credentials (e.g., Leadership in Energy and Environmental Design (LEED), Envision, WELL, ParkSmart) for businesses in the development and infrastructure sectors.

Sustainable Governance

S7 Perform an ADA Compliance Study

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment

County Strategic Goals

- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Strategy Type: Informational

Partners: N/A

Teams

Lead: Facilities Management

Support: Office of Sustainability, Office of Diversity, Equity, and Inclusion, Parks and Recreation, Risk Management Department

Despite ongoing efforts to improve Americans with Disabilities Act (ADA) accessibility, the county campus has many ADA compliance challenges. A likely cause for non-compliance is the age of the campus's physical infrastructure. Most campus facilities were built before the original ADA Standards for Accessible Design were codified in 1990 and altering older buildings not originally designed with the ADA standards is costly and rigorous; however, despite these barriers, the county remains committed to improving compliance and includes accessibility measures in all construction projects.

Other examples of non-compliance at the campus include narrow passageways and cramped spaces within county facilities, a lack of accessible connections between non-motorized pathways and the street, and instances of bollards or large planters limiting accessibility of non-motorized pathways.[13] Furthermore, ADA compliance is not limited to physical infrastructure. All forms of county communications, including websites and emergency communications services, are also subject to ADA regulations.

The county should perform an ADA compliance study to, at a minimum, understand non-compliance issues, and develop a plan to adequately update campus facilities and operations. As it relates to the Sustainability Plan's Guiding Principles, performing an ADA Compliance Study could:

- **Operationalize diversity, equity, and inclusion and provide accessible services and campus environment** by understanding where existing barriers are on campus and what options are available to make the campus facilities and resources more accessible.

The study would involve a thorough survey of campus facilities, grounds, supporting physical infrastructure (e.g., wayfinding signage), and digital and phone services to develop a comprehensive list of deficiencies. These deficiencies should not only relate to physical accessibility, but also audio-visual and language accessibility. In addition, the survey should identify opportunities to exceed legally required ADA standards and implement universal design principles, which recognize a wider spectrum of abilities to create an environment that accommodates and welcomes everyone. The survey should be performed with support from a specialized contractor to increase county staff's skill with ADA standards and universal design principles.

13 Some bollards and large planters on campus were deployed to deter vehicles from driving into restricted areas or to otherwise improve safety. Bollards and large planters should be replaced or adjusted to comply with ADA requirements without compromising safety.

Sustainable Governance

S7 Perform an ADA Compliance Study

In addition to a physical walkthrough, the study can be informed by a review of county data and industry best practice resources such as:

- ADA enhancement projects identified through the capital improvement program[14]
- Complaints filed with the county's Risk Management Department through its ADA Grievance Procedure
- ADA Best Practice Tool Kits for State and Local Governments[15]
- Design Resources developed by the Center for Inclusive Design and Environmental Access at the University at Buffalo (topics include wayfinding, clearances for wheeled mobility users, and pedestrian winter accessibility)[16]

The results of the survey and literature review should be summarized in an Accessibility Master Plan that identifies and prioritizes strategies for overcoming identified deficiencies, describes any necessary follow-on studies, establishes reliable funding sources for incrementally improving compliance, and stipulates comprehensive universal design practices for all new construction projects (and major renovations, where feasible). This process should consider that not all building types must demonstrate compliance with the same rigor (e.g., in spaces in which staff jobs, tasks and activities require able bodied people, ADA requirements would fall second to local building codes, Occupational Safety and Health Administration (OHSA), and other safety standards). Still, buildings should be renovated to be adaptable to future building use and strive for full compliance wherever possible.

This process may emulate the Oakland County Parks and Recreation Department's (OCPR's) approach to improving county parks accessibility. OCPR first completed an ADA Assessment and Master Plan in 2006 and has since developed individualized ADA Transition Plans for its parks. To support completion and implementation of transition plans, OCPR designates $50,000 in annual capital improvement program funds and $50,000 in annual maintenance program funds[17] towards its ADA Transition Program.

Once the county's plan is approved and begins to be implemented, the resources it provides to local businesses and cities, villages, and townships (CVTs) through the Advantage Oakland Accessibility Initiative[18] should be updated to reflect key themes and lessons learned, such as best practices for adapting older buildings to ADA Design Standards and strategies for resolving the most common causes of non-compliance.

14 County capital improvement program documents identified $16.2 million in unfunded ADA enhancements.

15 https://www.ada.gov/pcatoolkit/toolkitmain.htm

16 http://idea.ap.buffalo.edu/resources/

17 These figures should be evaluated to determine if the recurring funds are sufficient to achieve short-term compliance, and if not, the sum that would be required.

18 https://www.oakgov.com/advantageoakland/planning/historicpreservation/Pages/Accessibility-Initiative.aspx

Health and Wellness

Foster physiological, social, purposeful, ethical, mental, emotional, and intellectual wellness.

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Thriving and Inclusive Economy
- Healthy Residents
- Livable Neighborhoods
- Environmental Sustainability
- Organizational Excellence
- Diversity, Equity, and Inclusion

WHO Definition of Wellness

"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."[19]

Oakland County Health and Wellness is centered around the employee and evaluated through an approach based on the World Health Organization (WHO) definition of wellness. This wellness approach focuses on six comprehensive wellness components: Physiological, Social, Purposeful, Mental, Ethical, and Intellectual. Wellness is interconnected with all the sustainability Focus Areas. Wellness strategies can result in benefits such as improved employee mental and physical wellness, increased employee productivity, and decreased employee stress.

Objectives and KPIs

Improve staff mental health, as measured by use of the Employee Assistance Program (EAP) program and percentage of staff diagnosed with mental health conditions documented in annual reports from the county's health consultant.

Improve staff physical health, as measured by percentage of staff diagnosed with "lifestyle conditions" (i.e., diabetes, coronary artery disease, and hypertension) documented in annual reports from the county's health consultant.

Increase access to equitable and healthy workspaces, as measured by percentage of workspaces and facilities that adhere to workplace standards.[20]

Increase employee connection with wellness initiatives at Oakland County, as measured by participation rates in OakFit wellness programs annually.

19 https://www.who.int/data/gho/data/major-themes/health-and-well-being#:~:text=The%20WHO%20constitution%20states%3A%20%22Health,of%20mental%20disorders%20or%20disabilities

20 Workplace standards are to be determined through implementation of strategy W3. Enact Healthy Workplace Guidelines and Standards.

Health and Wellness

Foster physiological, social, purposeful, ethical, mental, emotional, and intellectual wellness.

Oakland County Health and Wellness strategies require application across various scales for the employee experience: at a campus scale, at a facilities scale, and in immediate workplace environment scale. The three Health and Wellness strategies build upon each other. The first is to develop an all-encompassing Health and Wellness Vision and Values for Oakland County, expanding on the existing mission of the OakFit Wellness Program. The next two strategies focus on actionable support to promote Health and Wellness through measurable outcomes and county-wide workplace standards and guidelines to streamline the Oakland County workplace.

Table 4. Health and Wellness Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
W1	Define Health and Wellness Vision and Values for Oakland County*		X						X	X	X	X			X	Human Resources	Office of Sustainability, County Executive	Marsh & McLennan Agency
W2	Develop Actionable Support for Wellness in Employee Lifestyles	X	X		X			X	X	X	X	X				Human Resources	County Executive	External vendors
W3	Enact County-Wide Workplace Guidelines and Standards		X		X	X			X	X	X			X	X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Human Resources, Purchasing, Environmental Health Services Unit of the Health Division	Marsh & McLennan Agency, Vendor partnerships

LEGEND: (*) In Progress

Health and Wellness

W1 Define Health and Wellness Vision and Values for Oakland County

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities
- Maximize resource efficiency

County Strategic Goals

- Healthy Residents
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: Marsh & McLennan Agency

Teams

Lead: Human Resources

Support: Office of Sustainability, County Executive

Oakland County has a robust OakFit Wellness Program with a multitude of offerings to employees. This strategy further strengthens this program by building upon its existing mission statement and goals. The first step is to review the existing OakFit mission and goals to assess if they are representative of all Oakland County employees, and if the mission and goals remain progressive toward the future vision. Include Health and Wellness success factors to provide a framework that Oakland County can apply to further enhance and strengthen the OakFit Wellness Program. During an interview for the sustainability planning process, OakFit Wellness Program Human Resource leaders shared the need to develop a specific vision for Oakland County employees based on Health and Wellness. Defining and confirming the Vision, Mission, and Values will provide guiding direction and reference

OakFit Mission Statement

The mission of OakFit is to assist Oakland County employees, retirees and dependents in taking ownership of their health and wellness in order to improve quality of life, enhance productivity, and stabilize long-term employee/employer health care costs.

OakFit Program Goals

- Build countywide awareness
- Encourage participation from all employees
- Engage employees in improving overall health
- Track and measure improvement efforts in order to reduce long term health care costs

Health and Wellness

W1 Define Health and Wellness Vision and Values for Oakland County

materials during implementation of strategies to ensure alignment with and progress towards goals. As it relates to the Sustainability Plan's Guiding Principles, defining Health and Wellness Vision and Values for Oakland County could:

- **Operationalize diversity, equity, and inclusion and provide accessible services and campus environment** by identifying health and wellness stakeholders and decision makers that are representative of all county employees.
- **Provide accessible services and campus environment** by administering a Vision that prioritizes equitable access to Health and Wellness resources and considerations for the diverse needs of employees and other stakeholders.
- **Create education and engagement opportunities** by establishing a concrete universal mission with a specific and digestible set of goals from which all other educational and outreach materials could be built.
- **Maximize resource efficiency** by developing an overarching Vision and Values for Health and Wellness the county can better prioritize resources to meet specific wellness goals and track metrics to ensure that resources are being maximized.

The following three steps provide a path toward developing the Health and Wellness Vision and Values. This strategy should also align with the *2022 Mental Wellbeing Strategy* Oakland County developed.

A common understanding and definition of what Wellness means to Oakland County will be critical to understanding the desired outcomes from Wellness strategies. The definition that Oakland County creates should be used in all employee communications referring to Health and Wellness. This will confirm employee understanding of Oakland County's Health and Wellness goals, and better align personal interests and investments.

Identify Health and Wellness Stakeholders: Human Resources would lead development of the Health and Wellness Vision and Values. Human Resources can engage the wellness committee, county decision makers, and end users in the process of defining the vision and values in order to ensure this framework aligns with staff needs.

Define Vision and Values: Conduct a series of engagements with the purpose of confirming the mission and defining the corresponding vision and values. This may include first convening with the identified leadership stakeholders and understanding alignment with employee perspective. This recommended series of engagements would be active and participatory workshops with pre-read communication materials, as well as post workshop findings reports. Workshops would be led by Human Resources with support from the County Executive and Office of Sustainability. The activities from these workshops would yield draft versions of the Health and Wellness Vision, Mission, and Values created by direct input of key stakeholders. From these draft materials, Human Resources should send follow-up communications for feedback and input, to ultimately yield the final version.

Measure and Track Success Factors: Human Resources can then define success factors to track progress towards achieving the mission, vision, and values. By comparing health consultant (e.g., Segal Consulting, Marsh & McLennan Agency) employee health reports year-over-year, health outcome changes and improvements can be measured and tracked over time.

Health and Wellness

W2 Develop Actionable Support for Wellness in Employee Lifestyles

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities

County Strategic Goals

- Thriving and Inclusive Economy
- Healthy Residents
- Livable Neighborhoods
- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: External vendors

Teams

Lead: Human Resources

Support: County Executive

This strategy builds on W1. Define Health and Wellness Vision and Values for Oakland County by outlining actionable steps towards offering resources aligned with the county's health and wellness vision, mission, and values. Through implementing these steps, the county can support all aspects of Health and Wellness in employee lifestyles, at all scales, from campus-wide to individual. As it relates to the Sustainability Plan's Guiding Principles, developing actionable support for wellness in employees' lifestyles could:

- **Operationalize diversity, equity, and inclusion** by taking into account employee feedback and developing actionable support that applies to the needs and interests of a diverse campus population.
- **Provide accessible services and campus environment** by building wellness programing and tools into the built environment and conducting specific initiatives to understand and improve program and campus accessibility.
- **Create education and engagement opportunities** by using employee feedback and dedicated research to expand the channels with which wellness messaging is conveyed.

Consider the following action steps when defining wellness support initiatives:

Step 1: Define Success Factors. Define success factors for each health and wellness value. To clearly identify how wellness initiatives advance success factors, create a matrix that includes each success factor across the top row and each wellness initiative down the first column. For each wellness initiative, mark the success factor(s) with which it aligns.

Step 2: Connect OakFit Wellness Program to the Built Environment. Develop actionable support to strengthen the connection between OakFit Wellness Program offerings and the built environment. Consider the opportunity to leverage

Health and Wellness

W2 Develop Actionable Support for Wellness in Employee Lifestyles

the campus as a living lab and pilot for OakFit Wellness Program offerings. For example, consider signage on future and existing non-motorized paths to encourage and motivate employees. Signage could include distance travelled and campus walking routes.[21] The county may also explore opportunities to connect the Farmer's Market to employee nutrition. Today the OakFit Wellness Program conducts Employee Market Day[22] at the Farmer's Market. Consider how this offering can be built upon to connect further to nutrition (such as displaying nutrition facts, recipes, or hosting cooking classes in partnership with the market to tie ingredients to a satisfying meal).

Step 3: Connect Messaging and Physical Environmental Cues. Consider reconciliation between the current OakFit messaging, county policies related to wellness, and physical environmental cues. For example, removing ash pot locations from main facility entrances to reflect the OakFit smoking cessation program and Oakland County Smoking Policy. Currently, there are several ash pots located at entrance sidewalks. In addition, the Segal Annual SHAPE Health reports demonstrate the need for focusing on diet due to negative health conditions being higher than the norm, yet access to healthy foods on campus is limited.

The Segal SHAPE Report, based on the Oakland County Health Plan from 2017, states "The number of plan participants diagnosed with Coronary Artery Disease (CAD) is more than double the norm. The annual per participant per year (PMPY) cost for these participants is $19,004 which is 3.96 times higher than the PMPY cost for the average plan participant. Since this disease can be prevented and reversed with dietary modification, this should be an area of focus for plan management." These statistics matched with the lack of resources on campus to improve diet and exercise demonstrates the importance of connecting the OakFit Wellness Program to the surrounding environment.

Also, consider external partners to support and encourage participation and habit building through verifying and rewarding engagement in everyday positive actions. For example, the county could consider adopting applications (apps) and programs that encourage sustainable behavior through rewards points. Actions could include walking, biking, exercising, recycling, or any other actions that Oakland County sees fit to promote. Allowing staff to earn rewards points through sustainable behaviors also furthers the next step, providing employee incentives.

Step 4: Provide Employee Incentives. Provide employees incentives to participate in wellness programs and initiatives. The county should offer incentives that go beyond monetary and competition-driven rewards by considering the impact of positive health outcomes on the individual. Consider cost and benefit to further tie incentives and programs for wellness programs to positive health outcomes. Based on feedback from focus groups and interviews with county employees, the prevailing incentive for participation in OakFit is monetary. For example, the Health Screening is documented as the most popular initiative, as it provides monetary incentive for participation. Currently, it has been reported that messaging to employees about participation in Health and Wellness programs provides benefit to the county through cost savings. Shifting the focus to how Health and Wellness programs benefit the individual provides incentive for participation.

The county should consider the following when developing actionable support toward employee wellness: accessibility of programming, inclusion of arts and cultural initiatives, creation and promotion of non-motorized paths, and understanding effectiveness of EAP resources in supporting mental and emotional health of employees. Each is described in further detail below.

21 https://wellness.oakgov.com/resources/Pages/Maps-Trails.aspx

22 https://wellness.oakgov.com/programs/Pages/Employee-Market-Day.aspx

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W2 Develop Actionable Support for Wellness in Employee Lifestyles

Consideration 1: Accessibility of Programming. This consideration pertains to equitable access to Health and Wellness resources, programs, and amenities for all worker profiles, including staff, managers, 24 hours a day, 7 days a week (24/7) employees, and essential employees, as well as for employees that work off the main campus.

Employee feedback on the accessibility of programming through the OakFit Wellness Program included perceptions that the lunch and learn programs were historically inaccessible to all employees, specifically 24/7 employees, off-campus employees, employees that do not have technology within their workplace, and staff that work in buildings that are open to the public during lunch time. However, beginning in early 2022 all lunch and learn sessions are now recorded with closed captioning and directly embedded into the OakFit website for current and previous employees to access.

Employees also provided feedback on the lack of access to healthy food options on campus, and constraints to visiting the only café located in the Courthouse. Employees expressed perceived disadvantages to having to pass through security check points before accessing the café, and inability to access the café due to work-hour constraints. Additional feedback included frustration from 24/7 employees that the only food options available are vending machines which do not include healthy options. Consider partnering with local food trucks and utilize the Farmer's Market location throughout the year.

In addition, feedback included general lack of access or knowledge of access to the current OakFit Wellness Program offerings. Consider increasing and targeting communications to both new and current employees to increase employee awareness and participation. Consider removing the requirement to subscribe to OakFit wellness emails and instead provide an opt-out option. Include OakFit communication in all general staff-wide communications such as the Telegraph or other frequent communications.

Consideration 2: Campus Inclusion of Arts and Cultural Initiatives. Define the county approach to inclusion of arts and cultural initiatives through physical representation on campus. This recommended approach is focused on the exterior campus level but could be extended to the interior built environment as the program gains support. Examples of this approach are sculpture parks, murals, and rotating installations. Consider partnering with local artists throughout Oakland County to showcase and promote their work.

Consideration 3: Creation and Promotion of Non-motorized Paths. Creating and promoting the use of non-motorized paths on Oakland County Campus is another strategy for improving employee Health and Wellness. Oakland County should consider beautifying existing non-motorized paths by planting trees, improving the pathways, and providing other amenities and enhancements, such as rest areas or mile markers, to encourage employees to access and use. The county should also consider amenities for post-use of the pathways such as bicycle parking, lockers, showers, and other amenities to support employee ease of use. Additional recreational amenities could include permanent outdoor bodyweight training structures. Wayfinding and signage is critical to this consideration. Please reference the O1. Improve Connectivity with Non-Motorized Pathways strategy and O2. Expand and Improve Signage with Accessibility strategy within the Open Space, Ecosystems, and Connectivity Focus Area for detailed information.

Health and Wellness

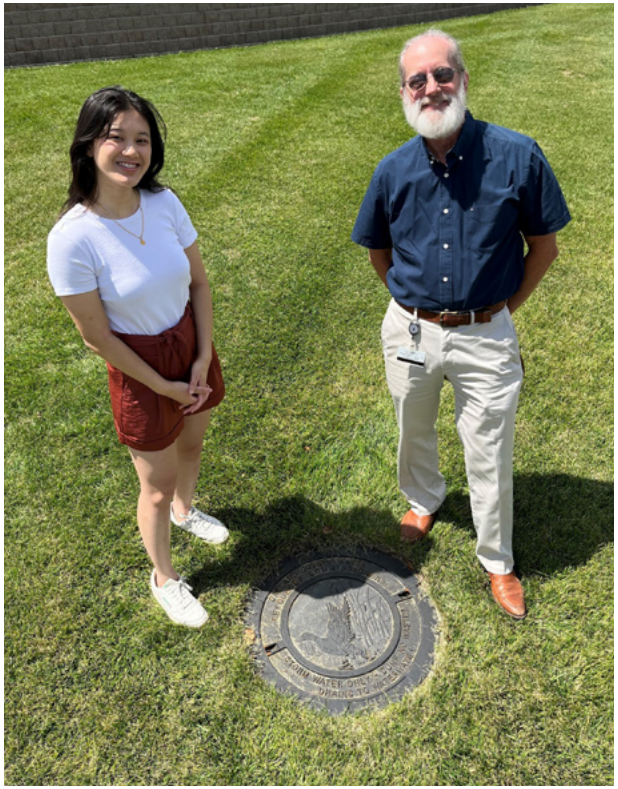
W2 Develop Actionable Support for Wellness in Employee Lifestyles

Consideration 4: Mental and Emotional Support Through EAP Resources. Focus group participants shared that currently the EAP is viewed as a disciplinary measure, not an asset for employees. Messaging around this program should shift from a disciplinary measure to a mental and emotional health resource. Due to recent county events, the EAP program has been promoted and utilized by staff and was supported by the OakFit Stamp Out the Stigma program promoting mental health awareness and wellness.

The county should consider continuous analysis to ensure that the current EAP resource is meeting the mental health needs of Oakland county employees. Information included in the county's health consultant's annual reports should be used to support this analysis.

Art and Health and Wellness

Research by the World Health Organization (WHO) demonstrates the inclusion of arts and cultural initiatives is beneficial to Health and Wellness. The WHO found that "within prevention and promotion, findings showed how the arts can affect the social determinants of heath, support child development, encourage health-promoting behaviors, help to prevent ill health, and support caregiving. Within management and treatment, findings showed how the arts can help people experiencing mental illness, support care for people with acute conditions, help support people with neurodevelopmental and neurological disorders, assist with the management of noncommunicable diseases and support end of life care."[23] Further, Harvard Health stated in an article, "Studies have shown that expressing themselves through art can help people with depression, anxiety, or cancer, too. And doing so has been linked to improved memory, reasoning, and resilience in healthy older people."[24]



Stormwater Manhole Cover Design Contest

The Water Resources Commissioner (WRC) lead a competition for high school students in the area to design artistic covers for stormwater manholes. The winner of the contest had their art included on all stormwater manholes throughout the city. The project served as an educational campaign to bring awareness to students and their families about the importance of managing storm water and keeping pollution out of storm drains. This project also had a distinct artistic component integrating art and culture into sustainability planning for the community.

23 "What is the evidence on the role of the arts in improving health and well-being? A scoping review." World Health Organization (Health Evidence Network (HEN), Fancourt D, Finn S, 1 2019, https://apps.who.int/iris/bitstream/handle/10665/329834/9789289054553-eng.pdf

24 "The Healing Power of Art." Harvard Health, Harvard Health, 1 July 2017, https://www.health.harvard.edu/mental-health/the-healing-power-of-art#

Health and Wellness

W3 Enact Healthy Workplace Guidelines and Standards

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Healthy Residents
- Livable Neighborhoods
- Environmental Sustainability
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: Marsh & McLennan Agency, Vendor partnerships

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division

Support: Human Resources, Purchasing, Environmental Health Services Unit of the Health Division

This strategy focuses on office-based workspaces in Oakland County facilities. It does not include specialized work environments, such as courtrooms, the Law Enforcement Complex, Children's Village, the Animal Shelter, Sheriff's Office Administration, and Farmer's Market. Due to the nature of the work in those specialized spaces, further investigation and modifications for workplace standardization is needed. However, administrative spaces within specialty spaces and buildings may apply to this strategy. Guidelines for nutrition apply to all facilities unless superseded by other programmatic and facility requirements. Guidelines for janitorial chemicals also apply to all facilities unless superseded by other programmatic and facility requirements.

county-wide workplace guidelines are important for office-based employees because they provide a standard approach to the workplace and resources. These guidelines strive to create transparency in the workplace and provide consistency across departments. This approach may allow for case-by-case considerations for individual employee accommodations. However, these standards should consider all users and abilities, and should be adaptable and universally designed. As it relates to the Sustainability Plan's Guiding Principles, enacting healthy workplace guidelines and standards could:

- **Operationalize diversity equity and inclusion and provide accessible services and campus environment** by creating a universal standard for offices that ensures all employees have equitable access to comfortable and healthy work environments.
- **Maximize resource efficiency** by standardizing buildings to eliminate the need for additional appliances, such as space heaters or personal microwaves and refrigerators, in buildings. By providing employees with the appliances and environmental conditions they need the county has more control over energy usage and resource management.
- **Improve air and water quality** by bringing buildings up to current industry standards for air quality and drinkable water access.

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W3 Enact Healthy Workplace Guidelines and Standards

A standardized approach to the workplace, whether with furniture or janitorial operations, provides ease of maintenance, operations, and asset management across all facilities. Uniform offerings can be transferred where needed throughout county facilities through various cycles of employee growth and attrition. The following considerations are steps towards creating county-wide workplace standards and guidelines: nutritional support and access to healthy food, access to clean drinking water, task lighting, outdoor seating, ergonomic and other flexible desk configurations (e.g., standing desk, hoteling areas), and reducing and replacing janitorial chemicals with environmentally, non-toxic alternatives.

Workplace Guidelines and Standards Documents: Create Workplace Guidelines and Standards documents that outline and detail requirements across county workplaces. These documents provide a standardized approach to workspace environment types that could span from high-level approaches (guidelines) to room data sheets with specifications (standards). These documents typically include individual workstation set up, workplace space types (spaces to support every work type, from focus heads-down work to collaborative teaming and social environments), hybrid work policies, amenities, and space use etiquette. A standardized allocation of square foot per employee in the workplace provides the opportunity for rightsizing space based on departmental requirements, both today and with future growth projections. Additionally, the county's most valuable asset are its workers, who are material to its operations and success – as such, it is paramount that workplace guidelines and standards support a healthy and safe work environment. Workplace guidelines and standards should align with the Occupational Safety and Health Administration (OSHA) standards. Creating a healthy and safe work environment can involve physical measures, like those outlined in this section, as well as processes for ensuring engagement, transparency, and accountability.

Developing workplace standards and guidelines provides an opportunity for county-wide policies around supplies (e.g., office, pantry, female hygiene products, sharps containers, recycling bins, etc.) and employee wellness spaces (e.g. breakrooms, lactation rooms, respite and prayer rooms, gender neutral bathroom options etc.) (Please reference the strategies S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities and S5. Update the Purchasing Evaluation Handbook to Increase Diversity of Bid Evaluation Teams and Incorporate Sustainability Evaluation Criteria in the Sustainable Governance Focus Area section for more detail).

Focus group participants mentioned inconsistency across departments for approach to coffee or snacks. Participants stated that coffee and snacks may be provided by managers out of their own interest, and many departments didn't have basic storage or amenities for access to food during the workday (e.g., microwaves, refrigerators, utensils). Some employees address such deficiencies by bringing in personal appliances. When employees use personal appliances, it can make it difficult for the county to manage energy consumption at the building level. Equitable distribution of these appliances should be accompanied by

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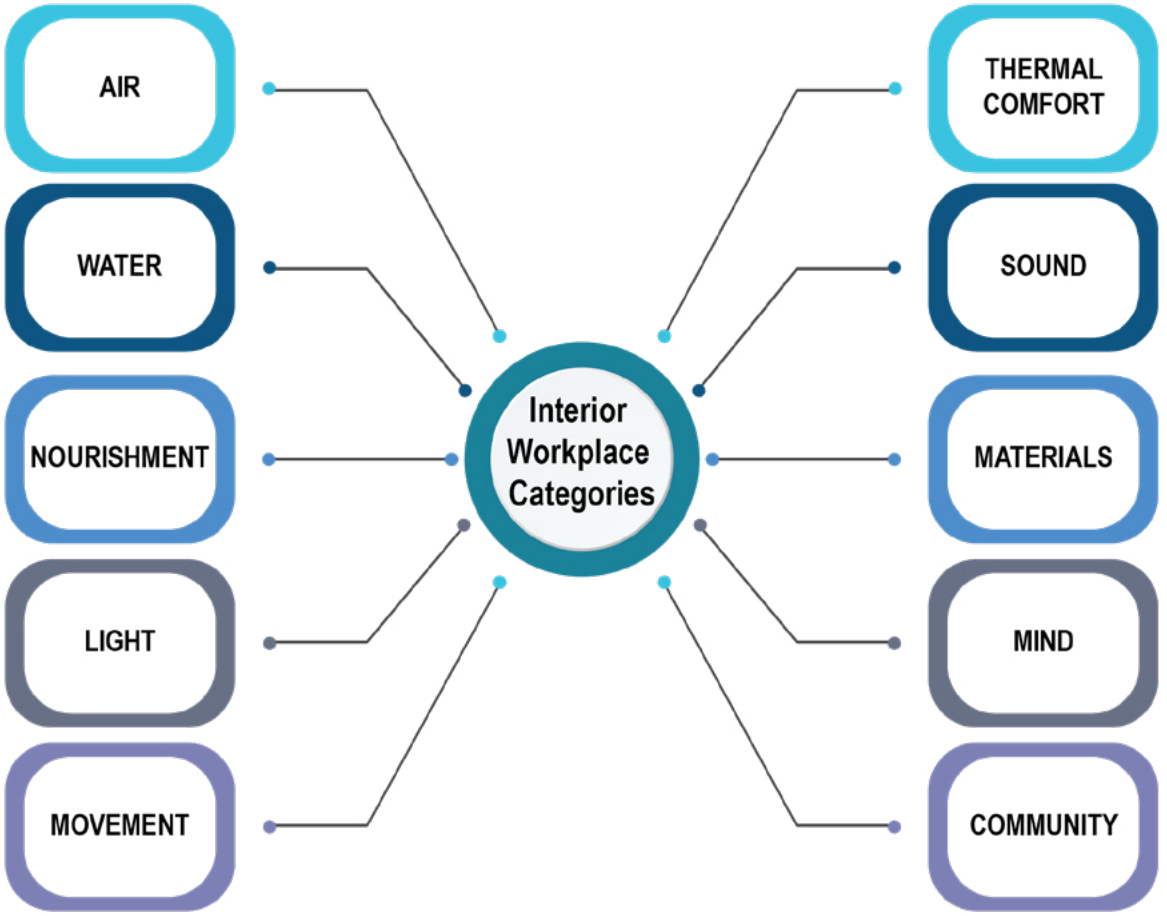
W3 Enact Healthy Workplace Guidelines and Standards

prohibiting personal devices such as dorm fridges, coffee makers, and space heaters. In addition, focus group participants discussed some departments had standing desks and others were not familiar with how to gain access to such resources. Workplace guidelines and standards can streamline the approach and policy to these resources across all departments and workplaces.

Workplace guidelines may also include recommendations for lifespan of and the intended use of furnishings. Replacement of furnishings in specialty spaces (Sheriff Administration Building, Children's Village, Law Enforcement Complex) occupied 24 hours a day requires a focus on durability or further considerations for end of useful life than other spaces that are used 8 hours a day. For example, focus group participants reported that office furniture in 24/7 workspaces may be beyond its useful life and in need of replacement. In addition to spatial, finishes, and furniture guidelines, the county may consider referencing and applying best practices of a wellbeing standard. The International WELL Building Institute's (IWBI) WELL Building Standard is the most robust wellbeing standard in the industry based on market research. Applying best practice solutions is a way to provide employee wellness benefits based on measurable outcomes and evidence-based recommendations. Categories

Figure 4. WELL Building Standard Interior Workplace Categories



Source: https://resources.wellcertified.com/articles/well-tip-understanding-the-comparison-between-well-v1-and-well-v2-pilot/

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W3 Enact Healthy Workplace Guidelines and Standards

for interior workplace wellness strategies include air quality, access to daylight, light levels, thermal comfort, acoustics, and finish materials. Several of these categories affect facility-wide systems and are to be considered at a systematic level prior to adaptation.

To complement these workplace standards, the county could also consider engineering standards that include targets for mechanical systems that support healthy indoor air quality. The WELL Building Standard includes goals for indoor air quality as a benchmark for indoor air quality basis of design. These have corresponding effects to the High-Performance Buildings Focus Area strategies, reference those strategies for more information. The EPA Environmental Benefits Mapping and Analysis Program[25] is a free tool that analyzes the effect of air quality on health impacts and their economic value. This tool can be a resource to understand how air pollution in the geographical area impacts county employee health.

Consideration 1: Nutritional Support and Access to Healthy Food. The main issues described in focus groups by employees were around the lack of access to food on campus. There is a security checkpoint in the Courthouse before gaining access to the only existing on-campus café and security prevents food delivery. The county could consider developing a program for employee pick up, delivery, and office event catering from the existing courthouse café. Employees who participated in focus groups stated that they often turned to fast food off-campus because there is no access to healthy food on-campus. All worker profiles should be considered, including 24/7 workers that work double shifts and essential employees, when developing on-campus food offerings. Also consider enabling equitable access to nutritional options for on-campus and off-campus facilities. Oakland County Human Resources and Purchasing should lead this portion of the strategy with support from a partner healthy food vendor.

Consideration 2: Nutrition Options. Provide access across many scales ranging from a full-service hot food café (staffed café) to grab-and-go markets (ready-made packaged with an automated point of sale) and healthy vending (vending machines). Providing employees with a broad range of nutritional food and ensuring it is accessible will give employees nutritious options on Oakland County's campus. The Human Resource department should examine courthouse café menus and current partner vending contracts for nutritional value and also examine the percentage of vending machine products that include soda and high trans-fat food. The county can consider exploring vendors that have high nutritional value options. Finally, working with a local vendor with nutritious food options could be one way to provide not only nutritious food, but also community and local business support. This action will have an impact on facility and operational costs; however, accessible healthy food offerings are a necessary action to lead by example, and could lead to cost savings on health expenses over time due to improved health outcomes.

25 https://www.epa.gov/benmap

Health and Wellness

W3 Enact Healthy Workplace Guidelines and Standards

This nutritional approach builds upon employee access for all locations, all shifts, and raising standards for nutritional value for meals across campus. The Segal SHAPE Reports on the Oakland County Health Plan provide information on the Oakland County employee base that show how employees would directly benefit from a nutritional strategy.

The Segal SHAPE report on the Oakland County Health Plan from 2018 stated, “The number of plan participants diagnosed with CAD is more than double the norm. The annual PMPY cost for these participants is $21K which is four times higher than the PMPY cost for the average plan participant. Since this disease can be prevented and reversed with dietary modification, this should be an area of focus for plan management.”

The Segal SHAPE report on the Oakland County Health Plan from 2018 states, “The number of plan participants exceeds the norm for each of the “lifestyle conditions” (i.e., Diabetes, CAD, and Hypertension). Strategies aimed at altering diet and increasing exercise should be prioritized.”

The Segal SHAPE report on the Oakland County Health Plan from 2019 stated, “Compliance with all diabetes measures is low. In particular, the number of diabetics monitoring their A1C values typically raises a red flag. However, the risk scores of those non-compliant diabetics are very low and may be an indication that these are type II diabetics who have their condition under control with diet and exercise.” The 2018 report highlighted a similar finding.

Consideration 3: Clean Drinking Water Access. Develop policies around access to palatable drinking water in workspaces. Employees who participated in focus groups reported the lack of access to palatable drinking water, noting issues with the drinking water taste and smell. In fact, one participant even mentioned inquiring with colleagues about interest in setting up a water delivery system in the office at their own cost, because the drinking water was unpleasant in the workplace. Facility standards may include filtered water bottle filling stations across buildings and accessible to workplaces. Installing water bottle filling stations is an example of best practice in the WELL Building Standard and Leadership in Energy and Environmental Design (LEED) rating system. Environmental Health and Safety should lead this portion of the strategy with support from Facilities Management.

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W3 Enact Healthy Workplace Guidelines and Standards

Consideration 4: Outdoor Seating. Provide smoke-free outdoor seating spaces at all facilities. Facilities Management and Purchasing should lead this portion of the strategy. Currently, the only observed outdoor seating outside of facilities doubles as smoking spaces. In focus groups, employees reported they desire to have smoke-free outdoor seating spaces where they can eat lunch or take a break. This consideration aligns with the county's Tobacco Cessation program by providing smoke-free seating options for staff and visitors. Further, research shows that smoking is the leading cause of chronic obstructive pulmonary disease (COPD).[26] According to Segal SHAPE Reports based on the Oakland County Health Plan from 2017-2020, Oakland County Healthcare spends about $1 million a year on COPD claims (about $1,650 per patient per year). While COPD is not the highest healthcare cost for Oakland County attributed in the SHAPE Reports, this is a significant expense that could be directly reduced by improved air quality including reduced direct smoke inhalation and second-hand smoke exposure. Providing smoke-free outdoor seating options can support those trying to limit smoking and prevent from second-hand smoke exposure.

Consideration 5: Reduce and Replace Janitorial Chemicals with Environmentally, Non-toxic Alternatives. The Oakland County Chief of Custodial Services has studied and worked to start implementing International Facility Management Association (IFMA) recommended sustainability initiatives. The Chief of Custodial Services' goal is to improve the work environment without impacting health standards or creating financial strain on operations. As of June 2021, Oakland County was ranked "Excellent" or "Satisfactory" in 9 of IFMA Benchmarks and "Needs Improvement" in 1 IFMA Benchmark. Current accomplishments include:

- A total of 99% of janitorial paper products are "Green Seal" certified or "ECO" approved
- Approximately 98% of chemicals are ready-to-use or ready-to dispense products
- All FMO vacuums have 97% or higher filtration systems
- Employees have been trained on the proper use of chemicals when treating services.

The IFMA Benchmark that was ranked as "Needs Improvement" in Oakland County facilities is "Use cleaning chemicals that meet Green Seal or similar standards." Oakland County should do an analysis of existing janitorial chemicals with industrial

26 "Smoking and COPD." Edited by David Dugdale, Mount Sinai Health System, Mount Sinai Health System, 2019, https://www.mountsinai.org/health-library/special-topic/smoking-and-copd#:~:text=Smoking%20is%20the%20leading%20cause,so%20it's%20hard%20to%20breathe.

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W3 Enact Healthy Workplace Guidelines and Standards

hygienists focused on environmental health and safety in the workplace and compare against other health standards, recognizing that some facilities (e.g., the County Jail) may require hospital grade cleaners/disinfectants because of the higher risk of viral and bacterial exposure. Choosing best practice janitorial chemicals and defining proper protocols for use of these chemicals will prevent employees from being exposed to toxic and harmful chemicals that can negatively impact human health. In doing so, consider referencing the WELL Building Standards, which provides a consolidated list of best practice certifications for each class of cleaning products (including Green Seal, in some cases).

According to WELL standard cleaning, all disinfection and sanitization products must meet one of the following three requirements to be less hazardous:

1. Products are labelled as 'low-hazard' or 'safer' by an ISO 14024-compliant or by a third-party certification recognized by the local government where the project is located.[27] Hazard criteria must be specific for the product classes within the scope of this feature.
2. The Safety Data Sheet (SDS) of each product as sold discloses ingredients per EU Regulation 2015/830 (CLP) or California State Bill No. 258 and no ingredients listed in Section 3 of the SDS are classified as the following Globally Harmonized System codes and corresponding hazard statements:
    - H311: toxic in contact with skin
    - H312: harmful in contact with skin
    - H317: may cause allergic skin reaction. Individual terpenes may be present up to a concentration of 0.5% in undiluted products.
    - H334: may cause allergy or asthma symptoms or breathing difficulties if inhaled
    - H340: may cause genetic defects
    - H350: may cause cancer
    - H360: may cause damage to fertility or the unborn child
    - H372: may cause damage to organs through prolonged or repeated exposure
3. Products meet Feature X08 Materials Optimization.

Implementation of this strategy may be in conjunction with the Waste Reduction and Diversion Focus Area strategies if janitorial services and waste diversion and removal services are combined (see the Waste Reduction and Diversion section for more information). The Environmental Health Services Unit of the Health Division and Facilities Management, Chief of Custodial Services, should lead this portion of the strategy.

27 Green Seal's certification procedures follow ISO 14020/14024.

Facility and Fleet Decarbonization

The county's net zero carbon goal for government operations is to reach net zero carbon emissions by 2050, with an interim goal of 50% carbon emission reduction by 2035 from a 2018 baseline.

Expand the county's clean energy generation capabilities, convert the county's fleet to clean-energy vehicles, and advance decarbonization goals.

Guiding Principles

- Provide accessible services and campus environment
- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Objectives and KPIs

Expand carbon neutral energy generation and use, as measured by the carbon emissions from energy consumption (CO_2e).

Decarbonize county vehicle fleet, as measured by the percentage of internal-combustion engine (ICE) vehicles to non-combustion engine vehicles within the fleet.

Promote cleaner transportation alternatives, as measured by the percentage of staff commuting to work by a transportation mode other than a single occupancy internal-combustion engine (ICE) vehicle.

To support the county's target to reach net zero carbon emissions by 2050, with an interim goal of 50% carbon emission reduction by 2035 from a 2018 baseline, the following section outlines specific targeted actions for development of onsite renewable energy generation capabilities, reduction of energy use and emissions from facilities, and advancement of zero emission vehicles (ZEV) across the county fleet.

Currently, 76% of the county's emissions are from energy use and 16% of the county's emissions are from their fleet. Decarbonizing energy and transportation-sector emissions is critical to achieving carbon neutrality by 2050. Electricity consumption generates 53% of total emissions and natural gas, which supplies the Central Steam Plant, represents 23% of all emissions. As such, conversion or decommissioning of the Central Steam Plant and of other natural gas equipment and appliances on campus must be the primary focus of the county's decarbonization strategy. Replacing energy sources with renewable energy generated on-site is also key to reaching the net zero carbon goal and can increase the county's energy-resilience. Off-site renewable energy sources, including power purchase agreements, can also contribute to advancing the net zero carbon goal.

Table 5. Facility and Fleet Decarbonization Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
F1	Conduct a Decarbonization Feasibility Study for the Central Steam Plant					X		X					X		X	Facilities Planning and Engineering Division	Facilities Management: Facilities, Maintenance, and Operations Division, Engineering	
F2	Pursue On-Site Solar Generation at Key Campus Locations					X		X					X		X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing, Parks and Recreation	
F3	Develop an Electric Vehicle Infrastructure and Fleet Transition Plan for the Oakland County Campus					X		X			X		X			Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing, Parks and Recreation	

LEGEND: (*) In Progress

Facility and Fleet Decarbonization

F1 Conduct a Decarbonization Feasibility Study for Central Steam Plant

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: Future

Strategy Type: Informative

Partners: N/A

Teams

Lead: Facilities Planning and Engineering Division

Support: Facilities Management: Facilities, Maintenance, and Operations Division, Engineering

The central steam plant currently operates predominantly on natural gas and serves several of the largest facilities on the Oakland County campus, producing 18% of overall county operations greenhouse gas (GHG) emissions.

The county's Steam Plant Decommissioning Study was conducted in 2021. The research in this study found that decommissioning the Steam Plant and replacing it with a local, more efficient, natural gas boilers could result in $18,890,316 in savings in the next 10 years. Study findings also showed that the localized high efficiency boilers would result in 30% less annual carbon emissions than the current steam plant and are expected to have a longer lifecycle and fewer necessary repairs. While this solution would reduce carbon emissions to meet short term carbon reduction goals, installing a natural gas system is still a long-term investment in fossil fuels that will not help the county meet its long-term net zero carbon goal. A new boiler system is an expensive replacement that would lock the county in to a long-term dependence on fossil fuels that would delay reaching the net zero carbon target.

The goal of this additional study would be to identify the feasibility of alternatives for a decarbonized heating system, either distributed or central. This is necessary to both meet the county's long-term net zero carbon goal as well as ensuring other energy investments. For example, energy efficiency upgrades to steam-serviced facilities. All upgrades and capital investments should be performed in alignment with the capital improvement plan and decarbonization efforts. Thus, this strategy is aligned with the county's Strategic Framework goal areas of Environmental Sustainability and Organizational Excellence. Conducting a decarbonization feasibility study of the central steam plant could:

- **Advance the net zero carbon goal** by exploring steam plant alternatives that eliminate the county's long-term dependence on fossil fuels.
- **Maximize resource efficiency** by exploring alternatives that are lower in maintenance costs and increase overall water and energy efficiency.

This proposed study would evaluate all available and emerging decarbonization alternatives for the central steam plant, including those that could separate the county from fossil fuels entirely in order to work towards the net zero carbon goal. The study should investigate different alternatives whether Oakland County decides to decentralize or maintain the steam plant. Preservation of the steam plant can include looking into renewable fuel alternatives, such as biofuels. Decentralization of the steam plant can include applying carbon neutral energy sources to buildings on campus, such as heat pumps. Options for evaluation include:

Facility and Fleet Decarbonization

F1 Conduct a Decarbonization Feasibility Study for Central Steam Plant

- **Distributed, Decarbonized Systems:** Transition from a central steam plant to individual systems at each county location which operate on newer, efficient electrified technologies. This would complement the 2021 study recommending the transition to natural gas boilers, but would include the exploration of non-fossil fuel alternatives and the technical and cost analysis of each option specific to the impacted county facilities and long-term net zero goal.
- **Centralized Ground Source Heat Pump (GSHP) System:** A connected GSHP system would provide heating and cooling from stable underground temperatures and would supply heating and cooling to each facility.
- **Alternative Fuels:** Renewable natural gas, biofuels, or green hydrogen may be considered. Feasibility is based on local availability of the alternative fuel.
- **Carbon Capture and Sequestration:** Capture of on-site carbon emissions for long term underground storage may allow for continued operation of the natural gas plant. This would require evaluation of ongoing cost and local sequestration site availability.

The feasibility study should include the following relative to each technology:

- **Current and projected technological maturity:** Availability or projected availability of the technology in the market will be critical for assessment of feasibility and implementation.
- **Timelines:** Each decarbonization technology and scenario should have an identified timeline which considers technological feasibility and design, engineering, construction timeframes, relation to the GHG targets, and current remaining steam plant lifespan.
- **Alignment with county net zero carbon targets:** Projected timeline and carbon intensity of each technology should align with the county's net zero goal and interim GHG reduction targets.
- **Cost estimates:** Capital investments required for each technology, as well as required ongoing annual operations and maintenance costs will be critical to this assessment and feasibility study.
- **Funding opportunities:** Where applicable, identification of funding and financing mechanisms which may be available to support each technology.
- **Options for new developments:** Provide guidance for new developments on either connecting to the alternative system or options for decarbonized distributed systems. Phase out connections to natural gas systems in new developments.

Looking into alternatives now will allow Oakland County to integrate the selected strategy into future capital plans, facility upgrades, and electric procurement processes. It will also provide updated timelines and phasing of current efficiency measures for facilities currently served by the plant. It is important to continue monitoring state and federal legislation that may impact the economics of decarbonization, including fuel switching or electrification incentives, and carbon pricing schemes.

Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division

Support: Purchasing, Parks and Recreation

Oakland County campus presents ample opportunity for development of onsite renewable energy, which will support decarbonization goals. Additionally, increased energy efficiency paired with use of on-site renewable energy and battery storage solutions will enhance county resilience by limiting its critical energy load and reducing its reliance on the broader electrical grid. As it relates to the Sustainability Plan's Guiding Principles, pursuing on-site solar generation at key campus locations:

- **Advance the net zero carbon goal** by developing localized renewable energy sources on campus to reduce and eventually eliminate the county's dependence on fossil fuels for energy.
- **Maximize resource efficiency** by taking advantage of existing roofs that would be eligible sites for onsite solar and increasing resilience and self-sufficiency of the campus energy system.

Primary sites of development are open spaces and parking areas on campus. Due to the decreasing cost of solar energy, on-site solar resources would provide economic benefits by reducing purchased energy from the grid, thus promoting efficient use of county funding.

Considerations for development of these sites include:

Key Site Locations: Oakland County campus has several parking lots, rooftop locations, and open space that would be a good fit for solar installations. Three key site locations , as seen in Figures 5-7, were identified through the Sustainability Plan development process: the Farmers Market parking lot, the public parking lot, and open space west of the Sheriff's Administration Building. Installing ground-mount solar in the open space west of the Sheriff's Administration Building has the potential capacity to generate approximately 3 million kWh in electricity per year.

Installing a carport solar system in the Farmers Market parking lot has the potential capacity to generate approximately 1 million kWh in electricity per year. Last, installing a carport solar system in the public parking lot has the potential capacity to generate approximately 2.5 million kWh in electricity per year. The analysis prepared in informing this Plan identified that approximately 21 million kWh of electricity was used by the Oakland County campus in 2020. Investment in on-site solar generation at selected sites identified here would produce enough electricity to offset approximately 30% of this annual consumption

Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

Funding and Financing Models: There are a range of models for development of solar including those that may allow for cash-flow neutral loan and energy savings. Leases, power purchase agreements, and any future state or utility programs should be evaluated to ensure maximized financial benefits of solar installations, including the federal investment tax credit (ITC).

Streamlined Planning and Development: Where possible, coordinate solar installation with other planned projects. New developments, including facilities and parking areas, can include solar ready design to support continued growth in campus renewables in the future. For example, installation of the Farmer's Market parking lot solar canopy or inclusion of solar ready design to support future installation could be considered in the county's planned improvements to the facility and parking lot during the timeframe of FY23 through FY25.[28]

Identification of Co-Benefits: There are several co-benefits to installing solar on campus. Installing solar canopies over parking areas provides covered parking which protects vehicles and people from the weather, resulting in reduced cooling needs for vehicles and comfort for visitors and employees. Ground-mounted solar on greenspaces can be designed to include native plantings which promote stormwater infiltration and benefits to pollinators and birds. Additional evaluation is needed to consider any potential local environmental or wetland impacts, particularly for solar development of green space. Last, installing battery storage opportunities in addition to solar can provide a resiliency measure to reduce reliance on the electrical grid and reduce overall carbon emissions.

Operations and Maintenance (O&M): The National Renewable Energy Laboratory has resources to understand and minimize O&M costs as well as a tool to determine O&M costs based on system size, roof type, and environmental conditions.[29] Snow is rarely removed from solar photovoltaic (PV) systems because it is not cost effective and the reduction in productivity is 3% on average and 15% in very snowy environments. However, snow is sometimes removed when a dangerous amount of weight is on the system or snow is removed from the front of the array to provide clearance for snow to slide off. The cost for snow removal on average is about $50 to $75 per hour for labor and about $0.50/sf of array area. Ice dams should be removed to ensure that water drains off the roof properly, the cost is $70 on average for labor per ice-dam location and materials include a $50 rake and ice-melting supplies.[30]

28 https://www.oakgov.com/parks/getinvolved/Pages/cip.aspx

29 https://www.nrel.gov/docs/fy20osti/74840.pdf

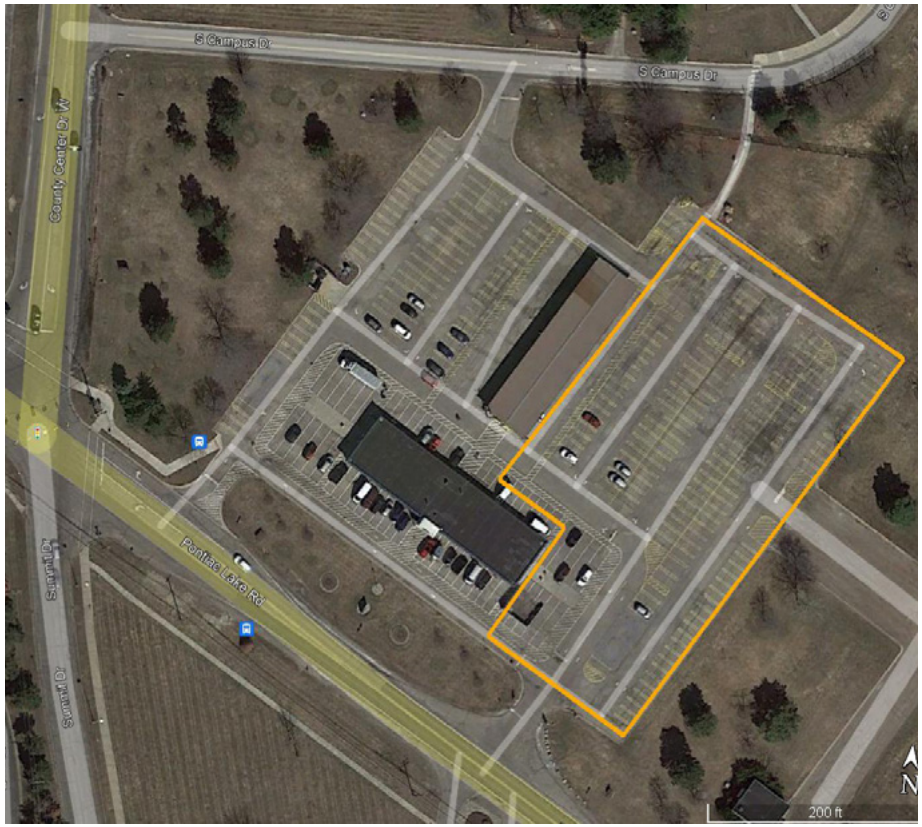
30 https://www.nrel.gov/docs/fy19osti/73822.pdf

Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

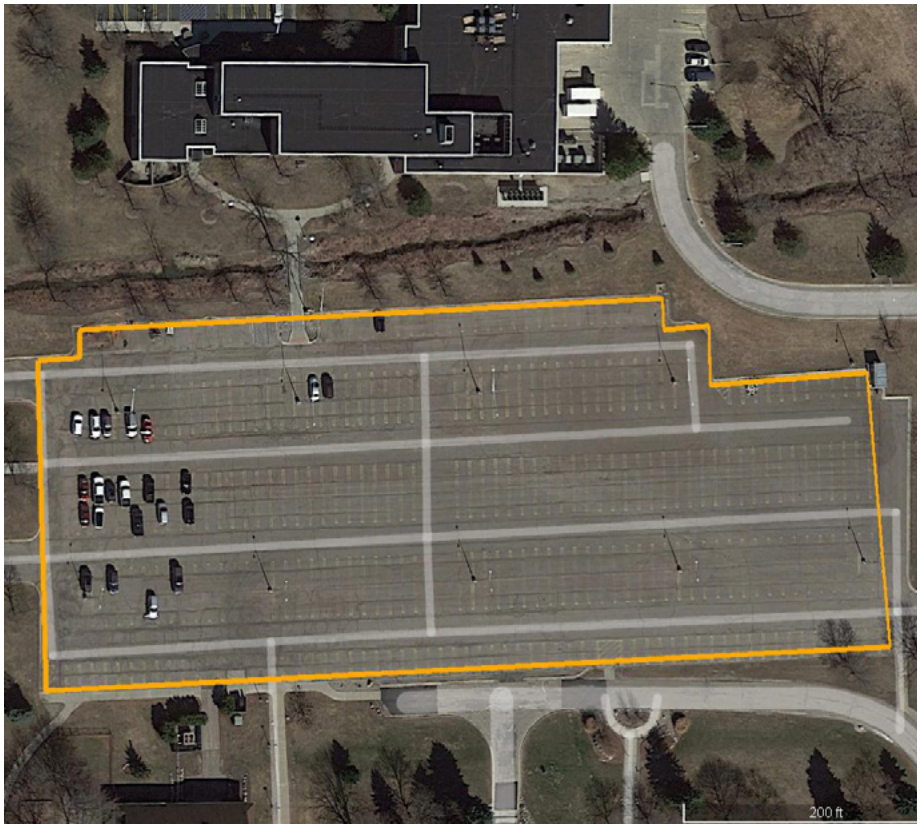
The Farmers Market parking lot could host an approximately 800 kW carport system, generating approximately 1 million kWh of electricity per year. With up front capital, ongoing O&M costs, and annual electric cost savings, it is estimated that this site would yield 4.1% ROI and have a 24.5-year payback period.

Figure 5. Potential Solar Canopy Site at Farmer's Market



The public parking lot could host an approximately 1900 kW carport system, generating about 2.5 million kWh per year. With up front capital, ongoing O&M costs, and annual electric cost savings, it is estimated that this site would yield 4.3% ROI and have a 23.3-year payback period.

Figure 6. Public Parking Lot Proposed Solar Area

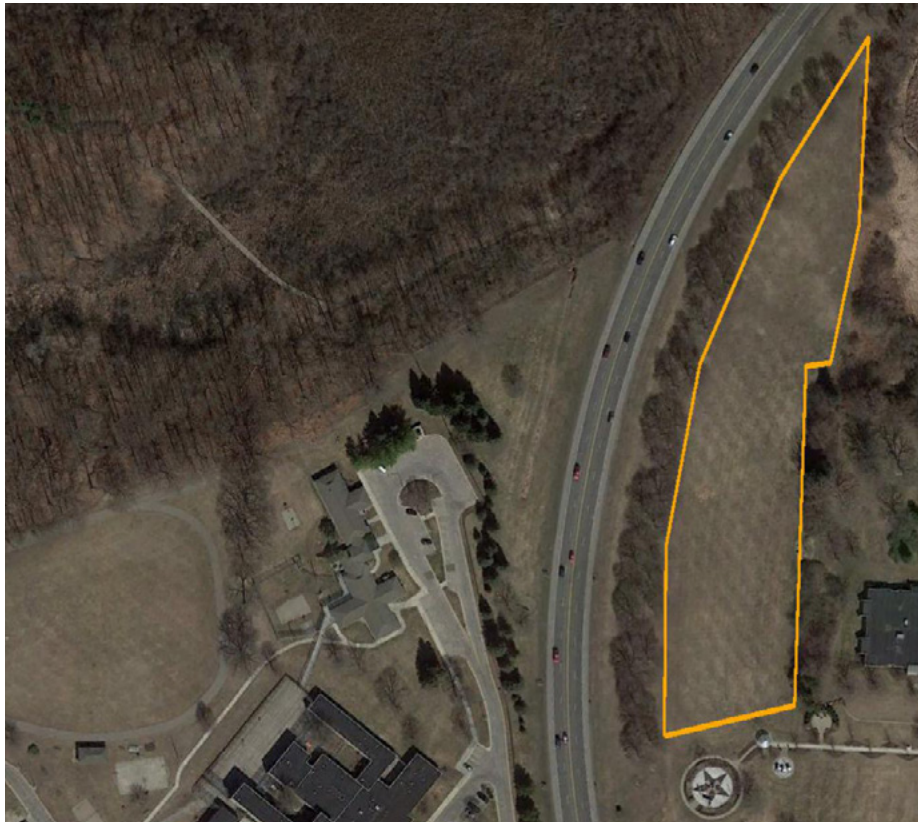


Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

The open space west of the Sheriff's Administration Building could host an approximately 2,000 kW ground-mount system, generating about 3 million kWh per year. With up front capital, ongoing O&M costs, and annual electric cost savings, it is estimated that this site would yield 9.0% ROI and have a 11.2-year payback period.

Figure 7. Possible Solar PV Site, West of Sheriff's Administration Building, Open Lot



Installation of the three preliminarily identified solar sites would result in 13% reduction in electricity emissions and 7% reduction in total emissions, from a 2018 baseline (Table 6).

Table 6. Potential GHG Emission Reduction from Solar Installation at Key Sites

	FARMERS MARKET PARKING LOT	PUBLIC PARKING LOT	OPEN SPACE WEST OF THE SHERIFF'S ADMINISTRATION BUILDING	THREE SYSTEMS COMBINED
Production (Year 1) (kWh)	1,000,000	2,500,000	3,000,000	**6,500,000**
% reduction in total 2018 electricity consumption (kWh)	2%	5%	6%	**13%**
% reduction in total 2018 electricity emissions ($MTCO_2e$)	2%	5%	6%	**13%**
Reduction in total 2018 municipal emissions	1%	3%	3%	**7%**

Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

Financial Analysis

The Farmers Market parking lot, the public parking lot, and open space west of the Sheriff's Administration Building went through initial evaluation and analysis to estimate cost, payback, and funding considerations for implementation. Based on preliminary analysis, the proposed solar installations have the following generation capacity: the Farmers Market parking lot could host an approximately 800 kW carport system, generating approximately 1 million kWh of electricity per year. The public parking lot could host an approximately 1900 kW carport system, generating about 2.5 million kWh per year. Last, the space west of the Sheriff's Administration Building could host an approximately 2,000 kW ground-mount system, generating about 3 million kWh per year.

The capital outlay, payback period, and return on investment (ROI) calculated by the county's consultants, were based on the total costs and electric savings for each of the three systems. A price per kW of $3,900 for the carport system and $1,900 for the ground-mount system respectively, including a 5% contingency, was applied to calculate the capital outlay for the carport and ground-mounted systems. By using a Tax Equity Partnership funding mechanism, bonus depreciation and the ITC was applied to the initial capital outlay (see the Partnership with Tax Equity Investor funding mechanism description for more information).

Additional costs for these systems include ongoing annual O&M costs ($5/kW) and a one-time inverter replacement cost ($10/kW) at year 15. Ongoing annual O&M costs would increase slightly each year due to inflation. Potential savings were calculated based electric cost savings. Even though solar degradation is 3% after year 1 and 1% annually thereafter, electric cost savings will increase over time due to utility rate escalation.

Capital outlay, ongoing O&M costs, inverter replacement costs, annual electric savings, payback period, and ROI for each system and the three systems combined are shown in Table 7. Figure 8 shows cumulative cashflows and breakeven points for each installation and the installations bundled.

The solar PV market is quickly evolving. As the market advances and technology improves, the costs of equipment and maintenance will decrease, and new incentives or alternative financing methods may become available. Such factors could dramatically increase the ROI and lower the payback period. Further, ground-mount systems have a higher ROI and lower payback period than the carport systems. This could be one consideration as the county prioritizes solar installations. It should also be noted that the analysis below does not place a value on the carbon reduced from the switch to solar power.

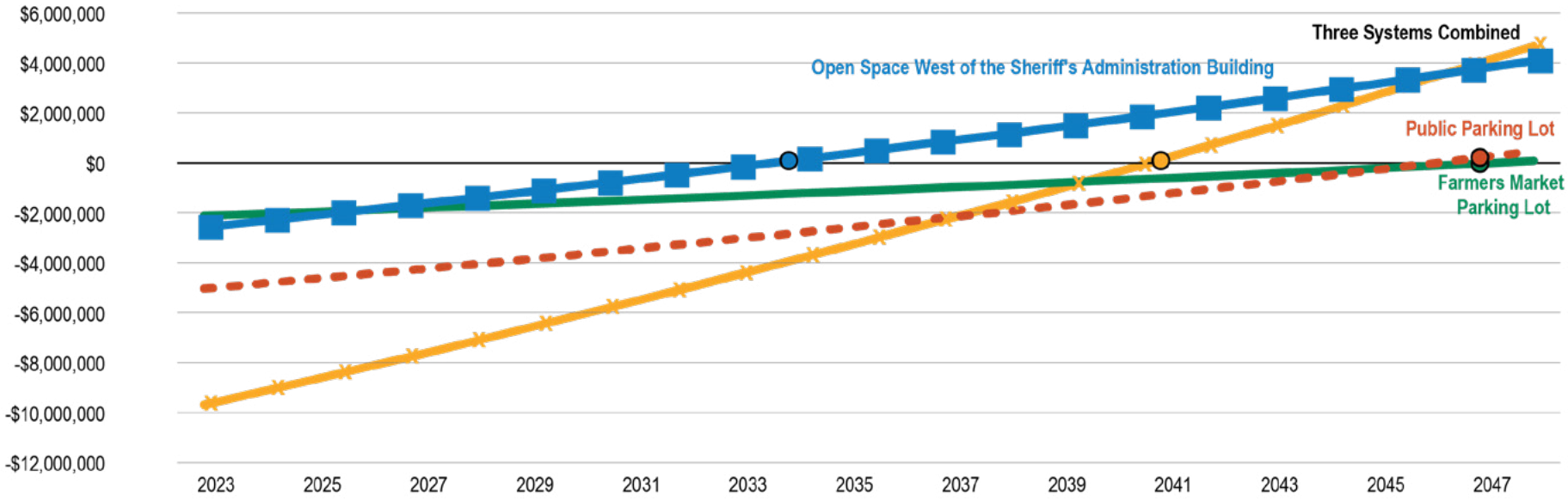
Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

Table 7. Key Solar Installation Financial Analysis Outputs

ITEM	FARMERS MARKET PARKING LOT	PUBLIC PARKING LOT	OPEN SPACE WEST OF THE SHERIFF'S ADMINISTRATION BUILDING	THREE SYSTEMS COMBINED
Capital Outlay	$2,100,000	$5,000,000	$2,600,000	$9,700,000
Ongoing Costs: Annual O&M (Year 1)	$4,000	$9,500	$10,000	$23,500
Ongoing Costs: Inverter Replacement (Year 15)	$8,000	$19,000	$20,000	$47,000
Annual Electric Savings (Year 1)	$80,000	$200,000	$240,000	$520,000
Payback Period (Years)	24.5	23.3	11.2	17.9
ROI	4.1%	4.3%	9.0%	5.6%

Figure 8. Solar Installations: Cumulative Cashflow



Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

Funding Mechanisms

Potential funding mechanisms for solar installations include:

Capital Budget: The solar PV systems costs should be included in a capital budget.

Operating Budget: Related ongoing maintenance and expenses for solar PV panels and inverters would be a part of the operating budget.

Partnership with Tax Equity Investor: Given that the ITC plays an important role in solar economics and helps lower the payback, the county should consider partnering with a tax equity investor.[31] As such, this funding mechanism was included in this financial analysis model for this strategy. The tax equity partner(s) could invest a certain percent of capital costs and claim all ITC (usually 99%) and bonus depreciation in year 1 or when the system is placed in service (per the Operating Agreement between project partners). The tax equity partner(s) would co-own the system for five to seven years to secure claimed tax benefits. After seven years, depending on the financial arrangement, the county can buy out the solar PV systems at an agreed price or Fair Market Value or transfer the ownership within the partnership.

Power Purchase Agreement (PPA): A PPA is a great option for entities that are not able to monetize tax credits or that cannot purchase solar PV systems outright. Through a PPA, a third-party solar developer would install, own, and operate an energy system on county property. The county would purchase the electricity for a predetermined period, usually 20 years. This option does not require a capital outlay from the county. The savings would be realized through the difference between the utility and PPA rates. To determine the PPA rates to calculate actual savings, the county would need to produce the RFP and collect quotes from solar developers.

Tax Exempt Bond Financing: The county could finance the solar installations through the proceeds of a tax-exempt bond issuance. The bonds would be sold to investors to raise funds for the solar installations. In return, the county would agree to repay the investors principal plus interest, which is generally exempt from federal, state, and local taxes. These bonds could qualify as green bonds to attract additional types of investors. There are two types of bonds distinguished by the source of repayment. General obligation bonds are secured by the county's pledge to repay from its taxing authority. Repayment of revenue bonds is from a specified revenue, often associated with the project being financed. When bonds are issued for solar projects, they are typically general obligation bonds; however, bonds have been issued with the savings generated by solar projects being pledged to repay the debt.

Guaranteed Energy Savings Performance Contracting (GESPC): The county can contract with an Energy Service Company (ESCO) to design, install and maintain the solar PV systems. The ESCO will guarantee that the energy savings generated from the project will be sufficient to offset the project costs, including financing. If the project does not meet the guaranteed savings, the ESCO is required to make up the shortfall to the customer. ESCOs are generally paid a negotiated fee or share in the energy savings. GESPC projects can be financed through a variety of mechanisms including bond financing or, more frequently, municipal leases. Michigan allows tax exempt lease purchases for energy conservation improvements. The lender holds title to the conservation title and

31 Tax information contained in this communication was not intended or written to be used by any person for the purpose of avoiding penalties, nor should such information be construed as an opinion upon which any person may rely. AECOM is not providing a formal opinion regarding the ITC and Depreciation. The ITC and depreciation estimate is preliminary and subject to adjustment based on actual costs.

Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

leases it for the term of the financing. At the end of the term, the lender transfers ownership to the county. This form of financing is not considered debt under Michigan law and therefore does not count toward the county's authorized debt limit.

Sustainability Revolving Fund: The county can establish a Sustainability Revolving Fund (Revolving Fund) to pay for the solar projects, or other projects that generate energy cost savings (e.g., H2. Complete Campus-Wide LED Lighting Conversion). Initial capitalization of the fund can come from grants, rebates, or appropriations from the county's General Fund. As projects are completed and ongoing, an amount equal to the energy savings would be paid back to the fund over time.[32] This would replenish the Revolving Fund which could be used for additional solar projects in facilities without additional General Fund appropriations.

Funds will be repaid and available for additional projects that will generate savings that are repaid to the Revolving Fund. For example, based on the payback period model for the open space west of the Sheriff's Administration Building, $230,000 in energy savings would be repaid to the fund after the first year and the capital outlay fully replenished by energy savings in about 11 years.

Federal, State, or Regional Programs: The Infrastructure Investment and Jobs Act (IIJA) appropriated $550 million to the **Energy Efficiency and Conservation Block Grant (EECBG) Program** to assist eligible local, county, tribal, and state governments in implementing strategies to reduce fossil fuel emissions, reduce total energy use, and improve energy efficiency for transportation and buildings. This program was previously funded back in 2009 through the American Recovery and Reinvestment Act and it is anticipated that solar projects will be eligible under this refunded program.[33]

32 Some Revolving Funds only receive a portion of the energy savings. The remaining savings accrue to the general fund. By sharing the savings, leadership may be more willing to undertake future energy projects; however, the fund will be replenished more slowly.

33 https://www.energy.gov/eere/wipo/energy-efficiency-and-conservation-block-grant-program-bipartisan-infrastructure-law-2021

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

Guiding Principles

- Provide accessible services and campus environment
- Advance the net zero carbon goal

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: Future

Strategy Type: Informative

Partners: N/A

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division

Support: Purchasing, Parks and Recreation

Oakland County taking the initiative to decarbonize its fleet will result in significant progress on reaching net zero carbon emissions. Installing EV charging infrastructure on Oakland County's campus would demonstrate the county's commitment to climate action and provide amenities to employees, residents, and visitors of the campus. Oakland County could then provide real-world accounts and education of the function, success, and opportunities electrifying large fleets and installing EV infrastructure has for a government entity. Community members may also be inspired to integrate electrification into their personal lives. As it relates to the Sustainability Plan's Guiding Principles, developing an electric vehicle infrastructure and fleet transition plan for Oakland County campus could:

- **Provide accessible services and campus environment** by providing EV charging infrastructure on campus adopting EVs becomes more accessible for campus employees. Switching to EVs for the campus fleet improves air quality and health outcomes for people on campus.
- **Advancing the net zero carbon goal** by eliminating the greenhouse gas emissions caused by gas and diesel vehicles and increasing awareness of EVs to promote widespread adoptions.

Oakland County operates a fleet of 853 vehicles across multiple departments, with the majority operated by the Sheriff's Office (233 vehicles) and the Water Resources Commission (195 vehicles). Two fleet vehicles are currently electric. There are several currently available EV alternative options for Oakland County's fleet. County fleet vehicle types vary widely from standard pool vehicles and transport vans to specialized airport maintenance, snow removal, and emergency services vehicles. These vehicles were categorized into vehicle types based on their size and function. Table 8 details the specific models identified through the sustainability planning process as potential electrified county fleet vehicle options for each vehicle type. These are intended as representative options for Oakland County. The technology and industry are ever changing to include additional model types with ranges comparable to internal combustion engine (ICE) vehicles.

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

Table 8. Electric Vehicle Alternative Options

VEHICLE	EXAMPLE MODELS
Truck - Class 6	BYD, CityFreighter CF-1, Endera Motors L, Freightliner eM2, SEA Electric MD Cutaway
Pick-Up Truck	Tesla Cybertruck, Ford F-150 Lightning
Work Van	Ford E-Transit, Envirotech Logistics Van, Maxwell Vehicles ePro
Passenger Vehicle - Hatchback	Hyundai Ioniq, Chevrolet Bolt, Audi e-tron, BMW i3, Ford Mustang Mach-E, Tesla Models
Motorcycle	Harley Davidson Live Wire, Zero SR/F, Lightning LS-218,
Passenger Vehicle - SUV	Cadillac Lyriq, Kia Niro EV, Volvo XC40 AWD BEV
Truck - Class 7 and 8	BYD 8TT, Freightliner eCascadia, Lion Electric Lion8
Multi-Purpose Delivery Vehicle (MPDV)	Canoo MPDV, Bollinger Deliver-E, Lightning System F-59 Cargo Van
Super Duty	Phoenix Zeus 500, Roush Cleantech F-650, Lion Electric Lion6, Nordresa T6, Lightning System Ford E-450,

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

In undertaking this electric vehicle infrastructure and fleet transition study, the county can develop opportunities to achieve operational savings and critical electrification investments for the fleet. To develop a fleet electrification pathway, consider identifying the following:

- Future assessment of electric fleet vehicles, including duty-cycles and charging needs, charging and electric utility infrastructure, and impacts to existing vehicle procurement and maintenance needs.
- EV fleet data management approaches, to ensure mileage, performance data, and preventative maintenance schedules can be maintained.
- EV charging policy for staff and visitors to determine campus charging needs, optimized infrastructure, and usage or fee policies. The policy may also suggest operating hours for charging user types.
- Lifecycle carbon assessment for fleet vehicle types to allow for prioritization of fleet conversion based on near-term and long-term targets, as informed by the GHG inventory.
- Campus-wide charging infrastructure plan, which includes siting and timeframes to support fleet electrification and workplace electrification. DC fast charging may be considered in some locations to support rapid charge of fleet or visitor vehicles.
- Develop vehicle procurement policy which emphasizes EVs and lifecycle savings. The county will be leading by example in demonstrating the potential for EVs to serve a range of their services while providing operational savings. Likewise, more EVs would be out on road, reducing overall fuel costs. Emerging business models may be considered, including battery swap outs, alternative battery leasing frameworks, and charging-as-a-service solutions.
- Identify applicability of emerging micromobility solutions for on-campus transportation including e-scooters and bicycles.
- Consider inclusion of off-road vehicles (e.g., lawn mowers, golf carts), which make up1% of the county's total GHG emissions, for inclusion in the transition plan for zero carbon alternatives. Electrification of on-road vehicles, which make up 15% of the county's total GHG emissions, should be prioritized.

Dual-port Level 2 chargers can be placed in public parking lots and equipped to accept the

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

Financial Analysis

Fleet electrification can lead to significant cost savings and carbon reductions for the county. A fleet analysis conducted by the county's consultants shows potential cost savings of replacing three ICE vehicle types within the county fleet with comparable EV models.

Given current depreciation and the existing replacement schedule, it is assumed that 100 fleet vehicles would be replaced over a five-year period. Potential electric vehicle alternatives were selected that are comparable to example models of existing county fleet vehicle types that have been identified as near-term replacement targets (Table 9). Cost, availability, and vehicle specifications at the time of replacement will determine actual EVs purchased.

The analysis included the cost of purchasing and installing Level 2 chargers for each vehicle and one DC Fast Charger. This is a conservative estimate of the number of chargers needed. A charging plan during the planning and implementation phases will likely result in fewer chargers and lower capital costs. Charger costs were reduced to reflect DTE rebate offerings; however, this analysis took a conservative approach, reducing the rebate amount applied to reflect the potential for rebate program modifications in the future. The charger rebate amount currently offered by DTE is $2,500, but the rebate amount used for this financial

Table 9. Replacement Vehicle Type and Comparable EV Models

VEHICLE TYPE REPLACEMENT TARGETS	EXAMPLE ICE MODEL	COMPARABLE EV MODEL
Passenger Sedan	Chevrolet Impala	Hundai Ioniq
Full-Sized Pickup	GMC Sierra 1500	Tesla CyberTruck
Multipurpose SUV	Ford Explorer	Cadillac Lyriq

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

analysis is $1,500 to reflect the potential for rebate modifications in the future.[34]

The capital outlay of $1,170,000 (present value) reflects the current price differential of the EV models over ICE vehicles and the purchase and installation price of EV chargers. Cost savings were calculated based upon a comparison of EV versus ICE vehicle models' fuel costs. For purposes of this analysis, no future year escalation rate was applied to electricity prices. This provides a more conservative approach to comparing costs given recent increases and volatility of gasoline prices. Results are listed below and shown in Figure 9 and Figure 10. Although not included in the analysis, it should be noted that revenues could be produced by offering charging services to the public utilizing the charging infrastructure installed for county vehicles. A feasibility study is needed to quantify the revenue potential.

- Capital Outlay: $1,170,000
- Annual Fuel Savings for Electric Vehicle Models Versus Comparable ICE Models:
  - Ioniq: $3,790
  - CyberTruck: $4,730
  - Lyriq: $4,000
- Payback Period: 7 years
- ROI: 21.6% over ten years

Figure 9. EV Fleet and EV Chargers: Cumulative Cash Flow

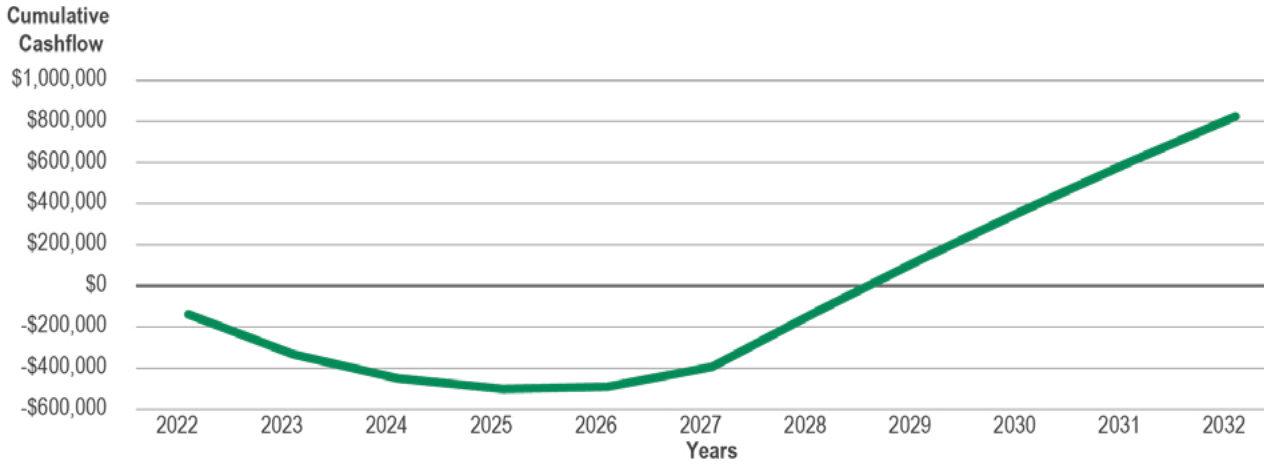
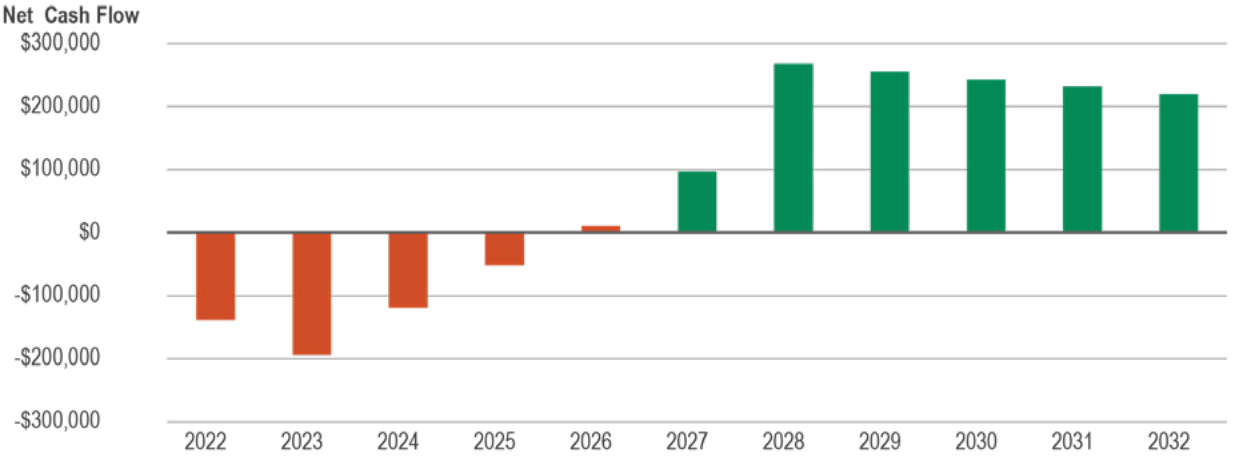


Figure 10. EV Fleet and EV Chargers: Annual Cash Flow



34 https://newlook.dteenergy.com/wps/wcm/connect/dte-web/home/service-request/business/electric/electric-vehicles/pev-biz-fleet

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

Funding Mechanisms

Potential funding mechanisms for EV replacements and associated costs could include:

Capital Budget: The scheduled replacement of existing vehicle and charger purchase costs should be included in a capital budget.

Operating Budget: Charger-related ongoing maintenance and expenses would be a part of the operating budget.

Rebates: Utility rebates are available through **DTE Energy's Charging Forward program** which offers a commercial fleet rebate of up to $2,500 per port for Level 2 chargers and up to $70,000 for DC fast chargers. These rebates are available on a first come serve basis on an installation site of up to 100 chargers and cover 30% to 50% of the cost of EV charging infrastructure.[35]

Federal, State, or Regional Programs:

The recently passed IIJA included the investment of $7.5 billion to build a national network of electric vehicle chargers in the United States with an initial goal of 500,000 EV chargers to accelerate the adoption of EVs, reduce emissions, improve air quality, and increase green jobs. Priority in funding is to be given to "rural areas; low- and moderate-income neighborhoods;" and "communities with a high ratio of multiunit dwellings to single family homes" with grant sizes up to $15 million per project.

The IIJA specifically introduced **Charging and Fueling Infrastructure Grants** which support the deployment of EV charging and other low-carbon fueling infrastructure with a set-aside for charging stations in publicly accessible locations such as public buildings and parks.

The IIJA appropriated $550 million to the **EECBG Program** to assist eligible local, county, tribal, and state governments in implementing strategies to reduce fossil fuel emissions, reduce total energy use, and improve energy efficiency for transportation and facilities. This program was previously funded back in 2009 through the American Recovery and Reinvestment Act and it is anticipated that clean transportation projects will be eligible under this refunded program.[36]

Southeast Michigan Council of Governments' (SEMCOG) Planning Assistance Program: SEMCOG has provided funding for local planning in a variety of areas since 2019. The FY2023 offering included grants of up to $50,000 for planning in six areas of regional significance, including Electric Vehicle Infrastructure Planning which could be used for feasibility studies or other EV planning efforts. These grants required an 18.5% local match. The FY2023 application window closed in May 2022; however, this program should be monitored for future opportunities.

Tax Exempt Bond Financing: The county could finance the conversion of ICE vehicles to EVs with the proceeds of a tax-exempt general obligation bond issuance. Given the relatively small size of capital outlay, the county will first determine that bond financing would be cost effective for the project.

35 https://newlook.dteenergy.com/wps/wcm/connect/dte-web/home/service-request/business/electric/electric-vehicles/pev-biz-fleet

36 https://www.energy.gov/eere/wipo/energy-efficiency-and-conservation-block-grant-program-bipartisan-infrastructure-law-2021

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

Public Charging Fees: In certain locations, EV chargers can be used for county vehicles and be available for public charging for a fee. Public charging fees could be used to offset additional vehicle electrification expenses or placed in the county's General Fund.

Dual-port Level 2 chargers can be placed in public parking lots and equipped to accept the county's Voyager Card, or similar purchase card, for fleet charging and other forms of payment for the public. A feasibility study should be conducted to determine appropriate locations and revenue potential. Considerations for placement would include, among others, public access, security for fleet vehicles, and proximity and convenience for fleet vehicle users. With dual-port chargers, one port can be available on a first come, first served basis, and the other restricted to county use always or during certain hours as need to ensure fleet vehicles are adequately charged.

Two business models are possible for this opportunity. The county can administer the program, or partner with an established charging company which could be responsible for various business functions such as billing in exchange for a set fee or portion of the revenues.

High-Performance Buildings

Maximize efficient and low-carbon use of energy, water, and material resources within county facilities to the highest degree possible, while considering the design, facility operation and use, and maintenance requirements.

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Objectives and KPIs

Reduce building energy use, as measured by building energy use intensity (kWh or MMBtu/square foot).

Increase building water efficiency, as measured by gallons of potable water use per square foot.

Electrify county buildings, as measured by the percentage of buildings fully electrified.

Increase construction waste diversion rate, as measured by percent of construction waste diverted from landfills.

Buildings generate GHG emissions through their on-site energy use, making up 76% the county's GHG emissions. The majority of these emissions come from using natural gas (23%) and electricity (50% to 55%) for heating, cooling, lighting, appliances, and water heating and delivery. By increasing county building performance, the county can more efficiently use energy and water, resulting in decreased emissions, improved air quality and comfort, and reduced operational costs. Increasing energy and water efficiency is critical to reaching the county's net zero carbon goal.

The Oakland County International Airport achieved the U.S. Green Building Council's LEED Gold Certification in 2012. To obtain this certification, the building was designed to fulfill prerequisites and credits included in the LEED Green Building Rating System™ that address carbon, energy, water, waste, transportation, materials, health, and indoor air quality.[37]

37 https://www.usgbc.org

Table 10. High-Performance Building Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
H1	Perform Energy Audits at Target Facilities					X		X					X			Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing	
H2	Complete Campus-Wide LED Lighting Conversion*					X		X					X		X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Purchasing, Human Resources	
H3	Continue Investment In Energy Efficiency Measures*					X		X					X		X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Purchasing, Human Resources	
H4	Perform a Campus-Wide Water Audit					X		X							X	Facilities Management	WRC	
H5	Continue Investment in Water Efficiency and Conservation Measures*					X		X							X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Purchasing, Human Resources	
H6	Develop Sustainable New Construction and Major Renovation Standards					X							X	X	X	Office of Sustainability, Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing, WRC, Parks and Recreation	

LEGEND: (*) In Progress

High-Performance Buildings

H1 Perform Energy Audits at Target Facilities

Guiding Principles

Advance the net zero carbon goal

County Strategic Goals

Environmental Sustainability

Organizational Excellence

Development Stage: In Progress

Strategy Type: Informative

Partners: N/A

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division

Support: Purchasing

Through a previous facility energy efficiency assessment in 2010, the county began to evaluate on-site energy usage and strategies to improve energy efficiency. The assessment identified behavioral changes, retrofits, and energy management systems that would improve efficiency on campus. The implementation of these changes resulted in a 15% decrease in energy usage across campus. However, the energy needs and opportunities for efficiency improvements have changed since 2010 with aging buildings and advancements in available technology.

Campus-wide energy audits completed every five years would fill persisting information gaps, keep data up to date and relevant, and identify opportunities to improve system-wide infrastructure condition and enable efficiencies. As it relates to the Sustainability Plan's Guiding Principles, performing energy audits on campus facilities could Advance the net zero carbon goal by identifying short term energy efficiency improvements to reduce emissions from on-site energy use.

This strategy is aligned with the county's Strategic Framework goal areas of Environmental Sustainability and Organizational Excellence by providing energy saving investments that also have associated cost savings and carbon reduction potential.

The first step for conducting audits is to gather data, both regarding energy consumption and the equipment or facilities that consume energy. Data on facilities that consume energy would include an examination of building envelope, lighting, HVAC, domestic hot water, plug loads, and compressed air for all buildings. Energy usage data can be used to determine base loads, seasonal variation, and efficient energy costs. Further assessment can include building air quality, temperature, ventilation, humidity, and other conditions that affect energy performance. This data can then be used to model the impacts of potential energy efficiency changes and produce reports of energy efficiency recommendations. Completing energy audits every five years can ensure that building energy data remains up to date and allows for new improvements in efficiency to be implemented. Major, non-steam plant connected facilities, such as the IT Data Center, should be prioritized for auditing and implementing energy efficiency mechanisms. Energy audit identified upgrades for facilities connected to the steam plant should align with outcomes of the county's steam plant decarbonization study efforts. In addition, the current county lifecycle plan for heating and cooling system upgrades and replacements involves an opportunity for revision every five years. Completing energy audits on a five-year cycle as well can help inform these heating and cooling revisions.

High-Performance Buildings

H1 Perform Energy Audits at Target Facilities

Energy audits should be performed in line with industry standard approaches, such as American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Level II. The county may also leverage utility or other funding opportunities to help offset the cost of energy audit studies, such as programs offered by DTE. Energy audits can also be expanded in scope to include consideration of opportunities for beneficial electrification, such as use of newer efficient, electric appliances.

Table 11. Facilities Connected to the Central Steam Plant

Administrative Annex II
Central Garage
Central Services Building
Courthouse Complex 12E/
Day Care Center
Health Center – Pontiac
Information Technology
L Building (attached to Heat Plant)
Law Enforcement Complex
MCF – Lab Only
North Oakland Health Center
North Office Building
Sheriff's Administration Building

Table 12. Campus Facilities Not Served by Central Steam Plant

Administrative Annex I
Animal Shelter and Pet Adoption Center
Children's Village "A" Bldg.
Children's Village "C" Bldg.
Children's Village "D" Bldg.
Children's Village "G" Bldg.
Children's Village "H" Bldg.
Children's Village "J" Bldg.
Children's Village "K" Bldg.
Children's Village School
D Building
East Annex
Executive Office Building
Health Center – Southfield
Medical Examiner's Facility
Oakland Pointe – East
Oakland Pointe – West
Paint Shop (Near RR Tracks)
Patrol Services
Public Works Building
Rochester District Court
Service Center – Pontiac
South Oakland Office Building

High-Performance Buildings

H2 Complete Campus-Wide LED Lighting Conversion

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation

Support: Purchasing, Human Resources

LED lighting is an industry standard energy efficient technology which can support major energy savings on short time scales. The county has already begun the process of replacing incandescent, fluorescent, high-pressure sodium, and other energy-intensive lighting technologies with newer, highly efficient LED bulbs and fixtures. However, many opportunities for LED retrofit remain, and there is limited current tracking of retrofitted and non-retrofitted areas. A comprehensive, one-time assessment and investment in conversion is recommended to complete this transition. As it relates to the Sustainability Plan's Guiding Principles, completing campus-wide LED lighting conversion could:

- **Advance the net zero carbon goal and maximize resource efficiency** by switching to a lighting system that uses less energy, increasing energy efficiency, and reducing campus dependence on greenhouse gases.

This strategy also aligned with the county's Strategic Framework goal areas of Environmental Sustainability and Organizational Excellence as LED lighting conversion and lighting controls can result in both energy and cost savings.

The strategy also supports standardization of workplace guidelines by promoting consistent lighting technologies and controls.

A campus-wide lighting inventory, including indoor and outdoor lighting, can establish the current extent of LED upgrades and inform gaps in the current transition. The inventory should include a count of non-LED bulbs, identify the lighting control (switches, schedule, motion sensor, 24/7 operation), identify the current bulb and fixture specifications, and any current lighting issues or deficiencies. The inventory should also identify any barriers to implementation, including the need to replace fixtures where a drop in LED is not feasible.

In addition to more efficient lighting, control types and levels may be assessed. This can allow for either automated operation, such as motion sensors or schedules, or increased manual controls to enable staff to selectively turn on lights when present outside of normal operating hours. Day-light harvesting may be an additional solution, where lights near windows are controlled based on sunlight levels and dim up or down to maintain proper illumination throughout the day.

Following the inventory, the campus should include all new LED fixtures in its procurement plans and policies to ensure persistence of savings and continued availability of replacement bulbs as needed (see strategy S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities).

High-Performance Buildings

H2 Complete Campus-Wide LED Lighting Conversion

Financial Analysis

Completing the lighting inventory detailed in this strategy would allow the county to determine remaining LED lighting conversion and lighting control opportunities as well as other information, such as bulb and fixture specification needs. For the purpose of this preliminary financial analysis, it is assumed that 80% of the county's building square footage has not yet had lighting converted to LED. Similarly, while there are various lighting control opportunities that should be assessed for applicability on a site-by-site basis, only installation of motion sensors for the purpose of this analysis were included.

These high-level assumptions were used by the county's consultants to determine the capital outlay, payback period, and ROI for the remaining LED lighting conversion and motion sensor installation based on estimated equipment costs, labor costs, and energy savings. Based on the market value of lamps, fixtures, controls, and associated installation labor, an initial capital outlay of approximately $3,4000,000 was calculated. Given that state and utility rebates and incentives are available for energy efficiency upgrades, a 10% rebate was applied to determine the upfront cost. The actual value of rebates would depend on the specifics of the final conversion which would be determined through the inventory. Potential savings were calculated by estimating electricity cost savings due to more energy efficient fixtures, and less overall energy use through the utilization of motion sensor lighting controls. Additional savings were calculated via avoided maintenance and materials given that LED lighting fixtures have a 1% failure rate compared to 20% and 10% failure rates for existing fluorescent bulbs and ballasts respectively. Electric and maintenance cost savings would increase slightly each year due to escalation of electric rates and inflation rates for lighting and control equipment and labor. Results are listed below and shown in Figure 11 and Figure 12.

- Capital Outlay: $3,400,000
- Annual Savings (Year 1):
  - Electric: $500,000
  - Maintenance: $166,000
- Payback Period: 4.8 years
- ROI: 20.6%

High-Performance Buildings

H2 Complete Campus-Wide LED Lighting Conversion

Figure 11. LED Lighting Conversion and Motion Sensor Upgrade: Annual Cash Flow

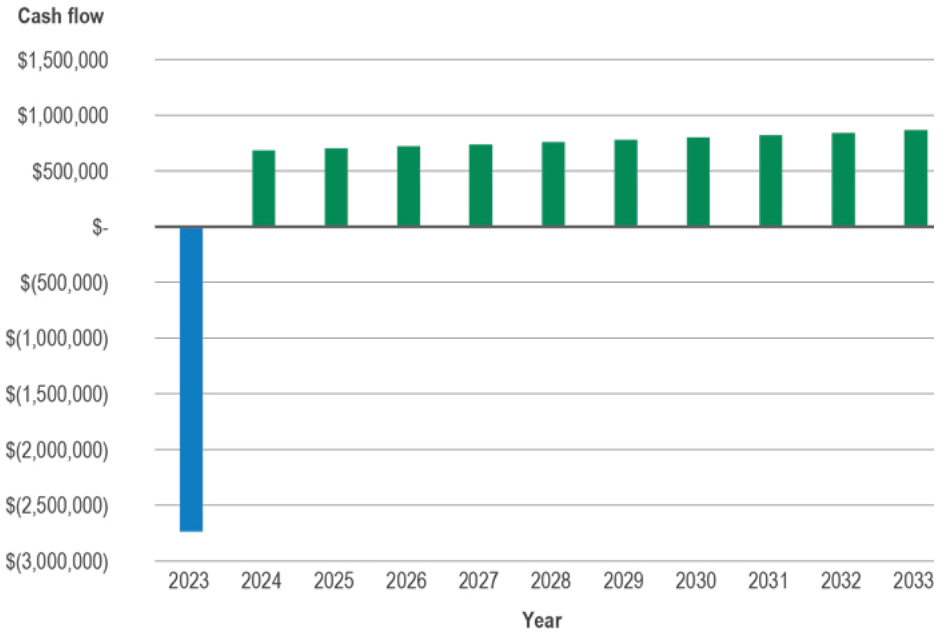
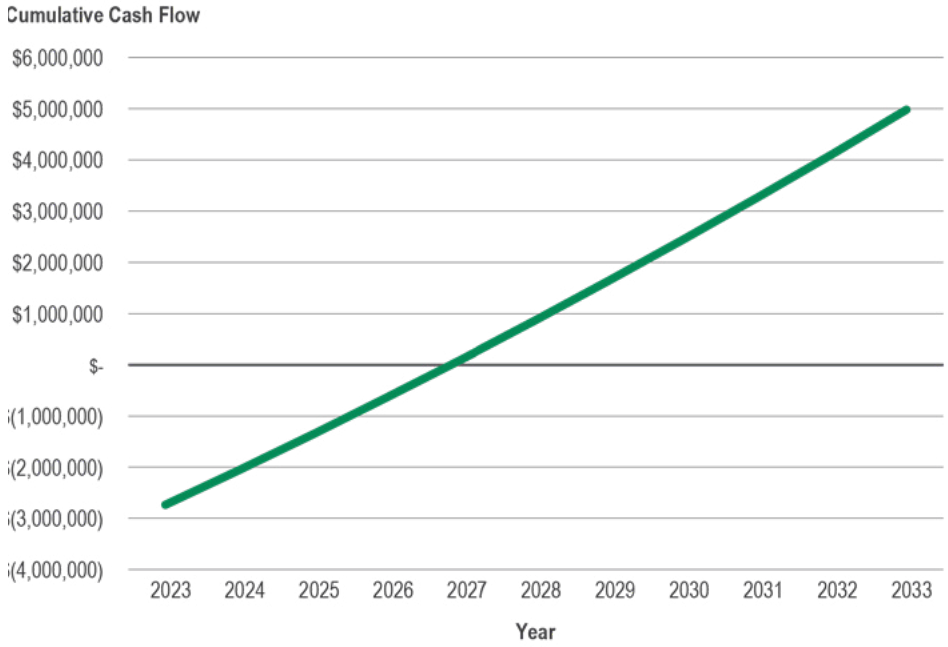


Figure 12. LED Lighting Conversion and Motion Sensor Upgrade: Cumulative Cash Flow



High-Performance Buildings

H2 Complete Campus-Wide LED Lighting Conversion

Funding Mechanisms

Potential funding mechanisms for LED light conversion and lighting controls installation include:

Capital Budget: The modest, upfront LED lighting conversion costs should be included in a capital budget.

Operating Budget: If there are increased ongoing maintenance and expenses, they would be a part of the operating budget.

Rebates: DTE offers the following programs:

- **Lighting Instant Discount Program:** DTE has partnered with participating distributors to make it easy to purchase qualifying LED lamps (usually bulbs only). Products are discounted instantly, with no additional rebate forms or applications to fill out.[38]
- **Prescriptive Incentives:** These incentives are paid based on the quantity, size and efficiency of the equipment.[39]
- **Michigan Saves Energy Efficiency Program for Business:** DTE Energy, in partnership with Michigan Saves, is offering 0% financing up to $150,000 for an energy efficiency project that receives prescriptive measure incentives through their Energy Efficiency Program for Business.[40]

Sustainability Revolving Fund: The county can establish a Sustainability Revolving Fund (Revolving Fund) to pay for the LED lighting conversion, or other projects that generate energy cost savings (e.g., F2. Pursue On-Site Solar Generation at Key Campus Locations). Initial capitalization of the fund can come from grants, utility rebates, or appropriations from the county General Fund. As projects are completed and ongoing, an amount equal to the energy savings would be paid back to the fund over time.[41] This would replenish the Revolving Fund which could be used for additional energy efficiency projects in Oakland County facilities without additional General Fund appropriations.

The LED lighting conversion is an ideal initial project to establish the Revolving Fund given the short payback period. Funds will quickly be repaid and available for additional projects that will generate savings that are repaid to the Revolving Fund. Based on the payback period model for this strategy, more than $250,000 in energy savings would be repaid to the fund after the first year and the capital outlay fully replenished by energy savings in less than seven years.

Tax Exempt Bond Financing: The county could finance the LED lighting conversion through the proceeds of a tax-exempt bond issuance. The bonds would be sold to investors to raise funds for the LED lighting conversion. In return, the county would agree to repay the investors principal plus interest, which is generally exempt from federal, state, and local taxes. These bonds could qualify as green bonds to attract additional types of investors. When bonds are issued for energy efficiency projects, they are typically general obligation bonds; however, bonds have been issued with the savings generated by the project being pledged to repay the debt.

38 https://www.newlook.dteenergy.com/wps/wcm/connect/dte-web/home/save-energy/business/programs+and+offers/lighting+discounts

39 https://www.newlook.dteenergy.com/wps/wcm/connect/dte-web/home/save-energy/business/incentives/presctiptive+incentives

40 https://www.newlook.dteenergy.com/wps/wcm/connect/dte-web/home/save-energy/business/incentives/michigan+saves

41 Some Revolving Funds only receive a portion of the energy savings. The remaining savings accrue to the general fund. By sharing the savings, leadership may be more willing to undertake future energy projects; however, the fund will be replenished more slowly.

High-Performance Buildings

H2 Complete Campus-Wide LED Lighting Conversion

Guaranteed Energy Savings Performance Contracting (GESPC): The county can contract with an Energy Service Company (ESCO) to design, install and maintain LED lighting conversions, or other energy efficiency projects. The ESCO will guarantee that the energy savings generated from the project will be sufficient to offset the project costs, including financing. If the project does not meet the guaranteed savings, the ESCO is required to make up the shortfall to the customer. ESCOs are generally paid a negotiated fee or share in the energy savings. GESPC projects can be financed through a variety of mechanisms including bond financing or, more frequently, municipal leases. Michigan allows tax exempt lease purchases for energy conservation improvements. The lender holds title to the conservation title and leases it for the term of the financing. At the end of the term, the lender transfers ownership to the county. This form of financing is not considered debt under Michigan law and therefore does not count toward the county's authorized debt limit.

Federal, State, or Regional Programs:

The Infrastructure Investment and Jobs Act (IIJA) appropriated $550 million to the **Energy Efficiency and Conservation Block Grant (EECBG) Program** to assist eligible local, county, tribal, and state governments in implementing strategies to reduce fossil fuel emissions, reduce total energy use, and improve energy efficiency in the transportation, building, and other appropriate sectors. This program was previously funded back in 2009 through the American Recovery and Reinvestment Act and it is anticipated that energy efficiency projects will be eligible under this refunded program.[42]

The IIJA introduced a new program, **Energy Efficiency Revolving Loan Fund Capitalization Grant Program**. This program is still being defined but will result in additional funds to States to support revolving loan funds. The program should be monitored as the county may have access to expanded or new revolving funds from the State for energy efficiency projects.[43]

42 https://www.energy.gov/eere/wipo/energy-efficiency-and-conservation-block-grant-program-bipartisan-infrastructure-law-2021

43 https://www.energy.gov/bil/energy-efficiency-revolving-loan-fund-capitalization-grant-program

High-Performance Buildings

H3 Continue Investment In Energy Efficiency Measures

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation

Support: Purchasing, Human Resources

Energy efficiency is a core component of any net zero strategy and often produces the most immediate and low-cost opportunities for carbon emissions reductions. Demonstration of the technologies and practices that lead to increased energy efficiency at key campus facilities and communication of associated savings and technologies deployed may serve as a model for the broader community. As discussed in strategy H1. Perform Energy Audits at Target Facilities, the county performed a successful energy audit in 2010 that identified opportunities for energy efficiency improvements that upon implementation resulted in a 15% reduction in energy usage campus wide.

The county has made energy efficiency investments at various campus locations, including use of variable speed drives in the HVAC systems and use of efficient technologies in newer facilities. These efficient technologies included the installation LED lighting discussed the previous strategy, replacement of single paned windows with double paned windows in campus buildings to improve insulation, and installation of smart meters in campus buildings to track energy usage. Other improvements were behavioral such as shifting custodial schedules to work in the same parts of the building at the same time so lighting could be turned off in other areas, adjusting the heating and cooling set points, establishing no-mow zones on campus to reduce mower emissions, and removing all personal appliances from offices.

This strategy aims to work with the momentum of these existing energy efficiency measures by continuing to invest in energy efficiency improvements as they arise. As it relates to the Sustainability Plan's Guiding Principles, continuing investment in energy efficiency measures could:

- **Maximize resource efficiency and advance the net zero carbon goal** by continuing to seek out technologies, behaviors, and management systems that reduce the amount of energy used to conduct campus operations, reducing energy needs of the county, dependence on fossil fuels, and energy cost.

Every five years when energy audits are completed, the county will identify new opportunities for improvements and can continue to make energy efficiency changes. Technical interviews with stakeholders for this report highlighted more efficient roofing and updating HVAC systems as additional energy efficiency improvements the county could consider. Also, as available technology advances the county can stay vigilant about taking advantage of opportunities to install new technology, perform retrofits, or implement new behavioral best practices for energy efficiency.

High-Performance Buildings

H4 Perform a Campus-Wide Water Audit

Guiding Principles

Maximize resource efficiency

County Strategic Goals

Environmental Sustainability

Organizational Excellence

Development Stage: In Progress

Strategy Type: Informative

Partners: N/A

Teams

Lead: Facilities Management

Support: Water Resources Commissioner's Office

Through past facility condition assessments, the county has begun to evaluate the condition of on-site water infrastructure. However, the condition of several water mains serving campus facilities is still unknown, and there may be irregularities in other data used to assess facility water performance. For example, in 2019, some facilities consumed several times (up to about 11.5 times) more water in July than in other summer months.

A campus-wide water audit would fill persisting information gaps, uncover potential reasons for data inconsistencies, and identify opportunities to improve system-wide infrastructure condition and enable efficiencies. As it relates to the Sustainability Plan's Guiding Principles, completing a campus-wide water audit could:

- **Maximize resource efficiency** by taking a data driven approach to understanding the campus water system and water waste in order to better manage and implement water efficiency measures.

A campus-wide water audit can identify:

- Water leaks in water mains or facility-level equipment and solutions to minimize losses and rebalance water consumption.
- Facilities with service lines that are incompatible with low-flow plumbing fixtures (if service lines are too large, water-efficient fixtures may provide insufficient flow to completely flush solids through the system) and potential resolutions.
- Opportunities to install flow meters to increase the accuracy and reliability of collected data.

The first step for conducting a water audit is to gather data, both regarding water consumption and the equipment or facilities that consume water (e.g., building occupancy, equipment specification sheets). A preliminary review of existing asset condition and water usage data can be used to identify areas of focus during the audit and develop a clear schedule of events to ensure all assets are evaluated in a streamlined manner. Next, auditors perform a thorough site survey to validate or identify inconsistencies and gaps in existing data. Together, these resources will enable auditors to develop a water balance and identify water losses and conservation opportunities. The American Water Works Association's (AWWA) manual for Water Audits and Loss Control Programs could be a useful tool to facilitate the audit process.[44] The Public Building Water Auditing Best Practices guide developed by the Nevada Governor's Office of Energy is a less technical resource that could also provide initial direction.[45]

44 The full manual must be purchased and can be done so here. The table of contents and first chapter are freely available.

45 Nevada Governor's Office of Energy (2017). Public Building Water Auditing Best Practices. https://energy.nv.gov/uploadedFiles/energynvgov/content/Programs/Public%20Building%20Water%20Auditing%20Best%20Practices.pdf

High-Performance Buildings

H4 Perform a Campus-Wide Water Audit

Analysis of and investment in water infrastructure not owned by the county will require coordination between the City of Pontiac and Waterford Township. Each community serves half of the campus. To streamline the audit process, the county should request the utility share any available data that is not provided on bills and be present at site surveys.

The audit can be paired with implementation of other strategies, such as an energy audit, to maximize resource efficiency by identifying efficiency solutions across the energy-water nexus. In addition, the scope of the audit could be expanded past domestic water systems to also consider irrigation and stormwater systems, and thus potentially identify solutions to optimize the county's irrigation system.

What is the energy-water nexus?

Energy is used to extract, transport, purify, and heat or cool water – this relationship is the water-energy nexus.

High-Performance Buildings

H5 Continue Investment in Water Efficiency and Conservation Measures

Guiding Principles

Maximize resource efficiency

County Strategic Goals

Environmental Sustainability

Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management, Parks and Recreation

Support: Water Resources Commissioner's Office

In addition to campus-scale water efficiency opportunities uncovered by the campus water audit, the county can expand implementation of low-flow plumbing fixtures as existing fixtures require replacement, existing facilities undergo renovation, and new facilities are constructed. Low-flow plumbing fixtures include low-flow sink faucets (e.g., faucets with aerators, which have already been installed in service center buildings), low-flow shower heads, dual flush toilets, and waterless urinals. Implementing water conservation measures are a relatively low-cost avenue for improving water efficiency and result in long-term cost savings.

Furthermore, water conservation measures limit energy required to transport, heat, or cool water, resulting in improved facility energy efficiency and mitigated carbon emissions. As it relates to the Sustainability Plan's Guiding Principles, continuing investment in water efficiency and conservation measures could maximize resource efficiency by implementing new technology and management strategies to reduce water waste and reduce inefficiencies in the water system. Improving the water system can also improve energy efficiency and further maximize resource efficiency on campus.

In addition, the county may consider opportunities to reduce potable water consumption through utilizing graywater or collected rainwater for non-potable applications (e.g., to flush toilets, for lawn irrigation, as process water in cooling or other industrial applications). To start, the county could conduct a study to assess feasibility of supplying graywater to facilities from one of its treatment plants, or if annual rainfall would provide sufficient capacity to offset irrigation demand and generate a return on the investment. Any strategies that result from this study should be designed in compliance with Appendix A of the 2015 Michigan Plumbing Code.[46]

Adoption of low-flow and graywater or rainwater collection systems will require the county to provide education and training opportunities on proper use and maintenance of these systems (particularly to abate any negative perspective of graywater recycling systems, even when use is limited to non-potable functions). Proper use and maintenance of low-flow fixtures will sustain the lifespan of the new, water conservation measures, providing usage and cost savings over time.

46 https://up.codes/viewer/michigan/mi-plumbing-code-2015/chapter/A/nonpotable-water-systems#A

High-Performance Buildings

H6 Develop Sustainable New Construction and Major Renovation Standards

Guiding Principles

- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability

Development Stage: In Progress

Strategy Type: Foundational

Partners: N/A

Teams

Lead: Office of Sustainability, Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division

Support: Purchasing, WRC, Parks and Recreation

Establishing a sustainable building standard for new construction and major renovation aligned with the county's sustainability Focus Areas and Guiding Principles can result in reduced greenhouse gas emissions, increased resilience to climate change and extreme weather events, healthier buildings, and reduced energy costs. Establishing and implementing a sustainable building standard is critical to achieving the county's net zero emissions goal as the buildings and facilities sector accounts for 76% of total county operational emissions. These emissions result from on-site use of electricity (53%), natural gas (23%), and fuel oil (1%). Sustainable buildings can support enhanced energy resilience by limiting critical energy load and increase climate resilience by helping to normalize indoor temperatures during extreme heat and cold events. Further, sustainable building features can create healthier building environments for county staff and visitors.

This strategy can advance the following sustainability Guiding Principles:

- **Advance the net zero carbon goal** by Implementing building standards that require measures to decrease energy use and reliance on fossil fuels. Also, require construction waste diversion requirements to limit emissions from solid waste disposal processes. When appropriate, adopt enabling infrastructure standards for county fleet electrification that will lead to reduced vehicle fleet emissions.
- **Improve air quality** through healthy building measures, like sealing and ventilation. In addition, reduce greenhouse gas emissions and harmful air pollutants from energy use, improving air quality. Reduce impact on the environment and contribute to diversity of the biosphere.
- **Maximize resource efficiency** by reducing utility costs through implementation of energy and water efficiency measures and energy demand management.

The county does not have an existing sustainable building standard. However, Michigan commercial buildings must comply with the International Energy Conservation Code (IECC) 2015 model energy code and ASHRAE 90.1-2013 energy efficiency standard. Michigan is in the process of updating their commercial building model energy code to IECC 2021. The Michigan Healthy Climate Plan also includes a strategy to include provisions to the IECC 2021 model energy code to support electric vehicle charging and other climate mitigation solutions (e.g., energy storage, renewable energy, and building decarbonization). Along with other

High-Performance Buildings

H6 Develop Sustainable New Construction and Major Renovation Standards

local governments, the county joined the U.S. Green Building Council's 2022 Leadership in Energy and Environmental Design (LEED) for Cities and Local Government Leadership Program to receive support for attaining LEED certification.

Sustainable building standards can cover various subject areas in addition to energy, such as planning and design, water, material management, environmental quality, governance, and socio-economic impact. Various funding mechanisms can be considered to reduce costs of sustainable building measures, such as utility incentives and rebates, state or federal funding opportunities, energy savings performance contracting (ESPC), or tax-exempt bond financing.[47] To integrate sustainability Guiding Principles and advancement of sustainability objectives into building new construction and renovation projects, it is recommended that the county establish a holistic sustainable building standard.

The county can follow the phases outlined below to develop its sustainable building standard:

Phase 1: Develop a goal framework. Review both existing and aspirational priorities and requirements to identify goals for the sustainable building standard. Existing priorities and requirements that the sustainable building standard should align with can include, but may not be limited to, the county's net zero carbon goal, sustainability objectives and key performance indicators (KPIs), OSHA standards, and Americans with Disabilities Act (ADA) compliance standards. Aspirational priorities might include specific targets that the county would set through decarbonization planning based on its greenhouse gas (GHG) inventory. The county can conduct a benchmark review of buildings standards adopted by peer municipalities or organizations with campus style sites to further understand current best practices.

Phase 2: Define the scope for the building standard. The county can determine what facility specifications (e.g., size, function, occupancy type) are included and not included under the sustainable building standard. Further, the county can specify what level of renovation is included and not included under the sustainable building standard. The county could consider requiring tiered levels of standard depending on scope. For example, the county could require new buildings to achieve net zero carbon energy use or net zero carbon energy-ready design while requiring majorly renovated facilities to attain a lower tiered level of energy performance. In addition to net zero carbon requirements, the county can create a product database that declares the product contents, where it's coming from, and where it goes at the end of its life. This could help contractors match materials to indoor air quality standards, understand the safety of certain chemicals, and, where possible, source materials closer to the building site.

Phase 3: Develop sustainable building standards to achieve the established goals for in-scope buildings. Ensure that standards align with building and engineering solutions presented in existing sustainability and resilience planning efforts (e.g., sustainability plan strategies, future vehicle fleet decarbonization planning, future decarbonization planning, transparency platform for materials and products).

Phase 4: Establish a process to integrate the sustainable building standard into decision making processes, like budget planning and bid processes.

Phase 5: Establish a process to check compliance and goal performance. Measure compliance and goal performance by tracking each building's energy consumption data, water usage data, material removal and installation quantities, and other relevant building information aligned with the goal framework for 12 consecutive months.

47 All listed potential funding mechanisms do not apply to all sustainable building measures. At the same time, any listed funding mechanism can apply to multiple types of sustainable building measures.

High-Performance Buildings

H6 Develop Sustainable New Construction and Major Renovation Standards

Use tracking outputs to understand building performance compared to similar buildings and understand how performance changes over time. The county could also consider requiring a certain level of goal performance at key events (e.g., building refinancing, building certifications, and inspections) or at the time of safety upgrades.

Phase 6: Determine a cadence (e.g., every 5 years) for updating the sustainable building standard.

Waste Reduction and Diversion

Reduce the amount of waste generated and sent to landfills through increased material reuse, recycling and composting, and implementing other strategies to reduce overall material consumption.

Guiding Principals

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Objectives and KPIs

Increase the non-construction waste diversion rate, as measured by percent of waste generated on campus diverted from landfills; and percent of material recycled or composted.

Waste also contributes to the county's overall GHG emissions. Waste that goes to landfills from the campus and parks generates almost 4% of total government operations emissions and composting green waste from county parks generates less than 1% of total government operations emissions. Waste diversion strategies, the process of diverting waste from landfills (such as reduced material use, composting, and recycling), can help reduce emissions linked to waste generation and processing. Waste diversion strategies are measured by the total weight of diverted material compared to total waste generated and reported as an overall percentage. This metric is important to keep track of the successes and opportunities for sustainable waste management. Education along with supportive waste collection processes, purchasing practices, and policies are foundational to increasing the county's waste diversion rate. By reducing waste, the county would utilize resources more efficiently and protect natural resources, such as water quality, air quality, and natural habitat.

Table 13. Waste Reduction and Diversion Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
D1	Review and Renegotiate Waste Hauling Contracts*							X							X	Facilities Management, Parks and Recreation	Office of Sustainability, Purchasing	
D2	Expand Recyclable Material Collection					X		X					X		X	Facilities Management, Parks and Recreation	Office of Sustainability	
D3	Expand Organic Material Collection					X		X					X		X	Facilities Management, Parks and Recreation	Office of Sustainability	
D4	Deploy Smart Waste Management Systems							X							X	Facilities Management	Office of Sustainability, Parks and Recreation	
D5	Develop Policies to Minimize Office Supply Consumption							X							X	Purchasing	Office of Sustainability	

LEGEND: (*) In Progress

Waste Reduction and Diversion

D1 Review and Renegotiate Waste Hauling Contracts

Guiding Principles

Maximize resource efficiency

County Strategic Goals

Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management, Parks and Recreation

Support: Office of Sustainability, Purchasing

The county contracts with a third-party vendor, Priority Waste, for solid waste pickup and disposal. The contract is structured so costs are fixed based on container size and number of weekly pickups. The county incurs the same cost if a container is half or completely full, and because Priority Waste does not report waste collection or disposal data, the county cannot quantitatively validate whether pickup schedules are optimized.

The COVID-19 pandemic has illuminated county employees' capability and interest in teleworking and renewed the value of public open spaces like Waterford Oaks County Park. As the county continues to respond and adapt to these trends—and also divert additional solid waste to recycling or compost (see the strategies D2. Expand Recyclable Material Collection and D3. Expand Organic Material Collection) —waste disposal volumes are likely to become more variable. The county should regularly evaluate the filled volume of collection containers and level of necessary service and remove, resize, and/or adjust pick-up schedules for under- or over-utilized bins. As it relates to the Sustainability Plan's Guiding Principles reviewing and renegotiation waste hauling contracts could:

- **Maximize resource efficiency** by developing contracts that allow the county to document the quantity of waste being produced on campus in order to develop strategies to reduce waste and maximize efficiency. New contracts could also work to reduce greenhouse gas emissions produced from transporting waste from campus to waste facilities.

The county should also consider renegotiating its waste hauling contracts so pricing is based on the volume or weight of waste collected, rather than a fixed rate per bin. Doing so would mitigate sunk costs from receiving service for relatively empty dumpsters and enable the county to more accurately track and report progress towards waste diversion goals but may require a change in vendor. Some vendors may not be able to provide precise measurements if the county's waste is picked up by trucks that service other customers. When the county reissues a Request For Proposal (RFP) for waste collection services, ability to measure volume or weight of collected waste should be a metric for bid evaluation.

Waste Reduction and Diversion

D2 Expand Recyclable Material Collection

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management, Parks and Recreation

Support: Office of Sustainability

The county collects some, but not all, recyclable materials. Paper and cardboard are collected at county facilities and parks, but plastics, glass, and metals are not. Expanding the county's recycling program to include collection of these materials would support the county's sustainability priorities. As it relates to the Sustainability Plan's Guiding Principles, expanding recycling materials collection could:

- **Advance the net carbon goal** by mitigating county Scope 3 GHG emissions from waste disposal at landfills and creating opportunities to preserve natural resources that might otherwise be converted into landfills. Scope 3 emissions are any emissions produced not from the county's facilities or operations but from external processes necessary for the operations of the county. So, emissions from a local landfill or incinerator where county waste is sent are an example of Scope 3 emissions.
- **Maximize resource efficiency** by expanding the number of materials that can be recycled and converted into new products, maximizing the productive lifespan of raw materials.

To best support the county's emissions reduction goals and enable profitability, it is recommended that the county collect plastics, glass, and metals separately from paper and cardboard using dual-stream recycling. Although dual-stream recycling is less convenient for building occupants and parkgoers (as well as janitorial staff and park managers), dual-stream programs can result in less contamination than single-stream programs. For example, the University of Colorado-Boulder's transition to single-stream recycling collection at its residential halls in hopes of increasing recycling participation was short-lived: the university reverted to its original dual-stream program after a single school year due to significantly higher contamination rates (which, in turn, limited the university's ability to sell collected paper at a good price).[48] In applying these lessons learned and considering both county staff's strong interest in waste reduction and recycling and their statements that janitorial staff often find contamination in existing paper/cardboard recycling streams, dual-stream recycling appears to be the more appropriate solution than single-stream.

Still, to overcome any trepidation that dual-stream recycling may be burdensome for building occupants and parkgoers, the county can implement the following best practices:

- Robust education and communication around recycling as new plastics, glass, and metals collection bins are deployed.

48 A full case study on this pilot is available to Association for the Advancement of Sustainability in Higher Education members at https://hub.aashe.org/browse/casestudy/14309/testing-single-stream-versus-dual-stream-recycling-at-cu. A summary of the pilot—and discussion on how it impacted design of other universities' recycling programs—is publicly available and can be found at https://operations.tufts.edu/recycle/news/2014/10/06/single-stream-vs-dual-stream/.

Waste Reduction and Diversion

D2 Expand Recyclable Material Collection

- Centralized waste and recycling station should have three color-coded bins (one for non-recyclable waste, one for paper products, and one for plastic, glass, and metal products). Office environments should also have small under-the-desk or deskside paper bins.
- All bins should have clear labels and be accompanied by graphic signage depicting what can and cannot be disposed in each bin and other rules for proper material disposal.
- To further build recycling competency, the county can also develop signage and/or digital newsletters spotlighting materials that are most often disposed improperly, and even sponsor competitions between facilities/departments to increase recycling rates and “accuracy”.
- The county can leverage resources from the University of Michigan (including a publicly accessible Dropbox of printable materials[49]) and State of Michigan “Recycling Raccoon” Program[50] to develop signage and other education and communications materials.

49 https://www.dropbox.com/sh/g4ckx1n7jin3pwk/AAAxUXOaXfCSbe7A0FxIFOUea?dl=0

50 https://recyclingraccoons.org/

Waste Reduction and Diversion

D3 Expand Organic Material Collection

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management, Parks and Recreation

Support: Office of Sustainability

As with recycling, the county collects some, but not all, organic materials generated at the campus and parks. Green waste (e.g., landscape clippings, leaves, raw wood) is composted and reused, but for the most part, food scraps and other organic waste (e.g., compostable utensils) is not composted.[51] Through diverting additional solid waste streams, composting can further advance county sustainability goals. As it relates to the Sustainability Plan's Guiding Principles, expanding organic material collection could:

- **Advance the net zero carbon goal** by mitigating the Scope 3 GHG emissions from waste disposal at landfills.
- **Maximize resource efficiency** by creating opportunities to preserve natural resources that might otherwise be converted into landfills.

These impacts can be realized quickly: the volume of solid waste collected from 50 tenant organizations housed in three commercial buildings in Montreal nearly halved within less than a year of when the development started its compost program.[52]

To start, the county should identify a hauling vendor to pick up organic materials, as the county does not have the physical infrastructure or resources to compost on-site. Alternatively, the county could explore selling collected materials to local farms or other organizations that manage organic waste. Selling organic waste could serve as a source of revenue. Organics collection bins (typically brown or yellow) should be placed at all commercial kitchens, break rooms, office lounges and other locations where organics are generated. Bins should have a closed lid and clear signage. Building occupants and janitorial staff should be trained on proper sorting and collection practices (education and communications materials generated for the expanded recycling program can also address composting). Consider having designated staff members for each facility be trained and responsible for organic waste management to assist the greater facilitations team with education, sanitation, and collection.

Once the composting program is more firmly established, the county could consider transitioning to on-site composting. This would require the county to identify the proper method for composting onsite, and which is most appropriate based on

51 Potential food waste from the Farmer's Market is diverted through means other than composting. Make Food Not Waste and Food Rescue USA to pick up excess food from Market vendors and share it amongst the community.

52 https://plus.lapresse.ca/screens/1c83f1a6-f96c-4405-8422-164c5301f260__7C___0.html

Waste Reduction and Diversion

D3 Expand Organic Material Collection

facility generation. For example, windrow composting, vermicomposting, or in-vessel units. Windrow composting is a process in which compostable materials are layered in long rows and turned periodically, this process is used in agricultural settings to produce large quantities of compost. Vermicomposting uses worms to convert organic material into compost. In-vessel composting is a process where organic materials are kept in a small, contained vessel with controlled environmental characteristics to facilitate composting in a compact space. The campus and parks grounds crews could then utilize the material in landscaping throughout county properties. This would also result in improved soil and plant health and cost savings on fertilizers.

Waste Reduction and Diversion

D3 Expand Organic Material Collection

Financial Analysis

The collective goal of the strategies to expand recycling and organic materials collection is to protect the environment and create new economic opportunities. Diverting waste from landfills will reduce GHG emissions while supporting the transition to a circular economy and development of recyclable materials and compost commodities markets.

The financial model developed for Strategies D2 Expand Recyclable Collection and D3 Expand Organic Material Collection by the county's consultants reflects the progressive changes in tonnages and hauling costs between trash, recycling, and composting categories, assuming a goal to reduce total waste generation by 20% and divert 75% of generated waste by 2030. This benchmark was established through referencing the State of Michigan's recycling goal,[53] peer county waste diversion goals, and public and private real estate owners and operators' corporate sustainability and/or ESG reports.

Assuming the county achieves the 2030 goals, the county's anticipated waste breakdown is:

- Trash (Landfill): 25%
- Recyclables: 60%
- Organic materials: 15%[54]

The capital budget includes:

- Recycling (dual-stream) and composting equipment, including BigBelly solar-powered compactor bins
- Resources to develop waste reduction and diversion education, awareness, performance monitoring, and auditing programs

Increasing diversion rates results in less waste sent to landfills. Figure 13 shows the progressive changes in weight across trash, recycling, and organic materials waste categories. So, while waste hauling costs will decrease, operational expenses from hauling recyclables and organic materials will increase as is shown in Figure 14. The greatest opportunity to offset increasing operational expenses from recycling and composting is to deploy smart waste management systems, such as BigBelly compactor bins. The bins' built-in compaction technology can yield up to a 5-to-1 compaction ratio, resulting in fewer pickups. Reducing collection frequency decreases labor, transportation, and material expenses (i.e., decreases the person-hours, transportation fuels, and plastic bags required to collect and dispose waste), as well as the emissions associated with transportation. This analysis assumes that compacting waste could decrease collection frequency, on average, from twice a day to once a day. In addition, the county can offset costs through new revenue streams, including sale of recycling commodities and processed compost.

- Capital Outlay: $1,200,000
- Payback Period: 21.9 years
- ROI: 4.6%

Annual and cumulative cashflows are shown in Figure 15. Foundational assumptions in the financial analysis are relatively conservative, considering that the recycling and composting markets in southeast Michigan are nascent but have potential for significant growth. As these markets mature, the estimated recycling and organic material hauling costs are likely to decrease, while revenues from commodities sales would increase—resulting in a lower payback period. This analysis does not yet consider funding mechanisms that would both reduce the upfront capital cost owed by the county and accelerate market growth, nor policies that place financial costs on environmental or social externalities (e.g., a social cost of carbon).

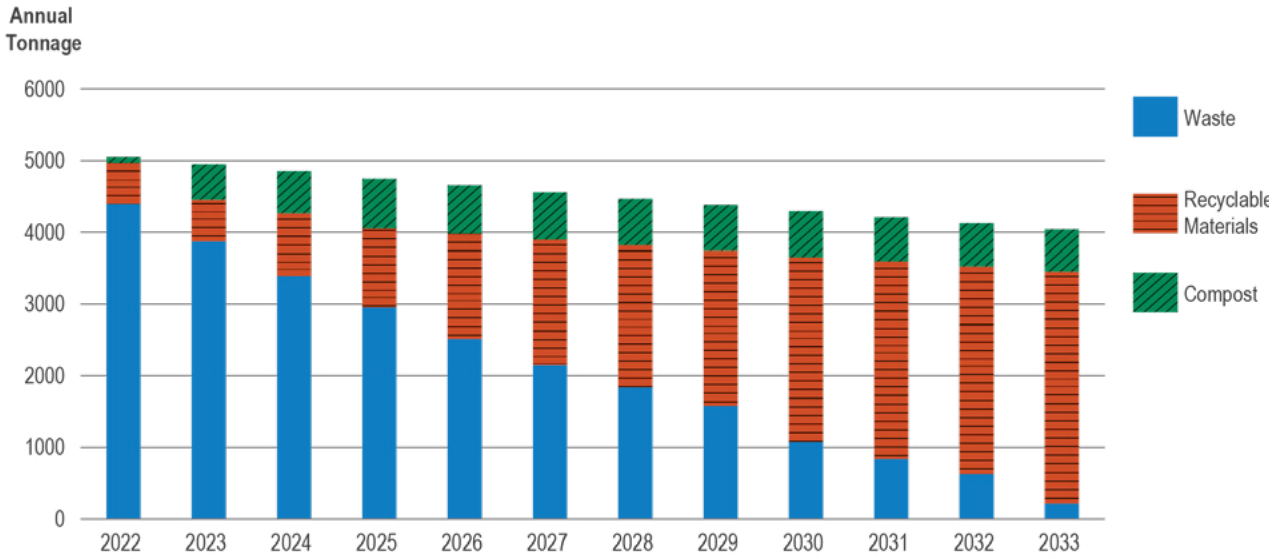
53 https://www.michigan.gov/egle/about/groups/solid-waste-and-recycling-advisors

54 U.S. Environmental Protection Agency data suggests 14.6% of municipal solid waste is food waste and yard trimmings accounted for about 2% of the county's collected waste in 2020 (https://archive.epa.gov/epawaste/nonhaz/municipal/web/html/). To achieve a 75% diversion rate, the remaining 60% of diverted waste will be recycled materials.

Waste Reduction and Diversion

D3 Expand Organic Material Collection

Figure 13. Projected Weight of Generated Waste by Category



Waste Reduction and Diversion

D3 Expand Organic Material Collection

Figure 14. Projected Operating Costs by Category

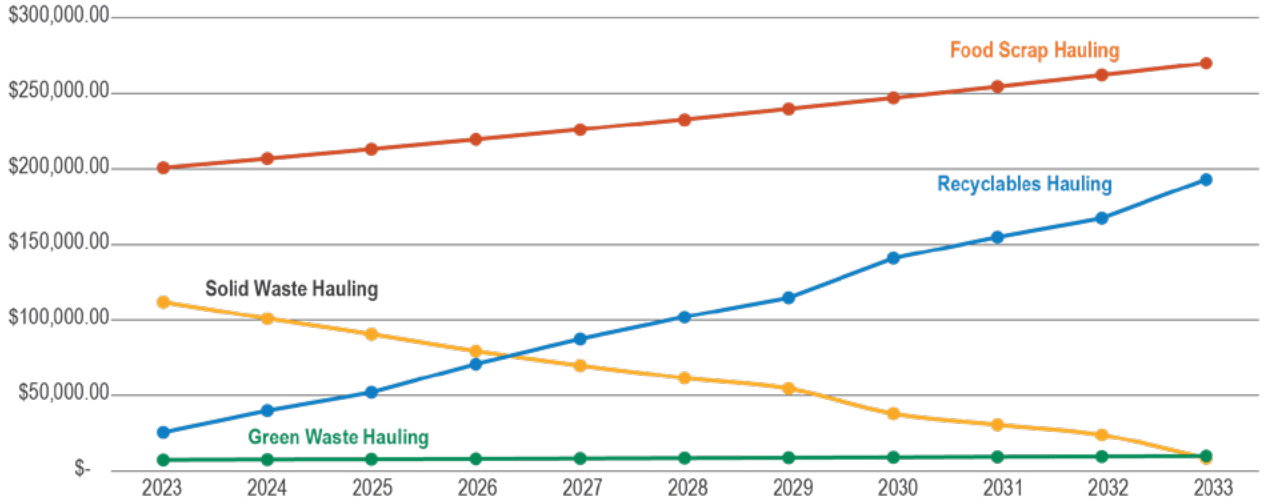
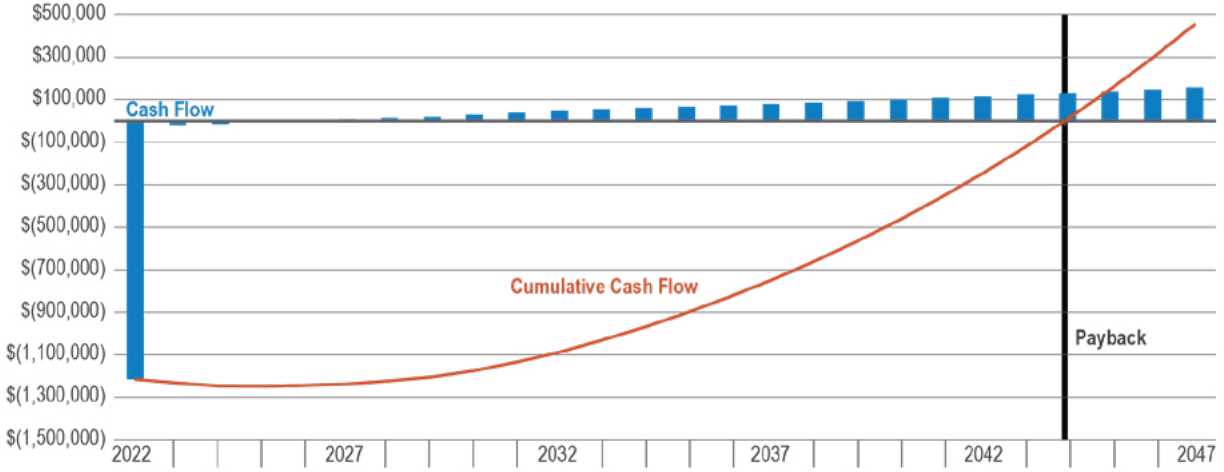


Figure 15. Expand Recyclable and Organic Material Collection: Annual and Cumulative Cash Flows



Waste Reduction and Diversion

D3 Expand Organic Material Collection

Funding Mechanisms

Potential funding mechanisms for the recycling and composting program include:

Capital Budget: The recycling and composting programs' initial costs should be included in a capital budget.

Operating Budget: Ongoing maintenance and waste hauling expenses would be a part of the county's operating budget.

Federal, State, or Regional Programs:

The Infrastructure Investment and Jobs Act (IIJA) funded a new grant program aimed at improving post-consumer materials management and infrastructure locally called the Solid Waste Infrastructure for Recycling Grant program. The program is still under development, but has funding allocated at $275 million.[55]

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) provides grants to support state-wide recycling goals. In 2022, EGLE will provide matching grants to support Governor Gretchen Whitmer's climate priorities by supplementing efforts to increase the state-wide recycling rate, ensure diversity, equity, and inclusion, and grow recycling markets and recycling supply chains through the NextCycle Michigan Initiative (NextCycle). A total of $15 million was made available for NextCycle Michigan Recycling Grant projects in FY 2022, and some funding categories are still accepting applications.

The NextCycle Michigan Recycling Grants have the following categories:

- **Michigan Recycling Infrastructure Grants:** Eligible projects increase collection and processing capacity of recyclable materials or food waste, access to recycling or food waste composting infrastructure, and participation rates in recycling or food waste composting programs. Applications are closed for the FY 2022 cycle, so the county should monitor the program site for notice of new funding opportunities.
- **Michigan Recycling Market Development Grants:** Eligible projects create new markets or expand existing markets and supply chains for recycled materials; stimulate demand for recycled materials and recycled content products; assist businesses that manufacture, market, and use recycled-content products; commercialize technologies to replace materials with recycled content; or research and develop new uses for recycled materials. Applications are closed for the FY 2022 cycle, so the county should monitor the program site for notice of new funding opportunities.
- **Michigan Small Community Education Grants:** Eligible projects provide access to recycling education resources for communities with fewer than 10,000 households. The county could qualify by targeting education towards one of its CVTs of this size. Applications are rolling until all funds are distributed.

For additional information on Michigan Recycling Grants, please reference the program RFP.[56]

55 https://www.epa.gov/rcra/solid-waste-infrastructure-recycling-grant-program

56 https://www.michigan.gov/egle/-/media/Project/Websites/egle/Documents/Programs/MMD/Recycling/2022-RFP.pdf?rev=bf089736d4f34a14880b8c21f7ba8964&hash=AF2E9087322515BF3C70E7A448766A89#:~:text=The%20NextCycle%

Waste Reduction and Diversion

D3 Expand Organic Material Collection

Partnerships:

- Partnerships with other public entities and/or residential and commercial buildings to achieve economies of scale for waste and recycling collections (e.g., collectively negotiate reduced hauling rates).
- Partnerships with non-profit organizations such as The Recycling Partnership, which provides grants for public education and outreach as well as other helpful resources and programs to improve recycling rates and reduce the bin contamination. If the county chooses to pursue an expanded waste and recycling public outreach program through **Advantage Oakland**[57], these partnerships could be especially beneficial.

Tax Exempt Bond Financing:

The county could finance the recycling and organic materials collection program through the proceeds of a tax-exempt bond issuance. The bonds would be sold to investors to raise funds for the program. In return, the county would agree to repay the investors principal plus interest, which is generally exempt from federal, state, and local taxes. These bonds could qualify as green bonds to attract additional types of investors. The county could generate revenue through the recycling and compost program through selling processed recyclables and compost. When bonds are issued for recycling and compost programs, they are typically general obligation bonds; however, bonds could be issued with the savings generated by the project being pledged to repay the debt.

57 https://www.oakgov.com/advantageoakland/planning/wasteandrecycling/Pages/default.aspx

Waste Reduction and Diversion

D4 Deploy Smart Waste Management Systems

Guiding Principles

Maximize resource efficiency

County Strategic Goals

Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management

Support: Office of Sustainability Parks and Recreation

Smart refuse systems can be deployed throughout the county campus and Waterford Oaks County Park to optimize trash pickup schedules, increase diversion rates, and improve site aesthetics. As it relates to the Sustainability Plan's Guiding Principles, deploying a smart waste management system could:

- **Maximize resource efficiency** by minimizing unnecessary trips to transport waste from campus to recycling facilities and landfills. Also, monitor recycling to reduce contamination and make recycling more efficient.

The county can consider two types of smart refuse systems: solar-powered trash compactor bins and dumpster monitoring systems.

Solar-powered Trash Compactor Bins: Municipalities and major development sites have increasingly begun to deploy solar-powered trash compactor bins in areas with significant non-vehicular traffic (e.g., retail/entertainment districts). When a bin becomes full, it will use energy produced by its embedded solar panels to compact collected trash or recyclables and allow room for more trash to be thrown away. Bins may go through this cycle several times before they are nearly full of compacted waste, at which point they use integrated "smart" systems to signal that collection is needed. As opposed to standard sidewalk bins, which either may only be half-full or overflowing onto the sidewalk when haulers come to collect trash, solar-powered trash compactor bins are only serviced when necessary—and before overflowing trash can cause clutter and unpleasant odors in the public way.

County leadership has already approved installing solar-powered trash compactor bins and, as of this writing, is negotiating a contract with BigBelly. Once the contract is finalized, the county should identify areas with significant non-vehicular traffic as priority locations for bin installation. Locations may include the Courthouse complex, Farmer's Market, Waterford Oaks County Waterpark, and at trailheads throughout the park.

Dumpster Monitoring Systems: Sensors and cameras can be placed inside standard dumpsters to monitor and analyze the volume and type of disposed materials, as well as vendor pick-up schedules. These systems can record instances of dumpsters being serviced when relatively empty or when a pick-up is missed, and for recycling bins, detect non-recyclable materials that contaminate the load. Collected datapoints across the service campus (or across county parks) can be integrated into reporting software and used to optimize hauler service schedules and routes, introducing cost savings, and if necessary, renegotiate hauler contracts (refer to the strategy D1. Review and Renegotiate Waste Hauling Contracts).

Dumpster monitoring systems have demonstrated significant returns on investments. A pilot of dumpster monitoring systems across several

Waste Reduction and Diversion

D4 Deploy Smart Waste Management Systems

developments in Texas yielded $1,000 in savings per container, the result of instituting corrective actions for dumpsters being serviced when they were as little as 31% full and haulers missing, on average, 2.5 pickups per month.[58] By comparison, the cost of dumpster monitoring is $10 to $20 per month.[59]

Given the potential benefit, the county should consider expanding the Smart Waste Program to include dumpster monitoring. A first step is to solicit quotes from potential vendors to better understand suitability for the county's campus and the associated costs and benefits.

58 https://www.forbes.com/sites/jeffkart/2020/09/14/trash-tech-from-realpage-and-compology-reduces-collection-costs-improves-recycling/?sh=255f2acb5453

59 https://www.cnn.com/2020/12/18/tech/compology-artificial-intelligence/index.html

Waste Reduction and Diversion

D5 Develop Policies to Minimize Office Supply Consumption

Guiding Principles

Maximize resource efficiency

County Strategic Goals

Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Purchasing

Support: Office of Sustainability

The county's waste strategy should not only include opportunities to expand waste diversion, but also reduce material consumption upfront. To start, the county should develop an enterprise-wide policy to reduce consumption of office supplies. As it relates to the Sustainability Plan's Guiding Principles, developing policies to minimize office supply consumption could:

- **Maximize resource efficiency** by adopting strategies that minimize supplies needed for office operations and implementing strategies to manage, reuse, and recycle necessary supplies to maximize efficiency.

The policies could include, but should not be limited to, the following strategies:

- Establishing a paperless office standard (e.g., only circulate digital copies of documents and scan existing hard copies rather than creating new copies). In cases where this is infeasible, limit paper purchases to recycled paper and establish default preferences for word processing software so files have reduced margins, use single spacing, and print double-sided.
- Eliminating provision of Styrofoam and single-use plastic dishware, drinkware, and utensils. Instead, the county can provide adaptive recyclable metal straws and compostable—or at least biodegradable—dishware, drinkware, and utensils, encourage use of personal dishware, drinkware, and utensils, and require that all beverages sold in vending machines and at the campus cafeteria be provided in recycled aluminum containers.[60] In addition, the county could offer branded reusable water bottles, utensils, etc. as an incentive for significant and/or consistent participation in sustainability-related programming.
- Similarly limiting purchases of pens and pencils to biodegradable options.
- Establishing centralized office supply stations for supplies that can be easily shared (e.g., staplers, tape holders) and encourage supply reuse as much as possible (e.g., for paper and binder clips).
- Centralizing purchase of office supplies to mitigate excess orders and alleviating inconsistent supply availability/quality. As the lead implementer, the Purchasing Department would be best suited for coordinating centralized purchases with support from individual department "champions". Department "champions" would not only coordinate purchases, but also encourage changes in their facility and educate staff.
- Requiring county staff that continue to regularly work from home to purchase personal supplies for their home offices through a county

60 Ball Arena (home to the Denver Nuggets and Colorado Avalanche) has transitioned to infinitely recyclable aluminium cans, bottles, and cups for all beverage concessions and, per a February 17, 2022 press release: "…is on pace to eliminate more than 1 million single-use plastic cups and bottles in 2022." (information sourced from https://www.ball.com/newswire/article/124110).

Waste Reduction and Diversion

D5 Develop Policies to Minimize Office Supply Consumption

portal, from a list of pre-approved sustainable alternatives. This list would be developed through implementation of S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities, which includes a recommendation to develop a catalog of products that are well-aligned with the county's sustainability priorities.

These policies could be established through similar means as the county's policy and procedure for establishing and implementing its Copier Fund (Section 3000.2 of its purchasing policy), which centrally governs enterprise-use of copier resources. The Fund appoints a single organization, the Oakland County Support Services Division, to review all departmental requests to lease copiers and monitor a centralized inventory of copier machines. A broader policy to minimize office supply consumption would apply these principles to other common office equipment and materials.

Alternatively, the policy could be free-standing from the county's main purchasing policy to provide individual organizations with more flexibility to adapt specific provisions to best meet their needs.

Open Space, Ecosystems, and Connectivity

Protect and enhance the natural and built environments of Oakland County Campus and Waterford Oaks County Park through ecological restoration, accessible design and connectivity, and restorative landscaping and planting areas.

Guiding Principals

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities
- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Healthy Residents
- Skilled and Educated Workforce
- Livable Neighborhoods
- Environmental Sustainability
- Organizational Excellence
- Diversity, Equity, and Inclusion

Objectives and KPIs

Convert lawns to native meadows or forest, as measured by acres of lawn converted to native meadows or forest.

Reduce run off, as measured by gallons of stormwater captured.

Enhance the connectivity of campus through non-motorized paths, as measured by linear feet of pathways.

Increase county tree canopy, as measured by number of trees planted per year.

Reduce impermeable surfaces, as measured by the square footage of impermeable surfaces removed.

In addition to reducing the county's carbon emissions from energy, transportation, and building sectors, carbon sequestration can help us meet the county's net zero carbon goal. Through carbon sequestration, carbon dioxide is captured and stored through nature-based systems such as forests, meadows, trees, and wetlands. The county can maximize carbon sequestration by expanding and enhancing the natural environment. Nature-based solutions, ecosystem restoration, reducing impervious surfaces, and other efforts can increase the resiliency of county properties and surrounding environments by improving storm water management, protecting waterways, and supporting native plants and animal species.

Whether people come to county sites for work, services, or recreation, the open space and pathways impact staff and visitors alike. County open space, recreation spaces, and pathways are critical infrastructure assets. Ensuring equitable outdoor amenities, such as accessible pathways and open spaces, contribute to positive employee and visitor mental and physical wellness. Adequate, accessible wayfinding increases connectivity and access to the county's properties and improves visitor interaction.

Table 14. Open Space, Nature, and Ecosystems Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
O1	Improve Connectivity with Non-Motorized Pathways*		X		X	X			X	X	X		X			Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Parks and Recreation	Oakland County Road Commission, MDOT, SMART, SEMCOG
O2	Expand and Improve Signage with Accessibility in Mind			X	X			X	X	X	X	X				Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division; Parks and Recreation: Wayfinding Group and Sign Standards Work Group	Office of Diversity, Equity, and Inclusion; Media and Communications; Office of Sustainability	Oakland County Road Commission, MDOT
O3	Convert Lawns to Forest or Meadow					X		X					X	X	X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division; Parks and Recreation	Office of Sustainability, WRC	
O4	Implement Ecological Restoration Projects				X	X							X	X	X	Office of Sustainability	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division; Parks and Recreation; WRC	City of Pontiac, Waterford Township, Plant Wise
O5	Reduce Paved Areas and Transition to Permeable Pavements or Greenspace*					X		X						X	X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Office of Sustainability, WRC	City of Pontiac, Waterford Township, Oakland County Road Commission, MDOT

LEGEND: (*) In Progress

Open Space, Ecosystems, and Connectivity

01 Improve Connectivity with Non-Motorized Pathways

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Advance the net zero carbon goal

County Strategic Goals

- Healthy Residents
- Livable Neighborhoods
- Environmental Sustainability
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: Oakland County Road Commission, MDOT, SMART, SEMCOG

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division

Support: Parks and Recreation

This strategy supports the county's Livable Neighborhoods Strategic Framework community objective of ensuring access to parks and recreation, transportation, and healthy food. The strategy also supports the county's Environmental Sustainability community objective of ensuring access to transportation by supporting infrastructure for alternative modes of transportation. In addition, this strategy supports the county's Healthy Residents Strategic Framework community objective of improving community mental health and connects to the Health and Wellness Focus Area (see the strategy W2. Develop Actionable Support for Wellness in Employee Lifestyles) by providing paths and spaces that promote employee interaction and provide mental refreshment to reduce stress and increase physical fitness. As it relates to the Sustainability Plan's Guiding Principles, improving connectivity with non-motorized pathways could:

- **Operationalize diversity, equity, and inclusion** and provide an accessible campus environment by making it safer and more accessible to travel to and from campus by modes of transportation besides the car. This expands access to the outdoor spaces and resources offered on campus.
- **Advance net zero carbon goal** by reducing the necessity of cars that emit greenhouse gases.

Non-motorized connections are incomplete in most areas of the county and prevents people from walking, biking, and using mobility devices safely throughout campus. Access around the county campus has largely favored vehicular traffic, and east campus is much more connected by non-motorized pathways than west campus. Expanding the non-motorized pathway network would increase access to and around the county campus and create a more equitable distribution of pathways between different parts of campus. Figure 16 shows potential non-motorized pathways, including sidewalks, trails, pathways, active transportation connections, and potential crossings.

A design goal would be to identify loop paths offering a 15- or 30-minute walk, preferably in naturalized areas, to promote employee walking during lunch or breaks. All the above result in a financial return to the county in the form of increased employee productivity and reduced health care costs. The county should also

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implement planned non-motorized pathways as identified by SEMCOG's 2020 Bicycle and Mobility Plan for Southeast Michigan.[61] The county should identify opportunities for infrastructure installation, such as bike lanes, and/or intersection reconfiguration, such as pathway connectivity and safe street crossings, to support a safe and comfortable experience for all users and all abilities, specifically focusing on the crossings at the existing bus stops and across Telegraph Road (see Figure 16). Consider installing supporting amenities such as bike parking, e-bike charging, lockers, showers, and bike repair stations. SEMCOG provides a compilation of bicycle, pedestrian, and supporting infrastructure design guidelines that should be referenced when implementing various non-motorized pathway types. These guidelines are included in the SEMCOG's 2020 Bicycle and Mobility Plan for Southeast Michigan and are based on design guidance provided by the American Association of State Highway and Transportation Officials (AASHTO), the National Association for City Transportation Officials (NACTO), the Federal Highway Administration (FHWA), and the Michigan Department of Transportation (MDOT).[62]

61 https://semcog.org/desktopmodules/SEMCOG.Publications/GetFile.ashx?filename=BicycleAndPedestrianMobilityPlanForSoutheastMichiganMarch2020.pdf

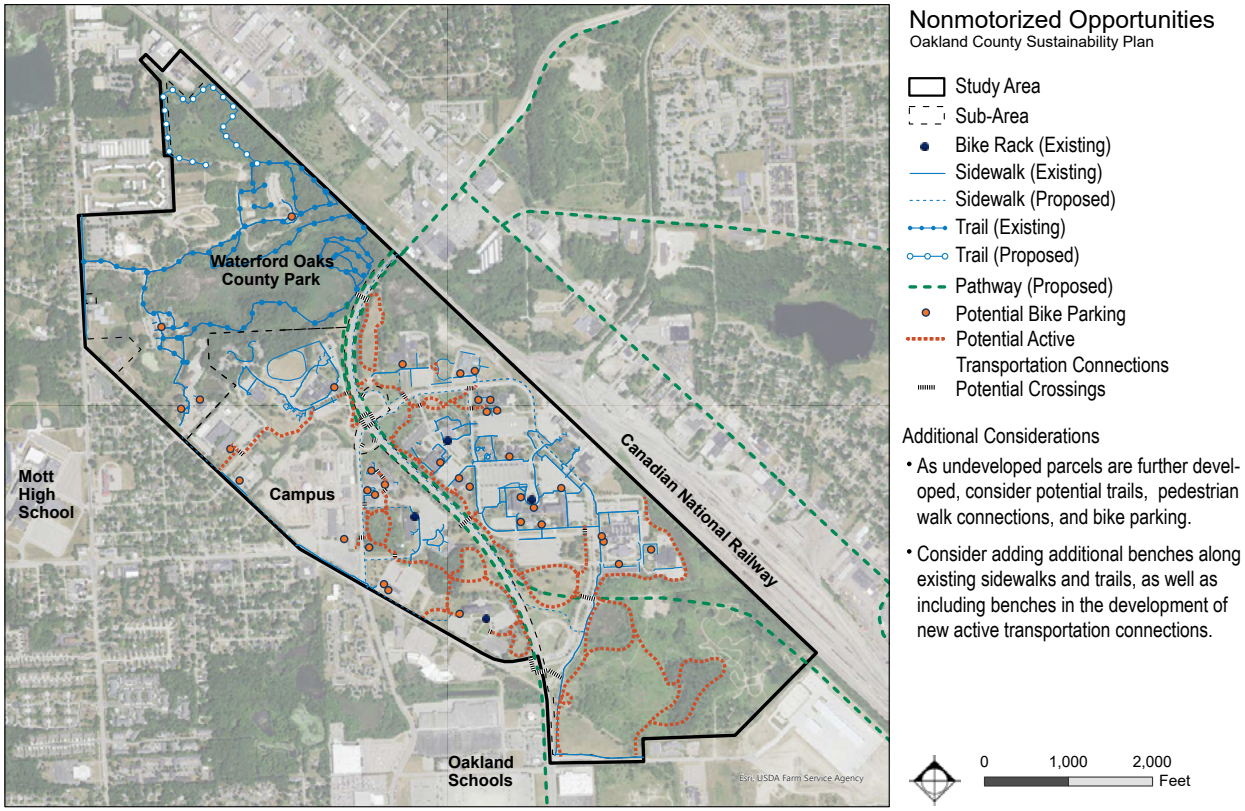
62 https://semcog.org/desktopmodules/SEMCOG.Publications/GetFile.ashx?filename=BicycleAndPedestrianMobilityPlanForSoutheastMichiganMarch2020.pdf

63 https://semcog.org/desktopmodules/SEMCOG.Publications/GetFile.ashx?filename=BicycleAndPedestrianMobilityPlanForSoutheastMichiganMarch2020.pdf

O1 Improve Connectivity with Non-Motorized Pathways

Trails are non-motorized pathways through natural areas that are usually unpaved. Pathways are regional non-motorized pathways identified by SEMCOG's 2020 Bicycle and Mobility Plan for Southeast Michigan[63] that include both trails and paved walking and biking pathways. Active Transportation Connections are county campus-specific pathways identified by the Oakland County Sustainability Plan development process that could be either trails or paved walking and biking pathways.

Figure 16. Potential Non-Motorized Pathways



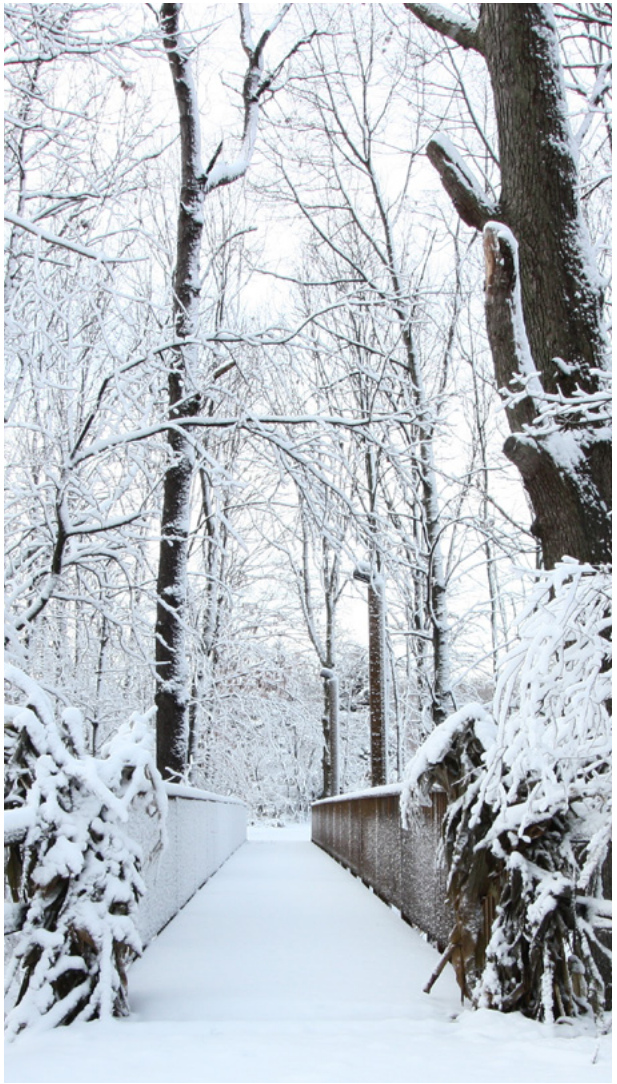
Open Space, Ecosystems, and Connectivity

01 Improve Connectivity with Non-Motorized Pathways

A bike or e-bike rental program is another consideration that may appeal to those who come to campus via vehicle or bus but want to get around campus during the day and should be coordinated with Facility and Fleet Decarbonization strategies.

Partnership with external agencies will be crucial for implementing new crossings and non-motorized pathways. The county owns most of the roadways on campus, and their maintenance falls under the Oakland County Road Commission's jurisdiction. Therefore, updates to existing facilities and their upkeep will need to be coordinated with the Road Commission. Telegraph Road is a state road, so any changes to this corridor will need to be coordinated with MDOT. Access to bus stops should be considered by coordinating with Suburban Mobility Authority for Regional Transportation (SMART). Finally, SEMCOG has identified future non-motorized pathways and can help the county access funding for their design and construction.

Maintenance is another crucial consideration for implementing non-motorized pathways on campus. If non-motorized paths are to provide equitable access, be part of a fitness strategy, and provide year-round health benefits, there should also be a program to keep these paths snow- and ice-free in the winter. Under current procedures, snow removal is prioritized at 24/7 facilities, then 7-day facilities, then facilities only open during business hours (within this last tier, buildings with the most public traffic are given most attention). Non-motorized paths should be factored into the county's snow removal procedures and location prioritization.



Open Space, Ecosystems, and Connectivity

O1 Improve Connectivity with Non-Motorized Pathways

Financial Analysis

The financial analysis developed by the county's consultants for this strategy demonstrates the potential financial benefit realized through increased employee walking following the creation of additional campus non-motorized paths. Physical activity can play a significant role in employees' health, wellness, quality of life, and productivity. The analysis focuses on benefits associated with walking including increased productivity[64] and decreased healthcare costs.[65]

Capital outlay, payback period, and ROI was determined based on the construction of 15,000 linear feet of pathways, assuming that 500 employees on campus would utilize the new paths. The initial capital outlay of $1.4 million to construct non-motorized pathways is based on market prices for labor, goods, and pathway development. Operation and maintenance costs were not included in the analysis as it was impossible to determine at this stage which areas of trail would be cheaper to maintain than the current surfaces or landscapes and which would be more expensive.

The ongoing positive impacts, however, are more difficult to measure. It was conservatively assumed that the full health and productivity impacts would be realized incrementally over a five-year period. Increased walking, physical activity, and breaks improve cognitive processes and attention,[66] ability to focus,[67] enthusiasm, and relaxation,[68] all of which are associated with increased productivity. While it is established that walking improves employees' ability to be productive, no studies were identified that provided a link to the actual economic output or value to the increased productivity. With that, the analysis utilized a modest assumption of positive economic benefit of 1% of salaries for affected employees. This economic benefit represents increased productivity and ability to provide additional services to Oakland County taxpayers and residents. Reductions in healthcare costs were based on a study authored by Masayuki Kato in 2013 and calculated at 2.6% per year.[69] In today's dollars, this assumed increase in productivity and savings in health care costs would be $1.26 million greater than the initial upfront investment (net present value) which over the 10-year time frame would be the equivalent to a 17.4% return.

- Capital Outlay: $1,400,000
- Annual Savings (year 6 and thereafter):
  - Healthcare Costs: $183,500
  - Productivity: $288,700
- Payback Period: 6.4 years
- ROI: 17.4%

64 https://redbooth.com/blog/walking-productivity-scientific-links
65 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4020264
66 https://doi.org/10.1080/01443410.2012.723612
67 https://doi.org/10.1016/j.cognition.2010.12.007
68 https://doi.org/10.1111/sms.12398
69 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4020264.

Open Space, Ecosystems, and Connectivity

01 Improve Connectivity with Non-Motorized Pathways

Figure 17. Pathways Development: Annual Cash Flow

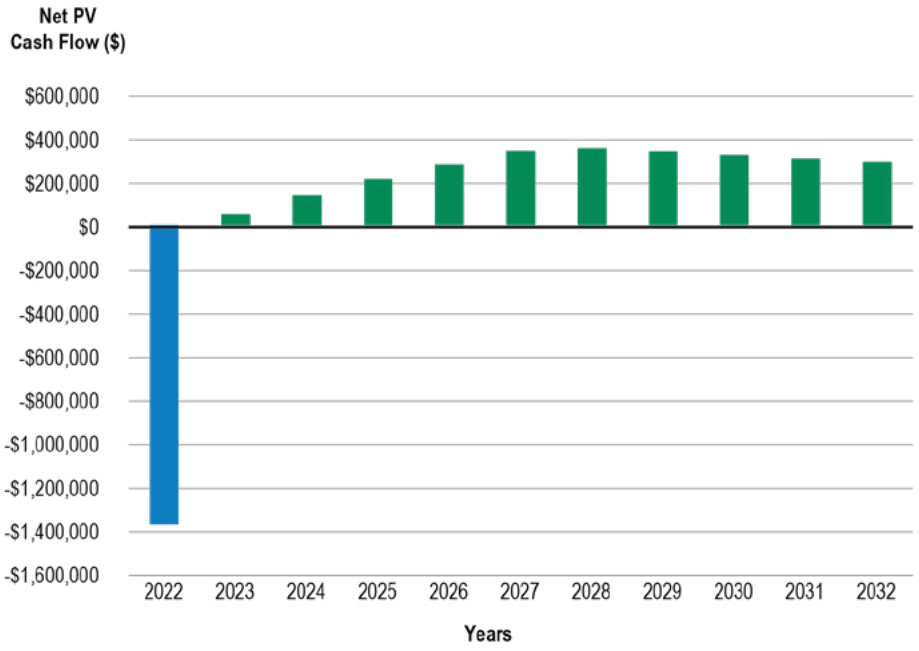
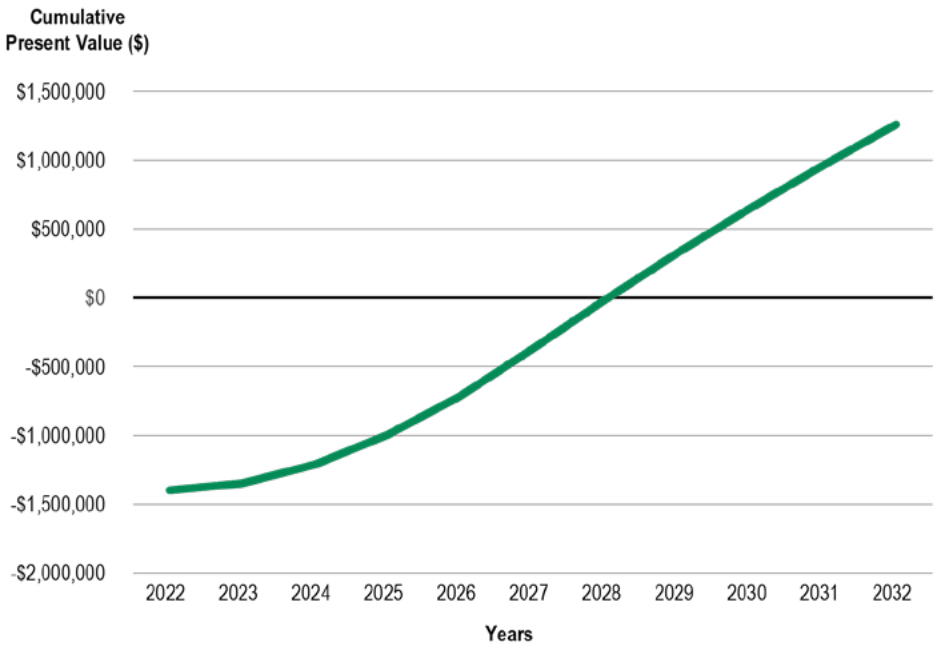


Figure 18. Pathways Development: Cumulative Cash Flow



Open Space, Ecosystems, and Connectivity

01 Improve Connectivity with Non-Motorized Pathways

Funding Mechanisms

Potential funding mechanisms for non-motorized pathways include:

Capital Budget: The non-motorized pathways program's initial costs should be included in a capital budget.

Operating Budget: Ongoing maintenance and expenses would be a part of the operating budget.

Federal, State, or Regional Programs:

The Infrastructure Investment and Jobs Act (IIJA) appropriated $550 million to the EECBG Program to assist eligible local, county, tribal, and state governments in implementing strategies to reduce fossil fuel emissions, reduce total energy use, and improve energy efficiency for transportation and facilities. This program was previously funded back in 2009 through the American Recovery and Reinvestment Act and at that time projects that reduced energy use for transportation, including new pathways and connections, were eligible.[70]

The **Michigan Department of Transportation's Transportation Alternatives Program** (TAP) is administered in Southeast Michigan through SEMOCOG. Typical projects funded by the program seek to improve mobility through bicycle and pedestrian infrastructure such as pathways, sidewalks, pedestrian crossings, and bike lanes. While counties are not eligible to apply, the county could partner with other eligible applicants such as the City of Pontiac or the Oakland County Public Transportation Authority for funding.[71] Grants require local match of at least 20%. In 2021, the Southeast Michigan Council of Governments awarded $2.8 million in TAP funds.[72]

The **Michigan Department of Natural Resources** (DNR), has recreation grant programs which could provide funding for non-motorized pathways:

- DNR makes recommendations to the National Park Service for outdoor recreation grants through the **Land and Water Conservation Fund**. Governmental entities with DNR approved community five-year recreation plans are eligible to apply for grants of up to $500,000 which require a 50% local match.
- **The Michigan Natural Resources Trust Fund** provides grants to local units of government for public outdoor recreation including trails. Applicants must have an approved five-year recreation plan to be eligible for grants up to $300,000. A 25% local match is required.[73]
- **The Recreation Passport Program** provides approximately $2 million per year for indoor and outdoor public recreation projects. Preference is given to rehabilitation of existing facilities. Grants require a 25% match and cannot exceed $150,000.[74]
- **The Michigan Trails Fund** provides grant opportunities to governmental organizations for regional non-motorized trail projects. Eligible uses include planning, design, engineering, and construction.[75]

Tax Exempt Bond Financing: The county could finance the additional campus non-motorized paths through the proceeds of a general obligation tax-exempt bond issuance. Given the relatively small size of capital outlay, the county will first determine that bond financing would be cost effective for the project or package with other projects.

70 https://www.energy.gov/eere/wipo/energy-efficiency-and-conservation-block-grant-program-bipartisan-infrastructure-law-2021, https://www.nlc.org/article/2021/12/03/what-you-need-to-know-the-energy-efficiency-and-conservation-block-grant/

71 https://www.michigan.gov/mdot/programs/grant-programs/transportation-alternatives.

72 https://eu.detroitnews.com/story/business/autos/2021/12/12/mobility-project-grants-millions-awarded-southeast-michigan-council/49517195/.

73 https://www.michigan.gov/dnr/buy-and-apply/grants/rec/mnrtf.

74 https://www.michigan.gov/dnr/buy-and-apply/grants/rec/rec-pp.

75 https://www.michigantrailsfund.org/new-page#

Open Space, Ecosystems, and Connectivity

O2 Expand and Improve Signage with Accessibility Standards

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities

County Strategic Goals

- Skilled and Educated Workforce
- Livable Neighborhoods
- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: Oakland County Road Commission, MDOT

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation: Wayfinding Group and Sign Standards Work Group

Support: : Media and Communications, Office of Sustainability, and Office of Diversity, Equity, and Inclusion

It is critical to coordinate with the Office of Diversity, Equity, and Inclusion and Communications to ensure all signage is accessible for all visitors. county branding and cohesion should be integrated into any signage or wayfinding displays on and off campus, at all county-owned property. As it relates to the Sustainability Plan's Guiding Principles, expanding and improving signage with accessibility standards could:

- **Operationalize diversity, equity, and inclusion and provide accessible services and campus environments** by setting a standard to ensure that the signage on campus is informative and useful for all employees and visitors on campus without the need for additional support. Improving accessibility of signage also improves accessibility of spaces by making it so everyone who visits campus can find their way around and take advantage of the green spaces and resources offered on campus.
- **Create education and engagement opportunities** by providing interpretive signage to learn about sustainability through the campus environment.

The county has already installed a drive-up information map with paper maps that visitors can take (see Figure 19), extensive operational and wayfinding signage across county park facilities, as well as interpretive signage. However, the drive-up information map is only accessible by car and some signage is located where it cannot be viewed at all (see Figure 20). There is an opportunity to make the same kind of information available along routes accessible by people walking and biking.

Strategy components for both wayfinding and interpretive signage follow. Both digital (e.g., Wi-Fi Kiosks) and non-digital modalities can be considered for signage.

Open Space, Ecosystems, and Connectivity

O2 Expand and Improve Signage with Accessibility Standards

Wayfinding Signage

As a 600-acre campus with 28 different departments, the county campus can be disorienting for visitors. Some wayfinding signage is currently provided, but more is needed to clearly orient visitors to the various departments, parking, and accessible entrances and routes for users of all abilities. A professionally designed wayfinding signage system is also an effective way to "brand" the county campus by using consistent colors and materials as well as defining the extents of the campus to visitors. The county may also consider developing a wayfinding app for the campus that connects to the Access Oakland data portal.[76]

By improving accessibility of county sites and services, this strategy for wayfinding signage supports the county's Livable Neighborhoods Strategic Framework community objective of ensuring access to parks and recreation and transportation as well as the Organizational Excellence Strategic Framework community objective of demanding the highest customer service.

Interpretive Signage

The county should also design and install interpretive signs located along non-motorized pathways to explain and illustrate sustainability topics to employees and visitors. Interpretive signage can also be placed in other locations, such as parking lots, under solar carports, or within facilities to share information. Interpretive signs are envisioned as separate from wayfinding signs but using consistent design themes. Interpretive sign content could include health benefits of walking, wetland restoration benefits, carbon sequestration effects of trees, clean energy benefits, or sustainable infrastructure (e.g., solar carport, greenhouse) information. Signage could include QR codes or website links for people to learn more.

Interpretive signage expansion also advances the county's Skilled and Educated Workforce Strategy Framework community objective of ensuring children get a great start in early learning and by more broadly providing an education opportunity.

76 https://accessoakland.oakgov.com/datasets/oakgov::oc-government/explore?location=42.659169%2C-83.384309%2C10.00

Open Space, Ecosystems, and Connectivity

O2 Expand and Improve Signage with Accessibility Standards

Figure 19. Existing Information Map

Figure 20. Existing Interpretive Signage

Open Space, Ecosystems, and Connectivity

O3 Strategically Convert Lawns to Forest or Meadow

Guiding Principles

- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation

Support: Office of Sustainability, Water Resources Commissioner

This strategy supports the county's Environmental Sustainability Strategic Framework community objectives of protecting drinking water and lakes and reducing county government energy use due to reduced lawn maintenance. It also supports the county's Organizational Excellence objective of maintaining the highest fiscal stewardship. Converting lawn to meadows would also contribute to enhancing pollinator habitats and visual diversity. As it applies to the Sustainability Plan's Guiding Principles, strategically converting lawns to forest or meadows could:

- **Advance the net zero carbon goal** by increasing carbon sequestration and reducing emissions from mowing. It is estimated that 50 acres of lawn conversion to forest would result in 40 tons of carbon reduction or sequestration per year.
- **Improve air and water quality** by reducing fertilizer and pesticide use, reducing the presence of greenhouse gases in the atmosphere, and capturing run off water.
- **Maximize resource efficiency** by reducing grounds maintenance costs and water used in lawn maintenance.

The county Facilities Department should collaborate with the Parks and Recreation Department to determine best conversion sites, as well as optimal plant selection, installation, and maintenance best suited for Oakland County properties. Prioritization should include areas that experience flooding, as buffers along natural resources, such as stream banks or drains, and areas that do not negatively impact visibility such as open fields or areas that can be integrated into existing landscaping areas. It is also important to consider land use and future land use. For example, not planting trees over critical underground infrastructure or in areas slotted for future development.[77]

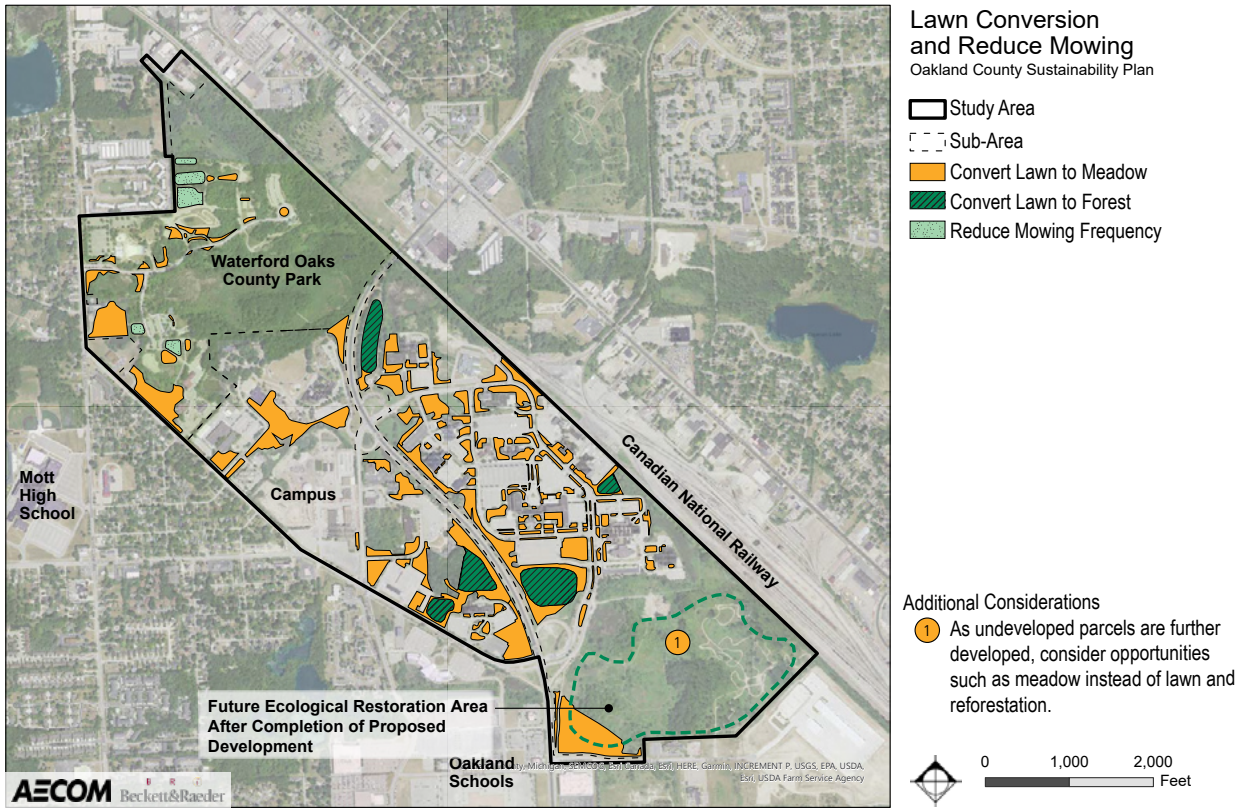
77 The campus landscape plan should also include tree planting locations (see the O4. Implement Ecological Restoration Projects strategy).

Open Space, Ecosystems, and Connectivity

O3 Strategically Convert Lawns to Forest or Meadow

It is estimated that there is potential for approximately 50 acres of lawn conversion on the county campus. Figure 21 shows opportunities for lawn conversion to meadow or forest. The figure also shows areas that could remain as lawns but be mowed less frequently. Opportunities to convert lawn to forest primarily occur west of the Sheriff's Administration building, north of the County Executive building, and south of the Circuit Court building. The open space west of the Sheriff's Administrative Building was also identified as a potential site for groundmount solar. If the county installs solar at this site, this space can be designed to include meadow with native plantings which promote stormwater infiltration and benefits to pollinators and birds. Forests should be planned with solar installations in mind, avoiding trees in locations that would block light from rooftop solar.

Figure 21. Potential Lawn Conversion Areas



Open Space, Ecosystems, and Connectivity

O3 Strategically Convert Lawns to Forest or Meadow

Converting lawn to native meadow plantings requires several steps and considerations. First, all turf grass needs to be removed and tilled to prep the area. Consider selecting drought tolerant native grasses and wildflowers in most areas. For areas that experience flooding, consider drought tolerant species and planting diagram recommendations. There are several community organizations that have resources supporting these types of installations, such as the SEMCOG Green Infrastructure Plan and the Clinton River Watershed Council. Meadows can take two to three years to fully establish and require regular maintenance to reduce noxious weed introduction and ensure optimal plant health. Adequate training and resources should be developed and provided to ensure county staff are trained properly.

Open Space, Ecosystems, and Connectivity

04 Implement Ecological Restoration Projects

Guiding Principles

- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Livable Neighborhoods
- Environmental Sustainability

Development Stage: In Progress

Partners: City of Pontiac, Waterford Township, Plant Wise

Teams

Lead: Office of Sustainability

Support: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation, Water Resources Commissioner

Wetland restoration and tree plantings support the county's Livable Neighborhoods Strategic Framework community objective of ensuring access to parks and recreation by adding green space to the county campus. This strategy also supports the Environmental Sustainability community objective of protecting drinking water and lakes. Furthermore, these recommendations would enhance habitat and the campus aesthetic. As it applies to the Sustainability Plan's Guiding Principles, implementing ecological restoration projects could:

- **Advance the net zero carbon goal** by sequestering carbon and reducing heat island effects.
- **Improve air and water quality** and **maximize resource efficiency** by relieving flooding, filtering runoff pollutants, and taking up nutrients.

Wetland Restoration

Streambank and wetland restoration projects are critical in improving water quality, providing flood relief, and maintaining natural habitat. Oakland County, by implementing critical restoration projects, will align with the new stormwater requirements developed by the Water Resources Commission, demonstrate commitment to preserving natural environments, and participate as stewards of the watershed.

Mainland Drain North is a 4,000-foot-long drainage corridor centrally located in the county campus, conveying runoff from more than 200 acres of the campus as well as large areas off campus (see Figure 22). It is reported that this area floods frequently. The county Facilities group in cooperation with WRC should sponsor creation of a stream restoration plan to restore and enlarge existing wetlands and restore the channelized ditch to a naturalized stream channel. Wetland enlargement would serve multiple purposes including increased stormwater flood storage volume, increased wetland vegetation to filter pollutants and uptake nutrients, enhance wildlife habitat, and improve campus aesthetic.

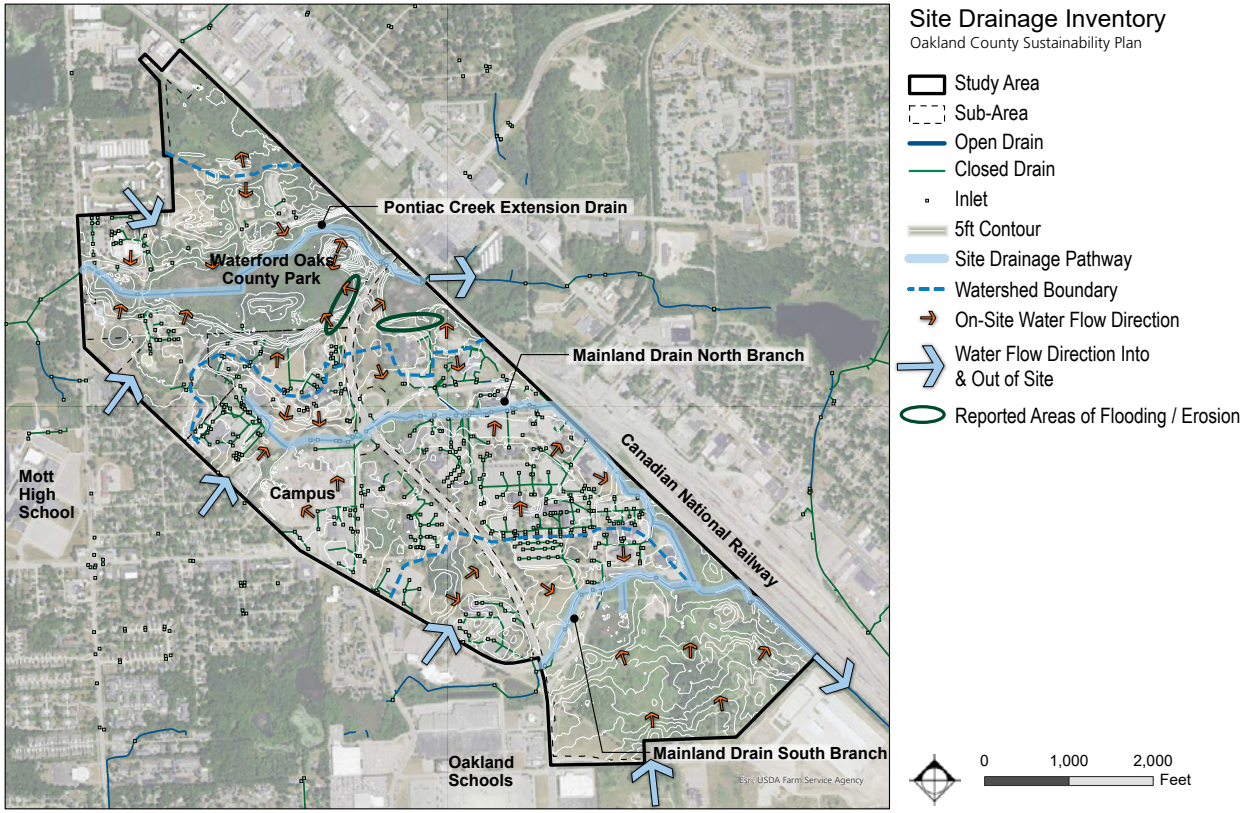
Open Space, Ecosystems, and Connectivity

O4 Implement Ecological Restoration Projects

Reforestation

The county should develop a campus landscape plan to identify feasible tree planting locations along streets, in parking lots, and near buildings.[78] There is an estimated potential for up to 1,000 trees to be planted on campus. The carbon absorption and runoff reduction benefits are significant. One published rule of thumb is that one tree can absorb 48 pounds of carbon per year;[79] therefore 1,000 trees could absorb 24 tons of carbon per year. Another published rule of thumb is that one tree can intercept an average of 1,700 gallons of rainfall per year; therefore, 1,000 trees could reduce runoff by over 1.5 million gallons per year. The tree planting plan should focus on utilization of a diverse mix of native species arranged in informal groupings.

Figure 22. County Campus Drainage



78 The campus landscape plan should also lawn maintenance and conversion areas (see the Strategically O3. Strategically Convert Lawns to Forest or Meadow strategy).

79 Various factors determine the amount carbon a tree can sequester, such as tree size, species, and health. Online calculators, such as the North Carolina State University Carbon Calculator, can be used to estimate carbon sequestration from trees. North Carolina State University Carbon Calculator: http://www.carboncalculator.ncsu.edu/

Open Space, Ecosystems, and Connectivity

O5 Reduce Paved Areas and Transition to Permeable Pavements or Greenspace

Guiding Principles

- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: City of Pontiac, Waterford Township, Oakland County Road Commission, MDOT

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation

Support: Office of Sustainability, Water Resources Commissioner

The county should evaluate additional opportunities to install green stormwater installations, such as permeable pavements or bio-infiltration areas, in new parking lot installations and assess parking lot pavement rehabilitation projects. The county Facilities Management Department integrated bioswales into the Administrative Complex parking area and paved one of the campus parking lots with porous asphalt. Learning from the successes and challenges of these existing installations, the county has an opportunity to implement similar infrastructure in other locations throughout campus. Green stormwater infrastructure implementation in parking areas should be coordinated with electric vehicle infrastructure installation (see strategy F3. Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus), as well as efforts to reduce overall parking space requirements wherever feasible. As it applies to the Sustainability Plan's Guiding Principles, reducing paved areas and transitioning to permeable pavements or greenspace could:

- **Improve air and water quality** by reducing and filtering stormwater runoff.
- **Maximize resource efficiency** by relieving local flooding, reducing roadway maintenance costs, and preventing the high costs and resources required to respond to serious flooding events.

The Executive Office Building parking lot at the northwest corner of Telegraph Road and Pontiac Lake Road should be considered as a high priority for pavement reduction or elimination due to very minimal use. The county should perform soil testing for infiltration rates as part of permeable pavement project planning and consider how the pavement will be maintained over time. Resources include the US EPA's Toolkit on Permeable Pavement[80] and the Minnesota Department of Transportation's Guidance on Permeable Pavements in Cold Climates report.[81]

The county does not use any coal-tar-based products. However, a formal policy should be adopted to ensure that the practice continues, and that products containing other harmful chemicals such as other polycyclic aromatic hydrocarbon (PAH) are not used. Furthermore, the county may consider placing a ban on PAH sealants, as many communities in Michigan and around the Great Lakes region have implemented. have implemented. For example, the Minnesota

80 https://www.epa.gov/soakuptherain/soak-rain-permeable-pavement

81 http://www.dot.state.mn.us/research/TS/2015/201530TS.pdf

Open Space, Ecosystems, and Connectivity

O5 Reduce Paved Areas and Transition to Permeable Pavements or Greenspace

Legislature banned the sale and use of coal tar-based sealants in 2014. The coal tar-based sealants contributed to 67% of PAHs in 15 Minnesota metro-area stormwater ponds.[82]

These recommendations support the county's Environmental Sustainability Strategic Framework community objective of protecting drinking water and lakes.

In the longer term, the county should evaluate the elimination of the two left-turn cloverleaf intersections on Telegraph Road at Pontiac Center Road and County Center Road which would reduce the surface area of impermeable pavement in the area. In partnership with the Road Commission and MDOT the traffic patterns at these locations should be evaluated under current traffic conditions for conversion to traditional perpendicular intersections consistent with the Telegraph Road corridor to the north and south of the county campus. This recommendation also aligns with strategy O1. Improve Connectivity with Non-Motorized Pathways This recommendation supports the county's Environmental Sustainability Strategic Framework community objective of protecting drinking water and lakes as well as the Organizational Excellence objective of maintaining the highest fiscal stewardship. In addition, this recommendation would free up land for the county's use.

The Huron River Watershed Council

The Huron River Watershed Council is an advocacy group that has worked with the Michigan Environmental Council, the League of Conservation Voters, and other interested groups to monitor the presence of PFAS in drinking water and lakes in the Michigan area. PFAS are a family of thousands of chemicals associated with many health problems, the pollution of which is widespread in the United States. The state of Michigan has established drinking water standards for seven PFAS chemicals and state rules are in place for cleanups regarding the seven chemicals. The Huron Rivers Watershed Council continues to monitor PFAS rates in drinking water and other bodies of water and has seen very low rates in the Michigan area due to successful legislation. This case study is an example of the impact the county could have on protecting drinking water by implementation a formal policy to ensure that coal tar and PAH based products are not used. The Huron River Watershed Council was able to reduce harmful chemicals in drinking water through strategic legislation and advocacy. Along with banning these chemicals from the source, the county can implement permeable pavements to reduce runoff and prevent chemicals in the environment from entering the water supply.

82 https://www.pca.state.mn.us/business-with-us/coal-tar-based-sealants

Next Steps

AECOM developed this Sustainability Plan on behalf of Oakland County to achieve their Sustainability Vision and advance their sustainability Guiding Principles through strategic action in the Focus Areas of Sustainable Governance, Health and Wellness, Facility and Fleet Decarbonization, High-Performance Buildings, Waste Reduction and Diversion, and Open Space, Ecosystems, and Connectivity. Through implementation of sustainability initiatives set forth in this Plan, Oakland County can advance the broader Strategic Framework. Most importantly, by advancing sustainability within county sites and operations, the county can further provide positive service experience for all, through efficient, equitable, and low-carbon operations – extending sustainability impact and resources throughout the greater community and continuing to lead by example.

This Sustainability Plan identified 29 strategies. The next step is to implement these strategies, supported by the guidance provided in the Change Management Plan. Progress will be monitored throughout the process through critical KPIs and metrics associated with each strategy. The Plan will be reassessed and evaluated periodically to ensure that it continues to align with county priorities and policies, as well as regional and state priorities.

Implementing Sustainability Strategies

Successful implementation of the sustainability strategies presented in this Plan hinges on the collaboration of county staff to keep moving sustainability forward. As such, purposeful communication of the county's Sustainability Framework and staff roles for strategy implementation is key. Effective communication can result in:

- Mainstreaming sustainability concepts and priorities amongst staff
- Reinforcing that all county decisions must be aligned with its sustainability priorities
- Empowering staff to take ownership of the county's current and future sustainability actions
- Increasing transparency and accountability for organizational processes

Achieving these objectives will require consistent messaging to encourage continued enthusiasm for pursuing and operationalizing sustainability. The steps below provide a roadmap for providing this messaging:

Step 1 Communicate the Sustainability Framework

Step 2 Define Roles

Step 3 Develop Sustainability Framework Brand Identity

Step 4 Connect Employees to the Brand

Step 5 Provide a Platform for Safe and Open Feedback Loop

Additionally, a supporting communications strategy and Change Management Plan will provide guiderails so the county can easily identify *who* needs to be engaged, *how* they are expected to contribute to the county's Sustainability Framework, *when* they are expected to achieve certain milestones, and *what* additional resources or measures, if any, need to be identified to overcome barriers in reaching these milestones.

STEP 1: Communicate the Sustainability Framework

When sharing the Sustainability Plan with Oakland County employees, the Sustainability Framework should be clearly communicated so all employees have unified understanding of the county's goals and how they should inform future decision-making. Consistent messaging will ensure the material resonates with staff.

STEP 2: Define Roles

Provide all individuals within county organizations with a clear definition of their role in progressing next steps. Defining roles immediately when projects are kicked off will help employees envision how they can contribute to a project's success and the county's broader sustainability Vision, ultimately ensuring efficient project delivery. Each strategy within this Plan identifies the lead, supporting, and external teams that are expected to contribute to project implementation. Building off this foundation, project leadership can create a responsible, accountable, consulted, and informed (RACI) matrix to align roles and responsibilities for each team member and concisely communicate them to the entire team.[83] A RACI matrix will support role clarity by ensuring all team members share a common understanding of their respective contributions, as well as how to coordinate amongst each other to achieve cohesive success

STEP 3: Develop Sustainability Framework Brand Identity

Develop a content calendar to ensure consistency and integration with other county-wide communications. A strong brand identity for sustainability within Oakland County will ensure that any communication distributed about sustainability has the same look, feel, and is instantly recognizable as on-topic. The Sustainability Framework should be at the foundation of the county's sustainability brand, and the triple bottom line should be visible in all messaging.

The Michigan Department of Environment, Great Lakes, and Energy's Recycling Racoons[84] campaign is an example of a sustainability brand. The Recycling Raccoons educate, engage, and mobilize Michigan residents on how to recycle correctly. Each member of the Recycling Raccoon Squad personifies a recyclable material (Gladys Glass, Paper Mackay, Nyla P. Lastic, Carlos Cardboard, and Precious Metale), who articulate important rules for recycling common household materials.

Branding also involves curating distribution channels so stakeholder groups (e.g., county staff, elected officials, and visitors) will have an individualized sustainability experience. Distribution channels may include digital platforms, printed materials, and permanent signage[85] solutions. A content calendar can be developed to identify an appropriate mix of digital and traditional mediums to make content accessible to a variety of patrons and reduce redundancies in planned communication.

83 Reference Appendix D: Change Management Plan for detailed information about stakeholder preparation and alignment towards role definition, among other Change Management strategies.

84 https://recyclingraccoons.org/

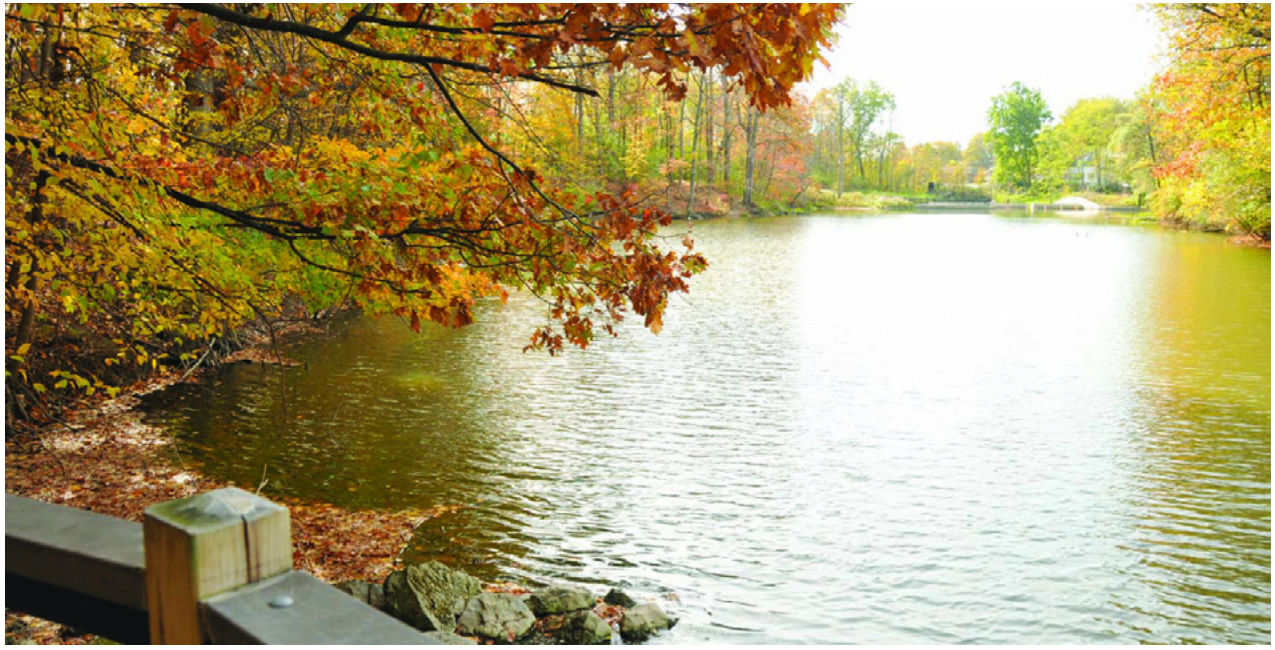
85 Please see O2. Expand and Improve Signage with Accessibility Standards for more detail.

STEP 4: Connect Employees to the Brand

The next step is to connect employees with the importance of the brand message—for their own work, the entire county organization, the environment, and the community at large. Simply put, the county needs buy-in from its employees to progress its sustainability agenda. Reiterating to employees the critical role they play in measuring and promoting, and providing them with the tools to do so, is foundational and ultimately achieving progress. As Oakland County's policies and programs evolve to reflect the Sustainability Framework, it is critical that sustainability leadership explain the reason for these changes.[86] As much as possible, leadership should point to the Guiding Principle(s) that justify the change and the objectives that will be advanced by this change. In addition, establishing county employee education and outreach programs will bring sustainability to the forefront and mainstream sustainability for staff and day-to-day operations. To incentivize collective sustainability action, the county can also consider connecting sustainability metrics to annual employee work plans and performance evaluations, leverage behavioral change applications to develop individualized sustainability coaching and training plans, and reward county departments and teams that achieve desired performance and seek partnerships with vendors that articulate the same values.

STEP 5: Provide a Platform for Safe and Open Feedback Loop

Provide a safe two-way communication channel for employees to provide feedback, including opportunities for anonymous comments. County and staff leadership are best positioned to receive and respond to employee feedback. Responses, particularly an explanation of how the sustainability program will be strengthened in response to comments, should be communicated to staff in a timely manner.



86 In focus groups facilitated as part of the Plan's development process, county employees reported that they often did not know the reason behind recent changes and expressed interest in county and staff leadership communication around why the change is happening.

Tracking Sustainability Progress

The Sustainability Framework defined in this Plan provides a set of Objectives and KPIs to monitor and review progress. The county can continuously monitor progress by tracking and analyzing performance according to the sustainability Objectives and KPIs. Progress towards achieving stated sustainability goals should be tracked on an internal or public dashboard to increase transparency and accountability for organizational processes.

The following steps can be taken to streamline progress reporting processes:

- Catalo ging and standardizing data streams required for tracking KPIs
- Hosting trainings to ensure consistent use of KPI evaluation methodologies (including quality control procedures) and reporting templates across departments and teams
- Identifying opportunities to integrate performance reporting procedures into existing workstreams
- Including strict reporting requirements in Request for Proposals (RFPs) (e.g., require waste haulers to regularly report the volume or weight of collected materials)

Monitoring performance can serve as a feedback mechanism that enables the county to identify areas for improvement and areas of success. The county can then use performance results to review its Sustainability Framework, strategies, and implementation practices to improve performance or better align with county priorities and policies.

A Message from Erin Quetell, Environmental Sustainability Officer

"Whenever you are asked if you can do a job, tell 'em, 'Certainly I can!' Then get busy and find out how to do it." – Theodore Roosevelt

To the residents and community members of Oakland County,

Thank you for your time and consideration in reviewing this plan. There is no blueprint for sustainability. It is a complex idea, and difficult to define. Politicians, scholars, and subject matter experts have tried to define sustainability with ever changing jargon and ideas as new technologies or thought processes emerge.

Acknowledging that, this inaugural Sustainability Plan attempts to define and establish strategies around sustainability to support advancement and efficiencies in Oakland County-owned facilities and operations. It aligns with the County Executive Strategic Framework and links to the overall goal of net zero carbon emission by 2050 for the county, and interim reduction of 50% carbon emissions for county operations by 2035. We have a lot of work ahead of us.

It is my pleasure to conclude this planning document and welcome feedback, critical and supportive, to continue to discover ways to implement sustainable practices into Oakland County. Together, we can work towards an equitable social infrastructure, preserve and enhance our natural environmental infrastructure, and continue to prosper as an economic driver for the State of Michigan.

Sincerely,

Erin Quetell
Chief Environmental Sustainability Officer

Appendix A

Urban Sustainability Directors Network Equity Principles and Commitments

This appendix includes the Urban Sustainability Directors Network's Equity Principles and Commitments.[87]

In the summer of 2019, the Planning and Advisory Committee (PAC) tasked the Equity Advisory Committee (EAC) with creating a strategy to prioritize equity network-wide. In response, the EAC collaborated to draft Equity Principles and Commitments, which outline USDN's foundational equity values and the resulting commitments the organization is making. In August of 2020, the EAC presented its work to the PAC, and the PAC unanimously endorsed the Equity Principles and Commitments (see below), which will help guide USDN's staffing, programming, and budget decisions.

Equity Principles

USDN recognizes that:

1. **The root causes of climate change, environmental injustice, and racial inequity are the same.** Climate change, environmental injustice, and racial inequity are systemic outcomes of colonization: the exploitative extraction of natural and human resources to generate profit for the few. Solutions that do not directly address these common causes will not succeed.
2. **Successful solutions prioritize the most marginalized.** We believe that to design better solutions, we must practice targeted universalism, prioritizing those who experience the most vulnerability to climate change, disproportionate exposure to environmental injustice, and the biggest barriers to benefiting from climate solutions. By doing so, we will produce solutions that meet the needs of everyone. By not doing so, we are upholding current disparities.
3. **Prioritizing marginalized communities means leading with race.** Race is the leading predictor of outcomes across the United States and Canada, yet governments have not systemically acknowledged or addressed disparities by race or their role in creating them. Because of this, racial analysis must be a priority. "Leading with race" does not mean "only race." It is a practice of starting with a racial equity analysis to understand how race impacts outcomes, recognizing how the intersectionality of identities and groups also impacts outcomes.
4. **Equity is a professional competency.** The skills associated with advancing equity make us better public servants, preparing us to deal with the complex nature of the social, economic, and environmental challenges our communities face. Equity is responsible governance. The government has a fiscal and moral responsibility to address the long-term implications that inequity has on prosperity, health, and safety for residents and stakeholders. Governments can either create or eliminate barriers for better outcomes through their policies, programs, and relationships.
5. **Diversity is an asset.** Increasing diversity within the sustainability field, and particularly in decision-making positions within government, will increase the long-term relevance and accountability of our work to communities who have been systematically denied influence. Diverse perspectives produce more sophisticated solutions. To diversify successfully, the sustainability field must consciously build an inclusive culture.

87 https://www.usdn.org/about/usdn-equity-principles-and-commitments.html#/

Equity Commitments

USDN commits to:

6. **Creating a learning community.** Developing equitable solutions that will produce the change needed in our communities will be hard, complicated work. USDN is a space for us to be authentic and make mistakes, but it will also push us to do better and be better.
7. **Supporting our members' individual racial equity work.** To build our professional competency and confidence in racial equity work, we must honor the vulnerability, courage, and humanity required. Although systemic racism negatively impacts us all, Black, Indigenous, and People of Color bodies and white bodies will have different needs, from healing to humility. We will support each member's individual anti-racism practice.
8. **Building the pipeline of diverse sustainability professionals and developing leaders.** We are committed to using our positional power and influence to attract, train, and retain members from communities underrepresented in the sustainability field, particularly Black, Indigenous, and People of Color practitioners. We also commit to creating growth and leadership opportunities for these individuals.
9. **Structuring USDN funding and resources to support our equity principles.** USDN will use our equity principles to inform staffing, programming, and budget decisions for both our organization and the funds we make available to members.
10. **Accelerating adoption of equity values and commitments in our field of practice.** USDN will work with partners that share our values, and we will use our organizational influence to set an example of racial equity work for our community of practice.
11. **Creating an inclusive culture.** USDN will create spaces where members, staff, and partners feel welcome to participate fully with their identities, experiences, and positions.
12. **Being accountable to our principles.** USDN will evaluate and publicly report on how we are living up to our explicitly stated equity principles and our opportunities to do better.

Appendix B

Summary of Strategies

Table 15. Summary of Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
S1	Standardize Business Management Tools and Workflows Across Departments							X			X	X			X	County Executive	Information Technology, Management and Budget, Office of Sustainability, Purchasing, Departmental Leadership	
S2	Develop an Integrated Planning Checklist to Coordinate Investments							X							X	Facilities Management, Parks and Recreation	Office of Sustainability, WRC, Information Technology, Management and Budget, Planning Division	DTE Energy, Consumers Energy, City of Pontiac, Waterford Township, Plante Moran, Oakland County Road Commission
S3	Develop an Enterprise Asset Management Plan							X	X	X	X	X	X	X	X	Facilities, Operations, and Maintenance	Office of Sustainability, Information Technology, Parks and Recreation, Water Resources Commissioner	Cityworks
S4	Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities	X				X		X	X	X			X		X	Purchasing	Office of Sustainability, Office of Diversity, Equity, and Inclusion	

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
S5	Update the Purchasing Evaluation Handbook to Increase Diversity of Bid Evaluation Teams and Incorporate Sustainability Evaluation Criteria							X	X	X						Purchasing	Office of Diversity, Equity, and Inclusion, Office of Sustainability	
S6	Expand Business Forward Initiative to include Sustainability-Focused Services	X		X				X	X	X	X					Economic Development	Office of Diversity, Equity, and Inclusion, Purchasing	
S7	Perform an ADA Compliance Study*							X	X	X	X					Facilities Management	Office of Sustainability, Office of Diversity, Equity, and Inclusion, Parks and Recreation, Risk Management Department	
W1	Define Health and Wellness Vision and Values for Oakland County*		X						X	X	X	X			X	Human Resources	Office of Sustainability, County Executive	Marsh & McLennan Agency
W2	Develop Actionable Support for Wellness in Employee Lifestyles	X	X		X			X	X	X	X	X				Human Resources	County Executive	External vendors
W3	Enact County-Wide Workplace Guidelines and Standards		X		X	X			X	X	X			X	X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Human Resources, Purchasing, Environmental Health Services Unit of the Health Division	Marsh & McLennan Agency, Vendor partnerships

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
F1	Conduct a Decarbonization Feasibility Study for the Central Steam Plant					X		X					X		X	Facilities Planning and Engineering Division	Facilities Management: Facilities, Maintenance, and Operations Division, Engineering	
F2	Pursue On-Site Solar Generation at Key Campus Locations					X		X					X		X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing	
F3	Develop an Electric Vehicle Infrastructure and Fleet Transition Plan for the Oakland County Campus					X		X			X		X			Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing, Parks and Recreation	
H1	Perform Energy Audits at Target Facilities					X		X					X			Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing	

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
H2	Complete Campus-Wide LED Lighting Conversion*					X		X					X		X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Purchasing, Human Resources	
H3	Continue Investment in Energy Efficiency Measures*					X		X					X		X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Purchasing, Human Resources	
H4	Perform a Campus-Wide Water Audit					X		X							X	Facilities Management	WRC	
H5	Continue Investment in Water Efficiency and Conservation Measures*					X		X							X	Facilities Management, Parks and Recreation	WRC	

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
H6	Develop Sustainable New Construction and Major Renovation Standards					X							X	X	X	Office of Sustainability, Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing, WRC, Parks and Recreation	
D1	Review and Renegotiate Waste Hauling Contracts*							X							X	Facilities Management, Parks and Recreation	Office of Sustainability, Purchasing	
D2	Expand Recyclable Material Collection					X		X					X		X	Facilities Management, Parks and Recreation	Office of Sustainability	
D3	Expand Organic Material Collection					X		X					X		X	Facilities Management, Parks and Recreation	Office of Sustainability	
D4	Deploy Smart Waste Management Systems							X							X	Facilities Management	Office of Sustainability, Parks and Recreation	
D5	Develop Policies to Minimize Office Supply Consumption							X							X	Purchasing	Office of Sustainability	

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
O1	Improve Connectivity with Non-Motorized Pathways*		X		X	X			X	X	X		X			Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Parks and Recreation	Oakland County Road Commission, MDOT, SMART, SEMCOG
O2	Expand and Improve Signage with Accessibility in Mind			X	X			X	X	X	X	X				Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division; Parks and Recreation: Wayfinding Group and Sign Standards Work Group	Office of Diversity, Equity, and Inclusion; Media and Communications; Office of Sustainability	Oakland County Road Commission, MDOT
O3	Strategically Convert Lawns to Forest or Meadow					X		X					X	X	X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division; Parks and Recreation	Office of Sustainability, WRC	

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
O4	Implement Ecological Restoration Projects				X	X							X	X	X	Office of Sustainability	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division; Parks and Recreation; WRC	City of Pontiac, Waterford Township, Plant Wise
O5	Reduce Paved Areas and Transition to Permeable Pavements or Greenspace*					X		X						X	X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Office of Sustainability, WRC	City of Pontiac, Waterford Township, Oakland County Road Commission, MDOT

LEGEND: (*) In Progress

Appendix C

Stakeholder Engagement

This appendix describes the various engagement activities and the departments, programs, or organizations engaged.

Engagement Activities

Steering Committee Meetings:

The Steering Committee included members of the county's Environmental Committee and select county employees with a keen interest in sustainability. Three Steering Committee meetings were held throughout the Sustainability Plan development process. This Committee provided general guidance, direction, and feedback.

Each Steering Committee meeting included information on the Sustainability Plan overall, development progress, and a discussion activity to gather participant input. The initial Steering Committee meeting was designed to gather input needed to inform the project vision. The second meeting focused on testing vision concepts and receiving feedback on Focus Areas and Guiding Principles. The third meeting focused on reviewing components of the draft Sustainability Plan.

Technical Interviews:

Five large group interviews were held to confirm or clarify technical information gathered through a Request for Information process. Interviewees were selected by the county based upon the employees' knowledge of specified subject matters. Each group interview had a topic of focus. These topics were:

- Campus Grounds
- Campus Facilities
- Parks Grounds
- Parks Facilities
- Health and Wellness

In addition to large group interviews, multiple smaller group and individual interviews with county staff relating to waste, procurement, health and wellness, asset management, and finance were held. These interviews were conducted to gather information from staff not available during the larger group interviews or to discuss topics in more detail than was possible in the large group interviews.

Focus Groups

Focus Groups were held in two rounds. The first round was held as analysis of Oakland County's operations was beginning. The second round of Focus Groups was held as potential sustainability strategies were being developed.

Round One:

During the first round, two Focus Groups were utilized to gather information, opinions, and insights relating to employee health and wellness. The members of these Focus Groups were selected based upon the organization in which they worked and the building in which they were located. A third Focus Group was used to test the visioning results from the first Steering Committee meeting.

Focus Group participants were selected based on a set of criteria to reflect a variety of job types, work locations, ethnicity and length of service with the county.

Round Two:

During this round of Focus Groups, two groups were used to gather feedback on potential sustainability strategies regarding ease of implementation and impact on employees. These groups consisted of employees randomly selected as well as employees that could have a role in strategy implementation. The third Round Two Focus Group was primarily designed to gather input about employees' readiness and resistance to change, knowledge about the Sustainability Plan project, and methods of communication. The Round Two Focus Group members were chosen randomly using criteria to approximate the racial and gender make up of Oakland County Employees.

The Focus Groups were held virtually and included an overview of project information followed by interactive activities to gather participant insights with introductory and project information provided through a slide presentation.

Virtual Room and Surveys

An online Virtual Engagement Room was created to provide the opportunity for employees to learn about the development of the Sustainability Plan and various topics relating to sustainability. Survey questions embedded in the Virtual Engagement Room sought information regarding how employees view sustainability, their vision of success for the county's sustainability efforts, and obstacles to success. Virtual Room engagement levels were low.

A separate online survey with questions like those in the Virtual Room was prepared to solicit information regarding employees' views regarding sustainability, their vision of success for the county's Sustainability efforts, and obstacles to success. Survey response rate was low.

Public Review

It is important that the county be transparent about its activities. A summary of the Plan and information about sustainability was provided via a Story Map on the county's website.

Engagement Participants

Almost 100 individual county employees took part in virtual engagement events, with some participating in multiple meetings. In total, employees provided input through meetings, the Virtual Room, and surveys in approximately 185 instances. Fifty different county divisions, programs, or organizations participated in engagement meetings.

County Department, Program, or Organization Participating in Engagement Meetings:

County Executive Administration
Corporation Counsel
Risk Management
Management & Budget Administration
Purchasing
Equalization Administration
Fiscal Services Administration
Fiscal Services Reimbursement
Facilities Management Administration
Facilities Management/Support Services Division
Facilities Maintenance & Operations Administration
Facilities Maintenance & Operations Building Custodial
Facilities Maintenance & Operations Building Maintenance
Facilities Planning & Engineering
Human Resources Administration
Human Resources Recruitment
Human Resources Benefits Administration
Human Resources Retirement
Human Resources Employee Benefits
Health Administration
Neighborhood & Housing Development
Public Services Administration
Children's Village Administration
Animal Control Administration
IT Administration
IT CLEMIS
Economic Development Administration
Planning & Local Business Development Division
Planning & Local Business Development/Trails Transportation & Environment
National & International Business Attraction
Emergency Management and Homeland Security
Department of Public Communications Community Engagement Unit
Circuit Court Civil/Criminal
Circuit Court Family Friend of the Court
Probate Estates & Mental Health
Prosecuting Attorney/Litigation
Sheriff/Sheriff's Staff
Sheriff/ERP/Administration
Sheriff/Patrol Service/Traffic
Emergency Communications Operations
Board of Commissioners/Administration
Library Board/Administration
Parks & Recreation Administrative Services
Parks & Recreation Programs & Services
Parks & Recreation Red Oaks Waterpark
Parks & Recreation Parks Facilities Maintenance & Development
Water Resources Commission Administration
Water Resources Commission Financial Services
Water Resources Commission Plan Review and Permit Services
Treasurer/Administration

Appendix D

Change Management Plan

This Change Management Plan is founded on the Prosci Change Management approach. Prosci is a global leader in Change Management. Training and certification as a Certified Change Practitioner is provided by Prosci.

Introduction

The Office of Environmental Sustainability will utilize this Change Management Plan when implementing strategies provided in this Sustainability Plan. This Change Management Plan includes an approach to identify the cause of any internal resistance to sustainability initiatives and is developed from practices defined by Prosci. Prosci's Change Management methodology is founded on scientific principles and applied research that is results-oriented to manage organization-wide change, one person at a time.

The Change Management Attachment is an Excel file to use in conjunction with this **Change Management Plan** as part of the Oakland County Sustainability Plan. The tabs in the Excel file correlate to the phases in the written Change Management Plan.

The change management team identified by the county to deliver this plan will utilize the following tools at these specified phases: 1) complete the Change Impact Assessment and Stakeholder Matrix tabs during Phase 1 of the Change Management Plan, and 2) complete the Communications Plan, Leadership Sponsor Roadmap, and Resistance Management Plan during Phase 2 of the Change Management Plan.

Defining Change Management

Change Management is an applied process and set of tools to help lead the people side of change, in parallel to the technical side of change, and reach organization desired outcomes. Change Management aids in mobilizing teams to understand why change is happening and provides transition allowing employees to be successful through times of change. Change Management has both a technical side and a people side. The technical side focuses on designing, developing, and delivering technical solutions, while the people side has a focus on employees to embrace, adopt, and use the change. The sustainability strategies outlined in the first half of this document represent the technical side of change. Change occurs one person at a time in an organization - going from current, to transition, to future state - and can occur at an individual, project team, or organizational level. It is important that change is viewed as a process, and the actions and activities are customized to the needs the county's organization. For Change Management to be successful, it is important to have a network of stakeholders across the organization that support the vision and key behaviors. Critical actions to ensure the success of any change include transparent and honest communication, leadership role-modeling behaviors, developing tools to help employees through change, building trust in leadership and the program, and ensuring measures are in place to sustain changes.

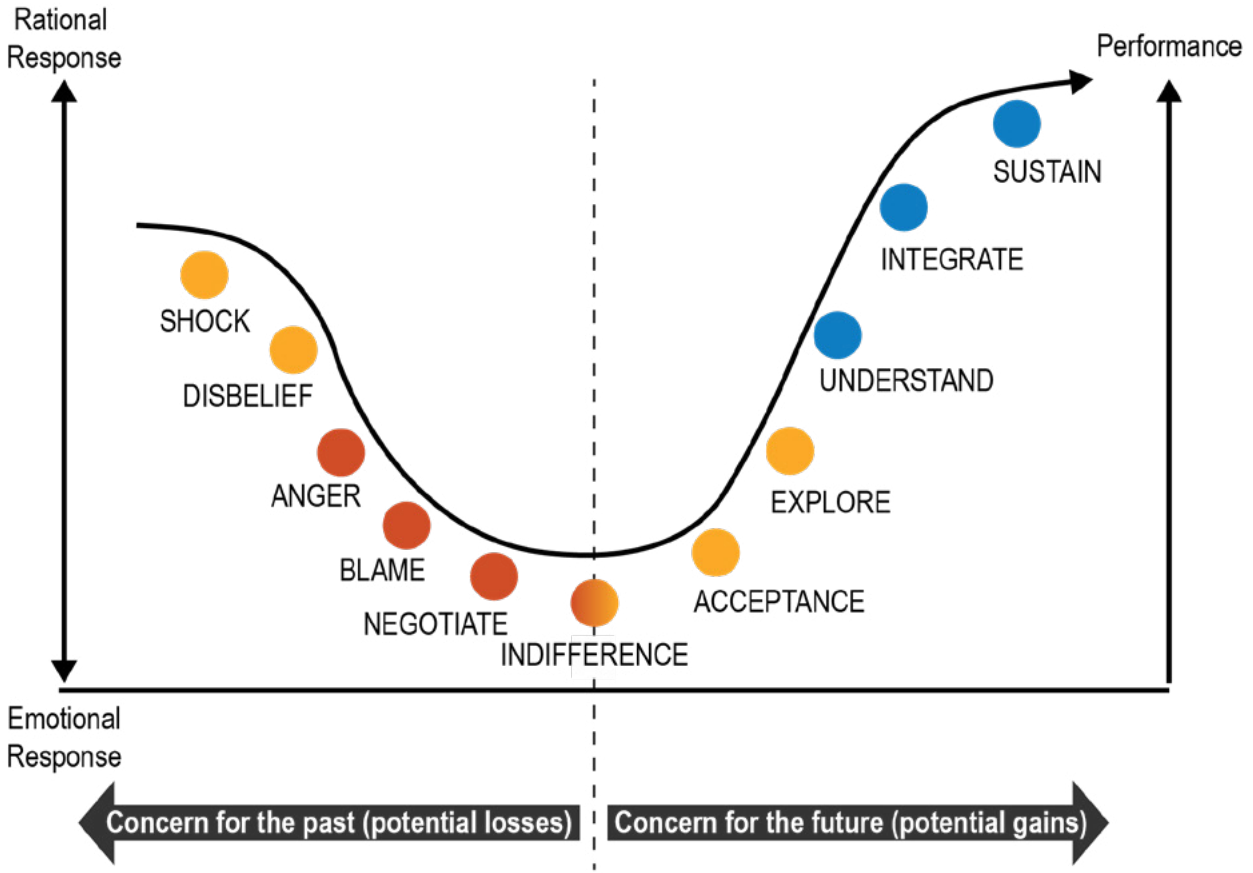
The Value of Change Management

When Change Management initiatives have good performance, they are six times more likely to meet project goals and objectives than initiatives with poor Change Management.[88] This success demonstrates the connection between employees realizing expected benefits and that change is a strategic capability that helps organizations become more resilient.

Models for Change Management – Individual Level

There are several approaches to setting a Change Management framework to develop a common and shared vocabulary around change and how individuals respond and react. The Kubler-Ross[89] change curve is a diagrammatic tool used today by many organizations to show how people respond to and experience change over time.

Figure 23. Kubler-Ross Change Curve



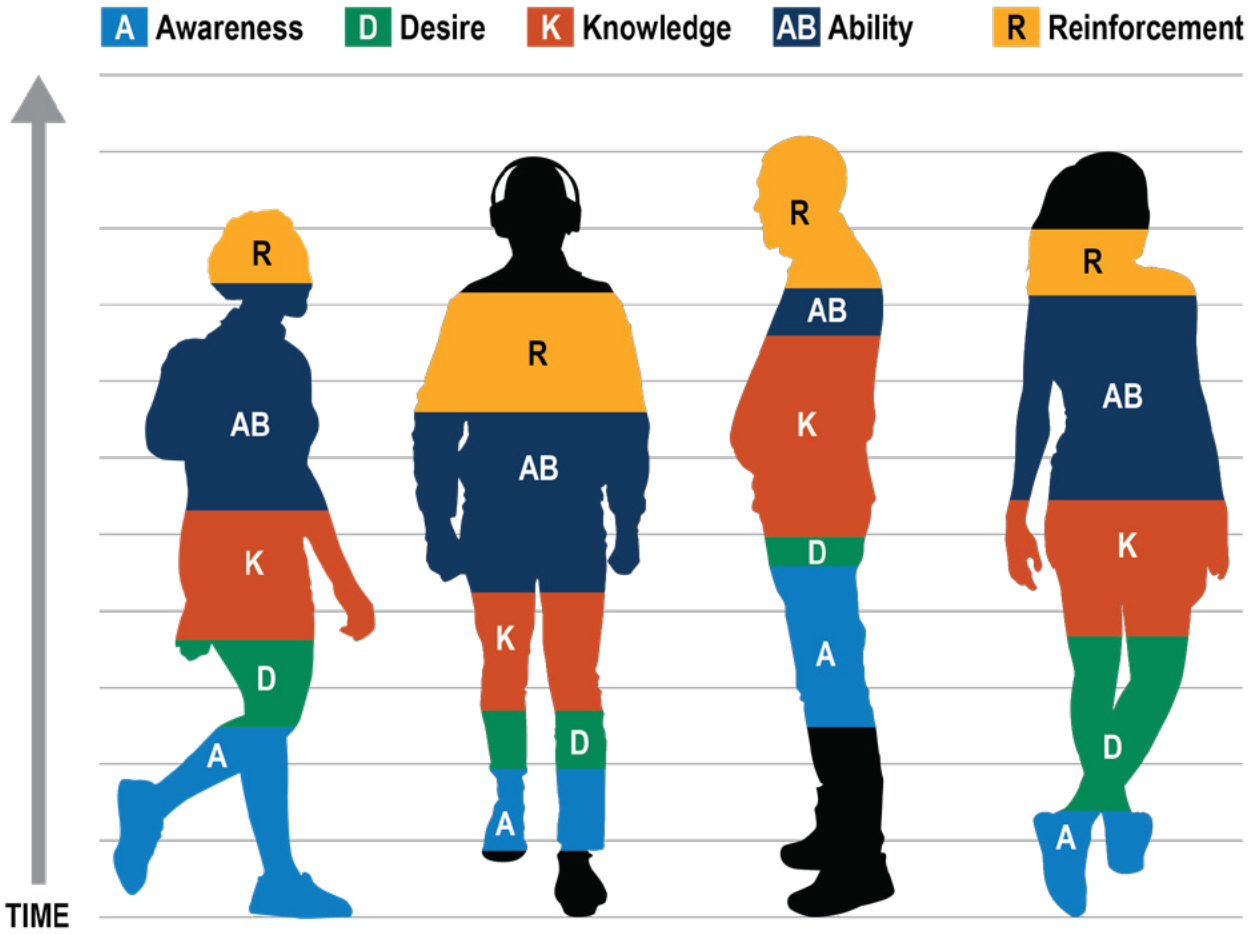
88 Prosci Benchmarking data 2007-2019

89 https://www.ekrfoundation.org/5-stages-of-grief/change-curve/

Procsi's change model, ADKAR[90], shares recognizable traits with the Kubler-Ross Change Curve, as the ADKAR steps could hypothetically be mapped across time. ADKAR is an acronym for: awareness, desire, knowledge, ability, and reinforcement. Procsi's ADKAR model is a framework to understand where people are in the change process when they are going through a change, and at which stage each individual is currently in – whether that is being aware of, desiring, knowledgeable of, able to adopt, or reinforcing a change.

Another Change Management model, the SCARF model[91], consists of five motivators, including: Status, Certainty, Autonomy, Relatedness, and Fairness. When people feel intimidated, it leads to a decrease in performance at work. On the contrary, when people feel recognized or rewarded, their performance increases. The SCARF model focuses on recognizing and addressing fears and maximizing the recognition from team members. Using the SCARF model can improve team performance and encourage constructive feedback from team members.

Figure 24. ADKAR Model Over Time per Person: Change Occurs at Different Times for Different People



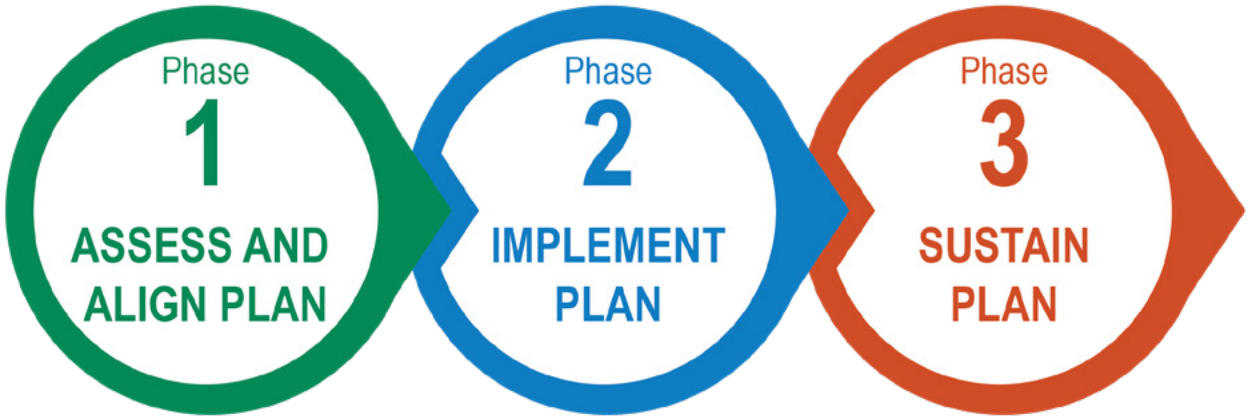
Source: https://pminb.ca/images/downloads/SelfGrowth_Professional_Development_Days_2021/pminb_change_management_presentation_may_13_2021.pdf

90 https://www.prosci.com/methodology/adkar?utm_term=prosci%20adkar&utm_campaign=ADKAR&utm_source=adwords&utm_medium=ppc&hsa_acc=5529787200&hsa_cam=10286811822&hsa_grp=100632746377&hsa_ad=497488228964&hsa_src=g&hsa_tgt=aud-1241589768885:kwd-302580028780&hsa_kw=prosci%20adkar&hsa_mt=e&hsa_net=adwords&hsa_ver=3&gclid=Cj0KCQjwjN-SBhCkARIsACsrBz4VrstbxkyIM8fUlW12ic6vWeriwMf3tK5Rk545LuJ7LWIaaSEY1SQaAsSaEALw_wcB

91 http://web.archive.org/web/20100705024057/http://www.your-brain-at-work.com/files/NLJ_SCARFUS.pdf

How to Use This Plan

This Change Management Plan includes three phases: **Phase 1 | Assess and Align Plan**, **Phase 2 | Implement Plan**, and **Phase 3 | Sustain Plan**. Throughout all three phases of this Change Management Plan thorough, consistent, and clear communication with all relevant stakeholders across Oakland County is critical to success. Throughout this Change Management Plan, there are references to 'projects' or a 'project.' This plan assumes that strategies in this Sustainability Plan will ultimately manifest in individual and specific projects implemented towards achieving the county's strategy. Additionally, this plan references 'project management' teams, assuming that individual projects are managed and delivered through this specific team, which is distinct from 'Change Management' teams.



Stakeholder Engagement for Change Management

Throughout the development of the Sustainability Plan, Oakland County employees have been engaged from a cross-section of the organization. Please reference Appendix C: Stakeholder Engagement to see all Stakeholder Engagement conducted towards the county's Sustainability Plan, and the outcomes and takeaways from that engagement. Engagement throughout Change Management at the employee level is crucial for employee buy-in when the time comes to implement sustainability strategies. This summary provides the stakeholder engagement key takeaways thus far that have informed the Change Management Plan and approach. While stakeholder engagement key takeaways are fully defined in the Stakeholder Engagement section of this plan, a high level summary of engagements is provided here through the change management lens. This summary provides the highest level of sentiment from employees engaged that should be considered when delivering change management.

Throughout all engagement activities, employees raised a consistent concern that resource constraints are a barrier to sustainability initiatives. Employees expressed that leadership needs to improve two-way communication and implement employee feedback. Employees engaged seemed to be interested in sustainability initiatives if they had the budget to implement them.

From technical interviews, the takeaway is that facilities maintenance and operations teams understand the value of sustainability improvements and are eager for resources to deliver them. Additionally, organization-wide baseline use of specific software to collect and dispatch maintenance work orders and monitor asset condition (i.e., Cityworks) is a step Oakland County is taking to streamline efforts and track progress towards O&M goals. Currently the county is not utilizing all Cityworks functions. Having specific software that tracks progress towards project goals allows the county to see what areas of a change are successful and what areas may need additional attention.

Nature, ecosystem, and trails related technical interviews provided the insight that Parks and Recreation has two existing committees dedicated to sustainability initiatives, which can be a resource for implementing successful Change Management.

Employees in Parks and Recreation understand the value of sustainability initiatives and are eager for the resources to deliver them.

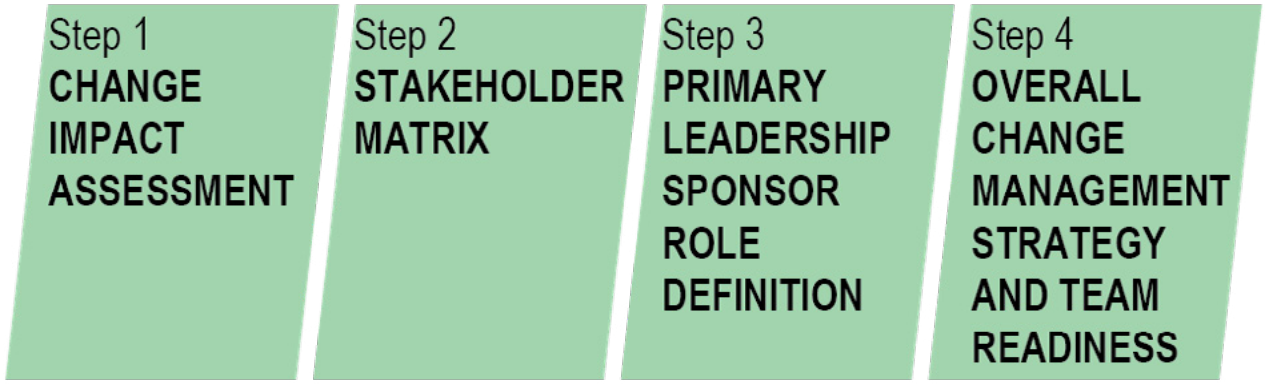
Technical interview outcomes on the topic of energy centered on the need for more clarity around energy goals and how this affects current roles and responsibilities of building engineers. Employees have implemented some forms of energy efficiency, like retrofitting LEDs, and have yet to tackle more complex efficiency issues. There currently is no database to track energy efficiency building updates.

Technical interviews and focus groups provided insights on Health and Wellness on the county's campus. These insights led to the takeaway that there is not a consistent approach to resources or offerings for employee wellness. Examples include: the standing desk approach being different per department, and wellness offerings are not universally available for different work schedules and locations. Additionally, findings demonstrated that the OakFit Wellness Program currently bases messaging on ROI to the county rather than the benefit directly to the individual.

Phase 1 | Assess and Align Plan

Phase 1 prepares teams for conducting the Change Management Plan itself. There are two goals of this phase of the Change Management Plan. One goal is to define why Oakland County has developed the Sustainability Plan, and why changes are occurring as related to its implementation. The other goal is to define who relevant stakeholders are, including those impacted by Sustainability Plan implementation changes and those critical to successful and lasting change and operations.

The specific steps to be complete during Phase 1 include: 1) conduct Change Impact Assessment, 2) prepare the Stakeholder Matrix, 3) prepare the Primary Leadership Sponsor Role, and 4) coalesce the overall Change Management strategy based on these developed items 1-3 in partnership with specific project management teams. Find a Change Impact Assessment Template and Stakeholder Matrix Template in the **Change Management Attachment**. This section will also explain how to use these templates in the appropriate steps.



Step 1 | Change Impact Assessment

Impact assessments are critical engagement activities meant to highlight the size and breadth of the change and gather information to ensure resources are allocated to implementing the change effectively.

The purpose of this Change Impact Assessment is to provide an understanding of the size of the change and the gap between the current situation and the desired future state, and finally to identify areas that need to be supported through the transition. Change impacts can include people, technology, behavior, processes, systems, workplace, and services. Conduct a Change Impact Assessment for every major Sustainability Plan Focus Area, Strategy, and project as applicable. The change impact may be the same for an entire Focus Area, so it isn't always necessary to complete a change impact assessment for every project. Additionally, it may be beneficial to revisit the impact assessment at key milestones throughout the project. It is important to continue to capture the impacts as the project progresses and outcomes gain increasing clarity.

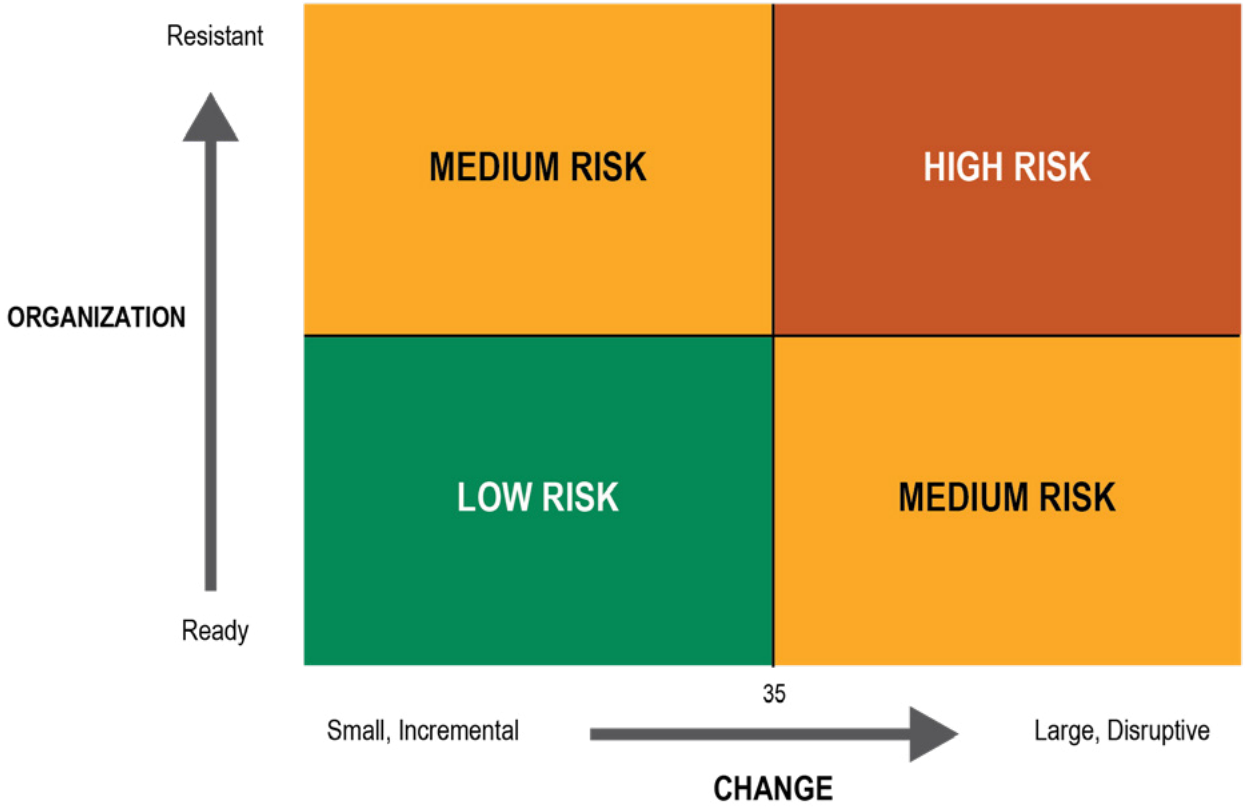
The steps that follow are to complete an impact assessment, through hosting and facilitating an interactive workshop. The goal of the workshop is to define details of sustainability implementation and changes. The workshop participants will be completing the Impact Assessment Matrix, using the template provided in **Change Management Attachment**, by defining the type and level of impact associated with the change. Completing this matrix includes identifying who will have an active role in completing the change and who will be impacted by the change. The outcome of completing the Change Impact Assessment is that areas of drastic change will be identified, and the project and change team can understand where resources are needed to mitigate and lead successful change.

Change impacts assessments may be completed in collaboration with a Change Leader Group and other key project team members. A Change Leader Group consists of a key group of individuals who form an important part of the change network. The role of the Change Leader Group is to support and engage employees through the change journey by being the conduit between the business units they represent and the project implementation team. Each Change Leader is nominated by business unit leaders based on desired attributes towards group makeup. The Change Leader Group role includes providing support to the change team by collecting feedback, cascading messages, and role-modelling behaviors. The Change Leader Group is a tool towards sustaining and embedding changes long term. The recommended size of this group is approximately 15 to 25 people and dependent on the number of departments that need representation. The Change Leader Group will be aware of what is changing, what is not changing, who is impacted, the timelines of the impact, the source of the change, the scope of change, and the risks of not changing.

Considerations while completing the Change Impact Assessment include identifying impacts and what motivators at an individual level are affected. This will help the county develop actions to respond to these impacts and motivators of change. A helpful tip is to remember is – do not just focus on negative impacts of change. Make sure that the positive impacts of the change are also discussed. These will help create positive messages, to bring users through a successful change journey. Once the impact assessment is complete, speak to department leads across the organizations to confirm alignment on impacts and that no major themes have been overlooked.

Defining change impact includes defining risk associated to any given project. A project's risk depends on organizational attributes and change characteristics. If the organization is supportive of the change, the project will have a lower amount of risk. When changes are small and incremental, they have less risk than large and disruptive changes. The diagram shown in Figure 25 depicts different levels of risk based on where a project falls within a change matrix. The matrix shows change characteristics (x-axis) and organizational attributes (y-axis). Information from your analysis of the change impact will inform a project's location on the change matrix. Once determined, communication of the project risk to the Primary Leadership Sponsor (this role is defined below in Phase 1, Step 3) is key because additional Change Management tactics and resources may be required to mitigate risk on a project. The risk level is not good or bad. The risk level informs the Change Management strategies needed to achieve success.

Figure 25. Organizational Attributes and Change Characteristics Risk Mapping



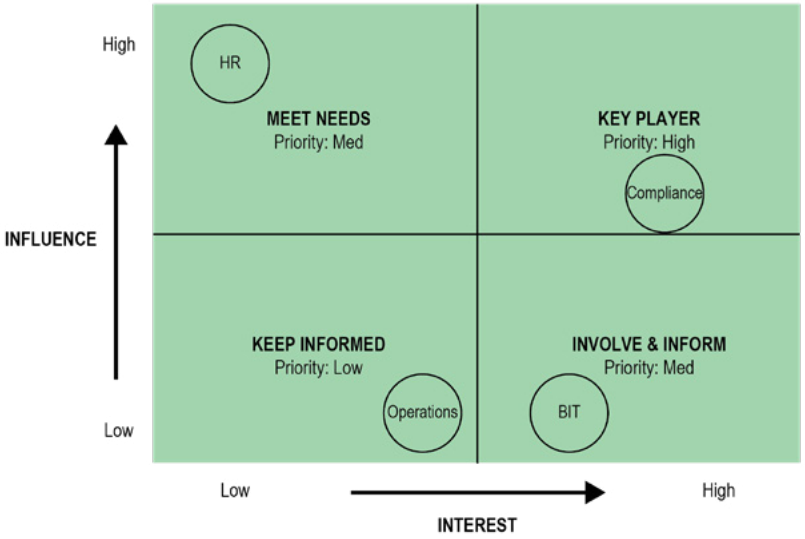
Source: https://blog.prosci.com/keys-to-prepare-for-change

Step 2 | Stakeholder Matrix

Development of the Stakeholder Matrix provides identification of all relevant stakeholders impacted through the county's Sustainability Plan. Due to the current parameters of the county's Sustainability Plan, the Stakeholder Matrix defined here is focused on Oakland County employees. Oakland County employees that are included in the Stakeholder Matrix may include: leadership, managers, change leaders, project and Change Management teams, communications teams, operations, human resources, information technology, and all other staff. Stakeholders will not necessarily know what is expected of them or understand the future vision at the onset of implementing the Change Management Plan or a specific project. Therefore, managing stakeholders and clearly defining roles and outcomes is necessary for project success. This Stakeholder Matrix tool in the **Change Management Attachment** will provide clarity in understanding stakeholder perspectives, in order to track and monitor progress with them throughout the change journey. Additionally, this tool can help identify both advocates and blockers of change. Identifying and understanding stakeholders, and if they will advocate or block the changes, will be essential in tailoring the communications and engagement approach (defined in Phase 2 | Implement Plan). All impacted stakeholders within an organization should be included on the matrix to confirm the best groups are engaged.

Stakeholder management is an ongoing process and needs to be reviewed frequently throughout the project. Consider applying the identified stakeholder attributes from the matrix to a stakeholder mapping exercise to visually map out the elements. The example stakeholder map provided in Figure 26 can help identify where to designate Change Management resources to help ensure that the change is successful. Stakeholders who have a high level of interest in the change occurring and a high level of influence within the organization will be crucial in the success of the change. Stakeholders who have a high level of interest, but a low level of influence should be informed throughout the change.

Figure 26. Stakeholder Matrix



Key Player

- When stakeholders have a high level of interest in the change and a high level of influence, work closely with them to achieve results.

Meet Needs

- Keep stakeholders who have a strong influence but a low interest in the change satisfied and confident throughout the program.

Involve and Inform

- Stakeholders who have high interest in the change but have limited influence need to be kept informed throughout the program. Involve them in low-risk areas to maintain interest.

Keep Informed

- Stakeholders with limited influence and low interest in the change should receive general communications and responses to questions asked. Aim to engage and increase interest in these stakeholders.

Step 3 | Primary Leadership Sponsor Role Definition

The Primary Leadership Sponsor role needs to be defined at the onset of Sustainability Plan implementation and builds upon the defined change characteristics and organizational attributes of the change impact assessment. The Primary Leadership Sponsor role is crucial for successful change initiatives and is an essential deliverer of key messages about change with employees. It is best practice to have active and visible executive sponsorship as projects with strong, effective sponsorship demonstrate strong successful outcomes.[92] The Primary Leadership Sponsor will also inform direction on influential employees within the organization, usually managers or leaders, who in turn advocate for and approve of any changes.

The Primary Leadership Sponsor for the county's Sustainability Plan will take one of the following forms: 1) someone on the project and Change Management team, 2) a mid-level manager, 3) both an executive leader and a mid-level manager, or 4) a steering committee member and an executive leader. Progressively each of these four models requires more resources and power regarding project sponsorship. The higher organizational attributes (change-resistant) and change characteristics (large and disruptive) the project is, the greater the need for strong project sponsorship. The higher the impact and risk identified during the Change Impact Assessment, the more critical support and sponsorship from leaders in the organization is for project success.

The Primary Leadership Sponsor participates actively and visibly throughout the project and must build a needed coalition of sponsorship with peers and other managers. The Primary Leadership Sponsor will set expectations and establish clear objectives for the project while holding the project team accountable for results. The Primary Leadership Sponsor will attend frequent project review meetings and actively review progress. Employees will look to senior leaders, such as the Primary Leadership Sponsor, for messages (both spoken and unspoken) about the project's importance and the organization's commitment to the change. The Primary Leadership Sponsor has been identified as the number one contribution to change success when there is active and visible sponsorship across benchmarking case studies. Finally, the Primary Leadership Sponsor, in a senior leadership role, is one of the two preferred senders of messages about change, especially when the topic is about business drivers for change (the other being directly from an employee's manager, on topics of day-to-day impacts).

An additional effective tool around Change Management leadership is establishing an Executive Leadership Team for sustainability at the county, which would include the Primary Leadership Sponsor. All impacted groups/departments should be represented in the Executive Leadership Team. An example makeup of an Executive Leadership Team may have approximately five members, all executive peers who convene to receive progress updates and provide guidance, input, and leadership at a regular cadence. This is made possible with the collaboration and action of the Executive Leadership Team as a whole. Convening a team with decision-making authority all in one place to document decisions to move a project forward is an effective way to ensure schedules, scopes, and budgets can be maintained.

The support system for the change includes the Executive Leadership Team and the Primary Leadership Sponsor. Together they make the change possible. It is important that endorsement of change be given and that expectations are clear at the beginning of the project to ensure leaders can commit the appropriate amount of time and resources to the Change Management process. It can often be helpful to discuss with the Executive Leadership Team what they perceive to be the traits of effective (and ineffective) leadership, and how this relates to the change process. Examples of engagements with the Executive Leadership Teams include: setting a vision for the future, defining reason and context for change, discussing ways of promoting change, and defining challenges to understand where the barriers lie. A helpful tip for the Executive Leadership Team is to not assume everyone is advocating for the change at the onset, not everyone will be on board with change – each Executive Leadership Team member is somewhere on the change curve too. Work with the Executive Leadership Team and share the importance of their role in supporting other people through their journey.

92 https://www.prosci.com/resources/articles/change-management-best-practices

Step 4 | Overall Change Management Strategy and Team Readiness

Defining an overall, actionable Change Management strategy per project will require collaboration with the project management team, to understand project parameters that feed into the strategy. There are four actions that are required to define an overall Change Management strategy per project, including: scope definition, identifying stakeholders impacted, defining change type, and defining change magnitude.

The first action, defining the scope, needs to be considered for each specific project within the overall Sustainability Plan to scope the change. The scope of change will be informed by the specific project scope, which will be coordinated through the project management team. Similar projects may align to the same change management needs and can be combined in one change management approach to streamline processes. One example of projects with similar change management needs is a compost program strategy and a recycling program strategy. These have similar impacts on end users, so one change management approach to ensure end user buy-in, and therefore, strategy success, can be utilized. The second action is to determine the number of individuals impacted by the change. For example, any specific project may impact a single workgroup, department, division, or the entire county employee base. The third action is to define what type of change is occurring per project and implementation initiative. Change types that apply to the county's Sustainability Plan include policy, process, system, operations, organization, job roles, staffing level, and strategy. Additionally, defining what type of change is occurring can be informed by the six Focus Areas (Sustainable Governance, Facility and Fleet Decarbonization, High-Performance Buildings, Waste Reduction and Diversion, Open Space, Ecosystems, and Connectivity, and Health and Wellness). The final step in defining the Change Management strategy is to determine the amount of change that is occurring. Determine if the change is an incremental improvement, a dramatic change, or if the change falls somewhere in the middle.

Defining the future state will help to gain insight into crafting a Change Management strategy for a sustainability project. Specifically, knowing the ideal future state will help articulate the "why" behind the need for a change and build support from other stakeholders. Additionally, defining the future state will inform if the change has been a success during project delivery, tracking outcomes against progress. Identifying the future state will also identify gaps before the project commencement, align stakeholders so that everyone knows what change is occurring, and assist with prioritizing actions and resource allocation.

Finally, setting up the Oakland County team delivering Change Management is part of an effective leadership sponsor structure necessary for successful change. The Change Management team makeup can be one of the following: 1) project team members assigned Change Management tasks, 2) team external to the project team dedicated to the project to perform Change Management, 3) a combination of the previous two (with Change Management team on the project team, and also supported with a team outside to perform Change Management tasks). The third team makeup example may best support the county based on how it is structured today: with specific teams at the county who lead communications, trainings, and other necessary activities being specialized and supporting a Change Management team that is embedded within a project team.

The key is to have the Change Management team cohesively integrated with both the project team and the Primary Leadership Sponsor. The identified Change Management team will execute the Change Management Strategy through the specific plans detailed in Phase 2 | Implement Plan. The Change Management team members must have proven leadership qualities and be able to successfully manage multiple priorities and stakeholders in a fast-paced environment. Change Management team members must have excellent communication skills, high emotional intelligence and empathy, and be passionate about contributing to the successful implementation of the Sustainability Plan. Necessary key attributes of Change Management team members include the ability to inspire others, a strong understanding of Oakland County practices, forward-thinking, forward-looking, solution-oriented, confidence, and integrity.

Phase 2 | Implement Plan

Phase 2 actively engages project and Change Management teams through implementation of Change Management, using these planning tools that can be found in the **Change Management Attachment**: Communications Plan Template, Leadership Sponsor Roadmap Template, and Resistance Management Plan Template. These planning tools are integrated across overall implementation and specific project schedules to drive towards change buy-in and adoption. Once implementation is in motion, progress towards change and milestones are tracked to ensure Change Management plan alignment, and these findings are synthesized to report out to teams and leadership at regular check-ins.

The Communications Plan is a detailed matrix developed and tailored to topics specific to the Sustainability Plan strategies and Focus Areas. The items identified in the Communications Plan include the following for specific communications: targeted audiences, key messages, timeframe and frequency for issuance, and delivery methods and channels. Depending on the Change Management team structure, the Communications Plan may also include who is responsible and accountable to prepare and deliver specific communications. Additionally, when preparing the Communications Plan, it will be critical to have a current project schedule related to the Sustainability Plan strategies implementation. Knowing key project milestone dates and deadlines will directly relate to when communications are issued to staff and stakeholders. Once the Communications Plan is prepared, it should be discussed and issued with the project and Change Management team, the Primary Leadership Sponsor, and any department leaders who are needed to support changes in the Oakland County Sustainability Plan.

The Communications Plan template in the **Change Management Attachment** is to be used to complete this step in the process. Based on the Prosci ADKAR model referenced at the beginning of this Change Management Plan, the ADKAR steps the Communications Plan helps clarify on an individual bases are Awareness and Reinforcement. The following are critical details to consider and include when developing the Communications Plan:

- **WHO** is going to communicate the message to employees? Employees receive messages about change best from senior leaders or executives in the organization. Once the sender is identified, who will communicate the message to employees, consider the platform for presentation (e.g., live, recorded, text, and other platforms)
- **WHAT** behind-the-scenes information do employees need to know, or what is the reason for the project? For example, if a certain change could produce a positive result towards Oakland County's desire to lead by example, the important message is that Oakland County leads by example for sustainability.
- **WHEN** is it necessary to communicate information to employees? Communication is crucial for employees to buy-into the project, so delivering the message before the design or development has started is helpful. The best timing to introduce a project is at the project start-up. Reference the project timeline and pick the appropriate date and time for this message.
- **HOW** is the message going to be delivered? This message can be communicated via email, newsletter, meetings, etc. For example, Oakland County may determine a newsletter or a post on the Intranet site is the best fit to deliver the message.

The Leadership Sponsor Roadmap clearly outlines roles and responsibilities by project phase for the Primary Leadership Sponsor and Executive Leadership Team necessary to support the change project. Not only is this expressed in terms of roles of the Primary Leadership Sponsor by project phase, but also by stakeholder group in each phase. Creating identifiable actions that the Primary Leadership Sponsor and/or the Executive Leadership Team will complete to sponsor the change is a key activity of the Change Management team, outlined on the Leadership Sponsor Roadmap. The Primary Leadership Sponsor typically has a role in project management and Change Management. The Primary Leadership Sponsor will make project management decisions regarding resources, scope, strategy, and schedule for the project. The Primary Leadership Sponsor will also act to support change management through actively participating in the project, directly communicating with employees, and building buy-in with managers and employees.[93]

93 https://pminb.ca/images/downloads/SelfGrowth_Professional_Development_Days_2021/pminb_change_management_presentation_may_13_2021.pdf

All of these roles, responsibilities and expectations of the Primary Leadership Sponsor are included and detailed in the Roadmap. The Leadership Sponsor Roadmap will directly affect the Prosci ADKAR model steps of Awareness, Desire, and Reinforcement. The Primary Leadership Sponsor has less of a direct and active role in impacting Oakland County employees development of knowledge and ability, which is more likely to be developed through managers and peers through training. The Leadership Sponsor Roadmap template in the **Change Management Attachment** is to be used to complete this step in the process. The process for the Change Management team to follow in development and delivery of the Leadership Sponsor Model is as follows:

- **Prepare** the Leadership Sponsor Roadmap for the Primary Leadership Sponsor using the template provided in the attachment.
- **Provide** the Primary Leadership Sponsor with this Roadmap through review and discussion to confirm understanding and commitment from leaders of the change.
- **Facilitate** and assist the Primary Leadership Sponsor in completing the Roadmap throughout the project process. The Change Management team will be an ongoing aide to the primary sponsor to support the project team, align any other critical sponsors of the change, and provide direction and create awareness with employees.

The Resistance Management Plan is a proactive approach to managing resistance, and entails preparing for areas of resistance at all levels of the organization. The Resistance Management Plan can be built with the foundation of the Change Impact Assessment results from Phase 1 | Assess and Align Plan, that forecasted areas where issues may need to be confronted. The Resistance Management Plan provides guidelines for handling resistance before encountering actual resistance. This will help find the source of resistance during project delivery and increase the success of the Change Management Plan.

Once the Resistance Management Plan is prepared, one of the key aspects of executing the plan will be to have conversations with individuals identified as resistant to the change. Preferably, these discussions would be led by the individual's direct supervisor and conducted face-to-face. In order to prepare for these conversations, to generate dialogue and response, consider these question prompts:

Prosci's top ten tips for leading these conversations:

For changes being implemented that are radical changes with medium to high risk, one key tool to proactively manage resistance is to offer opportunities for employees of Oakland County to engage at the on-set of projects and throughout the project delivery process. An early focus on reinforcement helps create employee buy-in through co-creation and ultimately increase the likelihood of sustaining the changes being implemented. It is also recommended to ensure alignment and tracking against the remainder of the other elements of the Change Management Plan if areas of resistance to the project implementation are identified within Oakland County. For example, if the Communications Plan as detailed is not following and meeting plan, this could be a source of resistance, because adequate communications are not reaching employees. If everything is tracking as planned, the Resistance Management Plan can then be relied upon as the most important area of focus.

Based on the outcomes of the Resistance Management Plan, individual coaching and training plans can be developed to bring each person along with the change – meeting them where they are, with what they need, in response to changes that impact them. It is recommended that coaching and training development align with Oakland County employee training means and methods for content development and delivery. Based on the Prosci ADKAR model referenced in this plan, the step of that model the Resistance Management Plan helps effect on an individual basis is Desire. The Resistance Management Plan template in the attachment of this document is to be used to complete this step in the process. Below are critical details to consider and include when developing the Resistance Management Plan:

- **WHAT** might resistance look like when implementing the Oakland County Sustainability Plan? How will the Change Management team identify resistance? What strategy will you use for managing resistance for employees of all levels? Direct supervisors or high-level managers are typically the best way to manage resistance to change coming from an individual.
- **WHEN** implementing the Oakland County Sustainability Plan, where are different levels of employees within the organization anticipated to become resistant?
- **HOW** has the prepared approach to managing resistance been reviewed and discussed with the Primary Leadership Sponsor?
- **HOW** has the Resistance Management Plan been communicated to managers and coaches, so they use it during employee sessions? Sessions include all-staff meetings, coaching, training, and individual development planning.

Finally, while change implementation is ongoing, ensure that you are tracking project and change milestones through the use of the Change Management Plan and tools. These findings are to be shared at regular project and Change Management check-ins to either redirect course or celebrate alignment.

Phase 3 | Sustain Plan

Phase 3 focuses on sustaining change adoption and integration long-term. This entails measuring performance, celebrating success, identifying and addressing areas of resistance, and integrating the project and changes into day-to-day operations within Oakland County. When focusing on sustaining the Change Management Plan, gather feedback across all levels of the organization. Create corrective action strategies based on feedback received from the organization. Use resistance management to understand and identify where resistance may exist and strategize how to manage that resistance.

Within 30 to 60 days after project completion, a reflective session is encouraged to be held with leaders (including both project and Change Management leaders, and overall Sustainability Primary Leadership Sponsor as required) to document lessons learned throughout the project. This will be the first line of feedback about the Change Management Plan delivery across the Sustainability Plan implementation. These sessions can be held per project or per Focus Area. They can be repeated when a major delivery milestone is reached for other areas of implementation.

The primary focus of this session will be to identify what worked well and what needs improvement during project implementation, and where gaps are that impacted the success of the change. This session should focus on Change Management application of communication, stakeholder, and leadership strategies in relation to project delivery. The project team can be included to debrief on lessons learned for the technical project delivery as well.

The next step to gathering feedback is to conduct employee end user feedback sessions about Sustainability Plan implementation and project delivery. Employee and end user feedback sessions will include prompts aimed at learning where the responder is on the change curve, utilizing the ADKAR model, to know how to interpret the feedback. From this feedback, it can be determined if there are any corrective actions required because of identified resistance or issues to realign and maintain progress toward sustaining implemented changes. Additionally, another area of focus in feedback sessions can be to understand areas that are cause for celebration because of successful change adoption. This can be done throughout the project as a vital tool to build momentum and positive buzz around an atmosphere of rewarding success.

Feedback can occur formally or informally and can be proactive or reactive. Planned and organized feedback, considered formal feedback, may include online forms, team meetings, and question and answer sessions. Examples of informal feedback include conversations in passing, general emails, and casual discussions with colleagues. Managers and supervisors are key sources of feedback. Employees are more likely to discuss change honestly and openly on a daily basis with their peers and in many cases their supervisors. This candid feedback is helpful in diagnosing gaps and developing approaches to managing resistance. The lessons that emerge from this informal feedback may not be fully disclosed in your organized, formal feedback channels.

Employee and end user feedback can be gathered across various channels and methods including surveys, comment boxes at live events, focus groups, outreach within business units and direct supervisors inquiry to teams, and finally, a resource through which employees can reach out with questions and input (such as a generic email where all feedback can be received throughout the project process).

Finally, to reiterate the significance of their role, leaders and sponsors are critical influencers to sustaining lasting change over time. It is important to have a discussion with leadership to determine how they feel they can support the change going forward. Leadership and sponsor visibility is critical throughout and after change.

To reiterate and support resistance management (Resistance Management Plan developed in Phase 2 | Implement Plan, to be utilized here) leaders across Change Management should continue to be role models and listen to the feedback from team members. More key actions include celebrating milestones and rewarding behaviors that are in line with the change, calling out behaviors that do not align with the change, and continuing to monitor impacted teams and individuals through the change curve and ADKAR model. Remember that some colleagues will take longer to accept the change than others.

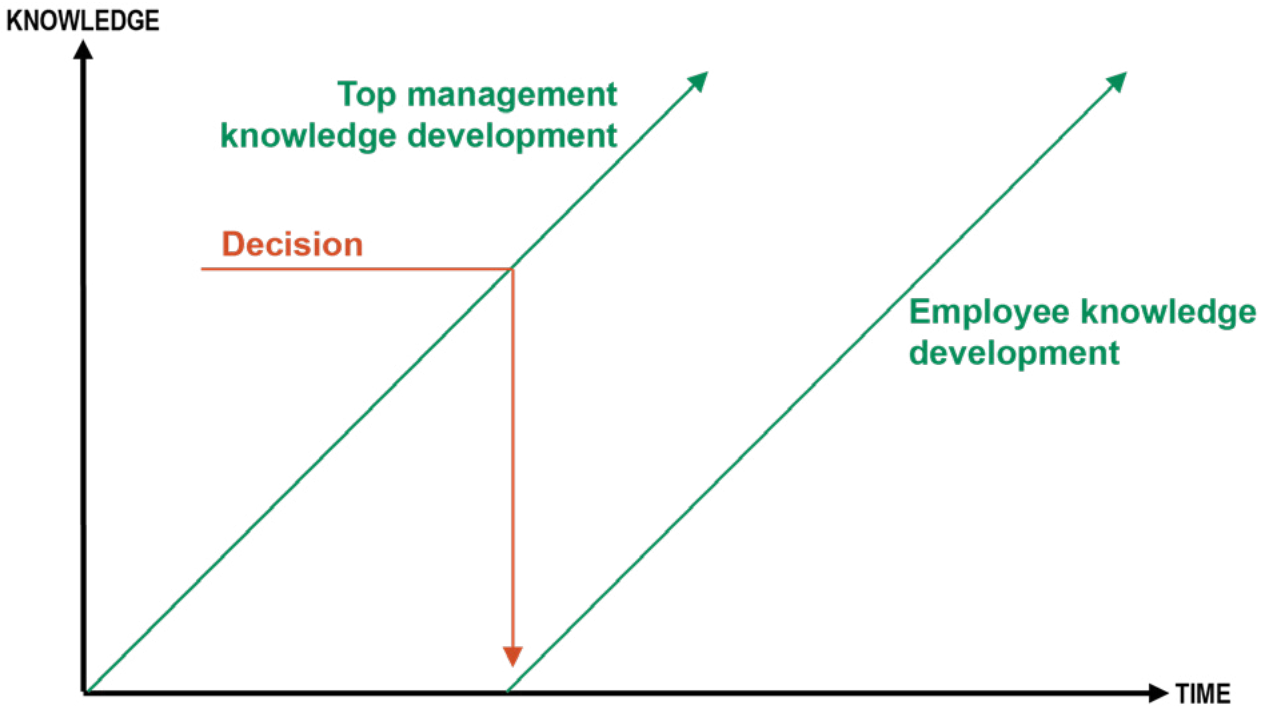
Change Management Plan | Conclusion

Two final tools are provided here to both provide empathy for those in Change Management roles, and to assist with mitigating resistance, in parallel to the Resistance Management Plan. Diagnosing gaps and managing resistance is an ongoing process. Although depicted in the Change Management process at the conclusion, the Change Management team can view these and other tools as ongoing activities through the project. These two models conclude planning and action of the Change Management Plan; however, these phases, tools, and teams can be applied cyclically throughout any given change or project as needed, to ensure successful change adoption.

The motivation gap shown in the diagram in Figure 27 demonstrates that knowledge about a specific topic or change is different per stakeholder group over time. Knowledge about the importance of the change can lead to motivation gaps between stakeholder groups. This tool can be used in workshop sessions with leaders, managers, and staff to empathize with colleagues. When used with leaders to empathize with colleagues, it can help reframe challenges their colleagues may experience when attempting to assimilate new information, behaviors, or protocols. When the motivation gap model is applied to Change Management, it highlights two things: the lag in time that exists between the development of a strategy, vision, or decision, and how to be successful with communications to inform employees about it.

When using the motivation gap model, consider the following engagement activity: Visualize a time they heard about a change in their life, and what other stakeholders were involved. Ask them to discuss what helped them during the change process, and how they can use their experiences to apply to the Sustainability Plan.

Figure 27. Motivation Gap



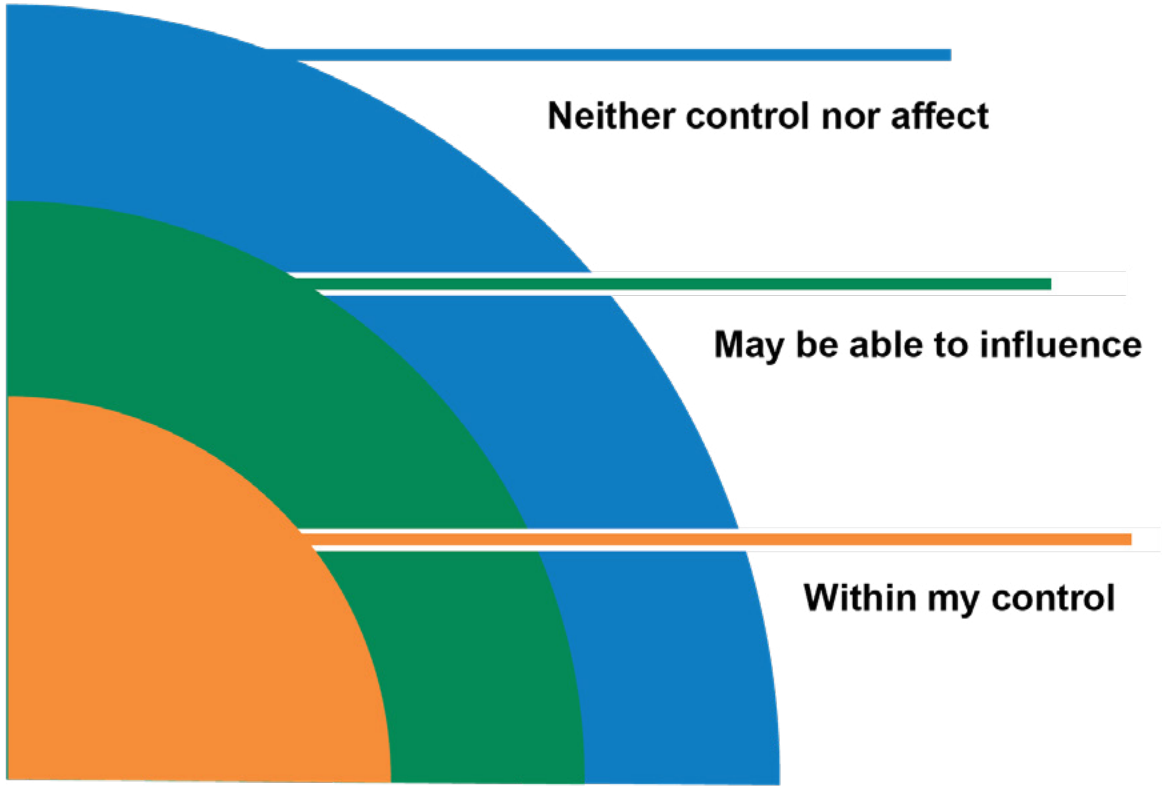
Finally, the influence model aims to assist employees in identifying areas of change that they can influence or control.

When a change process begins, use the influence model to reflect upon the following prompts with various stakeholders: *can you challenge this decision, can you influence the implementation of the decision, and what actions can you take to help embed and embrace the change?*

These prompts can be asked for each aspect of the change, whether it be a policy, work process, or team-based change, and each aspect could be mapped onto the model diagram in Figure 28 in a workshop setting with participants. Visually mapping and documenting specifically where their span of control is per aspect of the change could aid in change acceptance, and therefore progress towards success.

This Change Management Plan, tailored for the county's Sustainability Plan implementation, is a tool to establish end user adoption to provide successful and lasting change. This plan defines a process running in parallel for the 'people' side of change, alongside technical solutions implementation. In turn, the success of specific sustainability strategy implementation will help advance the county's Strategic Framework community objectives and goals.

Figure 28. Influence Model



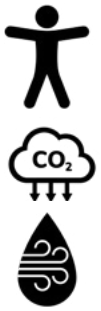
Appendix E

Sustainability Plan Vision and the Asset Management Framework

A key component of the county's sustainability Vision is to create an accessible, safe, and welcoming campus that contributes to a positive service experience for all and demonstrates efficient, equitable, and low-carbon operations. Establishing an asset management framework grounded in sustainability is a foundational step towards transparent and achievable action in this regard. As it relates to the county's Sustainability Plan's Guiding Principles, an asset management framework can:

Operationalize diversity, equity, and inclusion through rooting decision-making processes in data and organizational values to remove potential bias in asset planning and enable equitable distribution of O&M resources.

Create education and engagement opportunities through increasing exposure to content relating to asset performance and the county's asset management practices—for asset managers and asset users alike.



Provide accessible services and campus environment, **advance the net zero carbon goal**, and **improve air and water quality** through proactively identifying opportunities to improve asset efficiency, emissions, and accessibility throughout their lifecycle, not just at end of life.

Maximize resource efficiency through not only optimizing county assets' performance over their entire lifecycle, but also optimizing the use of county personnel and financial resources for asset management.

This framework is meant to serve as a foundation from which the county can develop a comprehensive Asset Management Plan, like that described in the strategy S3. Develop an Enterprise Asset Management Plan in the Sustainable Governance Focus Area section. The framework reflects the county's Sustainability Framework through integrating examples of how implementation of asset management best practices can enable environmental, social, and economic sustainability.

Asset Management Overview

Asset management is an integrated process that involves interdisciplinary and interdepartmental collaboration to manage existing and planned assets. When developed and applied correctly, asset management programs streamline organizational and data processes, reduce operational costs, and increase resource and operational efficiencies. An enterprise-wide Sustainability Asset Management Framework would help county government realize these benefits and, more specifically, provide departments with uniform and structured guidance for O&M of assets, capital planning for new and existing assets, and evaluating asset performance in line with the county's sustainability Vision. In turn, county residents, businesses, and CVTs experience benefits as well.

Benefits to County Staff and Operations:

- Lower long-term maintenance, operations, and preservation costs through streamlining existing procedures to improve operational efficiency
  - Introducing uniformity across departments to increase staff familiarity and comfort with asset management data, workflow, tools and clearly defined roles and responsibilities
  - Consolidating and automating workflows
- Access to new state and/or federal infrastructure funding streams that require applicants to demonstrate an established asset management program
- More effective utilization of available resources (including taxpayer dollars) and pursuit of funding opportunities available to priority projects

Benefits to County Residents, Businesses, and Local Governments:

- Improved performance of shared or publicly used assets and mitigated risk from reducing maintenance backlog
- Improved credibility and accountability for decision-making through clear demonstration that investments are aligned with the county's goals and resources, and as a result, improved communication between staff, elected officials, and the public
- More equitable distribution of Country resources

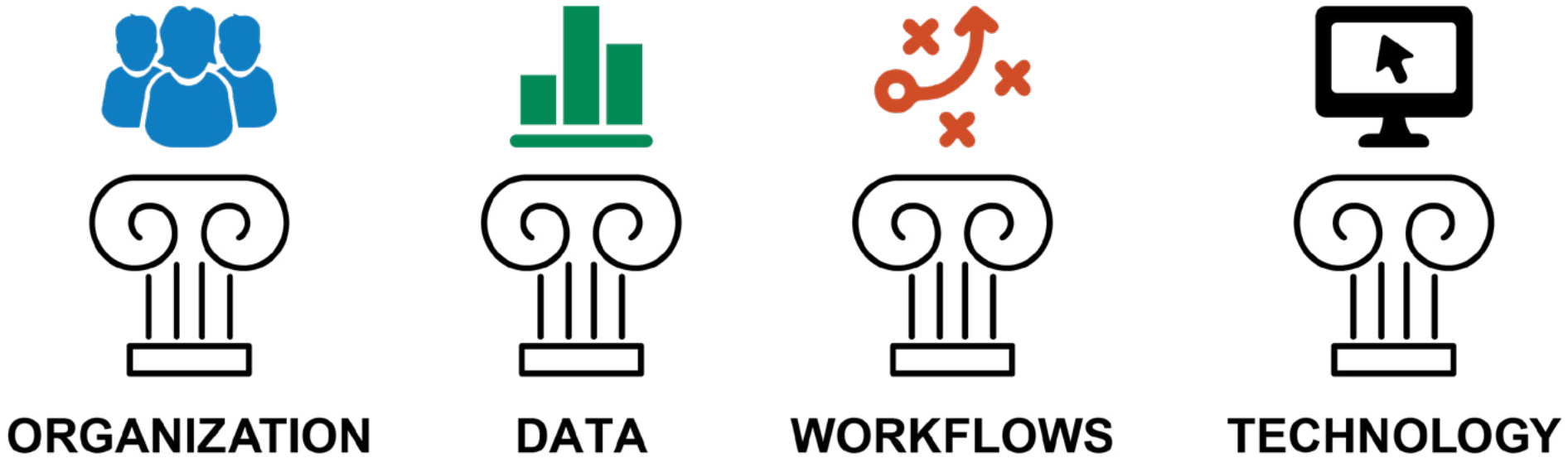
To capture these and additional benefits, the Sustainability Asset Management Framework builds upon the Four Pillars of Asset Management (organization, data, workflows, and technology), the Sustainability Framework, S1. Standardize Business Management Tools and Workflows Across Departments, and Tracking Sustainability Progress. The Framework is organized according to the Four Pillars, with Sustainability Plan ideals woven throughout.

Asset Management Framework Pillars

AECOM's Four Pillars of Asset Management—organization, data, workflows, and technology—collectively provide a structured framework for evaluating current asset management practices and identifying opportunities to incrementally improve performance.

As with sustainability planning, a key tenet of asset management is that beginning to make some improvements is better than making none. This Framework was designed recognizing that the county, the county's departments and divisions, and even the CVTs the county serve will progress along a maturity continuum of improving asset management capabilities. As such, the Four Pillars can be adapted and "right-sized" to reflect any organization's vision, resources, and experience, so that it can be applied at the county level, within specific departments and divisions, and by other peer municipal and regional governments.

The following principles, organized by Pillar, represent best practices for establishing an asset management strategy that empowers sustainable procurement and O&M of assets at any scale. The connection between each Pillar and the triple bottom line of sustainability is also exemplified in the following sections.



Organization

People and leadership are vital to successful implementation and sustainable operation of asset management programs. To establish cross-departmental accountability and an ongoing collaborative approach to asset management, the Sustainability Asset Management Framework was developed from the county's overarching sustainability Vision and goals that should resonate equally with county subject matter experts in finance, decision-making, and planning and operations within different service areas.

The following organizational best practices help establish standards, assign roles and responsibilities, and systematizes hierarchies for decision making.

1. Develop a standardized and coordinated approach to asset management across organizations while recognizing that operating units may have differing levels of maturity, have varying capabilities or capacity to track data, operate under different missions, and leverage different funding sources that may carry specific requirements.
    - 1.1. Adopting a standardized the asset management approach can position the county to leverage economies of scale for maintenance activities and support more accurate budget forecasting and capital planning.
        - 1.1.1 Coordinating bulk shipments of materials can not only save costs, but also reduce the county's supply chain emissions.
    - 1.2. Increased cross-departmental coordination from standardization can facilitate knowledge sharing and build collective capacity.
2. Establish indicators for evaluating asset performance that reflect sustainability principles, such as lifecycle cost, environmental impact, and asset criticality to continued operations.
    - 2.1. Regularly monitor and use indicators to re-evaluate asset management priorities and strategies.
    - 2.2. Include Sustainability Framework objectives and KPIs in asset management performance frameworks.
3. Explicitly map roles to asset management workflows for the most active participants (both at the enterprise and departmental or divisional levels) and establish expertise redundancy.
    - 3.1. Establish an asset management charter to formalize stakeholder (e.g., county staff, contracted vendor) roles and maintain accountability for accomplishing responsibilities according to defined workplans and schedules.
        - 3.1.1 Be alert to unconscious biases when forming stakeholder teams and assigning responsibilities.
        - 3.1.2 Plainly state the team's sustainability values and how they are reflected in the Asset Management Plan.
        - 3.1.3 Include budget, grant awards, or other funding requirements as an on/off ramp for critical workflows.
    - 3.2. Develop organizational maps that associate both individual staff members and generalized roles with fundamental workflows.
        - 3.2.1 Consider workflows at the enterprise, department, and division levels, and link to asset data and performance reporting (including that for sustainability) so it can also be rolled up through this hierarchy.
        - 3.2.2 Identify feedback channels between stakeholders and opportunities for succession and expertise redundancy.
            - 3.2.2.1 Establishing expertise redundancy can improve organizational resilience to natural hazards.
        - 3.2.3 Indicate generalized roles alongside specific contacts at multiple levels of the hierarchy to support more efficient information transfer as staff transition into new roles.

Example of an Existing Best Practice

The Parks and Recreation Department manages a dashboard to track implementation of Strategic Plan actions (including actions related to asset management), asset usage and user satisfaction, and asset financial value. Additionally, the Department established a "Priority Investment Rating" to direct funding towards assets that are highly valued by the community but may be underperforming (i.e., assets are unable to completely fulfill community needs in their current condition).

Data

Data collection, analysis, and management is where much of the effort to implement an asset management framework and plan is expended. Understanding best practices for data management related to existing asset inventories, recorded characteristics, and projected performance can help inform more effective planning, purchasing, and implementation of future assets.

1. Assign assets unique but standardized numerical IDs that are tied into an asset hierarchy.
    - 1.1. Continue to assign IDs at the time of purchase.
        - 1.1.1 Assign entirely numerical or alphanumeric IDs for improved data processing.
        - 1.1.2 Provide indication of the asset owner, location, and type within asset ID taxonomies and hierarchy.
        - 1.1.3 Structure IDs so they are easily interpretable to staff with varying levels of experience in asset management.
        - 1.1.4 Retain an up-to-date record of asset IDs. If IDs are changed to conform with a new naming convention, show a history of old and new IDs.
    - 1.2. Tag assets with scannable barcodes or QR codes (generated from their IDs) that map to their asset inventory profile.
        - 1.2.1 Ideally, tag all assets greater than $5,000 in value and interrelate tag numbers and asset IDs.
        - 1.2.2 Using RFID and GPS-enabled tags saves staff time and resources to locate assets.
2. Prioritize thorough data collection and maintenance for the division's most critical assets; right-size the appropriate level of effort at the divisional level.
    - 2.1. Remain vigilant against potential biases when prioritizing asset criticality.
    - 2.2. Involve the teams or individual staff performing O&M to define a "right-sized" data collection approach, both with respect to the number of assets for which data is collected and the amount of data collected for each asset.
        - 2.2.1 Involving the teams that perform O&M in data collection will mitigate potential resistance toward accepting new data collection workflows and tools.
    - 2.3. Where possible, consider implementing remote data collection and monitoring tools for critical assets to support early identification of potential failures.
        - 2.3.1 Remote data collection and monitoring for critical assets can improve organizational resilience to natural hazards.

3. Fill gaps in existing asset inventories so each asset profile includes a comprehensive maintenance history (e.g., link work orders to an asset profile to track historical asset condition data).
    3.1. Confirm lifecycle data (e.g., depreciation, level of deferred maintenance, replacement/demolition value) is gathered and regularly updated for each asset.
        3.1.1 Automated computation and updates to asset deterioration curves from lifecycle data can mitigate risk of asset failure.
        3.1.2 Maintaining up-to-date asset data can help teams more accurately forecast maintenance budgets.
    3.2. If not already included, consider updating lifecycle cost methodologies to reflect environmental and social costs (e.g., potential carbon pricing schemes)
    3.3. Expand inventories to include indicators of asset criticality to continued operation to support maintenance prioritization, especially when funding is constrained.
        3.3.1 Consider equity in prioritizing near-term levels of service.
4. Within data standards, specify who is responsible for completing each field, rules for completing each field (e.g., character types and limitations, and consistent nomenclature), and how often each field should be updated.
    4.1. Develop data standards so they can be clearly interpreted by staff with varying levels of experience in asset management.
    4.2. Review definitions of asset criticality or condition (i.e., language as being in "poor" versus "average" or "good" condition) for potential implicit biases.
    4.3. Align data collection cycles with internal budgeting and external funding application cycles and emissions reporting cycles.

Example of an Existing Best Practice

The Parks and Recreation Department inventories assets at the system, facility, and equipment level. At the equipment level, completed asset profiles include a numerical asset ID, type, location, manufacturer, model number, serial number, installer, utility requirements, start/end/length of life cycle, and cost. The profile also indicates when it was last updated and by whom.

Workflows

Workflows, or processes, help asset managers align budgetary and O&M decisions, recognize and respond to risk, and receive and address feedback from asset users. Workflow best practices involve designing, implementing, and clearly communicating processes to provide streamlined and effective services.

1. Perform condition assessments at least once every five years to maintain accurate asset deterioration forecasts.
    1.1. Define assessment cycles based on an asset's criticality and the level of risk associated with asset deterioration (i.e., assets critical to county operation/that carry higher risk of failure when deteriorated should be assessed more frequently).
        1.1.1 Where feasible, perform energy, water, and waste audits as part of broader condition assessments to improve operational efficiencies (see strategies H1. Perform Energy Audits at Target Facilities and H4. Perform a Campus-Wide Water Audit for more information).
        1.1.2 Collect data related to safety, ADA compliance, and other accessibility considerations to support implementation of strategy S7. Perform an ADA Compliance Study and the study's resulting recommendations.

1.2. Integrate assessment templates into software tools to allow more automated data entry and comparison across assets.

1.2.1 For teams that use Cityworks, leverage field applications that will become available through the latest software upgrade; for teams that do not, leverage digital forms that integrate into databases or output information into spreadsheets (e.g., Microsoft Forms).

1.2.2 Use compatible data standards to increase interpretability and effectiveness of assessment data.

1.3. Structure assessment templates to translate observations into a prioritized list of O&M tasks and/or new capital investments.

1.3.1 Use sustainability criteria (e.g., carbon reduction potential normalized by dollar value) to prioritize O&M tasks and capital investments.

2. Prioritize proactive maintenance to enable long-term savings and improved performance across the triple bottom line (e.g., prolonged equipment efficiency, increased reliability of budget forecasts, and reduced risk of sudden failure and associated safety hazards and expenses).

2.1. Build organizational capacity to conduct proactive maintenance through upfront investment in work order systems

2.1.1 When new assets are purchased, establish recurring work order tickets for preventative maintenance tasks

2.2. Leverage asset maintenance history to proactively schedule and prioritize maintenance.

2.2.1 Develop a library of formalized workflows specific to the most common maintenance requests or work orders and other asset management tasks.

3. Provide asset users with instructions of how to submit a work order for routine maintenance requests and notify staff of emergency maintenance needs.

3.1. Streamlined communications procedures can provide shorter repair and replacement turn-around times and more efficient use of funding sources.

3.2. Establish separate processes, contacts, response time expectations, etc. for addressing emergency maintenance requests.

3.2.1 Provide additional instruction regarding the types of failures that warrant emergency maintenance (to both users and maintenance teams).

3.2.2 When the county is facing increased risk of a natural hazard, remind users of emergency maintenance procedures to increase site resilience.

3.3. Work order and emergency notification systems should be accessible to customers with disabilities. Provide accessible alternatives if primary systems are not accessible (e.g., a telecommunications relay service or text service for deaf and hard of hearing staff).

Example of an Existing Best Practice

Use of a work order system provides the necessary foundation for the county's Facilities Maintenance and Operations Division (FMO) to efficiently track asset maintenance history and manage maintenance resources. Additionally, in their using of recurring work orders for preventative maintenance and creation of templates for recurring maintenance requests, FMO has begun to automate/streamline maintenance workflows. Cityworks can also autogenerate cyclically recurring work orders following customer submission of a reactive maintenance request so staff can further improve proactive maintenance in the future. Finally, FMO has established a separate workflow to elevate emergency maintenance requests: county staff are directed to call directly rather than go through Cityworks.

Technology

Technology is the means of delivering the Asset Management Framework and subsequent Plan. By using technology to collect, store, and interpret data, asset managers can better articulate data trends, reconcile outlier data points, and use data to make decisions about how to most effectively prioritize resources. Transitioning to a standardized system across all county departments would allow for increased operational efficiencies, but the system should provide flexibility so county departments can customize how it best serves them.

Technology best practices help distill objective information and thus better allow staff to apply subjective judgment for critical decisions, allowing for greater data transparency, justification in decision-making, and clearer understanding of processes, data limitations, and risk management.

1. Integrate asset, labor, material, equipment, and other financial data in one enterprise-wide system, or link asset management and mapping tools (e.g., Cityworks, GIS Indoors) and financial information systems so data streams are automatically shared between platforms.
    - 1.1. Establish enterprise-wide, platform-agnostic data standards and implement data governance gateways to enforce standards within data processing workflows.
        - 1.1.1 Leverage or map to a common asset ID system (i.e., translate between Cityworks, Workday, and GIS/CAD asset IDs).
    - 1.2. Incorporate asset condition data into system-scale drawings/maps to more easily identify hotspot areas of poor/good performance.
    - 1.3. Leverage user acceptance testing and sign-off to confirm software meets scoped requirements.
2. Compliment detailed step-by-step user guides for software systems with one-pagers (often provided by the software vendor).
    - 2.1. To ensure guides are user friendly, include a table-of-contents, version control table, annotated screenshots, and information on who to contact for additional information.
        - 2.1.1 Only distribute guides electronically to conserve paper resources.
        - 2.1.2 Guides should be accessible to staff with disabilities (e.g., annotated graphics should include alternative text).
    - 2.2. Structure guides so different teams can easily distinguish between foundational, capacity building, and more innovative modules and determine the optimal level of investment for their needs.
    - 2.3. Update the guides after major software upgrades or every three years (whichever is more frequent) to reflect new features and gained efficiencies from becoming more comfortable with the software over time.
3. Establish clear communication channels between software administrators from the vendor, IT, and individual user organizations.
    - 3.1. Ask software account managers to share best practices for how users can best leverage systems to advance environmental sustainability goals.
    - 3.2. Establishing strong technology support teams can facilitate expedited knowledge sharing and build collective capacity, enabling teams to more efficiently maximize the value of software systems.

Example of an Existing Best Practice

Cityworks is a well-regarded asset management tool. Most county facilities have been integrated into the tool, and it has been implemented at an appropriate scale for the county's operations. The county's pursuit of additional upgrades to the system will further enable efficient and sustainable asset management.

Additionally, the county has developed two step-by-step guides to educate county employees on how to complete the following tasks in Cityworks: submit and process work orders, add or delete a task associated with the work order, add internal labor and/or contracted estimates to a work order, and add materials from the stock room to a work order. The guide is searchable and includes annotated screenshots and, where applicable, a clear definition of different dropdown menu choices.

Appendix F

Financial Analysis Methodology

Oakland County's consultants conducted a financial analysis for the strategies listed below. This appendix includes the analysis methodology for each of these strategies.

F2. Pursue On-Site Solar Generation at Key Campus Locations

F3. Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

H2. Complete Campus-Wide LED Lighting Conversion

D2. Expand Recyclable Material Collection and D3. Expand Organic Material Collection

O1. Improve Connectivity with Non-Motorized Pathways

F2. Pursue On-Site Solar Generation at Key Campus Locations

Following industry practice and taking into account the nuance of the solar purchase investment, a market standard solar analysis template for cash purchase was utilized. It accounts for the capital costs of the carport and ground-mounted systems along with electric savings from energy production.

The Farmers Market parking lot, the public parking lot, and open space west of the Sheriff's Administration Building were used as indicative investment locations for the purpose of this analysis. Based on preliminary desktop analysis, the Farmers Market parking lot could host an approximately 800 kW carport system, generating approximately 1 million kWh of electricity per year. The public parking lot could host an approximately 1900 kW carport system, generating about 2.5 million kWh per year. Last, the space west of the Sheriff's Administration Building could host an approximately 2,000 kW ground-mount system, generating about 3 million kWh per year.

To calculate the upfront capital costs, a turn-key price per kW for carport and solar PV systems was used and a 5% contingency was added.

To calculate the payback period, the values of ITC and depreciation were subtracted from the total cost of installing the solar PV systems. The ITC for 2024 is assumed to be 22%. By using a Tax Equity Partnership funding mechanism, the net capital outlay after application of bonus depreciation and the ITC was calculated. For this analysis, as the county does not have tax liability to apply tax credit against, so it was assumed that only 80% of tax benefits would be received back through tax equity partnership. In other words, the county would buy a $1 tax credit for 80 cents. This calculation also assumes a 26% tax rate.

Table 16. Solar Installation Type, Size, Production, and Cost

ITEM	FARMERS MARKET PARKING LOT	PUBLIC PARKING LOT	OPEN SPACE WEST OF THE SHERIFF'S ADMINISTRATION BUILDING	THREE SYSTEMS COMBINED
System Type	Carport	Carport	Ground-mount	Carport, Ground-mount
System Size (kW-DC)	800	1,900	2,000	4,700
Production (Year 1) (kWh)	1,000,000	2,500,000	3,000,000	6,500,000
Production Ratio (kWh/kW)	1,250	1,316	1,500	
Turn-Key Price per KW[95, 96]	$3,900	$3,900	$1,900	
System Price	$3,120,000	$7,410,000	$3,800,000	$14,330,000
System Price after 5% Contingency	$3,276,000	$7,780,500	$3,990,000	$15,046,500
Net System Price after ITC and Bonus Depreciation	$2,121,850	$5,039,393	$2,584,304	$9,745,546

Additional costs after system installation include ongoing annual O&M costs ($5/kW) and one time inverter replacement cost ($10/kW) at year 15.[97] Ongoing annual O&M costs would increase slightly each year due to a 3% inflation rate.

On the revenue side, the electricity savings were calculated based on the estimated electricity production. The National Renewable Energy Laboratory's (NREL) PVWatts calculator was used to determine estimated electricity production for each system type.[98] Production would then decrease slightly over time due to a 3% solar degradation in year one and 1% annual solar degradation thereafter.[99] An electric rate of $0.08/kWh with a 2.25% annual escalation factor was assumed to calculate electric cost savings.[100]

95 The average market price is $3,000-4,500/kW depending on the design and features, such as built-in lighting, stormwater management system, columns configuration, steel pricing etc.

96 The average market price is between $1,700-$2,000/kW.

97 The typical warranty for inverters is 12 to 15 years.

98 https://pvwatts.nrel.gov/

99 The exact degradation rate would be based on the solar panels specifications. Solar panel performance warranties generally allow for 2-3% degradation in their first year and 0.5%- 1% each year after.

100 The base utility rate is derived from actual 2020 utility bills and escalated to the year of 2022.

Given the initial capital outlay, ongoing costs, and potential savings, the market standard solar analysis model yielded results in Table 17.

Table 17. Key Solar Installation Financial Analysis Outputs

ITEM	FARMERS MARKET PARKING LOT	PUBLIC PARKING LOT	OPEN SPACE WEST OF THE SHERIFF'S ADMINISTRATION BUILDING	THREE SYSTEMS COMBINED
Capital Outlay	$2,100,000	$5,000,000	$2,600,000	$9,700,000
Ongoing Costs: Annual O&M (Year 1)	$4,000	$9,500	$10,000	$23,500
Ongoing Costs: Inverter Replacement (Year 15)	$8,000	$19,000	$20,000	$47,000
Annual Electric Savings (Year 1)	$80,000	$200,000	$240,000	$520,000
Payback Period (Years)	24.5	23.3	11.2	17.9
ROI	4.1%	4.3%	9.0%	5.6%

F3. Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

Given a five-year depreciation schedule, the consultant calculated a regular replacement schedule that evenly replaced 100 existing vehicles over a five-year time frame. They have identified three vehicle types within the county fleet for near-term replacement. These vehicle types, along with example models in the county's fleet, comparable EV models, and the number of each replaced in the analysis are shown in Table 18. Cost, availability, and vehicle specifications at the time of replacement will determine actual EVs purchased.

Table 18. Fleet Vehicles Replaced

REPLACEMENT TARGETS	EXAMPLE ICE MODEL	COMPARABLE EV MODEL	NUMBER OF VEHICLES REPLACED
Passenger Sedan	Chevrolet Impala	Hundai Ioniq	25
Full-Sized Pickup	GMC Sierra 1500	Tesla CyberTruck	50
Multipurpose SUV	Ford Explorer	Cadillac Lyyriq	25

The cost to the county is shown as the difference between the higher priced EV versus the comparable ICE model in the Detroit market. The annual fuel costs for ICE vehicles and EVs were calculated and compared to determine the relative annual savings offered by EVs. ICE vehicle costs included the average price of regular fuel in Michigan on May 22nd, 2022. EV costs were calculated using the average electricity rate paid by the county in 2021 and accounted for battery capacity when determining annual electricity consumption. Assumptions relating to vehicles can be seen in Table 19.

Table 19. EV Assumptions

ITEM	ASSUMPTION
Miles driven per year[101]	20,000
Average Electric Rate[102]	$0.08/kWh
Unused Electric Battery Capacity[103]	10%
Gasoline Price[104]	$4.56/gal
Chevy Impalas Replaced	25
Chevy Impala Cost[105]	$37,662
Chevy Impala Fuel Economy[106]	4.5 gal/100 miles
Hyundai Ioniq Cost[107]	$38,829
Ioniq Battery Capacity[108]	38.3 kWh/170 miles
GMC Sierras Replaced	50
GMC Sierra Cost[109]	$35,655
GMC Sierra Fuel Economy[110]	5.9 gal/100 miles
Tesla CyberTruck Cost[111]	$40,000
CyberTruck Battery Capacity[112]	200 kWh/476 miles
Ford Explorers Replaced	20
Ford Explorer Cost[113]	$39,991
Ford Explorer Fuel Economy[114]	5 gal/100 miles
Cadillac Lyriq Cost[115]	$60,000
Cadillac Lyriq Battery Capacity[116]	100.4 kWh/300 miles

101 Based on the county's normal replacement of target of a vehicle of 60 months and/or 100,000 miles.

102 Based on Oakland County historical electricity bills. For purposes of this financial analysis, no escalation rate was applied for future years. This provides a more conservative approach given recent increases in and volatility of gas prices which impact the cost differential between ICE vehicles and EVs.

103 https://www.drivingelectric.com/your-questions-answered/96/electric-car-battery-life-how-preserve-your-battery

104 Average price per gallon of regular gasoline in Michigan on May 22, 2022 (https://fuelinsights.gasbuddy.com/home).

105 https://www.edmunds.com/chevrolet/impala/2020/vin/1G1105S37LU105021/?radius=6000

106 https://www.fueleconomy.gov/feg/bymodel/2016_Chevrolet_Impala.shtml

107 https://www.edmunds.com/hyundai/ioniq-electric/2021

108 https://www.hyundaiusa.com/us/en/vehicles/ioniq-electric/compare-specs

109 https://www.cargurus.com/Cars/new/nl-New-GMC-Sierra-1500-Detroit-d116_L16090

110 https://www.fueleconomy.gov/feg/bymodel/2016_GMC_Sierra.shtml

111 https://www.carwow.co.uk/tesla/news/4408/tesla-cybertruck-price-specs-release-date#gref

112 https://ev-database.uk/car/1248/Tesla-Cybertruck-Single-Motor

113 https://www.patmillikenford.com/ford-explorer-detroit-mi

114 https://www.fueleconomy.gov/feg/bymodel/2016_Ford_Explorer.shtml

115 https://www.edmunds.com/cadillac/lyriq/

116 https://www.autoblog.com/2021/04/21/2023-cadillac-lyriq-luxury-ev-crossover-reveal/

Although an optimization study should be conducted to determine the number of chargers needed, the consultant assumed the purchase and installation of a dual-port Level 2 charger in conjunction with each vehicle purchase. Dual-port chargers can be used for the county fleet and, potentially, to provide additional revenues from public charging. Without a feasibility study, these additional revenues are unknown but would have a net positive impact on the financial analysis. Given this uncertainty, they have not been included in the analysis. Public charging would not be appropriate in all fleet vehicle locations due to security needs or inconvenience to the public. Assuming that dual-port chargers would be purchased for each vehicle is a conservative approach and the charger investment is likely to be lower than the amount assumed. In addition to Level 2 chargers, a single DC Fast charger unit is purchased and installed at the beginning of the investment process. With each charger installed there is an associated operation and maintenance cost that is accrued on an annual basis which was factored into the analysis. Cost assumptions relating to chargers can be found in Table 20. Charger related costs were obtained from interviews with Dunamis Energy Partners.

Table 20. EV Charger Assumptions

ITEM	ASSUMPTION
Level 2 Charger and Software Cost per Charger	$3,650
Level 2 Charger Installation per Charger	$2,350
Level 2 Charger Annual O&M	$800
DC Fast Charger and Software	$45,000
DC Fast Charger Installation	$55,000
DC Fast Annual O&M	$1,750
Rebate Amount per Level 2 Charger	$1,500

The cost of each charger purchase is offset by a $1,500 purchase rebate. This number is lower than current charger rebates of up to $2,500 being offered by DTE.[117] The rebate amount was reduced below DTE's current offering to reflect the potential for rebate modifications in the future.

Given the initial capital outlay and potential savings, the payback period model yielded the below results.

- Capital Outlay: $1,170,000
- Annual Fuel Savings for Electric Vehicle Models Versus Comparable ICE Models:
  - Ioniq: $3,790
  - CyberTruck: $4,730
  - Lyriq: $4,000
- Payback Period: 7 years
- ROI: 21.6% over ten years

117 https://newlook.dteenergy.com/wps/wcm/connect/dte-web/home/service-request/business/electric/electric-vehicles/pev-biz-fleet

H2. Complete Campus-Wide LED Lighting Conversion

While the level of savings of each replaced fixture in terms of energy consumption and decreased maintenance can be calculated at a reasonable level of confidence, the range in magnitude of its application due to uncertainty in the amount of remaining LED lighting conversion needs creates material uncertainty. As such, given reasonable assumptions, the utilization of a payback period model indicates a worthwhile investment.

While only motion sensors were included in the payback period model, other lighting control solutions should be assessed for each site based on applicability during the lighting inventory. Examples of additional lighting control strategies include daylight harvesting sensors, bi-level fixtures, and network 'smart' controls. These controls should be implemented during major renovations as renovations present the best opportunity to improve lighting layouts and incorporate more advanced control strategies. The lighting contractors should refer to the most recent energy codes and base their design on these standards.[118]

Lighting control best practices include:

- Dimmable LED fixtures for all lighting (e.g., overhead, sconce, accent, desk lamps)
- Occupancy or vacancy sensors in all spaces that timeout 10 to 20 minutes after occupants have left
- Daylight sensors that dim or turn off lights when daylight is available
- Daylight sensors in open-plan offices (>500 sq. ft.) within daylight zones (e.g., near windows or skylights)
- Dimmers or switches with bottoms that provide continuous dimming or different levels of lighting (e.g., 0%, 50%, 100%)
- Bi-level fixtures for stairwells and parking areas that have 10% to 30% brightness when not occupied and100% brightness during occupancy. The percentage should be specified in Foot Candles in accordance with the building code.
- LED exit signs that are no more than five watts per side

Based on technical interviews and site visit initial observations, the consultant assumes that 80% of the available building square footage had yet to have lighting converted to LED (Table 21). They assume that this same portion of building stock would require motion sensor installation. An accurate amount of remaining building square footage for LED lighting conversion and lighting control upgrades would be determined through an LED lighting and controls inventory.

Table 21. Buildings Data

ITEM	ASSUMPTION
Total Building Sq. Ft.	1,922,091
LED and Controls Upgrade Sq. Ft. as a Percent of Total Building Sq. Ft.	80%
LED and Controls Upgrade Sq. Ft.	1,537,673

The number of fixtures for replacement was estimated based on the assumption that the Lighting Power Density (LPD) for the existing lighting is 1.30 W/sq. ft.[119, 120] (i.e., 1,537,673 sq. ft. x 1.30 W/sq. ft. = 1,998,974.64 W). Assuming the average common fixture is 64 W,[121] the total number of fixtures for replacement would be 31,234 fixtures (Table 22).

Table 22. Office Lighting Power Density

ITEM	ASSUMPTION
Baseline LPD	1.30 W/sq. ft.
Average Wattage per Fixture	64 W
Retrofitted LPD	0.64 W/sq. ft.[122]

118 ASHRAE 90.1-2019 Energy Standard (Table 9.6.1) or International Energy Conservation Code (IECC) 2021.

119 2010 Energy Code level (https://lightingcontrolsassociation.org/2011/04/18/ashrae-releases-90-1-2010-part-1-design-scope-administrative-requirements/).

120 2001 ASHRAE Energy Standard for offices.

121 Typical T8 fluorescent lamps wattage is 32 Watts (https://www.lrc.rpi.edu/programs/nlpip/lightinganswers/t8/03-t8-power.asp). 2x4 troffers can have 1-4 lamps per fixture. In this case, they assume a typical fixture has two lamps (tubes) and have a 64 W power load (2 x 32 Watts).

122 2021 IECC International Energy Conservation Code.

The total capital budget was estimated assuming that the county can retrofit 70% of the existing 31,234 fixtures with new LED lamps (bulbs only). The remaining 30% of the existing fixtures would be replaced with new LED fixtures. Additionally, costs for one wall switch motion sensor[123] per every 500 sq. ft. and one ceiling motion sensor per every 2,500 sq. ft. were factored in. Market value cost for lamps, fixtures, controls, and associated installation labor was used. Lastly, a 25% contingency factor and 10% in rebates was applied to total LED lighting and motion sensor upgrade costs. The resulting capital outlay was $3,403,543 (Table 23).

Cost savings were then calculated based on reduction in energy consumption due to reduced wattage from LED lighting replacements and reduced lighting operating time from the motion sensors. A baseline wattage per square foot for the existing lighting was assumed as 1.30 and the new retrofitted wattage per square foot was assumed as 0.64. Daily light operating time was assumed as 16 hours before motion sensor installation and 8 hours after motion sensor installation for each of the 260 business days.[124] Based on these factors, an annual electric savings of 6,268,784 kWh resulted. To calculate electric cost savings, the consultant used an electric rate of $0.08/kWh with a 2.25% annual escalation factor.[125] Electric savings in the first year would be $501,503.

Table 23. Equipment and Installation Costs

FIXTURE TYPE	MIXED	FIXTURE QUANTITY	BULBS/ FIXTURE	PRICE PER UNIT (INCLUDING INSTALLATION)	TOTAL COSTS
Lamps (bulbs)	70%	21,864	2	$20	$874,551
New Fixtures	30%	9,370		$200	$1,874,039
Motion Sensors (Wall Switches)	1/every 500 sq. ft.	308		$100	$30,753
Motion Sensors (Ceiling)	1/ every 2500 sq. ft.	615		$400	$246,028
				Total Costs	$3,025,371
				Contingency 25%	$3,781,714
				Cost after 10% Rebate	$3,403,543

123 Ceiling motion sensors mostly in restrooms.

124 Average across facilities.

125 The base utility rate is derived from actual 2020 utility bills and escalated to the year of 2022.

Along with the assumptions noted in Table 24, they used three main assumptions to calculate annual maintenance cost savings. Given the 20% failure rate of fluorescent lamps, it was estimated that the county would expect to replace 6,247 of the existing 31,234 fluorescent bulbs, resulting in a total annual associated material and labor costs of $81,208. Given the 10% failure rate of the electronic/magnetic ballasts, it was estimated that the county would expect to replace 3,123 of the existing 31,234 electronic/magnetic ballasts, resulting in a total annual associated material and labor cost of $124,936. Comparatively, given the 1% failure rate of LED fixtures, the county would expect to replace 312 of existing 31,234 fixtures if a lighting conversion was conducted, resulting in a total annual associated material and labor cost of $40,604. Considering the difference between costs of existing bulb and ballast replacements ($206,144) and costs of new LED fixture replacements ($40,604), the potential annual maintenance savings after LED lighting conversion is $165,540 in the first year. The financial model applies a 3% annual inflation rate after the first year, increasing savings gradually over time.

Table 24. Maintenance Savings Assumptions

ITEM	ASSUMPTION
Maintenance Staff Labor Rate[126]	$30.00
Time for Spot Lamp Replacement	0.10 hr. (6 min.)
Time for Spot Ballast Replacement	0.5 hr. (30 min.)
Time for Spot LED Fixture Replacement	1 hr. (60 min.)
LED Lamp Failure Rate	1%
Motion Sensors Failure Rate	1%
Existing Fluorescent Lamp Failure Rate	20%
Existing Fluorescent Ballast Failure Rate	10%
Costs per Lamp	$10.00
Costs per Ballast	$25.00
Costs per LED Fixture	$100.00
Inflation Rate	3%

Given the initial capital outlay and potential savings, the payback period model yielded the below results.

- Capital Outlay: $3,400,000
- Annual Savings (Year 1):
  - Electric: $500,000
  - Maintenance: $166,000
- Payback Period: 4.8 years
- ROI: 20.6%

126 Maintenance staff labor rates are based on the average of base rates for Building Maintenance Technician and Lighting Technician positions (https://www.indeed.com/career/building-maintenance/salaries/MI?from=top_sb, https://www.indeed.com/career/lighting-technician/salaries/MI?from=top_sb#common-benefits). 38% of the average base salary was then added to the maintenance staff labor rate to account for overhead and benefits (https://www.bls.gov/news.release/ecec.nr0.htm). Assumed avoided maintenance labor time resulting from this lighting upgrade scenario can be reallocated to time needed for other maintenance projects.

D2. Expand Recyclable Material Collection and D3. Expand Organic Material Collection

Methodology:

The volume of generated waste (by category) was projected using the 2020 waste schedules and proposed reduction and diversion goals. The county's waste schedule data included the number of containers, container size, and pickup frequency for each container, but not the actual volume of waste collected. The containers' "fullness" at the time of pickup and composition of disposed waste (i.e., volume-to-weight conversion factors) were assumed to estimate the weight of collected waste.[127, 128]

For example, two 6-yard containers located at Waterford Oaks County Park are serviced seasonally (four months per year). During the season, they are serviced twice a week (Tuesday and Friday).

Total Cubic Yardage = 6 yards x 2 containers x 2 times week x 4.33 weeks/month x 4 months x 75% full container = 312 cubic yards

To convert from cubic yards to tons, the following EPA Volume-to-Weight Waste Conversion Factors[129] were applied for each waste type:

- Commercial (all waste, uncompacted): 138 lbs per cubic yard
- Mixed Waste (compacted): 650 lbs per cubic yard
- Recycling paper (loose): 200 lbs per cubic yard
- Commercial Organics: 135 lbs per cubic yard
- Mixed Yard (uncompacted): 250 lbs per cubic yard

Returning to the example calculation, the waste collected from these Waterford Oaks County Park bins would be: 312 cubic yards x 138 lbs per cubic yard = 43,023 lbs = 19.36 tons (1 lb = 0.00045 metric tons).

This logic was used to estimate the total weight and cost of collected waste at each county park and service center pickup location.

Table 25. Waste and Cost Projections

ITEM	TONS	%	COSTS	BLENDED RATE
Trash	4,400	87%	$123,494	$28.07
Recyclables (paper/ cardboard)	570	11%	$24,576	$43.13
Organic Materials (including yard trimming[130])	82	2%	$7,200	$88.18
Total	5,052	100%	$155,270	

The projection assumes overall waste generation (tonnage) will be reduced by 2% every year through new procurement policies and applying the 5R Principles (Refuse, Reduce, Reuse, Repurpose, Recycle).

127 The county also provided monthly reports from its recycling vendor, Green for Life (GFL), with the volume and weight of paper collected from the service campus. Because 2020 data is not representative of a "typical year" (i.e., because county facilities were not fully occupied during the height of the COVID-19 pandemic), it is believed to underestimate the volume of paper generated in and cannot be used as a "true" baseline. Thus, the recycling baseline was determined using the same methodology for estimating the volume and weight of disposed trash: based on the container size, volume-to-weight conversion factors, pickup frequency of containers listed in the waste schedule.

128 The county should continually monitor collection container "fullness" relative to contracted service levels and contractually require vendors to weigh collected materials (refer to strategy D1. Review and Renegotiate Waste Hauling Contracts for more information). If vendors cannot collect reliable weight data (e.g., if a vendor's truck services multiple sites per trip), the county should adopt a similar methodology to measure and compare tonnages year over year.

129 https://www.epa.gov/sites/default/files/2016-04/documents/volume_to_weight_conversion_factors_memorandum_04192016_508fnl.pdf

130 All references to yard trimmings only encompass green waste produced at county parks. It is assumed that FMO will continue to manage green waste produced on the service campus; yard trimmings produced on campus will not be collected by a third party and the county will not incur additional third-party hauling costs.

The volume of waste generated per category was estimated based on the following assumptions:

- **Organic Materials:** starts at 10% during the first year of program implementation, and then progressively increases to 15% of total waste generated by Year 3 and then plateaus.[131]
- **Recyclables:** progressively increases from 11% to 60% of total waste generated by 2030. Assuming 15% of generated waste is organic materials, 60% of generated waste will need to be recycled in order to achieve a 75% diversion rate. The county will continue to expand recyclables collection past 2030, eventually reaching an 80% recycling rate by 2033.
- **Solid Waste:** progressively scales down from 87% to 25% of the waste stream by 2030, and only 5% of the waste stream by 2033.

After estimating the tonnage for each waste stream, the annual costs were calculated for the following scenarios. The difference between these scenarios represents incremental savings/ expenses in hauling and operational costs.

- Business as usual
- After the recycling and composting program is implemented

To calculate the total hauling costs, the average rate for trash, recycling, and yard trimming collection across county pickup locations was applied. The rates were averaged by dividing the estimated total annual costs by the estimated total annual tonnage. The collection rate for other organic materials (e.g., food scraps) was estimated from market data.

- Trash: $28.07 per ton
- Recycling: $43.13 per ton[132]
- Yard Trimming: $88.18 per ton[133]
- Composting: $5 per bin pickup (pickup 5 days per week) based on market data. Midtown Composting offers weekly pickups starting for $16 per month ($4 per pickup on average).[134]
- Escalation factor: 3% per year

While waste hauling costs decrease, operational expenses for hauling recyclables and organic materials will increase. Additional operating expenses will include ongoing education, performance monitoring, and auditing activities to encourage anti-contamination behavior.

The composting program will likely be the most cost-intensive program given the spread of bins throughout facilities. Program costs will depend on vendor rates (local vendors include My Green Michigan,[135] Midtown Composting,[136] and Unlimited Recycling[137]) and collection logistics, including proximity and capacity of local composting sites. Important considerations that may impact cost include:

- The number of collection points. The vendor could collect from multiple locations throughout the service campus and county parks or a central location to reduce logistical costs.
- If collected from a central location, the means for getting food waste to the pickup site. Janitorial staff could collect compost daily and bring it to the designated location, or facility occupants could store compost in break room freezers and deliver to a publicly accessible drop off location (e.g., the County Farmers Market) when needed. In the latter case, the county should prioritize compost pickup at the Farmers Market.

On the other hand, BigBelly compactors carry the greatest savings potential through reducing the number of pickups and associated labor, transportation, and material expenses.

131 EPA data suggests 14.6% of municipal solid waste is food waste and yard trimmings accounted for 2% of the county's collected waste in 2020 (https://archive.epa.gov/epawaste/nonhaz/municipal/web/html/).

132 The county's vendors charge a monthly rate for each pickup location based on service frequency and container volume.

133 The county pays a flat fee per service call ($235) and an additional charge per ton of waste collected ($30 per ton). The blended rate per ton was estimated assuming a container is serviced twice a month when they are nearly full (collecting about 2 tons of waste), so each service call carries an average charge of $300.

134 https://midtowncomposting.com/product/weekly-residential-food-waste-composting/

135 https://www.mygreenmi.com/?utm_source=CompostNow&utm_campaign=Friends&utm_medium=web#home

136 https://midtowncomposting.com/

137 https://unlimitedrecycling.com/food-waste-composting/?utm_source=CompostNow&utm_campaign=Friends&utm_medium=web

Assumptions:

2020 Baseline

- Trash: 4,400 tons
- Recycling (Paper): 570 tons
- Yard Trimming: 82 tons

TOTAL: 5,052 tons

2020 Diversion Rate: (570 tons + 82 tons) / 5,052 tons = 13%

2030 Goals (Suggested)

Total generated waste: 2% annual reduction

2030 Diversion Rate: 75%

2030 Waste Breakdown (Suggested):

- Trash (Landfill): 25%
- Recyclables: 60%
- Composting: 15%

Hauling Rates

- Trash/Landfill: $28 per ton
- Recycling: $43 per ton
- Yard Trimming: $88 per ton
- Composting: $5 per pickup per bin, estimating pickup 5 times per week (150 pickup locations/ bins). Facilities may have multiple pickup locations per building or centralized curb side pickup areas.

Equipment Quantity and Pricing

- Recycling Stations: every 2,500 square feet.
- Under-desk paper bins: every 500 square feet (3,460 desks)
- Composting bins: every 10,000-13,000 square feet, or one to two per floor (primarily located in kitchens, lounges, breakroom, etc.). For some facilities, totters or rollout containers with capacity of up to 50 gallons can be used in addition to or instead of small buckets with lids.

Extra bins can be placed in facilities with greater demand for composting and recycling collections than anticipated. In some locations where both recycling and composting are needed (e.g., cafeterias), the county should provide a four-stream bin instead of separate trash, dual-stream recycling, and composting bins. Four stream bins include:

- Trash
- Paper
- Glass, plastic, metal
- Composting

Estimated costs are based on average market prices (standard design).

Table 26. Equipment Quantity and Pricing

ITEM	QUANTITY	AVERAGE MARKET PRICE
Recycling Station (Triple-stream Bins with Trash, Paper/ Cardboard, Glass/ Plastic/Metal)	769	$501 per unit
Under Desk Paper Bins	3,460	$14 per unit
Outdoor Dual-stream BigBelly Units	75	$8,000 per unit
Small Composting Bins	150	$40 per unit
Extra Tumblers or Bins	100	$155 per unit
Container Sensors[138]		$10,000 (one time)
Additional Signage and Education Program		$35,000 (one time)

Total estimated costs also account for 10% contingency on all the categories above.

138 The county can place sensors in large collection containers to monitor container "fullness" at the time of service and identify missed pick-ups. Data can be used to reevaluate service schedules.

BigBelly Assumptions

The following (conservative) assumptions are based on the case study from the University of Houston.[139] These metrics should be reviewed with BigBelly during the contract negotiation process and updated once the contract is final.

- Number of Triple Station Kiosks (Trash and Dual-stream Recycling): 75[140]
- Collection Frequency for Standard Sidewalk Bins (times per week): 14
- Collection Frequency with BigBelly (times per week): 7
- Time to Empty a Bin: 20 minutes including logistics
- Labor Rate ($ per hour): $20
- Fuel Savings per Bin (from reduced travel): $100
- Reduced Number of Plastic Bags per Bin: $50
- Total Savings from per BigBelly Bin: $2,577

Recyclables Sales

The prices for recycled paper, plastics, glass, and scrap metals are very volatile and future regulations, tariffs, international trade policies or other initiatives may cause supply and demand of materials and resulting commodity prices to continue to fluctuate.

An online commodity pricing index for post-consumer recovered materials illustrates the wide range of recycling commodity prices between different grades of materials.[141] As of May 2022, the average market price for recyclables is:

- **Plastic:** between $1 and $1,000 per ton, depending on the plastic quality and chemical composition. For example:
  - Mixed, unsorted plastic materials (e.g., soda bottles, milk jugs, shampoo bottles, and yogurt cups): $1 to $2 per ton
  - Mixed, sorted Polyethylene Terephthalate (PET) and HDPE (High Density Polyethylene) plastic bottles, jars, and containers: $60 to $140 per ton
  - PET bottles only: $840 to $1,000 per ton
- Sorted office paper: $125 per ton
- Mixed glass: $10 to $30 per ton
- Mixed steel cans: $12.50 to $210 per ton

The county's net revenues would depend not only on the market (foreign and domestic), but also on the local MRF's processing costs, fuel costs, brokerage fees, collected material quality, recycling stream breakdown, etc. The following per ton commodities costs are based on low-end market prices, deduct processing costs, and assume the county would share profits with the recycling hauler/broker.[142]

- Recyclables: $20 per ton
- Compost: $10 per ton
- Escalation Rate: 5% per year

Additionally, contamination rates impact the county's potential revenues. Recycling contamination occurs when materials are sorted into the wrong recycling bin (e.g., placing a glass bottle into a mixed paper recycling bin). Incorrect disposal can cause a whole bag of recyclables to be rejected and sent to the landfill, resulting in a reduced revenue from recycling or composting materials. For example, if 50% of collected recyclables are contaminated, the county will only capture 50% of its revenue potential. This analysis assumes a gradual improvement in contamination rates:

- Years 1-2: 50% contamination rate
- Years 3-5: 25% contamination rate
- Years 6-7: 20% contamination rate
- Year 8: 15% contamination rate
- Years 9-onwards: 10% contamination rate

To achieve higher yield in recyclable material sales, the county needs to minimize contamination in the recycling stream.

139 https://uh.edu/facilities-services/programs/sustainability/Use_of_Solar_Powered_Recycling_and_Trash_Units_on_Campus.pdf

140 The first kiosks should be strategically placed near building entrances (on average, two stations per building (e.g., at a front and back entrance) with additional stations at high-traffic facilities (e.g., the Courthouse)), gathering areas, and along high-traffic non-motorized pathways and trails. Additional kiosks can be installed as needed, based on the success of the program's first phase.

141 www.recyclingmarkets.net

142 As recycling commodities markets mature, the profit share for recyclables sales should be outlined in the RFP process for the county's recycling vendor and/or recycling broker. For reference, Waste Management (WM), a publicly traded waste and recycling company, offers a fee-for-service profit share model to their customers. With this model, the price of recyclable materials is structured as a charge or "tip fee" when the commodities' price does not cover WM's cost to process the recyclable materials or as a "rebate" when the commodities' price is higher than WM's processing costs. In the latter case, WM and their customer share the benefit. WM's pricing schematic is either based on fixed contractual rates or on defined minimum per-ton rates. For more information on WM's practices, refer to: https://investors.wm.com/static-files/6f36d219-fd4c-43ce-93f6-35f5928eb2eb

O1. Improve Connectivity with Non-Motorized Pathways

To meet sustainability goals, such as improving campus connectivity and creating nature and fitness walks, it is estimated that 15,000 linear feet (LF) of trails would be needed. For purposes of this analysis, it is assumed that each trail would be eight feet wide with a two-foot shoulder each side leading to (12' x 15,000 LF) 4.2 acres of lawn displacement. Capital costs for pathway construction is estimated at $1.4 million assuming that construction, signage, engineering, and landscaping could be accomplished at the cost of $65.33 per linear foot. Thirty percent was added for contingency (Table 27). It is assumed all of the cost of this construction will be expended in year one.

Table 27. Pathway Construction Assumptions

ITEM	ASSUMPTION
Linear Feet of Trails Constructed	15,000
Cost per Linear Foot	$65.33
Contingency	30%
Total Cost of Construction, Signage, Engineering and 30% Contingency	$1,400,000[143]

To determine the positive productivity and healthcare impacts, it was assumed that 500 employees would take advantage of the new pathways on a regular basis. It was assumed that the economic output of increased productivity of those taking advantage of the new pathways be 1% of each employee's salary calculated using the average Oakland County employee salary of $57,740.[144] It was assumed that the full benefit of walking, productivity increases and healthcare cost reductions, would not be realized immediately. As such, these benefits were scaled up incrementally over five years, with the full cost savings benefit being realized in year six and each year thereafter. Healthcare savings were calculated using 2.6%[145] of the county's average annual healthcare costs of $14,112 per year over the five year scale up period.

Table 28. Economic Benefit Assumptions

ITEM	ASSUMPTION
Number of Affected Employees[146]	500
Increased Productivity	1%
Average Annual Salary of Employees	$57,740[147]
Scale Up Period to Realize Full Cost Savings	5 Years
Average Annual Healthcare Costs	$14,112[148]
Health Care Cost Savings Over Scale Up Period	2.60%[149]

Given the initial capital outlay and potential savings, the payback period model yielded the below results.

- Capital Outlay: $1,400,000
- Annual Savings (year 6 and thereafter):
  - Healthcare Costs: $183,500
  - Productivity: $288,700
- Payback Period: 6.4 years
- ROI: 17.4%

143 AECOM estimate

144 Human Resources, Oakland County

145 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4020264

146 Approximately one-tenth of the county's workforce.

147 Human Resources, Oakland County

148 Human Resources, Oakland County

149 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4020264

Appendix G

List of Acronyms

24/7 24 hours a day, 7 days a week

AASHTO American Association of State Highway and Transportation Officials

ADA Americans with Disabilities Act

ADKAR Awareness, desire, knowledge, ability, and reinforcement

ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers

CAD Coronary artery disease

CH_4 Methane

CO_2 Carbon dioxide

CO_2e Carbon dioxide equivalents

COPD Chronic obstructive pulmonary disease

County Oakland County, Michigan Government

CVT Cities, villages, and townships

DNR Department of Natural Resources

EAP Employee Assistance Program

EGLE Environment, Great Lakes, and Energy

ESCO Energy service company

ESG Environmental, social, and governance

EV Electric vehicle

FHA Federal Highway Administration

GHG Greenhouse gas

GESPC Guaranteed energy savings performance contracting

GSA General Service Agreement

GSHP Ground source heat pump

GWP Global warming potential

HDPE High density polyethylene

HFC Hydrofluorocarbon

ICE Internal-combustion engine

ID Identifier

IFMA International Facility Management Association

IIJA Infrastructure Investment and Jobs Act

ITC Investment tax credit

IWBI International WELL Building Institute

KPI Key performance indicator

LED Light-emitting diode

LEED Leadership in Energy and Environmental Design

LF Linear feet

LGOP Local Government Operations Protocol

LPD Lighting power density

LPG Liquified petroleum gas

MDOT Michigan Department of Transportation

MRF Material recovery facility

MT Metric tonnes

N_2O Nitrous oxide

NACTO National Association for City Transportation Officials

NREL National Renewable Energy Laboratory

O&M Operation and maintenance

OCPR Oakland County Parks and Recreation Department

OHSA Occupational Safety and Health Administration

P3 Public-private partnership

PAH Polycyclic aromatic hydrocarbon

PET Polyethylene terephthalate

PFC Perfluorocarbon

PMPM Per patient per month

PMPY Per participant per year

PPA Power purchase agreement

RACI Responsible, accountable, consulted, and informed

RFP Request for proposal

ROI Return on investment

RTV Rough terrain vehicles

SCARF Status, Certainty, Autonomy, Relatedness, and Fairness

SDS Safety Data Sheet

SEMCOG Southeast Michigan Council of Governments

SF_6 Sulfur hexafluoride

SMART Suburban Mobility Authority for Regional Transportation

Strategic Framework Oakland County Strategic Framework

SUT Smart utility technology

TAP Transportation Alternatives Program

USDN Urban Sustainability Directors Network

VMT Vehicle miles traveled

WHO World Health Organization

WRC Water Resources Commissioner

ZEV Zero emission vehicle

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OAKLAND COUNTY SUSTAINABILITY PLAN

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A2ZERO

EQUITABLE • SUSTAINABLE • TRANSFORMATIVE

ANN ARBOR'S

LIVING CARBON NEUTRALITY PLAN

APRIL 2020

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WELCOME LETTER

Friends –

Even during the COVID-19 global pandemic, we face no greater threat than climate change.

It already affects us locally in the significant increase in precipitation falling on our community compared to previous years. We feel it in increasing temperatures and greater weather volatility. We see it in the spread of disease and infection. We know it's in disruptions to our supply chains, our agricultural systems, and our Great Lakes. We anticipate it in regard to the movement of people from vulnerable regions to areas with less susceptibility to climate disruption.

These existing and future changes will cause significant impacts to our public health, safety, general welfare, local economy, transportation networks, natural environments, and our overall quality of life. We cannot solve this crisis on our own, but in an era of national retreat, state and local communities must do their part. It is because of this that the Ann Arbor City Council unanimously declared a climate emergency and directed the City to immediately begin crafting an aggressive and living strategy to achieve community-wide carbon neutrality by 2030.

We recognize that this is an ambitious goal, but we know that Ann Arborites have the passion, intellect, creativity, and the compassion necessary to see it met. To be clear, achieving carbon neutrality within a decade will necessitate that we all work together. It will necessitate collaboration, innovation, and disruption. If we are to achieve our goal, Ann Arbor 2030 must be vastly different from Ann Arbor 2020.

As the following pages describe, carbon neutrality means that we must adopt new land use strategies and break our dependence on internal combustion engine vehicles. It means that we must power our homes, businesses, vehicles, and recreational sites with 100% renewable energy. It means that we must change the way we interact with materials and resources. It means that we must reinvest in our relationships with our vulnerable neighbors, elders, and youth. We must rethink an Ann Arbor that is open and accessible to all.

Every person -- every home owner, renter, student, visitor, community member, business owner, worker, youth, and elected leader has a significant role to play in achieving community-wide carbon neutrality. This living A^2Zero Carbon Neutrality Plan tells us what we need to do and begins to detail how we get there. Over the coming months and years, the City of Ann Arbor and our 60+ partner organizations will work with community members and stakeholders to get the job done. We hope that you will join us because together, we can achieve a rapid and equitable transition to community-wide carbon neutrality.

Sincerely,

Christopher Taylor
Mayor

EXECUTIVE SUMMARY

The global climate is changing and nowhere are the effects felt more acutely than at the local level. Moreover, the growing economic, social, political, environmental, and cultural impacts associated with a changing climate are causing immediate and long-term damages to our society, public health, safety, and our overall quality of life.

In light of these realities, on November 4th, 2019, Ann Arbor City Council unanimously adopted a Climate Emergency Declaration, stating that climate change is one of the most important issues of our time and that responding to the climate crisis necessitates a mobilization on par with those activated during times of disaster. In passing the resolution, the Council also committed to charting a path for how the entire Ann Arbor community could achieve carbon neutrality by the year 2030.

This is an ambitious goal, but one that aligns with the values and sentiments of Ann Arborites. Ann Arbor is a community of great strength, leadership, intellect, compassion, and ability. It is only by unlocking the full potential in all of these areas that we will be able to achieve carbon neutrality within the next decade.

This document outlines the path needed to achieve a just transition to carbon neutrality, community-wide, by the year 2030. This was created with input from thousands of Ann Arborites over the course of an intensive four month planning process. The result is this living A^{2}Zero Carbon Neutrality Plan which centers around six core strategies and one catch-all strategy:

1. Power our electrical grid with 100% renewable energy
2. Switch our appliances and vehicles from gasoline, diesel, propane, coal, and natural gas to electric
3. Significantly improve the energy efficiency in our homes, businesses, schools, places of worship, recreational sites, and government facilities
4. Reduce the miles we travel in our vehicles by at least 50%
5. Change the way we use, reuse, and dispose of materials
6. Enhance the resilience of our people and our place
7. Other

Forty-four actions have been identified to fully implement these seven strategies. Each of these actions is outlined in the following pages. Combined, these actions get us to carbon neutrality, based on our current greenhouse gas emissions profile. By necessity, this Plan is considered living since many things, can and likely will, change in the coming years.

To achieve carbon neutrality, the entire Ann Arbor community must eliminate 2.1 million metric tons of carbon dioxide equivalent emissions annually – this is the quantity of greenhouse gas emissions we emitted, as an entire community, in 2018. Although the City recognizes the importance of upstream and embedded emissions, this figure does not include emissions associated with the production of the goods and services Ann Arborites

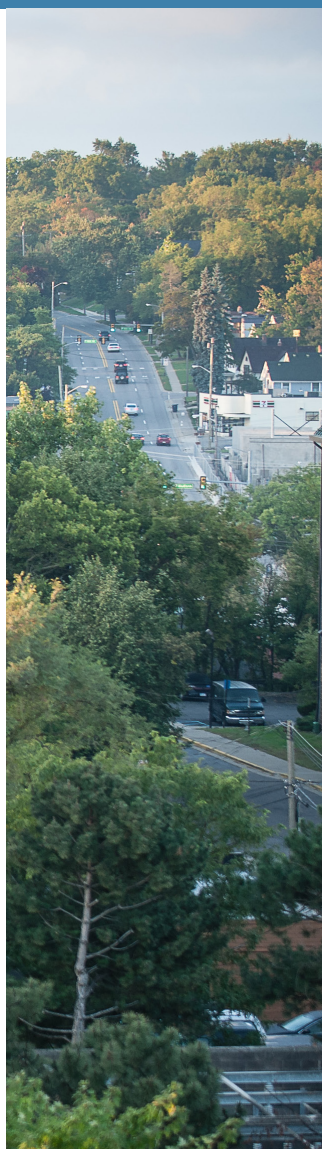
use. As the science and policy around carbon neutrality grows, we will continue to look for and contribute to methodologies to calculate community-wide upstream and embedded emissions in future inventories.

For now, this Plan focuses on eliminating the 2.1 million metric tons of carbon dioxide equivalent that primarily come from natural gas, electricity, gasoline, coal, and diesel used by residents, visitors, students, and businesses in Ann Arbor. Importantly, the seven overarching strategies proposed in this Plan are intrinsically linked. This means that care was taken to understand how given actions work together to achieve carbon neutrality. This also means that removing one action from consideration has a more significant impact than is denoted on any one given actions' summary page. As such, caution should be taken before removing any given action from consideration without fully understanding how it interacts with and informs other actions proposed in this Plan.

Where available, cost estimates are also provided for each action in the Plan. These cost estimates integrate soft, physical, and human capital costs associated with various actions. All costs estimated are incremental, meaning that the dollars allocated for each action are additional to resources, if relevant, already supporting a given action. In our analysis, the value of externalities was often calculated for information purposes. We did not, however, include those values in each individual cost calculation.

Additionally, we have identified an array of co-benefits associated with each action in the Plan. In total, 10 co-benefits were identified, including:

- **Supports local economy**
- **Improves public health**
- **Produces local energy**
- **Cost savings accrued**
- **Improves air quality**
- **Supports biodiversity preservation**
- **Creates jobs and/or develops workforce**
- **Benefits the most vulnerable**
- **Improves local resilience**
- **Scalable or transferable to other communities**



EXECUTIVE SUMMARY

Combined, the seven overarching strategies and accompanying 44 actions outlined in this Plan are projected to reduce emissions by 2.1 million metric tons of carbon dioxide equivalent and cost just over $1 billion additional dollars over the next ten years (Figure ES-1; ES-2; and ES-3). As we move forward with implementation, we will make tough decisions about how to fund and finance the actions outlined in this Plan.

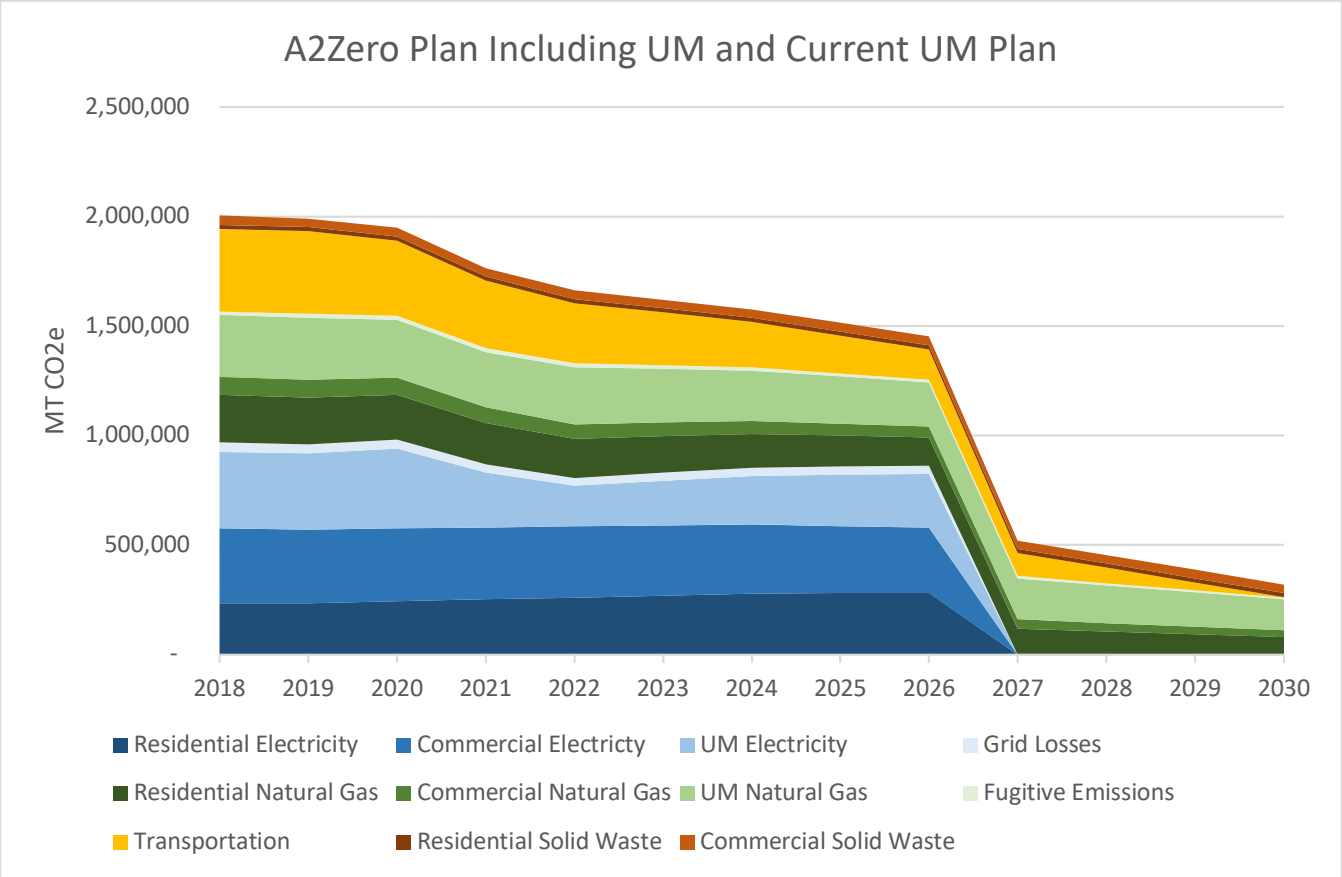


Figure 1: A "Win Scenario" outlining one possible path towards achieving carbon neutrality by 2030. The actions outlined in this Plan are centered on achieving this "win scenario". This "win scenario" assumes that the University of Michigan mirrors the actions of the City.

However, the University is currently undertaking their own carbon neutrality planning process so these assumptions will change once more information is available. Overall, this Plan is considered living and iterative, meaning that changes to this "win scenario" will be necessary over time.

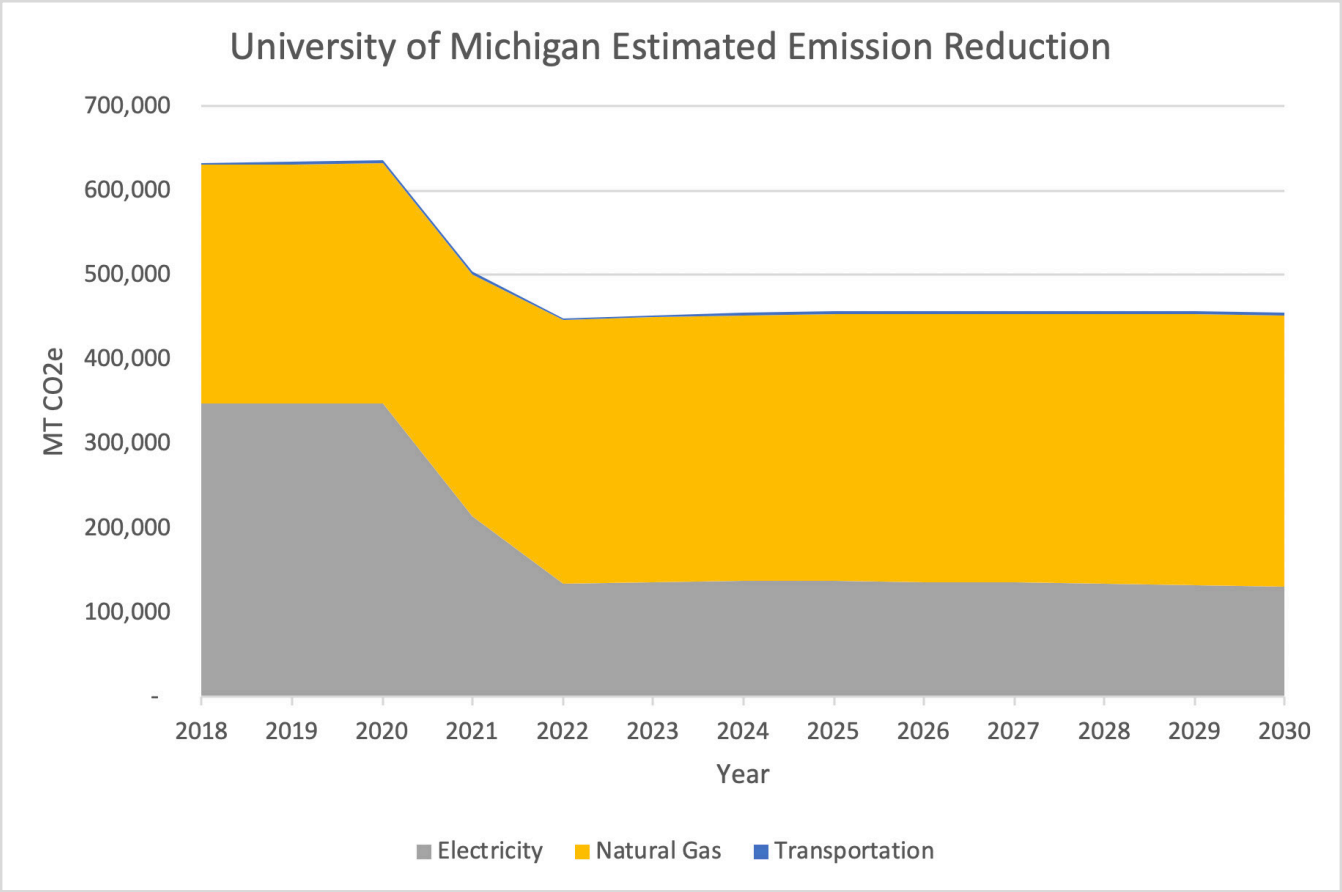


Figure 2: Summary of the University of Michigan's current strategies to reduce their emissions over the next two years. The University of Michigan is currently developing recommendations to achieve carbon neutrality by an undetermined date. Since the University's Plan was not finalized by the time the City's Plan was drafted, their participation in the actions outlined in this Plan was modeled. An update will be provided to this Plan once the University has formally adopted a path towards carbon neutrality. For now, this graph shows the University's currently projected emissions reduction activities.

One of the most pressing first steps in implementing this strategy is ensuring we have the human capital needed to immediately begin taking action. Models run as part of this analysis showed that a minimum staffing of 15 full time equivalent employees are needed, combined with a varying number of consultants, to fully implement this Plan. Not surprisingly, the more physical staff that are focused on the Plan, the more likely the Plan is to succeed. As such, decisions will need to be made not only about how best to fund the actions outlined in this Plan, but how best to build the human capital needed to design and support implementation of the Plan. Guiding this work as a living A^{2}Zero Investment Plan, A^{2}Zero Prioritization Framework, and an A^{2}Zero Governance Model.

Achieving a just transition to carbon neutrality, community-wide, by the year 2030 is audacious, ambitious, and inspirational. This Plan outlines a concrete path for how we can immediately make progress towards that goal. Time is of the essence if Ann Arbor is to seriously achieve this goal. From the engagement we've already seen with A^{2}Zero, we know City employees, partner organizations, technical advisors, neighborhoods associations, businesses, and members of the public stand ready to take this audacious goal and turn it into a reality. The time to start is now.

ACTION SUMMARY TABLE

STRATEGY 1	Total Costs	GHG Reduction	%total emissions	$/ton	Co-Benefits
Community Choice Aggregation	$3,245,000	784,000	35.8%	$4	AIR; $$; EQU; SCALE
Bulk Purchase of Renewables	$605,000	85,000	3.9%	$7	LOCAL; NRG; AIR; JOBS; RES; $$; SCALE
Community Solar Program	$205,000	11,500	0.5%	$18	LOCAL; NRG; AIR; JOBS; RES; $$; EQU; SCALE
Landfill Solar Project	$80,000	23,000	1%	$3.5	LOCAL; NRG; AIR; SCALE
STRATEGY 2	**Total Costs**	**GHG Reduction**	**%total emissions**	**$/ton**	**Co-Benefits**
Home & Business Electrification	$7,100,000	362,200	16.5%	$ 20	LOCAL; AIR; JOBS; HEALTH; SCALE
Bus Electrification	$86,000,000	13,800	0.6%	$ 5,839	LOCAL; AIR; RES; HEALTH; EQU
Bulk Purchase EVs	$700,000	122,900	5.6%	$6	AIR; JOBS; RES; HEALTH; $$; SCALE
Private EV Fleets	$123,000	Not Calculated			AIR; RES; $$; HEALTH; SCALE
City EV Fleet	$4,000,000	1,100	0.05%	$3,636	AIR; JOBS; RES; HEALTH; $$; SCALE
EV Infrastructure	$42,000,000	Not Calculated			AIR; JOBS; HEALTH; SCALE
STRATEGY 3	**Total Costs**	**GHG Reduction**	**%total emissions**	**$/ton**	**Co-Benefits**
Bulk Purchase of Energy Efficiency	$950,000	242,500	11.1%	$ 4	LOCAL; AIR; JOBS; HEALTH; $$; EQU; SCALE
Building Code Requirements	$1,935,000	48,300	2.2%	$ 40	LOCAL; JOBS; RES; $$; EQU; SCALE
LED Lighting	$3,140,000	2,600	.1%	$1,208	AIR; $$
Benchmarking	$2,370,000	Not Calculated			JOBS; $$; SCALE
Loan Loss Reserve	$1,578,000	Not Calculated			LOCAL; JOBS; RES; HEALTH; $$; EQU; SCALE
Energy Concierge & Community Education	$820,000	Not Calculated			JOBS; $$; EQU; SCALE
Net Zero Energy Affordable Housing	$800,000	400	0.0%	$2,000	LOCAL; NRG; AIR; JOBS; RES; HEALTH; $$; EQU
Green Rental Housing Program	$530,000	Not Calculated			LOCAL; AIR; JOBS; RES; HEALTH; $$; EQU; SCALE
Green Business Challenge	$700,000	Not Calculated			LOCAL; NRG; AIR; JOBS; RES; $$; SCALE
Aging in Place Efficiently	$155,000	Not Calculated			LOCAL; JOBS; RES; HEALTH; $$; EQU
Weatherization Expansion	$1,550,000	Not Calculated			LOCAL; JOBS; RES; HEALTH; $$; EQU

KEY					
EQU	Benefits the most vulnerable	RES	Improves local resilience	LOCAL	Produces local energy
COST	Cost savings accrued	HEALTH	Improves public health	ENV	Supports biodiversity preservation
$$	Supports local economy	SCALE	Scalable or transferable to other communities		
AIR	Improves air quality	JOBS	Creates jobs and/or develops workforce		

ACTION SUMMARY TABLE

STRATEGY 4	Total Costs	GHG Reduction	%total emissions	$/ton	Co-Benefits
Non-Motorized Plan	$2,400,000	60,400	2.8%	$40	AIR; RES; HEALTH; $$; EQU
Local and Regional Transit	$656,780,000	93,200	4.3%	$7047	LOCAL; AIR; JOBS; RES; HEALTH; $$; EQU
Park and Ride	$170,000,000	28,400	1.3%	$5,986	AIR; EQU; SCALE
Increase Housing Diversity	$250,000	2,200	0.1%	$114	LOCAL; AIR; RES; SCALE
Mixed-Use Zoning	$365,000	Not Calculated			LOCAL; AIR; RES; HEALTH
Parking Rates	$4,500,000	Not Calculated			LOCAL; AIR
STRATEGY 5	**Total Costs**	**GHG Reduction**	**%total emissions**	**$/ton**	**Co-Benefits**
Year Round Composting	$26,000,000	400	0.0%	$65,000	LOCAL; NAT; JOBS; SCALE
Commercial Recycling	$18,400,000	5,600	0.3%	$3,286	JOBS; SCALE
Sustainable Material Use and Reuse	$270,000	Not Calculated			LOCAL; ERS: HEALTH; $$; NAT; EQU
Circular Economy	$270,000	Not Calculated			LOCAL; JOBS; RES; HEALTH; $$; NAT
Plant-Based Diets	$208,400	Not Calculated			HEALTH; NAT
Refrigerant Recycling	$179,400	Not Calculated			JOBS; HEALTH
STRATEGY 6	**Total Costs**	**GHG Reduction**	**%total emissions**	**$/ton**	**Co-Benefits**
Resilience Hubs	$5,025,000	2,500	0.1%	$2,010	LOCAL; NRG; RES; HEALTH; EQU; SCALE
Neighborhood & Youth Ambassadors	$350,000	Not Calculated			LOCAL; JOBS; RES; HEALTH; EQU; SCALE
Tree Canopy	$1,160,000	450	0.0%	$2,578	AIR; RES; HEALTH; NAT; EQU; SCALE
Neighborhood Asset Mapping	$300,000	Not Calculated			LOCAL; RES: EQU; SCALE
Emergency Kits	$350,000	Not Calculated			RES; HEALTH; EQU; SCALE
Sensors and Data Monitoring	$300,000	Not Calculated			RES; HEALTH; $$; NAT; EQU; SCALE
STRATEGY 7	**Total Costs**	**GHG Reduction**	**%total emissions**	**$/ton**	**Co-Benefits**
Equity Programs	$200,000	Not Calculated			LOCAL; RES; EQU
SA2T Grant Program	$1,000,000	Not Calculated			LOCAL; RES
Internal Carbon Tax	$75,000	Not Calculated			LOCAL; NRG; RES; $$; SCALE
Offsets	$9,440 ,000	298,500	13.6%	$32	SCALE
Total	**$1,056,408,800**	**2,188,950**	**100.0%**		

Figure 3: Summary of Strategies, Actions, Cost, and Co-Benefits for Proposed Actions in the A²Zero Plan. Estimates incorporate engagement with the University of Michigan.

INTRODUCTION

In November 2019, Ann Arbor City Council passed Resolution 19-2103: A Resolution in Support of Creating a plan to Achieve Ann Arbor Community-Wide Carbon Neutrality by 2030. In this Resolution, City Council called on the City to work with the public to create a living plan for achieving carbon neutrality, and to present that plan by Earth Day 2020.

To initiate this work, the Office of Sustainability and Innovations launched A^{2}Zero: the City's carbon neutrality planning and implementation initiative. From the outset, A^{2}Zero was designed to be iterative, transparent, failure-positive, and grounded in justice and equity. A^{2}Zero was crafted so as to have extensive and broad public input and engagement, to be technically robust, to be visionary, and to be inclusive.

Achieving a just transition to carbon neutrality, community-wide, by 2030 will necessitate action from all members of our community. It will necessitate some subtle as well as some significant changes to our community. Not everyone will be excited about every change. But we know the goal – carbon neutrality – is a scientific imperative and one that Ann Arborites are ready to embrace.

But what does carbon neutrality mean? Simply defined, carbon neutrality is reducing the emissions our community puts into the air down to zero, through actions that minimize output and/or by purchasing greenhouse gas emissions offsets. Ann Arbor regularly conducts a greenhouse gas emissions inventory to track our emissions. From this, we know that community-wide emissions, as of 2018, were 2.1 million metrics tons (Figure 4). This means that we have to devise a plan to reduce emissions by 2.1 million metric tons over the next 10 years.

Simultaneously, we need to ensure that we continue preparing our community for the impacts of climate change that are already here, as well as those projected to come. For example, we already know that:

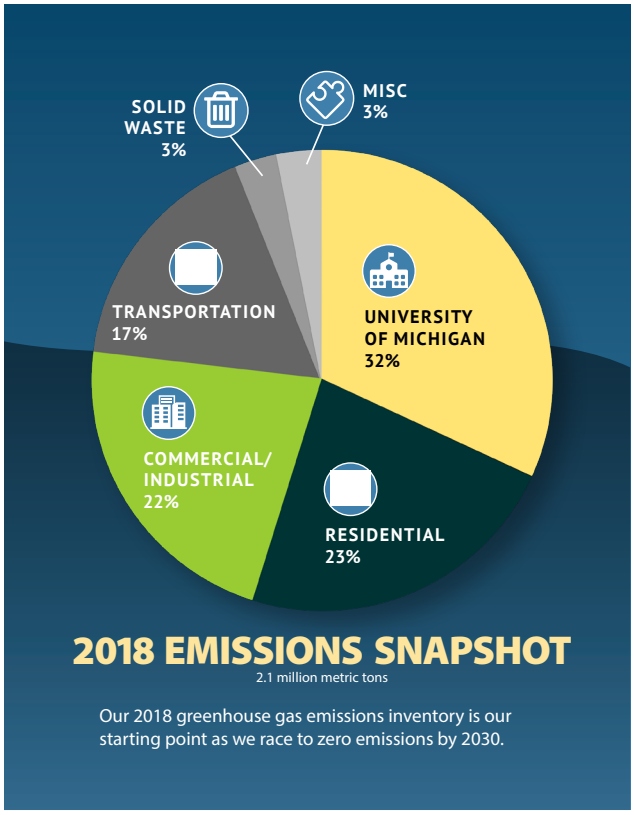


Figure 4: 2018 Greenhouse Gas Emissions by Sector.

- The average annual temperature in Ann Arbor has already increased nearly 1°F since the 1900s. And temperatures are expected to rise by 3-7°F more by 2050.
- Ann Arbor is projected to have 12-36 more days per year above 90°F by 2050 and 30-42 more by end of the century.
- Average annual precipitation has increased by 44% since the 1950s and continues to rise.
- The total amount of rain falling during extreme events has increased by 37% since 1981.

Given these realities, A^{2}Zero was designed to develop actions that change how we manage the unavoidable impacts of climate change by ensuring we invest in the resilience of our people and place, while avoiding the unmanageable impacts of climate change by doubling down on our efforts to reduce greenhouse gas emissions in an effective and timely manner. And, at the core of all of this work is equity; ensuring that our work does not disproportionately burden our low-income, minority, and frontline populations (Figure 5). This is A^{2}Zero.

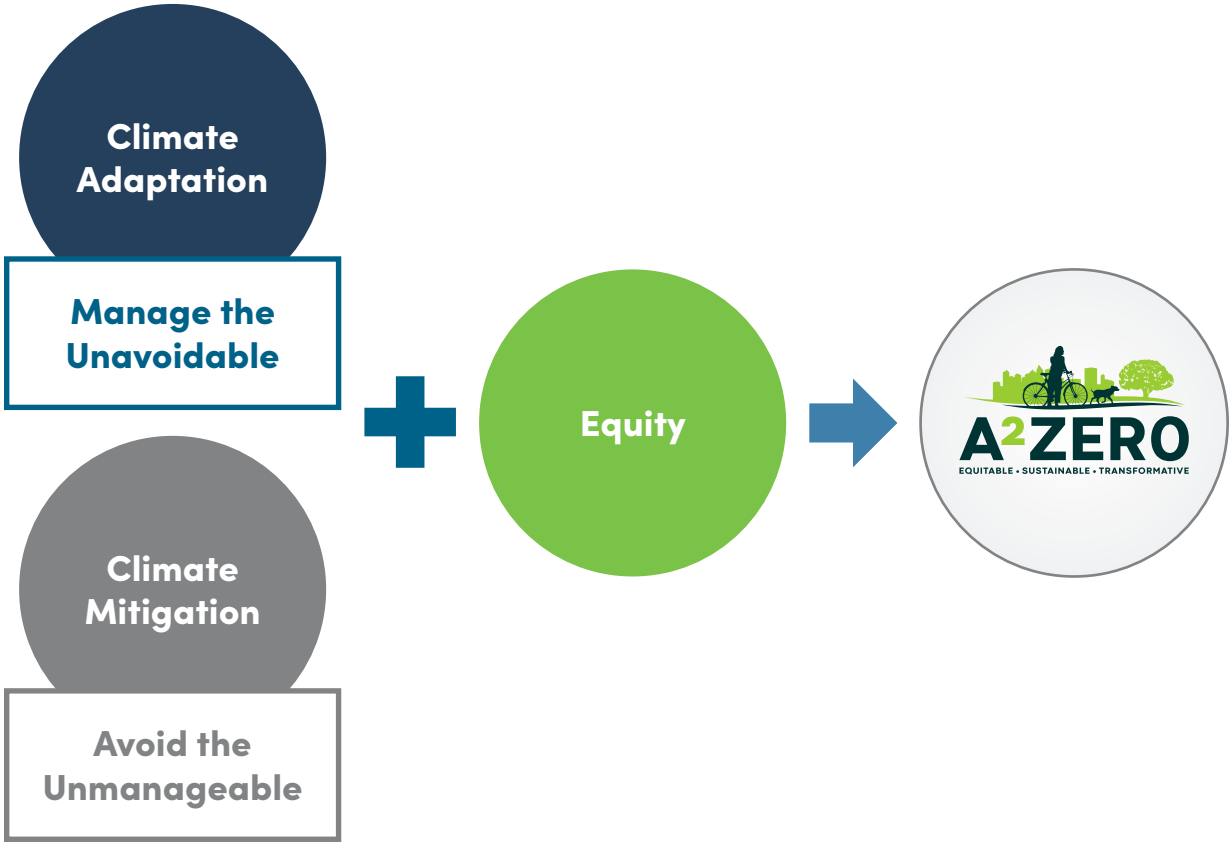


Figure 5: The Core Components of A²Zero.

A²ZERO VALUES

Three overarching values are fundamental to and guide the A²Zero initiative: Equity, Sustainability, and Transformation. The table below highlights what each of these values mean and what characteristics were applied to integrate these values into the A²Zero.

	Equity / Equitable	Sustainability / Sustainable	Transformation / Transformative
Definition	Ensuring everyone gets what they need to succeed based on where they are and where they need to go.	Capable of enduring, able to be sustained in perpetuity. Meeting the needs of the present without jeopardizing the ability of future generations to meet their own needs.	Causing a major change to something or someone, especially in a way that makes it or them better.
Characteristics	• Transparent • Community-Led • Inclusive • Prioritizes Frontline Populations	• Living / Iterative • Holistic	• Failure-Positive • Diversified • Accessible to All

A²ZERO MISSION

The A²Zero mission is the same as the City of Ann Arbor's mission: deliver exceptional services that sustain and enhance a vibrant, safe, and diverse community.

A²ZERO VISION

A²Zero strives toward one unifying vision: Together, creating and implementing a just transition to carbon neutrality, community-wide, by the year 2030. This vision guides all things related to A²Zero.

A²ZERO STRATEGY

Combing the A²Zero values, mission, and vision allowed us to land on seven overarching strategies that are essential to and make up the backbone of the A²Zero Carbon Neutrality Plan:

1. Power our electrical grid with 100% renewable energy
2. Switch our appliances and vehicles from gasoline, diesel, propane, coal, and natural gas to electric
3. Significantly improve the energy efficiency in our homes, businesses, schools, places of worship, recreational sites, and government facilities
4. Reduce the miles we travel in our vehicles by at least 50%
5. Change the way we use, reuse, and dispose of materials
6. Enhance the resilience of our people and our place
7. Other

Public input, guidance from technical advisory committees and peer communities, combined with staff expertise determined that 44 specific actions were needed to fully achieve the seven strategies outlined above. The majority of this Plan outlines these specific actions and how we, as a community, can immediately get started working towards carbon neutrality.

A²ZERO PLANNING PROCESS

Ann Arbor has been working on climate action since the early 2000s. A²Zero builds upon nearly two decades of planning, action, and local leadership. The City initiated A²Zero on November 13th, 2019 with a deadline of plan completion by mid-March 2020 - an incredibly accelerated, four-month creation period. What's unique about this Plan is the urgency and speed with which this Plan was created. In this four month period, the Ann Arbor Office of Sustainability and Innovations mobilized dozens of community partners and volunteers, thousands of members of the public, dozens of technical advisors, and peer communities to provide input into this Plan.

THE PROCESS

82 working days:

- 3 Public surveys
- Over 60 public events
- 2 large town halls
- Over 80 technical advisors
- 66 partner organizations

Figure 6: The A²Zero Planning Process. The process involved three phases, four main sources of input (including technical documents and the peer reviewed literature), over 60 public events, more than 80 technical advisors, three public surveys, and support from over 60 organizations.

This reminder of this section provides detail on the planning processes undertaken to arrive at this living A²Zero Carbon Neutrality Plan.

A²ZERO'S FIVE PILLARS OF PLANNING

To complete a holistic, comprehensive, and realistic carbon neutrality plan, the Office of Sustainability and Innovations designed a planning process that rests on five pillars:

1. Public Engagement
2. Technical Advisory Committees
3. Partner Support
4. Staff Expertise
5. Peer Learning and Literature Review

PUBLIC ENGAGEMENT

Public engagement is at the heart of A²Zero. Three primary means of public engagement were undertaken in order to create this Plan: 1) public events; 2) public surveys; and 3) regular communication via traditional means and social media. In terms of public events, staff in the Office of Sustainability and Innovations hosted 68 public events between November 13th, 2019 and March 12th, 2020 (Appendix 1). Public events focused on engaging underrepresented constituencies and leveraging partner networks to reach as wide of a swath of the community as possible. Partner organizations also encouraged to their members to take the three surveys as part of the planning process. Finally, the City leveraged its social media channels and partner networks to let people know about events, opportunities for feedback, and to share general information about the A²Zero initiative.

Three public surveys were administered as part of A²Zero:

Survey 1: Gathered ideas from the public about what they would like to see in the City's carbon neutrality work.

Survey 2: Collected feedback on which ideas the public supported to reduce greenhouse gas emissions as well as how the City should fund carbon neutrality efforts.

Survey 3: Focused on identifying what stakeholders need to support implementation of the final carbon neutrality strategy.

TECHNICAL ADVISORY COMMITTEES

Technical advisory committees (TACs) were established to ensure that experts within the community could help identify what would technically be needed to achieve carbon neutrality. Four TACs were established: 1) energy; 2) mobility; 3) resource reduction; and 4) adaptation and resilience. Over 80 individuals volunteered their time as technical advisors on at least one of the four committees. Technical advisors helped identify potential actions, evaluate actions (including those recommended by the public), and create a prioritized list of candidate strategies for potential inclusion in the final Plan (see Appendix 2 for TAC meetings).

PARTNER ORGANIZATIONS

To support outreach and engagement, as well as the eventual implementation of the A²Zero, the Office of Sustainability and Innovations sought partner organizations. Partner organizations had to agree to co-host a carbon neutrality event with the Office, share information about the initiative with their membership/networks, and to share their logo on partner messaging materials. As of early March 2020, 67 organizations had signed up to be partners of A²Zero, including:

Every month, from December – March, a partner messaging kit was developed and circulated to make it easy for partners to share updates about A²Zero with their networks.

The National Wildlife Federation; The Neutral Zone; Community Action Network; Citizens Climate Lobby - Ann Arbor; The Ecology Center; The Ann Arbor 2030 District; Interfaith Council for Peace and Justice; Michigan Environmental Council; Washtenaw 350; Ann Arbor Area Elders Climate Action Chapter; The American Institute of Architects Huron Valley Chapter; The University of Michigan; Washtenaw Climate Reality; Building Matters Ann Arbor; Michigan League of Conservation Voters; Sierra Club Huron Valley Group; A2 Climate Mobilization; Leslie Science and Nature Center; The Hands on Museum; Michigan Climate Action Network; Ann Arbor/Ypsilanti Regional Chamber; Ann Arbor Housing Commission; THRIVE Collaborative; Michigan Interfaith Power and Light; Washtenaw County Democrats; American Society of Adaptation Professionals; Washtenaw Bicycling and Walking Coalition; Colonial Square Cooperative; Walker Miller Energy Services; United Way of Washtenaw County; Lean and Green Michigan; Washtenaw Housing Alliance; Citizens Climate Lobby - UM Chapter; Forest Hills Cooperative; Ann Arbor Meals on Wheels; International Brotherhood of Electrical Workers Local 252; Ann Arbor Center for Independent Living; UM College Democrats; Students for Clean Energy; Great Lakes Renewable Energy Association; UM Climate Action Movement; Washtenaw Area Apartment Association; Washtenaw County; The Ride;

Ann Arbor SPARK; National Association for the Advancement of Colored People-Ann Arbor Chapter; Ann Arbor Public Schools; Ann Arbor Indivisible; University of Michigan President's Commission on Carbon Neutrality; Washtenaw County Food Policy Council; Huron Valley Democratic Socialists of America; Bee Safe Ann Arbor; City of Ypsilanti; Ann Arbor Summer Festival; Ann Arbor District Library; Pesticide-Free Ann Arbor; Slow Food Huron Valley; Common Cycle; Earth Sciences; Natural Resources Defense Council; Ann Arbor Main Street Association; Washtenaw Optimal Wellness; Downtown Development Authority; Mindful City Ann Arbor; and The Old Fourth Ward.

STAFF EXPERTISE

Staff expertise and research and analysis of published carbon neutrality literature, including Project Drawdown, were an integral component of planning. This included reviewing historical planning initiatives within the City, identifying existing successful initiatives, and reaching out to staff across the City to round out planning and engagement aspects of A^{2}Zero.

PEER LEARNING AND LITERATURE REVIEW

A key piece of our work was reaching out to and learning from peer communities working on carbon neutrality. This involved reading other community plans, talking to peer community liaisons, and researching key recommendations on community carbon neutrality from peer reviewed and technical sources.

OTHER

In addition to the aforementioned activities, the Office of Sustainability and Innovations also:

- Created a website to track activities around A^{2}Zero: www.A2Zero.org
- Created a listserv where stakeholders could continue to learn about A^{2}Zero
- Created a meeting-in-a-box kit that included materials so individuals could host their own A^{2}Zero events

  The meeting-in-a-box toolkit includes the following:

  - Guide on how to host your own A^{2}Zero meeting
  - A^{2}Zero slide deck with talking points, including discussion questions
  - A terminology sheet
  - A^{2}Zero overview sheet with is a 1-page document that summarizes the A^{2}Zero process and provides a snapshot of the initiative
  - Climate Change Overview – which is a 1 page document that introduces folk to the existing and projected climate change impacts in Ann Arbor
  - Sign-In sheet to track the individuals attending an event
  - Links to relevant A^{2}Zero surveys
  - Event results form to gather feedback about the event
  - Trivia questions to help make events more interactive and fun
  - Photo release form in case anyone was taking photos they intended to share
- Hired a communications firm to create a brand for the City's carbon neutrality work, through which A^{2}Zero emerged.

- Worked with Elevate Energy to assess the greenhouse gas reduction potential and costs associated with each action included in the final Plan.
- Created a 1-page fact sheet about A²Zero and the City's carbon neutrality work.
- Created a 1-page document summarizing the different sectors included in the City's carbon neutrality planning.
- Sent 11,000 backpack fliers to all K-5th grade students in Ann Arbor Public Schools.
- Developed A²Zero flyer for Ann Arbor Meals on Wheels to distribute to home bound residents.
- Developed flyer for all partners to display advertising the February 22nd Town Hall and the final A²Zero survey.

All of these activities were integral to creating A²Zero. In the end, this Plan was made by the community, for the community

THE LIVING CARBON NEUTRALITY PLAN

The remainder of this document highlights the actions that are part of the City's living A²Zero Carbon Neutrality Plan.

These actions are organized around the seven overarching strategies:

1. Power our electrical grid with 100% renewable energy
2. Switch our appliances and vehicles from gasoline, diesel, propane, coal, and natural gas to electric
3. Significantly improve the energy efficiency in our homes, businesses, schools, places of worship, recreational sites, and government facilities
4. Reduce the miles we travel in our vehicles by at least 50%
5. Change the way we use, reuse, and dispose of materials
6. Enhance the resilience of our people and our place
7. Other

STRATEGY 1:

Power Our Electrical Grid with 100% Renewable Energy

This strategy focuses on ensuring that all of the electricity used within our community is powered with renewable energy such as solar, geothermal, and wind. To achieve this strategy, four specific actions are proposed:

1. Implement Community Choice Aggregation
2. Support Onsite Renewables and Battery Storage
3. Develop Community Solar Program
4. Launch Landfill Solar Project

Combined, these four actions are projected to reduce community-wide greenhouse gas emissions by 41% and cost just over $4,100,000.

1. IMPLEMENT COMMUNITY CHOICE AGGREGATION

Community Choice Aggregation (CCA) program is an agreement among stakeholders to allow local governments to procure power on behalf of their residents, businesses, and municipal accounts from an alternative supplier while receiving transmission and distribution services from their existing utility providers. CCA allows communities to have more control over the production of their energy, including integrating community values such as 100% renewable energy into their purchasing decisions. Generally, a CCA is an opt-out program meaning that it allows economies of scale to be achieved which leads to close to or actual cost parity to existing electricity costs. In order to implement a CCA, the State will need to enact legislation to allow for CCA.

Vision for Implementing Community Choice Aggregation

Community Choice Aggregation legislation has been enabled by the State and Ann Arbor administers its first bulk buy of 100% new renewable energy by 2027. Through an opt-out structure and little change in energy rates, all residents and commercial entities, including the University of Michigan, participate.

Party Responsible for Implementation

Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- State legislature
- Other Michigan municipalities
- Michigan Municipal Association on Utility Issues (MI-MAUI)
- Michigan nonprofits focused on energy choice

Assumptions

- 100% of residential customers participate in the CCA
- 100% of commercial and industrial enterprises participate in the CCA
- 100% of any municipal operations not yet powered by renewable energy are included in the CCA
- Capacity of program accounts for changes in consumption due to (a) reductions in consumption achieved through widespread energy efficiency improvements, (b) increases in consumption related to switching from fossil fuel powered heating and vehicles to renewable energy, and (c) projected growth rates
- Renewable energy credits from the sources procured through the program are retired, and the energy sources offset fossil fuel generation

Equity Impacts

CCA provides clean, renewable energy for the whole community. This is a particularly useful option for residents who may not have the ability to otherwise install renewable energy systems at their residence, whether due to renting or to cost. A CCA program would provide renewable energy to those who may not otherwise be able to access this resource.

Indicators of Success / Goals

By 2030, 100% of our community's electrical needs are met with renewable energy sources, thanks in large-part to the CCA.

Target Demographic

Entire community

Timeline and Initial Actions

2020
The City begins working on recommendations for what to include in a CCA program.

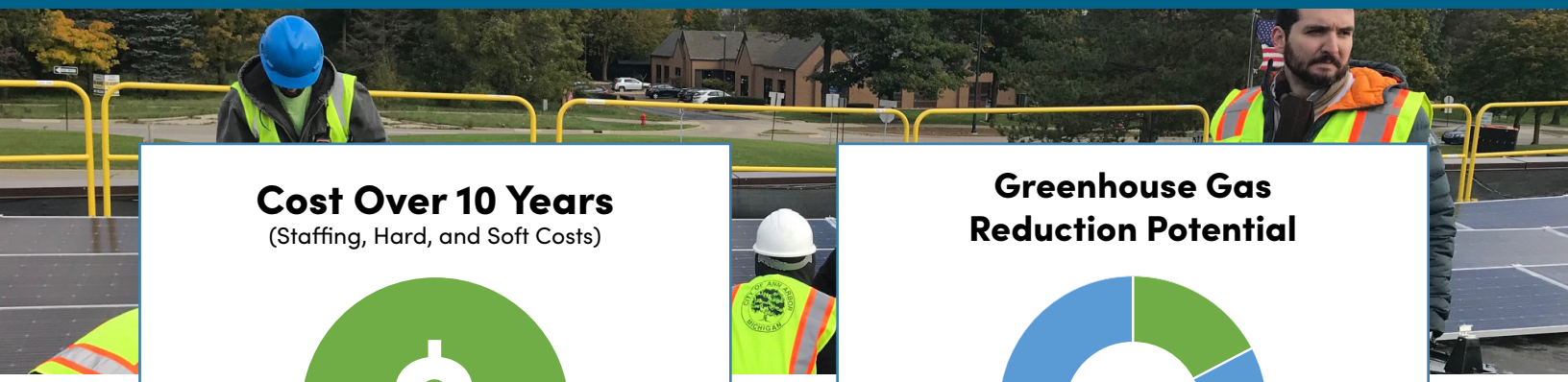
2021
The City begins working with legislators to develop CCA legislation. Public education begins. about CCA

2024
The City begins planning the startup of the CCA program, undertaking feasibility studies, public engagement, and business model planning.

2025
CCA is enabled in Michigan through the passing of state legislation.

2026
Ann Arbor public vote to allow a local CCA purchase.

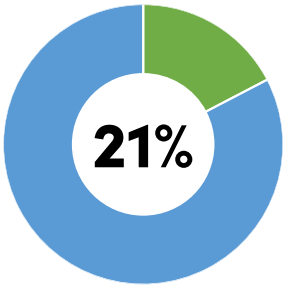
2027
CCA program launches in Ann Arbor and continues.



Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$3,245,000

Greenhouse Gas Reduction Potential



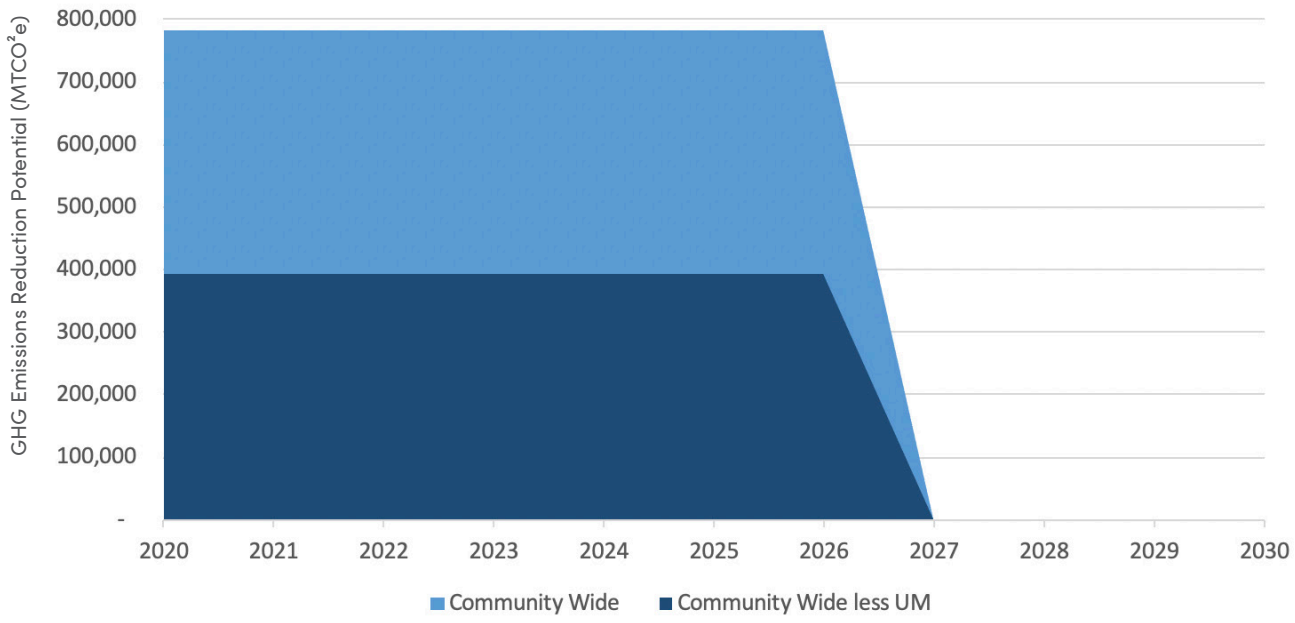
462,100 metric tons carbon dioxide equivalent (21% community-wide emissions)

If the University of Michigan participants, an additional 321,900 metric tons carbon dioxide equivalent could be reduced, resulting in a total of 784,000 metric tons carbon dioxide equivalent (~36% community wide emissions).

By 2027, the Implement **Community Choice Aggregation** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the total emissions reduction potential of Community Choice Aggregation (in light blue) assuming the community and University participate in the program. The dark blue shows the impact of Community Choice Aggregation if only the community (not the University) participates in the program.

IMPLEMENT COMMUNITY CHOICE AGGREGATION



2. SUPPORT ONSITE RENEWABLE ENERGY GENERATION WITH BATTERY STORAGE (BULK BUYS)

Renewable energy systems like geothermal, solar, and energy storage pay for themselves over their lifetime, but the upfront costs of installation can be a barrier for many people. To help reach our A²Zero goals, the City proposes establishing a bulk purchase program that enables residents and businesses to procure onsite renewables for a discounted price by achieving economies of scale.

Vision for Supporting Onsite Renewable Energy Generation with Battery Storage

By 2030, through the provision of bulk buys and discount programs, 78MW of local renewable energy is being generated on viable buildings, parcels of land, and carports. At least ¼ of these installations also have some form of battery storage, which is helping enhance the resilience of our local community and economy.[1]

Party Responsible for Implementation

Office of Sustainability and Innovations' Solarize Coordinator, with support from the OSI team

Collaborators / Project Co-Designers

- City of Ann Arbor Building, Rental, and Inspection Services
- Renewable energy contractors and installers
- Michigan Saves
- Potentially local banks

Assumptions

- 78MW of local renewable energy generation is achieved by 2030
- Pricing discounts of 5%, 10%, and potentially 15% are offered through the program
- The capacity generated through this initiative is not included in the CCA

Equity Impacts

Nonprofit organizations and public institutions may benefit from this program, but the benefits flow primarily to property owners.

Indicators of Success / Goals

78MW of new, local, onsite renewable energy generation is installed in Ann Arbor by the year 2030.

Target Demographic

Individuals who can install renewable energy on the buildings they own or operate, including homeowners, businesses, schools, and institutions

[1] In administering this program, OSI will also be looking to tie in energy efficiency support and electrification support so that each household or business receives a package of support as opposed to multiple different programmatic offerings.

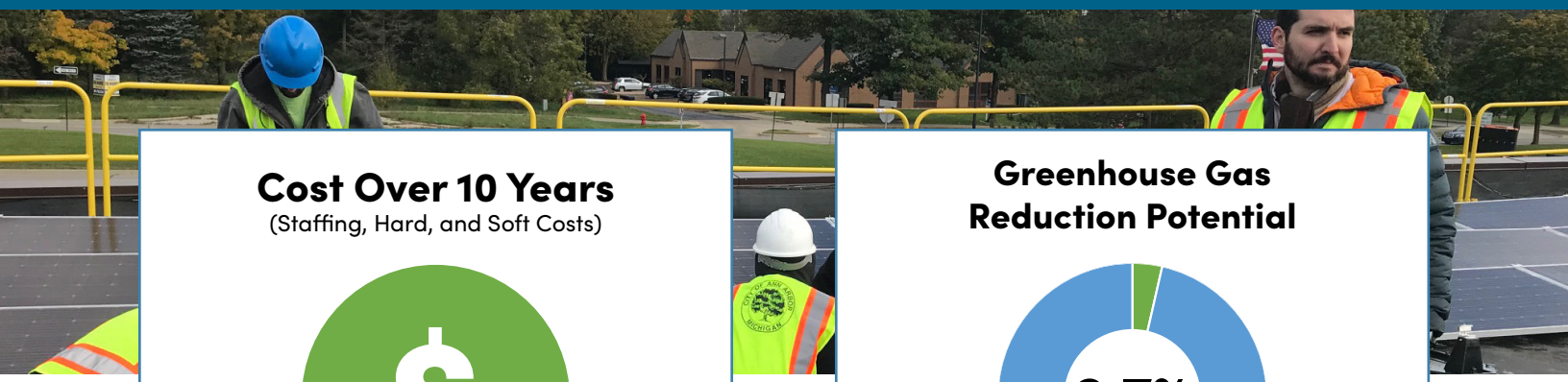
Timeline and Initial Actions

2020

Pilot test group buy in residential sector. Coordinate program with contractors. Conduct public outreach.

2020

Revise program based on lessons learned. Scale and continue to administer until at least 2030 (or until the program stops generating demand).



Cost Over 10 Years

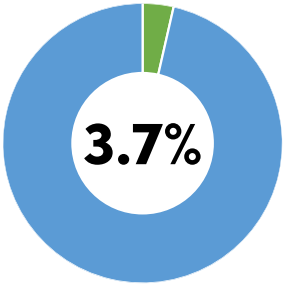
(Staffing, Hard, and Soft Costs)

Estimated

$605,000

($540,000 in staffing and $65,000 in stipends to community residents)

Greenhouse Gas Reduction Potential



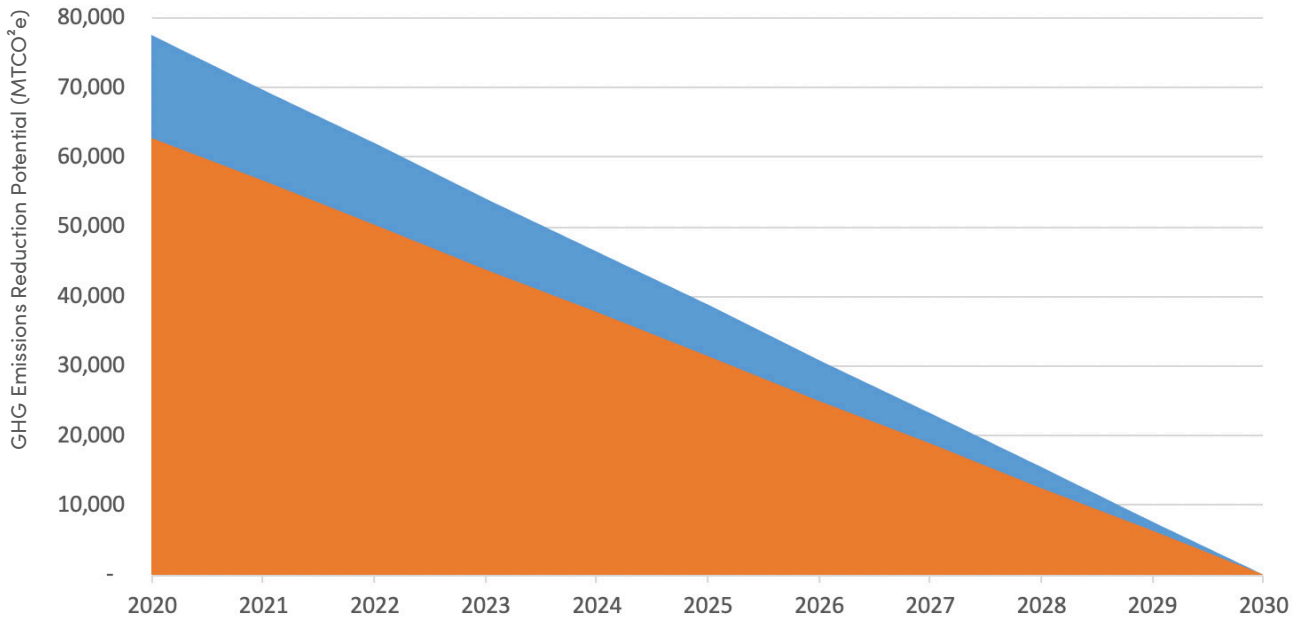
81,000 metric tons carbon dioxide equivalent (3.7% of community-wide emissions).

If the University of Michigan participates in this action, an additional 4,000 metric tons carbon dioxide equivalent could be reduced, resulting in a total of 85,000 metric tons carbon dioxide equivalent (3.9% community-wide emissions).

By 2030, the Support **Onsite Renewable Energy Generation with Battery Storage (Bulk Buys)** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the total emissions reduction potential of onsite renewable energy generation (in light blue) assuming the community and University participate in the program. The orange shows the impact of onsite renewable energy generation if only the community (not the University) participates in the program.

SUPPORT ONSITE RENEWABLE ENERGY GENERATION WITH BATTERY STORAGE (BULK BUYS)



3. DEVELOP COMMUNITY SOLAR PROGRAM

Not all residents and businesses are able to install solar on their property. This may be because of inadequate solar exposure, not owning one's home, or financial barriers associated with renewable energy. To provide options to all who want to invest in solar locally, the City of Ann Arbor, in partnership with our utility, will create and support a robust community solar program which allows solar installations on public properties. Community solar programs allow residents and business to purchase solar panels from an existing solar farm and receive an on-bill credit as if those panels were actually on their roof. State legislation is needed to enable community solar programs but the City is already working with state legislators to move this idea forward.

Vision for Developing Community Solar Program

By 2030, 11 MW of community solar has been established locally. As our community builds demand for community solar, the landfill solar site in opened for public subscriptions and the City's demand for renewable energy is moved to create even more local renewable energy generation.

Party Responsible for Implementation

Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- DTE Energy
- State of Michigan
- Partner organizations

Assumptions

- Community solar is enabled at the state
- Demand for community solar reaches at least 11MW by 2030
- On-bill financing is possible

Equity Impacts

Community solar primarily benefits those without the ability to install their own renewable energy projects.

Indicators of Success / Goals

By 2030, 11MW of new renewable energy has been created and is subscribed through a community solar program.

Target Demographic

Those who face barriers to installing solar on the buildings they inhabit, including renters, low-income residents, and those with shaded or obstructed roofs

Timeline and Initial Actions

2021

Enabling legislation passed and City works with DTE Energy to create local pilot community solar program.

2022

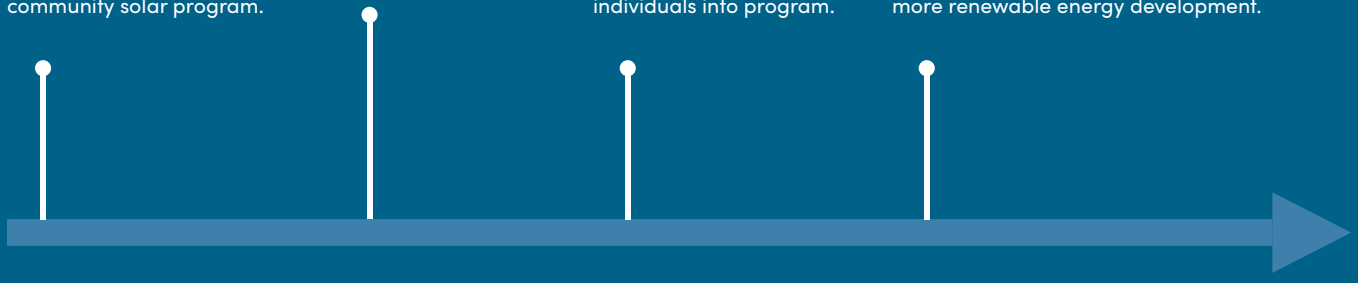
Local pilot program launches.

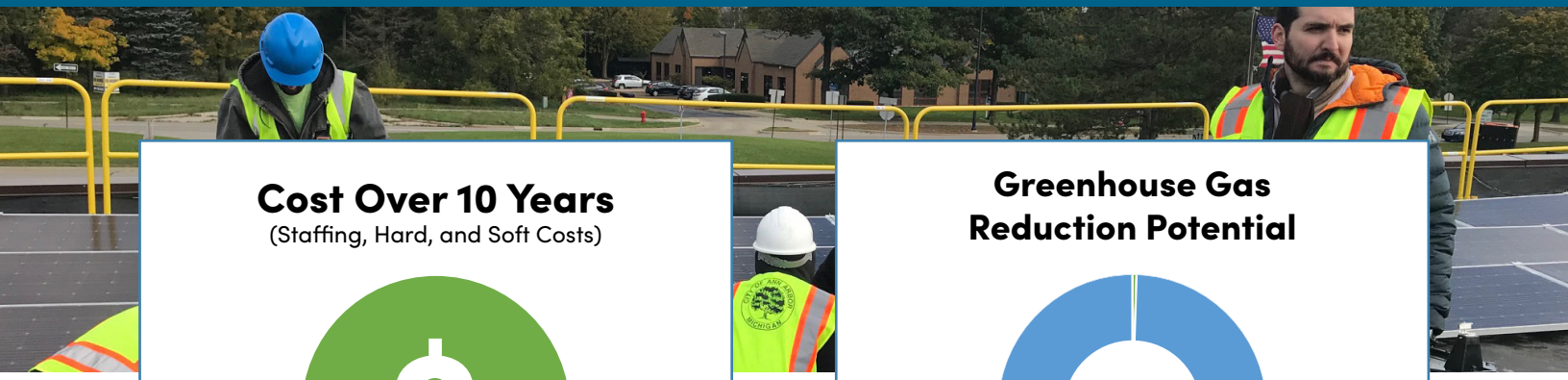
2024

Expansion of community solar program locally. Includes recruitment of individuals into program.

2026

Landfill solar site opens up for community subscriptions given the success of the initiative. Allows City to take its demand to stimulate more renewable energy development.





Cost Over 10 Years

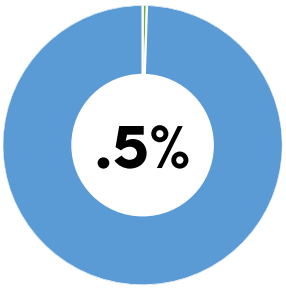
(Staffing, Hard, and Soft Costs)

Costs to the City are

$205,000

over 10 years to help administer the program. If the City becomes an anchor tenant, the costs would rise.

Greenhouse Gas Reduction Potential

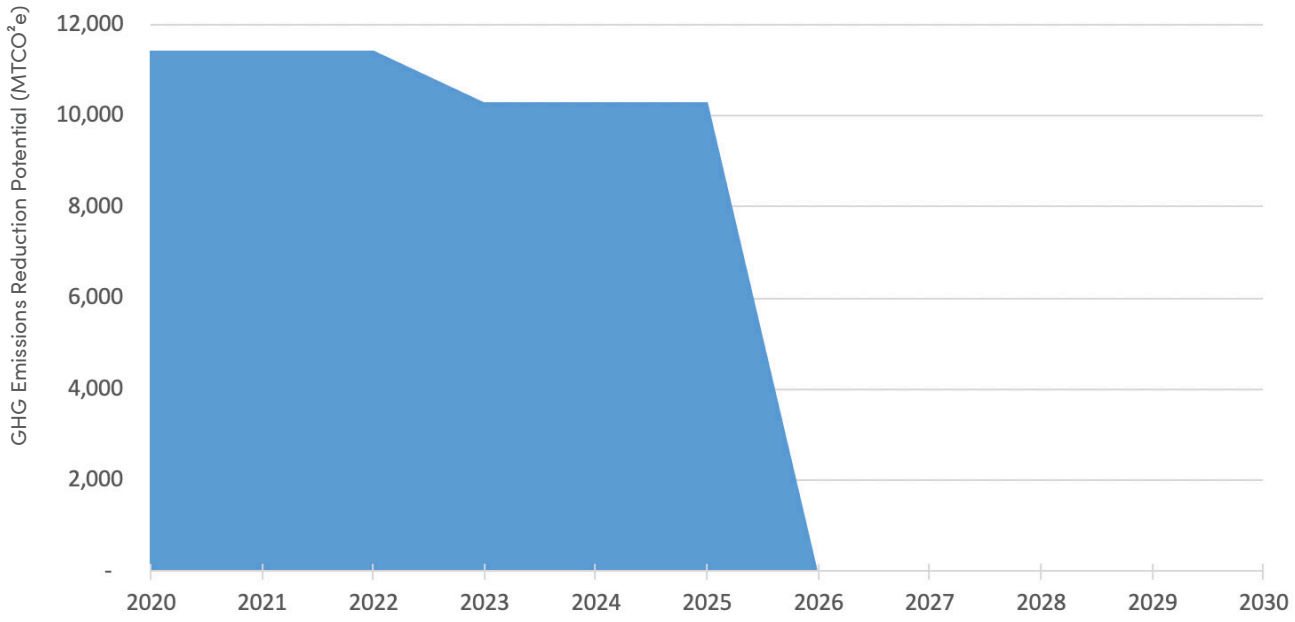


11,500 metric tons carbon dioxide equivalent (.5% of community-wide emissions)

By 2026, the Develop **Community Solar Program** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the total emissions reduction potential of onsite renewable energy generation (in light blue) assuming the community and University participate in the program.

DEVELOP COMMUNITY SOLAR PROGRAM



4. LAUNCH LANDFILL SOLAR PROJECT

The City of Ann Arbor is developing a utility scale solar project with DTE Energy to operate on the City-owned landfill and in Pittsfield Township. The intention is that this installation will provide enough energy to offset roughly 80% of Ann Arbor municipal energy usage. In addition to ground mounted solar, the project incorporates a pilot of solar panels installed on a retention pond, provides a portion of clean energy for Pittsfield Township to offset their municipal operations, and has many co-benefits including creating habitat for local pollinators. If demand exists and enabling legislation is passed, the solar project may be integrated into a community solar program.

Vision for Launching Landfill Solar Project

By 2030, the City-owned landfill and surrounding property has 24 MW of installed solar capacity, the vast majority of it used to offset Ann Arbor municipal energy use.

Party Responsible for Implementation

Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- DTE Energy
- State of Michigan
- Partner organizations

Assumptions

- The landfill is deemed a viable site for utility-scale solar
- Current federal tax credits are leveraged to reduce cost of project

Equity Impacts

Should the landfill solar project include community solar provisions, it could serve many Ann Arborites who cannot install their own solar arrays, whether due to renting, cost, or those with roofs not optimal for solar.

Indicators of Success / Goals

By the end of 2023, a 24MW solar installation is fully operational at the former Ann Arbor landfill and on the land held in PUD with Pittsfield Township.

Target Demographic

The City of Ann Arbor and Pittsfield Township. Once local demand is established, the project may be turned into a community solar program

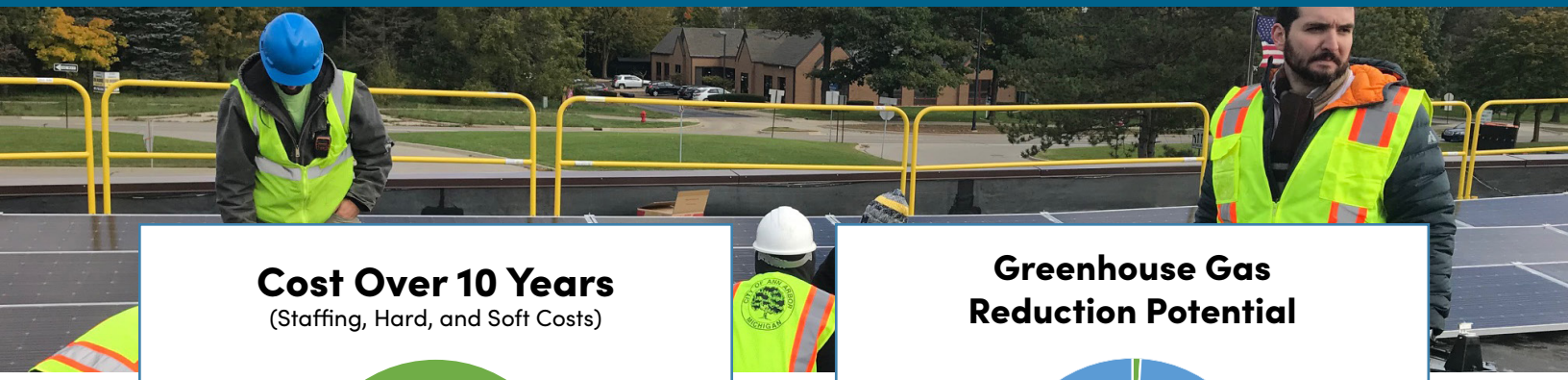
Timeline and Initial Actions

2020

The City of Ann Arbor, in partnership with DTE Energy and Pittsfield Township, completes feasibility and technical assessments of the site. If the project is deemed feasible, an RFP is released and safe harboring of equipment is undertaken.

2023

The landfill solar project begins operation, providing local renewable energy.

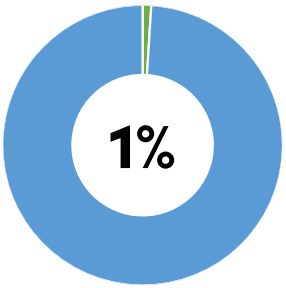


Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

Estimated
$80,000
for staffing support

Final cost to be determined based on any required costs to upgrade the grid at the point of intersection.

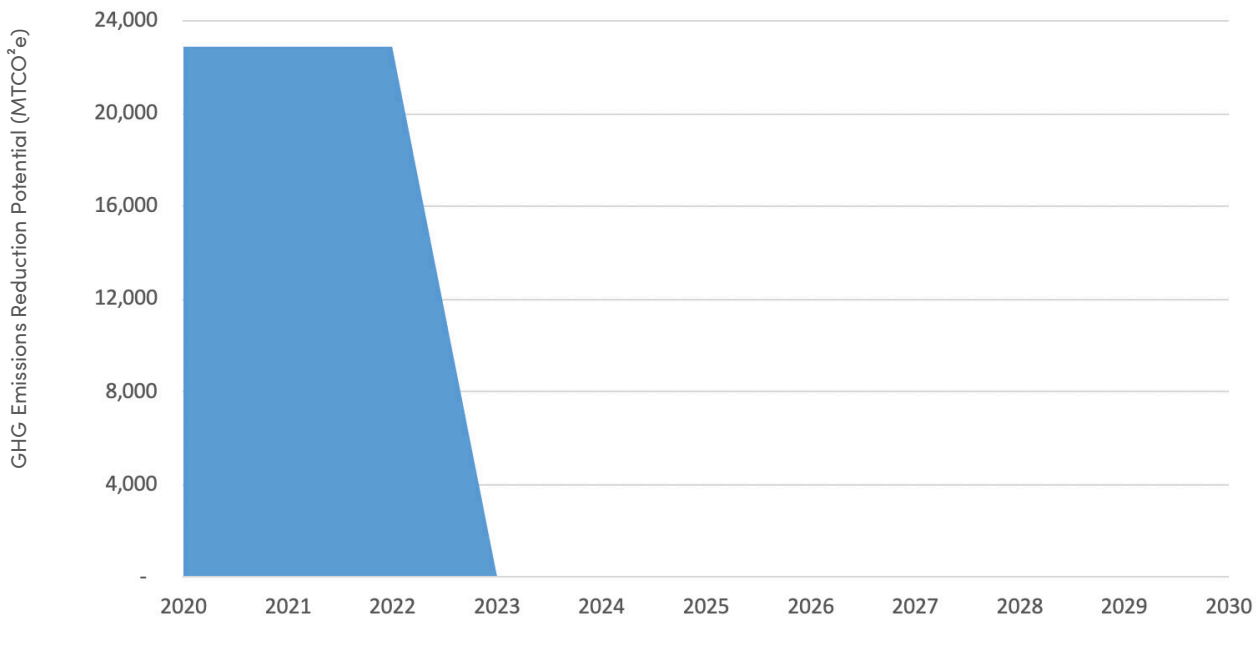
Greenhouse Gas Reduction Potential



23,000 metric tons carbon dioxide equivalent (1% of community-wide emissions)

By 2023, the Launch **Landfill Solar Project** strategy will have achieved all of its potential greenhouse gas emissions reduction potential.

LAUNCH LANDFILL SOLAR PROJECT



STRATEGY 2:

Switch our Appliances and Vehicles from Gasoline, Diesel, Propane, Coal, and Natural Gas to Electric

This strategy focuses on converting the vast majority of our existing gasoline, diesel, propane, coal, and natural gas powered equipment, appliances, and vehicles to electric. This is particularly important since we are working to ensure our electrical grid is powered with 100% renewable energy. To achieve this strategy, 6 specific actions have been identified:

1. Promote Home & Business Electrification
2. Electrify Buses
3. Support Community Electric Vehicle and Solar Bulk Buys
4. Electrify City Fleet
5. Electrify Private Fleet
6. Expand Electric Vehicle Charging Infrastructure

Combined, these six actions are estimated to reduce community-wide emissions by 23% and cost just over $143,000,000.

1. PROMOTE HOME & BUSINESS ELECTRIFICATION

The use of natural gas for heating space and water, as well as cooking in buildings represents over 25% of our community's greenhouse gas emissions. Transitioning away from natural gas to electric, especially given our work to ensure that all electricity is powered with renewable energy, is a pivotal component of A^{2}Zero. To support the electrification of appliances, the City of Ann Arbor will work to establish policies that promote electrification of heating and cooking systems by evaluating options in codes, inventive programs, and through other avenues. The City of Ann Arbor will lead this effort by electrifying all municipal buildings.

Vision for Promoting Home & Business Electrification

By 2030, 100% of city facilities, 30% of owner-occupied homes, and 25% of rental properties have fully electrified and conducted air sealing and insulation improvements. The electricity now used by these systems is sourced from renewable energy, and the additional capacity has been incorporated into plans for community-wide renewable energy purchasing initiatives. Additionally, building occupants benefit from better indoor air quality.

Party Responsible for Implementation

- Office of Sustainability and Innovations
- For City buildings – Facilities with support from Office of Sustainability and Innovations

Equity Impacts

Few equity impacts from this action except as part of the community solar program (above).

Collaborators / Project Co-Designers

- City of Ann Arbor legal team
- City of Ann Arbor Building, Rental, and Inspection Services
- Michigan Saves
- Home Improvement Stores
- Contractors (i.e., energy efficiency, repair, installation)

Indicators of Success / Goals

By 2030, 100% of city facilities, 30% of owner-occupied homes, and 25% of rental properties have fully electrified and the electricity powering those homes is coming from renewable energy sources.

Assumptions

- 30% of single family homes are all electric by 2030, not including the 20% already using electric heat
- 25% of rentals are all electric by 2030
- City commits to and achieves 100% electrification by 2030
- A 1:1 replacement of natural gas energy to electricity, with 1CCF gas transitioning to 30.36kWh electricity
- All new residential and commercial buildings are designed and built to operate without the use of natural gas, reducing the increased cost associated with retrofitting existing systems
- All additional electric consumption is powered by an associated increase in renewable energy sources

Target Demographic

All buildings in Ann Arbor, including single-family homes, rentals, and businesses. The action was modeled to show the impact if the University of Michigan participates as well as if it does not

Timeline and Initial Actions

2020

Conduct legal analysis and finalize electric vehicles (EV) readiness ordinance.

2021

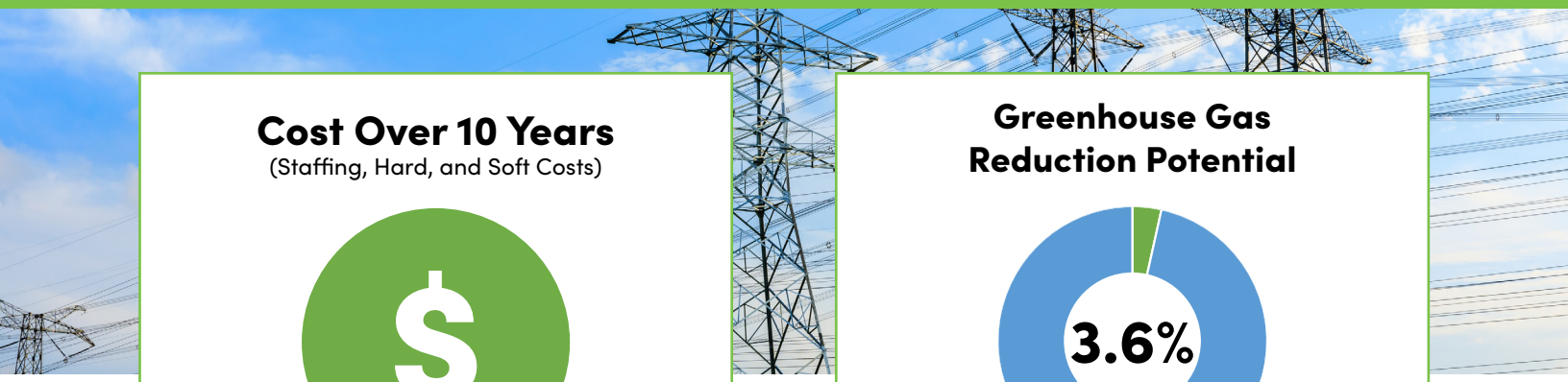
Develop electrification policy. Begin planning administrative program. Capacity building by ensuring enough contractors are trained in electric heating systems appropriate for Ann Arbor's climate. EV readiness ordinance adopted.

2023

Public outreach and education, including visible and accessible alternatives to natural gas systems. Program launches and is enforced.

2024

Buildings transition at a steady rate annually.



Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

Estimated

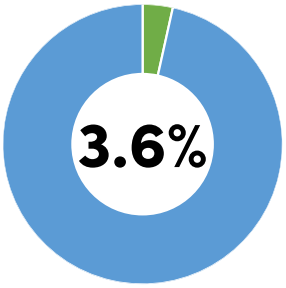
$1,400,000

staffing, trainings, and administrative costs for community portion of electrification program.

$5,700,000

for transitioning City facilities to all electric.

Greenhouse Gas Reduction Potential



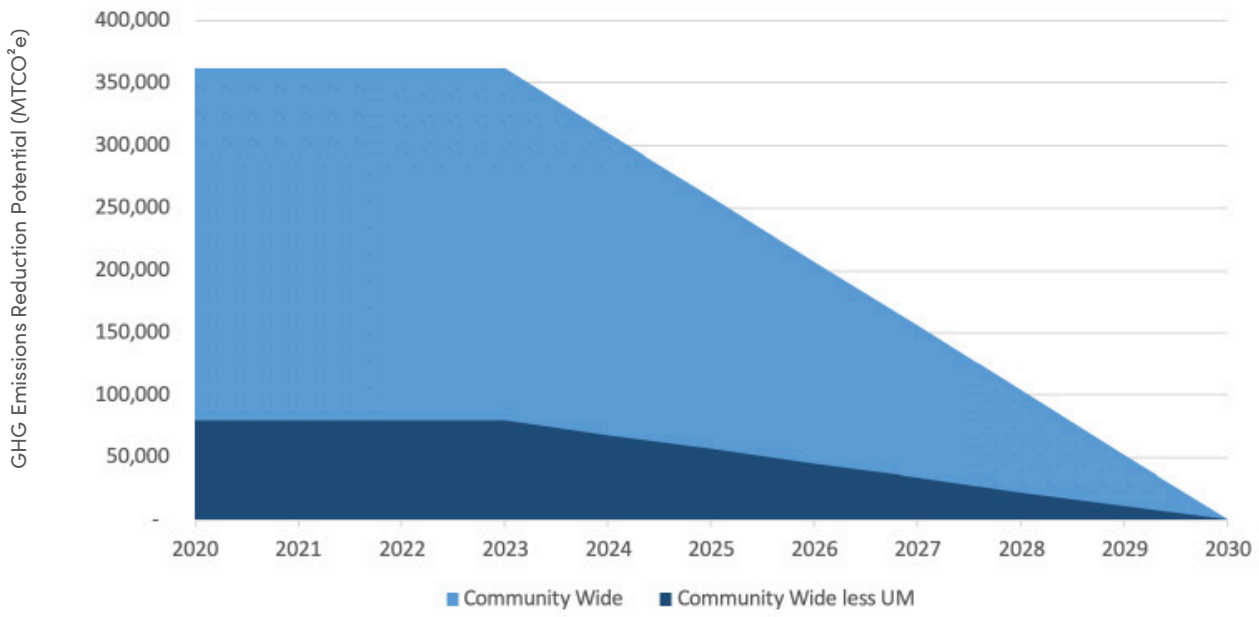
79,200 metric tons carbon dioxide equivalent (3.6% of community-wide emissions) for residential and municipal electrification.

If the University of Michigan were to electrify all of their operations and power that additional electrical demand with clean energy, it would be an additional reduction of 283,000 metrics tons of carbon dioxide equivalent (13% of community-wide greenhouse gas emissions), resulting a total of 362,200 metric tons of carbon dioxide equivalent (16.5% of community-wide emissions).

By 2030, the **Promote Home & Business Electrification** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the total emissions reduction potential of home and business electrification (in light blue) assuming the community and University participate in the program. The dark blue shows the impact of home and business electrification if only the community (not the University) participates in the program.

PROMOTE HOME AND BUSINESS ELECTRIFICATION



2. ELECTRIFY BUSES

This action involves electrifying TheRide's diesel and diesel-hybrid fleet of 87 buses as well as the University of Michigan's ethanol, biodiesel, and gasoline buses on an aggressive time line.

Vision For Electrifying Buses

By 2030, TheRide and UM's bus fleet have transitioned to electric propulsion. Consequentially, both entities are enjoying lower maintenance, operating, and fuel costs. Solar has been installed on AATA and UM properties so that the electricity running the buses is 100% carbon-free.

Party Responsible for Implementation

- TheRide, with support from the Office of Sustainability and Innovations' Sustainability Analyst
- UM Transportation Department, with support from the Office of Sustainability and Innovations

Party Responsible for Implementation

- DTE Energy
- Michigan Department of Environment, Great Lakes, and Energy (EGLE)
- UM Energy Institute
- UM Carbon Neutrality Commission

Equity Impacts

Electrifying buses will give riders a cleaner, more comfortable, and healthier ride. Communities who live along electrified bus routes will benefit from reduced asthma and COPD rates, which disproportionately impact communities of color and low-income communities.

Indicators of Success / Goals

By 2030, TheRide and UM's entire fleet of buses are electric and their power is drawn from renewable energy.

Assumptions

- Annually, 9 new electric buses are purchased starting in 2021 for TheRide
- UM replaces buses at a rate of approximately 5 per year
- Bus fleets stay at their current level
- A traditional bus is $525,000; an electric bus is $750,000
- No value calculated for selling diesel or gasoline buses
- 2 additional electric buses are purchased per year to grow the fleet and expand service
- Assumes limited operational savings in the first few years of operation as facilities adjust to new types of buses
- Costs are only calculated for TheRide's portion of electric buses
- Air quality improves along the bus corridors

Target Demographic

Bus riders and potential bus riders

Timeline and Initial Actions

2020

Planning for e-buses commences. Grant applications filed.

2021

TheRide purchases 9 new e-buses and installs EV charging infrastructure that will be needed for first 5 years of operation. UM purchases first 5 buses and EV charging infrastructure.

2030

All buses operated by TheRide and UM are electric.

Cost Over 10 Years

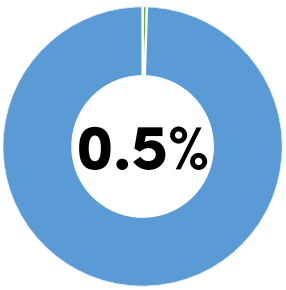
(Staffing, Hard, and Soft Costs)

Estimated

$86,000,000

(only accounting for TheRide's electric buses)

Greenhouse Gas Reduction Potential

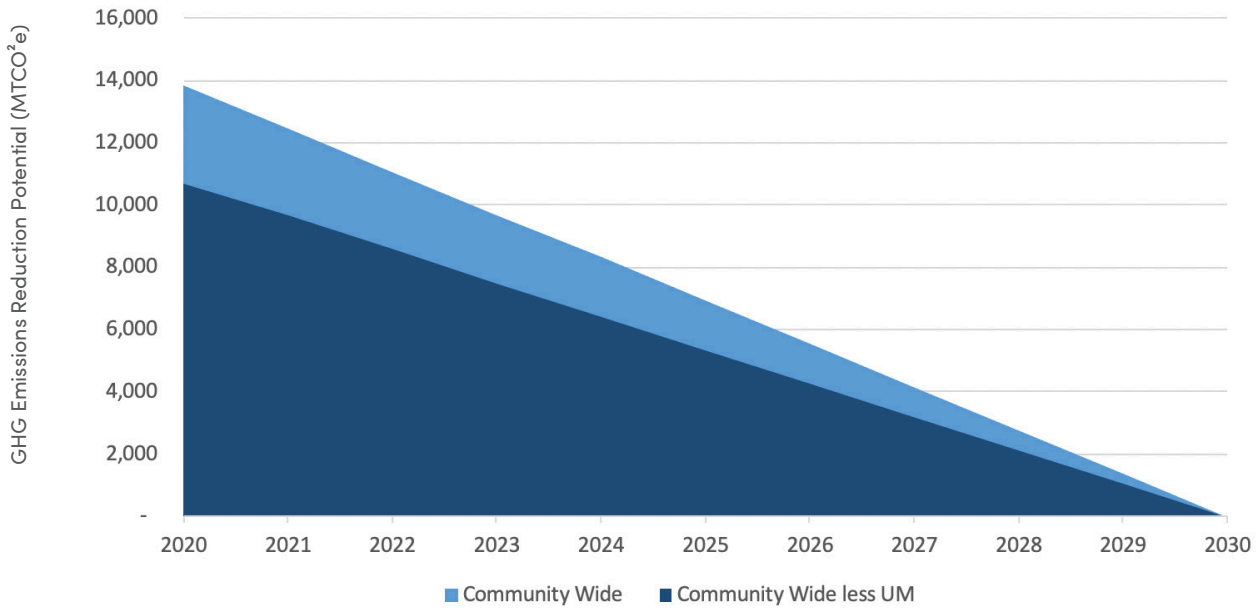


10,700 metric tons of carbon dioxide equivalent (0.5% of community-wide emissions) if TheRide buses are electrified. If the University of Michigan participates and also converts their buses, an additional 3,100 metric tons of carbon dioxide equivalent (0.1% of community-wide emissions) are also reduced. In total, 13,800 metric tons of carbon dioxide equivalent (0.6% of community-wide emissions)

By 2030, the **Electrify Buses** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the total emissions reduction potential of bus electrification (in light blue) assuming the community and University participate in the program. The dark blue shows the impact of bus electrification if only the community (not the University) participates in the program.

ELECTRIFY BUSES



3. SUPPORT COMMUNITY ELECTRIC VEHICLE AND SOLAR BULK BUYS

Group-buy programs increase the accessibility of EVs by allowing potential EV purchasers to take advantage of bulk purchase or lease discounts. In order to promote immediate EV purchases, group-buy programs are only offered for a limited time, typically a few months. Coupling EV group-buy programs with purchase programs for residential solar installation allows EV owners to reduce their EV charging costs, while helping the City of Ann Arbor transition towards clean, renewable energy. The program includes the creation of incentives for low-income residents to purchase off-lease or used EVs.

Vision for Supporting Community Electric Vehicle and Solar Bulk Buys

Residents and businesses in Washtenaw County can purchase new and used EVs at a discount of 10-15%. Local dealerships participate with their auto manufacturers to ensure ample EV stock is available on dealerships' lots and that their sales teams are educated about EVs. Residents are able to pair solar (through Solarize program) with EVs, which should significantly reduce the payback period for solar and the EV.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- DTE Energy
- Michigan Saves
- Energy Commission
- Transportation Commission
- Washtenaw Electric Auto Association
- Urban Sustainability Directors Network
- Local auto dealerships
- Major auto companies (OEMs)
- Plug In America's PlugStar program
- Smart Columbus Electrified Dealers program
- University of Michigan

Equity Impacts

We will explore offering bulk buys for EVs that are coming off leases, and offer bulk buys for e-scooters and e-bikes to ensure equitable and affordable options for all.

Indicators of Success / Goals

By 2030, 50% of all vehicles miles traveled are in electric vehicles.

Assumptions

- DTE Energy will continue partnering with the City
- OEMs will have enough cars to meet demand
- Reduced rates are available through the bulk buy
- The CCA purchase will help reduce new electricity demand from Ann Arbor EV owners

Target Demographic

Residents and local car dealership employees

Timeline and Initial Actions

2020

OSI and DTE Energy kick off a group buy program for City staff with one or two OEMs participating.

2021

OSI and DTE Energy expand the program to all DTE Energy customers in their service territory. The program also includes more OEMs and dealerships participating.

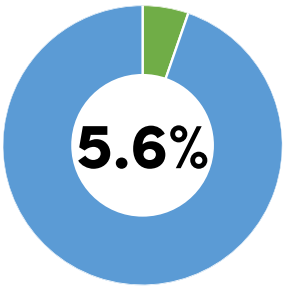
2022

OSI and DTE Energy expand the offering to include paired solar installations.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$700,000

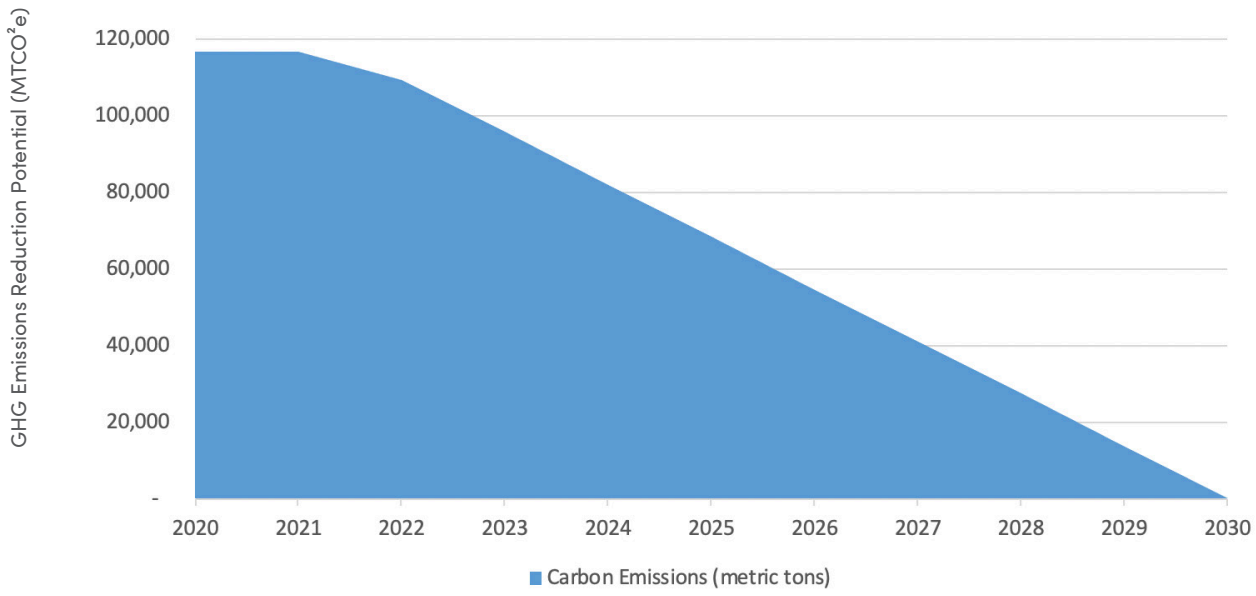
Greenhouse Gas Reduction Potential



122,900 metric tons carbon dioxide equivalent (5.6% of community-wide emissions)

By 2030, the **Support Community Electric Vehicle and Solar Bulk Buys** strategy will have achieved all of its potential greenhouse gas emissions reductions.

SUPPORT COMMUNITY ELECTRIC VEHICLE AND SOLAR BULK BUYS



4. ELECTRIFY CITY FLEET

In June 2017, City Council approved Resolution R-17-237, directing the City Administrator to update and revive the City's Green Fleets Policy, promote the purchase of plug-in electric vehicles, and incorporate updated best practices and lessons learned from peer municipalities. The Green Fleets Team (GFT) was given until the first quarter of 2020 to develop a plan for electrifying the City fleet by 2025. Because there are so many more electric vehicle options for light duty vehicles at this time, the GFT focused first on transitioning those and then on electrifying construction equipment and medium- and heavy-duty vehicles.

Vision for Electrifying City Fleet

By 2025, 90% of the City's fleet has transitioned to electric. The remaining 10% are pieces of medium- and heavy-duty vehicles and equipment that cannot be electrified.

Party Responsible for Implementation

- Fleets and Facilities Department, with support from the Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Green Fleets Team
- The Electrification Coalition
- Ecology Center

Equity Impacts

Improved local air quality for all.

Indicators of Success / Goals

By 2025, 90% of the City's fleet has transitioned to electric.

Assumptions

- EV market continues to grow and move into new market shares
- Electricity from the EVs is powered through CCA or onsite solar

Target Demographic

Ann Arbor City Employees

Timeline and Initial Actions

2020

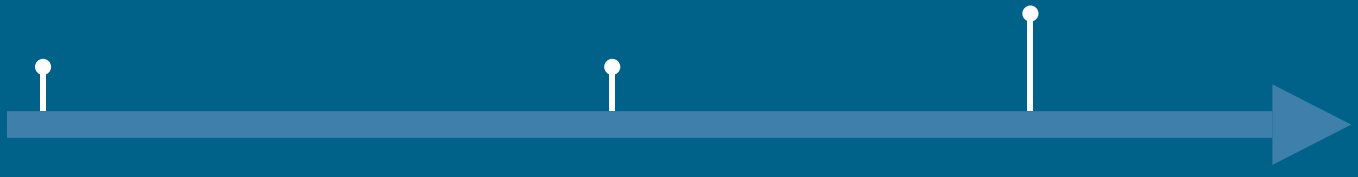
Municipal fleet electrification strategy complete and updated fleet replacement rates calculated.

2021

New fleet replacements rates integrated into the budget.

2025

90% of fleet is transitioned to electric.



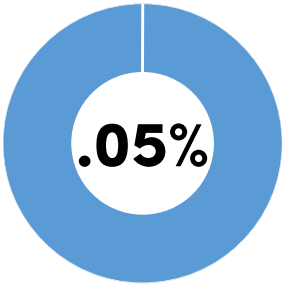
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$4,000,000

(only accounting for TheRide's electric buses)

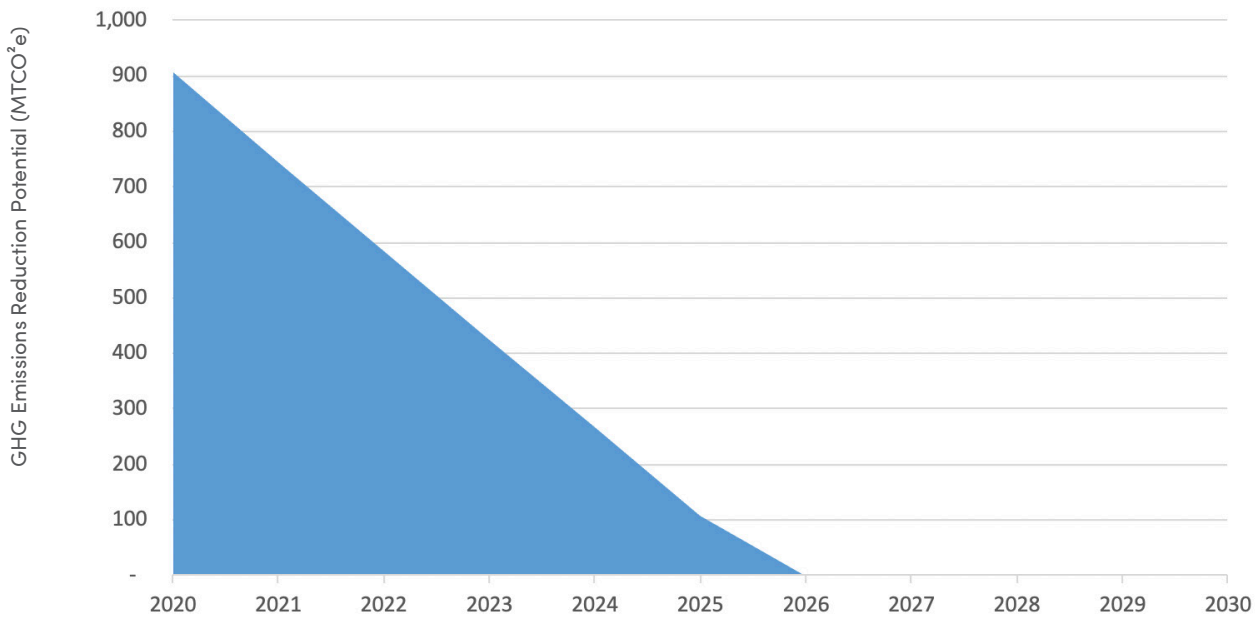
Greenhouse Gas Reduction Potential



1,100 metrics tons of carbon dioxide equivalent (0.05% of community-wide emissions)

By 2026, the **Electrify City Fleet** strategy will have achieved all of its potential greenhouse gas emissions reductions.

ELECTRIFY CITY FLEET



5. ELECTRIFY PRIVATE FLEETS

Programmatic support is offered, along with an ambitious outreach and education program, to support private companies with transitioning their fleets to electric. This includes working with the State and utilities to offer more rebates and incentive programs, and sharing information about existing rebates for charging.

Vision for Electrifying Private Fleets

Medium and large companies in Ann Arbor help the City meets its ambitious climate neutrality goal by transitioning their fleets to electric, encouraging their employees to drive EVs, and installing EV charging infrastructure. Ridesharing companies have agreed to franchise agreements which require that at least half of their fleets are EVs.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Equity Impacts

Improved local air quality for all.

Collaborators / Project Co-Designers

- DTE Energy
- The Electrification Coalition
- Ecology Center
- Washtenaw Electric Automobile
- Association
- Ann Arbor 2030 District
- Ceres
- DDA
- EGLE
- Employers in Ann Arbor with large fleets
- Ridesharing and ride hailing companies
- Delivery companies

Indicators of Success / Goals

By 2030, 50% of private fleets within the City are electric.

Assumptions

- Corporate fleets will encourage a transition to EVs
- The State and utilities will continue to provide incentives for fleet electrification

Target Demographic

Employees and owners of medium to large business in Ann Arbor

Timeline and Initial Actions

2021

Installation of 20 new level 2 EV chargers in each DDA parking garage and lot (using DTE Energy rebates).

2022

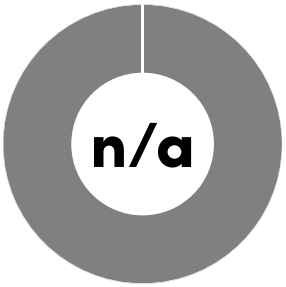
As needed, install more level 2 chargers in garages (75% cap for EV parking charging spots in any garage). Create new Direct Current Fast Chargers (DCFC) infrastructure for use by ride hailing companies, car sharing services, and the public (not fee based).

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$123,000

Greenhouse Gas Reduction Potential



The impact of this action was not calculated separately but included in the EV bulk buy action.

ELECTRIFY PRIVATE FLEETS

6. EXPAND ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

In the next three decades, electric vehicles (EVs) will replace internal combustion engine (ICE) vehicles as the dominant type of vehicles on the market. This action item aims to significantly increase electric vehicle charging infrastructure at parking lots and garages, park and ride lots, ride sharing spots, workplaces, and City facilities to support this transition.

Vision for Expanding Electric Vehicle Charging Infrastructure

Ann Arbor has plentiful EV charging infrastructure deployed to meet the needs of a burgeoning transition from ICE vehicles to EVs. While 80% of EV charging will continue to happen at home, public and workplace charging has expanded to fill in the remaining gaps.

Party Responsible for Implementation

- Office of Sustainability and Innovations, in partnership with Downtown Development Authority
- City's Engineering Department Transportation Group

Collaborators / Project Co-Designers

- State of Michigan (EGLE)
- Private businesses for workplace charging
- Property owners for multifamily charging
- Residents for home-based charging
- UM for campus charging
- Transportation Commission
- Ann Arbor 2030 District
- EV charger manufacturers and installers
- Affordable housing community
- Project developers for new housing and commercial projects
- DTE Energy

Equity Impacts

Placement of new EV chargers prioritizes renters in multifamily housing and street-side for residents who do not have a garage or driveway. Expanded public charging in garages and lots will ensure that some basic level of charging is available to all who need it.

Indicators of Success / Goals

10% of all public and private parking spaces are equipped with level 2 EV chargers and 2% with Direct Current Fast Chargers (DCFCs).

Assumptions

- 1,250 level two chargers are installed a year starting in 2021; each year 200 of these chargers are paid for through utility rebates
- 2 fast chargers are installed in the community each year; both are paid for through utility rebates
- Any additions to electrical capacity will be paid for separately
- New EV chargers will be prioritized for placement in low-income areas
- All additional electricity demand is integrated into the CCA

Target Demographic

Current and future EV owners who drive in Ann Arbor

Timeline and Initial Actions

2021

Installation of 20 new level 2 EV chargers in each DDA parking garage and lot (using DTE Energy rebates).

2022

As needed, install more level 2 chargers in garages (75% cap for EV parking charging spots in any garage). Create new Direct Current Fast Chargers (DCFC) infrastructure for use by ride hailing companies, car sharing services, and the public (not free to use)

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$42,000,000

Greenhouse Gas Reduction Potential

This action does not directly lead to greenhouse gas reductions but contributes to the ability of residents and businesses to invest in electric vehicles.

EXPAND ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

STRATEGY 3:

Significantly Improve the Energy Efficiency in our Homes, Businesses, Schools, Places of Worship, Recreational Sites, and Government Facilities

This strategy focuses on drastically improving the energy efficiency of our homes, businesses, schools, places of worship, government buildings, and recreational sites. To achieve this strategy, 11 specific actions have been identified:

1. Transition to More Energy Efficient Homes and Businesses
2. Update Building Codes
3. Power Street Lighting and Traffic Signals with LED
4. Benchmark and Disclose Energy Usage
5. Establish Loan Loss Reserve
6. Develop Energy Concierge and Community Engagement Program
7. Transition Affordable Housing Sites to Net Zero Energy
8. Promote Green Rental Housing Program
9. Launch Green Business Challenge
10. Support Aging in Place Efficiently
11. Expand Weatherization Program

Combined, these 11 actions are projected to reduce community-wide emissions by 13.4% and cost just over $14,500,000.

1. TRANSITION TO MORE ENERGY EFFICIENT HOMES AND BUSINESSES

As much as 80% of energy consumed in our buildings is wasted, through gaps in building envelopes or unnecessary operation of lights and electronics. Improving building envelopes with better insulation and windows, efficient lighting and appliances, and advanced heating and cooling systems can have a significant impact on the amount of energy our community uses to heat and cool our buildings. While energy efficiency improvements pay for themselves through energy savings over time, the upfront cost of installing them can be a barrier for many. Through a widespread, comprehensive group-buy program, the City of Ann Arbor can encourage and enable residents and businesses to procure energy efficiency products for a discounted price.

Vision for Transitioning to More Energy Efficient Homes and Businesses

Through a broad-reaching public engagement campaign, 80% of residents and businesses participate in energy efficiency group-buys, incentivized through discounts achieved through economies of scale. The campaign is inclusive, designed with input from the public and helps reduce energy use of participating buildings by 20%.

Party Responsible for Implementation

- Ann Arbor Building, Rental, and Inspection Services, with support from the Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Local contractors and energy efficiency financers, like Michigan Saves
- City of Ann Arbor Building, Rental, and Inspection Services
- Community liaisons, including neighborhood ambassadors
- Ann Arbor 2030 District
- DTE Energy

Equity Impacts

If coupled with the Green Rental Housing Policy, all rental housing in homes will be mandated to achieve energy efficiency standards as part of maintaining a rental license through the City.

Indicators of Success / Goals

85% of owner occupied homes, 80% of tenant occupied homes, and 80% of businesses achieve a 20% reduction in electricity usage and 15% reduction in natural gas usage by 2030.

Assumptions

- 85% of owner occupied homes are retrofitted and achieve a 20% electricity savings and 15% natural gas savings
- 80% of tenant occupied and commercial enterprises are retrofitted and achieve a 20% electricity savings and 15% natural gas savings

Target Demographic

This program reaches all homeowners, landlords, and businesses through targeted engagement strategies

Timeline and Initial Actions

2020

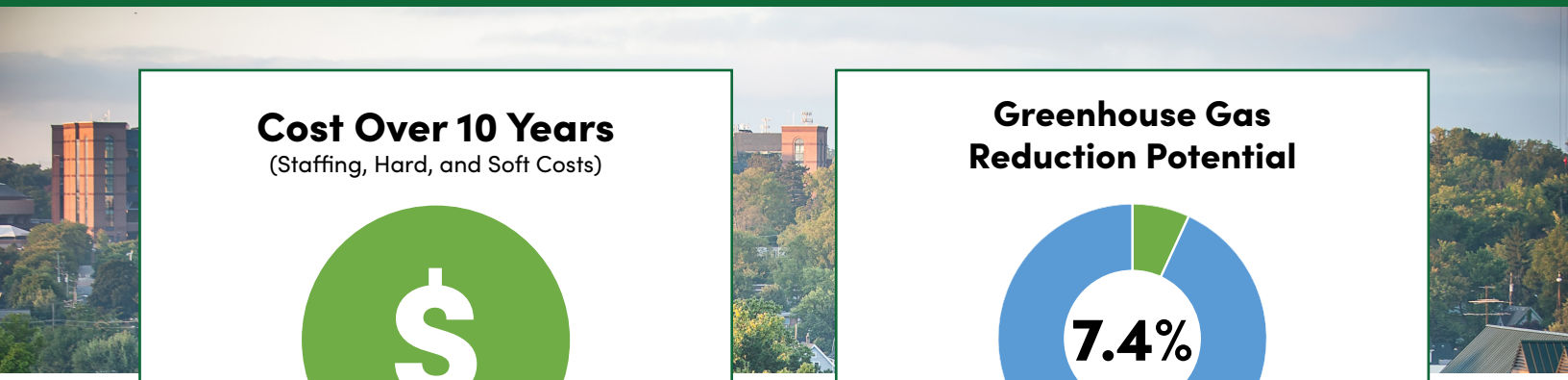
Program design and contractor outreach and education.

2021

Program launches and first bulk buy takes place. Participation steadily increases annually.

2030

85% of owner occupied homes, 80% of tenant occupied homes, and 80% of businesses have had an energy efficiency improvement.

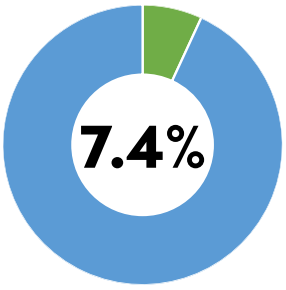


Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$950,000

Greenhouse Gas Reduction Potential



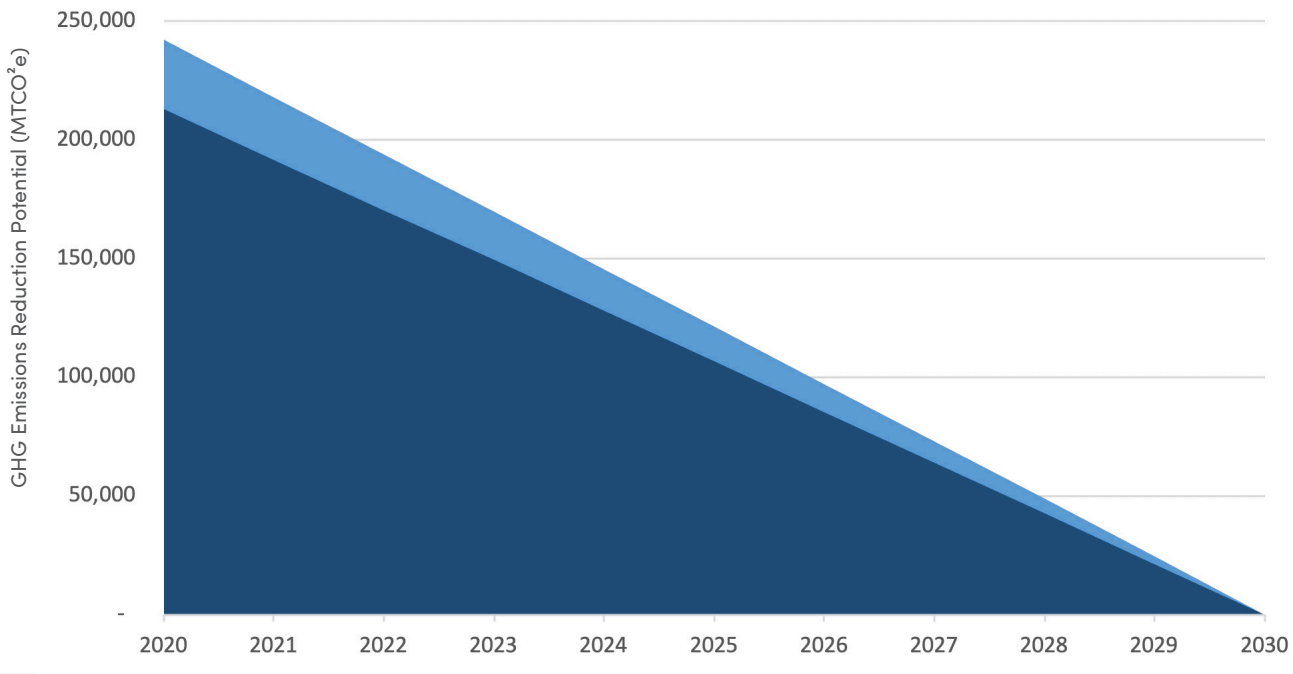
161,000 metric tons of carbon dioxide equivalent (7.4% of community wide emissions).

If the University of Michigan participates and achieves a 20% reduction in total energy usage, an additional 81,500 metric tons of carbon dioxide equivalent could be reduced, resulting in a total of 242,500 metric tons of carbon dioxide equivalent (11.1% of community-wide emissions).

By 2030, the **Transition to More Energy Efficient Homes and Businesses** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the total emissions reduction potential of efficiency initiatives (in light blue) assuming the community and University participate in the program. The dark blue shows the impact of efficiency initiatives if only the community (not the University) participates in the program.

TRANSITION TO MORE ENERGY EFFICIENT HOMES AND BUSINESSES



2. UPDATE BUILDING CODES

Buildings are the largest source of greenhouse gas emissions locally. Doing all we can to reduce their energy consumption and greenhouse gas emissions will have a significant impact on our ability to achieve carbon neutrality. In Michigan, local municipalities are constrained by the State's building code, meaning that efforts to advance more energy efficient and ideally net zero energy buildings will need to be done through changes in the State's building code. This action focused on working with the state to pass the 2021 building code and the zero code appendix so that all new developments and major renovations in Ann Arbor can be net zero energy.

Vision for Updating Buildings Codes

By 2030, through an update to the State's building code, all new buildings and major renovations have been built to net zero energy standards. Any and all growth in Ann Arbor is done so sustainably and equitably.

Party Responsible for Implementation

- Ann Arbor Building, Rental, and Inspection Services, with support from the Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- State of Michigan
- Developers and contractors

Equity Impacts

At first, primarily higher income residents will occupy the new buildings that will be more energy efficient. However, over the long term, all Ann Arborites will benefit from stronger building codes.

Indicators of Success / Goals

By the end of 2030, 2,120 residential units and 160 commercial units are net zero energy buildings.

Assumptions

- All new construction from 2022 through 2030 (and beyond) is built to net zero energy standards, which includes no natural gas consumption and all electricity usage offset through the CCA
- Annual growth rate of 265 housing units for residential, based on past growth rate of housing units per census data
- Annual growth rate of 21 units annually for commercial enterprises, based on past growth rate of commercial units per building permit data
- Does not include savings associated with renovations as those are calculated in other areas of this Plan

Target Demographic

Developers constructing new and renovating buildings

Timeline and Initial Actions

2020

Work with state and local partners to garner support for adopting the 2021 building code and zero code appendix.

2021

State adopts updated building code. City creates infrastructure to support developers, the construction community, electricians, and others in achieving the Code. City works with state on educational material and trains inspectors. Enforcement begins.

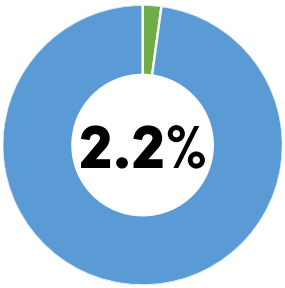
2022

City maintains administrative support to achieve code. Enforcement continues. City works with 2030 District to launch net zero energy districts.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$1,935,000

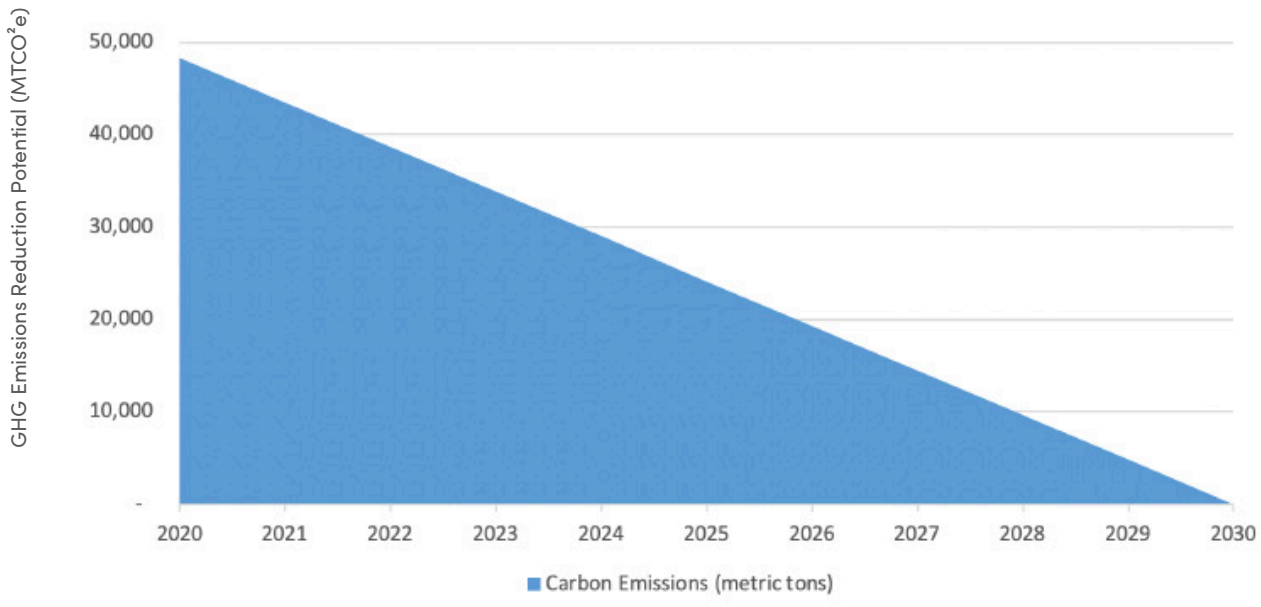
Greenhouse Gas Reduction Potential



48,300 metric tons carbon dioxide equivalent (2.2% of community-wide greenhouse gas emissions)

By 2030, the **Update Building Codes** strategy will have achieved all of its potential greenhouse gas emissions reductions.

UPDATE BUILDING CODES



3. POWER STREET LIGHTING AND TRAFFIC SIGNALS WITH LED

Lighting accounts for 15 percent of global energy use and a significant portion of municipal energy consumption in the form of lighting our streets for safety. The City has started converting streetlights in our community from conventional lights to LEDs, the most energy-efficient bulbs available. This can reduce energy usage by up to 70 percent, significantly reduce maintenance costs, and offer more control over when and how lights shine.

Vision for Powering Street Lighting and Traffic Signals with LED

By 2030 all of our community's public streetlights and traffic signals are LED.

Party Responsible for Implementation

- City of Ann Arbor Signs and Signals

Collaborators / Project Co-Designers

- Office of Sustainability and Innovations
- DTE Energy

Equity Impacts

Few equity issues except slightly increased pedestrian safety.

Indicators of Success / Goals

By 2029, all streetlights and traffic signals have been converted to LEDs.

Assumptions

- City will gain ownership of 2/3 of the streetlights currently owned by utility
- 60% kWh savings by replacing 4,467 lights with LED lighting; Average savings are between 50-70%
- City will replace all traffic lights with LED; 85% efficiency savings
- City will assess/identify opportunity to replace all crosswalk lighting with LED efficient lighting

Target Demographic

This action applies to municipal streetlights, crosswalks, and outdoor lighting

Timeline and Initial Actions

2020

The City initiates negotiations with DTE Energy about purchasing streetlights.

2021

City begins purchasing streetlights and replacing with LEDs. Traffic signals are replaced on a rolling basis.

2029

Replacement of streetlights and traffic signals complete.

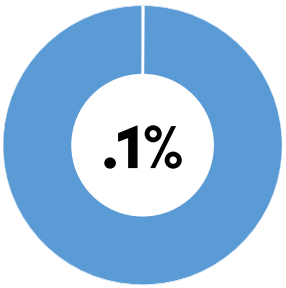
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$3,100,000

including the cost to purchase the assets from DTE Energy and finance the conversion to LEDs.

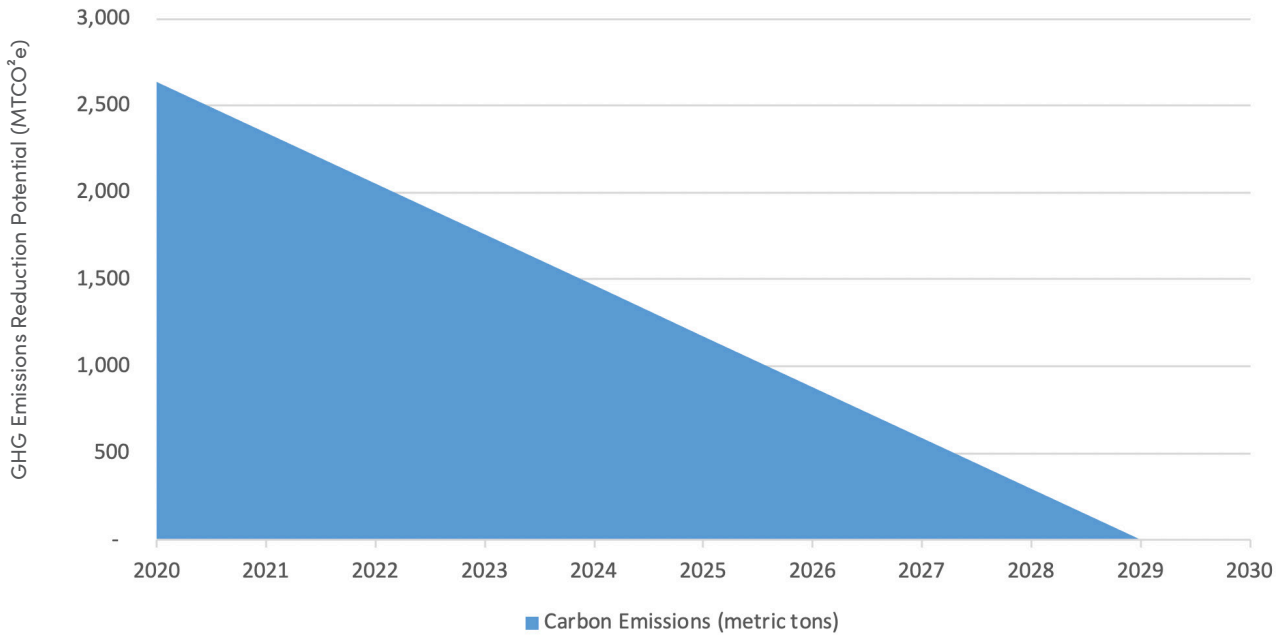
Greenhouse Gas Reduction Potential



2,600 metrics tons of carbon dioxide equivalent (.1% of community-wide emissions)

By 2029, the **Power Street Lighting and Traffic Signals with LED** strategy will have achieved all of its potential greenhouse gas emissions reductions.

POWER STREET LIGHTING AND TRAFFIC SIGNALS WITH LED



4. BENCHMARK AND DISCLOSE ENERGY USAGE

In order to understand our community's potential for and achievement of energy efficiency improvements, we need more granular information about how we use energy. Benchmarking, through the disclosure of energy usage, identifies where we can make the most significant impacts, and serves to motivate performance improvements.

Vision for Benchmarking and Disclosing Energy Usage

Through standardized energy audits and self-reporting, residents and businesses take ownership of their energy usage, and have worked towards significant energy improvements. Achievements have been recognized across sectors, and as a community we have reduced our energy usage by 20%.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Ann Arbor Information Technology Department
- Commercial property owners and tenant Real estate agents, brokers, and homeowners
- Energy auditors
- DTE Energy and Consumers Energy
- Ann Arbor 2030 District

Equity Impacts

Lower-income homeowners may suffer lower sales prices for their homes if they have inefficient homes. Rents may rise for highly efficient rental units, which may further exacerbate race and income disparities in the community.

Indicators of Success / Goals

Benchmarking requirements are passed, with 90% compliance by the residential, commercial, and institutional sectors by 2025.

Assumptions

- A back-end portal to automatically report energy usage is built between the utilities and the City
- Sufficient Code Enforcement staff exist to ensure compliance in the program
- Support resources are available to help building owners and tenants reduce energy after benchmarking; this initiative contributes to participation in other energy efficiency initiatives in this Plan

Target Demographic

Homeowners, landlords, businesses, and institutions

Timeline and Initial Actions

2021

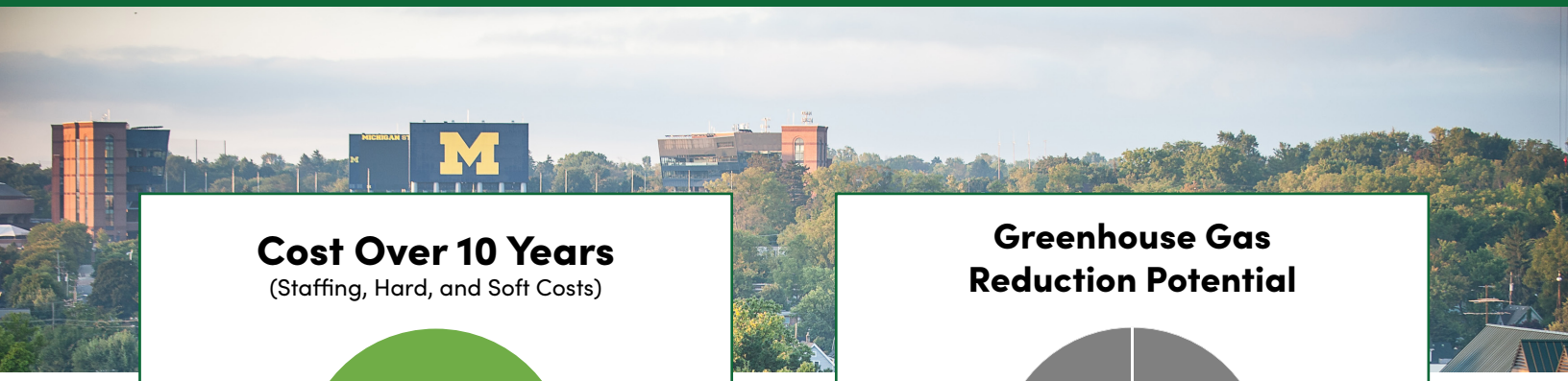
Design program. Conduct building inventory for all sectors. Create reporting platform, educate, and pilot.

2022

Fully administer the program. Continually revisit customer service support, enforcement, and program administration for areas of improvement.

2025

Achieve 90% compliance in the residential, commercial, and institutional sectors.



Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$

$2,370,000

Greenhouse Gas Reduction Potential

Not assumed to directly reduce greenhouse emissions but action is foundational for work.

BENCHMARK AND DISCLOSE ENERGY USAGE

5. ESTABLISH LOAN LOSS RESERVE

Well-designed renewable energy, energy efficiency, and electrification improvements pay for themselves over their lifetime. However, the upfront cost of installation can be a barrier to many, especially to those who cannot secure financing. The City of Ann Arbor proposes establishing a loan loss reserve to provide credit enhancements for residents with lower credit scores, expanding those who can finance energy efficiency, renewable energy, fuel switching, and electric vehicle purchases.

Vision for Establishing Loan Loss Reserve

All Ann Arborites can secure the financing they need, at a reasonable rate, to make the energy efficiency, renewable energy, and fuel switching activities needed to achieve carbon neutrality.

Party Responsible for Implementation

- Michigan Saves, with support from the Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Local and regional banks
- Ann Arbor Finance Department

Equity Impacts

Homeowners with lower credit scores will benefit from the City establishing a loan loss reserve. Banks and Michigan Saves can lower the minimum credit scores needed to qualify for loans to do energy efficiency and renewable projects.

Indicators of Success / Goals

By 2021, Ann Arbor has created a $1,000,000 loan loss reserve fund that enables lenders to loan to low-income residents to undertake energy efficiency and renewable energy improvements.

Assumptions

- $1,000,000 is placed into a loan loss reserve to initiate the program
- Average loan terms of 6% APR over 10 years
- The seed funding has a leverage ratio of 1:20
- 5% default rates

Target Demographic

Low-income residents

Timeline and Initial Actions

2020

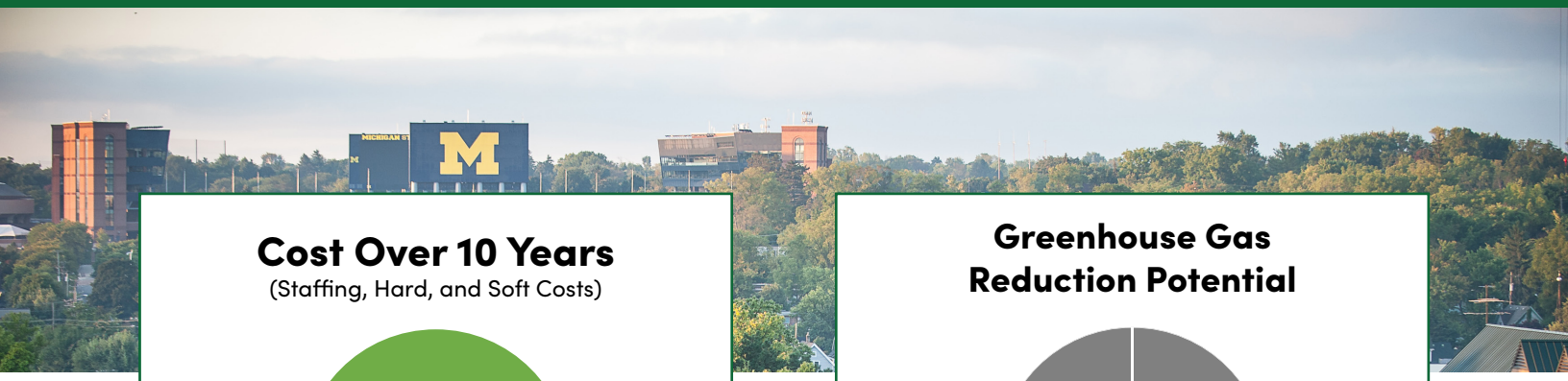
Meet with Michigan Saves to initiate concept. Work on program design and secure lenders.

2021

Launch loan loss reserve.

2022

Monitor progress and revise.



Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$1,578,000

Greenhouse Gas Reduction Potential

This action does not directly lead to greenhouse gas reductions but contributes to the ability of residents and small businesses with lower credit scores being able to access financing for energy efficiency, renewable energy, electrification, and other activities outlined in this plan.

ESTABLISH LOAN LOSS RESERVE

6. DEVELOP ENERGY CONCIERGE AND COMMUNITY ENGAGEMENT PROGRAM

Many of the actions proposed rely on effective, inclusive, and accessible community engagement programs to reach the required levels of participation to achieve carbon neutrality. The City of Ann Arbor proposes creating an easy to use energy concierge service to help residents and businesses understand the best, highest impact, and most affordable methods to carry out greenhouse gas reduction activities.

Vision for Energy Concierge and Community Engagement

It is 2030, and through an easy to reach energy concierge service and effective, widespread community education, we have reached our carbon neutrality goal. Efforts to install renewable energy, improve energy efficiency, and transition away from fossil fuels have been coordinated at both a community-wide and individual level to ensure that we use the least amount of energy possible.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Contractors
- Michigan Saves
- Solarize Coordinator
- DTE Energy

Assumptions

- Programs are highlighted through the concierge that serve all members of our community
- High levels of outreach achieved for all sectors of our community

Equity Impacts

Property owners, including owners of rental housing, will primarily benefit from this program. Low-income residents may benefit from programs targeted to help them achieve energy savings.

Indicators of Success / Goals

By 2025, the Energy Concierge has helped 2,500 Ann Arborites access energy-related program, funding, and support resources, leading to the implementation of activities that have reduced community-wide greenhouse gas emissions.

Target Demographic

This action is foundational to the entire carbon neutrality effort, and includes all Ann Arborites

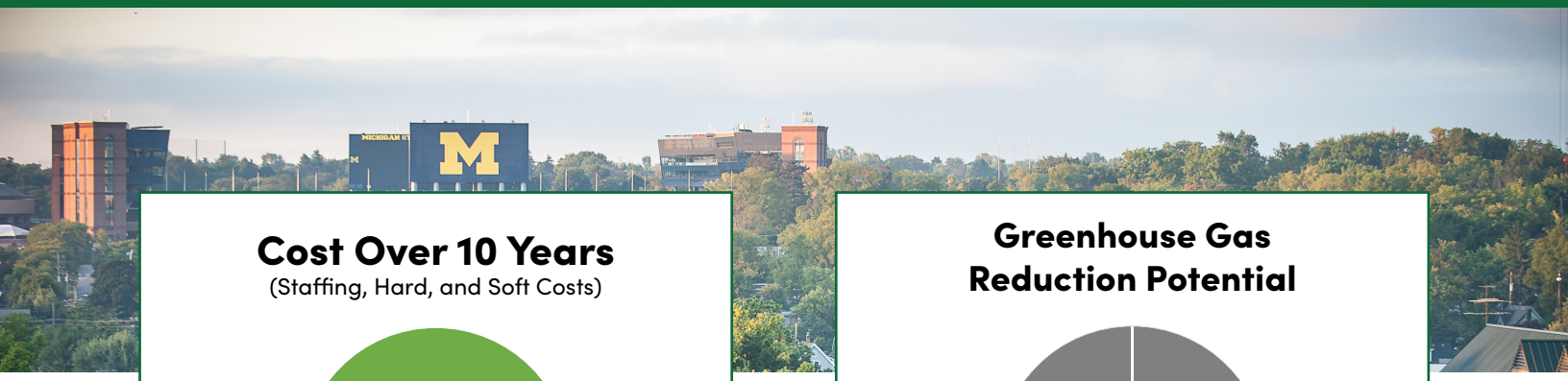
Timeline and Initial Actions

2021

The City develops an energy concierge and engagement program and soft launches

2022

The program continues to operate throughout the community even after carbon neutrality is achieved. The program is continuously improved based on community needs and emerging programs



Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$820,000

Greenhouse Gas Reduction Potential

This action does not directly lead to greenhouse gas reductions but contributes to the ability of residents and businesses to find, access, and implement energy efficiency, renewable energy, electrification, and other activities outlined in this Plan.

DEVELOP ENERGY CONCIERGE AND COMMUNITY ENGAGEMENT PROGRAM

7. TRANSITION AFFORDABLE HOUSING SITES TO NET ZERO ENERGY

Through a deep and collaborative partnership, the Office of Sustainability and Innovations and the Ann Arbor Housing Commission have been working to transition all existing and new affordable housing sites to net zero energy. These systems are also being designed to handle electric vehicle charging and battery storage.

Vision for Net Zero Energy Affordable Housing

Every affordable housing site in the City is net zero energy by 2030. Savings accrued through the program are directly invested in more programming for Housing Commission tenants and into more affordable housing sites.

Party Responsible for Implementation

- Office of Sustainability and Innovations, in partnership with Ann Arbor Housing Commission

Collaborators / Project Co-Designers

- UM Battery Lab
- Energy Contractors
- U.S. Housing and Urban Development
- DTE Energy

Equity Impacts

Ann Arbor Housing Commission funding that would have assisted in paying energy bills can be redirected to help meet Ann Arbor's annual affordable housing goals.

Indicators of Success / Goals

By 2030, every affordable housing site in the City is net zero energy.

Assumptions

- The Office of Sustainability and Innovations continues to provide $200,000 to support energy efficiency improvements and renewable energy at Housing Commission sites through 2021
- Starting in 2022 through 2025, the Office of Sustainability and Innovations provides $100,000 in direct support to the Housing Commission
- Fundraising is conducted to finance the rest of the energy improvements

Target Demographic

Those currently residing in affordable housing and those in need of affordable housing

Timeline and Initial Actions

2020

City continues partnership with AAHC to retrofit existing facilities to highest energy standards possible.

2021

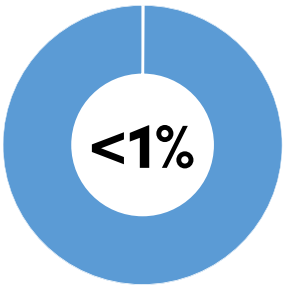
City seeks external funding to support more rapid transition of sites.

Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$800,000

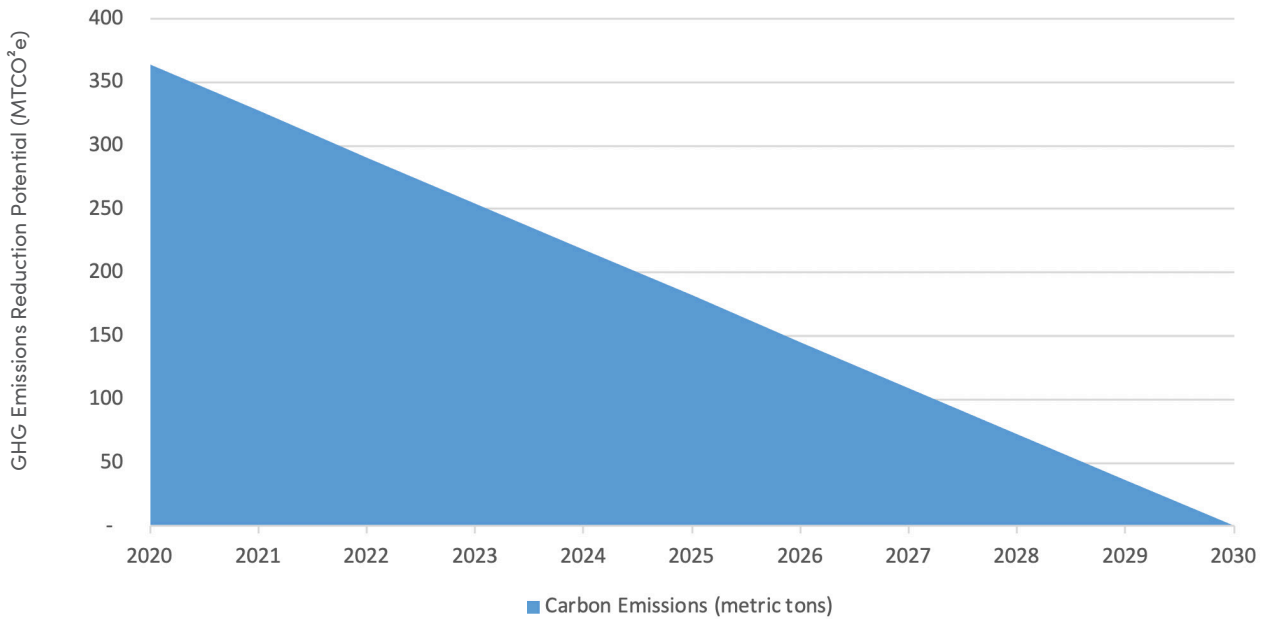
Greenhouse Gas Reduction Potential



400 metric tons of carbon dioxide equivalent (less than 1% of community-wide emissions)

By 2030, the **Transition Affordable Housing Sites to Net Zero Energy** strategy will have achieved all of its potential greenhouse gas emissions reductions.

TRANSITION AFFORDABLE HOUSING SITES TO NET ZERO ENERGY



8. PROMOTE GREEN RENTAL HOUSING PROGRAM

The Green Rental Housing Program improves energy efficiency and reduces greenhouse gas emissions associated with our rental buildings. Since rental units make up 55% of Ann Arbor's housing stock, actions in this area are vital to reducing greenhouse gas emissions. The Green Rental Housing program is accomplished by adding energy efficiency requirements into the existing City rental licensing process, thereby ensuring that every rental unit in Ann Arbor meets a minimum energy efficiency performance standard. Trainings, rebates, and financing support are provided as well to help transition rental units to greater efficiency.

Vision for Promoting Green Rental Housing Program

Renters are living in vastly more energy efficient homes and are saving on their energy bills and/or rents. Property owners are investing in the value of their properties and are seeing increased tenant retention and satisfaction.

Party Responsible for Implementation

- Office of Sustainability and Innovations and Community Services

Collaborators / Project Co-Designers

- Rocky Mountain Institute
- Urban Sustainability Directors Network
- University of Michigan's Beyond the Diag
- Washtenaw Area Apartment Association
- Michigan Saves
- DTE Energy

Equity Impacts

Renters in Ann Arbor may be able to rent more energy efficient homes as soon the ordinance goes into effect, and as more buildings become more energy efficient.

Indicators of Success / Goals

10% reduction in energy usage in rental properties within the City by 2030.

Assumptions

- We are able to integrate energy efficiency requirements into existing City rental licensing processes
- 80% compliance with the policy after the policy has been in effect for 4 years
- No net increase in average rents, outside of normal market inflation, 5 years post policy adoption

Target Demographic

Renters in Ann Arbor, with a special emphasis on low-income and student renters

Timeline and Initial Actions

2020

Stakeholder engagement and policy development commences.

2021

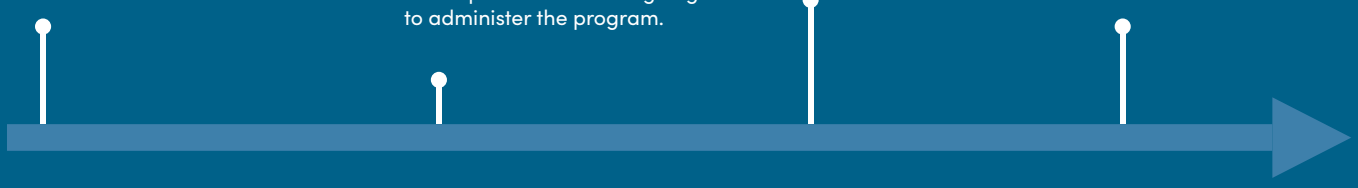
Policy brought forward and adopted by Council; workforce development and training begins to administer the program.

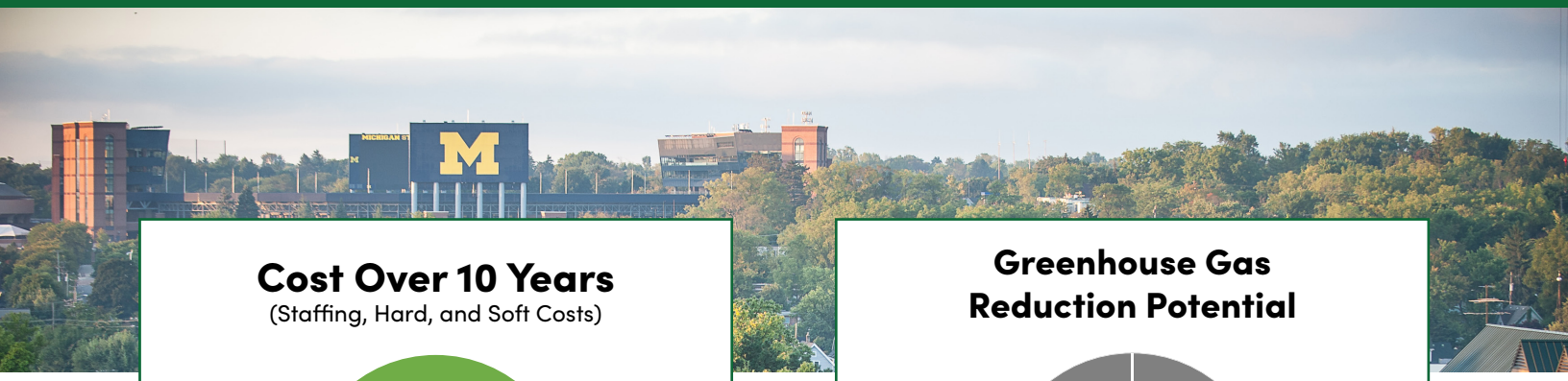
2022

Policy goes into effect.

2025

Policy reviewed and revised, if needed.





Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$530,000

Greenhouse Gas Reduction Potential

Impact of this action is included in other calculations.

PROMOTE GREEN RENTAL HOUSING PROGRAM

9. LAUNCH GREEN BUSINESS CHALLENGE

This action encourages our businesses to engage in more sustainable behaviors by providing technical assistance, guidance, and recognition to local businesses that voluntarily become more sustainable and lower their environmental footprint. At the core of the program are energy efficiency, renewable energy usage, waste reduction and material reuse, water reduction, and alternative transportation.

Vision for Launching Green Business Challenge

Ann Arbor businesses are some of the most sustainable in the nation, thanks in part to the City's Green Business Challenge. By providing incentives, guidance, and recognition for local businesses, the Green Business Challenge helped businesses lower their operating costs and reduce their environmental footprints. It has also increased support for the City's thriving small, medium, and large businesses.

Party Responsible for Implementation

- TheRide, with support from the Office of Sustainability and Innovations' Sustainability Analyst
- UM Transportation Department. with support from the Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Ann Arbor – Ypsilanti Regional Chamber of
- Commerce
- Ann Arbor SPARK
- Public Services
- DTE Energy
- Consumers Energy
- Ecology Center
- Huron River Watershed Council
- Michigan Saves
- Local banks
- Downtown Development Authority
- Ann Arbor 2030 District
- TheRide

Equity Impacts

Few equity impacts.

Indicators of Success / Goals

By 2025, participating businesses have reduced their energy consumption by 10%, increased waste diversion by 10%, reduced water consumption by 10%, and eliminated single-use plastics.

Assumptions

- 2030 District is a partner in educating and engaging/recruiting businesses
- 50 local businesses are participating by 2025

Target Demographic

Local businesses – initially those in the downtown but eventually any local business in town

Timeline and Initial Actions

2020

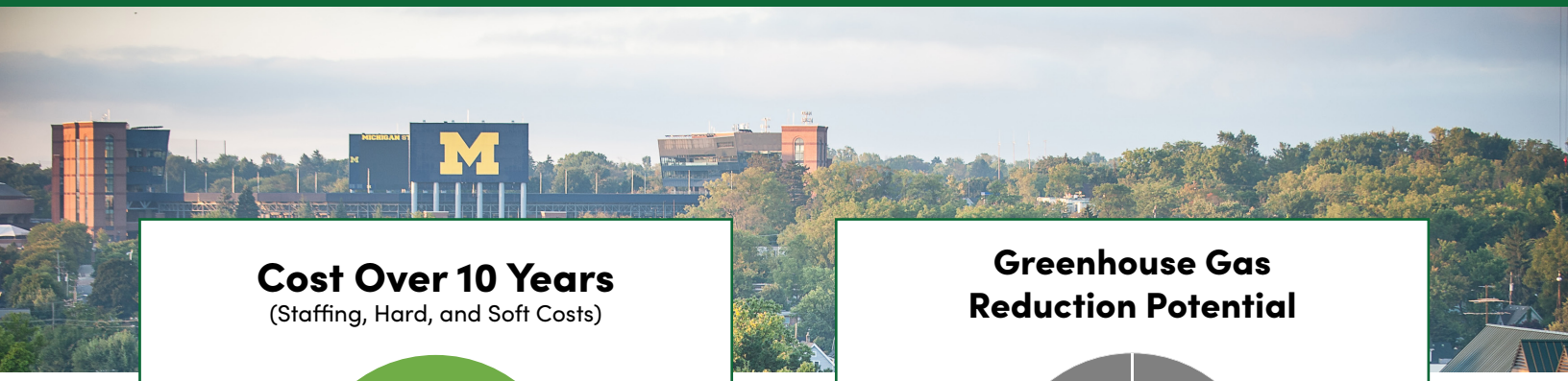
Launch Green Business Challenge stakeholder committee.

2021

Design the Challenge; recruit participants.

2022

Administer the first year of the Challenge.

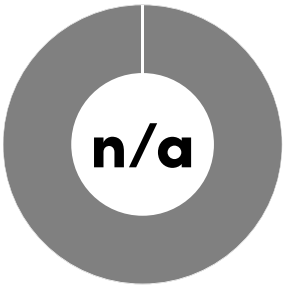


Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$700,000

Greenhouse Gas Reduction Potential



Impact of this action is included in other calculations.

LAUNCH GREEN BUSINESS CHALLENGE

10. SUPPORT AGING IN PLACE EFFICIENTLY

The Aging in Place Efficiently program helps low-income seniors age in a place of their choosing for longer by providing physical and energy efficiency improvements to their residences. More specifically, this program aims to integrate energy efficiency improvements into a wide variety of existing services available to seniors in our community.

Vision for Supporting Aging in Place Efficiently

It is 2035 and all low-income seniors in our community have healthier outcomes. Thanks to physical improvements to their homes and energy efficiency upgrades that reduce their monthly expenditures, they are able to age gracefully and stay in their homes longer.

Party Responsible for Implementation

- Office of Sustainability and Innovations
- Washtenaw County Department of Community and Economic Development
- Meals on Wheels

Equity Impacts

This program will provide expanded weatherization services to a broader segment of low-income senior citizens than the County program is allowed to currently serve.

Collaborators / Project Co-Designers

- Local aging organizations
- Energy efficiency experts
- Michigan Saves
- Dr. Tony Reames
- DTE Energy
- Housing Bureau of Seniors
- City Transportation Team
- TheRide

Indicators of Success / Goals

By 2023, at least 20 low-income seniors have reduced their energy bills by at least 15% and are recording improved quality of life thanks to improvements made in the program.

Assumptions

- Funding is secured through Partners for Places Grant
- Existing partners continue to engage in the initiative
- The model proves scalable and replicable throughout the City and region

Target Demographic

Low-income seniors

Timeline and Initial Actions

2020

Apply for external funding to initiate program. If successful, hire program assistant.

2021

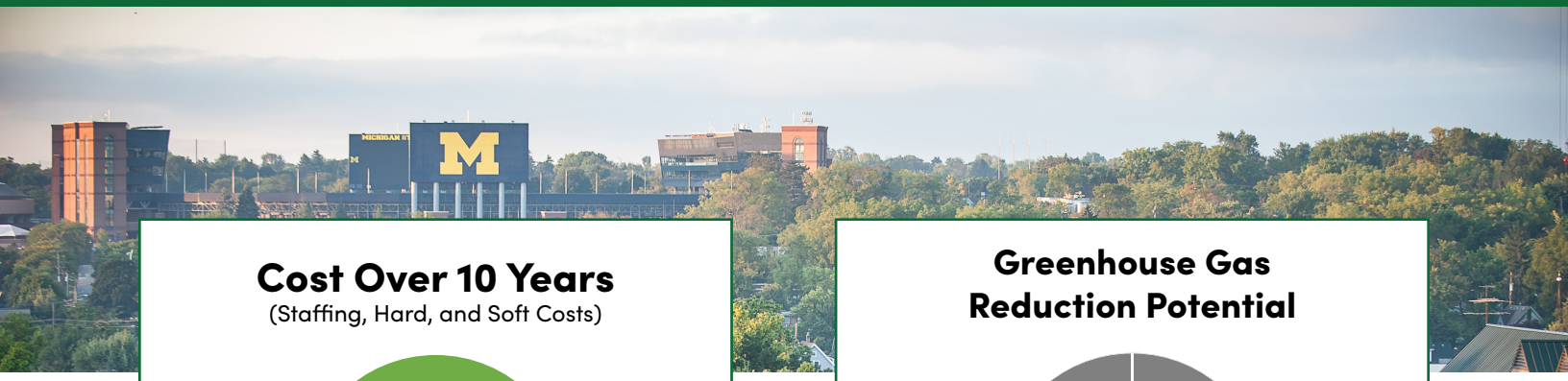
Pilot the program in Ann Arbor.

2022

Review, make revisions, and work with partners to expand in Ann Arbor and begin piloting throughout Washtenaw County.

2025

Program at full scale in the City and launched in the County.



Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$150,000

Greenhouse Gas Reduction Potential

n/a

Impact of this action is included in other calculations.

SUPPORT AGING IN PLACE EFFICIENTLY

11. EXPAND WEATHERIZATION PROGRAM

Washtenaw County and multiple nonprofits offer weatherization services to low-income homeowners in Ann Arbor. Weatherization is the practice of protecting a building and its interior from the elements, particularly from sunlight, precipitation, wind, and of modifying a building to reduce energy consumption and optimize energy efficiency. Through this program, the City of Ann Arbor will expand weatherization support so that more low-income homeowners can access these services.

Vision for Expanding Weatherization

By 2030, all low-income residents have been offered weatherization services.

Party Responsible for Implementation

- Washtenaw County Office of Community and Economic Development

Collaborators / Project Co-Designers

- Office of Sustainability and Innovations
- Michigan Saves
- Ann Arbor Meals on Wheels
- Habitat for Humanity
- DTE Energy
- Consumers Energy

Equity Impacts

This program will expand weatherization services to more low-income Ann Arbor homeowners than can be served by the County weatherization program.

Indicators of Success / Goals

By 2030, all low-income residents in the City have been offered weatherization services.

Assumptions

- Expansion of weatherization includes funding to support electrification of homes
- Contract is passed by Council to support program and administering of funds to County to implement

Target Demographic

Low-income residents in Ann Arbor

Timeline and Initial Actions

2020

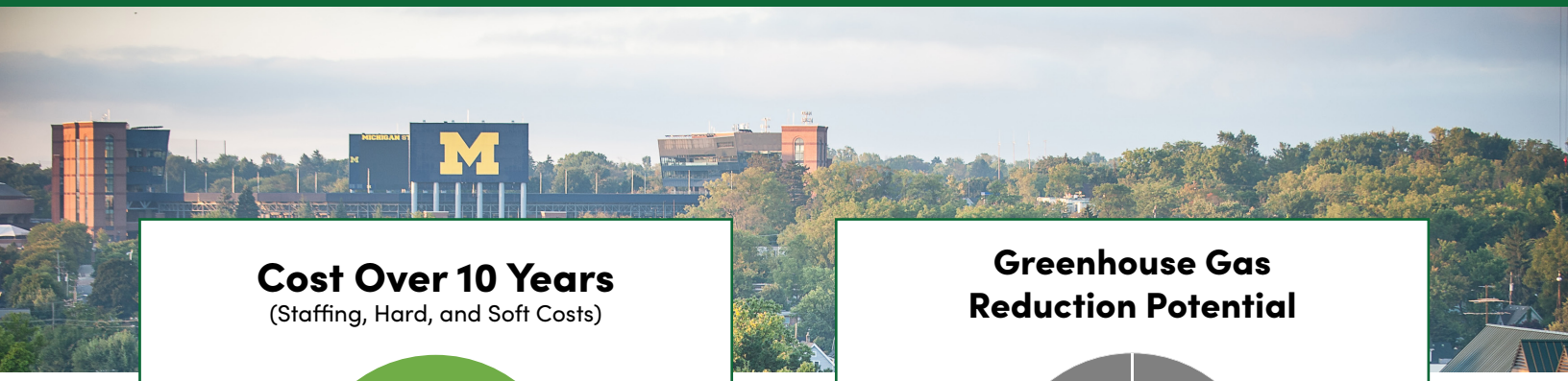
Background research into the number and needs of low-income homeowners in Ann Arbor; work with County Office of Community and Economic Development to design weatherization expansion program.

2021

Create operating agreements with Washtenaw County and pilot program.

2022

Review, make revisions, and work to serve more individuals in Ann Arbor.



Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$1,550,000

Greenhouse Gas Reduction Potential

Impact of this action is included in other calculations.

EXPAND WEATHERIZATION PROGRAM

STRATEGY 4:

Reduce the Miles we Travel in our Vehicles by at least 50%

This strategy focuses on reducing the miles we travel in our vehicles, regardless of type, by at least 50%. This is particularly important as emissions from transportation are on the rise, meaning that if we don't act to curtail this source, our greenhouse gas emissions reductions in other areas may be offset by gains in transportation-related emissions. To achieve this strategy, 7 specific actions have been identified:

1. Implement Non-Motorized Transportation Plan
2. Expand and Improve Local Transit
3. Expand and Improve Regional Transit
4. Increase Number of Park and Rides and Ensure Seamless Connection to Transit
5. Increase Diversity of Housing
6. Establish Mixed-Use Neighborhoods
7. Tiered Parking Rates

Combined, these seven actions are projected to reduce just over 8% of community-wide emissions and cost just over $901,000,000 due to mainly physical infrastructure costs.

1. IMPLEMENT NON-MOTORIZED TRANSPORTATION PLAN

The City's Non-Motorized Transportation Plan was designed to ensure an interconnected network of options to achieve 25% of in-city trips through non-motorized transit. New infrastructure such as sidewalks, road crossings, separated bike lanes, streetlights, traffic devices, and connections between public transit and active transport modes will be needed to achieve this goal, which strongly overlaps with the A²Zero initiative.

Vision for Implementing Non-Motorized Transportation Plan

All Ann Arbor residents, employees, students, and visitors have safe, convenient, and enjoyable choices to move around the City, whether by foot, bicycle, or other self-propelled modes.

Party Responsible for Implementation

- Ann Arbor Engineering Department Transportation Team, with support from Ann Arbor City Council

Collaborators / Project Co-Designers

- Transportation Department
- Transportation Commission
- Planning Commission (Capital Improvement Plan)
- Downtown Development Authority
- Ann Arbor Area Transit Authority
- Michigan Department of Transportation
- Washtenaw Bicycling and Walking Coalition
- University of Michigan
- Smart City group
- Private micromobility companies
- Private employers

Equity Impacts

Residents who cannot afford to buy and maintain private automobiles often bike, walk, or travel by micromobility modes. Investing in new infrastructure will enable those already using non-motorized modes of travel to have safer, more convenient, and faster trips. These investments will also encourage more residents to travel by bike or foot. However, pedestrians and cyclists are often vulnerable road users, and have faced increasing injuries and deaths from traffic collisions. Safe, ubiquitous infrastructure is needed.

Indicators of Success / Goals

By 2030, 25% of in-city trips are conduct by walking or bicycling thanks to ubiquitous and safe infrastructure.

Assumptions

- 25% of in-city trips are done with bicycling and walking
- These trips are in-city trips only
- 5 miles of new bike lanes installed per year – the majority are protected
- At least 5 major mid-block crosswalks and 2 minor mid-block cross-walks installed per year
- 90% of sidewalk gaps are filled by 2030

Target Demographic

Implementing the Non-Motorized Transportation Plan will primarily benefit pedestrians and bicyclists, although the increased safety and access to infrastructure will also reduce vehicle collisions. Drivers will also benefit from less congested streets as people switch to walking and biking

Timeline and Initial Actions

2020

Continue implementing elements on the Non-Motorized Plan. Finalize the VisionZero Transportation Plan update.

2021

Continue hosting public meetings to understand weaknesses in current infrastructure and opportunities for improvement.

2026

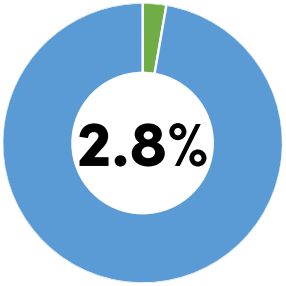
Full implementation of the Non-Motorized Transportation Plan.

Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$2,400,000

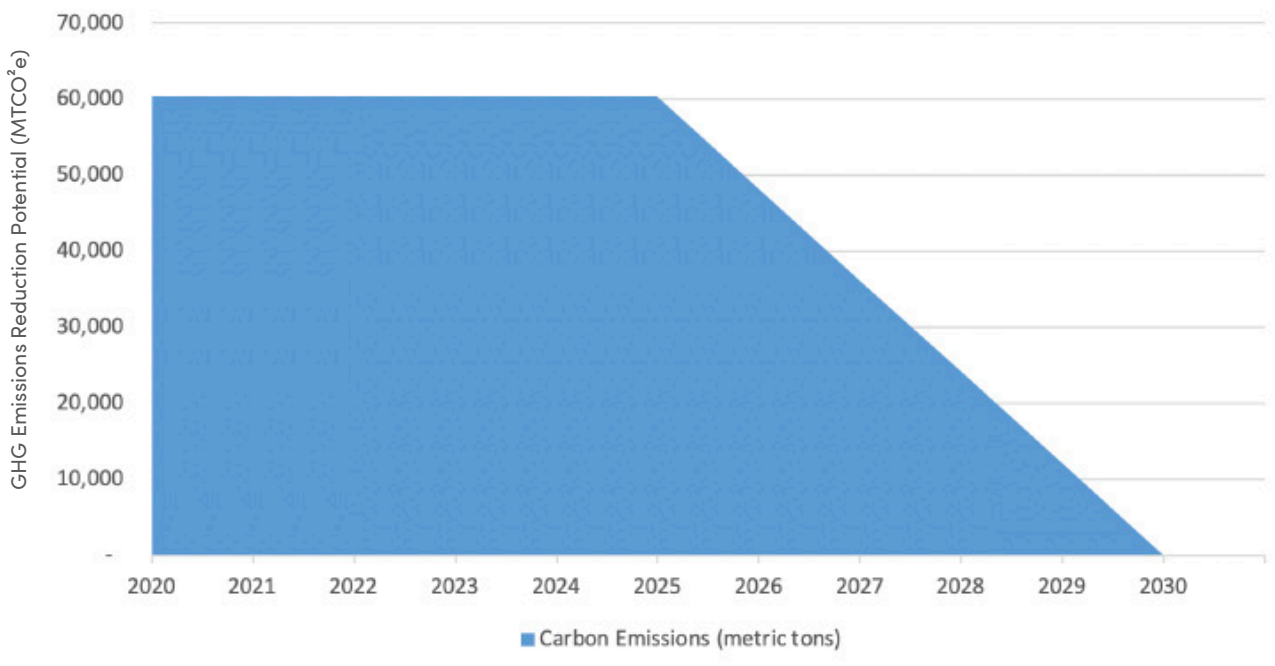
Greenhouse Gas Reduction Potential



60,400 metric tons carbon dioxide equivalent (2.8% of community-wide emissions).

By 2030, the **Implement Non-Motorized Transportation Plan** strategy will have achieved all of its potential greenhouse gas emissions reductions.

IMPLEMENT NON-MOTORIZED TRANSPORTATION PLAN



2. EXPAND AND IMPROVE LOCAL TRANSIT

An extremely common theme during public outreach was the need to expand and improve local transit services. Ideas suggested included longer service, new service routes, dedicated bus lines and bus rapid transit along major transportation corridors, and expanding the Get Downtown Program to companies outside of downtown. This action focuses on how we can expand and improve transit service with the aim of significantly increasing ridership.

Vision for Expanding and Improving Local Transit

By 2030, ninety-five percent of Ann Arbor residents have access to transit within a 10 minute walk with frequencies of 20 minutes or faster. This leads to residents taking transit for 40% of their journeys to work. This extensive transit service is powered with electric vehicles, all fueled with renewable energy.

Party Responsible for Implementation

- Ann Arbor Area Transit Authority, with support from the Regional Transit Authority of Southeast Michigan

Collaborators / Project Co-Designers

- Ann Arbor Transportation Commission
- Southeast Michigan Council of Governments (SEMCOG)
- Washtenaw Area Transportation Study (WATS)
- Federal Transit Administration (FTA)
- Senator Stabenow, Senator Peters, and
- Congresswoman Dingle
- Downtown Development Authority (DDA)
- University of Michigan
- Michigan Department of Transportation (MDOT) SPARK
- Ann Arbor 2030 District
- Ann Arbor Engineering Department
- Transportation Team
- Private employers

Target Demographic

All residents of Ann Arbor

Equity Impacts

Those who stand to benefit the most are those who may not have access to many forms of transportation due to disability, age, or income. The entire community can become economically stronger and more resilient from investments such as improved transit since investments in public transportation generate 31 percent more jobs per dollar than new construction of roads and bridges. Since property values tend to increase with new transit investments which would directly benefit property owners, it is important to find ways of keeping fares low for these new services so low-income residents are not disproportionately burdened by these improvements.

Indicators of Success / Goals

Residents take transit for 40% of their journeys not done through walking and biking.

Timeline and Initial Actions

2020

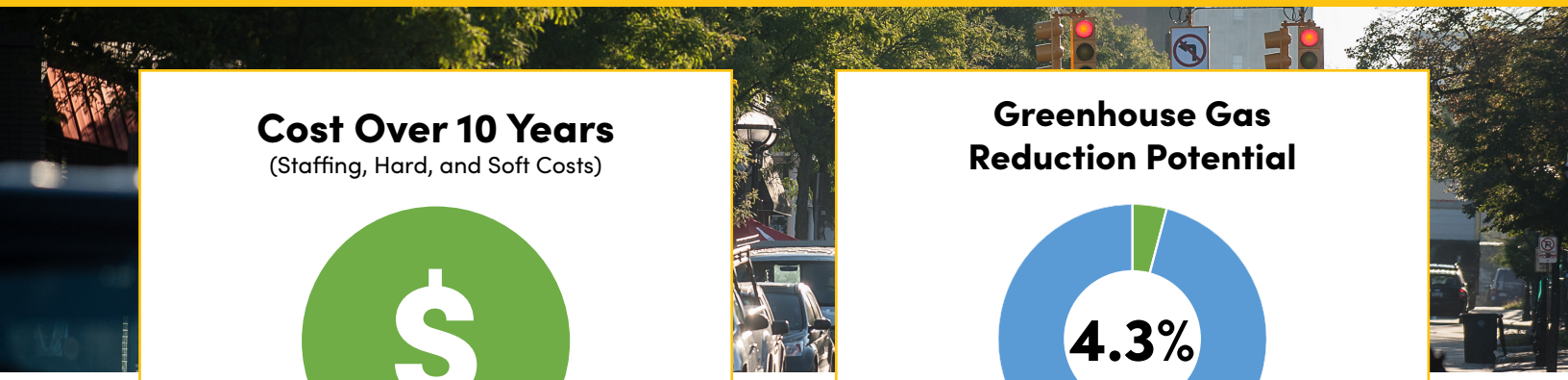
Vision Zero Transportation Master Plan is finished and adopted by Council. Work with AAATA to include bus rapid transit, electric buses, and solar, in millage renewal.

2021

The Get Downtown Program is expanded to include all businesses with more than 20 employees in Ann Arbor, and also to Ann Arbor residents who ae not working for a participating company.

2030

Bus Rapid Transit is built along transportation corridors.

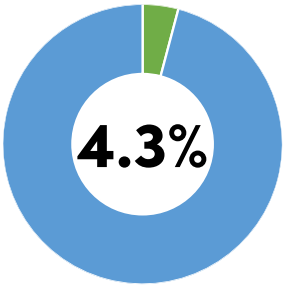


Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$656,780,000

Greenhouse Gas Reduction Potential



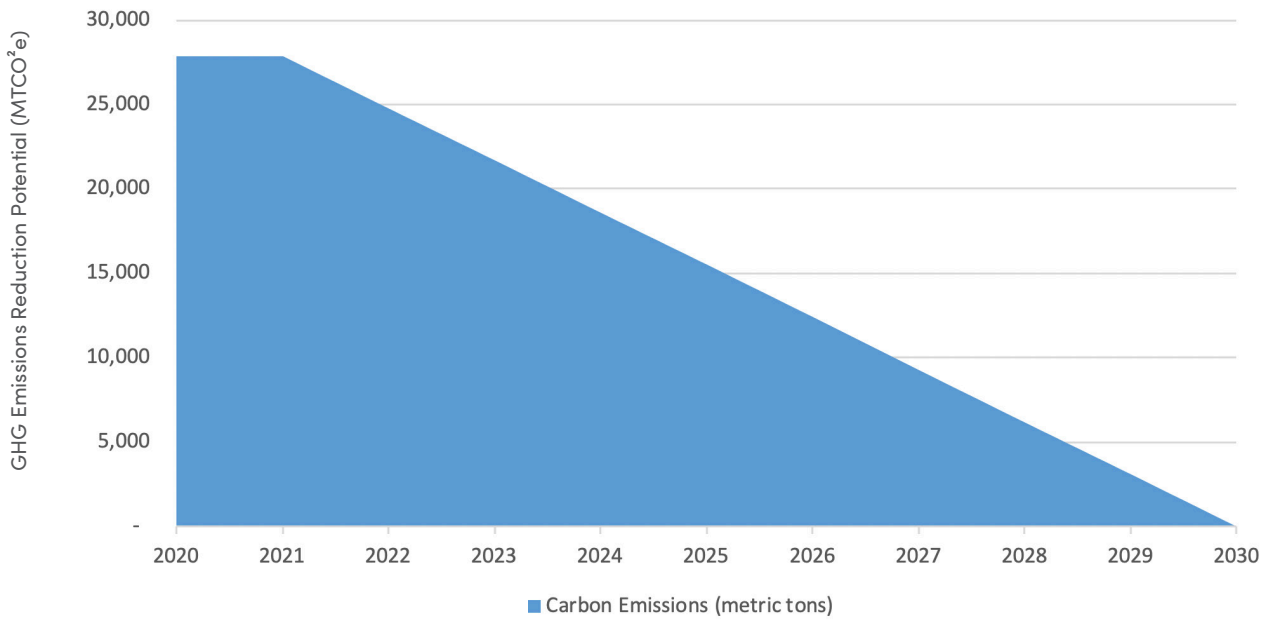
93,200 metric tons carbon dioxide equivalent (4.3% of community-wide emissions).

Assumptions

- Quadrupling of current bus ridership, with the average of 3.5 miles per trip
- Includes costs of new bus rapid transit lines
- Weekday bus rapid transit trips are assumed to run along routes of roughly 8 miles, for 5 days a week, or 48 weeks
- Weekend bus rapid transit trips are assumed to run along routes of roughly 8 miles, for 2 days a week,
- for 52 weeks
- Includes 22 queue jump facilities for regular buses
- Includes stop amenities and signal priority equipment for priority corridors
- Only calculates emissions reductions starting at the border of Ann Arbor (note: staff are working to gather comprehensive origin and destination data to update these figures)
- 2 new electric buses a year for 10 years added to the fleet to expand service

By 2030, the **Expand and Improve Local Transit** strategy will have achieved all of its potential greenhouse gas emissions reductions.

EXPAND AND IMPROVE LOCAL TRANSIT



3. EXPAND AND IMPROVE REGIONAL TRANSIT

Upwards of 80,000 individuals commute into Ann Arbor on any given day for work, school, or recreation. Regional transit service can help significantly reduce these numbers, thereby decongesting roads, improving local health, and reducing stress. Regional transit service into and from Plymouth, Jackson, Detroit, Brighton, Ypsilanti, and Ypsilanti Township are the areas prioritized at this time.

Vision for Expanding and Improving Regional Transit

By 2030, a high capacity transit and express transit system exists that connects Ann Arbor with nearby jurisdictions such as Detroit, Ypsilanti, Chelsea, and Brighton. Twenty-five percent of commuter trips into and out of Ann Arbor occur through these highly effective regional transit services.

Party Responsible for Implementation

- Ann Arbor Area Transit Authority, with support from the Regional Transit Authority of Southeast Michigan

Collaborators / Project Co-Designers

- Engineering Department Transportation Group
- Washtenaw, Oakland, and Wayne counties and the cities and townships in those counties
- Ann Arbor Transportation Commission
- Southeast Michigan Council of Governments
- Washtenaw Area Transportation Study (WATS)
- Federal Transit Administration
- Federal Railroad Administration WATCO
- Senator Stabenow, Senator Peters, and
- Congresswoman Dingell
- University of Michigan
- Michigan Department of Transportation

Equity Impacts

High capacity regional transit and express transit will primarily benefit commuters to and from Ann Arbor. Such service would broaden opportunities and access to jobs for those without access to other forms of transportation. Quality regional transit can also attract occasional riders and all-purpose riders who find it desirable to take transit to and from Ann Arbor to avoid traffic, parking fees, and the hassles of driving. It will be important to ensure that low-income riders have convenient and affordable access to expanded transit opportunites.

Indicators of Success / Goals

By 2030, 25% of the regional commuting trips into the City are done via regional transit options.

Assumptions

- Bus rapid transit lines are created and can be utilized by regional transit lines
- The average regional trip is 8 miles or less, running 5 days a week for 48 weeks
- 25% of the commuter trips will be taken by regional transit
- Includes calculations related to supporting more work from home programs. Estimated 5% participation
- rate for those with a one-way commute of 10 miles or less and a 10% participation rate for those with a
- one-way commute of 11 miles or more.

Target Demographic

Regional transit will primarily benefit people who work or school in Ann Arbor and the jurisdictions where transit stops exist

Timeline and Initial Actions

2020

Work with AAATA to include bus rapid transit, electric buses, and solar, in millage renewal. Regional transit to Detroit is established.

2021

Regional transit to surrounding municipalities is established.

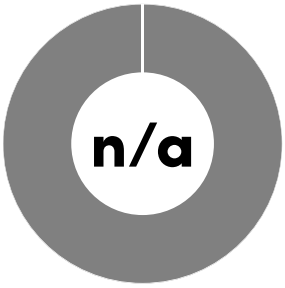
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$

The majority of costs for this action are covered in other actions.

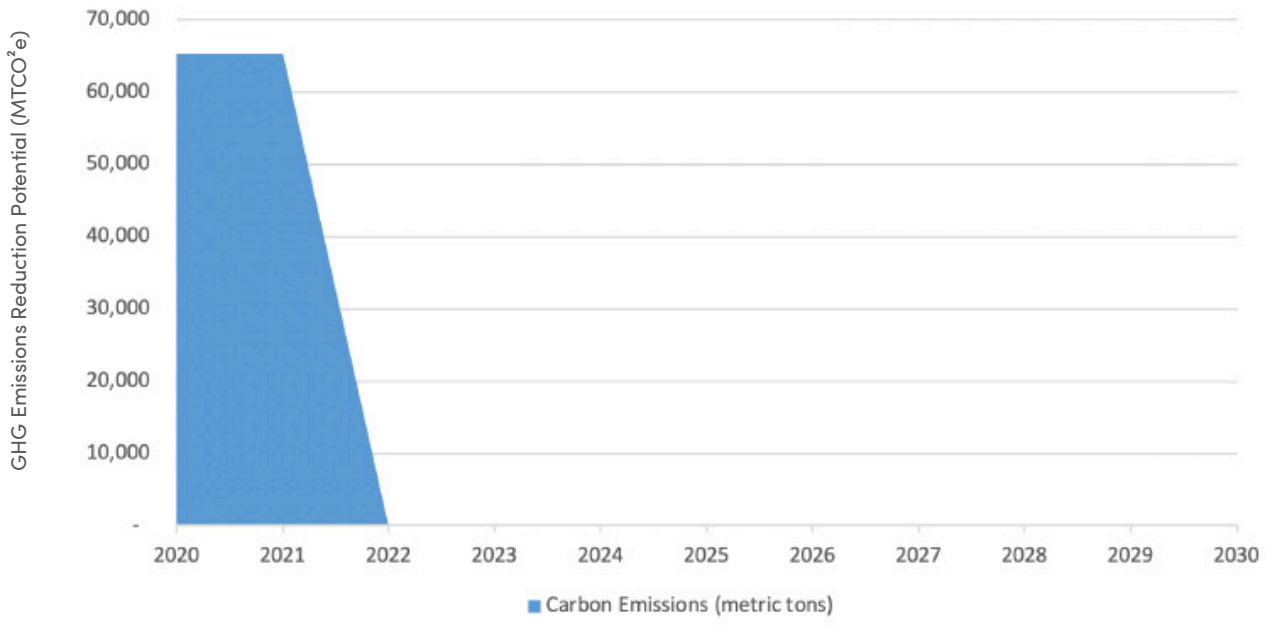
Greenhouse Gas Reduction Potential



The greenhouse gas reduction potential of this action in captured in other actions

By 2022, the **Expand and Improve Regional Transit** strategy will have achieved all of its potential greenhouse gas emissions reductions.

EXPAND AND IMPROVE REGIONAL TRANSIT



4. INCREASE NUMBER OF PARK AND RIDES AND ENSURE SEAMLESS CONNECTION TO TRANSIT

More than 80,000 individuals commute into the City every day for work, school, or recreation. Intercepting people as soon as they arrive and diverting vehicular traffic to park and rides that provide electric vehicle charging and seamless connection to public transit so they can rapidly get to where they need to go is an important component of reducing vehicular miles traveled in the city. Right now, there are just over 1,300 available free Park and Ride parking spaces. We propose at least a 10x increase in the number of spots to reduce in-city traffic.

Vision for Increasing Park and Rides with Seamless Connection to Transit

Through a significant increase in park and ride infrastructure that is seamlessly connected to transit, we have displaced 25% of commuter trips into the City.

Party Responsible for Implementation

- Michigan Department of Transportation with support from the Ann Arbor Area Transit Authority

Collaborators / Project Co-Designers

- Engineering Department Transportation Group
- Downtown Development Authority
- Washtenaw Area Transportation Study
- Employers
- Transportation

Equity Impacts

Park and Rides primarily benefit commuters coming into Ann Arbor, including low-income residents of nearby towns. Parking at Park and Rides would remain free, which would save drivers money, as compared to paying for parking downtown.

Indicators of Success / Goals

By 2030, commuter trips from the border of the City to their destination within the City has declined by 25%.

Assumptions

- 10x more parking spots are provided at park and rides; These spots are free
- Increased transit ridership accounted for in other actions
- Integrates demand management programs such as carpooling and ridesharing

Target Demographic

Transit riders, bicyclists, pedestrians, and car drivers would all benefit from reduced traffic congestion in the downtown core and by major work and educational centers

Timeline and Initial Actions

2020

Initiate planning for desired park and ride locations.

2021

Begin working with MDOT to acquire necessary properties and fundraise for infrastructure costs.

2023

Begin building new park and ride lots.

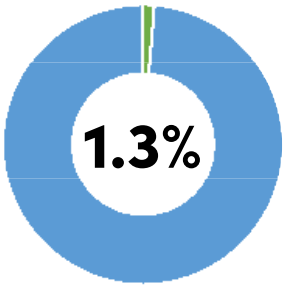
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$170,000,000

(Note: This does not include the costs to purchase the land on which park and rides will reside)

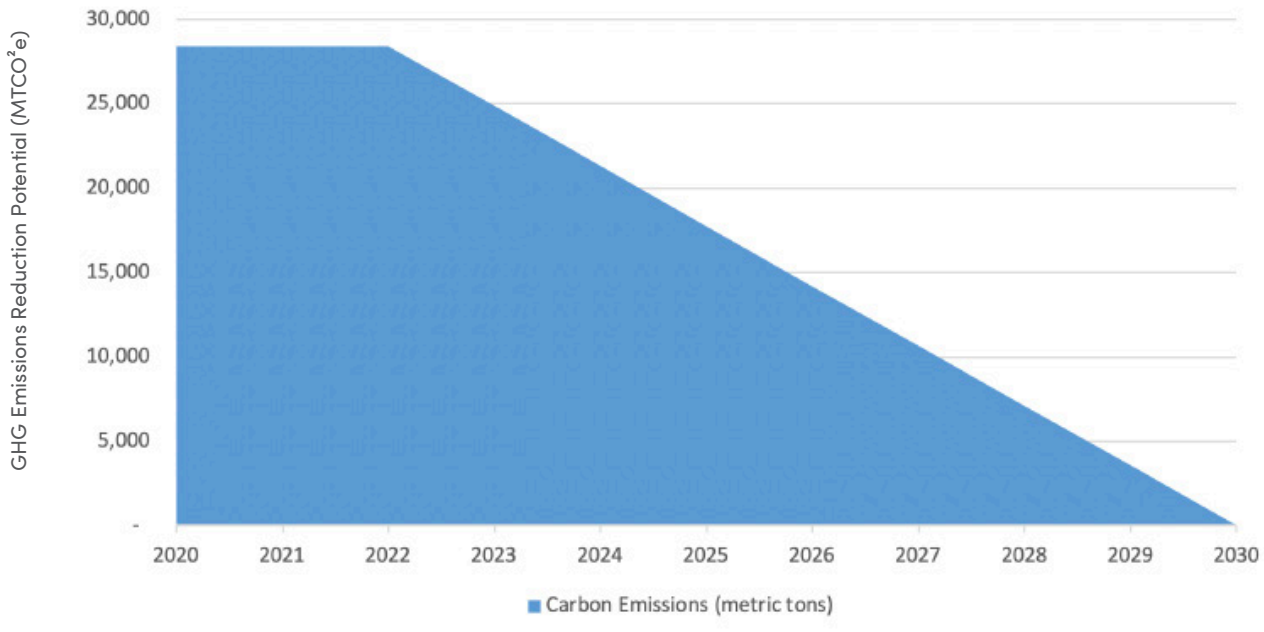
Greenhouse Gas Reduction Potential



28,400 metric tons carbon dioxide equivalent (1.3% of community-wide emissions).

By 2030, the **Increase Number of Park and Rides and Ensure Seamless Connection to Transit** strategy will have achieved all of its potential greenhouse gas emissions reductions.

INCREASE NUMBER OF PARK AND RIDES AND ENSURE SEAMLESS CONNECTION TO TRANSIT



5. INCREASE THE DIVERSITY OF HOUSING

This action focuses on supporting policies to increase housing opportunities within the City. This action was identified numerous times as a way to reduce greenhouse gas emissions, diversify housing options, and address affordability concerns. Overall, this action focuses on increasing the walkability and livability of neighborhoods while creating more accessible housing to a wider array of community members.

Vision for Increasing the Diversity of Housing

Ann Arbor neighborhoods grow slightly while maintaining their character and charm. Ann Arbor begins meeting its goal for reducing single occupancy trips by half while making notable progress toward providing more accessible and afforable housing.

Party Responsible for Implementation

- Ann Arbor Planning Department, with support from the Planning Commission and City Council

Collaborators / Project Co-Designers

- Office of Sustainability and Innovations
- Ann Arbor Housing Alliance
- Ann Arbor Historic District Commission

Equity Impacts

Allowing, multi-units and promoting ADUs will benefit renters, lower-income residents, in-commuters, and project developers. Reduced income disparity benefits all of Ann Arbor, both socially and economically.

Indicators of Success / Goals

2,000 new units of residential multi-family or ADUs are built in residential neighborhoods by 2030.

Assumptions

- City Council will approve an updated Comprehensive Master Plan
- 7-10% increase in housing availability
- Reduces new occupants commute by 20 miles each way and increases public transit usage
- 85% of new residential units are in mixed use areas

Target Demographic

Renters and property owners

Timeline and Initial Actions

2020

Public Engagement on Master Plan Update.

2021

Complete Comprehensive Master Plan Update. Present to Planning Commission and Council.

2024

If needed, zoning code amendments are adopted and implementation begins.

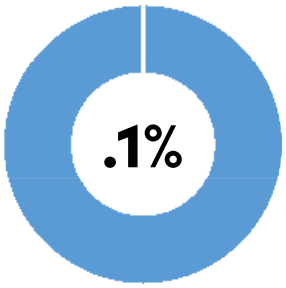
2028

Planning staff and Planning Commission review the code and make suggestions to Council for changes.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$250,000

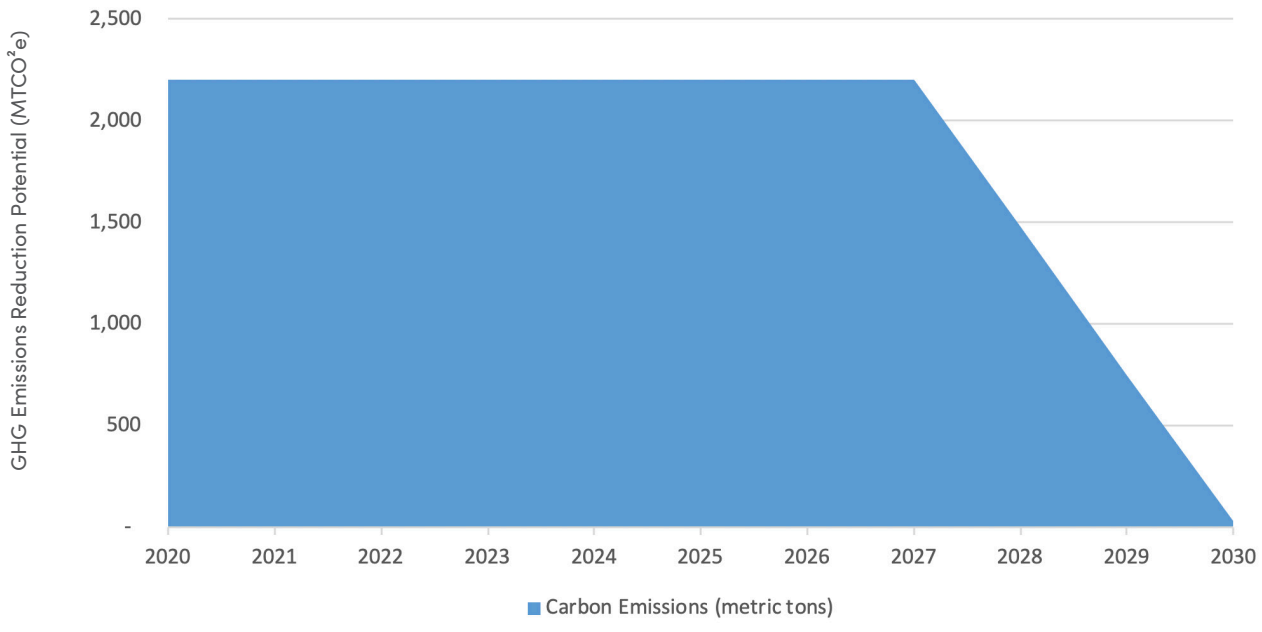
Greenhouse Gas Reduction Potential



2,200 metric tons of carbon dioxide equivalent (.1% of community-wide emissions)

By 2030, the **Increase the Diversity of Housing** action will have achieved all of its potential greenhouse gas emissions reductions.

INCREASE THE DIVERSITY OF HOUSING



6. DEVELOP MIXED-USE NEIGHBORHOODS

Helping residents walk and bike to places of their choosing necessitates having the proper infrastructure in place as well as having the places they desire going within walking and biking distance. This action focuses on updating the zoning code to allow mixed-uses in residential neighborhoods so that things such as bakeries, grocery stories, breweries, coffee shops, etc. can be accessible in nearly all of our neighborhoods. This increases walkability and reduces vehicular miles driven.

Vision for Developing Mixed-Use Neighborhoods

More errands and entertainment are accessible by foot and bike thanks to mixed-use zoning, which has allowed us to maintain the integrity of Ann Arbor's neighborhoods while adding in amenities that enhance quality of life.

Party Responsible for Implementation

- Ann Arbor Planning Department, with support from the Planning Commission and City Council

Collaborators / Project Co-Designers

- Neighborhood associations
- Local businesses
- Ann Arbor Historic District Commission

Equity Impacts

Increasing mixed-use zoning positively impacts residents and small business owners in mixed use neighborhoods.

Indicators of Success / Goals

By 2030, 20% of in-city trips are done by walking or biking

Assumptions

- Increased social cohesion
- Increased walking and biking
- Reduced driving and car ownership in mixed use neighborhoods

Target Demographic

Residents and small business owners

Timeline and Initial Actions

2020

Initiate Comprehensive Master Plan Update.

2021

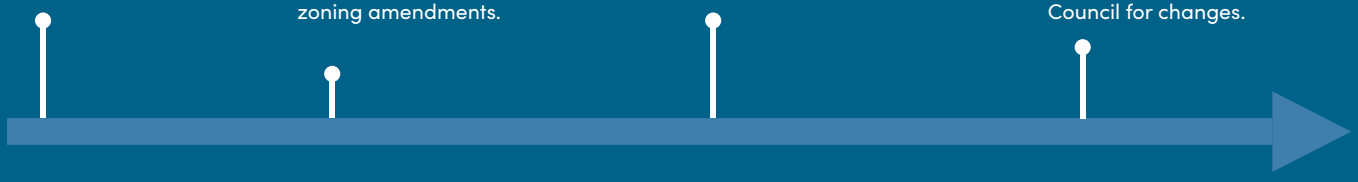
Complete Comprehensive Master Plan Update. Start working on corresponding zoning amendments.

2024

Zoning code amendments are adopted and implementation begins.

2028

Planning staff and Planning Commission review the code and make suggestions to Council for changes.



Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$365,000

Greenhouse Gas Reduction Potential

Emissions reduction potential included in other actions.

DEVELOP MIXED-USE NEIGHBORHOODS

7. ESTABLISH TIERED PARKING RATES

This action focuses on dis-incentivizing driving into the City by having a sliding parking fee structure that increases the cost to park, but has lower rates for low-income residents, residents with disabilities/specific parking needs, and electric vehicle drivers. This includes deploying smart metering and establishing dynamic pricing. Excess on-street parking in the DDA will be removed and replaced with more beneficial street uses, such as infrastructure for pedestrians, bicyclists, transit, and street activities (such as outdoor restaurant seating). Action includes eliminating all parking minimums and setting low parking maximums through the Plan review process.

Vision for Establishing Tiered Parking Rates

Many city streets will be transformed into Complete Streets through the repurposing of on-street parking to more active and pedestrian friendly activities.

Party Responsible for Implementation

- Downtown Development Authority with the Ann Arbor Engineering Department Transportation Group

Collaborators / Project Co-Designers

- Michigan Department of Transportation
- Office of Sustainability and Innovations
- Transportation Commission
- Ann Arbor 2030 District
- Ann Arbor Area Transit Authority
- Ann Arbor Smart City group
- University of Michigan
- Planning Department
- Planning Commission
- US Department of Transportation

Equity Impacts

Biking and walking become safer and more convenient ways to get around, which will open more mobility options for lower-income residents who cannot afford a car. For lower-income residents who must drive, parking rates will be tiered so as to offer lower cost options.

Indicators of Success / Goals

10% increase in walking and biking in the downtown corridor.

Assumptions

- More transportation users help active and sustain transportation modes
- Reduced parking rates for EV drivers and for low-income drivers

Target Demographic

This action will prioritize users of active and sustainable transportation modes

Timeline and Initial Actions

2020

Investigate what equipment and software other cities have used to enable dynamic parking rates.

2021

Develop a partnership to launch new parking technology and pilot dynamic parking rates somewhere in the DDA; eliminate parking minimums in UDC and replace with parking maximums.

2022

Full scale launch of tiered rates.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$4,500,000

Greenhouse Gas Reduction Potential

Emissions reduction potential included in other actions.

STRATEGY 5:

Change the Way We Use, Reuse, and Dispose of Materials

This strategy focuses on changing our relationship with what we buy and use, how we buy and use materials, and how we dispose of materials once we are done using them. The calculations in this section only focus on the greenhouse gas savings associated with reducing the disposal of materials and products. City staff will continue working on a methodology to capture upstream emissions associated with extracting and creating the goods and materials we use. For now, however, upstream emissions are not included in calculations. To achieve this strategy, six specific actions have been identified:

1. Expand Composting Program
2. Expand Commercial Recycling
3. Require Sustainable Materials in New and Existing Developments
4. Move Toward a Circular Economy
5. Support a Plant Rich Diet
6. Enhance Refrigerant Recycling and Reuse Program

Combined, these six actions reduce baseline community-wide greenhouse gas emissions by 0.3% and cost just over $45,000,000.

1. EXPAND COMPOSTING PROGRAM

The action focuses on moving to year round composting, which includes diverting food and yard waste from the waste stream into more productive uses in our compost system. This reduces methane emissions and helps produce valuable compost that can be used locally.

Vision for Expanding Compost Program

As food waste gets discarded as compost there's a gross reduction in the amount of methane produced from rotting food and a reduced impact on our GHG production.

Party Responsible for Implementation

- Department of Public Works

Collaborators / Project Co-Designers

- Office of Sustainability and Innovations
- Food collection and distribution organizations
- Restaurants
- Communication Department

Equity Impacts

Through the new market for imperfect produce, low-income residents could benefit from being able to access more affordable fruits and vegetables.

Indicators of Success / Goals

By 2022, year round and commercial composting has led to over 5,000 tons of yard and food waste being diverted from our waste stream annually.

Assumptions

- Solid Waste Resource Management Plan (SWRMP) estimates that increasing to year round composting would put collection at 1,000 – 2,784 tons
- SWRMP estimates increasing collection of food from food-related businesses would add another 1,000– 2,400 tons per year
- Includes creating markets for imperfect fruit and vegetables to ensure they don't enter waste stream
- Increased education to ensure food waste doesn't freeze to cart
- Necessitates changes in the downtown area to allow compost pick-up; These costs are not factored into the cost estimate below

Target Demographic

All business and residences in Ann Arbor

Timeline and Initial Actions

2020

Adoption of a Solid Waste Resource Management Plan or at least elements related to compost expansion.

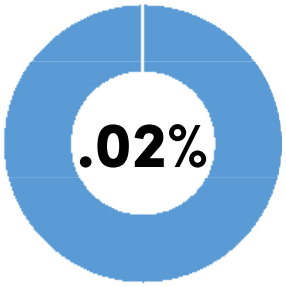
2021

Year round composting begins along with extensive outreach and engagement with businesses and residents about what is compostable and what is not.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$26,000,000

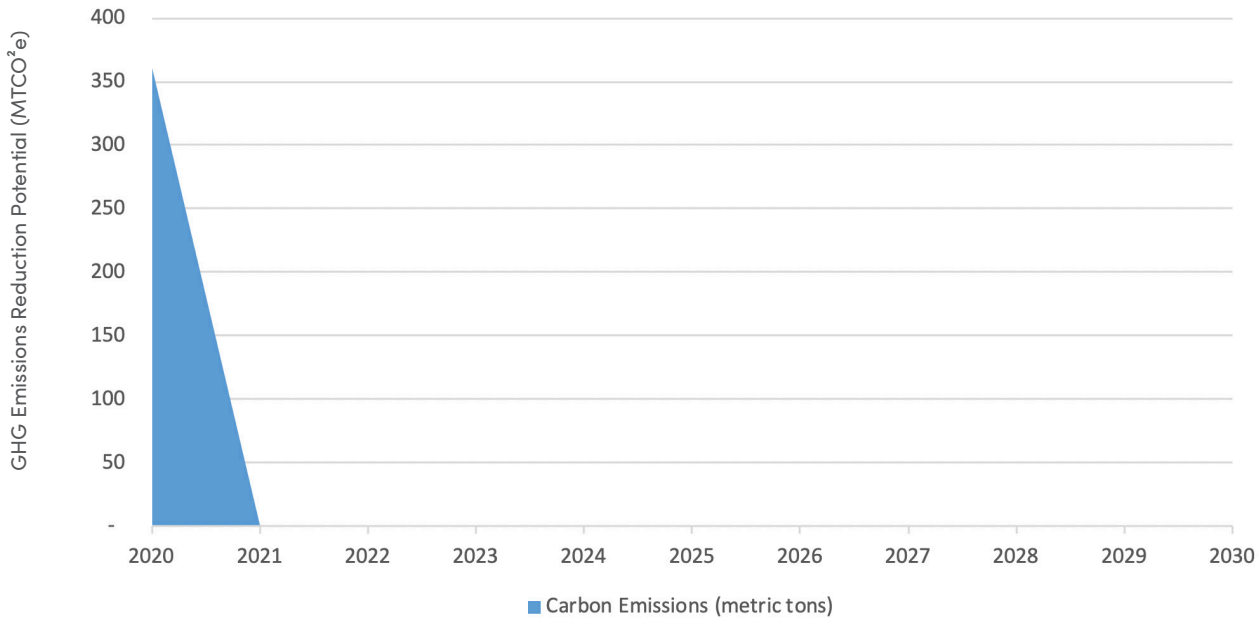
Greenhouse Gas Reduction Potential



400 metric tons carbon dioxide equivalent
(.02% of community-wide emissions)

By 2021, the **Expand Composting Program** strategy will have achieved all of its potential greenhouse gas emissions reductions.

EXPAND COMPOSTING PROGRAM



2. EXPAND COMMERCIAL RECYCLING

Through incentives, education, and enforcement policies, this action focuses on getting commercial sector recycling rates to at least 30%.

Vision for Expanding Commercial Recycling

The Solid Waste Resource Management Plan (SWRMP) estimates a range of 1700 to 4400 tons of waste diverted from landfill as a result of increased participation in commercial sector recycling.

Party Responsible for Implementation

- Department of Public Works, with support from Resource Recycling Associates

Collaborators / Project Co-Designers

- Office of Sustainability and Innovations
- Commercial businesses
- State of Michigan

Equity Impacts

No equity impacts explicitly identified.

Indicators of Success / Goals

By 2028, City of Ann Arbor diverts 30% of commercial sector recyclable waste from the landfill to recycling centers.

Assumptions

- Requiring recycling at restaurants will increase recycling rates in the commercial sector
- Businesses will divert more recyclables from landfill
- Commercial sector diversion rate is 4,400 annual tons
- Increase in enforcement of commercial establishments who don't recycle and compost

Target Demographic

Ann Arbor businesses

Timeline and Initial Actions

2020

Adoption of a Solid Waste Resource Management Plan, or at least elements related to expanding commercial recycling, and education begins.

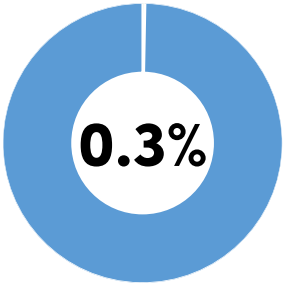
2021

Policies enacted and formal enforcement begins along with extensive outreach and engagement with businesses about what is recyclable and what is not.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$18,400,000

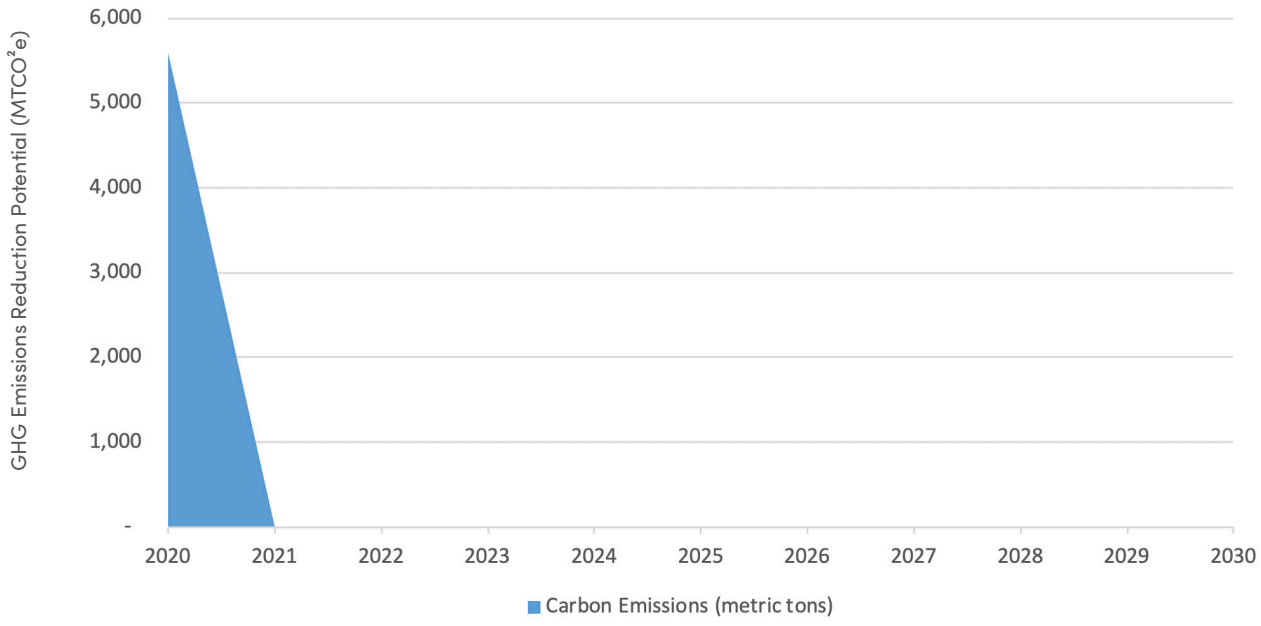
Greenhouse Gas Reduction Potential



5,600 metric tons carbon dioxide equivalent (.3% of community-wide emissions)

By 2021, the **Expand Commercial Recycling** strategy will have achieved all of its potential greenhouse gas emissions reductions.

EXPAND COMMERCIAL RECYCLING



3. REQUIRE SUSTAINABLE MATERIALS IN NEW AND EXISTING DEVELOPMENTS

This action involves the implementation of existing draft City plan for Construction and Demolition Waste to ensure 100% of debris is captured and repurposed. This includes expanding the plan to require sustainable designs in new building approval processes.

Vision for Requiring Sustainable Materials in New and Existing Developments

Ann Arbor has moved one step closer to a circular economy by removing 80% of construction and demolition waste from the landfill and supports it being repurposed for other constructive uses.

Party Responsible for Implementation

- Ann Arbor Department of Public Works, with support from Planning Department

Collaborators / Project Co-Designers

- Office of Sustainability and Innovations
- Resource Recycling Associates
- Construction community

Equity Impacts

No equity impacts explicitly identified.

Indicators of Success / Goals

Would consist of development of an ordinance to require construction and demolition projects to submit waste and diversion data as a component of their building permit or occupancy permit.

Target Demographic

Construction companies, developers, businesses, and community at large

Timeline and Initial Actions

2020

Review existing draft policy and revise, as necessary.

2021

Bring policy to Council for consideration. If passed, begin developing education and outreach materials immediately.

2022

Full scale implementation of policy.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$270,000

Greenhouse Gas Reduction Potential

Not calculated

REQUIRE SUSTAINABLE MATERIALS IN NEW AND EXISTING DEVELOPMENTS

4. MOVE TOWARD A CIRCULAR ECONOMY

This action focuses on moving towards a circular economy, including actions to promote resource reduction, material reuse, and regeneration. By working with peer municipalities, we can create tools that allow for more transparency, traceability, and the calculation of embedded greenhouse gas emissions for different materials, goods, and services.

Vision Statement for Moving Toward a Circular Economy

The City of Ann Arbor will create a model of Circular Economy where goods and materials are recovered, reused, and recycled.

Party Responsible for Implementation

- Department of Public Works, with support from the Office of Sustainability and Innovations

Equity Impacts

Lower-income residents may benefit from being able to buy repurposed and refurbished items.

Collaborators / Project Co-Designers

- Peer Municipalities
- Repair Centers
- Tool Libraries /Lending Libraries
- Thrift Stores
- Curbside textile collection companies

Indicators of Success / Goals

• Repair centers for bicycles, appliances, etc. are promoted as first choice as opposed to replacement
• Support for toy, book and tool libraries to decrease the number of new purchases
• Support for thrift stores and reuse centers, along with having curbside textile collection to reduce the number of materials entering the landfill
• There is no City-coordinated textile collection program; curbside collection of textiles would be contracted for by the City with a private collector to provide weekly curbside collection from single family homes initially with potential future expansion to multi-family properties

Target Demographic

Ann Arbor residents and businesses

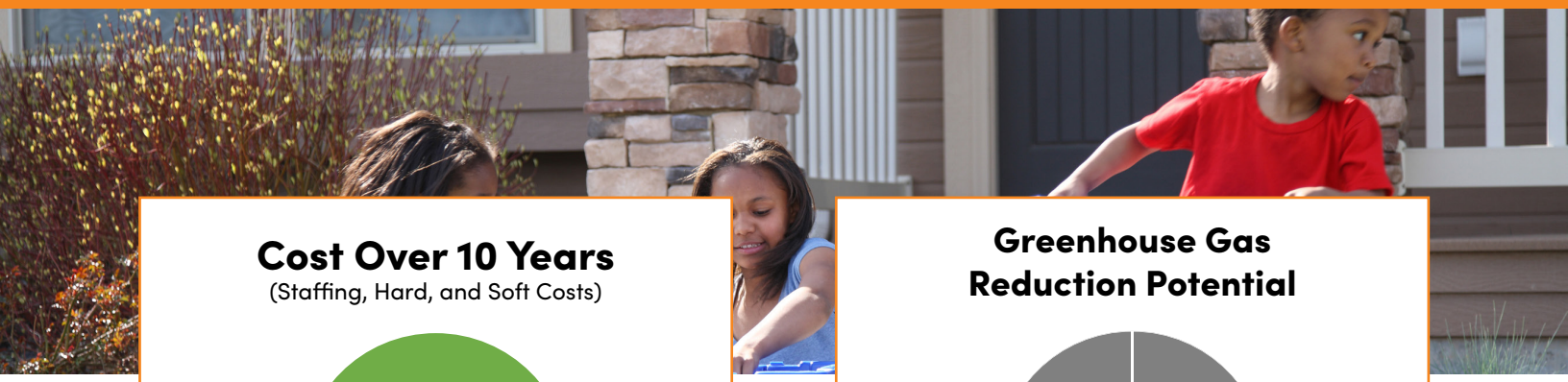
Timeline and Initial Actions

2020

Solid Waste Resource Management Plan gets adopted.

2022

Circular Economy strategy gets finalized and integrated into other planning initiatives.

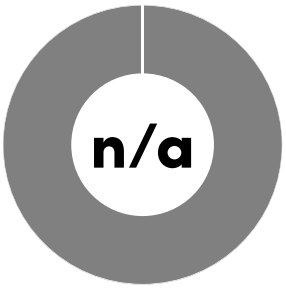


Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$270,000

Greenhouse Gas Reduction Potential



Not calculated

MOVE TOWARD A CIRCULAR ECONOMY

5. SUPPORT A PLANT RICH DIET

Eating less meat and more fruits, vegetables, legumes, whole grains, nuts, and seeds is known to reduce one's environmental footprint and improve one's overall health. This action focuses on educating the community about the benefits of reducing meat consumption. Included in the action is the exploration of a greenhouse gas emissions footprint disclosure (like a calorie disclosure) on food sold at City facilities in order to educate people on the environmental footprint of their dietary choices.

Vision for Supporting a Plant Rich Diet

Ann Arborites are healthier, happier, and more sustainable by increasing the amount of fruits, vegetables, and grains they consume and lowering the amount of meat they consume.

Party Responsible for Implementation

- Office of Sustainability and Innovations, with support from Farmer's Market staff

Collaborators / Project Co-Designers

- Ann Arbor City Council
- Local farmers
- Washtenaw Optimal Wellness
- Department of Public Works
- Growing Hope
- Local grocery stores
- Local Chefs and restaurant owners
- Cultural centers

Equity Impacts

Food deserts exist in our region meaning residents do not have access to healthy and nutritious food. This action can help ensure that everyone in the City, especially our low-income residents, have access to healthy, nutritious options.

Indicators of Success / Goals

When asked, consumers indicate that they are better educated about the environmental impacts of their consumption choices and factor environmental impacts into their decision making.

Target Demographic

All Ann Arbor residents

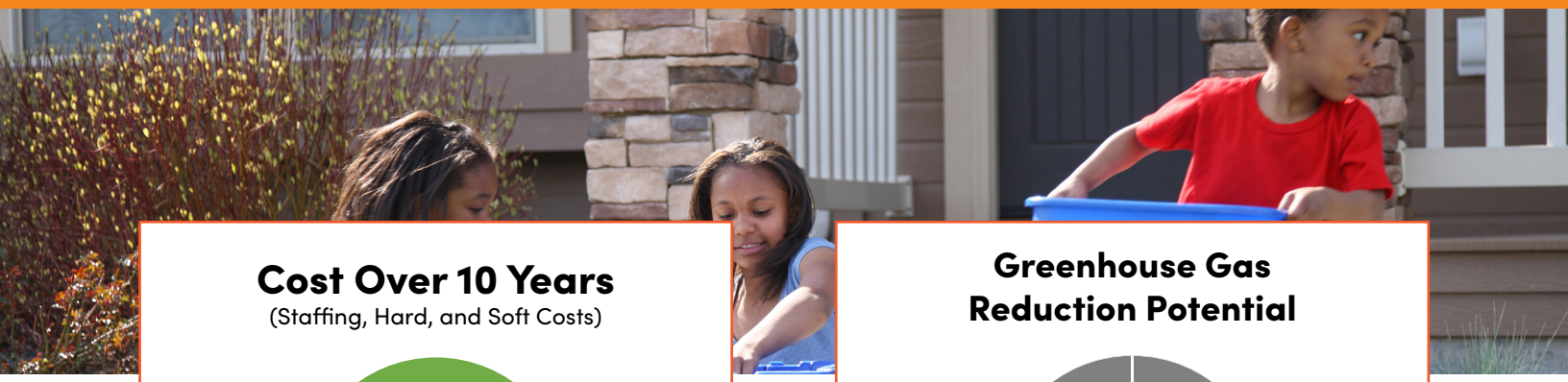
Timeline and Initial Actions

2021

Work with University of Michigan to understand environmental food labeling program; explore expanding to all City facilities where food is stored.

2022

Continue working with partner organizations to develop and disseminate materials about the benefits of a plant rich diet.



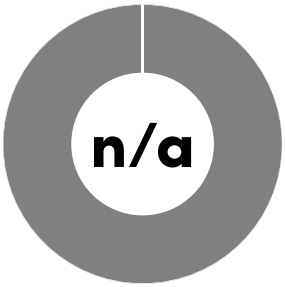
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$

$208,400

Greenhouse Gas Reduction Potential



Not calculated

SUPPORT A PLANT RICH DIET

6. ENHANCE REFRIGERANT RECYCLING AND REUSE PROGRAM

The use of refrigerants emits potent greenhouse gases, and removing them from use can have a significant impact on emissions reduction. This action focuses on enhancing refrigerant recycling programs and discouraged refrigerant use where possible.

Vision for Enchancing Refrigerant Recycling and Reuse Program

By banning refrigerants from disposal at City of Ann Arbor landfills we will drastically reduce greenhouse gas emissions from refrigerant emissions.

Party Responsible for Implementation

- Department of Public Works, with support from the Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Local businesses
- City Communication Team

Equity Impacts

No equity impacts explicitly identified.

Indicators of Success / Goals

95% reduction in the amount of refrigerants disposed of at City facilities.

Assumptions

- Program focuses on education; explores penalties for violation

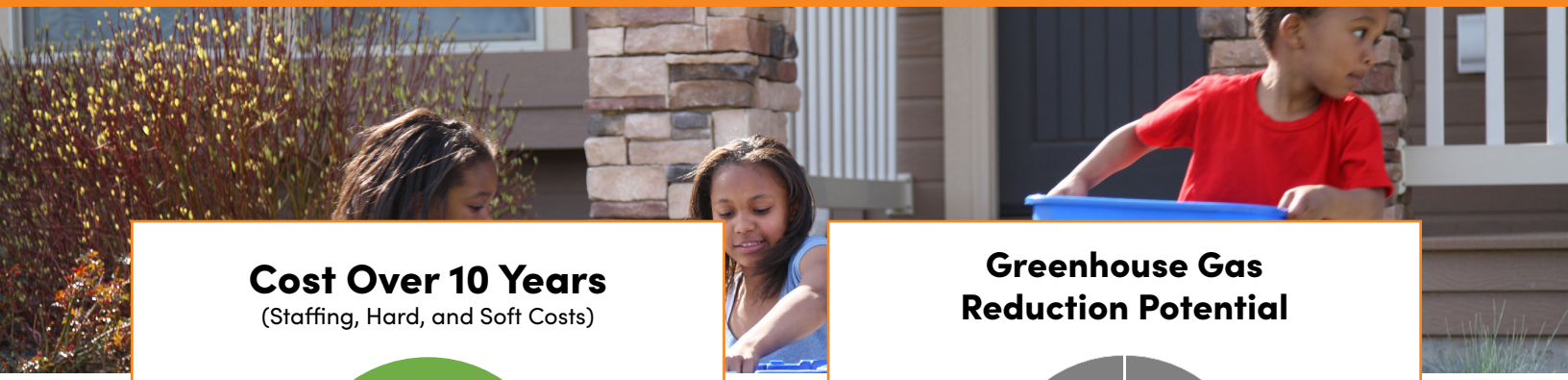
Target Demographic

All Ann Arborites, especially renters, homeowners, and businesses

Timeline and Initial Actions

2021

Work with partners to launch an aggressive refrigerant education campaign; ensure systems are in place to properly recycle all refrigerants that are disposed of in the community.

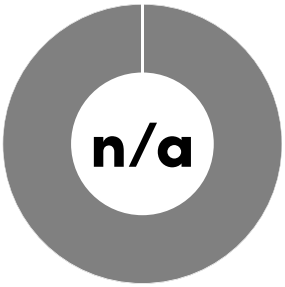


Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$179,400

Greenhouse Gas Reduction Potential



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ENHANCE REFRIGERANT RECYCLING AND REUSE PROGRAM

STRATEGY 6:

Enhance the Resilience of Our People and Our Place

This strategy focuses on enhancing the resilience of our people and our place. In particular, this strategy focuses on ensuring our community can not only survive, but thrive, regardless of what disruptions or changes may take place. To achieve this strategy, six actions were prioritized:

1. Invest in Resilience Hubs
2. Foster Neighborhood and Youth Ambassador Program
3. Preserve and Enhance the Local Tree Canopy
4. Conduct Asset and Needs Mapping of Neighborhoods
5. Assist in Assembling and Distributing Emergency Preparedness Kits
6. Implement Sensors to Monitor and Manage Heat, Air Quality, Waterways, and Flooding

While reducing greenhouse gas emissions were not the priority in selecting these actions, they do have a modest value to the community's carbon neutrality goals. In total, these actions contribute a 0.1% reduction in community-wide greenhouse gas emissions and cost around $7,500,000.

1. INVEST IN RESILIENCE HUBS

Resilience hubs are community-serving facilities augmented to support residents and coordinate resource distribution and services before, during, or after a natural hazard event. At their core, resilience hubs empower communities to take action around preparedness and increase community and neighborhood capacity. Resilience hubs operate at the nexus of climate mitigation, climate adaptation, and equity, and they strive to enhance community sustainability and resilience through a bottom-up approach centered on co-development and leadership.

Vision for Investing in Resilience Hubs

Ann Arbor's five resilience hubs are equitably enhancing community resilience while reducing greenhouse gas emissions. The hubs improve local quality of life for all of our residents, especially for our front line communities. Our robust network of resilience hubs empower residents to care for one another during a disaster for up to five days before government assistance resources may be needed. The hubs have reduced the poverty rate, increased local economic opportunities, reduced crime rates, and significantly increased people's satisfaction with their community.

Party Responsible for Implementation

- Office of Sustainability and Innovations, with support from Emergency Management

Collaborators / Project Co-Designers

- Residents
- Local businesses
- Community-based organizations
- The city's communications team
- Police department
- Fire department
- Finance and procurement
- Washtenaw County Department Of Community and Economic Development
- City planning team
- Washtenaw County Health Department
- Public Works
- Legal
- Transportation Manager
- Local community institutions
- Parks and Recreation
- Others as co-determined with

Equity Impacts

Many lower-income residents do not have access to a variety of resources in case of an emergency. Resilience hubs provide residents the ability to support one another in a crisis as well as to access community and City services day to day.

Indicators of Success / Goals

Every Ward within the City has a functioning, community-designed and -operated resilience hub that helps improve community sustainability, resilience, and social cohesion by 2030.

Target Demographic

The first few hubs will be placed in our underserved neighborhoods. Eventually, the goal is to have at least one resilience hub in each Ward and, ideally, a resilience hub in all of our front line communities/ neighborhoods

Assumptions

- External funding will be available to support the development of hubs
- External parties will be able and interested to operate the hub once developed
- The community is able to come to near consensus on what to include in their hub

Timeline and Initial Actions

2020

Continue working with community to explore resilience hub in southeastern Ann Arbor; continue seeking funding to support the hub.

2021

Initiate planning and community involvement for second hub; continue seeking funding for hubs and work on design with the community.

2022

Aim to launch first resilience hub.

2023+

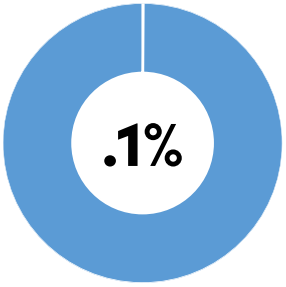
Continue working with community to design, fundraise for, and launch hubs throughout the community.

Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$5,025,000

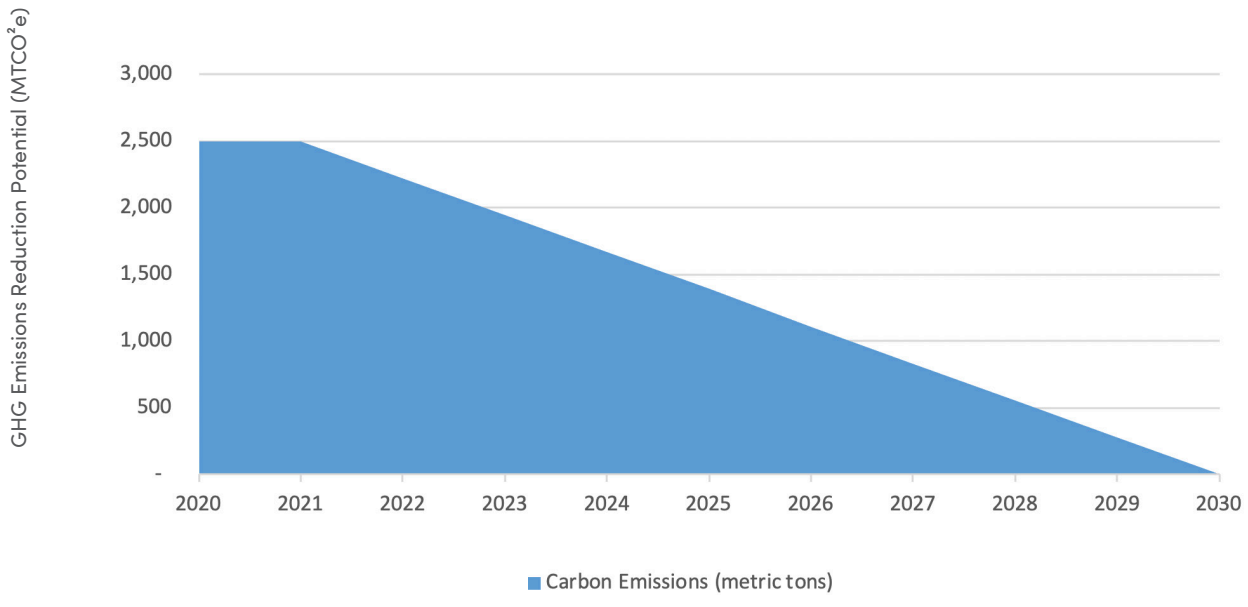
Greenhouse Gas Reduction Potential



2500 metric tons carbon dioxide equivalent (0.1%)

By 2030, the **Invest in Resilience Hubs** strategy will have achieved all of its potential greenhouse gas emissions reductions.

INVEST IN RESILIENCE HUBS



2. FOSTER NEIGHBORHOOD AND YOUTH AMBASSADOR PROGRAM

Achieving carbon neutrality will require mobilization of Ann Arborites on a nearly unprecedented scale. This action seeks to work with interested stakeholders to rapidly scale up and out our carbon neutrality work and the actions outlined in this Plan. In particular, this action calls for the creation of neighborhood as well as youth ambassadors. These individuals will be trained and given the tools and resources to work with their peers to implement many of the actions identified in this document.

Vision for Fostering Neighborhood and Youth Ambassador Programs

Through education and engagement, youth elevate their voices and take ownership of mitigation and adaption initiatives – helping to drive significant community-wide action. Neighborhood ambassadors lead a variety of projects related to energy and water consumption, waste reduction and recycling, transportation, and local food efforts. These actions foster community resource stewardship, climate action, and enhance local social cohesion.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Neighborhood associations
- A^2Zero youth representatives
- Ann Arbor Public Schools
- Community Action Network
- United Way
- Neutral Zone

Assumptions

- Individuals will want to serve as neighborhood or youth ambassadors
- All regions of the City will have someone volunteer to serve as an ambassador (or be recruited to serve) so that there aren't spatial gaps

Equity Impacts

OSI could partner with a nonprofit like United Way to train a cohort of adult residents who are living in affordable housing or who are low-income to be Climate Ambassadors. There could also be a youth cohort who are from underserved communities who could be trained as Youth Ambassadors. Participants in each of these groups would receive stipends. OSI could lead a group of other adults who would not need as much training in a similar program. These people would not get a stipend.

Indicators of Success / Goals

100 individuals are trained as youth or neighborhood ambassadors by 2025 and are actively working with their peers and neighbors to implement that A^2Zero strategy.

Target Demographic

All Ann Arborites interested in helping support the implementation of the A^2Zero Plan

Timeline and Initial Actions

2020

Design the neighborhood and youth ambassador program; work with interested stakeholders.

2021

Launch training and first tranche of ambassadors.

2022

Revise the ambassador program and scale throughout the City.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$350,000

Greenhouse Gas Reduction Potential

Not calculated

FOSTER NEIGHBORHOOD AND YOUTH AMBASSADOR PROGRAM

3. PRESERVE AND ENHANCE THE LOCAL TREE CANOPY

This action begins with conducting an analysis and creating a shared inventory of the local tree canopy as well as updating the master plan to incentivize shade tree and vegetation planting for private projects. This will increase the impact of shade trees as a natural cooling mechanism in urban areas. Tree type and placement are important considerations in advancing this action.

Vision for Preserving and Enhancing the Local Tree Canopy

A properly managed and diverse urban forest increases resiliency against invasive insects that carry diseases and impact the human population. By planting diverse tree species, the community benefits from increased shade and decreased heat island effects, while supporting biodiversity. Careful planning and management help the City mitigate and adapt to changing climate conditions.

Party Responsible for Implementation

- City Forrester/Public Works, with support from the Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Local nurseries
- Neighborhood associations
- Ambassadors

Equity Impacts

Studies have found that tree canopies in low-income communities and communities of color tend to be smaller. Ann Arbor's first Health Impact Assessment should be updated to ensure equitable enhancement of tree canopy in underserved neighborhoods is prioritized.

Indicators of Success / Goals

By 2030, 10,000 new trees are planted on city property and in the right of way and 10,000 new trees are planted on private property.

Assumptions

- City continues to plant 1,000 trees per year on City property and in the right of ways
- Community plants 1,000 trees per year on private property; These trees all survive
- Over the duration of this Plan, a single tree will absorb 48 pounds of carbon dioxide

Target Demographic

City facilities and private property owners

Timeline and Initial Actions

2020

City to continue annual tree planting.

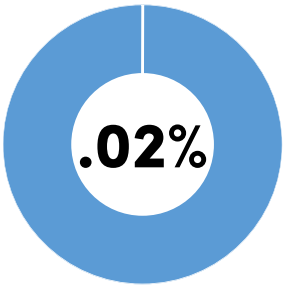
2021

Launch neighborhood tree planting initiative.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$1,160,000

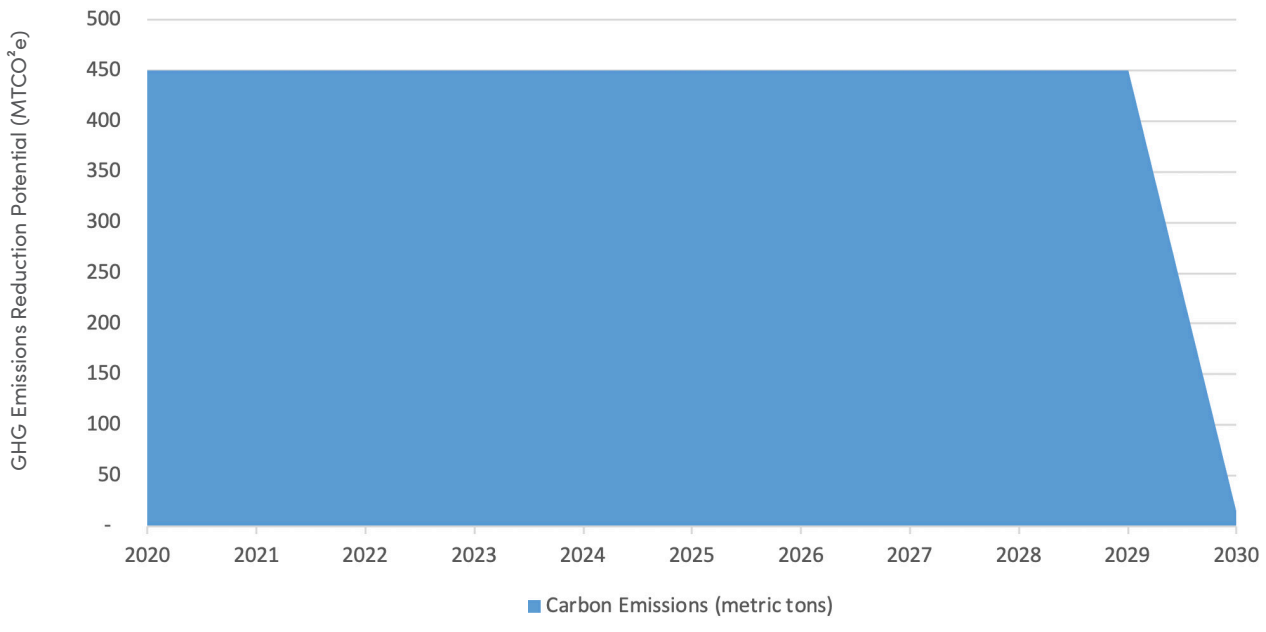
Greenhouse Gas Reduction Potential



450 metric tons of carbon dioxide equivalent (0.02% of community-wide emissions)

By 2030, the **Preserve and Enhance the Local Tree Canopy** strategy will have achieved all of its potential greenhouse gas emissions reductions.

PRESERVE AND ENHANCE THE LOCAL TREE CANOPY



4. CONDUCT ASSET AND NEEDS MAPPING OF NEIGHBORHOODS

This action involves working with neighborhoods to systematically identify what assets and needs exist in the area. Local assets are then leveraged to create a plan that prioritizes and addresses community needs.

Vision for Conducting Asset and Needs Mapping of Neighborhoods

Community mapping leads to the identification of safe gathering points in neighborhoods when events such as natural disasters and power outages occur. Physical spaces, such as homes, are activated as shelters during necessary times.

Party Responsible for Implementation

- Office of Sustainability and Innovations, with support from Emergency Management

Collaborators / Project Co-Designers

- Red Cross
- Neighborhood Associations
- Meals on Wheels
- Neighborhood Ambassadors
- Youth Ambassadors
- Ann Arbor Public Schools

Equity Impacts

Many residents do not have financial security when faced with crisis situations. By identifying assets in advance, community mapping will help residents better rely on each other in crisis situations.

Indicators of Success / Goals

By 2025, every neighborhood in Ann Arbor has an asset map and knows how to activate it in the case of an emergency.

Assumptions

- Enough individuals volunteer to help with the exercise to ensure the entire community is covered
- Capacity exists to update and maintain the asset map

Target Demographic

All Ann Arborites

Timeline and Initial Actions

2020

Develop asset mapping exercise; convene neighborhood associations and those interested in neighborhood ambassador program to get feedback on mapping.

2021

Launch neighborhood asset mapping exercise; create methodology to update and maintain asset map.

2022

Work with volunteers to ensure all neighborhoods have a preliminary asset map at least.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$300,000

Greenhouse Gas Reduction Potential

Not calculated

CONDUCT ASSET AND NEEDS MAPPING OF NEIGHBORHOODS

5. ASSIST IN ASSEMBLING AND DISTRIBUTING EMERGENCY PREPAREDNESS KITS

This action involves working directly with partners and community organizations to educate Ann Arborites on emergency preparedness and prepare emergency preparedness kits and plans that residents can keep to ensure they are safe during an emergency.

Vision for Assembling and Distributing Emergency Preparedness Kits

Residents have the resources they need to care for themselves and their families for multiple days during a disaster situation.

Party Responsible for Implementation

- Office of Sustainability and Innovations, with support from Emergency Management

Collaborators / Project Co-Designers

- Red Cross
- Neighborhood Associations
- Meals on Wheels
- Neighborhood Ambassadors
- Youth Ambassadors
- Ann Arbor Public Schools

Equity Impacts

Many residents, whether due to cost, language, or other barriers may not the resources to build emergency preparedness kits for their families on their own. Working as a group will help all residents be better prepared for emergencies.

Indicators of Success / Goals

1000 residents have emergency preparedness kits by 2030 thanks to support from this action.

Assumptions

- AAPS partners with the City on hosting emergency preparedness events
- Some supplies are donated by local businesses

Target Demographic

All Ann Arbor residents with a priority given to low-income residents

Timeline and Initial Actions

2020

Work with Emergency Management to create a list of essential emergency supplies and a template emergency plan.

2021

Work with schools to launch emergency preparedness sessions with students and caregivers throughout the community.

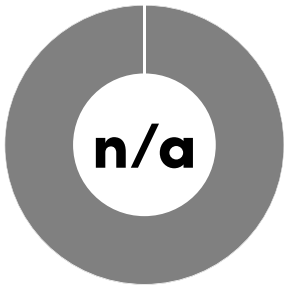
2022

Integrate emergency preparedness module into the Neighborhood and Youth Ambassador programs.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$350,000

Greenhouse Gas Reduction Potential



Not calculated

ASSIST IN ASSEMBLING AND DISTRIBUTING EMERGENCY PREPAREDNESS KITS

6. IMPLEMENT SENSORS TO MONITOR AND MANAGE HEAT, AIR QUALITY, WATERWAYS, AND FLOODING

This action focuses on collecting data and using sensors to proactively understand risks and mitigate vulnerabilities. Includes the usage of drones and sensors to collect data and to respond to events, when necessary.

Vision for Implementing Sensors to Monitor and Manage Heat, Air Quality, Waterways, and Flooding

Ann Arbor's ubiquitous system of sensors and monitors allows the City to proactively manage threats and risks, while ensuring that Ann Arborites enjoy an exceptional quality of life. Monitors and sensors throughout the City provide real-time data that helps protect the public health, safety, and general welfare.

Party Responsible for Implementation

- Ann Arbor Information Technology Unit

Equity Impacts

Few equity impacts.

Collaborators / Project Co-Designers

- Stormwater, wastewater, and water system
- Office of Sustainability and Innovations
- Emergency Management
- University of Michigan
- Huron River Watershed Council
- Downtown Development

Indicators of Success / Goals

Ann Arbor's landscape of sensors and monitors provides real-time information that has been utilized to protect the public from acute and chronic disruptions.

Assumptions

- Any technology adopted can tie into the City's existing IT infrastructure
- The various technologies used can inter-operate

Target Demographic

This action mostly impacts local government staff and regional decision-makers/planners

Timeline and Initial Actions

2020

Finish Smart City Strategy; include needs for monitoring.

2021

Pilot sensors throughout the City with UM and other partners.

2024

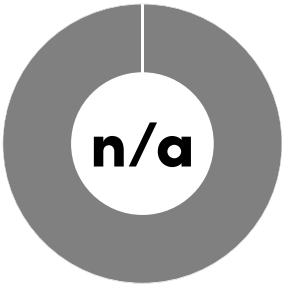
Install sensors and monitors throughout the City as an interconnected network.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$300,000

Greenhouse Gas Reduction Potential



Not calculated

IMPLEMENT SENSORS TO MONITOR HEAT, AIR QUALITY, WATERWAYS, AND FLOODING

OTHER STRATEGIES:

This strategy covers the remaining programs and activities that don't fit into other areas. It also includes greenhouse gas emissions offsets to close out any lingering gaps in achieving community-wide carbon neutrality. To achieve this strategy, four specific actions have been identified:

1. Advance Equity Programs
2. Promote Sustaining Ann Arbor Together Grant Program
3. Establish Internal Carbon Price
4. Offset Greenhouse Gas Emissions

Combined, these four actions equate to just under 14% of community-wide emissions reductions and are estimated to cost just under $6,000,000.

1. ADVANCE EQUITY PROGRAMS

The Office of Sustainability and Innovations (OSI) is committed to ensuring climate protection and mitigation work improves the lives of Ann Arbor residents who have been historically underrepresented and under-resourced. Our Equity Program works to ensure that equity is embedded in all of the work we do – from the programs we advance, to the stakeholders we engage with, to the advisors we seek.

Vision for Advancing Equity Programs

By 2028, all of OSI's programs have an equity focus, OSI staff reflect the diversity of Ann Arbor and Washtenaw County, and staff have developed strong working relationships with members of local low-income communities and communities of color.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Washtenaw County's Racial Equity Program Manager
- Dr. Tony Reames
- Urban Sustainability Directors Network
- City Administrator
- All City Service Areas
- OSI's Equity Fellow
- City of Ann Arbor's Diversity, Equity and Inclusion Manager

Equity Impacts

OSI will continue to center equity in their work, and will expand their decision-making and implementation to authentically include marginalized communities who are most at risk due to climate change.

Indicators of Success / Goals

By 2028, all of OSI's programs have an equity focus.

Assumptions

- Resources will continue to exist to support racial equity training for staff

Target Demographic

Ann Arbor City employees and staff of allied organizations, Ann Arbor residents of color, and low-income Ann Arbor residents and workers

Timeline and Initial Actions

2020

OSI staff will receive and lead continuing education about equity issues (ongoing); hire equity fellow to help with aging in place efficiently work

2021

OSI staff will conduct baseline equity trainings with the Energy and Environmental Commissioners; hire summer equity fellow

2023

OSI Equity Advisory Commission formed

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$200,000

Greenhouse Gas Reduction Potential

Not calculated

ADVANCE EQUITY PROGRAMS

2. PROMOTE SUSTAINING ANN ARBOR TOGETHER GRANT PROGRAM

This program provides small grants to residents, schools, local nonprofits, and local businesses to advance sustainability-related activities in Ann Arbor's right of way.

Vision for Promoting Sustaining Ann Arbor Together Grant Program

Through the Sustaining Ann Arbor Together grant program, Ann Arborites are able to unlock financial capital to implement solutions that are making our community a healthier, more sustainable place to live.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Nonprofit organizations serving Ann Arbor residents
- Neighborhood associations
- University of Michigan
- Ann Arbor Public Schools

Equity Impacts

These resources can help undeserved areas of the community unlock capital to address their specific sustainability concerns and opportunities.

Indicators of Success / Goals

At least 10 grants are awarded, per year, through the Sustaining Ann Arbor Together grant program.

Assumptions

- $100,000 will continue to be available, annually, for the program
- The program will be fully subscribed

Target Demographic

Ann Arbor residents

Timeline and Initial Actions

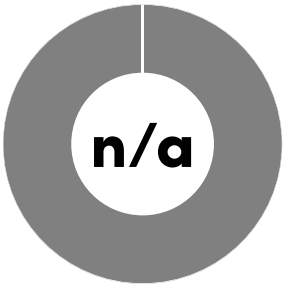
2020

OSI staff continue to administer the program, conducting outreach regularly to let people know about the opportunity.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$1,000,000

Greenhouse Gas Reduction Potential



Not calculated

PROMOTE SUSTAINING ANN ARBOR TOGETHER GRANT PROGRAM

3. ESTABLISH INTERNAL CARBON PRICE

This action creates a financial mechanism whereby all City Service Areas holistically integrate greenhouse gas emissions and their impacts into decision-making. This will happen through the use of an internal carbon tax (e.g., payment by each service area for each ton of greenhouse gases emitted). These resources will then be given back in the form of energy efficiency improvements and renewable energy installations at City facilities.

Vision for Establishing Internal Carbon Price

Citywide greenhouse gas emissions are carbon neutral thanks in part to our internal carbon tax that encourages Service Areas to reduce emissions while providing funding support through the fee collected to finance energy efficiency and renewable energy improvements.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Equity Impacts

No explicit equity impacts were identified.

Collaborators / Project Co-Designers

- Finance
- Information Technology
- DTE Energy
- City Administrator
- Consumers Energy
- Fleet and Facilities

Indicators of Success / Goals

All City operations are powered with 100% clean and renewable energy by the year 2030.

Assumptions

- Funding generated by enterprise funds will remain available for use only by the enterprise funds
- Any funds generated will be applied to energy efficiency work and/or renewable energy activities that reduce the overall greenhouse gas emissions of the unit
- Price will not grow to more than the social cost of carbon

Target Demographic

All City Service Areas

Timeline and Initial Actions

2020

OSI staff create internal carbon tax work plan and work with finance to pilot a $5/ton charge

2021

OSI work to increase fleet rates and administer a $10/ton charge

2022

Review program and suggest any needed revisions

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

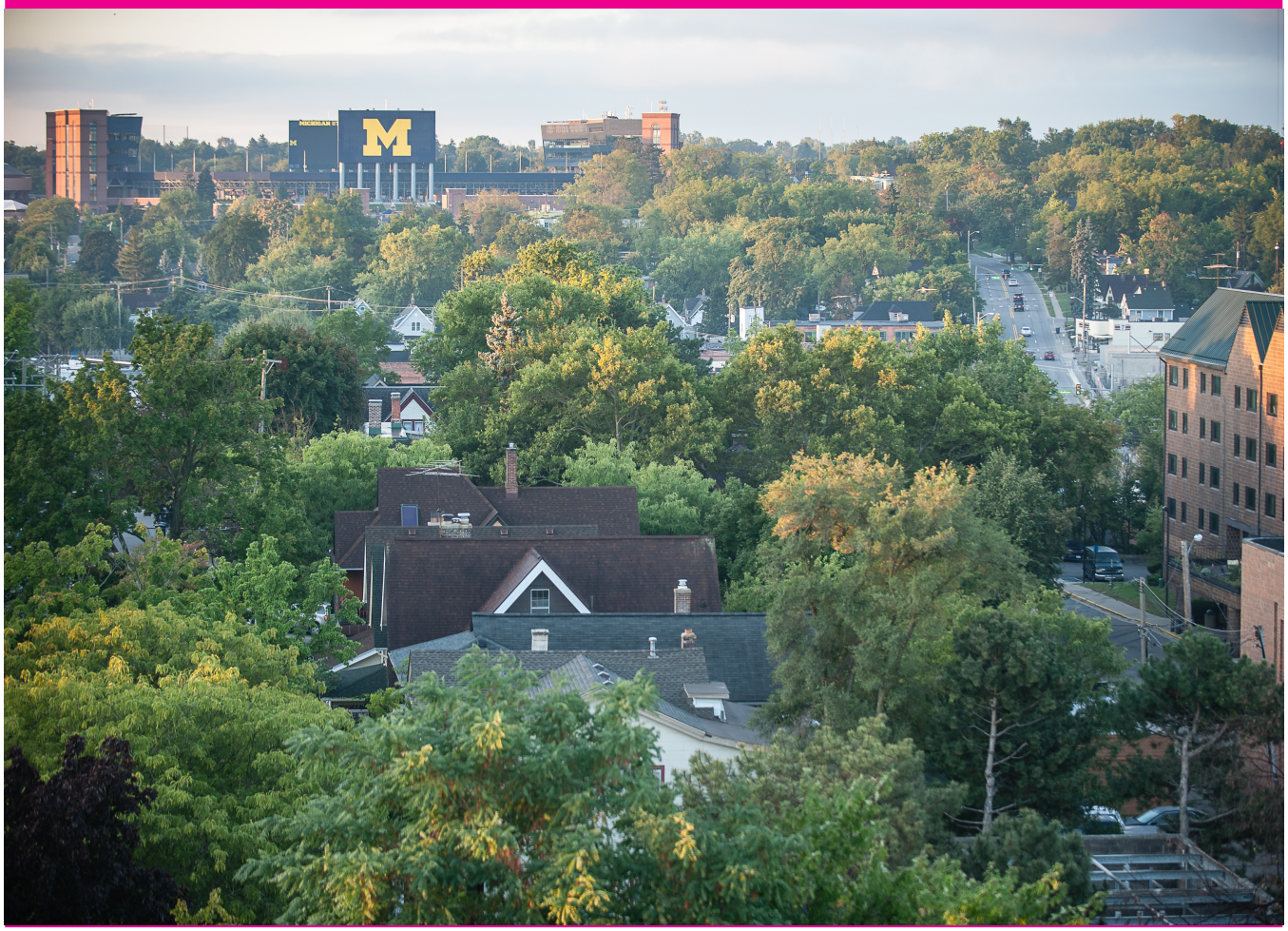
$75,000

Greenhouse Gas Reduction Potential

n/a

Not calculated

ESTABLISH INTERNAL CARBON PRICE



4. OFFSET GREENHOUSE GAS EMISSIONS

Our community has a lot of work to completely eliminate our greenhouse gas emission by 2030. For the activities that we cannot currently reduce emissions from, due to a lack of technical or financially feasible solutions, we can purchase carbon offsets to reduce greenhouse gas emissions outside of our community. Because greenhouse gases act the same way in the Earth's atmosphere, regardless of where they are produced, our community can purchase and retire renewable energy credits replacing fossil fuels to offset our own emissions as we work towards our target.

Vision for Offsetting Greenhouse Gas Emissions

Offsets are only used to close the greenhouse gas emissions gap between what we are able to do locally and what needs to be offset to achieve our goal of carbon neutrality by 2030.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Energy Commission
- Environmental Commission
- University of Michigan

Equity Impacts

While local offsets may or may not be feasible, the City will aim to invest our carbon offset funds into programs that will decrease income and/or racial justice inequities. This includes looking at potentially making investments in the global south which has been disproportionately burdened by extractive economies.

Indicators of Success / Goals

The amount of greenhouse gas emission offsets purchased decline over time as the City undertakes more local actions.

Assumptions

- All offsets are additional, meaning that they wouldn't have happened without our investment
- Reduces demand for fossil fuels and other greenhouse gas emissions sources
- Preference given to investing in projects that take place in low-income and front line communities
- Any renewable energy credits generated will be retired
- Includes investigating options for a local carbon offset program

Target Demographic

Entire community

Timeline and Initial Actions

2020

Provide recommendations on characteristics of offsets and get Council's agreement

2021

Solidify the source for purchasing greenhouse gas emissions offsets

2028

Undertake first greenhouse gas emissions offset purchase and continue as needed.

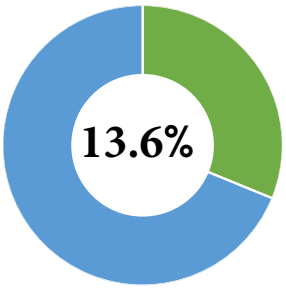
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$9,440,000

– this assumes two years of purchasing offsets and the staffing support to set-up the purchase.

Greenhouse Gas Reduction Potential

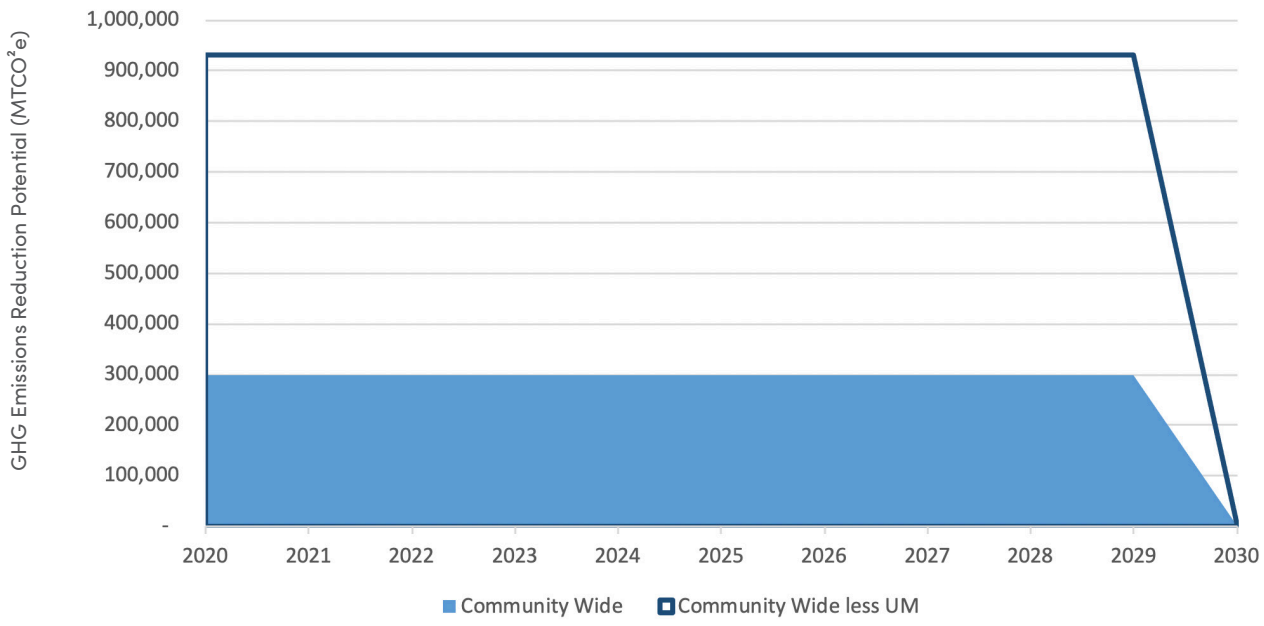


298,500 metric tons carbon dioxide equivalent (13.6% of community wide emissions if UM participates in all programs).

By 2030, the **Offset Greenhouse Gas Emissions** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the estimated total amount of offsets (in light blue) that will need to be purchased assuming the community and University participate in all actions of the Plan outlined above. The dark blue outline shows the amount of offsets that will need to be purchased if the University does not participate in any of the actions outlined.

OFFSET GREENHOUSE GAS EMISSIONS



CLOSING

The A²Zero Plan is a holistic living Plan. It will change. It will evolve. It will get better as the community comes together to implement these and other actions. It is also the beginning of the journey that many other Michigan municipalities will follow in their own efforts to achieve carbon neutrality. With no blueprint for us to follow, A²Zero is our effort to reimagine Ann Arbor in a manner that's equitable, sustainable, and transformative for all Ann Arborites while ensuring we create a more resilient community.

Grounded in equity, the Plan works to ensure the most vulnerable in Ann Arbor can thrive as we bounce forward from any shock or stressors the future may hold. The Plan recommends investing in land use strategies that allow for denser and mixed use neighborhoods to both close the wealth gap by providing more affordable housing so those who work here can also live here ,and by providing more accoutrements within walking and biking distance to our homes. A²Zero encourages more residents and visitors to use an expanded, energy efficient multimodal transportation network to move about our community. It encourages investment in local renewable energy and in our connection to each other and our place.

A²Zero also gives respite to those seniors who desire to age in the places they are most familiar with by ensuring they have access to weatherization programs that lower their energy costs, by launching aging in place programs, and by fostering greater neighborhood social networks.

A²Zero builds upon the significant recent science indicating that society needs to move as rapidly as possible to achieve significant reductions in greenhouse gas emissions in order to avoid the most catastrophic impacts associated with climate change. That is why staff within the Office of Sustainability and Innovations created this Plan as a foundation for achieving community-wide carbon neutrality by 2030.

Time is of the essence, and action is desperately needed. Some of the programs in this Plan will be wildly successful. Others will be moderately successful. And yet others will prove inadequate for the challenge ahead. Our job is not to be beholden to what is written in the pages of this document, but to move intentionally, aggressively, and wholeheartedly towards a significant reduction in local greenhouse gas emissions.

Ann Arbor has the intellect, the human power, the resources, and the skills needed to move climate action and sustainability forward. What is currently missing is the will, and what is lacking is time. Join us as we combat the most significant crisis of our era. Together we can avoid the unmanageable, manage the unavoidable, and create a more equitable and just society for all.

APPENDIX 1 – LIST OF PUBLIC EVENTS

1. November 13, 2019 – Public launch of the A²Zero initiative at Cobblestone Farm. Over 250 individuals attended.
2. November 18, 2019 – Washtenaw International High School sustainability talk to 60 High School students.
3. November 19, 2019 – met with leader of Old Fourth Ward Neighborhood Association to discuss A²Zero.
4. November 20, 2019 – Lunch and Learn with City Staff on A²Zero.
5. November 21, 2019 – Climate Reality Presentation at Vertex Coffee.
6. November 26, 2019 – Ypsilanti Sustainability Committee Climate Reality Presentation at Park Ridge Community Center.
7. December 3, 2019 – Power Hour at Westgate Library discussing energy efficiency and solar power.
8. December 4, 2019 - Meeting to discuss how we can disseminate the word about A²Zero and launch a neighborhood climate ambassadors program.
9. December 4, 2019 - Commercial Power Hour in partnership with the 2030 District & large scale commercial building owners.
10. December 10, 2019 – Cohosted event at Forest Hills Cooperative to begin teaching recycling and composting to over 15 residents and children. Including an introduction to A²Zero.
11. December 11, 2019 – Met with Extinction Rebellion to explain and gather feedback about A²Zero.
12. December 15, 2019 – Tabled at Homegrown at The Cobblestone Art Show to share information about A²Zero.
13. December 18, 2019 – Convened 12 High School and 1 middle school student to glean their thoughts on how they would like to assist in A²Zero at their schools.
14. December 19, 2019 – Tabled about A²Zero at the Ann Arbor Hands on Museum.
15. December 20, 2019 – Climate Reality Presentation at Wheeler Service Center to 140 staff; included an introduction to A²Zero.
16. January 6, 2020 – A²Zero Meeting with Fire Department Management.
17. January 6th, 2020 – A²Zero meeting with Safety unit.
18. January 8, 2020 – Tabled at Veterans Memorial Park during High School Hockey game.
19. January 11, 2020 - A²Zero discussion with Washtenaw 350.
20. January 13, 2020 – Discussed A²Zero and opportunities for resident engagement with property manager of Arrowwood Hills.
21. January 14, 2020 – A²Zero presentation and discussion with the Energy Commission.
22. January 14, 2020 – A²Zero discussion with Clerks Office.
23. January 15, 2020 – Presentation and discussion on A²Zero to the Washtenaw Food Policy Council.
24. January 15, 2020 – A²Zero presentation at the Ann Arbor Housing Commission meeting.
25. January 17, 2020 – Youth and A²Zero discussion with local youth leaders.
26. January 17, 2020 – A²Zero and the Transportation, Energy, Environmental, and Planning Commissions.
27. January 21, 2020 – A²Zero discussion at the Slow Food Huron Valley member meeting.

28. January 21, 2020 – A²Zero presentation and discussion with the Huron Valley Sierra Club members.
29. January 21, 2020 – A²Zero meeting with Forest Hills Cooperative.
30. January 23, 2020 – Arrowwood Youth Conversation.
31. January 23, 2020 – A²Zero discussion with the Attorney's Office.
32. January 26, 2020 – A²Zero presentation and discussion with Citizens Climate Lobby members.
33. January 28, 2020 – A²Zero discussion with Ann Arbor's IT Department.
34. January 29, 2020 – A²Zero presentation to the Ann Arbor School Board.
35. January 30, 2020 – A²Zero Lunch and Learn United Way of Washtenaw County.
36. January 30, 2020 – Sustainability Forum in A²Zero and the Energy Sector.
37. January 30, 2020 – A²Zero presentation and discussion with neighbors in Pittsfield Village.
38. February 6, 2020 – A²Zero presentation and discussion with Main Street Association members.
39. February 8, 2020 – A²Zero tabling at the Ann Arbor Farmers Market.
40. February 12, 2020 – A²Zero presentation at Michigan Municipal League event.
41. February 13, 2020 – Sustainability Forum on A²Zero and Mobility.
42. February 13, 2020 – Shared details about A²Zero at Michigan Environmental Justice Summit.
43. February 15, 2020 – A²Zero presentation and discussion with Ann Arbor Indivisible.
44. February 18, 2020 – A²Zero materials shared at The Polar Vortex Climate Change and Weird Weather event.
45. February 19, 2020 – Bryant Community Center, A²Zero, & A2 Housing Commission Outreach.
46. February 19, 2020 – A²Zero presentation and discussion with the Transportation Commission.
47. February 19, 2020 – A²Zero and Climate Night Trivia.
48. February 20, 2020 – Presentation to Zingerman's Community of Businesses on A²Zero.
49. February 20, 2020 – Presentation on A²Zero to the Washtenaw Area Apartment Association.
50. February 20, 2020 – Presentation to the Ann Arbor Street Design Team on A²Zero.
51. February 22, 2020 – Dive-In Movie (Moana) and Climate Brainstorming.
52. February 22, 2020 – 2nd Carbon Neutrality Town Hall.
53. February 22, 2020 – Washtenaw 350 Environmental Justice Dialogues, including sharing details about A²Zero.
54. February 24, 2020 – A²Zero presentation and discussion with Finance Department.
55. February 26, 2020 – 21 Day Equity Challenge Summit and opportunity to share about A²Zero.
56. February 26, 2020 – A²Zero discussion at the Ann Arbor Climate Partnership meeting.
57. February 27, 2020 – A²Zero discussion with Environmental Commission.
58. February 27, 2020 – Climate change and the Great Lakes presentation and discussion about A²Zero.
59. February 27, 2020 – A²Zero forum with local and regional solar installers.
60. February 29, 2020 – A²Zero tabling at the Ann Arbor Farmers Market.

61. March 2, 2020 – A²Zero and Sustainability presentation to Washtenaw International High School.
62. March 4, 2020 – Climate Leadership Conference– Presentation on A²Zero.
63. March 6, 2020 – Presentation at the New Strategies for Resilient Local Economies about A²Zero.
64. March 9, 2020 – ²Zero presentation at the Local Food Summit.
65. March 9, 2020 – A²Zero presentation at Symposium on Societal Engagement in Climate and Space Sciences.
66. March 9, 2020 – A²Zero presentation to Old West Side Neighborhood Association Board of Directors.
67. March 18, 2020 – A²Zero discussion with Transportation Commission.
68. March 19, 2020 – Sustainability, A²Zero and Local Climate Action at Ford School.
69. March 26, 2020 – A²Zero discussion with Environmental Commission.

Postponed or Delayed Events

1. TBD: Neutral Zone Environmental Justice Forum with A²Zero (rescheduled due to weather).
2. March 11, 2020 – Climate Action Teach-In at University (Cancelled due to Coronavirus Pandemic).
3. March 11, 2020 – A²Zero and Student Engagement presentation (Cancelled due to Coronavirus Pandemic).
4. March 12, 2020 – Michigan Climate Action Summit and Panel on A²Zero and local climate action (Cancelled due to Coronavirus Pandemic).
5. March 12, 2020 – Wege Lecture on Sustainability (Cancelled due to Coronavirus Pandemic)
6. March 12, 2020 – Rise Up for the Earth – Community Earth Day Celebration brief introduction to A²Zero (Cancelled due to Coronavirus Pandemic).
7. March 14, 2020 – Finding the Middle Ground and American Climate presentation (Cancelled due to Coronavirus Pandemic).
8. March 14, 2020 – Climate Strategies: What actions will keep us at 1.5-2oC presentation (Cancelled due to Coronavirus Pandemic).
9. March 14, 2020 – Climate Change and the Great Lakes (Cancelled due to the Coronavirus Pandemic).
10. March 19, 2020 – Sustainability Forum on Carbon Neutrality in the Resource Sector at Downtown Library (Postponed due to Coronavirus Pandemic).
11. March 22, 2020 – Solar Faithful Workshop and discussion on A²Zero (Cancelled due to the Coronavirus Pandemic).

APPENDIX 2 – LIST OF TECHNICAL ADVISORY COMMITTEE MEETINGS

1. November 13, 2019 – Hosted four technical advisory committee meetings simultaneously to launch this element of our work. The four technical advisory committees were: 1) mobility; 2) energy; 3) resource reduction; and 4) adaptation and resilience.
2. December 16, 2019 – Adaptation and Resilience TAC meeting.
3. December 17, 2019 – Resource Reduction TAC meeting.
4. December 17, 2019 – Energy TAC meeting.
5. December 19, 2019 – Mobility TAC meeting.
6. January 9, 2020 – Adaptation and Resilience TAC meeting.
7. January 16, 2020 – Energy TAC meeting.
8. January 22, 2020 – Resource Reduction TAC meeting.
9. January 23, 2020 – Mobility TAC meeting.
10. January 27, 2020 – Adaptation and Resilience TAC meeting.
11. January 31, 2020 – Mobility TAC meeting.
12. February 6, 2020 – Resource Reduction TAC meeting.
13. February 11, 2020 – Adaptation and Resilience TAC.
14. February 21, 2020 – TAC celebration breakfast.

APPENDIX 3 – LIST OF A²ZERO PARTNER EVENTS

1. December 13, 2019 – Hosted first meeting of the A²Zero partners.
2. December 19, 2019 – Hosted equity and climate training for A²Zero partners.
3. March 20, 2020 – A²Zero partners only unveiling of the final strategy.

APPENDIX 4 – COUNCIL RESOLUTION IN SUPPORT OF CREATING A PLAN TO ACHIEVE ANN ARBOR COMMUNITY-WIDE CLIMATE NEUTRALITY BY 2030

..Title

Resolution in Support of Creating a Plan to Achieve Ann Arbor Community-Wide Climate Neutrality by 2030

..Body

Whereas, By adopting the Climate Action Plan (CAP) in 2012, the Ann Arbor City Council ("City Council") committed to an ambitious, multi-strategy vision to address climate change by reducing community-wide greenhouse emissions (8% by 2015, 25% by 2025, and 90% by 2050 relative to year 2000 baseline carbon dioxide equivalent (CO_2e) emissions levels);

Whereas, The Environmental Commission and many community and student groups have advocated for Ann Arbor's declaration of a climate emergency;

Whereas, The Office of Sustainability and Innovations ("OSI") was created in FY19 in order to actualize the goals created and reaffirmed by City Council;

Whereas, The Office of Sustainability and Innovations has created a 5-year work plan that will help the City achieve a 25% reduction in community-wide greenhouse gas emissions by the year 2025, based on 2000 levels;

Whereas, Despite the City's goals and progress to-date, the global climate is changing at a rate that necessitates bolder action to reduce greenhouse gas emissions, including getting to net zero emissions as soon as possible;

Whereas, Over 19,000 scientists have signed a Second Warning to Humanity proclaiming that "a great change in our stewardship of the Earth and the life on it is required, if vast human misery is to be avoided",

Whereas, City Council realizes that climate change has direct and pressing impacts on all aspects of public health, safety, and general welfare;

Whereas, Great community interest exists to support the efforts to achieve community-wide carbon neutrality in a just and equitable manner;

Whereas, The University of Michigan has convened The President's Commission on Carbon Neutrality (PCCN), which commission includes Ann Arbor staff, for the purpose of working together with community and regional partners toward shared carbon neutrality goals;

Whereas, Creating a climate neutrality plan is necessary to identify, plan for, budget, and work towards implementing the actions required to achieve community-wide carbon neutrality; and

Whereas, Funding for public engagement is available in the FY2020 Office of Sustainability and Innovations budget;

RESOLVED, That the Ann Arbor City Council declares a climate emergency and commits to take action as a result of that declaration;

RESOLVED, The Ann Arbor City Council supports a public engagement process, beginning immediately, that helps outline how the entire Ann Arbor Community could achieve carbon neutrality by the year 2030, a target date that is both ambitious and achievable;

RESOLVED, City Council requests that the City Administration develop a draft plan for how the Ann Arbor community could achieve carbon neutrality ("2030 Carbon Neutral Ann Arbor Plan") to be presented to Council not later than March 31, 2020 to support its presentation on Earth Day 2020;

RESOLVED, City Council directs the City Administrator to design and execute a community engagement process that culminates with a draft strategy for how the Ann Arbor community could achieve carbon neutrality around the year 2030;

RESOLVED, City Council direct the City Administrator to seek and facilitate collaboration with the University of Michigan and the PCCN to create and realize the 2030 Carbon Neutral Ann Arbor Plan; and

RESOLVED, City Council request the City Administrator to consider the likely outcomes of the in-development 2030 Carbon Neutral Ann Arbor Plan as he develops the FY21 Budget Planning process and, ultimately, the FY21 Budget.

Sponsored by: Mayor Taylor, Councilmembers Bannister, Smith, Ramlawi, Grand, Ackerman, Eaton, Nelson and Griswold

As Amended and Approved by Ann Arbor City Council on November 4, 2019

APPENDIX 5: LIST OF IDEAS CONSIDERED FOR A²ZERO

Through the A²Zero process, we received input from a diverse group of stakeholders, including technical experts, partner organizations, residents, and the general public interested in providing feedback to the A²Zero Initiative. Ideas were generated at public events, like the first A²Zero Town Hall, through multiple public surveys, and from four technical advisory committees. The Plan presented above includes the ideas evaluated to be the most impactful to reducing our community-wide emissions, fairly improving our community's quality of life, and the most feasible to implement. The list of ideas below serves to document the full list of ideas received, and to be turned to should adjustments to the Plan be required. Many of the ideas listed below would enhance our community, and is a testament to our community's dedication, creativity, and hopes and dreams.

TOPIC: ENERGY

Energy Production

- Regional methane digester
- Solar energy on greenbelt
- County/city energy efficiency and renewable energy concierge service
- Create microgrids
- Create community solar on non-city property, university of Michigan, municipal property, or Ann Arbor Public Schools
- Bulk-buy purchasing opportunities for renewable energy, energy efficiency, and electric vehicles and infrastructure
- Target high-energy "districts" with renewables, energy efficiency, electrification: residential, commercial
- Change solar incentives
- Create volunteer solar opportunities

Energy Efficiency

- New building requirements: energy efficiency, renewables
- Net zero affordable housing
- Reduce property taxes based on energy efficiency upgrades to buildings
- Develop carbon neutral districts: zero energy zones, 2030 districts
- DTE Energy on-bill financing for energy efficiency improvements
- Geothermal districts
- Require green/white roofs
- Energy disclosure policies: rental/single family/commercial

Electrification

- Require all existing appliances and HVAC systems be electrified
- Increase grid capacity for electrification

Financing

- Create financing opportunities/loan loss reserve
- Create carbon tax
- Create on-bill financing for renewable energy and energy efficiency projects

Sequestration

- Increase carbon sequestration practices in Ann Arbor

Offsets

- Offset programs

Education, Outreach, and Marketing

- Youth education on carbon neutrality
- Create information sessions on energy efficiency, electrification, renewables, and electric vehicles for different sectors

- Spread information about DTE Energy's existing energy efficiency programs
- Increase awareness of existing programs
- Change zoning laws to allow for more density
- Expedite permitting for more efficient construction
- Create more zoning opportunities for solar

TOPIC: MOBILITY

Motor Vehicle Electrification

- Require new construction to include EV charging stations and expand existing charging (chargers in low demand areas, car-sharing, ride-hailing, Park and Ride lots)
- Allow homeowners to make chargers available/charge others to use
- Encourage/support electrifying car-sharing. Implement a shared-use program (City)
- Incentivize/Convert fleets to EV (City, car sharing, ride-hailing, commercial delivery needs)
- Create a total cost of ownership target commitment for EVs
- Pair EV charging stations (both private and public) with solar power (and storage)
- Set up EV bulk buy program (for individuals, institutions, employers)
- Subsidize EVs and charging for low income households
- Organize buyback program for ICE vehicles
- Encourage pilot/autonomous vehicle programs, electric delivery options. Infrastructure (5G, DSRC, Wifi) that enables connected and autonomous vehicles
- Reduce congestion at chargers by using rotating system (people could be employed to switch chargers between cars?) that emphasizes fast charging, not charging to full battery
- Make battery recycle program for utility batteries to be used in school and public buses
- Hub deliveries to downtown (larger vehicles stay outside of downtown area and transfer deliveries to smaller green vehicles)
- DTE Energy: Coordinate a Workplace Charging Challenge with DTE, Leverage DTE rebates
- Require/encourage electrifying lawn equipment

Active Transportation

- Implement e-bike and e-scooter program to electrify short-distance travel. Offer safe options for riding e-bikes and e-scooters.
- Expand sidewalks and crosswalks in areas that are currently un-walkable
- Maintain and repair bike lanes preferentially (including clearing gravel). Improve snow-clearing to encourage biking and walking year-round.
- Make more bike lanes. Improve bike access to downtown. Increase regional/connected bikeways
- Make more protected bike lanes or elevated bikeways. Prioritize safety on scenic bike routes. Increase bike lanes separated from roads (greenways)
- Expand services like "Common Cycle," a volunteer-based bike repair clinic
- Encourage bike banks/bike sharing
- Provide City snow clearing of sidewalks
- Make interconnecting with public transit easier (allow bikes inside buses)
- Enforce codes protecting bikes and bike lanes (driving distance, parking and obstructions in bike lanes)
- Traffic signals reflect active transport needs and prioritize safety. Safer lighting for crosswalks and bike lanes.
- Add skywalks between major buildings

Transit and Paratransit

- Make public transportation free
- Expand Go-Pass area. Reduce transit fees/offer pass deals (annual)
- Expand TheRide bus routes and connect routes more
- Increase the speed and efficiency of bus transit. Provide rapid transit along major corridors
- Use better technology to make bus system more accurate, on-time, etc.
- Power bus stop shelters with solar power (security lighting, cameras, and info)
- Create bus and carpool lanes
- Create student shuttles to reduce demand for student cars (e.g. shuttle from campus to nearest grocery stores). Collaborate with/address UM transit. Work with UM to create incentives for students not to bring cars on campus. Make shuttle to WCC.
- Develop light rail (commuter, local). Develop electrified regional public transit
- Electrify TheRide vehicles
- "Right size" transit vehicles
- Create "mobility hubs" dispersed through city that act as home-base for multiple transit options (e-bikes, e-scooters, zip cars, bus stops, EV chargers, autonomous delivery vehicles, carpools, etc.)
- Improve public school transit (school of choice, etc.)
- Increase availability and convenience of Park and Ride lots for commuters
- Allow multiple modes of fare payment
- Encourage alternatives to flying (increase trains, etc.)

Policies, Funding, Public Outreach, and Education

- "Upzone" to encourage density and affordability. Make zoning allowances for mixed-use neighborhoods. Walkable grocery stores. Encourage tiny houses and accessory dwelling units (ADUs). Transit-oriented urban planning along transit corridors
- Build affordable workforce housing near workplaces to reduce commuting
- Incentivize work-from-home, 4-day-work-week, and shorter work day policies (with health care credits, bonuses, etc.) to reduce employee commuting. Provide free internet to support telecommuting
- Reduce availability of parking, reduce/eliminate parking minimums. Work towards a parking-space free campus. Tax vacant lots and development of new parking lots
- Enact car-free (or petrol-free) zones. Make downtown pedestrian-only on weekends, linked with shuttles from Park-n-Rides
- Implement odometer tax or congestion tax. Price vehicles on occupancy. Implement City gasoline tax on pumps/new development. Tax large local industries. Implement City income tax
- Enforce no idling laws
- Alter Act 51 (act for distributing funds for road infrastructure) to give locals more control over types of projects. Lobby for state policy that creates a dedicated funding source for non-motorized and electric transportation (like there is for highways)
- Lobby to eliminate state registration fees for EVs
- Increase education about biking and walking through middle and high school (there is nothing after Safety Town). Incentivize driver's education programs use EVs
- Create education, certification, and/or incentive program for auto dealers to sell EVs. Develop certification program for EV-qualified maintenance shops
- Leverage Forth Mobility for education and outreach
- Work with health-care systems to educate patients about health benefits of active transportation
- Leave behind level of service measures – use a better method like people through-put

- Adopt transportation pyramid (walking as priority to single occupancy driving at the bottom). Carbon neutrality mobility requirements in master plan
- Permeable pavement
- One-way street design
- Encourage carpooling for larger companies using apps
- Spotlight organizations who are taking action/success stories. Provide sample sites, pilots, and working examples of new ideas
- Help people understand their carbon footprint related to transportation and impact of changes

Process-Related

- Improve GHG tracking from transportation
- Using property taxes for funding can create equity concerns
- Always consider accessibility concerns
- Run lifecycle analysis on all ideas to see what is most effective
- Youth need to be at the table
- Carbon off-sets and sequestration (for travel)
- Plans from other communities with carbon neutrality goals (statewide coalition to move legislation at the state level)

TOPIC: RESOURCE REDUCTION

Waste Reduction

- Conduct environmentally-extended input-output analysis: City, University, hospitals
- Create a Zero Waste Plan
- Require all city-wide events be Zero Waste
- Leverage partnerships
- Report out on what happens to recovered waste
- Discourage landfilled waste:
  - Extend time between trash pick ups
  - Initiate payment by amount of trash model
  - Limit size of/availability of containers
  - Use funds from trash can fees for educational campaign
- Reduce single use plastics:
  - Organize a local cohort of business who do not use single use plastics
  - Tax/ban single use plastics (bags, takeaway containers, etc.)
  - Require bottle-filling stations
  - Encourage/enable price incentives for using reusable containers
  - A^2Zero branded compostable alternatives to single-use plastics
- Electrify waste truck fleet
- Choose/require methane recovery at landfills in active use

Recycling

- Renovate city-owned Materials Recovery Facility
- Develop new city-owned Materials Recovery Facility
- Educate public/resolve recycling uncertainty
- Eliminate drop-off fees for recycling

- Multi-stream recycling pick-up
- Neighborhood level recycling rather than drop-off
- Improve textile recycling
- Enforce recycling

Organics

- Address waste water
- Methane recovery on waste water (Cross cutting: Energy)
- Improve composting pick up:
- Accessible to commercial, industrial, multi-family
- Ease of use
- Year round composting
- Local composting:
- Compost in neighborhoods/locally
- Return to local farmers
- Provide free compost to residents
- Create compost market
- Encourage/incentivize/educate on homeowner composting
- Provide information on environmental impacts of different compostable materials

Plant Based Diets

- Scale pledge programs, Blue Zone Program
- Incorporate AAPS and institutions
- Provide cooking classes focused on plant-based, local, seasonal foods (Rec & Ed)
- Education/ban on commodity beef/CAFO meat

Local Food Production

- Scale community gardens/local food production
- Local food waste recovery (gardeners, farms, restaurants, grocery stores)
- Farmers Markets Expansion
- Year round
- More locations
- Expanded food hubs/food stops/local food in grocery stores
- Protect SNAP in appropriate scaled sizes
- Pilot local food subscription meals with circular/reusable packaging
- Collaborate with AAPS, UM on food planning, purchasing, and waste

Circular Economy

- Reskilling and skill sharing opportunities
- Repair centers for bikes, appliances, etc.
- Toy and tool library/shed, shared play areas
- Support thrift stores, reuse center, flea markets
- Create a time bank/local currency

Sustainable Purchasing

- Charge a carbon price on the embedded GHG of products
- Create a local market for reusable goods
- Closed loop reusable packaging
- Offer refillable bulk containers, takeout containers, cups (at point of sale)
- Create/enforce purchasing policies, guidelines, or incentives for:
  - Municipal operations
  - Institutions
  - Individuals
- Create consumption-based inventories for:
  - The City
  - Institutions

Construction and Development

- Require sustainable materials in new development

Community Engagement

- Engage with commercial and institutional sector
- Commercial reuse packaging program
- Accelerate/scale current data collection/plans:
  - Green Business Challenge
  - Engagement with private sector
  - Require/encourage disclosure from businesses/community groups

Community/Education

- Publicize available data/educate on:
  - Decreasing and recovering food waste
  - Reducing packaging, single use plastics
  - Purchasing transparency: traceable, embedded GHG, recyclability/compostable, Energy Star
  - Increasing composting and its benefits
  - What is recyclable and how to recycle
- Ongoing community engagement team (provide inventory management)
- Demystify terminology
- Compost at schools, local food at schools
  - School curriculum on environmental science
- Link to public health initiatives (diet, pollution)
- Recognition program for successes, spotlight organizations who are taking action
- Promote sample sites, pilots, and working examples

TOPIC: RESOURCE REDUCTION

Preparation

- Develop new/leverage existing infrastructure as resilience hubs
- Activate some homes as shelters with resources, energy, etc.
- Identify safe gathering points in neighborhoods during power outages, extreme heat/cold, etc.
- Conduct needs mapping of neighborhoods based on specific support residents require
- Generate neighborhood-based resiliency plans, incorporate residential best practices.

- Activate neighborhood climate ambassadors/captains to help
- Enable/organize ongoing training via Red Cross/CERT/partners
- Coordinate across Red Cross/AmeriCorps/partners
- Develop redundant communication (e.g., Code Red), not dependent on internet
- Assist/organize preparing/distribute residential emergency kits
- Host a National Preparedness Month campaign
- Engage behavior change scientists and define actors/actuators
- Conduct risk assessments and incorporate into planning
- Conduct a resilience-aesthetic charrette
- Strengthen relationships with other local governments

Community cohesion

- Activate strong neighborhood community networks that support local efforts
- Activate neighborhood welcome ambassadors
- Educate and engage community on the expected risks/how to prepare/how to respond, sharing experiences, climate tours
- Increase local workshops and space for public input
- Youth participation/education through actions/videos/ambassadors/curriculum/training/competitions
- Develop a program to recognize neighborhood-level efforts
- Enable/organize block parties for energy/resilience themes
- Provide support for emotional resilience, grief management, psychological services, etc.
- Create shared childcare programs.
- Create communal kitchens

Response

- Develop climate refugee support/networks
- Develop program to use city buses for evacuation and power sources during a disaster

Urban Planning

- Implement/leverage sensors and data to monitor heat, air quality, waterway and floods. Assist with drones for data/response.
- Track public health metrics from state and CDC
- Urban planning to moderate heat via shade trees, lighter contract, more rain gardens
- Design for increased urban density and walkability/bike-ability. Update city zoning.
- Street trees: Analysis of shading/inventory/update master plan/incentivize private tree planting
- Improve parking lot design standards for shading, storm water retention, heat island mitigation, trees
- Incentivize white/green roofs
- Purchase repetitive loss properties. Redevelop vacant space as green space.
- Prioritize affordable housing.
- Require all City functions be zero waste.
- Allow/encourage telecommuting

Energy

- Transition to underground power lines
- Create redundancy in energy systems (storage)
- Decentralize energy infrastructure. Incentivize individual energy production.
- Increase renewable energy systems, storage, microgrids, and community solar.

- Plan for higher energy loads due to increasing temperatures.

Green Spaces

- Connect green spaces
- Increase natural area preservation and stewardship for carbon sequestration and storm water management
- Educate on native and invasive plants
- Increase land use for local food production. Host an improved food infrastructure innovation challenge.
- Encourage fruit trees/foraging, collect fallen fruit. Allow food production on city lands in neighborhoods.

Water

- Enable/encourage water generation and reuse and natural water/flood capture systems
- Design flexible water systems that adapt to conditions
- Remove dams/coordinate dam management
- Use accessory dwelling units for drinking water security
- Add vegetated buffers along waterways for storm water management
- Stricter floodway/floodplain management/planning

Transportation

- Design roads for flexibility, networked, alternative transportation, slower traffic, storm water management, trees, boulevards, durability. Fully implement green streets.
- Leverage Common Cycle to keep bikes on the road
- Encourage/enable car sharing
- Minimize parking available
- Install EV chargers at stores/apartments

Residential/Commercial Support

- Define and educate on residential best management practices
- Create a resilience fund/funding focused on equity
- Educate on DTE Energy support for energy efficiency upgrades
- Strengthen building code for efficiency/weatherization. Require 2030 District standards across all buildings.

A2ZERO
EQUITABLE • SUSTAINABLE • TRANSFORMATIVE

Developing the Climate Strategy

Climate Equity Advisory Council

The Climate Equity Advisory Council (CEAC) provided feedback and guidance on developing actions that best support community needs. It informed the development of indicators used in the Community Vulnerability Assessment. The CEAC also developed equity-centered implementation recommendations for the strategy, called **Community Guidelines**.

1. Act in equitable and just ways
2. Build engagement through shared vision, goals, and practices
3. Put people first
4. Build community leadership & community action
5. Link & leverage actions to accelerate impacts
6. Strengthen policy and action that directly reduce emissions

Community Engagement

In 2021, the Office of Sustainability and Climate Strategy project team facilitated three town hall meetings and six focus group sessions to better understand resident perspectives and priorities for climate action.

Cross-Dept. Coordination

City departments were engaged throughout the development of the Detroit Climate Strategy to ensure that the strategies and actions align with City priorities.

Addressing Climate Change in Detroit

The City of Detroit's Climate Strategy is a framework for residents, businesses, City departments, and industry to achieve the City's greenhouse gas (GHG) emission goals and increase resilience as climate change impacts our daily lives.

This strategy builds on the Sustainability Action Agenda released by Mayor Duggan in 2019 and updated in 2022. It was developed collaboratively by the Office of Sustainability, the Climate Equity Advisory Council (CEAC), and was informed by extensive community engagement.

> *"Detroit has always been known for its determination, innovation and resilience. These qualities have shaped our history and will continue to be assets as we confront the pressing challenges posed by climate change."*
>
> Mayor Duggan, City of Detroit

Detroit Climate Strategy

This document outlines **4 strategies** and **35 actions** centered on mitigation (reducing GHG emissions) and resilience (adapting to the impacts of climate change).

1. **Transitioning to Clean Energy**
2. **Increasing Sustainable Mobility**
3. **Accelerating Energy Efficiency and Reducing Waste**
4. **Prioritizing Vulnerable Residents and Adapting to Change**
   - a. Reducing Flood Risks
   - b. Protecting from Extreme Heat
   - c. Improving Air Quality

scan this for full document

Want to learn more?

Learn more about the impacts of climate change, actions and targets to lower GHG emissions, and share your vision for a climate-friendly Detroit.

detroitmi.gov/sustainability

Detroit is transforming 250 acres of vacant land into solar energy

Prompted by a challenge issued by President Joe Biden for cities to use more solar power and the passage of the Inflation Reduction Act, Mayor Duggan launched an initiative to transform blighted areas into solar arrays. The initiative is paired with community benefits that can be used for energy efficiency upgrades to reduce residents' energy burden.

Office of Sustainability

Detroit Climate Strategy

Four Priorities

1 Transitioning to Clean Energy

Almost 70% of our citywide GHG emissions in 2018 came from the generation of electricity from dirty sources. Clean energy, like solar, does not produce GHG emissions, is renewable and is critical to cleaning up the air we breathe.

2 Increasing Sustainable Mobility

Sustainable mobility like walking, biking, transit and zero emission vehicles is critical to reducing GHG emissions and improving quality of life. Increasing mobility options ensures that all Detroiters can access clean, safe, affordable, and efficient ways to get around.

3 Accelerating Energy Efficiency and Reducing Waste

Reducing energy consumption in homes and buildings will reduce our GHG emissions, lower energy bills, and improve indoor and outdoor air quality. Recycling, composting, and reducing the amount of waste that we create also lowers GHG emissions, saves natural resources, and creates more jobs.

4 Prioritizing Vulnerable Residents and Adapting to Change

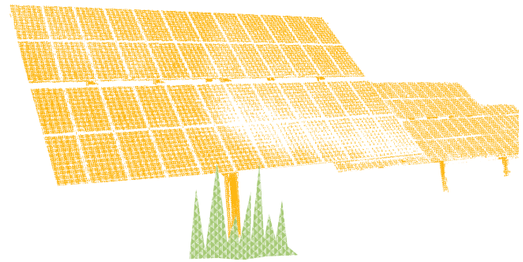
The intensity and frequency of extreme weather events have increased, and it is vital to strengthen the resilience of the city with a focus on our most vulnerable residents. For example, expanding the City's basement back up protection program ensures that more Detroiters stay dry during heavy rains.

View the full Detroit Climate Strategy Online

Find out more about the 35 actions and three-year targets that will help us meet our climate goals and improve everyone's quality of life.

www.detroitmi.gov/sustainability

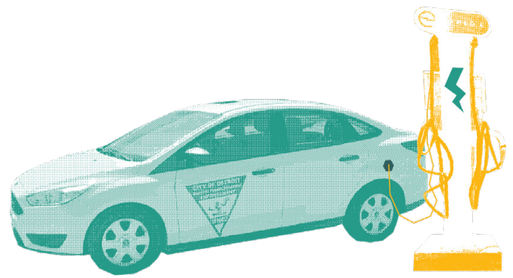
Action Highlights:



Clean Energy

Powering Detroit with Solar

The City has a goal of powering 100% of its municipal buildings with clean energy by 2034. This year, the Office of Sustainability, and Department of Neighborhoods partnered with environmental and energy organizations and community residents to host solar arrays and receive community benefits.



Sustainable Mobility

Installing EV Chargers Across the City

The Office of Mobility and Innovation is working to ensure Detroiters in every District have access to EV charging locations. In the next 3 years, 200+ publicly accessible EV chargers will be installed in City facilities, garages, on-street, and surface parking lots across Detroit.

Energy Efficiency

Assisting Residents and Lowering Energy Costs

Leveraging home repair programs, the City will support residents with roof and windows repairs, and weatherization, ensuring they can improve the insulation of their homes. This will help increase their comfort, and lower their energy costs.

Prioritizing Vulnerable Residents

Building Community Resilience

In October 2023, the City opened its first Resilience Hub at A.B. Ford Park. This Community Center is equiped to provide critical resources during outages, floods, heatwaves, and other climate emergencies. This Hub will be part of a broader network of Resilience Hubs across Detroit.

Detroit Climate Strategy: Implementation Table

STRATEGY	#	ACTION	3-YEAR TARGET	LEAD	PARTNERS
Transitioning to Clean Energy	1.1	Source 100% of municipal electricity from clean energy by 2034	Power 50% of municipal electricity with clean energy	OoS	INFRA
			Establish a pathway to 100% clean electricity		
	1.2	Launch a solar program to generate clean energy on City-owned sites and provide community benefits to residents	Issue a Request for Proposals for the deployment of solar energy on City-owned sites	OoS	INFRA
	1.3	Work with utility provider and private property owners to source 50% of Detroit's electricity from clean energy	Coordinate bulk purchasing of clean energy with businesses and other large energy users	OoS	INFRA
			Support community solar efforts		
Increasing Sustainable Mobility	2.1	Install 200+ public EV chargers at City facilities, garages, on-street and surface parking lots, covering every District	Install EV chargers in 7 commercial corridor lots	OMI	MPD
			Issue Executive Order requiring all municipal facilities with parking, including Recreation Centers, to have EV chargers installed by 2025		
			Leverage Federal funding to expand on-street charging		
	2.2	Pilot EV carshare services in neighborhoods underserved by transit	Ensure the presence of at least 2 publicly accessible EV car share vehicles at each Recreation Center	OMI	OoS
	2.3	Adopt ordinance requiring EV infrastructure for new developments	Adopt an ordinance requiring 20% of spaces in new developments be EV-capable	OMI	Legislative Policy
	2.4	Transition City light-duty vehicle fleet to 100% zero emission by 2034	Issue Executive Order requiring purchase of zero emission light-duty vehicles	GSD	OMI OCP
			Require that every Department have light duty Zero Emission Vehicles in their fleet		
	2.5	Transition City heavy-duty vehicles to zero emission and clean fuel options	Complete City fleet conversion plan	GSD	OMI OCP
			Implement City fleet conversion plan		
	2.6	Transition City bus fleet to electric or clean fuel buses	Procure zero emission buses as part of fleet transition	DDOT	OMI OCP
	2.7	Adopt a single pass for all forms of public transportation	Integrate at least 2 mobility modes (i.e. DDOT and MoGo)	OMI	DDOT
	2.8	Make equitable investments in pedestrian and cyclist infrastructure	Complete 8 miles of the Joe Louis Greenway, with a MoGo bike station at every mile of the greenway	DPW	PDD
			Invest $31 million in intersection safety improvements		
	2.9	Invest in public transit infrastructure to increase ridership	Improve reliability and timing of buses per the DDOT Reimagined Plan	DDOT	OoS
	2.10	Reduce miles traveled to goods and services	Launch master planning process citywide—increase policies for mixed use development and Transit Oriented Development (TOD)	DDOT	OoS
	2.11	Support mobility innovation and investment	Pilot inductive charging and associated activations on city roadways	OMI	OoS
			Expand the Transportation Innovation Zone		
			Launch a program to prepare youth for future mobility and innovation jobs		
Accelerating Energy Efficiency and Reducing Waste	3.1	Adopt an energy benchmarking ordinance	Collect annual energy and track water data for City buildings greater than 10,000 sq. ft	CDD	GSD
			Adopt an ordinance requiring benchmarking for targeted public and private buildings		
	3.2	Retrofit municipal facilities to reduce their use of energy and fossil fuels	Upgrade 25% of the largest energy using critical facilities, achieving at least 25% energy reduction	CDD	GSD
	3.3	Require all new municipal buildings to be all-electric or all-electric ready	Issue Executive Order requiring new municipal buildings to be all-electric or all-electric ready	OoS	BSEED
	3.4	Expand access to energy efficiency programs and electrification upgrades by leveraging existing home repair programs	Complete roof replacements for senior, low-income, and disabled Detroiters via the Renew Detroit Program	HRD	OoS
			Weatherize Detroiters' homes through the Low Income Home Energy Assistance Program and other programs.		

continue on next page

STRATEGY	#	ACTION	3-YEAR TARGET	LEAD	PARTNERS
Accelerating Energy Efficiency and Reducing Waste	3.5	Support development of financing programs for energy efficiency and electrification projects	Launch pilot financing program for commercial or multi-family buildings	DEGC	HRD
	3.6	Accelerate energy reductions in buildings of all scales through increased participation in education, incentives, and recognition programs	Work with partners to identify opportunities for broader buildings decarbonization	OoS	Detroit 2030 District
	3.7	Increase participation in waste reduction and recycling	Divert 15% of municipal solid waste from landfills	DPW	OoS
			Increase participation in curbside recycling to 60%		
			Increase the amount of food rescued and reduce food waste		
	3.8	Develop a zero waste plan to increase waste diversion	Publish a Zero Waste Strategy identifying long term targets for waste diversion and materials management	DPW	OoS
	3.9	Pilot community and commercial-scale composting initiatives	Pilot community food scrap and yard waste drop-off sites in partnership with local compost processor	DPW	OoS
			Pilot commercial composting in municipal buildings		
			Train health inspectors onfood donation and rescue,and provide resources toDetroit businesses		
	3.10	Work with other municipalities in the region to drive down industrial emissions	Create task force with relevant regional stakeholders to address industrial emissions	OoS	OoS
Prioritizing Vulnerable Residents and Adapting to Change	4.1	Develop a network of Resilience Hubs that serve as a resource in times of extreme weather events	Launch two additional Resilience Hubs in Detroit	GSD	DHSM
	4.2	Increase resident participation in Detroit's emergency management notification system - Detroit 365	Increase participation in Detroit 365 by 10%	DHSM	Comms
	4.3	Support neighborhood-level action on climate resilience and emergency preparedness	Launch 3 community engagements to support local communities on climate resilience	DoN	Comms
	4.4	Expand access to resources for recovery post extreme weather events at the household level	Develop a disaster recovery guide for residents and coordinate distribution via Resilience Hubs	DWSD	
	4.5	Coordinate with DTE on energy reliability improvements and support prioritization of power restoration to vulnerable communities	Work with DTE on pilot to bury electrical assets underground	OoS	DTE
			Upgrade at least three recreation centers with back up power		
	4.6	Advocate for electric service continuity during extreme weather events	Work with partners to support the continuity of electric service during extreme weather events	INFRA	OoS
	4.7	Implement large scale green stormwater infrastructure projects and conduct sewer system improvements and maintenance on a regular basis	Invest $30 million in infrastructure in Rouge Park	DWSD	
			Invest $42 million in infrastructure in Brightmoor		
	4.8	Expand sewer protection program resources in flood-prone areas of the City	Complete 10,000 lead service line replacements by 2025	DWSD	Grants
			Protect 1,000 homes with basement back up retrofits		
	4.9	Incorporate small-scale green stormwater infrastructure into City-funded capital projects	Incorporate green stormwater infrastructure in the design checklist for City capital projects	CDD	Grants
	4.10	Reduce the urban heat island effect and mitigate the impacts of extreme heat on public health	Plant 30,000 trees, starting with most blighted properties and areas	GSD	Health
			Update the Extreme Heat Action Plan		
	4.11	Work with partners to reduce truck pollution in areas with low air quality	Launch program for clean freight	BSEED	OMI
			Complete two green buffers (phytoremediation) along truck corridors and expand to other locations		
			Strengthen air quality mitigation at new industrial developments		

BSEED Buildings, Safety Engineering, and Environmental Department
CDD Construction & Demolition Department
DDOT Detroit Department of Transportation
DEGC Detroit Economic Growth Corporation
DHSM Department of Homeland Security and Emergency Management
DoN Department of Neighborhoods
DPW Department of Public Works
DWSD Department of Water and Sewage
GSD General Services Department
HRD Housing and Revitalization Department
INFRA Chief of Infrastructure
OMI Office of Mobility and Innovation
OCP Office of Contracting and Procurement
OoS Office of Sustainability
PDD Planning and Development Department

Sustainable Rochester

DEVELOPMENT FRAMEWORK

DRAFT March 1, 2018

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Acknowledgments

Thank you!

The participation and cooperation of Rochester community leaders, residents and members of the business community and other stakeholders in the preparation of the Sustainable Rochester Plan is greatly appreciated and we thank everyone who participated in its development.

The content in this Plan reflects the Rochester's commitment to sustainability and the on-going collaboration between the various City officials, administration, and boards and commissions.

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Purpose and Needs

Sustainable Rochester is a toolkit to help City administration, elected officials, decision makers, and potential developers understand and communicate about many, often competing impacts and benefits associated with development. Rochester is in a great position to guarantee the City's long-term environmental and fiscal sustainability. The City's current plans, policies, and regulations ensure that new development will be designed to be respectful of community norms. Sustainable Rochester will bridge a gap between code and creation with a common framework for discussing community benefits and potential impacts of new projects. Upon completion City Council, Planning Commission, and the Downtown Development Authority (DDA) will consider passing resolutions to adopt the Sustainable Rochester Development Framework as a current policy to assist in project evaluation. New projects in the City will be provided a Project Evaluation Worksheet to evaluate how the project contributes to each of the Development Components identified in the framework.

Guided by the City of Rochester staff and a Sustainable Rochester Steering Committee, the conceptual framework defines the following purpose for Sustainable Rochester:

PURPOSE

Sustainable Rochester is defined in terms of the quality of life for Rochester residents. Specifically, if the economic, social and environmental systems that make up Rochester are providing a healthy, productive, meaningful life for all residents, present and future. Sustainability is about understanding the connections and trade-offs between each element of a community's quality of life and analyzing and mitigating the effects of those trade-offs. Ultimately, Sustainable Rochester achieves balance between each element of quality of life and the needs of the current and future community.

Sustainable Rochester

Sustainable Rochester will be used to ensure responsible and sustainable development decisions. It embraces the City's existing sustainability goals, which are compiled into six Sustainability Values: Environmental Health, Mobility, Fiscal Strength, Public Services, Strong Neighborhoods, and Downtown Viability. Each element captures a facet of sustainability that positively influences Rochester's quality of life.

Together, this set of interrelated factors represents the primary elements that are necessary to evaluate the trade-offs associated with a specific commercial/residential/industrial development and how it affects the long-term sustainability of Rochester.

Sustainability Values and Development Components

The Sustainable Rochester Development Framework takes a similar approach to many communities throughout the United States that seek to measure quality of life and evaluate progress towards reaching specific targets. This framework combines the concepts identified in prescient studies along with the specific needs of City of Rochester to compose the underpinning framework for future evaluation. Specifically, we consider sustainable development evaluation in a systematic and comprehensive way, with a framework that is comprised of sustainable values, development components, and indicators (regional or local, illustrated on the following page).

» Six **Sustainability Values** represent the broad conceptual categories that define sustainability. Each sustainability value corresponds to existing City goals and policies.

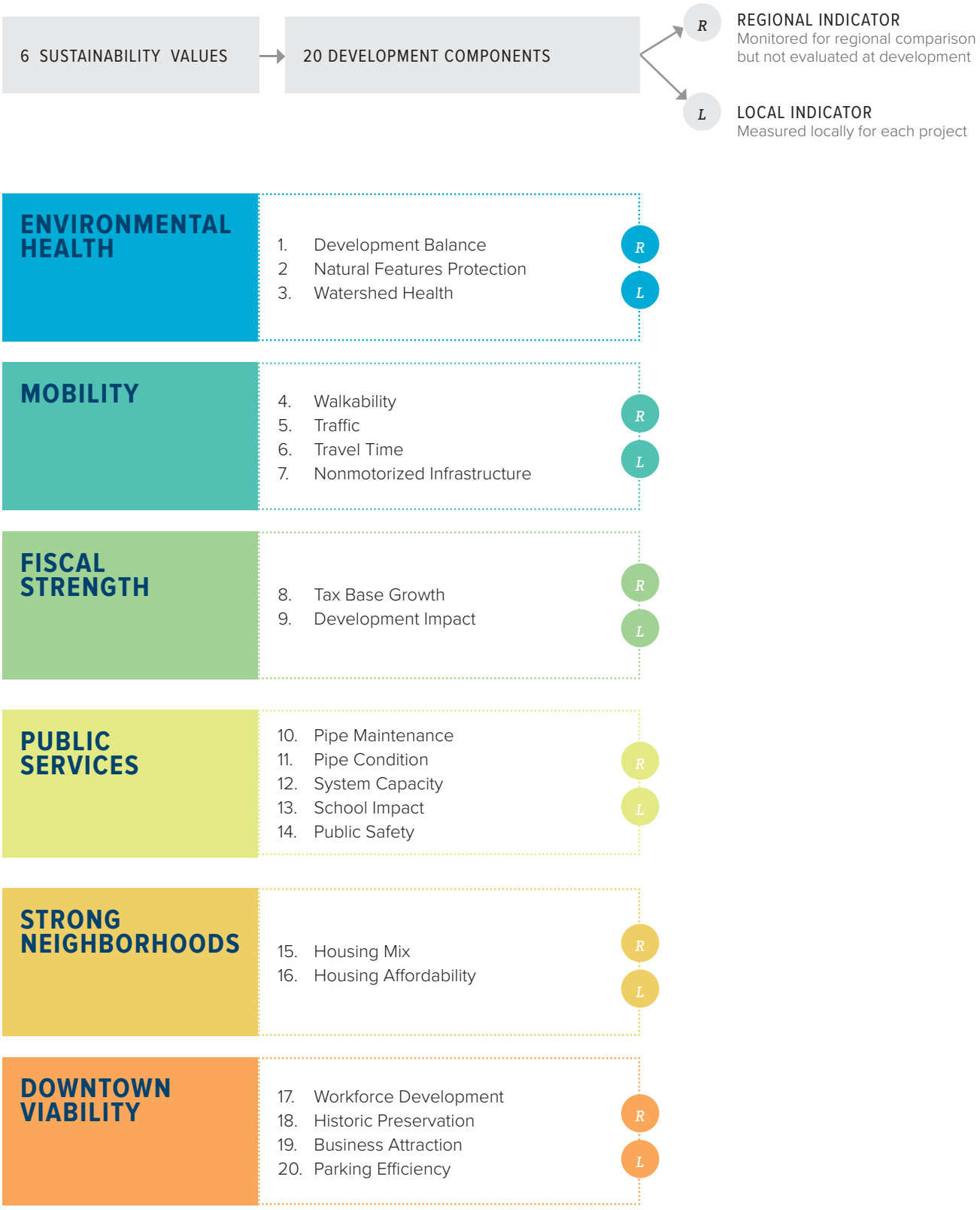
» Within each dimension are twenty **Development Components**: unique but related concepts that together make up each Sustainability Value.

» Each Development Component is divided into **indicators** that measure as many valid aspects of that Development Component as possible. Indicators are categorized as either regional or local:

- A **regional indicator** is a measurement that compares components of sustainability regionally (either to Rochester's surrounding communities or peer communities with similar historic downtowns). These measurements provide context to the City, serving as a measure of comparison and/or showing the City's regional position. These indicators also represent larger regional trends that the City of Rochester may not have a direct influence over such as traffic flow along major corridors, average commute time, and environmental factors concerning the regional watershed. Regional indicator data should be collected and evaluated every five years to illustrate changes in regional trends or how the City compares to other communities.

- A **local indicator** is a measurement that compares components of sustainability locally and at the time of development. These measurements can be obtained and/or changed on a property by property basis. A local indicator shows how a specific development project increases, maintains, or reduces the quality of life for Rochester residents. While these indicators are often able to be compared regionally (i.e. Parks & Open Space Acres / 1,000 Residents or Average Unit Price) they are meant to provide a fact-based comparison across developments and to existing conditions within the City.

FIGURE 1: PROJECTS EVALUATED BASED ON THE 6 SUSTAINABILITY VALUES AND 20 DEVELOPMENT COMPONENTS.



Project Scoring

A Project Evaluation Worksheet has been developed as an appendix to this report for developers to evaluate how their projects score based on the Development Components and identified local indicators, baselines and targets. Each indicator is a threshold criterion which will either be met or not met by the projects. If a project moves the needle in the right direction, it will be given a point for meeting the threshold criteria for the respective indicator. The final Sustainability Score for each project will be a 1 to 20, with 20 being the highest score.

Threshold Criteria out of 20 Points

0-7	8-14	15-20
NOT SUSTAINABLE	**MUST MITIGATE**	**SUSTAINABLE**
[does not meet City goals]	[report exceeds criteria(s)]	[meets City Goals]

The City's appointed Sustainability Coordinator will provide a Sustainable Project Evaluation Report for each project to assess project strengths and weaknesses. Projects that score in the lower third will generally be asked to revise submissions to better conform with City requirements. Projects that score in the middle third (8 to 14) may have some areas where they excel and can mitigate for project impacts or values where there are project deficiencies. The upper third will generally be determined to have met the City's sustainability goals and the Project Evaluation Report will describe the benefits associated with the project.

The result of this process will be consistent and fair evaluation across project submittals and no one project will be required to address all goals. Using this method the City can over time evaluate development trade-offs and move toward a sustainable vision for the future.

Strategic Action Plan

The Strategic Action Plan outlines strategic actions for the City and others to pursue in order to implement the Sustainable Rochester Development Framework. The strategies and actions outlined for each Sustainability Value will help the City to implement and institutionalize Sustainable Rochester.

1	Development Framework Implementation	PRIORITY	TIMEFRAME	PARTNERSHIPS
STRATEGIES + ACTIONS	**1.1** Adopt the Sustainable Rochester Development Framework by resolution as a formal City policy for evaluating development at City Council, Planning Commission, and the Downtown Development Authority.	A	< 6 Months	CITY, CC, PC, DDA
	1.2 Appoint Sustainability Coordinator to formally evaluate projects and support City Administration, Council/Commissions, and the public.	A	< 6 Months	CITY
	1.3 Appoint a Sustainable Rochester Committee to monitor indicator progress and make recommendations on implementation activities or assign this to Planning Commission.	B	1 year	CITY, CC, PC, DDA, CM, BO
	1.4 Complete an annual Sustainable Rochester progress report to provide status updates on indicator progress and project evaluation results.	B	1 year	CITY
	1.5 Conduct a Master Plan and Zoning Ordinance Audit to identify necessary revisions and amendments to implement Sustainable Rochester and incorporate the revisions identified.	C	1+ years	CITY

A	Environmental Health	PRIORITY	TIMEFRAME	PARTNERSHIPS
STRATEGIES + ACTIONS	**A.1** Consider developing a green initiative program that incentivizes green roofs and/or solar panel titles/roofs.	C	1+ years	CITY, UC, DPW, PC
	A.2 Identify high priority parks and open space activities in and near Downtown and continue to maintain a current Parks and Recreation Plan.	C	1+ years	CITY, DPW
	A.3 Develop a Citywide geolocated tree inventory and update tree mitigation requirements in the Zoning Ordinance.	C	1+ years	CITY, DPW
	A.4 Continue to work with the Clinton River Watershed Council in evaluating projects that affect the Sustainable Rochester development indicators.	B	1 year	CITY, DPW, CRWC

B	Mobility	PRIORITY	TIMEFRAME	PARTNERSHIPS
STRATEGIES + ACTIONS	**B.1** Complete a City of Rochester Mobility Plan to plan infrastructure, operations, technology and behavioral strategies to improve network function in the City.	C	1+ years	CITY, DPW, MDOT, DDA, PC, CC, CM, BO
	B.2 Set an overall Citywide Vehicle Level Of Service (LOS) goal of C and consider Multimodal Level of Service indicators in all traffic evaluation.	B	1 year	CITY, DPW, CC, PC, DDA
	B.3 Identify high priority planned trail, biking, and pedestrian connections and amenities in the City for near-term mobility improvements. Specifically consider strategic placement of bike lanes, bicycle racks, and designated cut out lanes for ridesharing pickups and drop-offs.	A	< 6 Months	CITY, DPW, CM
	B.4 Consider piloting a bike-sharing program.	C	1+ years	CITY, CC

C	Fiscal Strength	PRIORITY	TIMEFRAME	PARTNERSHIPS
STRATEGIES + ACTIONS	**C.1** Continue to maintain and update the City Capital Improvement Plan (CIP) and identify projects that are supported by the Sustainable Rochester Development Framework.	C	1+ years	CITY, DPW, CC, PC
	C.2 Track increases to taxable value resulting from development projects evaluated using the Sustainable Rochester Development Framework and consider revising the City budget to use the value added to achieve the City's Sustainability Values.	C	1+ years	CITY, DPW, CC
D	**Public Services**	**PRIORITY**	**TIMEFRAME**	**PARTNERSHIPS**
STRATEGIES + ACTIONS	**D.1** Identify the top 5 public works projects outlined in the City's asset management planning process that will most benefit Rochester's long-term sustainability and work to develop partnerships for implementation.	B	1 year	CITY, DPW, CC
	D.2 Consider the adoption of Smart City infrastructure initiatives.	C	1+ years	CITY, DPW, CC
	D.3 Address City emergency response times through operational and capital investment and update Sustainability measures as improvements are made.	B	1 year	CITY, CC
E	**Strong Neighborhoods**	**PRIORITY**	**TIMEFRAME**	**PARTNERSHIPS**
STRATEGIES + ACTIONS	**E.1** Consider developing a local affordable housing incentive program and work with the Oakland County Community & Home Improvement Division to coordinate implementation.	C	1+ years	UC, CITY, DDA
	E.2 Consider to implement the local historic district, historic commission, and historic preservation guidelines and work with the Oakland County Community Historic Commission and the Rochester-Avon Historical Society to coordinate implementation.	C	1+ years	BO, CITY, DDA
F	**Downtown Viability**	**PRIORITY**	**TIMEFRAME**	**PARTNERSHIPS**
STRATEGIES + ACTIONS	**F.1** Develop incentives for new developments to provide public parking or event parking to serve Downtown.	B	1 year	DDA, BO, CM
	F.2 Develop an updated retail and job market study to quantify retail and office space needs in the downtown area and work with developers to incorporate suitable tenant spaces into structures.	C	1+ years	DDA, CM, BO
	F.3 Continue marketing and outreach efforts to maintain Rochester's role as the regions premier Downtown.	Ongoing	Ongoing	DDA, CITY, CM, BO

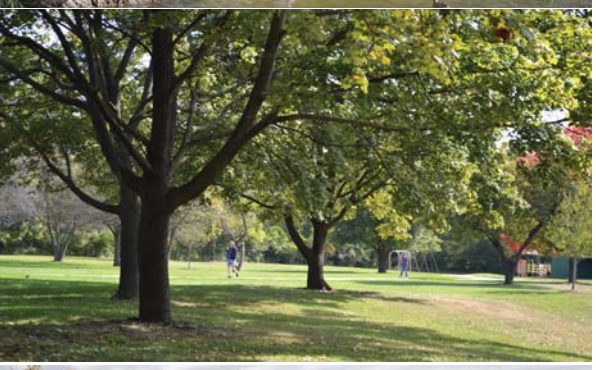
LEGEND

PRIORITY

- A Top Priority
- B Near-Term Priority
- C Long-Term Priority

PARTNERS

BO	Business Owners
CC	City Council
CITY	City of Rochester Administration
CM	Community Members
CRWC	Clinton River Watershed Council
DDA	Downtown Development Authority
DPW	Department of Public Works
OC	Oakland County
PC	Planning Commission
MDOT	Michigan Department of Transportation
UC	Utility Companies



Environmental Health
Sustainability Value #1

PROACTIVE APPROACH

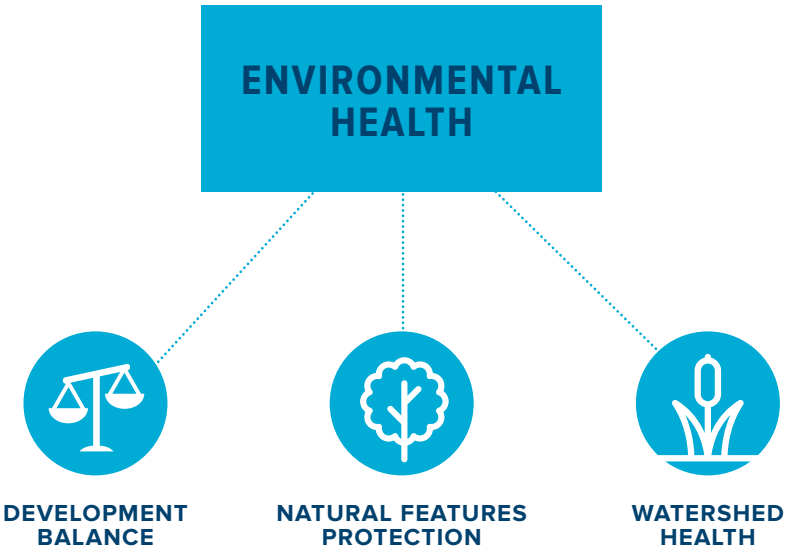
The following goals and strategies have been adopted by the City of Rochester in an effort to proactively work towards environmental sustainability. Additional policies can be found in the City's adopted Master Plan.

MASTER PLAN GOALS

1. Preserve, maintain and protect sensitive natural features.
2. Provide park facilities for the enjoyment of all residents and visitors.

MASTER PLAN STRATEGIES

1. Carefully consider methods to preserve natural features for the enjoyment of the current and future population.
2. Improve park facilities in order to maintain them as viable recreation areas.
3. Enhance Rochester's facilities by developing existing land for parks and recreation.



DEVELOPMENT COMPONENT	INDICATOR	BASELINE	TARGET / FUTURE TREND
1 *Development Balance*	**1.1 Regional** Percent of Land Use: Impervious Surfaces	36.6%	Reduce
	1.2 Local Parks and Open Space Acres / 1,000 residents	24.8 acres / 1,000 residents	10% increase
2 *Natural Features Protection*	**2.1 Regional** Percent of Land Use: Tree Canopy	31.1%	Grow
	2.2 Local Net Tree Change	Site specific	15% increase in total number of trees
3 *Watershed Health*	**3.1 Regional** Beneficial Use Impairments (BUI) of the Clinton River Watershed	8 BUIs	Reduce
	3.2 Local Development within Flood Hazard Zones	Existing development within flood hazard zones	0% net increase

Development Balance

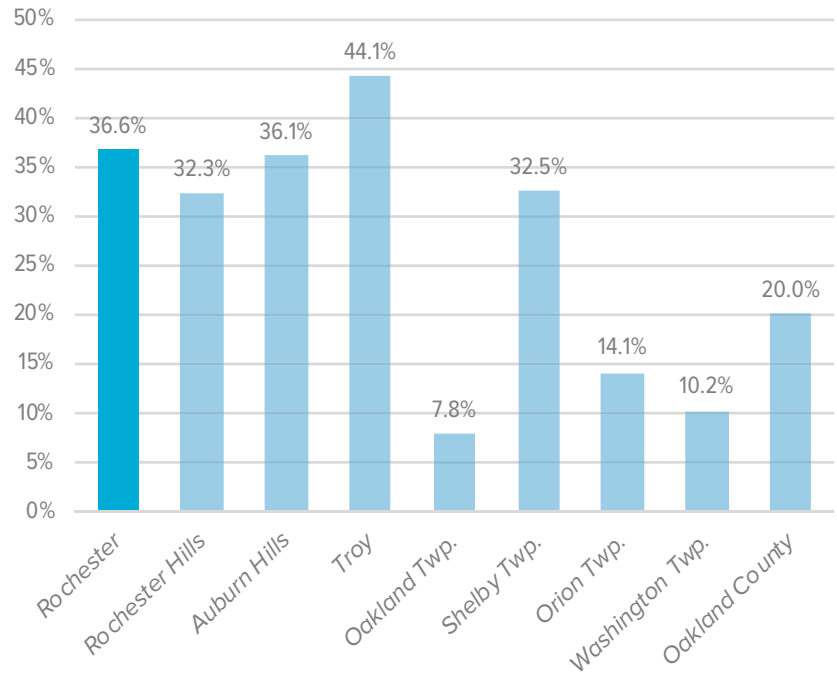
1.1 **Percentage of Land Use: Impervious Surface**

BACKGROUND:

Impervious surface cover refers to anything that water cannot penetrate. Ranging from residential rooftops, patios and driveways to city roads, public buildings, commercial surfaces, and parking lots. Impervious cover prevents rain and snow from soaking into the ground, turning it into stormwater runoff. Impervious cover also changes the quantity and speed of runoff causing more rapid and intense flooding.

The percent of land use classified as impervious surface measures development within a jurisdiction, specifically development that is sprawling and/or intensive in use compared to the amount of property available to develop.

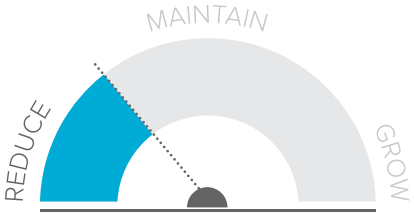
PERCENT OF LAND USE: IMPERVIOUS SURFACE (2010)



BASELINE

36% of land use covered by impervious surface

FUTURE TREND



Reduce

CURRENT TREND:

Of the City's surrounding communities, Rochester has the second largest percentage of its land use dedicated to impervious surface (36.65%), second only to the City of Troy.

In comparison to the adjacent Townships, Rochester is nearly completely built out with few green fields left for development.

A focus on greening roofs could help reduce Rochester's impervious surfaces.

Source: SEMCOG Land Use Estimate, 2010

Development Balance

1.2 **Parks and Open Space Per 1,000 Residents**

BACKGROUND:

Parks and open space are critical to preserving natural resources and wildlife habitats, which offer significant social and economic benefits. The number of residents per park serves as a proxy for measuring the degree of development and population density as it relates to provision and preservation of open space.

The National Recreation and Parks Association publishes annual research that benchmarks the country's park providers' averages and recommended standards for this measure. In 2017, the national park acreage per 1,000 residents was 9.6.

AREA WITHIN 0.5 MILES OF A PUBLIC PARK OR OPEN SPACE

See **Map 10** in the Sustainable Rochester Map Book Appendix.

BASELINE

24.8 acres per 1,000 residents

TARGET EVALUATION

10% increase

EVALUATION CRITERIA

1. Number of units
2. Acres of open space

CURRENT TREND:

Rochester has 24.8 acres of park area for every 1,000 residents. While this number exceeds the 9.6 acres / 1,000 residents' standard established by the National Recreation and Park Association, nearly 100% of residents live within 0.5 miles of a park facility.

Land use patterns indicate that many portions of Rochester are built-out and/or contain environmentally sensitive areas which cannot easily be developed into parks facilities. Eastern Rochester (as compared to the downtown and western Rochester) has less public recreational facilities. However, private open spaces located within newer subdivisions may be addressing the need of those neighborhoods.

Source: City of Rochester Parks and Recreation Plan, American Community Survey, 2016

Natural Features Protection

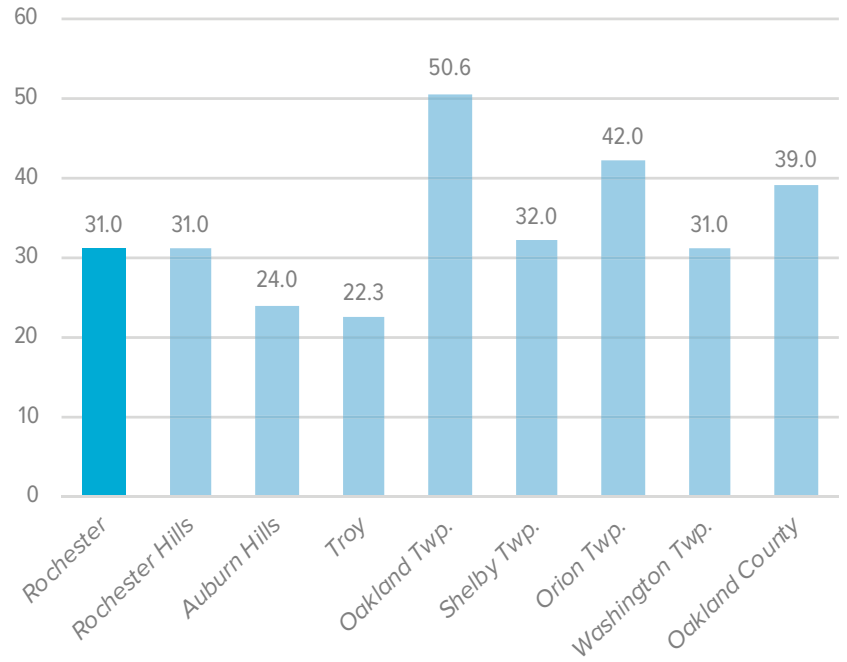
2.1 **Percentage of Land Use: Tree Canopy**

BACKGROUND:

Tree canopy provides multiple benefits to the region and to communities. It enhances quality of life and improves aesthetics of the area. Tree canopy also provides habitat and connections for wildlife and shades streams to provide cooler water for area fish.

Tree canopies improve water quality by interrupting rainfall during storms and slowing the rate of flow of rainwater into storm sewers, rivers, and streams. This allows more rainwater to infiltrate the ground, reduces erosion, and reduces the amount of pollution carried by rain into water bodies.

PERCENT OF LAND USE: TREE CANOPY (2010)



BASELINE

31% of land use covered by the tree canopy

FUTURE TREND

Grow

CURRENT TREND:

Despite its relatively high percentage of impervious surface cover (compared to adjacent communities), Rochester is about average in the amount of its land that is covered by tree canopy. Its percentage is larger than the more urban inner ring communities (Auburn Hills and Troy) but less than the developing Townships. The percentage of tree canopy varies from over 50.6% to 22% in the counties and municipalities throughout Southeast Michigan. In order to realize the multiple benefits of tree canopy (e.g., air quality benefits, improved sense of place, habitat connection, reduced stormwater into our rivers and lakes), SEMCOG recommends a 40 percent target.

Source: SEMCOG Land Use Estimate, 2010

Natural Features Protection

2.2 **Net Tree Change**

BACKGROUND:

Tree canopy is an important sustainability measure that supports numerous social and sustainable outcomes.

Trees provide necessary habitat, improve aesthetics, add to a pedestrian friendly downtown, increase local property values—including local business revenue—and provide water- and air-quality benefits.

The net number of trees shows the community's effort in preserving and/or expanding tree coverage within a community.

EXISTING TREES IN ROCHESTER

BASELINE

Site specific

TARGET EVALUATION

15% increase in total number of trees

EVALUATION CRITERIA

1. Existing number of trees
2. Number of trees to be removed
3. Number of trees proposed for planting (or payment in lieu, if applicable)

CURRENT TREND:

No benchmark data is available at this time. We recommend that the City of Rochester begin tracking the number of trees planted / removed annually, as well as for each development project.

This indicator will be crucial to determine, on a project by project bias, if a development will bring the City closer to its goal to protect natural features by ensuring there is a positive number of trees added to the City each year.

Watershed Health

3.1 Beneficial Use Impairments (BUI) of the Clinton River Watershed

BACKGROUND:

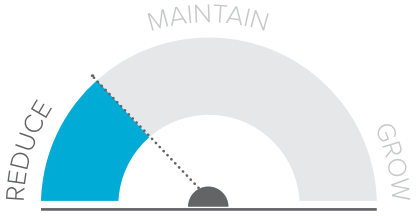
The Clinton River and Paint Creek are just two of the incredible natural resources that contribute to the environmental quality of life in Rochester. The Clinton River, specifically, is a major resource throughout the region. However, due to historic industrial and municipal discharges the watershed was labeled as an Area of Concern by the Environmental Protection Agency.

The original listing of Areas of Concern (AOC) within the Clinton River was based on the presence of beneficial use impairments (BUI). The Clinton River currently has eight identified BUIs out of 14 possible. The Clinton River BUIs are: 1) Restrictions on Fish and Wildlife Consumption; 2) Degraded Fish and Wildlife Populations; 3) Beach Closings; 4) Loss of Fish and Wildlife Habitat; 5) Eutrophication and Undesirable Algae; 6) Degradation of Benthos; 7) Degradation of Aesthetics; 8) Restrictions on Dredging Activities.

BASELINE

Eight BUI's identified for the Clinton River Watershed

FUTURE TREND



Reduce

CLINTON RIVER WATERSHED, MICHIGAN

CURRENT TREND:

The Clinton River Public Advisory Council (PAC) has successfully been working in partnership with the Michigan Department of Environmental Quality (MDEQ) and the U.S. Environmental Protection Agency Great Lakes National Program Office (EPA-GLNPO) to prioritize restoration projects that will lead to BUI delistings.

In 2015, $20 million dollars were awarded for major Great Lakes Restoration Initiative projects in the Clinton River Area of Concern. These funds contribute to the removal of the loss of fish and wildlife habitat, restrictions on fish and wildlife consumption, and degradation of fish and wildlife populations through wetland and habitat restoration.

The City has received $1.3 Million in grants for upgrade and restoration of Paint Creek, a stream within the Clinton River watershed, which is one of the few natural reproducing cold water trout streams in southeast Michigan.

Source: U.S. Environmental Protection Agency, 2018

Watershed Health

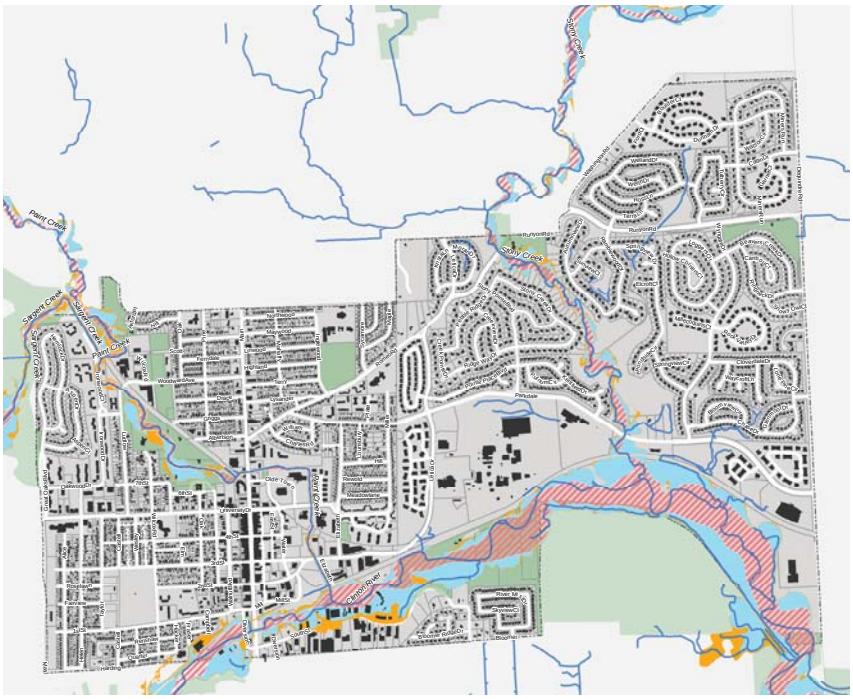
3.2 **Development within Flood Hazard Zones**

BACKGROUND:

Floodplains or flood hazard zones are land areas adjacent to rivers and streams that are subject to recurring high waters. There are different classifications of flood hazard zones that illustrate the probability and consequences of a flooding event. Owing to their continually changing nature, floodplains and other flood-prone areas need to be examined in the light of how they might affect or be affected by development.

The City of Rochester should strive to keep development at a minimum in its flood risk zones or ensure that development mitigates its impact to the flood system by incorporating best practices in stormwater management.

FLOOD HAZARD ZONES

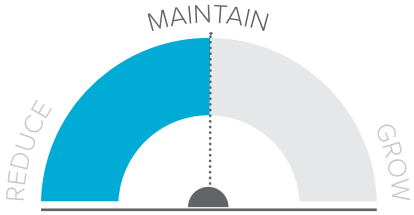


*See **Map 12** in the Sustainable Rochester Map Book Appendix.*

BASELINE

Existing development within flood hazard zones

FUTURE TREND



0% increase

EVALUATION CRITERIA

1. Existing site location
2. Mitigation strategies (if location is within Flood Hazard Zones)

CURRENT TREND:

The flood hazard zones within the City extend into the flat areas from the Clinton River, Stoney Creek, and Paint Creek. The flood hazard zones surrounding Paint Creek and Stony Creek have been preserved from development, with most of the land being dedicated open space.

Along the Clinton River, the flood hazard zones are also largely undeveloped with just one identified building within the 0.2% Annual Change Flood Hazard Zone.

Source: Federal Emergency Management Agency, 2018

Mobility
Sustainability Value #2

PROACTIVE APPROACH

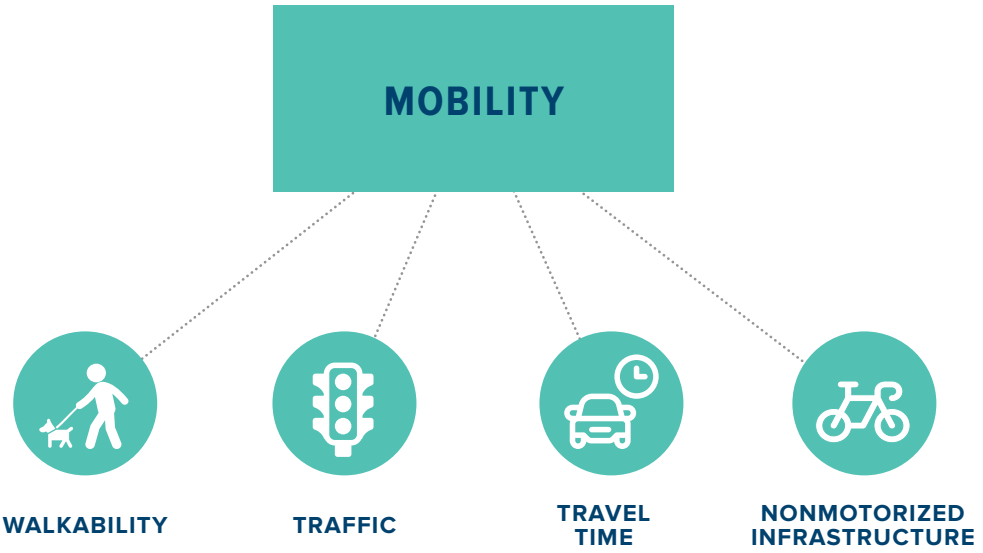
The following goals and strategies have been adopted by the City of Rochester in an effort to proactively work towards mobility - to improve traffic access and flow, and promote the use of pedestrian-friendly and bike-oriented facilities throughout the City. Additional policies can be found in the City's adopted Master Plan.

MASTER PLAN GOALS

1. Promote a pedestrian-friendly atmosphere throughout the community.
2. Develop better methods to control traffic flow through the City.

MASTER PLAN STRATEGIES

1. Evaluate traffic signal placement and enforce speed limits in order to promote a more pedestrian-friendly downtown.
2. Continue development of a pedestrian and bicycle route network as an alternative means of non-motorized transportation.
3. Evaluate and improve traffic signal timing for a more efficient movement of traffic.
4. Improve the public transportation system by working with neighboring communities and educational institutions.
5. Maintain roadways so as to provide safe and efficient access throughout the community.
6. Evaluate developing enhanced roadway access and connectivity from downtown to the southern and eastern areas of the City.



DEVELOPMENT COMPONENT	INDICATOR	BASELINE	TARGET / FUTURE TREND
4 *Walkability*	**4.1 Regional** National Walkability Index	4.3 - 11.2 walkability index score	Grow
	4.2 Local Intersection Density	20.8 - 192.3 / square mile	10% increase
5 *Traffic*	**5.1 Regional** Overall Traffic Counts	8,833 - 31,799 AADT	Maintain baseline
	5.2 Local Trip Generation	Site Specific - ITE peak hour trip generation average of adjacent parcel(s)	5% higher trip generation than average of adjacent parcel(s)
6 *Travel Time*	**6.1 Regional** Average Commute Time	27.7 minutes	Reduce
	6.2 Local Intersection Delay	Site specific	15% higher peak hour intersection delay
7 *Nonmotorized Infrastructure*	**7.1 Regional** Regional Nonmotorized Infrastructure	2,291 miles	Grow
	7.2 Local Nonmotorized Transportation Infrastructure	61 miles	15% increase

Walkability

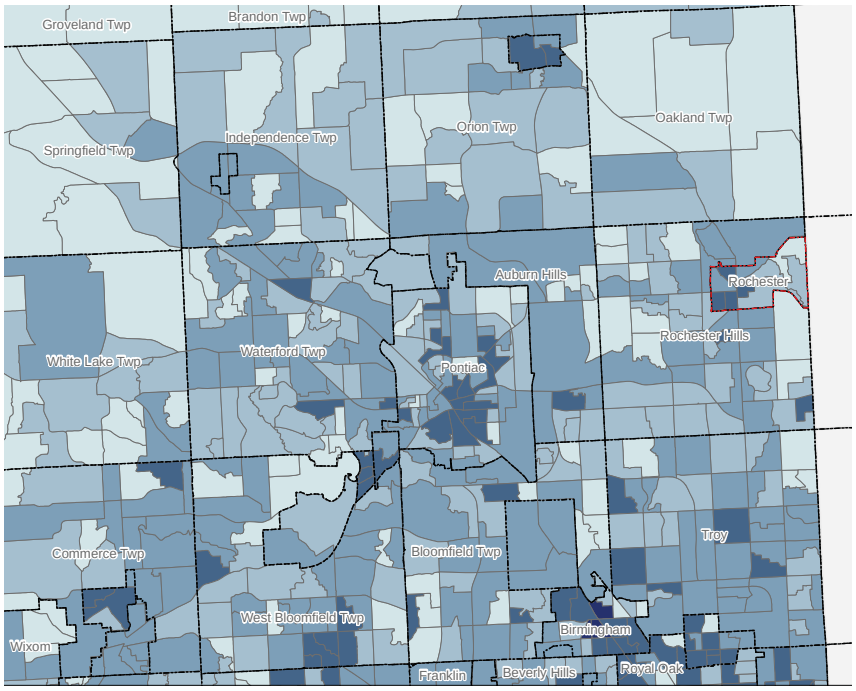
4.1 **National Walkability Index**

BACKGROUND:

Walkability indicates sustainability by demonstrating the viability of place independent of motor vehicles.

When a place is highly walkable, people are more likely to conduct daily errands within walking distance of where they live, are more likely to visit multiple businesses, and are more likely to contribute positively to the economic well-being of their community. Thriving walkable areas in Southeast Michigan are seen as highly desirable places to live.

NATIONAL WALKABILITY INDEX (1-20)

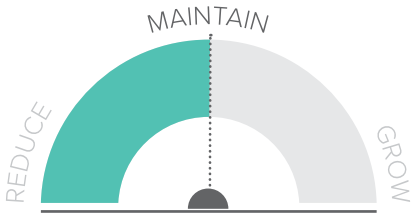


*See **Map 13** in the Sustainable Rochester Map Book Appendix.*

BASELINE

4.3 to 11.2 walkability index score

FUTURE TREND



Grow

CURRENT TREND:

Rochester's highest walkability index score (11.2) is concentrated in the southwest corner and the northwest/northeast parts of the downtown. Within proximity to Rochester, there are only a few walkable areas, reinforcing the fact that the City's downtown serves as the city center and as a destination for Oakland Township, Shelby Township, Rochester Hills and beyond. The downtown area of Birmingham scores as the most walkable area in Oakland County and is also considered one of the area's downtown and destination centers.

Source: U.S. Environmental Protection Agency, 2018

Walkability

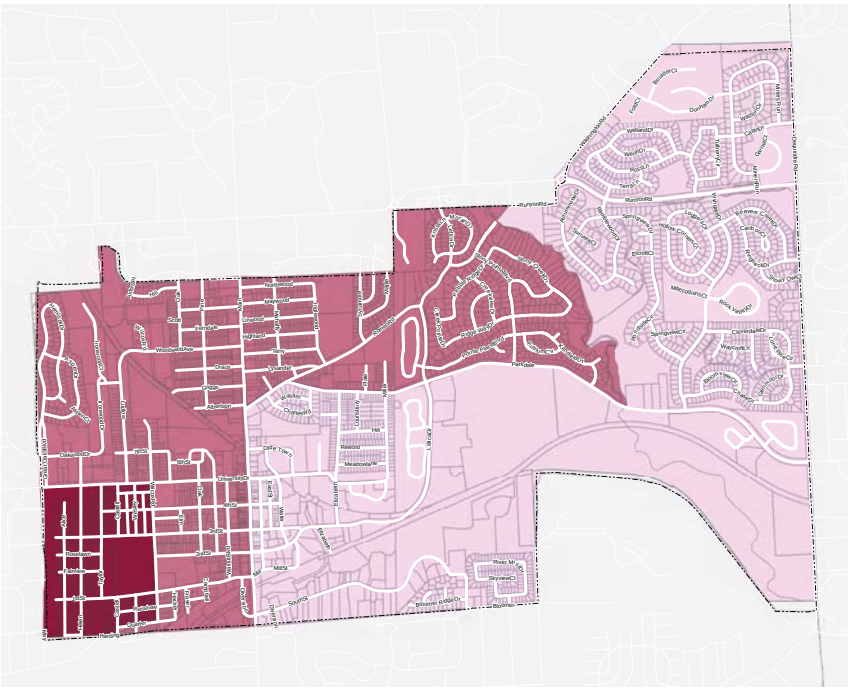
4.2 **Intersection Density**

BACKGROUND:

Intersection density uses the number of intersections in the roadway network and other information as a measure of the walkability of a location. When intersections are close together, the resulting blocks are smaller which encourages people to walk through a place rather than around it.

Intersection density can be measured using two different ways. Some state DOTs have requirements for a certain level of intersection density for new developments.

INTERSECTION DENSITY

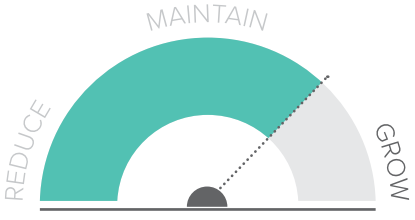


*See **Map 14** in the Sustainable Rochester Map Book Appendix.*

BASELINE

20.8 to 192.3 per square mile

TARGET EVALUATION



10% increase

EVALUATION CRITERIA

1. Number of proposed pedestrian connections

CURRENT TREND:

The traditional grid network of roads, often seen in older cities, generally has a high intersection density. The subdivisions typically built in the postwar era with curvy roads and cul-de-sacs, often seen in the suburbs, generally has a low intersection density. The western half of Rochester which is built out in a grid has a higher intersection density than the eastern half.

Source: U.S. Environmental Protection Agency, 2018

Traffic

5.1 **Overall Traffic Counts**

BACKGROUND:

Traffic counts are collected at certain locations along the roadway to calculate the Average Annual Daily Traffic (AADT) at a particular time (and are adjusted to account for seasonal variations in traffic patterns). SEMCOG gathers traffic count data for the Southeast Michigan region from county road commissions, local communities in Southeast Michigan, the Michigan Department of Transportation, and by consultants specializing in traffic data collection. Traffic counts often follow the roadway functional class as each roadways are designed to handle a certain traffic volume.

Traffic counts can indicate sustainability in different ways - a low traffic count is potentially indicative of a safe, walkable area for pedestrians, but it could also mean there is not much in the immediate area to attract people (and vehicles). A high traffic count may indicate a congested environment that is not very walkable, but it could also mean that the area is thriving with activity and increased opportunities for mixed use.

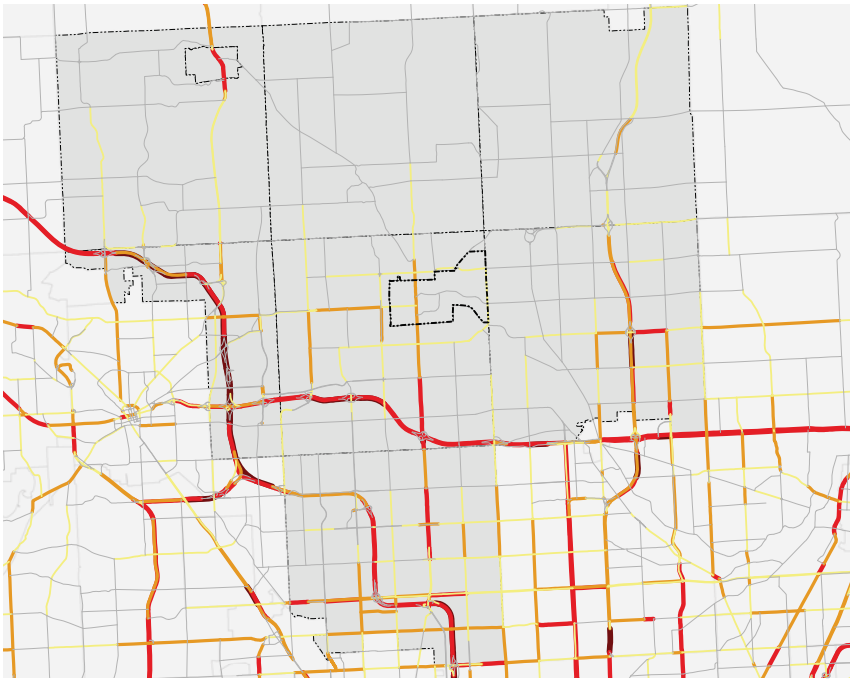
BASELINE

8,833 to 31,799 AADT

FUTURE TREND

Maintain baseline

TRAFFIC COUNTS AADT



See ***Map 15*** *in the Sustainable Rochester Map Book Appendix.*

CURRENT TREND:

Rochester's traffic volume increases from Rochester Road and Main Street, south to M-59, with the busiest roads being Main, University and Dequindre. Parkdale and Runyon are key secondary roads, while Romeo and Washington feature comparatively low traffic volumes.

Source: SEMCOG, 2017

Traffic

5.2 **Trip Generation**

BACKGROUND:

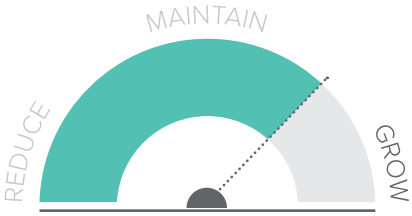
The Institute of Transportation Engineers (ITE) publishes, on a regular basis, the Trip Generation Manual which gathers data on the number of trips generated for specific land uses, taking into account factors such as time of day, urban, suburban, or rural character, and others. This data provides insight into the activity level that can be reasonably expected by a certain land use.

Trip generation data is a sustainability indicator because by providing a common unit of measurement, the data helps communities understand the magnitude of the impacts of new developments. Additionally, if a community wants to generate more trips in an area to encourage activity or further business growth, it can encourage land uses that will generate more trips.

BASELINE

Site Specific – ITE peak hour trip generation average of adjacent parcel

TARGET EVALUATION



5% higher trip generation than average of adjacent parcels

EVALUATION CRITERIA

1. ITE existing peak trip generation estimates for adjacent parcels
2. Estimated ITE peak trip generation for proposed development

TRAFFIC CONGESTION

CURRENT TREND:

Trip generation is measured on a site-specific bias. The estimated number of trips generated by a specific development is affected by a variety of factors including type of use, square footage of the development, and time of day. Trip generation is calculated as part of a traditional traffic study.

Source: Institute of Transportation Engineers Trip Generation Manuel

Travel Time

6.1 **Average Commute Time**

BACKGROUND:

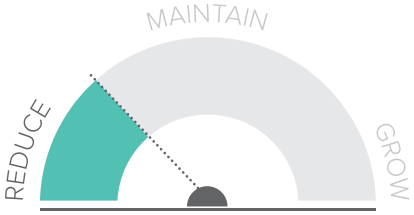
Commute time describes the amount of time people spend in a motor vehicle for their everyday travels, which affects the natural environment, traffic congestion, and many other aspects of sustainability.

Commuting data is collected by the United States Census Bureau and can be used to determine certain characteristics of a community. For communities outside of major job centers, commute time generally increases the further away a place is from the job center. Commute time also depends on what types of roads are available to connect the community to the region, traffic volume and potential congestion and other factors.

BASELINE

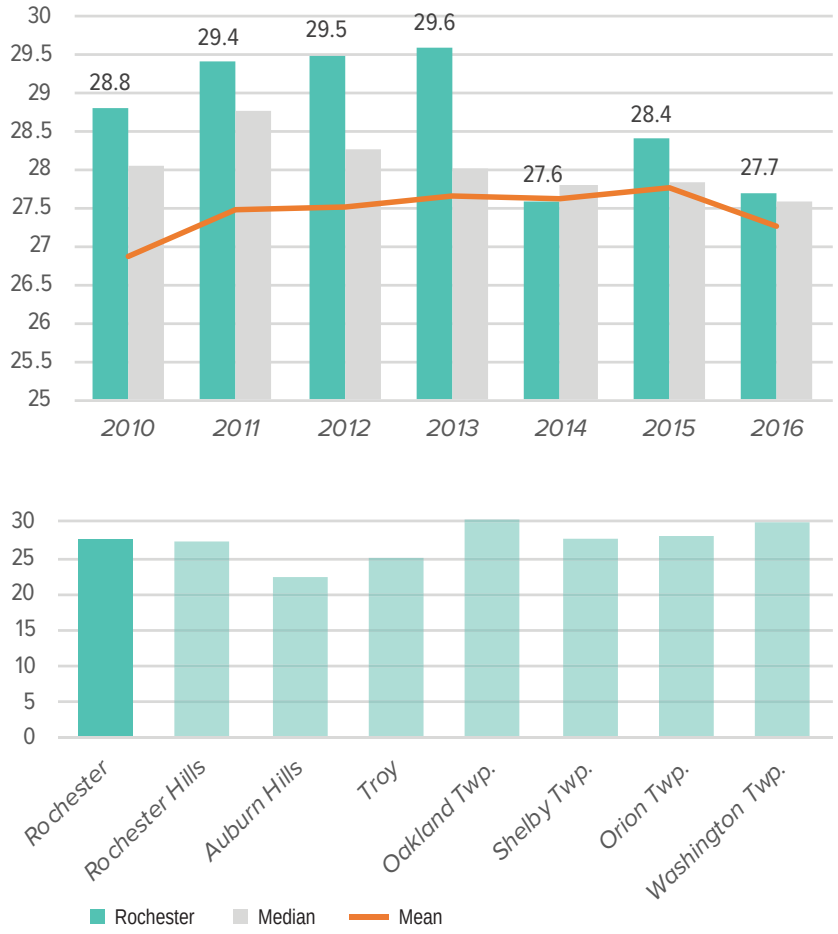
27.7 minutes

FUTURE TREND



Reduce

AVERAGE COMMUTE TIME (MINUTES) & AVERAGE COMMUTE TIME (2016)



CURRENT TREND:

The average commute time for all adjacent communities, including Rochester rose from 2010 to 2013. Generally cities (vs. townships) have shorter commute times. Rochester's average commute time is longer than the average in Rochester Hills, Auburn Hills, Troy and Shelby Township.

Rochester experienced a two-minute decline in average commute time between 2013 and 2014, however, the City's commute time has since increased.

Source: American Community Survey, 2016

Travel Time

6.2 **Intersection Delay**

BACKGROUND:

Intersection Delay is used to evaluate the performance of intersections in allowing traffic to enter and pass through, or to enter and turn onto another route. Specifically, this indicator measures the delay that results when congestion causes a vehicle to reduce speed or to stop at a signal in comparison to a free flow intersection. Delay is considered one of the most important measures of effectiveness used to design, optimize, and evaluate the operation of signalized intersections.

INTERSECTION

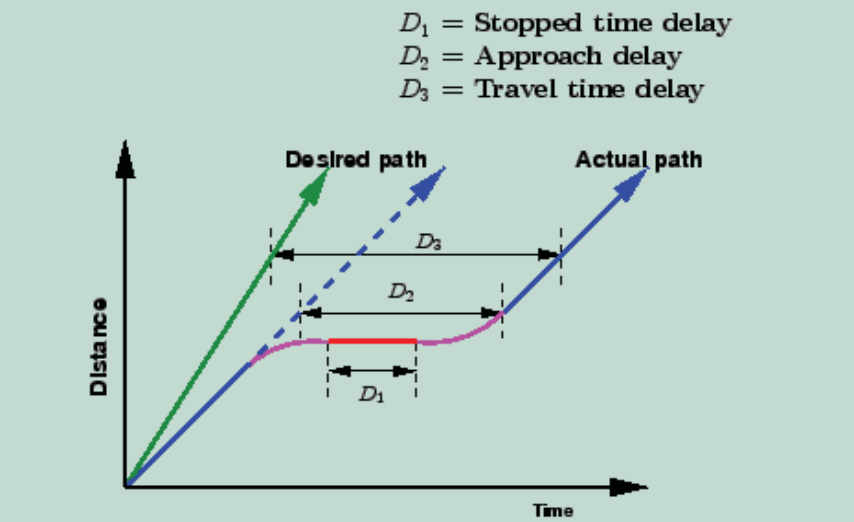
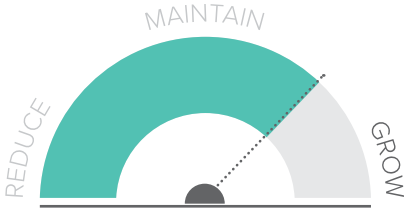


Figure 1: Illustration of delay measures

BASELINE

Site Specific

TARGET EVALUATION



15% higher peak hour intersection delay

EVALUATION CRITERIA

1. Existing intersection delay
2. Proposed intersection delay

CURRENT TREND:

Intersection delay is measured on a site-specific basis. The degree of intersection delay is affected by a variety of factors including time of day, traffic signal timing, street design, and pedestrian usage. Intersection delay is calculated as part of a traditional traffic study.

Source: Synchro Software

Nonmotorized Infrastructure

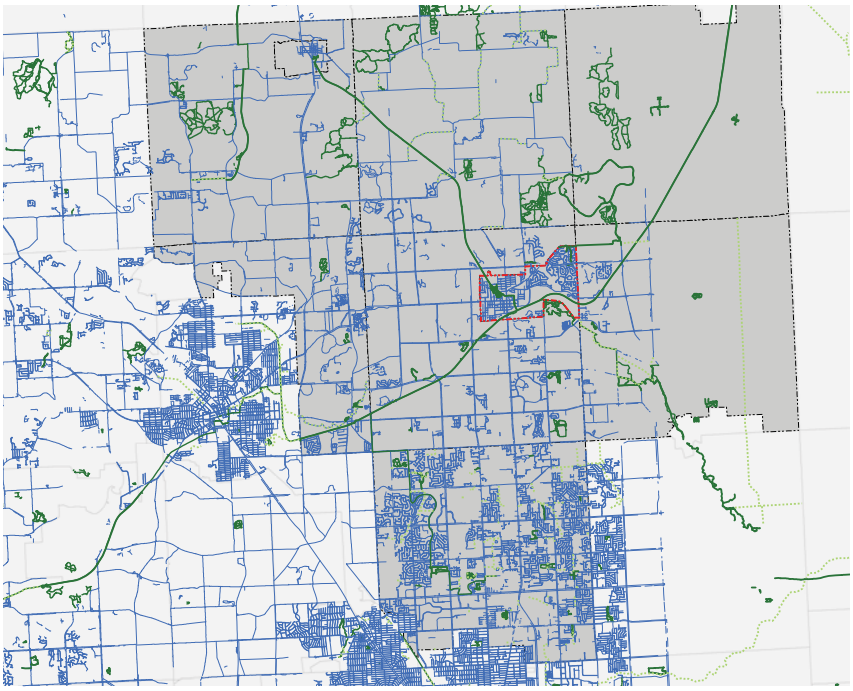
7.1 **Regional Nonmotorized Infrastructure**

BACKGROUND:

Biking and walking are major modes of transportation that are receiving more attention than ever, especially with the concept of Complete Streets and planning for all modes of transportation.

Communities are working to ensure that sidewalks and multi-use paths are included in new developments and that they connect to the overall transportation network. Regions have also been seeking to build new long-distance non-motorized facilities to create opportunities for transportation and recreation.

REGIONAL NONMOTORIZED INFRASTRUCTURE

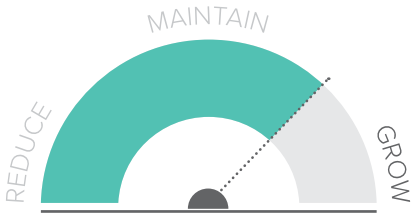


*See **Map 16** in the Sustainable Rochester Map Book Appendix.*

BASELINE

2,291 miles of nonmotorized infrastructure

FUTURE TREND



Grow

CURRENT TREND:

Oakland County's nonmotorized infrastructure, of approximately 2,291 miles, includes the Clinton River Trail and Paint Creek Trail.

The Clinton River Trail connects Rochester to Macomb County communities such as Romeo, Armada and Richmond to the east via the Macomb Orchard Trail, and connects to the areas west of the City, such as Rochester Hills, Pontiac and West Bloomfield.

Source: SEMCOG, 2017

Nonmotorized Infrastructure

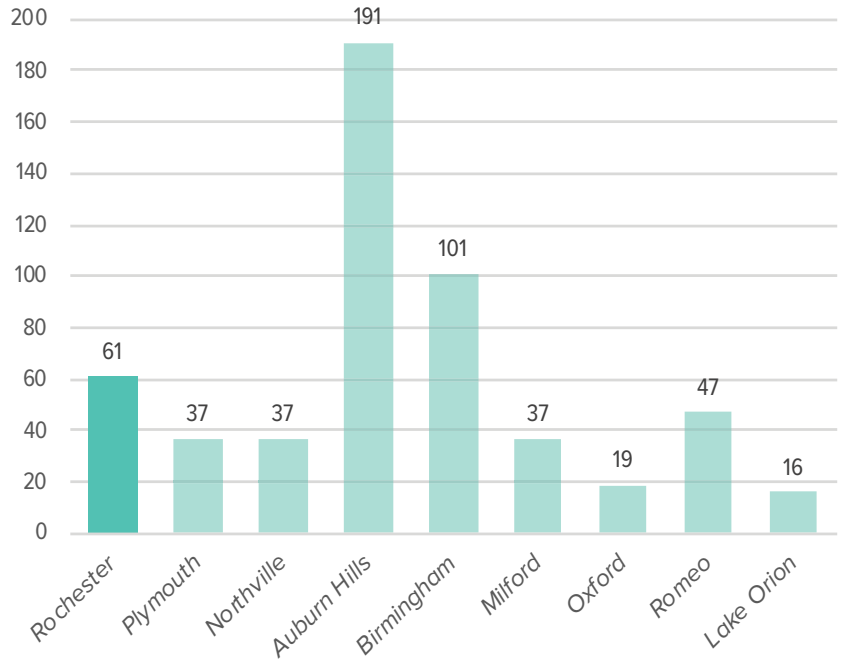
7.2 **Nonmotorized Transportation Infrastructure**

BACKGROUND:

Nonmotorized infrastructure within a community is an indicator of sustainability as it demonstrates the community investment in bicycling and walking facilities. Communities with such nonmotorized facilities create the opportunity to reduce motor vehicle trips.

Reducing motor vehicle trips contributes in many ways to the City's overall environmental sustainability, including relieving traffic congestion, and reducing space necessary for parking.

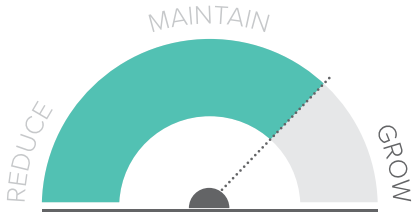
MILES OF BICYCLE AND PEDESTRIAN FACILITIES



BASELINE

61 miles

TARGET EVALUATION



15% Increase

EVALUATION CRITERIA

1. Linear feet of proposed nonmotorized infrastructure

CURRENT TREND:

Rochester currently features 61 miles of nonmotorized infrastructure, which includes sidewalks and pathways.

Rochester has the third greatest number of miles of nonmotorized infrastructure, after Auburn Hills and Birmingham, out of its adjacent and peer downtown communities. Rochester currently does not have any bicycle infrastructure, including shared lane markings or dedicated bike lanes.

Source: SEMCOG, 2017

Fiscal Strength
Sustainability Value #3

PROACTIVE APPROACH

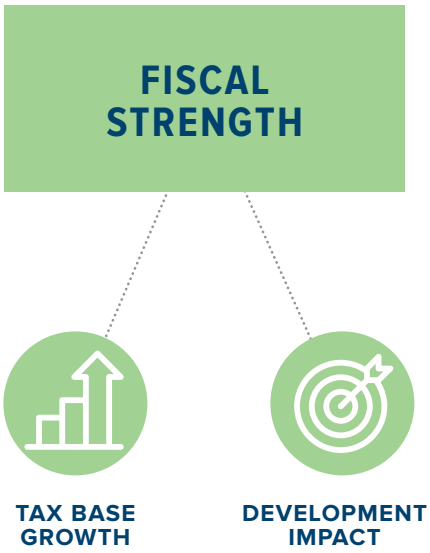
The following goals and strategies have been adopted by the City of Rochester in an effort to proactively work towards fiscal strength. Additional policies can be found in the City's adopted FY 2017 Budget.

FY 2017 BUDGET GOALS

1. Promote economic development
2. Financial stability
3. Provide safe, efficient, well maintained infrastructure
4. Promote our positive image
5. Maintain and enhance services
6. Improve employee productivity and morale

STRATEGIES

1. Accumulate cash reserves in advance of major capital projects (utilizing long term debt judicially in order to meet financial goals and policies of the City Council).
2. Maintain a cash balance reserve of six (6) months operating expenditures in the City's reserve fund.
3. Operate enterprise activities on a self-supporting basis.



DEVELOPMENT COMPONENT	INDICATOR	BASELINE	TARGET / FUTURE TREND
8 *Tax Base Growth*	**8.1 Regional** Rochester Tax Revenue Per Acre	$3,681.12 per acre	Maintain baseline
	8.2 Local Increase in Taxable Value Per Acre	Average SEV / acre of four surrounding properties	15% above the average adjacent parcels SEV / per acre
9 *Development Impact*	**9.1 Regional** Cost of Living Index	123.1 index score	Maintain baseline
	9.2 Local Housing Units per Acre	1 - 5 residential units per acres	10% increase of block group residential units per acre

Tax Base Growth

8.1 **Rochester Tax Revenue Per Acre**

BACKGROUND:

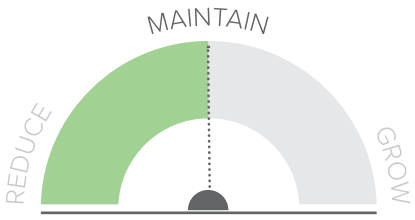
Local government finance measures are an important set of indicators for determining fiscal health. The revenue collected from property taxes is the backbone of municipal finances. This revenue allows Cities to provide a range of services to residents such as public safety, public works, parks and recreation, and utility services. The greater a City's tax revenue, the greater its ability to provide quality services, invest in future needs, and spur economic development.

Tax revenue can be measured in multiple ways but by looking at the tax revenue per acre City officials can determine how productively the land is currently being used. This measure shows the amount of resources the City has to invest and the distribution of the tax burden across the resident base by the size of a parcel and the intensity of development.

BASELINE

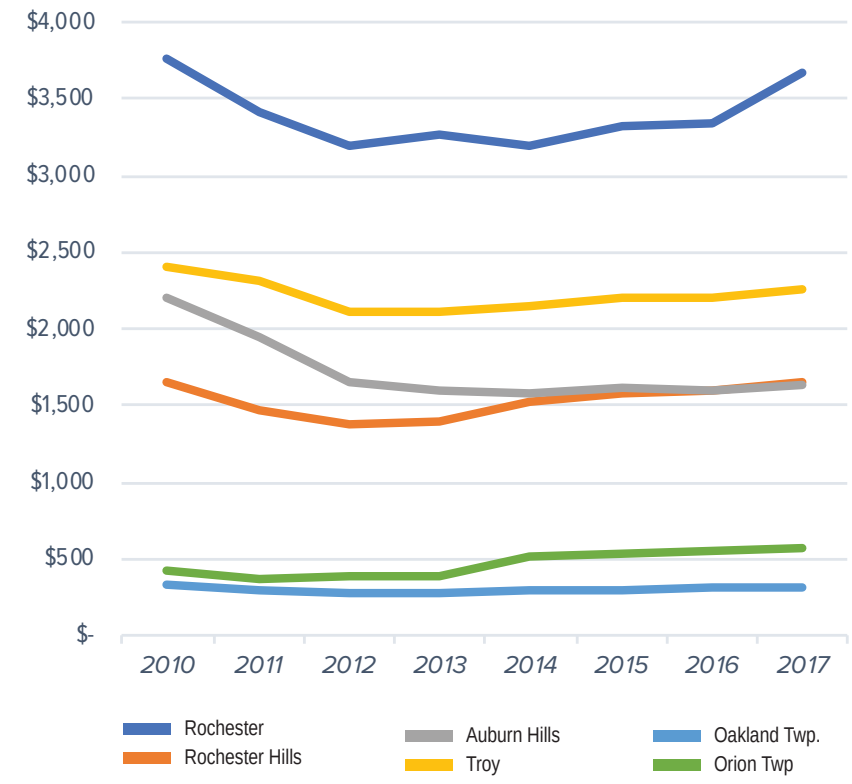
$3,681.12 per acre

FUTURE TREND



Maintain baseline

TAX REVENUE PER ACRE (2010-2017)



CURRENT TREND:

Rochester collects the most tax revenue per acre of the adjacent communities. This number has been on the rise indicating that taxable values are increasing and/or land is being redeveloped. This is likely because the City is small in area and nearly fully developed compared to the larger but undeveloped Townships. This number will increase with more intense / dense development.

Source: Oakland County Department of Equalization, 2017

Tax Base Growth

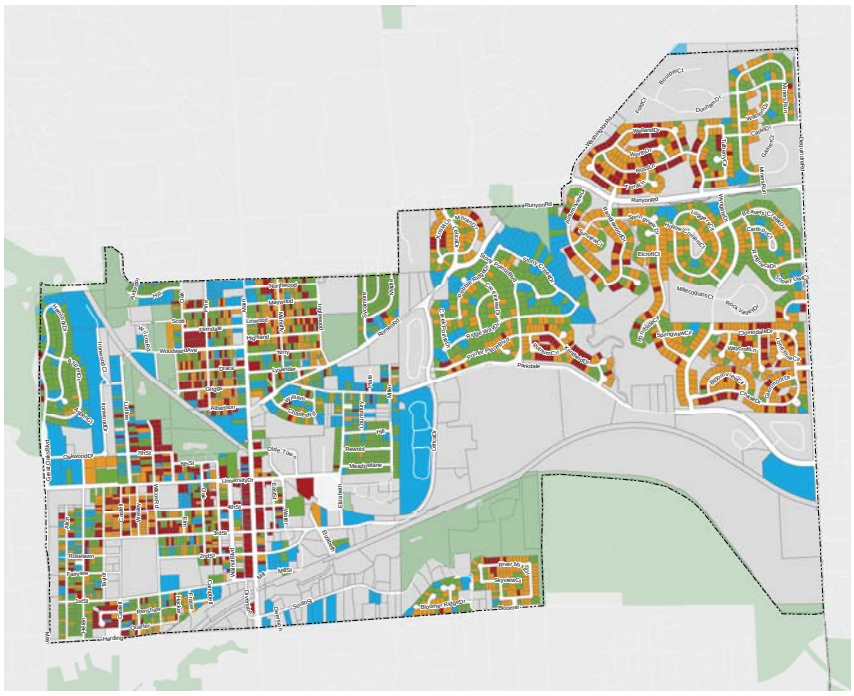
8.2 **Increase in Taxable Value Per Acre**

BACKGROUND:

The change in taxable value per acre shows a property's change in value due to a project's redevelopment.

When a parcel is redeveloped to increase the taxable value per acre, the City gains an increase in taxable value without increasing tax rates for the rest of the City. Large increases in taxable value per acre show the productive redevelopment of the land and the proposed intensity/quality of a development.

STATE EQUALIZED VALUE PER ACRE (2017)

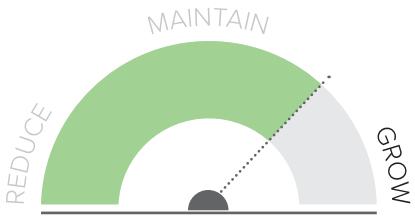


*See **Map 18** in the Sustainable Rochester Map Book Appendix.*

BASELINE

Average SEV / acre of four surrounding properties

TARGET EVALUATION



15% above the average adjacent parcels SEV / per acre

EVALUATION CRITERIA

1. Existing SEV / acre of adjacent parcels and development property
2. Proposed SEV / acre of development property

CURRENT TREND:

There is a range of State Equalized Value (SEV) per acre for individual properties across the City of Rochester (between $1,300 to $10,900,540 per acre).

Downtown Rochester and the small lot subdivisions to the north have the highest concentration of parcels with the highest taxable value per acre. Areas east and south of downtown Rochester have redevelopment potential to increase tax revenue per acre. From 2016 to 2017, the City of Rochester increased it tax revenue per acre by 10%.

Source: Oakland County Department of Equalization, 2017

Development Impact

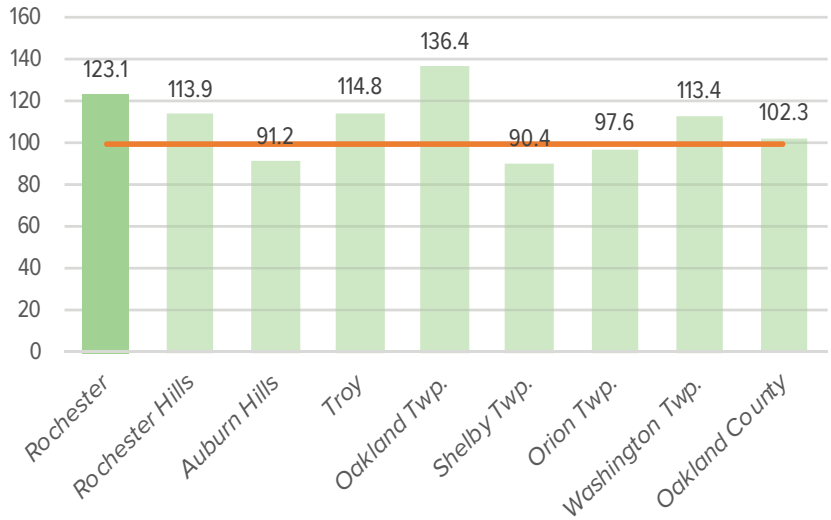
9.1 Cost of Living Index

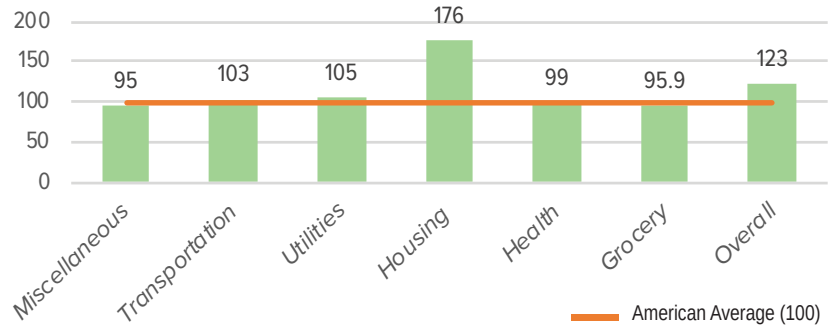
BACKGROUND:

The Cost of Living Index measures relative price levels for consumer goods and services in participating areas.

The average for all participating places, both metropolitan and nonmetropolitan, equals 100, and each participant's index is read as a percentage of the average for all places. This measure shows how specific elements of life compare to other cities and how the expense of those elements relate to the national average.

COST OF LIVING INDEX & ROCHESTER COST OF LIVING





BASELINE

123.1 cost of living index score

FUTURE TREND

Maintain baseline

CURRENT TREND:

Rochester's cost of living index score is significantly higher than the national average and many its adjacent communities. Housing expense is largest factor in the cost of living difference. The City can make strides to lower its cost of living by providing an array of housing options that are affordable and meet the needs of a diverse population (condos, apartments, small and large lot housing).

Source: Sperling's BestPlaces, 2017

Development Impact

9.2 **Housing Units Per Acre**

BACKGROUND:

The number of housing units per acre measures the density of residential development within a specific area. In terms of sustainability, specifically within geographic constraints, the more housing units per acre illustrates a city's efficient provision of housing.

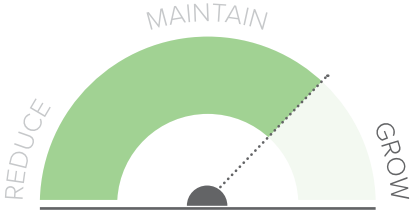
HOUSING UNITS PER ACRE -- YEAR?

*See **Map 20** in the Sustainable Rochester Map Book Appendix.*

BASELINE

1 - 5 residential units per acres

TARGET EVALUATION



10% increase of block group residential units per acre

EVALUATION CRITERIA

1. Number of residential units per acre of block group
2. Number of proposed residential units per acre

CURRENT TREND:

The number of housing units per acre within Rochester ranges from 1 to 5 units. Downtown and adjacent neighborhoods have the greatest number of housing units per acre within their Census Block Group.

There are very few housing units per acre south of downtown and on the east side of the City. Large lots subdivisions, industrial businesses, and open space characterize these low-density areas.

Source: American Community Survey, 2016

Public Services
Sustainability Value #4

PROACTIVE APPROACH:

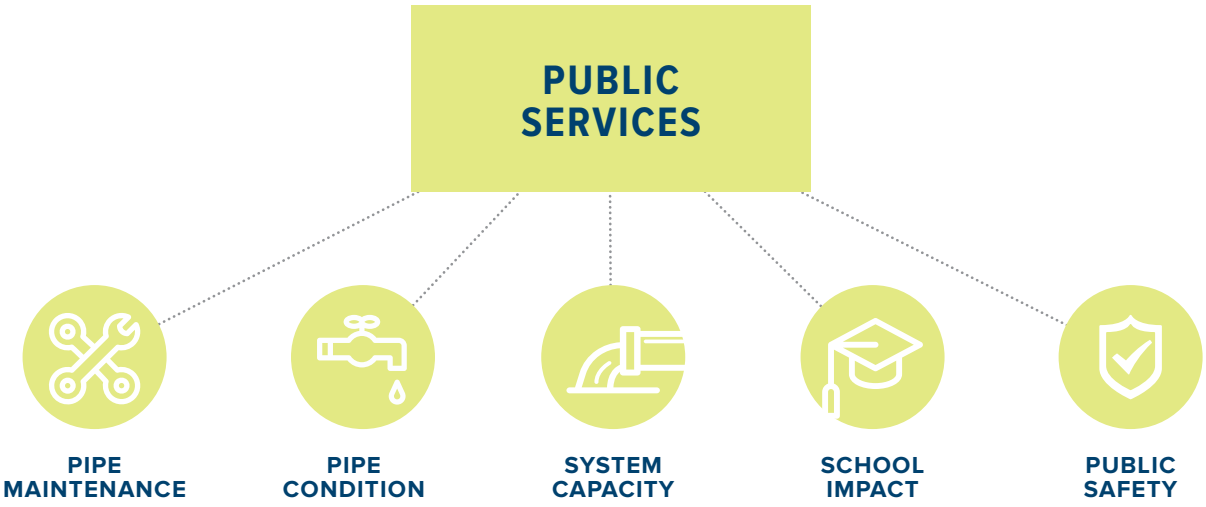
The City of Rochester has adopted the following goal and strategy to show its commitment to proactively investing in and providing quality public services. The City's adopted Master Plan details additional strategies.

MASTER PLAN IDEA

1. Maintain a safe and effective infrastructure system.

MASTER PLAN STRATEGIES

1. Repair, replace and expand infrastructure in order to properly serve the community.



DEVELOPMENT COMPONENT	INDICATOR	BASELINE	TARGET/ FUTURE TREND
10 *Pipe Maintenance*	**10.1 Regional** Municipal Water and Sewer Expenditures Per Capita	$406.13 water and sewer expenditures / capita	Maintain baseline
	10.2 Local Linear Feet of Pipe	Combined Pipe Length – 398,723 linear ft.	2% increase
11 *Pipe Condition*	**11.1 Regional** Age of Water and Sanitary System	1869	Reduce
	11.2 Local Percent of Deficient / Critical Pipes	High Risk Sanitary Pipe – 9,985 linear ft. Water Pipes < than 8 in. (diameter) – 88,207 linear ft.	Sanitary – reduce 15% Water – reduce 5%
12 *System Capacity*	**12.1 Regional** U.S. Census Urbanized Area	Rochester within UZA and half of Oakland Township	Maintain baseline
	12.2 Local Net Change in ERU	At capacity	0% change
13 *School Impact*	**13.1 Regional** Overall School District Enrollment	15,187 students	Maintain baseline
	13.2 Local Tax Generated by School District	$2,333,461	5% increase
14 *Public Safety*	**14.1 Regional** Crime Index	18.8 (property) 25.7 (violent)	Reduce
	14.2 Local Emergency Response Time	9 minutes	0% change

Pipe Maintenance

10.1 Municipal Water and Sewer Expenditures Per Capita

BACKGROUND:

Public utilities such as water, sanitary sewer, and storm sewer are major amenities provided by municipal governments in many communities. The water and sewer expenditures of a municipal government per capita illustrate the degree to which a municipality maintains and invests in its system in relation to its number of residents.

MUNICIPAL WATER & SEWER EXPENDITURES PER CAPITA (FY 2016/17)

BASELINE

$406.13 water and sewer expenditures/ capita

FUTURE TREND

Maintain baseline

CURRENT TREND:

The City of Rochester spends the least per capital on municipal water and sewer. Northville, Auburn Hills, and Birmingham spend over twice as much as Rochester per capita.

Source: City Budgets, 2016/2017

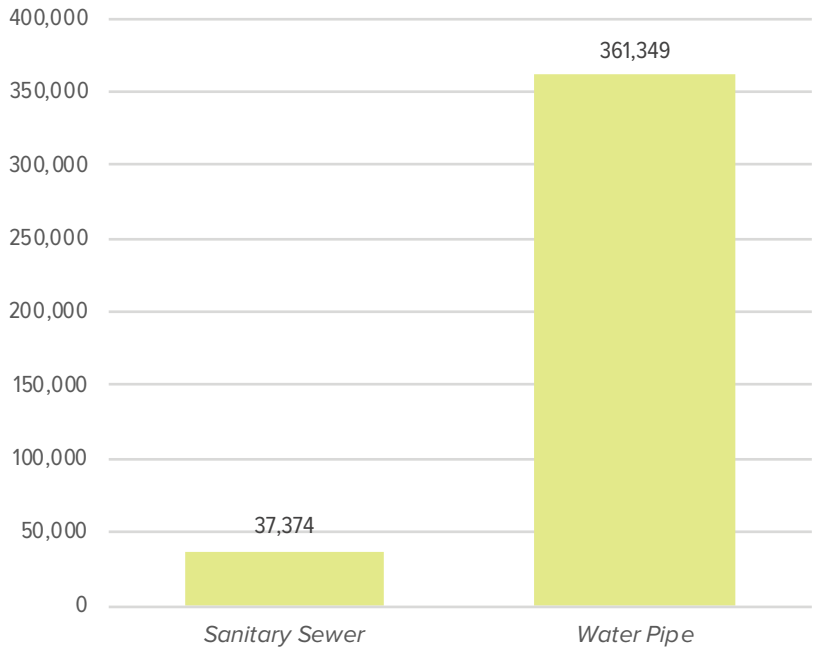
Pipe Maintenance

10.2 **Linear Feet of Pipe**

BACKGROUND:

Although public utilities are useful amenities, they can be expensive to operate and maintain over the long term. The length of pipe within a utility system serves as an indicator of the expense and magnitude of municipal maintenance and oversight. While new development often brings new residents and tax dollars, it also often brings more piping that the City will be responsible for maintaining throughout the life of the development.

LINEAR FEET OF PIPE



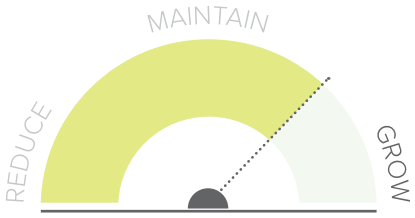
BASELINE

Sanitary
269,223 linear ft.

Water
361,349 linear ft.

Combined Pipe Length
398,723 linear ft.

TARGET EVALUATION



2% increase

EVALUATION CRITERIA

1. Proposed linear feet of public pipe

CURRENT TREND:

The City of Rochester currently has 269,223 linear feet of sanitary pipe and 361,349 linear feet of water pipe.

Source: City of Rochester Water and Sewer Asset Management Plans

Pipe Condition

11.1 **Age of Water and Sanitary System**

BACKGROUND:

Many infrastructure systems were established as Cities and Villages were growing and incorporating. The age of a City can serve as a proxy the age of the utility system within a community. The older the system the more maintenance and replacement will be needed to prevent system failures, such a pipe bursts or system backups. Some communities throughout Michigan, still have original wooden pipes functioning within the utility system.

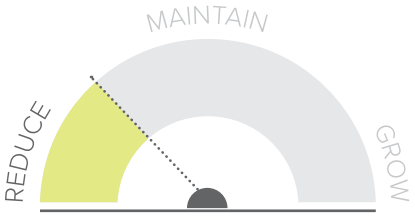
YEAR MUNICIPALITY INCORPORATED

VILLAGE/CITY	YEAR OF INCORPORATION	AGE
Lake Orion	1859	159
Birmingham	1864	154
Plymouth	1867	151
Northville	1867	151
Rochester	**1869**	**149**
Milford	1869	149
Oxford	1876	142
Auburn Hills	1921	97

BASELINE

Rochester incorporated as a village in 1869
(149 years ago)

FUTURE TREND



Reduce

CURRENT TREND:

Despite incorporating over 149 years ago, Rochester is the fourth youngest municipality of its peer communities. Lake Orion, which incorporated 10-years before Rochester, was the first of the peer communities to incorporate followed by Birmingham in 1864. While many original pipes have been replaced since incorporation, it is likely that each municipality has pipes that are over 100-years old and in operation.

Source: History of Oakland County, Michigan (Thaddeus D. Seeley) 191

Pipe Condition

11.2 **Percent of Deficient / Critical Pipes**

BACKGROUND:

Deferred maintenance on public utilities can be problematic for local municipal budgets, and older infrastructure can become less reliable and inefficient. Municipal systems regularly conduct asset management assessments of their public utility systems in which they access the condition of the system's pipes. Municipalities use that information to prioritize pipe replacement to prevent system failures especially if the pipes will experience increased pressure and/or usage because of new development.

SANITARY SEWER CRITICALITY RATING SYSTEM

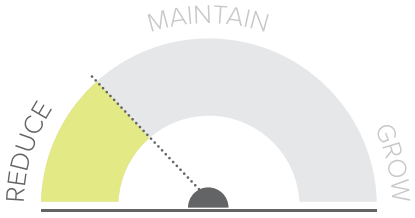
Business Risk Evaluation (BRE) Total Score	
Business Risk Evaluation Scoring	
Business Risk	**Total BRE Score**
Critical / Intolerable Risk	16.00 - 25.00
High Risk – Tolerable and Manageable – Aggressive Monitoring	10.00 - 15.99
Medium Risk –Tolerable and Manageable – Monitoring	5.00 - 9.99
Low Risk –Failure is Tolerable	0.00 - 4.99

BASELINE

High Risk Sanitary Pipe:
9,985 linear ft.

Water Pipes less than 8 inches (diameter):
88,207 linear ft.

TARGET EVALUATION



Sanitary – Reduce 15%

Water – Reduce 5%

EVALUATION CRITERIA:

1. Proposed linear feet of sanitary and water pipe replacement

CURRENT TREND

The City of Rochester underwent a comprehensive Sewer and Water asset management planning process in 2017. During the process, 9,985 linear feet of sanitary pipe were identified as high risk and 88,207 linear feet of water pipe were identified as deficient (less than 8 inches in diameter).

Source: City of Rochester Water and Sewer Asset Management Plans

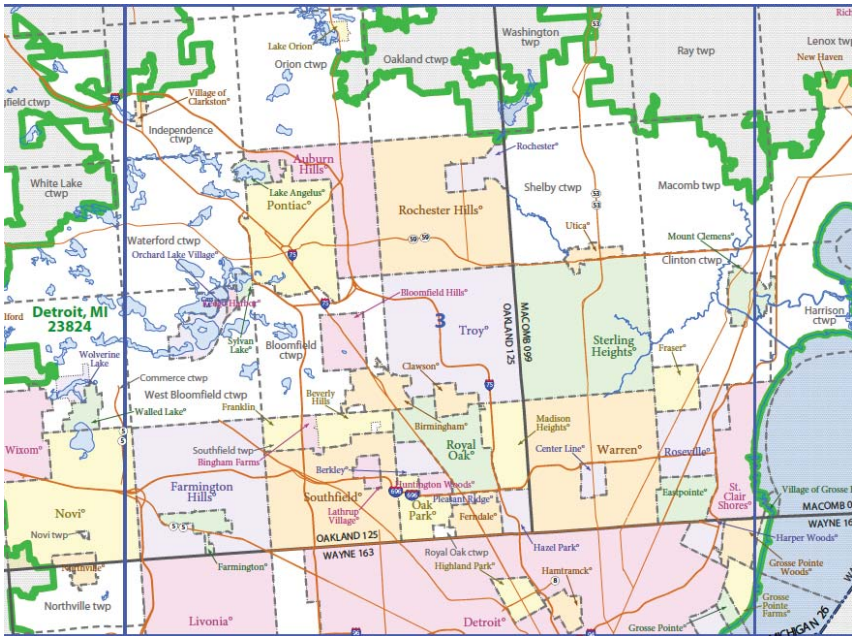
System Capacity

12.1 **U.S. Census Urbanized Area**

BACKGROUND:

The 2010 Census Bureau defines an urbanized area as a densely settled core of census tracts and/or census blocks that meet minimum population density requirement. The Census Urbanized Area serves as a proxy for determining the availability of public utilities and infrastructure capacity.

U.S. URBANIZED AREA



BASELINE

Rochester within UZA and half of Oakland Township

FUTURE TREND

Maintain baseline

CURRENT TREND:

The City of Rochester is on the edge of the Detroit urbanized area. New growth in Oakland Township and other areas to the north may expand the urbanized area in that direction.

Source: US Census, 2010

System Capacity

12.2 **Net Change in ERUs**

BACKGROUND:

An Equivalent Residential Unit (ERU) is the portion of a user's facility that has an impact on the water and wastewater system equivalent to a single family residence. The ERUs would be equivalent to what would be used by typical single-family residences, if they were using the water or wastewater system. The result is an estimate of total system service capability expressed as the number of ERUs the water system serves, or could serve. As a system develops (increases in ERUs) the ability of the mains to carry the increasing flows is stressed. Without capacity improvements, areas of the water system might have inadequate system pressures because of increased development (increased ERUs).

BASELINE

At capacity

FUTURE TREND

0% change

EVALUATION CRITERIA:

1. Proposed capacity improvement
2. Expected ERU
3. Net ERU

CURRENT TREND:

The City of Rochester is currently at capacity and any proposed increase in ERUs would result in a need for system capacity improvements.

Source: Oakland County Schedule of Units

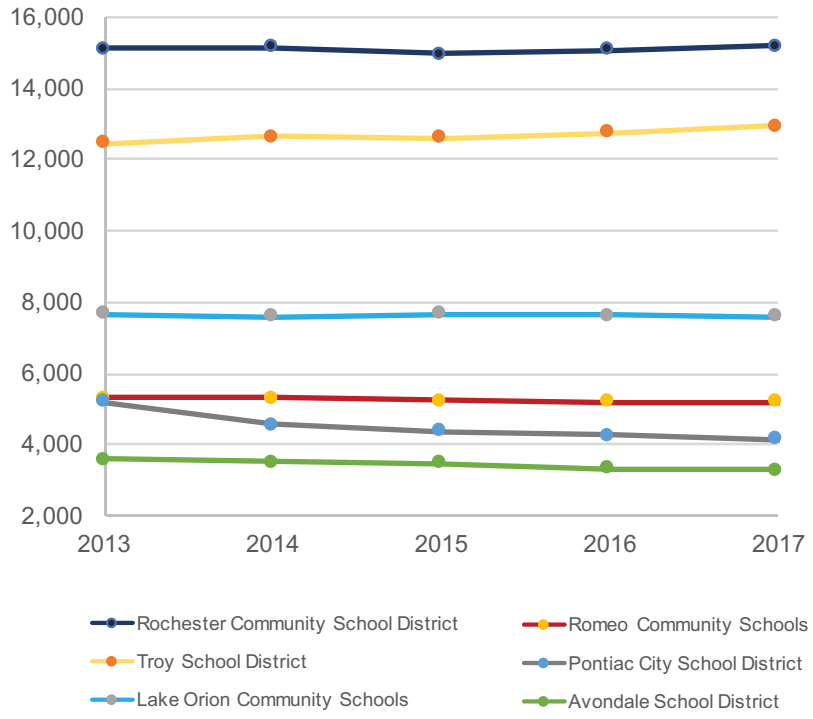
School Impact

13.1 **Overall School District Enrollment**

BACKGROUND:

A strong school can serve as an anchor for the neighborhood and the community. Families want to send their children to the best schools possible, and a good school indicates the desirability of the community. Schools can have positive spillover effects by having a visible presence throughout the entire community and by generating other activities in the surrounding neighborhoods.

TOTAL DISTRICT ENROLLMENT



BASELINE

15,187 students

FUTURE TREND

Maintain baseline

CURRENT TREND:

Rochester is part of the Rochester Community School District, which covers the entire City of Rochester and parts of Rochester Hills, Orion Township, Oakland Township, Washington Township, and Shelby Township. The Rochester Community School District enrollment numbers have remained consistent (hovering around 15,100) from 2013 to 2017. In 2017, the district reached its highest enrollment figures, 15,187 students. More students are enrolled in the Rochester Community School District than the surrounding districts.

Source: Michigan Department of Education, 2017

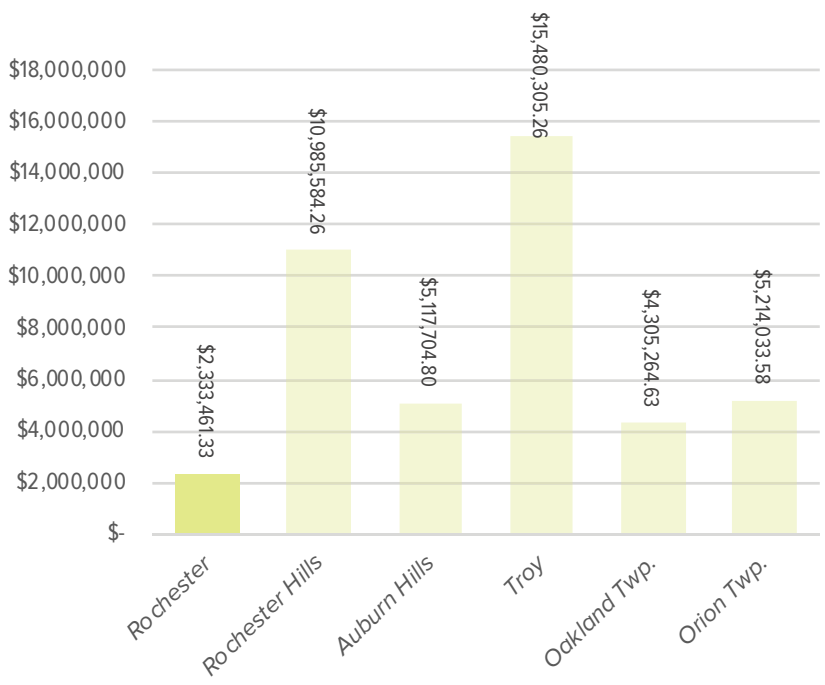
School Impact

13.2 **Tax Revenue Generated for School District**

BACKGROUND:

Maintaining the quality of schools available to Rochester residents is vital to the quality of life of the community. The quality of a school effects the desirability of a community. The tax revenue generated for school districts shows that ability of the community to sustain school quality and to share the prosperity created by development.

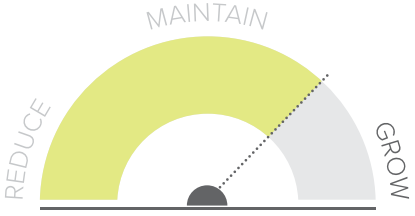
TAX REVENUE GENERATED FOR SCHOOL DISTRICT (2017)



BASELINE

$2,333,461 tax revenue generated

TARGET EVALUATION



5% increase

EVALUATION CRITERIA

1. Proposed increase in taxable value

CURRENT TREND:

In 2017, the City of Rochester generated $2,333,461 for the Oakland Intermediate School District. Increases in taxable value within a community, can positively impact the revenue collected for each school district and/or redistribute the tax burden on residents while providing adequate resources for the school district.

Source: Oakland County Department of Equalization, 2017

Public Safety

14.1 **Crime Index**

BACKGROUND:

Communities can see major effects from variations in the crime rate. Areas with low crime rates are seen as desirable and often attract additional businesses and activities. The additional people generated from the new businesses and activities also help deter crime.

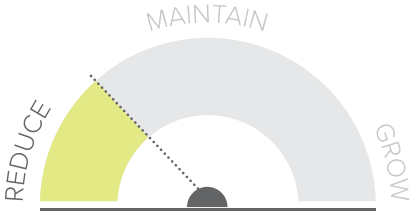
Crime rates are a sustainability indicator because of how they relate to the economic success of an area. Communities with high crime rates suffer from an increased strain on the police and other public service providers. Disinvestment in local businesses also threatens the economic vitality of a community as well as its ability to generate a reliable tax base. Places with low crime rates benefit from reliable tax revenue and steady public services.

BASELINE

18.8 – Property Crime

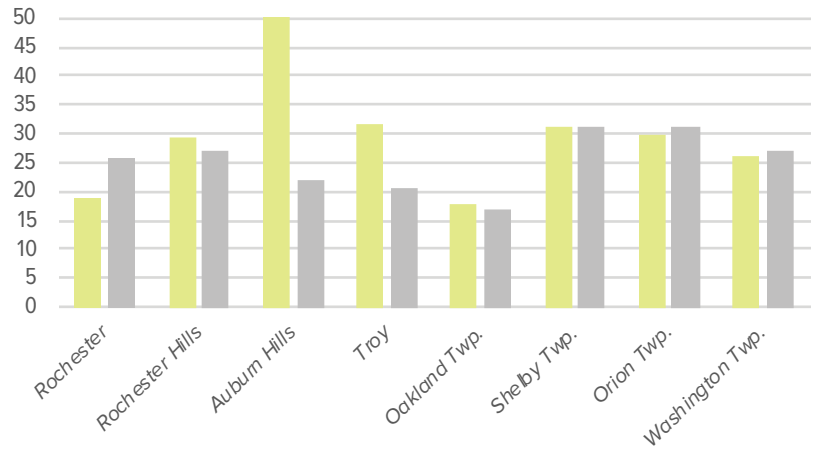
25.7 – Violent Crime

FUTURE TREND

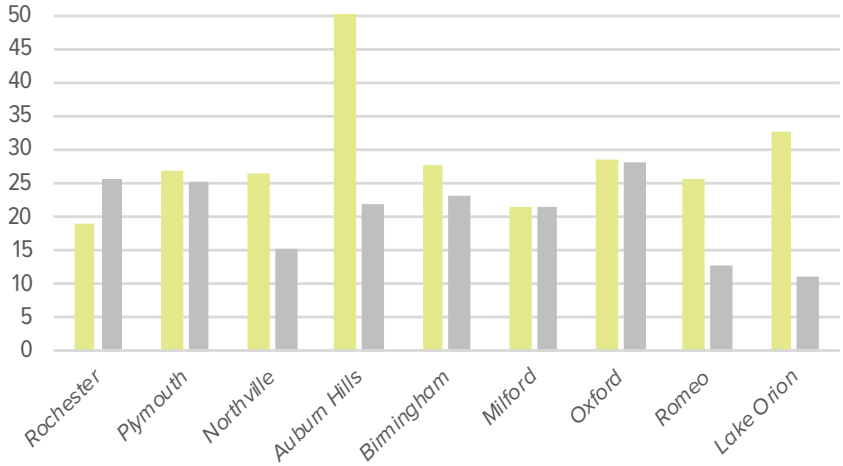


Reduce

CRIME RATE INDEX (1-100) ADJACENT COMMUNITIES



CRIME RATE INDEX (1-100) PEER COMMUNITIES



CURRENT TREND:

Rochester has low crime rate index (less than 26 for both property crime and violent crime). Rochester's property crime index score is less than all communities (both peer and adjacent) except for Oakland Township. The violent crime index score for Rochester is like many of its peer and adjacent communities. Romeo and Lake Orion have the lowest violent crime index of 12.9 and 10.9 respectively.

Source: Sperling's BestPlaces, 2017

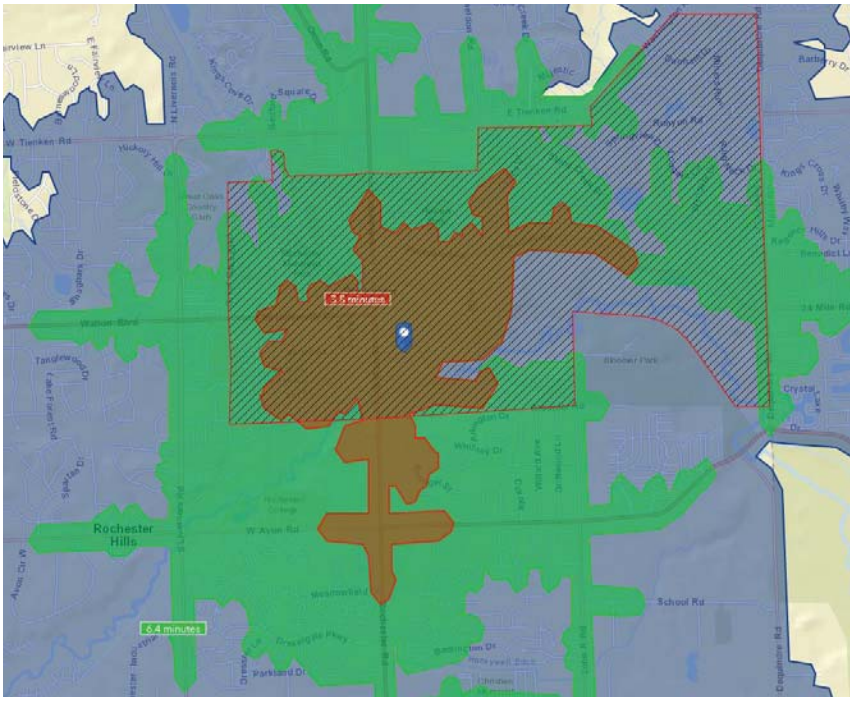
Public Safety

14.2 **Emergency Response Time Coverage**

BACKGROUND:

The National Fire Protection Association standard emergency response time for municipal services is 9 minutes. To reach all parts of a community within the 9-minute standard, the municipalities may consider several options when maintaining emergency services, on-call volunteers, full-time resident staff, and/or multiple fire stations. However, each option to increase service comes at an additional expense to the municipality. Municipalities balance what is fiscally responsible while also considering the safety of its residents when determining the provision of emergency services.

EMERGENCY RESPONSE TIME COVERAGE



*See **Map 21** in the Sustainable Rochester Map Book Appendix.*

BASELINE

9-minute response time (brown coverage)

TARGET EVALUATION

0% change

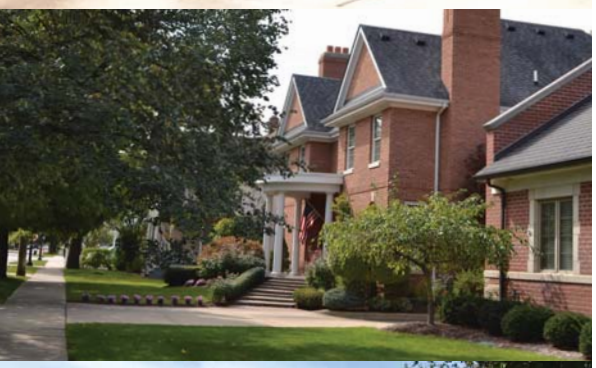
EVALUATION CRITERIA

1. Travel time from fire station to development at 35 mph

CURRENT TREND:

Currently, the City of Rochester maintains a volunteer fire fighter force, where the average volunteer lives three miles from the station. When an emergency occurs, the volunteer must travel on average 5.14 minutes to the station from their home and will then have 3.86 minutes to travel to the emergency. The emergency response map illustrates the emergency response time coverage with a volunteer on-call firefighting force.

Source: ESRI Business Analyst



Strong Neighborhoods
Sustainability Value #5

PROACTIVE APPROACH:

In an effort to proactively strengthen neighborhoods, the City of Rochester has adopted the following goal and strategies to encourage the provision of appropriate housing options, affordability, and historic character. Additional strategies can be found in the City's adopted Master Plan.

MASTER PLAN GOAL

1. Provide a variety of housing options for City residents in various stages of their lives, while maintaining the historic character and sense of community in Rochester.

MASTER PLAN STRATEGIES

1. Encourage residential developments which are needed by persons of all ages, incomes and household sizes.
2. Maintain the historic character and sense of community in Rochester.

DEVELOPMENT COMPONENT	INDICATOR	BASELINE	TARGET/ FUTURE TREND
15 *Housing Mix*	**15.1 Regional** Housing Tenure & Type	36% of housing stock multiple family / 37% of housing stock renter occupied	Grow
	15.2 Local Number of Multifamily Units	2,144 units	20% increase of total multifamily units
16 *Housing Affordability*	**16.1 Regional** Percent of Households with Housing Cost Burden	17.2% (mortgage) / 44.2% (renters)	Maintain baseline
	16.2 Local Median Unit Price	$361,735 (median house value) / $861 (median rent)	10% of units at median housing cost

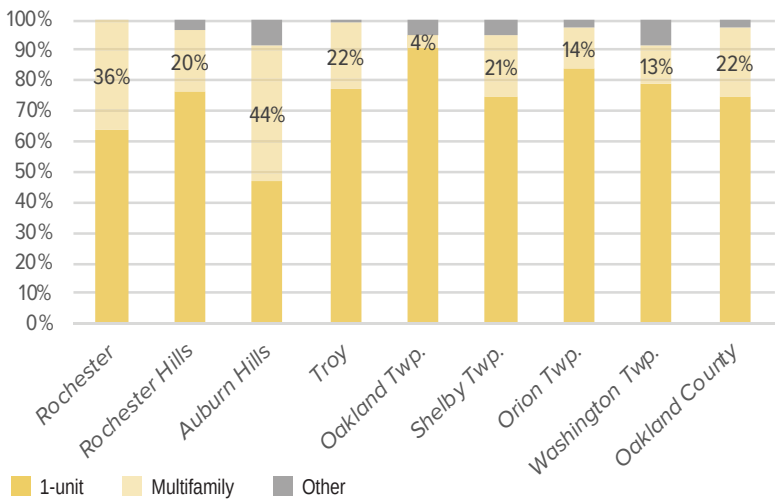
Housing Mix

15.1 **Housing Type and Tenure**

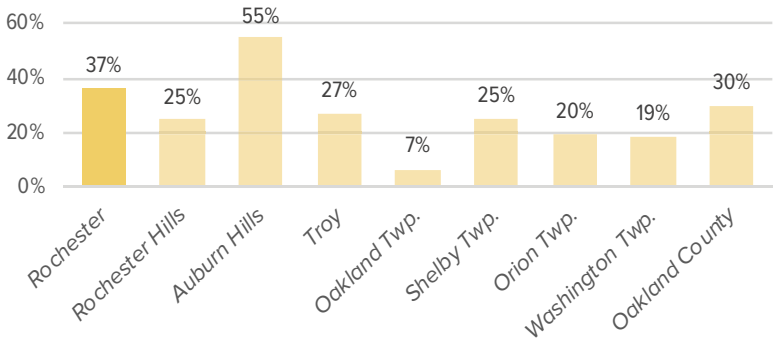
BACKGROUND:

Housing tenure and housing type often determine neighborhood strength. Housing tenure measures whether housing is owner occupied, or rented, and housing type measures the number of units within a housing structure (multiple family, single family, etc.). A mix of different housing types (e.g., rental and for sale, multifamily and detached, and large and small) can accommodate people in different life phases, from starting out in the workforce to raising a family to retiring.

PERCENT OF HOUSING UNITS, 2016



PERCENT OF HOUSING UNITS RENTER OCCUPIED, 2016

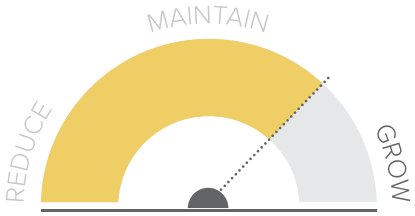


BASELINE

36% of housing stock **multiple family**

37% of housing stock **renter occupied**;

TARGET EVALUATION



Grow

CURRENT TREND:

Of the City's adjacent communities, Rochester has the second highest percentage renter-occupied housing, 37%. Adjacent townships provide the least rental housing. Like housing tenure, Rochester has the second highest percentage of multiple family units, 36%. However, Rochester has the highest percentage of its housing stock considered medium density. This size structure, which is often characterized as the "missing middle," includes housing structures that have 2-4 residential units. Medium density housing is often consistent with the style and size of single-family homes, while utilizing land in an efficient way.

Source: American Community Survey, 2016

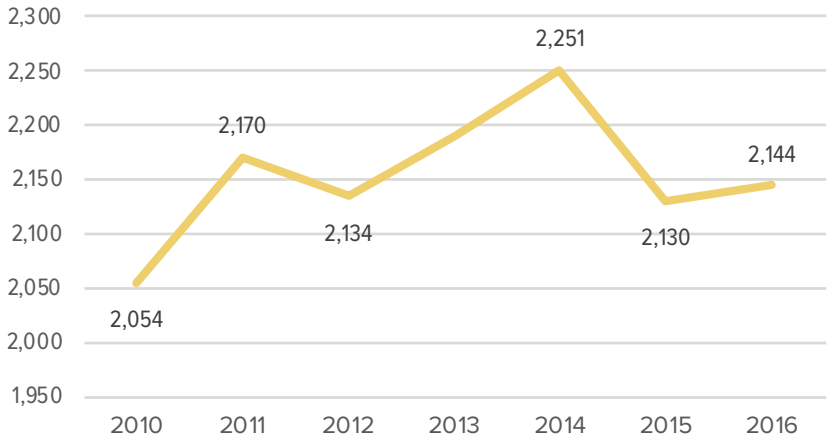
Housing Mix

15.2 **Number of Multiple Family Units**

BACKGROUND:

Multifamily residential is a classification of housing where multiple separate housing units for residential inhabitants are contained within one building or several buildings within one complex. As the demand for housing within the City increases, the provision of multiple family units increases the overall housing stock while making best use of limited developable space. The ability for the City of Rochester to provide multiple family units signals its ability to accommodate population increase with its limited space for greenfield development.

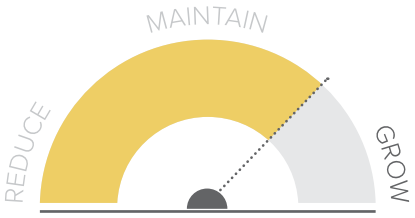
NUMBER OF MULTIPLE FAMILY UNITS (2010-2016)



BASELINE

2,144 units within the City (does not include assisted living units)

TARGET EVALUATION



20% increase of total multifamily units

EVALUATION CRITERIA

1. Number of multiple family units

CURRENT TREND:

The number of multiple family units within the City reached its peak in 2014 with 2,251 units. This number declined in 2015, but has since seen an increase to 2,144 units.

The baseline measure (2,144 units) is obtained using the US Census American Community Survey. This data source defines and measures multiple family units as the City's combined total of attached condominiums, apartment complexes, and senior independent living facilities (which includes 55 and older independent housing). The US Census does not consider assisted living facilities (complexes where individuals are under the full-time care of medical professionals) and other group homes in this measure. However, it is important to note that the City of Rochester does have a significant number of senior independent living communities and assisted living facilities. To further the goal of affordability and to ensure that housing is being provided to meet the needs of this growing community, the City should strive to develop a separate measure of both the number of units classified as "Senior Independent Living" and "Assisted Living".

Source: American Community Survey, 2016

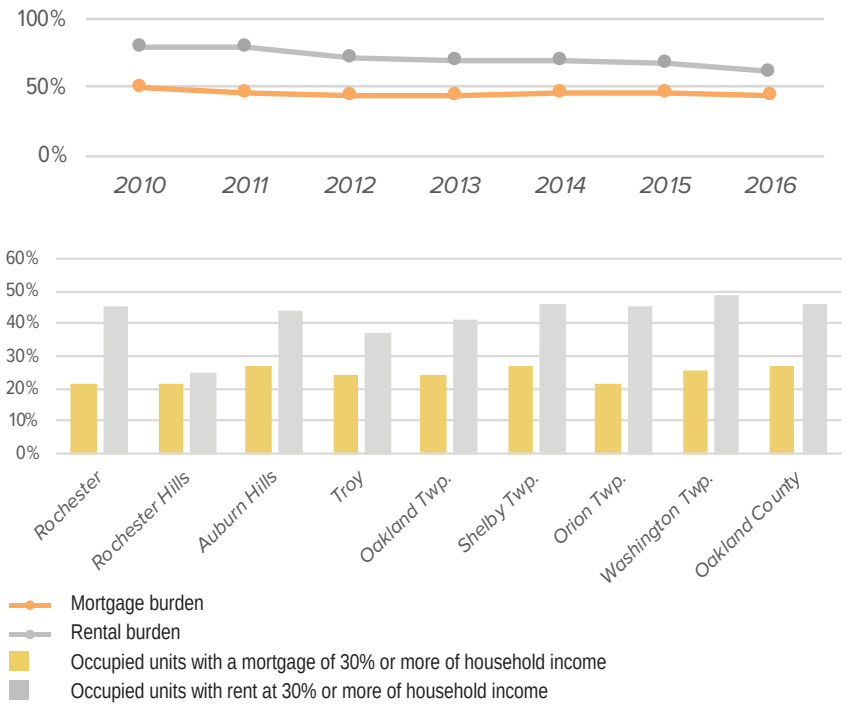
Housing Affordability

16.1 Percent of Households with Housing Cost Burden

BACKGROUND:

Housing affordability is an important factor in determining the long-term sustainability of a community. Cities must provide housing at prices people can afford to maintain stable neighborhoods and allow existing residents to age in place. As well as serve as a community where individuals of all income levels can move and grow. Housing affordability is measured as the percent of households paying more than 30% of their income towards housing costs (either as gross mortgage payments or rent).

PERCENT OF HOUSEHOLDS WITH HOUSING COST BURDEN (2010-2016) & HOUSING COST BURDEN (REGIONAL COMPARISON, 2016)

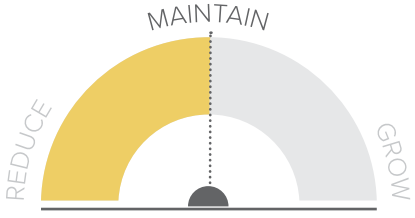


BASELINE

17.2% housing cost burden (home-owners with mortgages)

44.2% housing cost burden (renters)

FUTURE TREND



Maintain baseline

CURRENT TREND:

The percentage of households with a mortgage who are "cost burdened" due to paying over 30% of their income towards their housing costs has been consistently lower than the percentages of residents in Rochester's adjacent communities. However, over time the percent of those cost burdened has reduced. In 2016 nearly one in five households in Rochester with a mortgage paid more than 30% of their income.

In terms of rental units, all communities have a higher percentage of renters who are cost burdened. Rochester's percentage of renters who are cost burdened has remained near the average for the region and has started to trend downwards over the past six years. Townships—which likely have a constrained supply of rental housing have larger percentages of renters who are cost burdened.

Source: American Community Survey, 2016

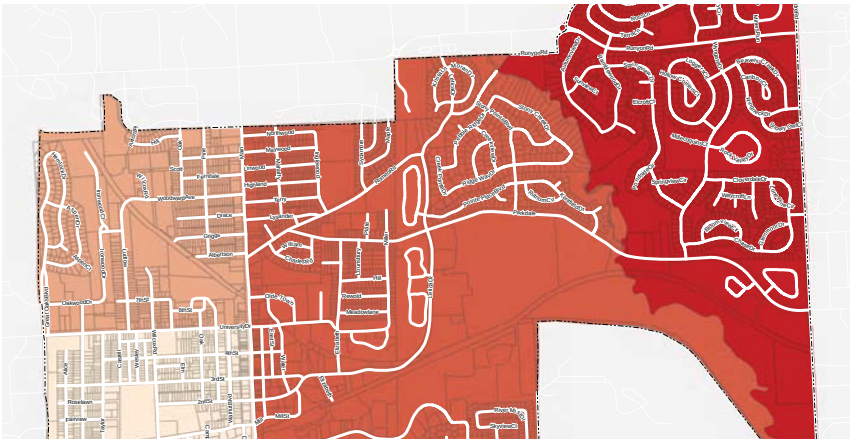
Housing Affordability

16.2 **Median Unit Price**

BACKGROUND:

Median unit price measures a developments ability to provide housing that is affordable to the median resident currently within Rochester. While, population growth and economic growth are often positive changes within the community, maintaining or slowing the increase unit prices will help keep current residents within the City.

MEDIAN GROSS RENT



*See **Map 24** in the Sustainable Rochester Map Book Appendix.*

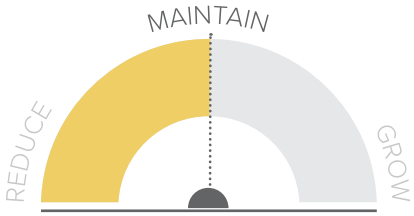
MEDIAN HOUSING VALUE

*See **Map 25** in the Sustainable Rochester Map Book Appendix.*

BASELINE

$361,735 (median housing value) / **$861** (median gross rent)

FUTURE TREND



Maintain baseline

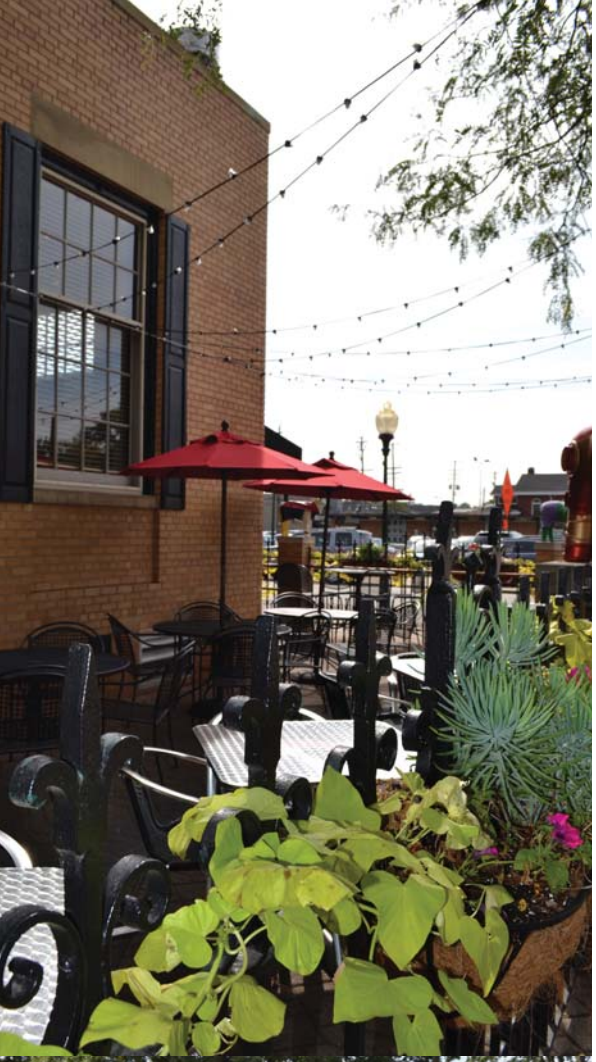
EVALUATION CRITERIA

1. 10% of units at median housing cost

CURRENT TREND:

The median house value and median gross rent indicate the point at which half the homes / rent prices within the area are more expensive / less expensive. These values vary by their location within the City. The eastern edge of the City has the highest median rent ($1,500) while the south western corner of the City has the most affordable median rent ($762). The median house value within the City ranges between less than $270,000 to greater than $310,000.

Source: American Community Survey, 2016



Downtown Viability
Sustainability Value #6

PROACTIVE APPROACH:

The City of Rochester has adopted the following goal and strategies to ensure downtown viability by proactively seeking a mix of uses and by calling for effective design decisions that balance parking and circulation needs without negatively its character. Additional strategies can be found in the City's adopted Master Plan.

MASTER PLAN IDEA

1. Develop and maintain a variety of retail and entertainment uses with appropriate pedestrian and vehicular access while preserving the character of the downtown.

MASTER PLAN STRATEGIES

1. Design parking areas and circulation patterns in order to accommodate the needs of downtown users without negatively impacting the pedestrian environment of the community.

2. Actively seek a variety of unique and compatible uses for the downtown which do not negatively impact adjacent land uses.

DEVELOPMENT COMPONENT	INDICATOR	BASELINE	TARGET/ FUTURE TREND
17 *Workforce Development*	**17.1 Regional** Number of Jobs	7,028 jobs	Grow
	17.2 Local Mixed Use Percentage	72% commercial use	5% increase within DDA district
18 *Historic Preservation*	**18.1 Regional** Percentage of Housing Structures Over 50 Years Old	33.1% of housing structures over 50 years old	Grow
	18.2 Local Compliance with Sight Lines	Existing skyline	0% change
19 *Business Attraction*	**19.1 Regional** Number of New Businesses within DDA District	432 businesses within DDA	Grow
	19.2 Local Proportion of Businesses in DDA District	57% of businesses within the DDA	5% increase within DDA district
20 *Parking Efficiency*	**20.1 Regional** Number of Event Days	56 event days	Maintain baseline
	20.2 Local Public Parking Provided	1,314 paid parking spots 367 free parking spots	10% increase

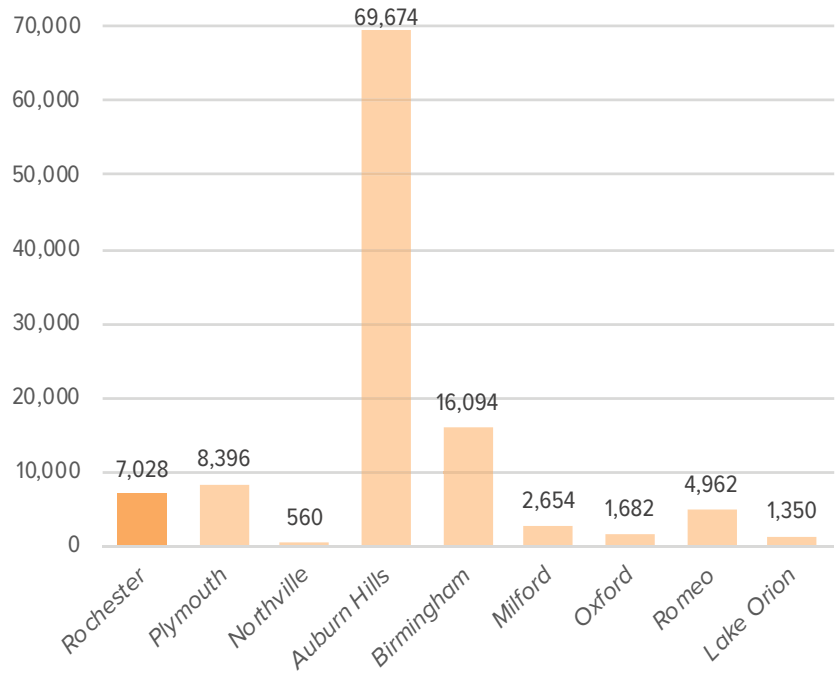
Workforce Development

17.1 **Number of Jobs**

BACKGROUND:

The number of jobs within a community is the foundation of any economic growth strategy. By building on what already exists, cities can support current businesses and create a strong foundation on which to attract new businesses, residents, and employment.

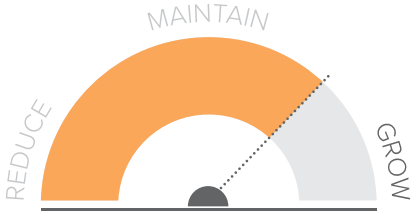
JOBS WITHIN THE CITY



BASELINE

7,028 jobs

FUTURE TREND



Grow

CURRENT TREND:

Rochester currently has 7,028 jobs within the City. Of the peer downtown communities, Rochester has the fourth largest amount of jobs after Auburn Hills, Birmingham, and Plymouth.

Source: American Community Survey, 2016

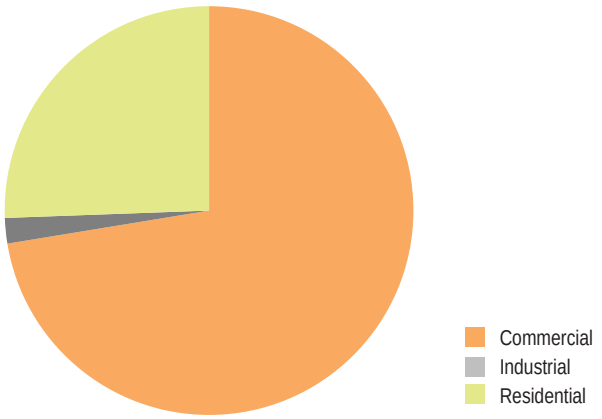
Workforce Development

17.2 **Mixed Use Percentage**

BACKGROUND:

The business mix of an area describes the different types of businesses located there including retail and commercial, restaurants, personal services, offices, and more. An area such as a downtown can foster a mix of businesses based on its design and level of activity. When people are coming downtown for work and other activities, a well-designed space provides them an opportunity to go to multiple destinations on one visit. Different businesses can also focus on their activities at different times of the day, which helps prevent the area from being empty especially in the evening.

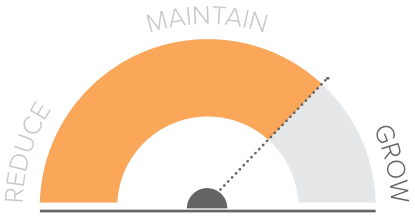
USE MIX WITH DDA



BASELINE

72% commercial use

TARGET EVALUATION



5% increase within DDA

EVALUATION CRITERIA

1. Percentage of property nonresidential use

CURRENT TREND:

Rochester's downtown is currently comprised of approximately 72% commercial uses. Another quarter of uses are strictly to residential uses, and a small percentage of properties, just 2%, is devoted to industrial uses.

Source: Oakland County Department of Equalization

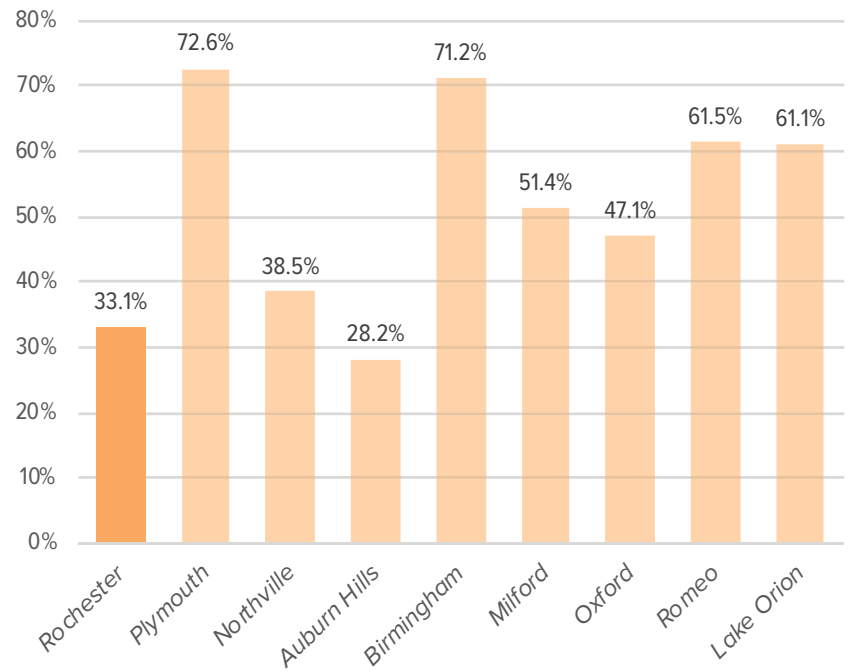
Historic Preservation

18.1 Percentage of Housing Structures Over 50 Years Old

BACKGROUND:

During times of increased development, it is important for a community to maintain the places and institutions that make it special, such as natural landscapes, gathering places, and historic buildings. These places, along with attractive streetscapes and storefronts, contribute to a sense of place and neighborhood identity. While, it is difficult to compare community character change across peer communities and over time, the percentage of housing structures over fifty years old can serve as a proxy to quantify the degree of change within a community.

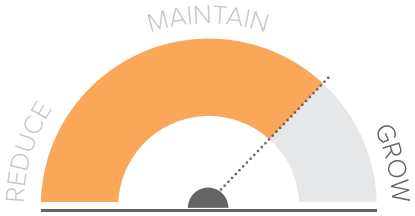
PERCENTAGE OF HOUSING STOCK BUILT BEFORE 1970 (2016)



BASELINE

33.1% of housing structures over 50 years old

FUTURE TREND



Grow

CURRENT TREND:

Rochester has the second smallest percentage of its housing built before 1970, after Auburn Hills. This low percentage is likely due to the large, modern subdivisions on the City's east side. Plymouth and Birmingham have the greatest percentage of housing over 50 years, 72.6% and 71.2% respectively.

In the past five years, the City of Rochester experienced 57 residential tear downs, where the existing structures were demolished and rebuilt.

Source: American Community Survey, 2016

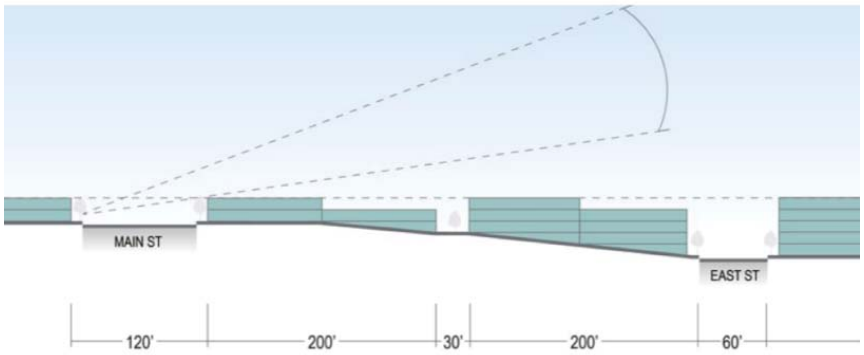
Historic Preservation

18.2 **Compliance with Sight Lines**

BACKGROUND:

The downtown has traditionally been the visual and economic center of the City of Rochester. Downtown has historic small-town character, and is a walkable, predominantly commercial area designed at a pedestrian scale. In the Rochester 2025 Masterplan a "Skyline Test" was established to preserve the historic nature of the downtown.

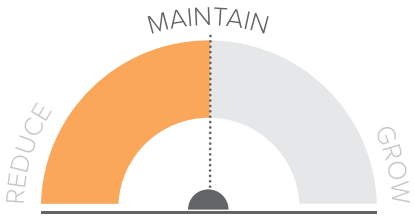
SIGHT LINE ILLUSTRATION



BASELINE

Existing skyline

TARGET EVALUATION



0% Change

EVALUATION CRITERIA

1. Sight diagrams

CURRENT TREND:

The Skyline Test is a measurement of height of a building based on its visibility from the Downtown Core. Buildings of height greater than the height permitted may be permitted, subject to demonstration through line of sight diagrams that the building will not detract from the appearance of Main Street's skyline.

Source: City of Rochester

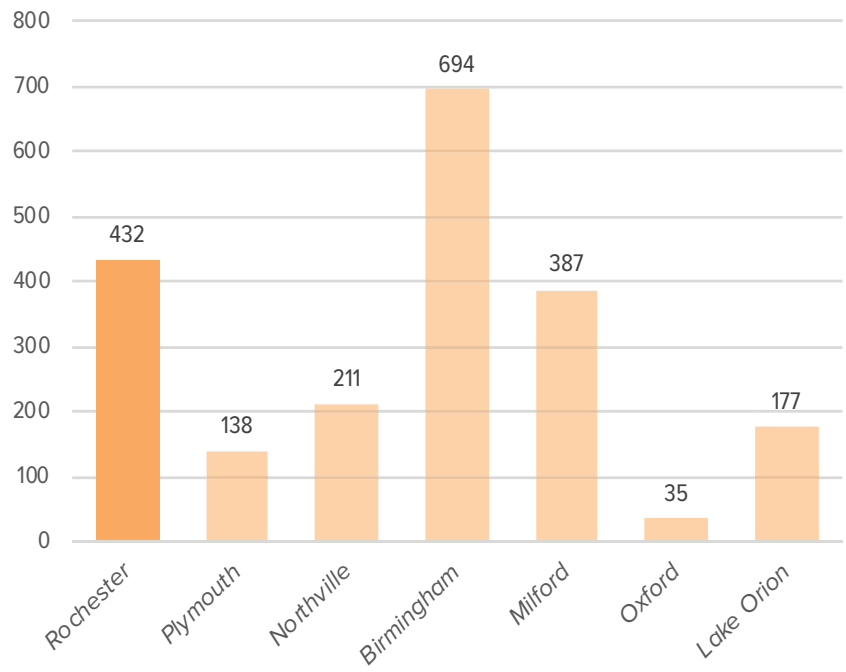
Business Attraction

19.1 Number of New Businesses within DDA District

BACKGROUND:

Supporting and expanding existing businesses and attracting new businesses can help support the viability of a community's downtown. As new businesses arrive, economic development opportunities are created for the district such as job growth, the expansion and diversification of the tax base, and improvements to quality of life with new services and amenities.

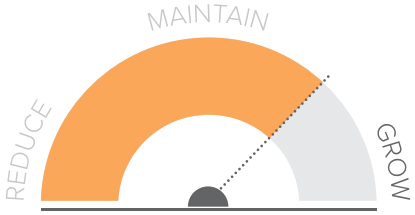
NUMBER OF BUSINESSES WITHIN THE DDA



BASELINE

432 businesses within DDA

FUTURE TREND:



Grow

CURRENT TREND:

Rochester has the second most businesses within its DDA, after Birmingham. Oxford has the fewest businesses located within its DDA.

Source: City of Rochester DDA

Business Attraction

19.2 **Proportion of Businesses in DDA District**

BACKGROUND:

The proportion of businesses within the DDA district is number of businesses located within the DDA divided by the total number of businesses within the City. For an economic activity center such as a downtown, a high proportion of businesses shows that the area is desirable, businesses are successful, and a variety of activities are taking place.

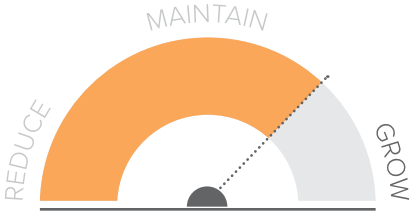
EXISTING LAND USE

*See **Map 4** in the Sustainable Rochester Map Book Appendix.*

BASELINE

57% of businesses within the DDA

TARGET EVALUATION



5% increase

EVALUATION CRITERIA

1. Number of tenet spaces within the DDA / outside the DDA district

CURRENT TREND:

A majority of the businesses within Rochester are located within the City's DDA, 57%. However, there are industrial uses located along South Street and Letica Drive. Additional commercial uses extend west from downtown along University Drive.

Source: Oakland County Department of Equalization

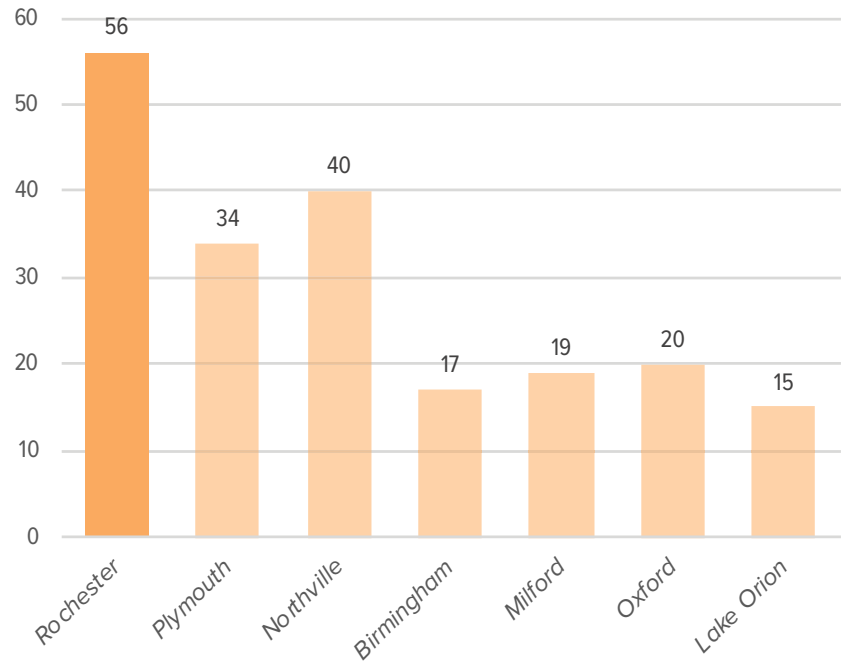
Parking Efficiency

20.1 **Number of Event Days**

BACKGROUND:

Ongoing public events help drive positive awareness of a City and its downtown. Bringing people from across the city and from other areas within the region to downtown on a regular basis, serves to make citizens aware of the unique amenities that exist in the central part of the community. Awareness of the amenities and foot traffic in the City's downtown helps to strengthen businesses and supports the City's quality of life.

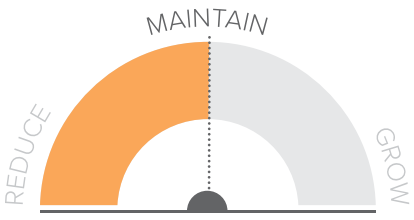
NUMBER OF EVENT DAYS A YEAR



BASELINE

56 event days

FUTURE TREND



Maintain baseline

CURRENT TREND:

Downtown events in Rochester far exceed the number of events that occur in its peer communities. Rochester has 16 more events a year than Northville, which has the second most of all peer communities. The high number of events likely are attracting residents from all over the region to enjoy the amenities found in the City's downtown.

Source: City of Rochester DDA

Parking Efficiency

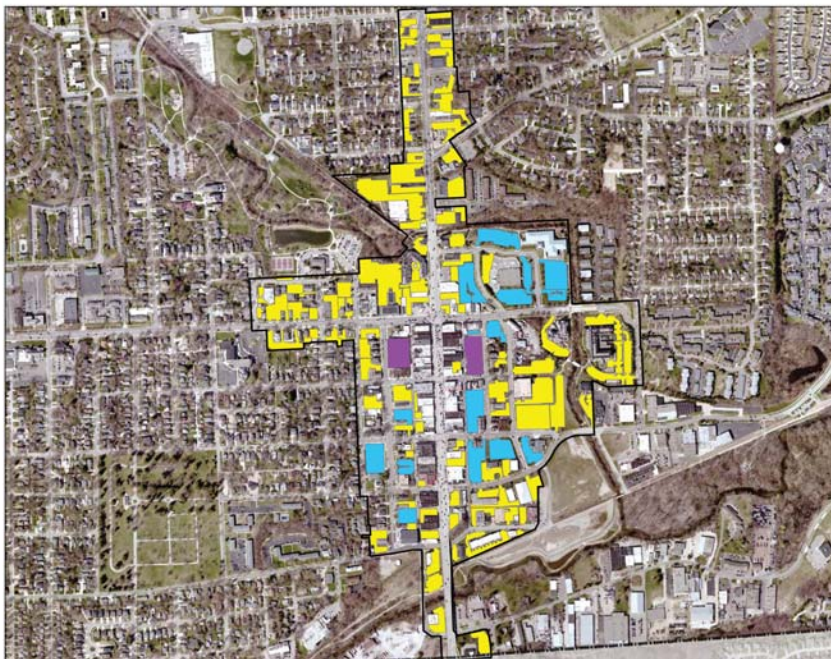
20.2 **Public Parking Provided**

BACKGROUND:

Parking areas have great impacts on the areas surrounding them. Walkable areas generally have parking located on side streets or in structures accessed from side streets. The main streets contain storefronts to put the activity in a visible place and encourage people to visit multiple businesses. A parking structure can be an effective way for the community to provide a large volume of parking behind their main street. Structures can also reduce the overall amount of impervious surface taken up by parking lots, allowing for improved management of storm water, additional open space and landscaping, and other benefits.

Parking lots indicate sustainability based on several factors. Well-utilized parking areas indicate that the area is a highly desirable destination. Parking located on side streets allows the main street to thrive and encourage activity.

DOWNTOWN PARKING AREAS

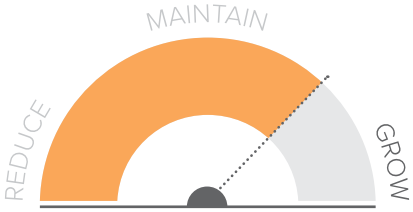


*See **Map 26** in the Sustainable Rochester Map Book Appendix.*

BASELINE

1,314 paid parking spots
367 free parking spots

TARGET EVALUATION



10% increase

EVALUATION CRITERIA

1. Public parking provided
2. Event parking provided
3. Drop-off space provided

CURRENT TREND:

Parking is provided in the City of Rochester's downtown through a variety of options – parking platforms and private and public surface lots. The City currently maintains 1,314 paid parking spots, with many of those spots located in platforms and in the northern half of the DDA district.

The City also maintains 367 free parking spots, which are located around the City's largest municipal park and at the north and south edges of the DDA district.

Source: City of Rochester DDA

TROY
MICHIGAN

PLAN TROY 2040

Resolution #2023 To Be Included

CITY COUNCIL

Ethan Baker, Mayor
Rebecca Chamberlain Creanga, *Mayor Pro Tem*
Ellen Hodorek
Mark Gunn
Theresa Brooks
Hirak Chanda
David Hamilton
Ann Erickson Gault (2021-23)
Edna Abrahim (2021-23)

PLANNING COMMISSION

Chair
Dave Lambert

Members
Marianna Perakis, *Vice Chair*
Toby Buechner
Carlton Faison
Michael Hutson
Tom Krent
Lakshmi Malalahalli
Tyler Fox
John Tagle
Sadek Rahman (2021-22)
Jerry Rauch (2021-22)

CITY MANAGER

Mark Miller

COMMUNITY DEVELOPMENT DIRECTOR

Brent Savidant

PLANNING DEPARTMENT

Paul Evans,
Zoning and Compliance Specialist
Jackie Ferencz, *Office Manager*

INFORMATION TECHNOLOGY DEPARTMENT

Alex Bellak, *I.T. Director*

CITY PLANNING CONSULTANT

Carlisle/Wortman Associates

PHOTOGRAPHER

All Troy photos, unless otherwise credited, were provided by Acacia Photography of Troy, MI

Executive Summary

In 2008, the City of Troy adopted a new Master Plan, the first updated Master Plan since 1965. The 2008 Master Plan recognized Troy's place in a changing post-Recession world. Rather than control growth, the 2008 Master Plan identified opportunities and strategies for competing in the global economy.

2015 Revision:
In 2015, the city determined that the 2008 Master Plan still represented Troy's long-term vision, goals, and policies for development and growth. However, while the plan was still relevant and effective, due to shifts in economic, demographic, and development patterns the City felt that the 2015 plan update should focus on specific geographic areas. The 2015 plan update incorporated three (3) special area plans. Special area plans were chosen for areas where substantial development and redevelopment activity was likely to occur. Special area plans provide an illustrative framework to guide development in a way that fosters a sense of place and establishes community identity in key locations. The special area plans provide schematic representations of potential development areas at a variety of scales and levels of detail, and may include illustrative configurations for new streets, buildings, parking, open space, and circulation as may be appropriate to the area.

2015 Special Area Plans:
Rochester Road
The Rochester Road Special area plan provides a unifying framework built around public and private improvements that will change the function and character of the corridor over time. The plan identifies three (3) complementary concepts for dealing with these issues and creating a solution that all users will welcome. The first concept deals with restructuring the pattern of land use and development lining the corridor, the second involves incorporating the redesign of the public right-of-way, and finally, the third creates a cohesive image and stronger identity for the corridor.

Maple Road
Maple Road presents an opportunity to build on the existing diversity of land uses, transportation options, and proximity to residential properties. For properties lining the corridor, revitalization requires a restructuring of development patterns, with less emphasis on land use and more focus on quality, accessibility, and innovative redevelopment. For those parcels in the industrial areas located off the corridor, a focus on protection and reinvestment of the industrial and technology development base should be emphasized. The repurposing of Maple Road offers three (3) key priorities based on the following land patterns: the development nodes at major mile intersections, the linear segments of the corridor between the major mile intersections, and the industrial and employment areas located off the corridor.

North Troy
North Troy faces a turning point. Its original development pattern must evolve to meet new challenges in the marketplace. Both employers and employees must be flexible and nimble to respond to demands in competition. As such, their facilities must adapt to fulfill evolving, diverse requirements in the workplace. Many of today's knowledge workers expect entertainment and service amenities nearby as well as opportunities and spaces to connect and share ideas. The isolated buildings in North Troy do not reflect this trend. There is no central, defining place that represents the heart and vision of North Troy. Creating this balanced mix of uses and a sense of place will create a symbiotic relationship with the adjacent neighborhoods, where employment, service, and residential uses are interconnected. Fortunately, North Troy has ample opportunities to evolve and create a modern, preferred employment hub.

2023 Revision:
In 2020, the City again reviewed the Master Plan to determine if it was still relevant and continued to represent Troy's long-term vision, goals, and policies for development and growth. This review was conducted during the COVID-19 Pandemic, one of the most impactful events of the 21st Century. The City found that many of the strategies that aided the recovery from the Great Recession – flexibility in use, encouraging mixed use, permitting residential density in appropriate locations – are the same strategies that should assist the City as it recovers from the effects of the Pandemic.

At the start of the process, it was agreed upon that the Master Plan continued to be relevant. It was forward thinking at the time and many of the issues that were focused on are still applicable. However, there were a few key issues that needed updating, specifically the planning for the Neighborhood Nodes.

Revised Neighborhood Node Intent Statement
The Neighborhood Node Intent Statement lays out the overall purpose of the neighborhood nodes. The revised intent statement reflects the historical past and current conditions, and better articulates the planned vision of the nodes.

Revised Neighborhood Node Language
The City reviewed each node in detail to revise their specific intent based on the revised node intent statement, historical past, current conditions, and future anticipated vision. Each node was revised based on this detailed review.

Language has been revised for the following nodes:
- B (Maple and Dequindre)
- C (John R. and Maple)
- D (Big Beaver and Dequindre)
- E (Wattles and Dequindre)
- F (John R and Wattles)
- I (Crooks and Wattles)
- J (Dequindre and Long Lake)
- K (John R and Long Lake)
- N (Dequindre and Square Lake)
- O (John R and Square Lake)
- P (Rochester and Square Lake)
- Q (Livernois and Square Lake)
- R (John R and South)
- T (Livernois and South)
- U (Crooks and South)

Based on detailed review, the City eliminated the following nodes:
- A (Dequindre and Maple)
- G (Rochester and Wattles)
- H (Livernois and Wattles)
- L (Rochester and Long Lake)
- M (Livernois and Long Lake)
- S (Rochester and South)

Concept Plans
To best visually portray the intended vision for the nodes, three (3) concept plans were included. These concept plans include elements of mixed use, architectural quality, transitions between intensity on roadways to adjacent single-family neighborhoods, infill development, and landscape buffers.

Future Land Use Plan
The Future Land Use Plan was updated to reflect changes in Neighborhood Nodes. In addition, the Future Land Use Plan for Big Beaver Road on the northside of Big Beaver Road between Crooks and Coolidge is amended to be consistent with the existing zoning and land use pattern of the surrounding area, and to provide an appropriate transition.

Introduction
The Master Plan introduction was strengthened to clearly articulate the relationship between Master Plan and Zoning Ordinance.

Eliminate Big Beaver Pedestrian Special Area Plan
This was made redundant with the construction of the I-75 Diverging Diamond Interchange and the adoption of the Downtown Development Area Landscape Plan.

Refresh Format and Layout
The Master Plan layout and format was updated including graphics and images. In addition, relevant data and demographics were updated based on the most current data.

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7 – Green City: Responsibility to Natural & Energy Resources

Every level of government bears responsibility for the protection of the natural environment.

The United States Government sets policy and protects national resources, like the national parks and other important wildlife refuges. The State of Michigan regulates wetlands and sets uniform statewide policies for the protection of critical Michigan resources. The State also empowers local units of government to establish laws to protect those resources in their own front yards. Local units of government are the front line of environmental protection and natural resource conservation. This Chapter will establish the philosophy of environmental sustainability in Troy, framed around a series of policies designed to make the most of the tools available to the City.

Troy is characterized as a vibrant and engaging place to live and work, where environmental and ecological resources play a role in creating a community that will draw the best workforce in the region. Troy can be an environmental leader, demonstrating to others how to grow while embracing its natural resources and making wise use of energy resources. As discussed in Chapter 2, sustainable cities integrate the concepts of sustainability into policies covering social, economic, and environmental topics. Troy and its citizens can use the community's environmental resources responsibly without compromising the ability of tomorrow's residents to meet their needs.

Preservation and Enhancement of Existing Natural Features

Economic growth and environmental preservation are elements that are commonly perceived as two forces that must be at odds. However, environmental considerations have the ability to enhance economic development. Efficiency reduces the cost of products and services, and preservation of natural features increases the value of developed properties.

The City of Troy is nearly built out. However, the City manages over 900 acres of parkland. Some of the existing park land is used for active recreation areas, and some is maintained as natural areas for passive recreation and general open space. The City's current Parks and Recreation Master Plan identifies these City-owned properties and provides a brief description of each.

Development and Natural Feature Preservation

The value of home sites adjacent to open space, parks, wetlands, greenbelts and other green amenities is greater, all things being equal, to similar sites not adjacent to such amenities. A report published by the Metropolitan Council, a regional planning agency for the Twin Cities of Minneapolis and St. Paul and surrounding seven-county metropolitan area, showed a conclusive positive impact of open space on residential property values.[1]

In addition, preservation of the existing natural systems can reduce infrastructure costs. For example, the preservation of woodlands and open space reduces the amount of stormwater infrastructure necessary to accommodate the site's runoff. Clustering of home sites is another preservation technique that reduces costs in that the developer does not need to unnecessarily extend underground infrastructure to accommodate a more sprawling site layout. The reduction of infrastructure costs results in a greater return on investment.

1: http://www.metrocouncil.org/Directions/development/dev2006/OpenSpaceStudyNov06.htm

Low Impact Development

Low Impact Development (LID) represents a different way of thinking about stormwater. It is a series of design techniques that manage rainfall at the source using uniformly distributed, decentralized techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source.

Under LID, stormwater runoff is not a waste product, but a resource. For instance, LID techniques such as cisterns and rain barrels use collected rain water for irrigation, or as gray water for toilet flushing. LID also advances the idea that almost all elements of a site plan (open space and built features) can be used for stormwater control. For instance, the parking lot can be made out of porous pavement. When stormwater drains through the pavement, it recharges the groundwater. Similarly, rooftops can be used as planting areas, soaking up rainwater and reducing runoff.

LID techniques often cost less to construct than traditional closed designs. Case studies conducted by the Low Impact Development Center show a 25-30 percent reduction in site development costs over traditional techniques. One reason for the lower costs is that LID techniques keep stormwater on top of the ground, rather than building the infrastructure underground to handle stormwater. Another reason is that small infiltration areas are generally less expensive to construct than one large detention area, particularly if the site is designed to limit the amount of stormwater generated by impervious surfaces.

Low Impact Development Center, www.lowimpactdevelopment.org

Encouraging natural feature preservation can be accomplished through ordinance regulations or guidelines that ensure the least amount of impact on a site so that it continues to function at its pre-development level. This can be done by limiting disturbance, imitating natural systems with built replacements, and mitigating the reduction in vegetation and infiltration when the land is covered with impervious surfaces. These design techniques are called Low Impact Development (LID) techniques. While these techniques generally concentrate on stormwater management, they also help preserve existing natural features, like woodlands, that contribute more to the community than just absorbing stormwater runoff. Troy does not have wetland or woodland protection ordinances in place.

The City of Troy must engage its neighbors to preserve features that cross more than one jurisdiction, such as a wetland system or watershed. Natural features provide significantly more benefits if they are maintained in larger units, such as a complex system of woodlands, wetlands, and rivers or streams. These larger, connected systems are more successful at maintaining their ecological integrity. The less fragmented natural features are, the higher quality they remain.

Urban Redevelopment

Troy Futures suggested several development methods that will influence natural feature preservation within the City. Villaging, for instance, will act to cluster commercial and cultural services in higher density locations within the community. This, in turn, will allow the few remaining greenfields, or undeveloped areas, to be less densely developed, enhancing the possibility of natural feature preservation on these sites.

For the remaining undeveloped parcels, emphasis should be placed on preserving any existing natural features to the greatest extent possible, clustering in already cleared areas of each site, and ensuring that open spaces are contiguous with adjoining open spaces.

Redevelopment of obsolete or underutilized properties provides opportunities to restore or recreate vegetated communities that enhance the site's ecological value. While not completely natural systems, tree plantings mimic woodlands or native wildflowers plantings that simulate a meadow can be aesthetically pleasing and provide environmental benefits. For instance, one LID technique is to plant deep rooted plants, such as tall grasses typically found in a prairie. The root systems of these grasses grow up to 8 feet deep, and as they grow and die, they provide tiny waterways through the soil that improves infiltration of stormwater runoff. While these techniques would provide benefits in any situation, they could be especially effective in the case of a redevelopment property.

Brownfield Redevelopment Authority

The City Council established the Brownfield Redevelopment Authority in 1999, expressing Troy's interest in redeveloping brownfield and other idle or underutilized sites in the City. The Brownfield Redevelopment Authority can offer financial incentives for cleanup and redevelopment or for demolition of functionally obsolete buildings in the form of Tax Increment Financing (TIF) reimbursements.

TIF Reimbursement: The Brownfield Authority may capture the incremental real and personal property tax revenues generated by a developer's project to pay for eligible environmental clean up and contamination prevention incurred on the property.

Single Business Tax Credit: A tax credit of 10 percent up to ten million dollars is available for an owner or operator of a facility for capital and equipment expenditures for redevelopment.

The Troy Brownfield Redevelopment Authority has assisted in the redevelopment of sites throughout the community. Its first project was the redevelopment of the former Ford New Holland Tractor Plant at the southwest corner of Maple Road and Coolidge Highway. The site, which sat underutilized for nearly a decade because of liability and other issues concerning contamination, is now know as Midtown Square, a $200 million mixed use development boasting 600,000 square feet of retail space and 285 residential units.

Benefits of Brownfield Redevelopment

There are obvious environmental benefits to cleaning up brownfield sites in a community. These actions create a cleaner and safer environment, reducing risks to public health, safety and welfare, and other benefits:

- Redeveloping a brownfield site transforms property that is most likely not generating substantial tax revenues to a property that contributes to the local tax base, eliminating an opportunity cost. Also, by not redeveloping brownfields, they could potentially have a depressing effect on property values, leading to further tax revenue loss.
- Idle properties that were once viable businesses do not contribute to the job base. Turning them over for new, productive uses creates new job opportunities.
- It is likely that brownfield sites have the infrastructure in place to serve a new land use. This can represent a substantial savings by a community or developer compared to building on a green field site.
- Re-using property in urban areas decreases development pressure in green fields, which in turn, increases the opportunity to preserve open space and combat urban sprawl.

Brownfield Redevelopment Guide; Consumers Renaissance Development Corporation; 1998.

Redevelopment Incentives

Ordinance regulations are the first line of environmental stewardship in many communities. However, there are other ways of encouraging sustainable development. The following incentive-based techniques encourage sustainable development:

- Fee adjustments for infill housing: Riverside, California waives certain fees, such as grading permit fees and water distribution fees, if the property being redeveloped meets the definition of residential infill.[2]
- Smart Growth Zone: Developments in Smart Growth Zones in the City of Austin Texas are charged reduced fees for zoning, subdivision, and site plan applications, and for water and wastewater capital recovery fees.[3]
- Primary employer incentives: Incentives such as application fee waivers, utility and transportation improvements, streetscape improvements, and expedited processing of development applications are offered by the City of Austin, Texas to guide large employers to the Desired Development Zone. These types of employers generate significant levels of growth, both within their specific project and in the surrounding area.[4]
- Built Green Program: In partnership with local counties and builders, the City of Seattle promotes best known practices in energy, air quality, stormwater management, and water efficiency to give homeowners added value and home builders a competitive advantage. To stimulate growth in Built Green-certified homes, the City launched a design competition, and highlighted winners on their website.[5]
- Green Review Track: King County, Washington, offers a dedicated "Green Track" for green buildings and projects that incorporate Low Impact Development techniques. Proposals on this track are assigned to a green team, composed of County staff with expertise in green development practices. Staff provides assistance to customers on sustainable development techniques including green roofs, alternative energy systems (solar, wind, geothermal), rain water collection, resource efficient framing, recycled materials, and Low Impact Development site design. Green developments follow a customized review schedule with a single point of contact.[6]

Transportation

Methods to reduce the dependence on the automobile were introduced in Chapter 5. Improving opportunities for non-motorized transportation, transit-oriented development, mixed-use, and technological pathways will contribute to the changing mobility needs of Troy.

Green Building

There is an emerging, global trend to encourage the development of environmentally sustainable buildings and neighborhoods. Commonly referred to as "green building," this trend has been fueled by numerous organizations who have worked to develop standards around which architects and builders can design their projects. The most prominent of these groups is the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program.

The LEED rating system was originally designed for individual buildings. LEED Certification can be achieved through the use of green techniques applied to new construction or renovations to existing buildings, including historic structures. Over 4,000 buildings have either already been LEED certified or are registered and going through the certification process in the U.S. Michigan has almost 200 LEED-certified buildings including office buildings, university buildings, churches, nature centers and private residences.

Many green buildings across the country have been completed because the owner was self-motivated, based on the benefits those buildings enjoy. However, communities can also develop incentives to encourage green buildings and green site design techniques. Incentives could include property tax credits, tax abatement and tax exemptions, density bonuses, expedited permit review, and waiving of permit fees.

In Troy, several notable green buildings have gained regional notoriety. The Kresge Foundation, highlighted on this page, is a model of green development located on Big Beaver Road. Walsh College is also adopting a green building philosophy. The College's 15 million dollar expansion at the Troy Campus will seek LEED Certification by choosing recycled or environmentally sensitive material, incorporating rain water harvesting for irrigation and other uses, and using design techniques to capitalize on solar energy for heating.

Troy is also home to the first previously existing building in Michigan to earn LEED Certification. Bank of America's facility in Troy earned gold status due to its use of many environmentally-friendly technologies. The Bank of America facility has the second largest green roof in Michigan, over 53,000 square feet in area. The building also uses heat generated from the computer servers to warm the building, heat water, and melt snow. Other features include the use of underground well to provide water to the decorative fountain, whose wastewater is used to irrigate the landscaping and pull heat from the building during hotter periods.

In addition to LEED, the National Association of Homebuilders have developed their own, voluntary certification program for residential construction, which the Michigan Association of Homebuilders have adopted as part of their program known as GreenBuilt. GreenBuilt is a program intended to allow Michigan homebuilders to create more sustainable home developments that are energy efficient and more respectful of natural resources. The GreenBuilt program requires that all members who elect to secure GreenBuilt status attend a 3-hour GreenBuilt training session. GreenBuilt also provides professional assistance to members.[7]

In Troy, the Cedar Pines of Troy project is the only entirely GreenBuilt project in southeast Michigan. This project includes homes that are designed to use 52 percent less electricity, 54 percent less natural gas, and 46 percent less water. The development also features homes with dual flush toilets, rain water harvesting, low flow faucets, renewable flooring materials, no VOC Paints, trim made from sustainable forests and plantations, high efficiency dual stage furnaces, high efficiency water heaters, and photovoltaic solar cells.[8]

Other green development techniques are reflected in projects such as Caswell Town Center, which incorporated innovative stormwater management techniques.

Urban Form and Neighborhood Design

Neighborhoods can be designed to reduce energy consumption by providing opportunities for shorter vehicle trips and the use of alternative forms of transportation. Some techniques include the locating of residential units near neighborhood shops and existing utilities, the provision of bicycle and transit facilities, and proximity to schools and parks.

The U.S. Green Building Council is piloting a program for energy-efficient neighborhoods. The LEED Neighborhood Development Pilot Program includes many site design techniques that preserve natural features, habitat, and open space, such as:[9]

- Limit parking to encourage people to use alternative methods of transportation, like walking or bicycling.
- Promote local food production to minimize the impacts of transporting food long distances. Farmer's markets allow such goods to be sold locally.
- Use energy saving technology for infrastructure needs such as street lights, water, and waste water pumps.
- Capture and use stormwater runoff and use in place of potable water for irrigation and toilet flushing.
- Use recycled concrete and asphalt for roadways and parking lots.

2: www.riversideca.gov/planning/infill.htm
3&4: www.ci.austin.tx.us/smartgrowth/sgincentives.htm
5: www.seattle.gov/dpd/GreenBuilding/OurProgram/DesignToolsStrategies/BuiltGreen/default.asp

6: http://www.metrokc.gov/dnrp/swd/greenbuilding/

7: www.greenbuiltmichigan.org

8: Wake-Pratt Construction Company
9: Pilot Version, LEED for Neighborhood Development Rating System, U.S. Green Building Council

Sustainable Design Projects (SDP)

Troy's SDP program promotes environmentally sustainable and energy efficient design and development practices for the construction of new and the rehabilitation of existing buildings and sites within the City. It is a voluntary option that encourages property owners to incorporate features designed to minimize the adverse impacts on the environment.

There are numerous categories from which the applicant can seek relief, including lot coverage and front yard parking. Each category has specific design measures that must be met to qualify as a Sustainable Design Project. The design measures offset the effects of granting relief. For example, to offset the relief granted to exceed lot coverage, the applicant could provide measures related to stormwater quality control, stormwater quantity control, and reduction of the heat island effect.

An example of an approved and constructed SDP project is 966 Livernois. The applicant, O'Brien Construction Co. Inc., sought to construct four front yard parking spaces in the IB Industrial and Business Zoning District. To offset the effects of the impervious parking spaces, the applicant provided the following improvements:

- Rain garden and swale
- Underground storage tank to capture rainwater runoff from roof
- Runoff from garage captured in rainbarrels
- Exterior lights on timers

The applicant met the three Prerequisite Measures (Stormwater Quality and Quantity and Light Pollution) and one Qualifying Measure (Water Efficient Landscaping).

City Demonstration Projects

Many of the ideas presented in this chapter for environmental preservation and energy efficiency are long-term techniques. However, there are many initiatives the City can accomplish relatively quickly to communicate its commitment to the environment. These "next steps" will engage citizens and inspire community members to think about the environmental issues Troy is facing.

What is LEED?

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. LEED gives building owners and operators the tools they need to have an immediate and measurable impact on their buildings' performance. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. LEED provides a roadmap for measuring and documenting success for every building type and phase of a building lifecycle.

United States Green Building Council, www.usgbc.org

Hands-On Projects

One way to foster a bond between residents and a particular natural feature, such as a wetland or stream, is to get them involved in a hands-on restoration or clean-up project on City-owned properties. Once people have been introduced to the plants in the ecosystem, and the function that those plants play, they have a greater understanding and appreciation for that place. Hands-on projects give residents a chance to learn about the ecosystems in the City. Once the project is complete, interpretive signage should be installed to describe the "why," "what," and "who" of the project.

Maintenance of Parks and Recreation Facilities

Another relatively short-term effort is to ensure that the City staff maintain parks and natural areas in an environmentally friendly way. New alternatives for maintaining turf, ball fields, roadways, and other elements of City parks are now available. Better practices ensure that facility maintenance does not negatively impact adjacent wetlands or other natural features. A regular evaluation of how City activities are done should be considered in light of natural feature preservation objectives. If practices do change, interpretive signage can be used to inform the public of changes to a park's visual appearance.

Planting Trees

Climate change and stormwater management are two important environmental topics. One common thread between these two is the impact trees have on each. Trees sequester a large amount of carbon. For example, a 2.5 acre Oak woodland can sequester about 3 tons of carbon in one year. Trees also intercept and absorb a large amount of stormwater. A typical woodland can absorb 20,000 gallons of rain in one hour through holding water on its leaves and trunk, absorption into the tree, and absorption into the deep leaf litter on the woodland floor.

The City can lead community planting programs and encourage additional trees with incentive techniques in the Zoning Ordinance.

Planting trees can be an annual community event that is also relatively inexpensive. The City is now working with the Alliance of Rouge Communities (ARC) to conduct a City-wide tree canopy survey using City Green software to quantify and evaluate the City's urban forest.

KRESGE FOUNDATION HEADQUARTERS

Kresge Foundation

In 2006, the Kresge Foundation has completed renovations to its headquarters in Troy in 2006 and 2015, which include the addition of a new a series of environmentally friendly site improvements. The project also restored 19th Century farm buildings on the 3 acre site. The use of green roof materials, geothermal wells, and recycled materials help the facility function efficiently. The Kresge Foundation is one of the top 20 largest private foundations in the U.S. The Kresge Foundation advances its mission to promote human progress by expanding opportunity for people with low incomes in America's cities. A staff of over 100 employees work to expand opportunities in America's cities for people with low incomes through grantmaking and social investing nationally in arts and culture, education, environment, health, human services and placed-based work in Detroit, Memphis, New Orleans and other parts of the country. (see https://kresge.org/about-us/careers/) .

Source: www.worldarchitecturenews.com

LEED Across Michigan

Michigan is a national leader in the area of green building. As of 2013 there are 410 LEED certified projects in Michigan. West Michigan is especially successful in its encouragement of green building. In fact, the City of Grand Rapids has been recognized by the U.S. Green Building Council as a national award-winner in green building. Grand Rapids has more square footage per capita of LEED certified buildings than any other city in the United States. The City itself lead the way with the development of its own new LEED certified Water and Environmental Services Facility, which uses 23 percent less gas and 35 percent less water than similar buildings of its use and size.

Private industry in Grand Rapids has also taken the green building initiative seriously. Steelcase and Herman Miller have voluntarily followed environmentally safe procedures for manufacture of furniture and Crystal Flash, a gasoline station chain, has begun offering biodiesel on a more widespread scale.

These and other Michigan companies, including large corporations like Ford, have begun to realize the benefits to green building in more ways than one. Not only do these companies realize actual savings in terms of building maintenance and energy use, but they also contribute to their public image by encouraging environmental stewardship.

Michigan Business Report; Michigan Economic Development Corporation, Volume 5, Issue 2, 2007

Waste Reduction

While the City has an extensive recycling program for its residents, the City could also institute a waste reduction program for its own operations. Waste reduction makes good business sense because it saves money through reduced purchasing and waste disposal costs. The US Environmental Protection Agency has a program called “WasteWise” that provides free technical assistance to help develop, implement, and measure waste reduction activities.

Adaptive Reuse

The economic impacts of the Covid-19 Pandemic, particularly the office market, continue to play out over time. Many zoning districts in Troy permit flexibility in the use of space, including the repurposing of offices into residential buildings. In October, 2022, the Planning Commission granted Preliminary Site Plan Approval to Forum Flats, a 200-unit multi-family development on Kirts Boulevard. This project included the conversion of a vacant 3-story office into 90 apartments. In addition, the development included two new 4-story, 55-unit apartments. This project had the effect of replacing underperforming office space while adding 200 new housing units to the market. This adaptability is important as Troy continues to evolve.

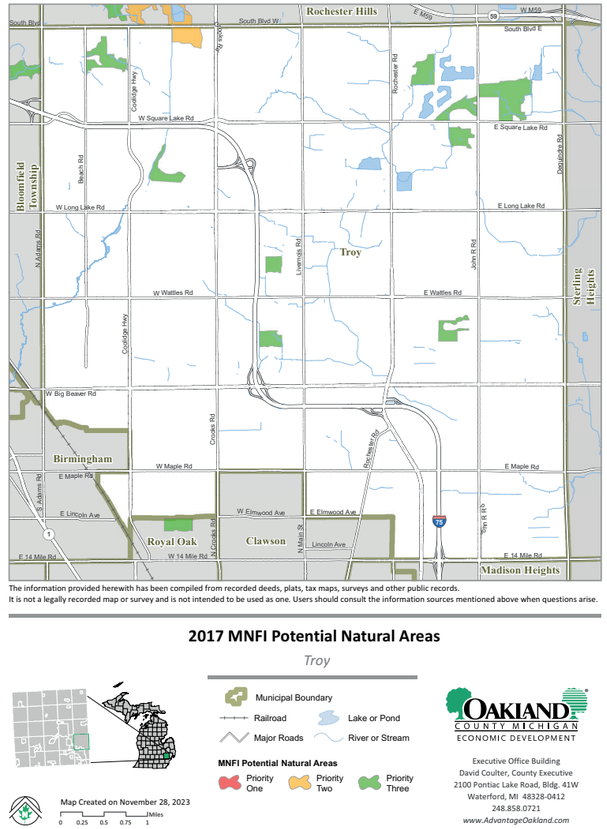
The City should also continue to identify opportunities for adaptive reuse of obsolete properties within its own facilities network. A good example of City-initiated adaptive reuse is the creation of the Sanctuary lakes Golf Course from a former landfill site. This 18-hole golf course is a critically acclaimed asset to the City and makes use of challenging property to create a significant asset for the community.

Natural Features Inventory

The Michigan Natural Features Inventory has been documenting and tracking the location and condition of Michigan's rare species and habitats for more than 40 years. The program is now run by the Michigan State University Extension since 2000.

In 2017, MNFI prepared an update for Oakland County. Portions of Troy have been designated as Priority II and Priority III areas. Most of the areas in the MNFI data are located along waterways or related to floodplains that are part of the Gibson Drain, Lane Drain, or Ferry Drain systems that are tributaries to the Clinton River. Additionally other sites are located along the River Rouge watershed tributaries and floodplains within the city.

The MNFI and Oakland County examined each natural area based upon specific scaled criteria to prioritize sites. Criteria included size, stream corridor, landscape connectivity, restorability of surrounding lands, vegetation quality, parcel fragmentation, and number of known rare species and natural communities. Based on scored criteria, sites were ranked high (priority I), medium (II), and low (III) for priority protection status.



For more information please visit:
https://www.oakgov.com/home/showpublisheddocument/494/638027377124100000

Electric Vehicles and EV Charging Stations

Electric vehicles offer an alternative to gasoline and diesel-powered vehicles. The benefits of electric vehicles and EV infrastructure include reduced air pollution and noise and reduced expenditures on gasoline. As the automobile industry ramps up efforts to produce more electric vehicles, EV infrastructure must also expand.

The Southeast Michigan EV Resource Kit and Planning Hub gives local communities and stakeholders quick access to key data and background information, the current status of infrastructure and deployment, funding opportunities, and local case studies and best practices. The EV Hub will be updated and expanded as needed to address emerging issues and respond to changes in technology, the market, grant programs, laws and regulations, state and federal Policies, and requests and recommendations from communities, organizations, educational institutions, and other stakeholders.

The Hub maintains real time data related to publicly accessible charging locations by community. As of November 23, 2022, Troy had the most EV charging stations in Oakland County with 21. Zoning is not a barrier for the construction of EV charging stations in Troy. EV charging stations are permitted by right on any property, subject to review and approval of appropriate permits including electrical permit. (Source: SEMCOG, Electric Vehicle Resource Kit & Planning Hub).

MEMORANDUM

TO: ENVIROMENTAL SUSTAINABILITY COMMITTEE

SUBJECT: PEER COMMUNITY ENVIROMENTAL PLANS

DATE: JUNE 13, 2024

To help facilitate the roundtable discussion on outside resources the following environmental action and strategic plans from peer communities were identified for review:

Neighboring Communities in Michigan

1) Oakland County
2) Ann Arbor
3) Detroit
4) Grand Rapids (External Link)
5) Rochester
6) Troy

Peer Cities in other States

1) Cary, North Carolina (External Link)
2) Lenexa, Kansas (External Link)
3) Fishers, Indiana (External Link)

c:

OAKLAND COUNTY SUSTAINABILITY PLAN

OAKLAND COUNTY MICHIGAN

A Message from David Coulter, Oakland County Executive

To the residents of Oakland County,

I am pleased to share the Oakland County Sustainability Plan prepared by AECOM with you. This comprehensive plan represents one of the first steps toward our goal of reducing greenhouse gas emissions on Oakland County's government campus, as well as implementing sustainable strategies for our buildings and operations.

It allows us to measure our progress to achieve net zero carbon emissions by 2050 with an interim benchmark of 50% carbon emission reduction by 2035.

With this plan's recommendations in hand, we can be more intentional about achieving more energy-efficient buildings on the county's campus and fewer gas-guzzling cars in the county's fleet, more environmentally friendly grounds, and foster a workforce culture that embodies the county's commitment to a more sustainable Oakland County.

The Sustainability Plan is key to the seven goals we've identified as top priorities for the county. And these goals are all linked. You can't have healthy residents without clean and safe water and air.

Livable neighborhoods can't be fully achieved without access to non-motorized trails, public transportation and open green spaces for recreation.

Equipped with the recommendations in this report, we can in All Ways, Move Forward in a proactive way to address the inequities that underserved communities experience on issues such as climate change and access to public transportation and green spaces.

I promise you, this is not a plan that will sit on a shelf. With the help of some federal funding, we have a real opportunity to make transformational, once-in-a-generation changes. And that's what I intend to do.

It's the right thing to do, it's the moral thing to do and it's the thing that we're going to do to ensure future generations have a safe and clean county where they can live, succeed and thrive.

With gratitude

David Coulter

Acknowledgments

Indigenous Land Acknowledgment

Oakland County resides on the ancestral, traditional, and contemporary lands of the Anishinaabe, known as the Three Fires Confederacy, comprised of the Ojibwe, Odawa, and Potawatomi. The land was ceded in the 1807 Treaty of Detroit and makes up southeast Michigan.

In recognizing the history and respecting the sovereignty of Michigan's Indian Nations, Oakland County honors the heritage of Indigenous communities and their significant role in shaping the course of this region. Further, the county recognizes the wrongs done to those forcibly removed from their homelands, separated from their families, deprived of their natural resources, prohibited their use of spiritual and traditional practices, and restricted from expressing their cultural identity. The county commits to fostering an environment of diversity, equity, and inclusion that is responsive to the needs of the First Peoples through our words, policies, and actions.

The acknowledgment, preservation, and perpetuation of customs and traditions of Indigenous nations are essential to our shared cultural heritage. A deep understanding of Native peoples' past and present informs the policy creation, partnerships, and community engagement of the county in its ongoing effort to elevate the dignity of all people and serve as shared stewards of the land.

Thank You

Thank you to all who have collaboratively developed the county's Sustainability Plan, including Steering Committee members, Focus Group and technical interview participants, and other staff. This Plan and its future implementation will advance the sustainability of the county's sites and operations, further enabling the county's government to serve the community now and into the future.

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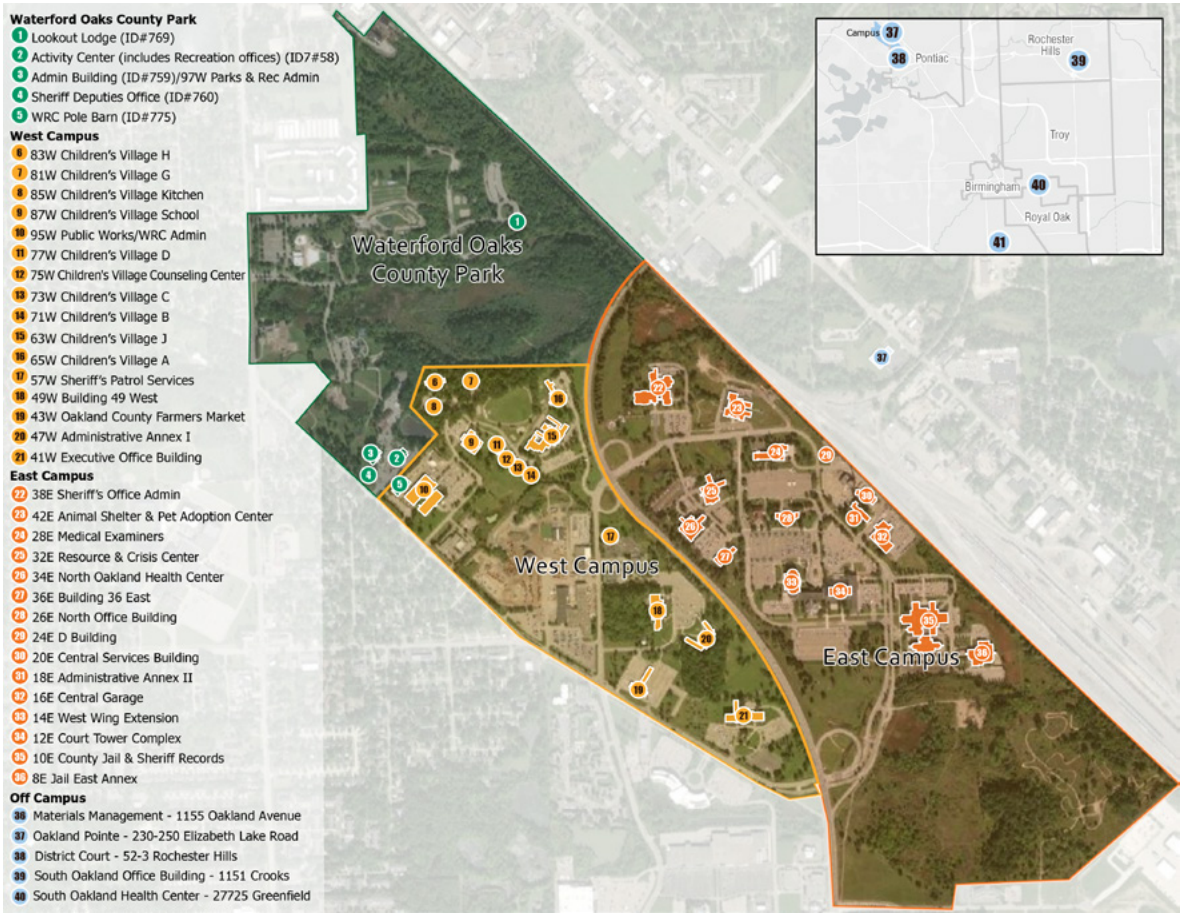
Introduction

Leading by Example

Oakland County is committed to fostering social equity, economic prosperity, and environmental sustainability. By modelling transparent, innovative, and achievable actions to improve sustainability within county sites and operations, the county aims to lead by example for the greater Oakland County community to advance social, economic, and environmental sustainability. Contained in this Sustainability Plan, there are recommended strategies that the county can implement to become more sustainable and an associated Framework to guide county decisions into the future.

The sustainability strategies focus on the Oakland County campus, select off-campus facilities, and Waterford Oaks County Park (see Figure 1). These strategies can also apply to specialty facilities and operations, like those at the county airport – however, these types of sites and operations will require more nuanced sustainability planning. The county's Greenhouse Gas Inventory includes all the county-owned sites and operations and will inform further decarbonization planning across the county's operational portfolio.

Figure 1. Sustainability Plan Sites and Facilities



A Framework was developed to guide this work. It includes the sustainability Vision, Guiding Principles, Focus Areas, Objectives, and Key Performance Indicators (KPIs). While Focus Areas are defined separately, they are all interconnected. The success of the county's sustainability efforts hinges on holistically advancing the Focus Areas together. The Framework is supported by a collective definition of sustainability and diversity, equity, and inclusion. The Sustainability Plan and Framework are complimented by a three phase Change Management Plan to support successful implementation of the sustainability strategies (See Appendix D: Change Management Plan).

What is Sustainability?

Sustainability is creating common good for all by protecting the environment and supporting the needs of the present without compromising the needs of the future. It considers the intersection of protecting the environment, protecting people, and supporting an equitable and inclusive economy. It is specifically defined through the three subjects below:

Environmental Sustainability

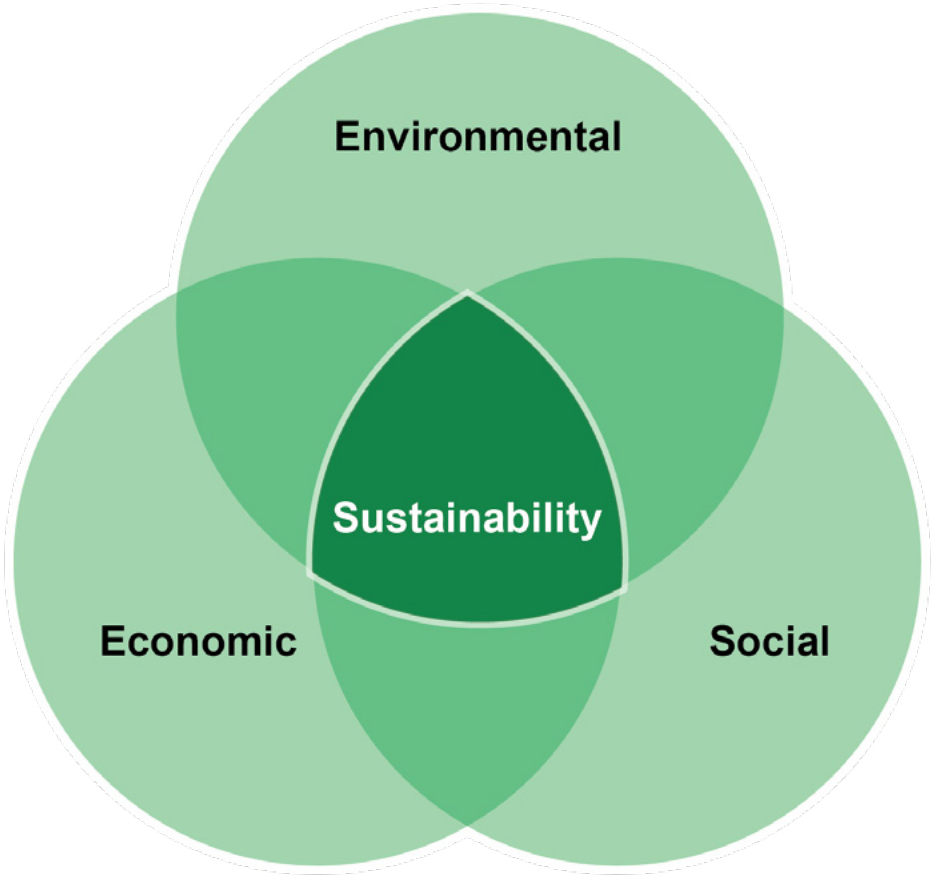
Environmental sustainability focuses on the natural environment and includes factors such as air and water quality, waste reduction and recycling, emission reduction, and ecosystem preservation and enhancement.

Social Sustainability

Social sustainability focuses on people and communities and includes factors such as diversity, equity and inclusion, access to education and training, and health and wellness resources.

Economic Sustainability

Economic sustainability focuses on finances and transactions of goods and services, and includes factors such as procurement, cost savings, revenue, and economic growth.



How does Diversity, Equity, and Inclusion relate to Sustainability?

Oakland County is a member of the Urban Sustainability Directors Network (USDN), an organization for sustainability practitioners in government. In 2019, USDN developed equity principles and commitments.[1] The county aligns with those principles and commitments, and specifically recognizes the following:

Equity is a professional competency. The skills associated with advancing equity make us better public servants, preparing us to deal with the complex nature of the social, economic, and environmental challenges Oakland County communities face.

The government has a fiscal and moral responsibility to address the long-term implications that inequity has on prosperity, health, and safety for residents, community members, and stakeholders. Governments can either create or eliminate barriers for better outcomes through their policies, programs, and relationships.

Increasing diversity, and promoting inclusion, within the sustainability field, and particularly in decision-making positions within government, will increase the long-term relevance of accountability of the county's work to communities who have been systematically denied influence. Diverse perspectives produce more sophisticated solutions. The sustainability field must consciously build a diverse and inclusive culture.

More information on the USDN Equity Principles and Commitments can be found in Appendix A.

What is Diversity, Equity, and Inclusion?

Equity means that everyone has access to resources and the support to reach each person's full potential. Creating a diverse, equitable, and inclusive county environment means that the county's workforce and visitors are valued, respected, included, and heard. Oakland County is committed to the goal of operationalizing equity by taking actions to integrate diversity, equity, and inclusion within all county operations. As a government organization with a commitment to public service and influence on public decision-making, Oakland County has a responsibility to identify, challenge, and change systems that perpetuate injustices and create disparate outcomes for marginalized and disadvantaged individuals and communities.

Action

Oakland County is continuously taking action to integrate diversity, equity, and inclusion into all county operations as well as setting measurements to identify progress or areas of opportunity.

Accountability

The county will hold all parties accountable to this commitment through continuous education around structural and systemic inequities and intentional incorporation of equity and inclusion in all policies, practices, and programs.

Strategies

Throughout this Sustainability Plan, look for sustainability strategies tagged with the county sustainability Guiding Principle of "Operationalize diversity, equity, and inclusion" for strategies that advance this value

1 Urban Sustainability Directors Network, https://www.usdn.org/about/usdn-equity-principles-and-commitments.html#/

Sustainability Framework

The Sustainability Framework includes the Vision, Guiding Principles, and Focus Areas to guide Oakland County's sustainability efforts and decision making. Each strategy is accompanied by objectives and KPIs to measure performance.

Guiding Principle: Value that is important to advance through sustainability strategies

Focus Area: Area for achievement that sustainability strategies are organized into

Objective: Indicator of progress toward advancing a Focus Area

Key Performance Indicator: Measure of performance toward an objective

Vision

Oakland County demonstrates leadership in social, environmental, and economic sustainability through modelling transparent, innovative, and achievable action. The county creates an accessible, safe, and welcoming campus that contributes to a positive service experience for all, through efficient, equitable, and low-carbon operations.

Guiding Principles

Operationalize diversity, equity, and inclusion

Integrate diversity, equity, and inclusion as core components of county operations, policies, and procedures.

Provide accessible services and campus environment

Create an accessible, safe, and welcoming county campus, and continue to enable county staff to better serve residents, businesses, and local governments.

Create education and engagement opportunities

Provide education, training, and engagement opportunities for staff as well as for campus visitors.

Advance the net zero carbon goal

Achieve net zero carbon emissions by 2050 with an interim benchmark of 50% carbon emission reduction by 2035 from a 2018 baseline.

Improve air and water quality

Mitigate the release of air and water pollutants and invest in technologies and infrastructure that improve air and water quality.

Maximize resource efficiency

Maintain quality while optimizing the use of financial, material, staff and other resources.

Focus Areas, Objectives and Key Performance Indicators

Sustainable Governance

Embed environmental, social, and fiscal sustainability into county operations.

- **Align the county's purchasing power with county sustainability values**, as measured by the percentage of county contracts awarded to vendors that scored highest against the sustainability- and equity- related bid evaluation criteria laid out in each request for proposal (RFP).[2]
- **Uphold the county's Asset Management Plan**, as measured by the percentage of critical assets that are tagged, integrated into the county's asset management databases, and undergo regular condition assessments and proactive maintenance.

Health and Wellness

Foster physiological, social, purposeful, ethical, mental, emotional, and intellectual wellness.

- **Improve staff mental health**, as measured by use of the Employee Assistance Program (EAP) program and percentage of staff diagnosed with mental health conditions documented in annual reports from the county's health consultant.
- **Improve staff physical health**, as measured by percentage of staff diagnosed with "lifestyle conditions" (i.e., diabetes, coronary artery disease, and hypertension) documented in annual reports from the county's health consultant.
- **Increase access to equitable and healthy workspaces**, as measured by percentage of workspaces and facilities that adhere to workplace standards.[3]
- **Increase employee connection with wellness initiatives at Oakland County**, as measured by participation rates in OakFit wellness programs annually.

Facility and Fleet Decarbonization

Expand the county's clean energy generation capabilities, convert the county's fleet to clean-energy vehicles, and advance decarbonization goals.

- **Expand carbon neutral energy generation and use**, as measured by the carbon emissions from energy consumption (CO_2e).
- **Decarbonize county vehicle fleet**, as measured by the percentage of internal-combustion engine (ICE) vehicles to non-combustion engine vehicles within the fleet.
- **Promote cleaner transportation alternatives**, as measured by the percentage of staff commuting to work by a transportation mode other than a single occupancy ICE vehicle.

2 Sustainability-related bid evaluation criteria may vary across RFPs. For a set of example criteria, please refer to strategy S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities. This KPI is also inclusive of the county's strategic objective and KPI to increase opportunities in county procurement, as measured by the percentage of county contracts awarded to minority-, woman-, disabled-, veteran-owned businesses.

3 Workplace standards are to be determined through implementation of strategy W3. Enact Healthy Workplace Guidelines and Standards.

Focus Areas, Objectives and Key Performance Indicators

High Performance Buildings

Maximize efficient and low-carbon use of energy, water, and material resources within county facilities to the highest degree possible, while considering the design, facility operation and use, and maintenance requirements.

- **Reduce building energy use**, as measured by building energy use intensity (kWh or MMBtu/ square foot).
- **Increase building water efficiency**, as measured by gallons of potable water use per square foot.
- **Electrify county buildings**, as measured by the percentage of buildings fully electrified.
- **Increase construction waste diversion rate**, as measured by percent of construction waste diverted from landfills.

Waste Reduction and Diversion

Reduce the amount of waste generated and sent to landfills through increased material reuse, recycling and composting, and implementing other strategies to reduce overall material consumption.

- **Increase the non-construction waste diversion rate**, as measured by percent of waste generated on campus diverted from landfills; and percent of material recycled or composted.
- **Decrease non-construction waste generation**, as measured by the total tonnage of waste generated.

Open Space, Ecosystems, and Connectivity

Protect and enhance the natural and built environments of Oakland County Campus and Waterford Oaks County Park through ecological restoration, accessible design and connectivity, and restorative landscaping and planting areas.

- **Convert lawns to native meadows or forest**, as measured by acres of lawn converted to native meadows or forest.
- **Reduce run off**, as measured by gallons of stormwater captured.
- **Enhance the connectivity of campus through non-motorized paths**, as measured by linear feet of pathways.
- **Increase county tree canopy**, as measured by number of trees planted per year.
- **Reduce impermeable surfaces**, as measured by the square footage of impermeable surfaces removed.

Moving Sustainability Forward: Oakland County Sustainability Progress

Oakland County continues to demonstrate commitment to sustainability through strategic planning, resolutions, and actions. On Earth Day, April 22, 2021, the county announced the proposed resolution to achieve net zero emissions from county operations by 2050 with an interim goal of 50% carbon emission reduction by 2035. The County Board of Commissioners adopted this resolution on May 13, 2021. The Greenhouse Gas Inventory, created as part of this Sustainability Plan, sets a baseline of calendar year 2018 for the emissions target. The County Executive developed a Strategic Framework[4] to define the priorities, guide the work, and help measure the impact over the next five years.

In line with the Strategic Framework and one of the key priorities for County Executive David Coulter's administration, the county established the Office of Environmental Sustainability led by the county's first Chief Environmental Sustainability Officer to move sustainability forward. New initiatives led by the Office of Environmental Sustainability to date include drafting building standards that align with Leadership in Energy and Environmental Design (LEED), drafting and discussion of plans for vehicle electrification and required charging infrastructure, participating in various community-wide resilience and climate action planning efforts, and local partnerships for sustainability.

Also, in line with the Strategic Framework, the county continues to demonstrate commitment to enabling community members and staff to reach their full potential through establishing the Office of Diversity, Equity, and Inclusion led by the first Chief Diversity, Equity, and Inclusion Officer. Further, the county is implementing the recently developed community-wide roadmap for equitable programming, Strategies for Equitable Programs and Services, and conducted a Workplace Cultural Assessment, with both efforts led by the Office of Diversity, Equity, and Inclusion. Alignment and collaboration between county departments is critical to implementing sustainability initiatives with diversity, equity, and inclusion at the heart of all county priorities.

4 https://www.oakgov.com/StrategicFramework

Aligning the Sustainability Plan with the Strategic Framework

The County Executive Strategic Framework established community objectives and KPIs in the following eight goal areas: Thriving and Inclusive Economy, Healthy Residents, Skilled and Educated Workforce, Livable Neighborhoods, Environmental Sustainability, Public Safety and Fairness in the Criminal Justice System, Organizational Excellence, and Diversity, Equity, and Inclusion. These goal areas collectively touch on each component of sustainability – social, economic, and environmental – and the strategies within the Sustainability Plan can advance the strategic goal areas at the government site and operation level.

The Oakland County Sustainability Plan coincides with the County Executive Strategic Framework for the county.[5] The Strategic Framework guides the county's actions to accomplish its mission to serve through collaborative leadership and to help support communities where residents flourish and businesses thrive. The county's vision is to be a healthy, safe, and thriving place where everyone is valued, quality of life is high, and economic opportunity abounds.

Advancing equity through sustainability initiatives at county-owned sites and through county operations is key to advancing the strategic vision at the government scale. Advancing equity is core to making sure county-owned sites are healthy, safe, and accommodating to all users and abilities. When equity is advanced through government sustainability initiatives, the effect will extend through the services provided to community members. Therefore, a Guiding Principle of this Sustainability Plan is to operationalize diversity, equity, and inclusion.

VISION

To be a healthy, safe, and thriving place where everyone is valued, qualityof life is high and economic opportunity abounds.

MISSION

To serve through collaborative leadership and to help support communities where residents flourish and businesses thrive.

5 https://www.oakgov.com/StrategicFramework/Pages/default.aspx

Strategic Framework Goals

Thriving and Inclusive Economy

Oakland County cultivates entrepreneurs, attracts talent and investment, promotes cutting-edge technology, and strives for an economy that works for all people and businesses of all sizes.

Healthy Residents

Oakland County works to ensure access to quality affordable health care, including mental health services, to improve health outcomes for all residents.

Skilled and Educated Workforce

Oakland County provides residents the education, training, and support they need to get good paying jobs while assisting businesses in retention and recruitment efforts.

Diversity, Equity, and Inclusion

Oakland County celebrates and embraces its diversity and is committed to ensuring that all residents feel a sense of belonging, are valued, their voices uplifted, and are included in the efforts to close social, economic and well-being gaps that exist in our county.

Livable Neighborhoods

Oakland County offers residents quality, affordable housing in welcoming neighborhoods with access to parks and recreation, public transportation, and healthy food.

Environmental Sustainability

Oakland County seeks to protect the environment, reduce carbon pollution, keep our water and lakes safe, and conserve natural resources.

Public Safety and Fairness in the Criminal Justice System

Oakland County keeps residents safe from crime, ensures that all people are treated fairly by the criminal justice system, and helps put offenders on the path to productive lives.

Organizational Excellence

Oakland County government values its employees, responsibly manages taxpayer dollars, and delivers innovative and effective services to Oakland County residents.

Throughout this Sustainability Plan, look for sustainability strategies tagged with the Strategic Framework goal area icons for strategies that advance each goal.

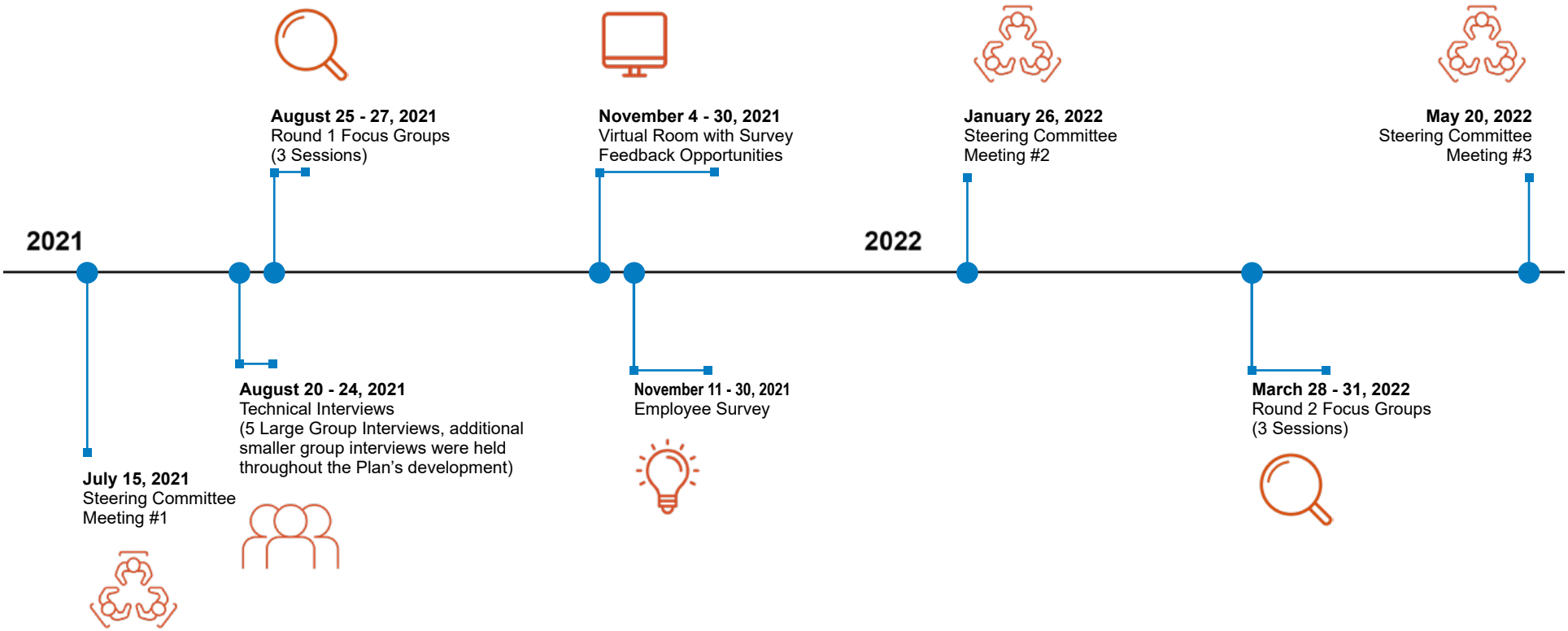
Stakeholder Engagement

The individuals and teams who work and run the county campus and facilities hold pivotal insights and are crucial to both the development and implementation of an impactful sustainability plan. Their input helped develop sustainability goals and provided technical information regarding operations. An employee Steering Committee made up of employees with a keen interest in sustainability provided overall guidance as the project moved forward.

Engagement allowed employees the opportunity to learn about and shape the Sustainability Plan in a meaningful way. Approximately 100 employees from 50 departments, programs, and service areas were engaged through virtual meetings. Employees were also provided additional opportunities to provide input on the Sustainability Plan development through a Virtual Engagement Room and survey, but participation through these mediums was limited.

A timeline of Engagement activities is here and are described in more detail in Appendix C: Stakeholder Engagement.

Timeline of Engagement Activities



Engagement activities provided a significant amount of technical information that was utilized to develop and refine potential strategies and inform approaches for successfully embedding sustainability into county operations. Qualitative information was also collected via employee engagement which provided background and personal views on sustainability in Oakland County. The transparent and honest communication received from county staff provided direction for implementation planning that acknowledges employees' views regarding sustainability. Several key insights gathered included:

Lead by Example

- Oakland County employees are proud of the work they do and the service they provide to county residents, both in the area of sustainability and elsewhere. They feel that leading by example is a priority for the success of the county's sustainability efforts.

Sustainability Priorities

- Employees feel that Health and Wellness is the most important sustainability Focus Area.
- Providing a healthy and safe work environment ranked as the top priority for sustainability efforts.
- The Focus Area of Open Space, Ecosystems, and Connectivity was also seen as a priority for the success of the county's sustainability efforts.

Barriers

- Resource constraints, including budget and staff capacity, are seen as the greatest barrier to sustainability.
- Focus group members were concerned that future administrations will not continue to move sustainability projects forward.

Equity and Access

- Those engaged generally stated that diversity, equity, and inclusion are important; however, this was not consistent among all engagement activities.
- There is a need for common definition and understanding of the impacts of accessibility and the connection of diversity, equity, and inclusion to sustainability.
- Employees do not feel that all employee groups have equal access to a healthy workplace in terms of OakFit Wellness Program activities and the availability of equipment, such as sit/stand desks, and facilities such as breakrooms and locker rooms.

Carbon Reduction

- Focus group members saw carbon reduction as less important to the success of the county's sustainability efforts compared to Steering Committee and county leadership.
- Focus group members generally felt that the county's actions in these areas would have limited impacts and/or that policies set outside of the county's control would address these needs.
- The net zero carbon goal was seen as less achievable and less tangible than other Guiding Principles. Greater understanding of the net zero carbon goal is needed among employees.

Acceptance of Sustainability

- Employees want acknowledgment of their sustainability efforts and achievements made to date.
- Focus Group members were excited about sustainability from a visionary perspective, but at times appeared resistant to change in areas related to their jobs.
- Engagement participants were eager to provide feedback on sustainability matters and want to have input on planning and implementation.

Greenhouse Gas Inventory

Net Zero

The county set a goal to achieve net zero emissions for county government operations by 2050 with an interim goal of 50% emissions reduction by 2035 compared to 2018 emissions. The 2018 baseline year was selected as it corresponds with other local government targets and GHG inventories. As there are different pathways for meeting a net zero carbon goal, the definition of net zero in the context of Oakland County's operations and Sustainability Plan is as follows:

Net zero is achieved when the net GHG emissions associated with county government operations are zero. This is achieved through ambitious local climate action that reduces GHG emissions to the extent feasible combined with implementation of local and regional carbon dioxide removal (CDR) opportunities to remove any remaining emissions estimated to occur in the target years. CDR opportunities can include natural strategies, such as forest restoration and agricultural soil management, or high-tech strategies, such as direct air capture.

The county conducted a greenhouse gas (GHG) inventory to understand the sources of county operational GHG emissions and to identify priority actions that can advance its net zero carbon goal. The GHG inventory results presented in this section highlight the sectors in which the county will need to focus GHG reduction efforts to achieve the net zero carbon goal. While the sustainability strategies in this Plan focus on the county campus, select off site facilities, and Waterford Oaks County Park, the inventory accounts for emissions across all sites, facilities, and operations to represent the full spectrum of county operational emissions. Strategies set forth in the Sustainability Plan will support the county in pursuing the goal of net zero carbon. However, a decarbonization strategy is needed to chart the path for achieving that target. The Decarbonization Framework serves as a base roadmap to develop a full decarbonization strategy.

This government operations GHG inventory follows the guidance outlined in the Local Government Operations Protocol (LGOP), developed by ICLEI – Local Governments for Sustainability, the California Air Resources Board, and the California Climate Action Registry. As an ICLEI member, the county selected ICLEI's ClearPath tool as the primary GHG inventory tracking tool. ClearPath is an online application for the calculation, tracking, and management of GHG emissions inventories at the government operations and community scales. ClearPath allows users to create government operations inventories that are in line with the Local Government Operations Protocol (LGOP). The tool accounts for the GHGs recognized under the Kyoto Protocol, including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). These GHGs have varying levels of climate impact and are represented as carbon dioxide equivalents (CO_2e) in the GHG inventory to allow for comparison. Each GHG has a global warming potential (GWP) that represents its heat-trapping ability relative to that of CO_2. Quantities of different GHGs are converted to CO_2e using their 100-year GWP values from the Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report.[6]

What is CO_2e?

CO_2e is a metric used to represent CO_2 emissions along with other harmful greenhouse gas emissions all in one number.

6 https://www.ipcc.ch/assessment-report/ar5/

Table 1. IPCC Fifth Assessment Report GWP Values

GHG*	GWP
CO_2	1
CH_4	28
N_2O	265

* Due to Oakland County's inventory boundary and reporting protocol requirements, only CO_2, CH_4, and N_2O emissions were relevant to the county's operations and are included in this table.

The LGOP recommends GHG inventories be developed based on calendar year data. The county's base year inventory represents calendar year 2018 as it is the most recent year that reflects normal, pre-COVID-19 operating conditions. The inventory is organized into five sectors: Buildings and Facilities, Vehicle Fleet, Solid Waste Facilities, Wastewater Facilities, and Fugitive Emissions.

Generally, the inventory includes emissions from sources over which the county has operational control, except for solid waste disposal. The county has operational control in instances where there is full authority to introduce and implement operating policies at the operation. If services are contracted to other organizations who maintain operational control, any emissions resulting from the service are considered "outside" of the county's control and can be optionally reported. Even though solid waste disposal operations would be considered an optional emissions source, these emissions have been included in the 2018 inventory to better represent total GHG emissions due to county operations.

To reach the net zero carbon goal, sector-specific strategies and targets can be identified to ensure sector reductions are progressing in line with the net zero carbon goal. However, there may be technological or political barriers to meeting these sector targets or reducing remaining emissions.

GHG Inventory Summary

In calendar year 2018, government operations generated 56,411 metric tons (MT) of CO_2e. Approximately 75% of these emissions are from building and facility electricity and natural gas use. The remaining emissions are primarily from on-road fleet vehicles followed by wastewater treatment processes, solid waste disposal, and off-road vehicles and equipment. The following sections detail municipal emissions in each of the five sectors (see Figure 2 and Table 2).

Figure 2. 2018 GHG Inventory: Municipal CO_2e Emissions by Sector

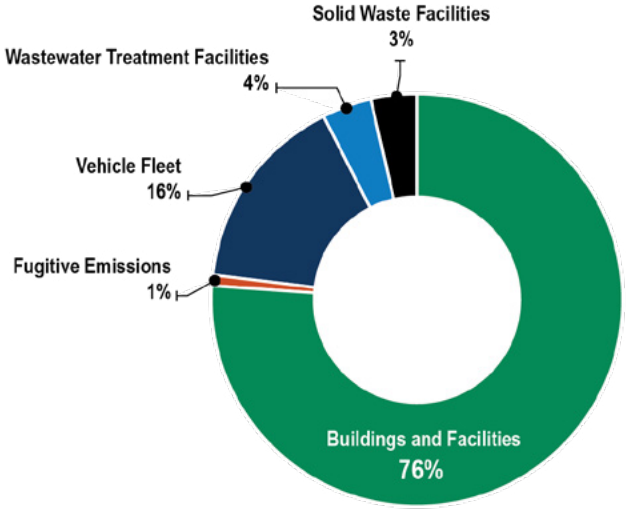


Table 2. 2018 Municipal Activity Data and Emissions

CLEARPATH CATEGORY	CY2018	ACTIVITY DATA	UNIT	CLEARPATH EMISSIONS ($MTCO_2E$)	% TOTAL
BUILDINGS AND FACILITIES	Natural Gas	2,460,769	therms	13,088	23%
	Generator Fuel Oil	1,587	gallons	16	<1%
	Electricity	49,829,981	kWh	29,857	53%
VEHICLE FLEET	On-road Vehicles – Diesel	39,163	gallons	400	<1%
	On-road Vehicles – Gasoline	891,677	gallons	7,864	14%
	Off-road Vehicles – Diesel	31,144	gallons	321	<1%
	Off-road Vehicles – Biodiesel	451	gallons	4	<1%
	Off-road Vehicles – Gasoline	28,292	gallons	250	<1%
SOLID WASTE FACILITIES	Campus Solid Waste	5,014	short tons	1,627	3%
	Park Waste – Landfill	1,129	short tons	366	<1%
	Park Waste – Compost	49	short tons	3	<1%
WASTEWATER TREATMENT FACILITIES	Conventional WWTP Process Emissions	221,112	people	513	<1%
	Conventional Aerobic WWTP Effluent Discharge	96,112	people	589	1%
	Conventional Anaerobic WWTP Effluent Discharge	125,000	people	910	2%
	Conventional Anaerobic WWTP Digester Gas Combustion	125,000	people	8	<1%
	Septic Systems	1,379	people	168	<1%
PROCESS AND FUGITIVE EMISSIONS	Fugitive Emissions from Natural Gas Distribution	2,460,769	therms	427	<1%
TOTAL				**56,411**	

Buildings and Facilities

Buildings and facilities generate GHG emissions from on-site energy use. Electricity consumption is the single largest contributor to county GHG emissions, generating roughly 53% of total local government operations emissions. The county uses a third-party choice purchaser, Executive Energy, to purchase electricity, but does not currently participate in any green power purchasing, which could serve to reduce the county's electricity emissions in the future. Natural gas consumption generates approximately 23% of total GHG emissions, while fuel oil used in generators contributes less than one percent.

The Central Steam Plant uses natural gas to generate steam. The steam is distributed to the main campus buildings to provide space heating/cooling and water heating. Though the Central Steam Plant occasionally uses fuel oil, none was consumed in calendar year 2018. In addition, three campus buildings do not use central steam and are served directly by utility-provided natural gas. The county also operates three airports and multiple wastewater treatment facilities, septic systems, and retention treatment basins that use natural gas and electricity. Streetlight electricity consumption was excluded from this inventory as direct electricity consumption data was not available and GHG emissions are likely negligible based on the small number of streetlights within county control.

The county operates 35 emergency generators that use #2 dyed ultra-low sulfur diesel. The county's wastewater treatment facilities also use separate generators, but the fuel consumption information for these systems is not currently tracked and has not been included in the 2018 inventory.

Fugitive Emissions

Fugitive emissions include the intentional or unintentional releases of GHGs commonly arising from the production, processing, transmission, storage, and use of fuels and other substances. This includes refrigerant leakage from air conditioners or natural gas leakage from distribution pipelines.

Municipal operations fugitive emissions include those from natural gas distribution and represent less than 1% of the county's total GHG emissions. Calculating refrigerant leakage emissions depends on knowing the timing and quantity of refrigerant recharge. The county hires contractors to re-charge refrigerants in chiller systems but the amount of added refrigerant is not tracked. The county is currently working to create a refrigerant tracking system for large chillers, which could help inform future GHG inventories.

Vehicle Fleet

The county's vehicle fleet includes on-road and off-road vehicles and equipment. The on-road vehicle fleet generates nearly 15% of total GHG emissions while off-road vehicles and equipment contribute approximately 1%.

On-road and off-road vehicles and equipment both use gasoline and diesel fuels while some off-road equipment also uses biodiesel. While on-road vehicle fleet fuel use could not be disaggregated by county department, off-road emissions included in the inventory were from Parks and Recreation and Airport Administration equipment, such as lawnmowers, all-terrain vehicles, snowblowers, plows, runway brooms, fire trucks, and tractors. The Water Resources Commissioner's (WRC) Office also uses gasoline, diesel, and liquified petroleum gas (LPG) powered off-road vehicles and equipment, such as forklifts, pumps, rough terrain vehicles (RTV), telehandlers, snow blowers, and pressure washers. However, WRC does not specifically track off-road fuel consumption, so emissions from their off-road vehicles and equipment were excluded from the 2018 inventory.

The Sheriff's Office helicopters are the only source of aviation fuel consumption in county municipal operations. During inventory development, county staff considered this fuel use to be negligible and this activity was excluded from the inventory.

What are Fugitive Emissions?

Fugitive emissions are unintended or unmonitored greenhouse gases or other emissions that escape into the atmosphere. These emissions are not a result of an intentional or necessary function of the system, they are instead the result of leaking valves, seals, or fittings, evaporation losses, or other weaknesses in the system.

Wastewater Treatment Facilities

Wastewater generates GHG emissions during its treatment and discharge. The county operates multiple wastewater treatment facilities, septic systems, and retention treatment basins. These systems serve residents, businesses, parks, and golf courses. Wastewater treatment and discharge from these systems generates nearly 4% of total county emissions.

This category represents process emissions that occur from wastewater treatment and discharge. Any electricity and natural gas use from county-operated wastewater facilities is reflected in the Buildings and Facilities sector. Wastewater produced by municipal operations, such as in bathrooms, is primarily sent to wastewater facilities outside of the county's operational control (e.g., Clinton River Water Resource Recovery Facility). Therefore, these emissions are considered optional sources for reporting purposes and are not included in the 2018 inventory.

Solid Waste Facilities

Solid waste disposal generates GHG emissions based on its treatment process, such as through the decomposition of organic matter. This typically occurs in landfills where fugitive methane emissions are released. Composting organic waste can drastically reduce these emissions, while recycling waste typically produces no GHG emissions that are reflected in the GHG inventory. Using estimated waste quantities, landfilled waste from the campus and parks generates almost 4% of total government operations emissions. Composting green waste from county parks generates less than 1%. Around 13% of total waste is estimated to be diverted to recycling or compost.

The county does not own or operate any landfills and therefore does not report any direct landfill fugitive GHG emissions. The county does generate solid waste though and contracts waste disposal services. Even though contracted solid waste disposal operations are considered optional emissions sources, they are included in the 2018 inventory to better represent total GHG emissions from municipal operations.

Empirical data on solid waste disposal in 2018 was not available. However, a campus operations diversion rate analysis was conducted as part of the sustainability planning process with 2020 data that showed estimated campus and park waste quantities and destinations. These estimates were developed based on information gathered from department interviews, dumpster sizes, and pick-up schedules. The 2020 estimated waste quantities were used as a proxy for calendar year 2018. Notably, these waste values reflect pandemic-related operational impacts while the rest of the 2018 GHG inventory data does not. In addition, the specific receiving landfills and composting sites for the campus and park waste are unknown, so default assumptions were made to support the GHG emissions calculations.

To improve future solid waste tracking and emissions reporting, the county should require waste quantity and disposal destination reporting from its waste contractors (see the strategy D1. Review and Renegotiate Waste Hauling Contracts for more detail).

Decarbonization Framework

To ultimately reach the net zero carbon goal, a series of actions will need to be undertaken over the short-, medium-, and long-term to electrify fleets and facilities, pursue carbon neutral energy sources, and drive energy efficiency to reduce overall energy need. The following framework outlines how the county may tackle each of the main emissions sectors. The framework is divided between high priority actions and ongoing actions.

High priority actions are needed in the near-term to guide long term planning and the most significant capital investments and operational changes needed for net zero carbon operations. Ongoing actions can be adopted incrementally and as needed to drive down remaining emissions. This framework is intended as a starting point for future strategic planning and to guide near-term decision-making to support the interim and long-term net zero goals.

What is Decarbonization?

Decarbonization is any process that aims to reduce the carbon dioxide and other greenhouse gases produced or released into the atmosphere by an energy process. This can mean shifting energy systems that produce carbon dioxide to systems that do not or using carbon capture strategies to prevent the carbon produced from entering the atmosphere.

High Priority Actions

- Identify Pathways to Facility Fuel Decarbonization
- Pursue Fleet and Equipment Electrification

Ongoing Actions

- Invest in Efficient Operations
- Decarbonize Electric Supply
- Pursue Offsets or Partnerships for Remaining Emissions Sources

High Priority Actions

Identify Pathways to Facility Fuel Decarbonization

Decarbonization of the Central Steam Plant is a high priority action, as potential alternative fuels or systems will require significant capital investment and planning. Further, the decarbonization strategy selected will inform prioritization of other actions the county will undertake around energy efficiency and adoption of renewable energy. The alternative system will also need to align with future new developments, either through ability to scale capacity or through expanded use of decentralized systems. This high priority action aligns with the strategy F1. Conduct a Decarbonization Feasibility Study for Central Steam Plant.

Following identification of a Steam Plant decarbonization pathway, options for electrification or fuel alternatives for other equipment may be reviewed, including ground or air source heat pumps for distributed heating and cooling systems and efficient electric appliances such as heat pump dryers and induction cooktops.

Pursue Fleet and Equipment Decarbonization

Decarbonization of fleet and off-road equipment may occur concurrently to facilities decarbonization and efficiency measures. Ongoing review of new alternative vehicles and equipment will be needed in order to ensure the county is maximizing opportunities to continue to reduce carbon emissions in this sector.

A first step in electrification will be development of an electric vehicle (EV) plan which identifies a clear pathway for fleet conversion and infrastructure investment needs to ensure sufficient charging capacity, as discussed in the strategy F3. Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus. Off-road equipment will be harder to electrify than on-road vehicles, but are associated with a small (1%) of total GHG emissions. Therefore, the initial study focus should be electrifying on-road vehicles (15% of total emissions) while monitoring emerging zero emission vehicle off-road technology solutions.

Ongoing Actions

Invest in Efficient Operations

Energy efficiency is a core strategy for reducing overall energy and carbon needs and can be applied to achieve short term energy and cost savings in pursuit of net zero carbon operations. Consideration should be given to long term plans for use of fossil fuels and the Central Steam Plant when selecting capital efficiency projects to avoid investment in technologies not compatible with the county's broader decarbonization strategy.

To ensure persistence of efficiency measures and to maintain high performance, energy audits are advised on a 5-year cycle for all county campus facilities. Additionally, the county may seek to invest in high return measures across all facilities to quickly scale impact, such as completion of the campus's light-emitting diode (LED) lighting conversion. Efficiency measures will reduce overall renewable energy needed, either through on-site generation or off-site purchasing arrangements. This ongoing action aligns with multiple strategies, including: H1. Perform Energy Audits at Target Facilities, H2. Complete Campus-Wide LED Lighting Conversion, H3. Continue Investment In Energy Efficiency Measures, H4. Perform a Campus-Wide Water Audit, H5. Continue Investment in Water Efficiency and Conservation Measures, and H6. Develop Sustainable New Construction and Major Renovation Standards.

Decarbonize Electric Supply

Electric power may be decarbonized through adoption of on-site renewable or off-site renewable supply. In addition to providing routine operational power, on-site renewable generation can be paired with battery or other onsite storage to decarbonize back-up generators. This will ultimately be a core element of the decarbonization strategy as electricity currently generates about half of the total emissions, a fraction that will likely increase as electrification is pursued. On-site solar opportunities on the campus are discussed more in strategy F2. Pursue On-Site Solar Generation at Key Campus Locations.

The county may seek to develop long term electric supply outlooks, considering decarbonization of its current fleet and facilities to properly plan for renewable procurement volumes.

Pursue Offsets or Partnerships for Remaining Emissions Sources

While the main decarbonization focus will be on addressing fleet and facility emissions, some smaller sources will need to be addressed over the long term to achieve net zero carbon operations. Smaller emissions sources, such as wastewater treatment and effluent, may be addressed through forming partnerships with providers to support reduced carbon emissions in these external processes or by securing carbon offsets for these smaller, difficult to decarbonize processes.

Local carbon sequestration measures such as tree planting should be prioritized for such emissions to address any residual emissions in 2050 (see strategies O3. Strategically Convert Lawns to Forest or Meadow and O4. Implement Ecological Restoration Projects for more). As a next-best strategy, industrial carbon capture technology is still in its infancy but is showing promise for efficiently removing large volumes of CO_2 from the atmosphere. The county can continue to assess these technologies. Finally, purchasing carbon offsets should be considered as a last resort for meeting the net zero carbon goal.

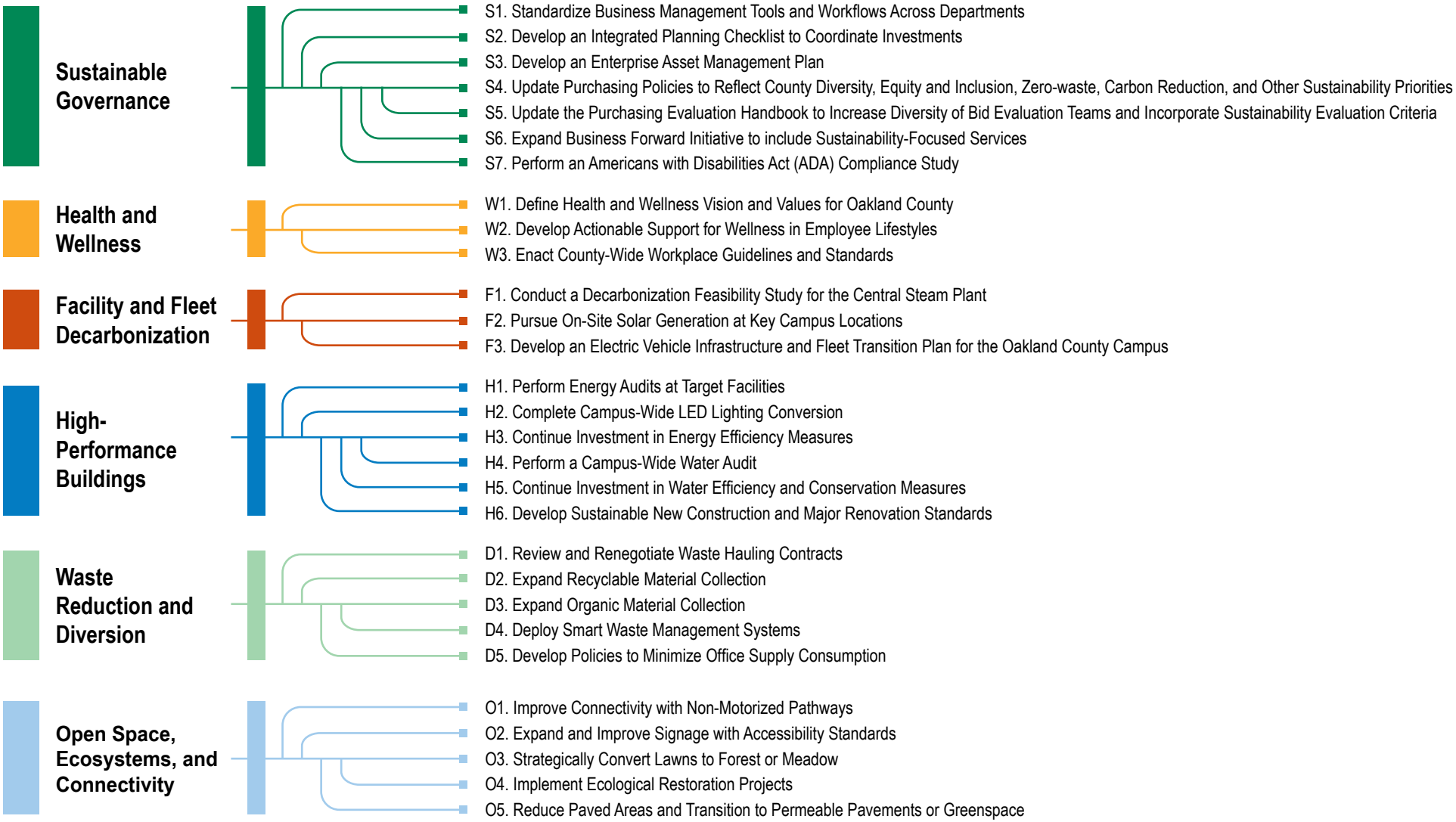
Keep Moving Sustainability Forward

To develop this Plan, the county reviewed sustainability progress to date, identified opportunities for improvement, and engaged with county staff. After the county reviewed the current state of sustainability for energy, fleet, operations, health and wellness, nature, and ecosystems, the county identified areas for improvement aligned with the county's social, economic, and environmental priorities. Throughout the Plan development process, collaborative conversations were held with staff to gather insights to inform the Plan (see the Stakeholder Engagement section). The county identified 29 strategies to advance over the six Focus Areas.

Oakland County's Sustainability Vision

Oakland County demonstrates leadership in social, environmental, and economic sustainability through modelling transparent, innovative, and achievable action. The county creates an accessible, safe, and welcoming campus that contributes to a positive service experience for all, through efficient, equitable, and low-carbon operations.

Sustainability Strategies



Strategy Implementation Sequence

Due to staff capacity and funding availability, the county cannot implement all strategies at once – instead, the county must sequence the implementation of strategies. Figure 3 serves as a guiding roadmap for how the county can sequence strategy implementation according to sustainability priorities and potential equity and decarbonization impacts. The "immediate," "next," and "future" priority zones serve as guideposts for implementation sequencing. The county can review and alter strategy sequencing as new priorities, resources, or KPI performance trends emerge.

Three of the sustainability strategies are foundational strategies, in that they will increase the county's ability to efficiently coordinate efforts, make decisions guided by county priorities, and track performance towards the Objectives. These strategies should be prioritized for implementation, as they will enable more effective implementation of other strategies identified in this Plan. Five additional strategies are informative strategies, in that they will uncover additional sustainability opportunities for consideration. These five strategies include studies, plans, or audits and will collectively help target and plan for high impact investments in energy, mobility, water, and waste systems. Implementation of informative strategies should start in the "immediate" priority zone.

The remaining strategies are targeted policies and initiatives that the county can implement directly. Most policies should be developed in the "immediate" priority zone as they establish guidelines and processes that will set the county up for success in aligning future actions with sustainability priorities. Similarly, initiatives that prioritize equity, diversity, inclusion, and employee wellness should be prioritized for implementation. Initiatives that can have decarbonization impact in the county's largest emitting sectors – Buildings and Facilities and Vehicle Fleet – should be prioritized and start implementation in the "immediate" and "next" priority zones (see the Greenhouse Gas Inventory section for more information). Namely, high priority actions identified in the Decarbonization Framework section should start implementation in the "immediate" priority zone. Remaining strategies, though important, should be prioritized for a future date as more resources become available or as implementation of other actives are completed.

Foundational Strategies

- **S1** Standardize Business Management Tools and Workflows Across Departments
- **W1** Define Health and Wellness Vision and Values for Oakland County
- **H6** Develop Sustainable New Construction and Major Renovation Standards

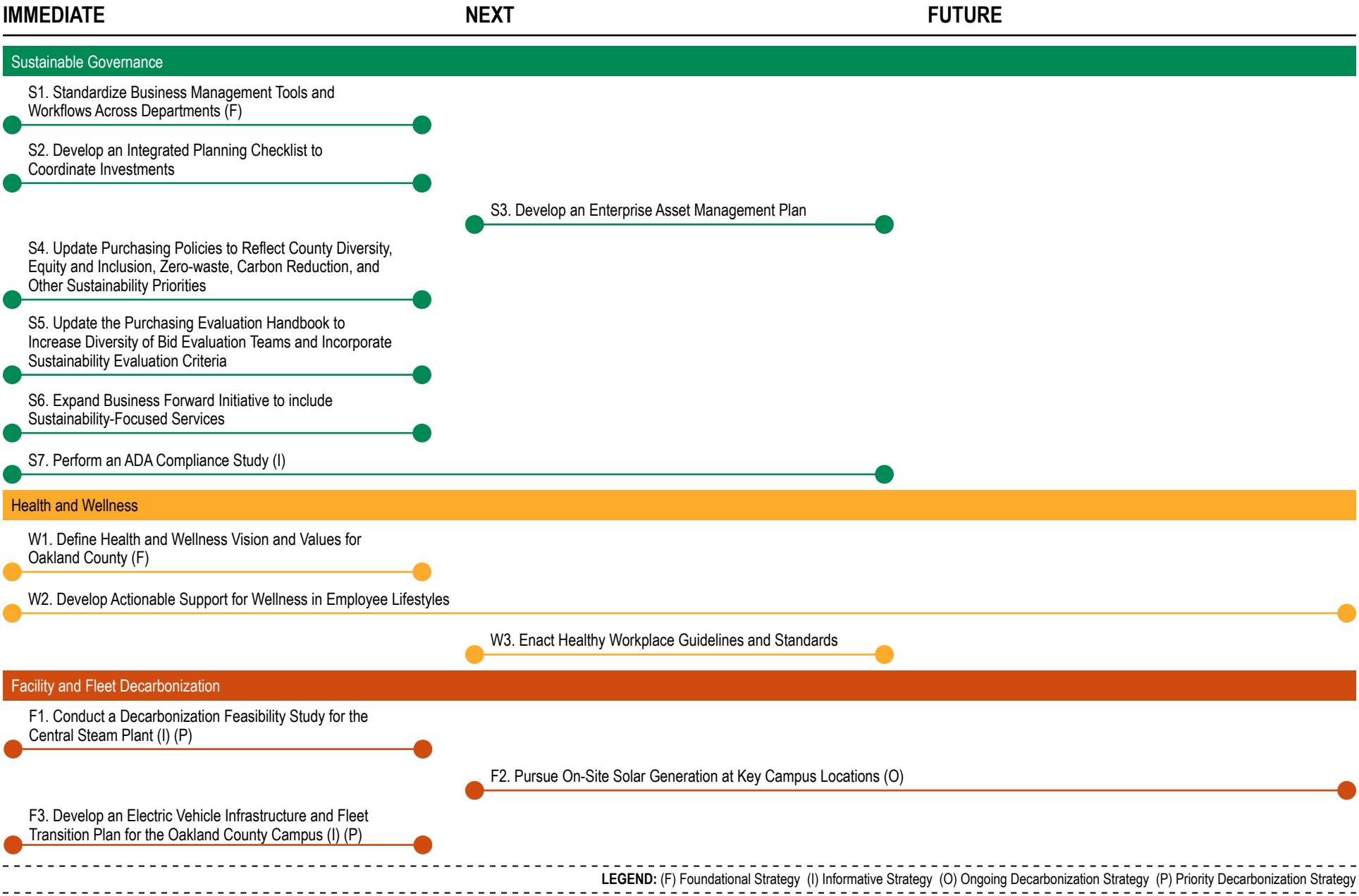
Informative Strategies

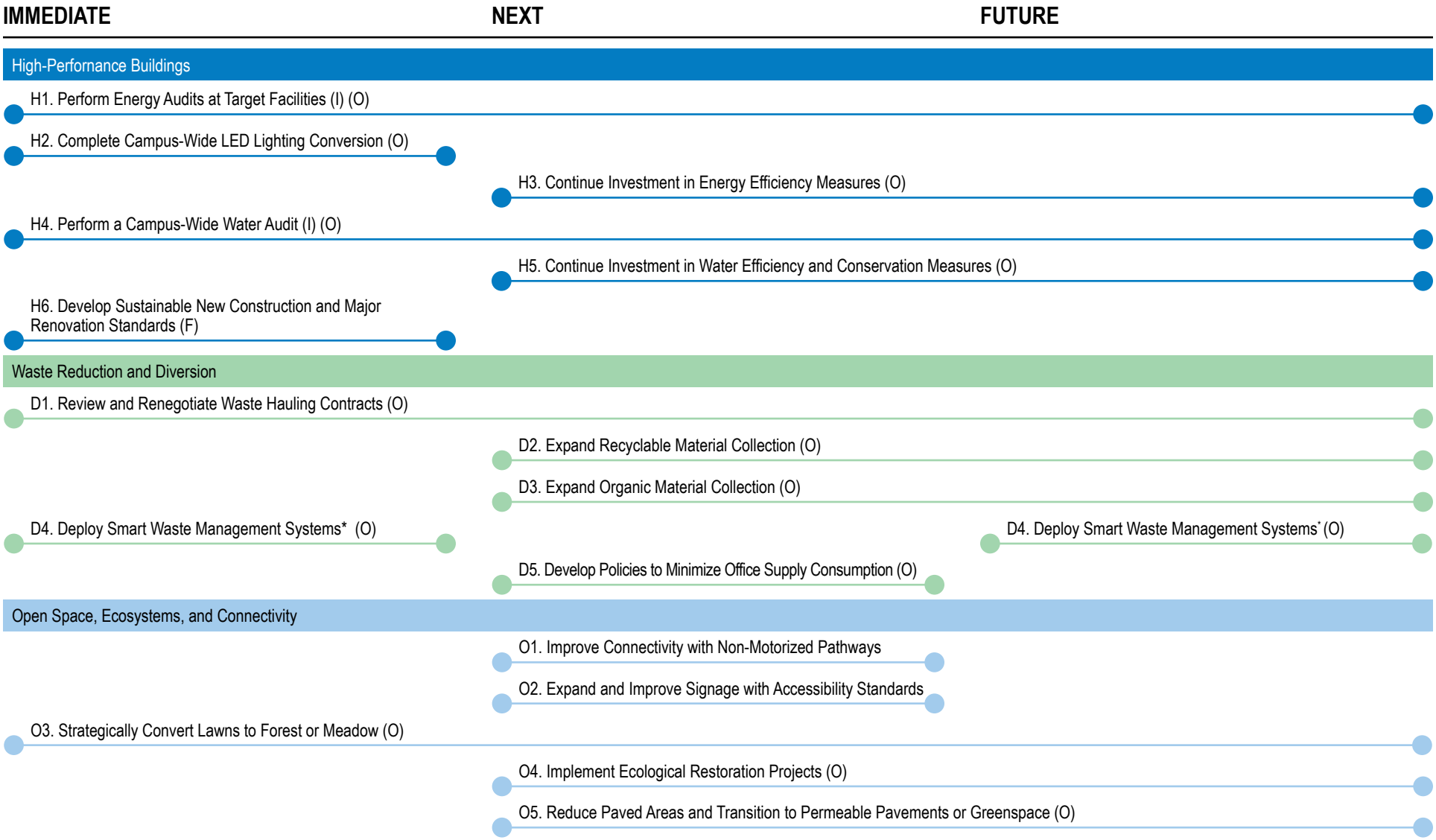
- **S7** Perform an Americans with Disabilities Act (ADA) Compliance Study
- **F1** Conduct a Decarbonization Feasibility Study for the Central Steam Plant
- **F3** Develop an Electric Vehicle Infrastructure and Fleet Transition Plan for the Oakland County Campus
- **H1** Perform Energy Audits at Target Facilities
- **H4** Perform a Campus-Wide Water Audit

Priority Decarbonization Strategies

- **F1** Conduct a Decarbonization Feasibility Study for the Central Steam Plant
- **F3** Develop an Electric Vehicle Infrastructure and Fleet Transition Plan for the Oakland County Campus

Figure 3. Strategy Implementation Sequence





*The county has approved installing solar-power trash compactor bins and, at the time of this writing, is negotiating a contract with BigBelly. The county can install solar-power trash compactor bins in the "immediate" prioritization zone as a quick win. The county can consider installing dumpster monitoring systems in the "future" priority zone as the next iteration of its strategy to deploy smart waste management systems (see strategy D4. Deploy Smart Waste Management Systems for more detail).

LEGEND: (F) Foundational Strategy (I) Informative Strategy (O) Ongoing Decarbonization Strategy (P) Priority Decarbonization Strategy

How to Read the Strategies

Each Focus Area section includes an introduction that explains the Strategic Framework goals and sustainability Guiding Principles advanced through strategies within the Focus Area. Objectives and KPIs to track performance within each Focus Area are also included.

Each strategy is presented in the following format. Along with each strategy approach, development stage, strategy type, internal teams, external partners, the county Strategic goals, and Guiding Principles advanced by the strategy are identified.

FOCUS AREA

STRATEGY ID AND NAME

GUIDING PRINCIPLES
Guiding Principle advanced through the strategy

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities
- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

COUNTY STRATEGIC GOALS
County strategic goal advanced through strategy

- Thriving and Inclusive Economy
- Healthy Residents
- Skilled and Educated Workforce
- Livable Neighborhoods
- Environmental Sustainability
- Public Safety and Fairness in the Criminal Justice System
- Organizational Excellence
- Diversity, Equity, and Inclusion

DEVELOPMENT STAGE
Current development stage for the strategy

In Progress: The county is currently planning or implementing this strategy

Future: The county is not yet planning or implementing this strategy

STRATEGY TYPE

Foundational: Increases the ability to efficiently coordinate, make decisions guided by priorities, and track performance towards Objectives

Informative: Helps target and plan for high impact investments

PARTNERS
External organizations contributing to strategy planning or implementation

TEAMS
County teams involved in strategy planning and implementation

Lead: Lead county team responsible for strategy planning and implementation

Support: Supporting county team contributing to strategy planning and/or implementation

FINANCIAL ANALYSIS
To explore the financial viability of select strategies, Oakland County's consultants, Eminence Partners and AECOM, conducted preliminary financial analyses using rough order of magnitude costs and reasonable assumptions for six strategies. These six strategies are:

F2. Pursue On-Site Solar Generation at Key Campus Locations

F3. Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

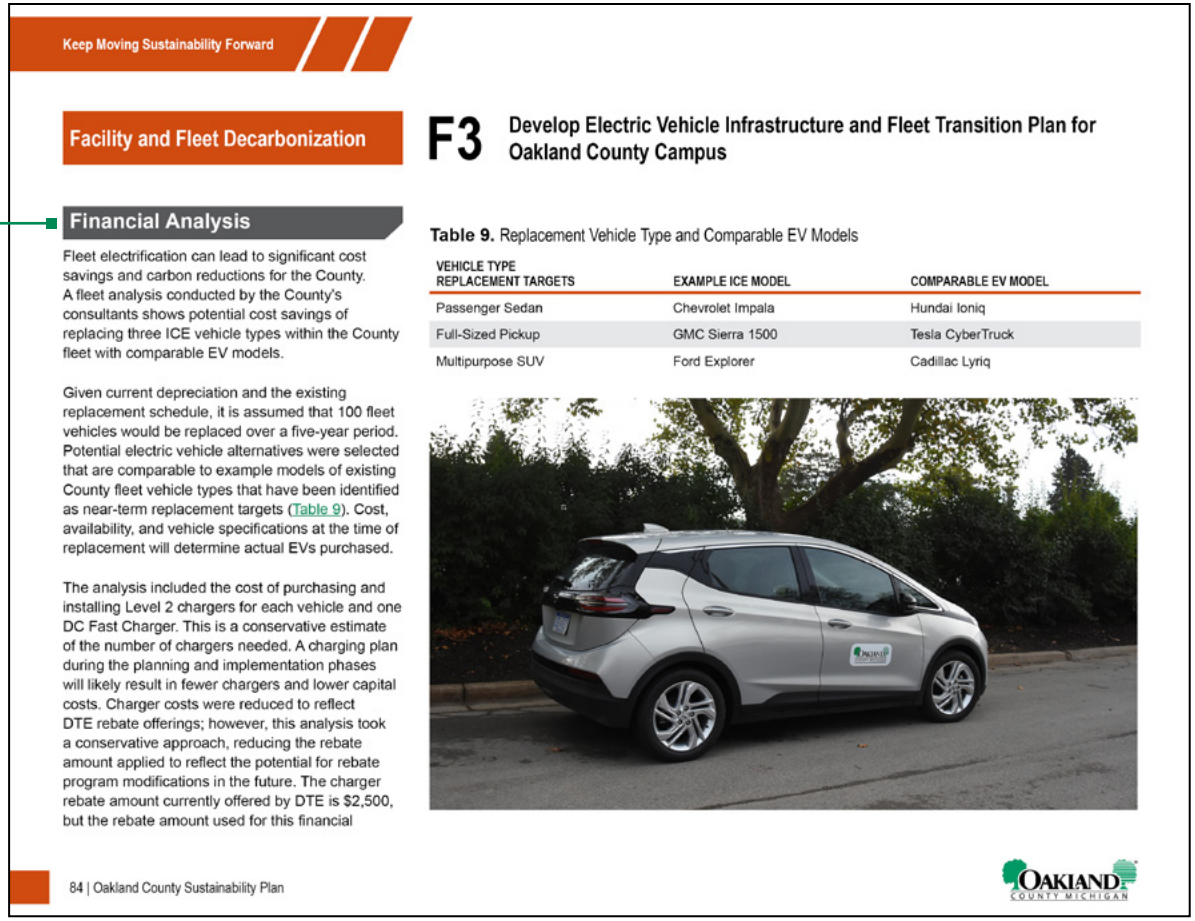
H2. Complete Campus-Wide LED Lighting Conversion

D2. Expand Recyclable Material Collection

D3. Expand Organic Material Collection

O1. Improve Connectivity with Non-Motorized Pathways

The analyses illustrate potential upfront costs, return on investment (ROI), and payback periods and were used to identify potentially applicable funding and financing mechanisms. Examples of the identified funding and financing mechanisms are described on the next page. The county should continue to explore investing in sustainability and potential funding mechanisms as they implement sustainability strategies.



Funding and Financing Mechanisms

Examples of types of funding and financing mechanisms available to implement sustainability-related initiatives are described on this page. Where applicable, these are expanded upon within the six strategies for which preliminary financial analysis was conducted.

Capital and Operating Budgets

When planning for future fiscal year budgets, the county can build funds into the capital and operating budgets to cover the cost of sustainability strategies. Capital Budgets are used for the acquisition, installation, and, at times, major repair of assets such as land, buildings, and equipment or installations. Operating Budgets include funds allocated to the ongoing maintenance and operation of assets, programs, and services. These budgets may contain a variety of funds, such as Sustainability Revolving Funds, which are dedicated for specified purposes.

Tax Exempt Bond Financing

The county could fund many sustainability improvements through the proceeds of a tax-exempt bond issuance. The bonds would be sold to investors to raise funds for the project. It may also be possible to fund multiple smaller projects through one bond issuance, which could make the transaction more cost effective. When bonds are sold, the county agrees to repay the investors principal plus interest, which is generally exempt from federal, state, and local taxes. These bonds may qualify as green bonds to attract additional types of investors and potentially lower interest rates.

There are two types of bonds distinguished by the source of repayment. General obligation bonds are secured by the county's pledge to repay from their taxing authority. Repayment of revenue bonds is from a specified revenue, often associated with the project being financed. Revenue bonds can be issued with the savings, such as energy savings, generated by the project pledged to repay the debt. The county will work with its financial advisor and other professionals to determine the appropriate structure and type of bonds for each project or group of projects if bonds are issued to fund strategies.

Federal, State, and Regional Funding Programs

At the Federal, State, and regional levels, there are a variety of grants and programs available to governmental entities, including the county, to help advance sustainability-related strategies. Specifically, with the passing of the Infrastructure Investment and Jobs Act (IIJA), several existing programs have received renewed funding and many new programs have been created

Collective Buying Power

To reduce the capital or operating costs of strategies, the county can explore the ability to form coalitions with other counties or cities, villages, and townships to increase buying power and negotiate lower rates and costs for strategy the implementation. For example, bulk procurement of electric vehicles for several jurisdictions could help reduce per-unit costs or coordinating with other entities for waste and recycling collections could reduce hauling rates.

Public Private Partnerships (P3)

Through a P3, the county would partner with private investors, developers, and/or operators who would shoulder a portion of the development, capital, or operating costs in exchange for (a portion of) operating revenues (including advertising rights), valuable biproducts (e.g., renewable natural gas or fertilizer), and/or tax benefits. The agreement could also be structured to allow us to repay a partner through operational savings such as through a Guaranteed Energy Savings Performance Contracting arrangement.

Sustainable Governance

Embed environmental, social, and fiscal sustainability into county operations.

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities
- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Thriving and Inclusive Economy
- Skilled and Educated Workforce
- Environmental Sustainability
- Organizational Excellence
- Diversity, Equity, and Inclusion

Objectives and KPIs

Align the county's purchasing power with county sustainability values, as measured by the percentage of county contracts awarded to vendors that scored highest against the sustainability- and equity- related bid evaluation criteria laid out in each request for proposal (RFP).[7]

Uphold the county's Asset Management Plan, as measured by the percentage of critical assets that are tagged, integrated into the county's asset management databases, and undergo regular condition assessments and proactive maintenance.

County policies and procedures impact all county services, projects, and programs, as well as the experience of county staff and visitors. As demonstrated in the County Strategic Framework, the county is focused on advancing a Thriving and Inclusive Economy and Organizational Excellence. The county can leverage its purchasing power to support the local economy by developing sustainability- and equity- focused purchasing policies and supporting local businesses in building skills and services within these areas. Every strategy within the Sustainable Governance Focus Area can advance the Organizational Excellence goal through increasing opportunities in county procurement, improving service delivery, and responsibly and efficiently managing assets and taxpayer dollars.

7 Sustainability-related bid evaluation criteria may vary across RFPs. For a set of example criteria, please refer to strategy S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities. This KPI is also inclusive of the county's strategic Objective and KPI to increase opportunities in county procurement, as measured by the percentage of county contracts awarded to minority-, woman-, disabled-, veteran-owned businesses.

Table 3. Sustainable Governance Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
S1	Standardize Business Management Tools and Workflows Across Departments							X			X	X			X	County Executive	Information Technology, Management and Budget, Office of Sustainability, Purchasing, Departmental Leadership	
S2	Develop an Integrated Planning Checklist to Coordinate Investments							X							X	Facilities Management, Parks and Recreation	Office of Sustainability, WRC, Information Technology, Management and Budget, Planning Division	DTE Energy, Consumers Energy, City of Pontiac, Waterford Township, Plante Moran, Oakland County Road Commission
S3	Develop an Enterprise Asset Management Plan							X	X	X	X	X	X	X	X	Facilities, Operations, and Maintenance	Office of Sustainability, Information Technology, Parks and Recreation, Water Resources Commissioner	Cityworks
S4	Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities	X				X		X	X	X			X		X	Purchasing	Office of Sustainability, Office of Diversity, Equity, and Inclusion	

LEGEND: (*) In Progress

ID	NAME	County Strategic Goal: THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	Sustainability Guiding Principle: OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	Teams: LEAD	SUPPORT	Partners
S5	Update the Purchasing Evaluation Handbook to Increase Diversity of Bid Evaluation Teams and Incorporate Sustainability Evaluation Criteria							X	X	X						Purchasing	Office of Diversity, Equity, and Inclusion, Office of Sustainability	
S6	Expand Business Forward Initiative to include Sustainability-Focused Services	X		X				X	X	X	X					Economic Development	Office of Diversity, Equity, and Inclusion, Purchasing	
S7	Perform an ADA Compliance Study*							X	X	X	X					Facilities Management	Office of Sustainability, Office of Diversity, Equity, and Inclusion, Parks and Recreation, Risk Management Department	

LEGEND: (*) In Progress

Sustainable Governance

S1 Standardize Business Management Tools and Workflows Across Departments

Guiding Principles

- Provide accessible services and campus environment
- Create education and engagement opportunities
- Maximize resource efficiency

County Strategic Goals

- Organizational Excellence

Development Stage: Future

Strategy Type: Foundational

Partners: N/A

Teams

Lead: County Executive

Support: Information Technology, Management and Budget, Office of Sustainability, Purchasing, Departmental Leadership

County departments and teams currently utilize different tools and workflows to perform the same functions and, within individual departments, not all teams have established consistent workflows and centralized documentation for implementing and tracking projects. Where feasible, using the same tools enterprise-wide and establishing uniform workflows and data standards for these tools can help to streamline the county's operations and improve the services provided to county residents. As it applies to the Sustainability Plan's Guiding Principles, standardizing business management tools and workflows across departments can:

- **Provide accessible services and campus environment and create education and engagement opportunities** by setting one standard for management and workflow so that information is more accessible and useful to employees at all levels.
- **Maximize resource efficiency** by streamlining management and operational practices to save employee time and money and prevent unnecessary losses.

One area with significant opportunity for standardization is asset management. For example, while many county departments and teams that maintain critical county assets have adopted Cityworks to manage asset maintenance, not all departments and teams use the platform—or use it to its full extent. Additionally, assets are assigned different identifiers (IDs) across software platforms (e.g., Cityworks and the county's financial information software) and departments use different taxonomies to generate asset identifiers (i.e., asset identifiers have different composition of numbers/letters and a varying number of characters).

A more comprehensive list of strategies for improving asset management practices can be found in S3. Develop an Enterprise Asset Management Plan, but other opportunities for standardization include:

- Developing an asset management charter to tie departmental roles to specific workflows and responsibilities.
- Defining common assumptions for calculating asset deterioration curves and lifecycle value, with consideration to enterprise departments such as Parks and Recreation or the Water Resources Department for specific guidelines.
- Determining recurring condition assessment cycles based on asset criticality and the level of risk associated with asset depreciation and deterioration.

Sustainable Governance

S1 Standardize Business Management Tools and Workflows Across Departments

- Providing structured templates for condition assessments that clearly dictate how assets should be evaluated (e.g., documents that should be consulted to support the assessment, guidance to distinguish between "good," "average," and "poor" condition).

Opportunities to standardize business practices expand past asset management. More broadly, facility improvements—such as implementation of energy efficiency measures and workstation improvements—have historically been completed in an ad hoc manner. There is a need to standardize and centralize communication or documentation of past efforts, including what and where improvements have been made and who was involved in implementing these improvements. Building a clear record of progress and centralized database of resources (e.g., vendor contacts and lessons learned) as projects are completed will increase transparency and enable county organizations to move through workflows more efficiently and effectively.

To kick-off implementation of this strategy, the county should identify a multi-disciplinary group of departmental representatives to sit on a workgroup charged with identifying the business processes that would most benefit from standardization, developing resources to support adoption of new tools and workflows, and advocating for change within their department. A cross-departmental approach will promote broader consideration of lessons learned from a more diverse set of tools and processes and lead to solutions that can be adapted to departments and teams' different needs. In other words, all solutions and resources should balance standardization with flexibility to ensure departments can right size the use of tools and workflows to fit their mission, critical functions, and organizational capacity.

In establishing the workgroup, the county can look to the interdepartmental Property Acquisition and Management Work Group (staffed by Oakland County Parks and Recreation, Facilities Maintenance and Operations, Corporation Counsel staff) for best practices on identifying participants and defining their individual roles and responsibilities. As the county begins to approach potential participants, the county should clearly articulate the expected level of commitment to ensure active participation.

Finally, implementation can expand past internal organizations to include cities, villages, and townships (CVTs) and peer counties. The U.S. General Service Agreement's (GSA) Cooperative Purchasing Programs[8] enables local governments to jointly-purchase IT products and services, and the county's own G2G Marketplace[9] (an online procurement center for government agencies) supports collective purchase of software systems. The county should consider leveraging these programs to coordinate a joint purchase of business management tools that would benefit its network. Standardization across the county and its CVTs could streamline transfer of non-proprietary data and create a more cohesive service experience for residents.

8 https://www.gsa.gov/buying-selling/purchasing-programs/gsa-multiple-award-schedule/schedule-buyers/state-and-local-governments/cooperative-purchasing

9 https://www.oakgov.com/purchasing/G2GMarket/Pages/default.aspx

Sustainable Governance

S2 Develop an Integrated Planning Checklist to Coordinate Investments

Guiding Principles

Maximize resource efficiency

County Strategic Goals

Organizational Excellence

Development Stage: Future

Partners: DTE Energy, Consumers Energy, City of Pontiac, Waterford Township, Plante Moran, Oakland County Road Commission

Teams

Lead: Facilities Management, Parks and Recreation

Support: Office of Sustainability, Water Resources Commissioner, Information Technology, Management and Budget, Planning Division

The county has identified and begun to plan for millions of dollars of capital improvement and maintenance projects but are often met with funding and other resource limitations when translating ideas into action. Coordinating implementation of multiple improvement projects can consolidate costs, breakdown siloed workstreams, encourage cross-departmental communication, and accelerate progress towards multiple sustainability objectives. For example, installing EV-ready utility infrastructure concurrently with new fiberoptics and transitioning pavement construction to the use of porous materials to reduce maintenance (thereby reducing costs and visitor frustration at the lack of parking during construction maintenance). In addition, identifying opportunities to coordinate implementation of a single measure (e.g., LED lighting conversion) across multiple locations at once—rather than on a location-by-location basis—can enable the county to leverage economies of scale more effectively. As it applies to the Sustainability Plan's Guiding Principles, developing an integrated planning checklist to coordinate investments can:

- **Maximize resource efficiency** because a standardized checklist ensures that investments are being made strategically and working together to prevent excess costs or time wasted.

To support identification of synergistic capital projects or maintenance initiatives, the county should develop an integrated planning checklist that requires project sponsors to evaluate the viability of implementing multiple sustainability improvements simultaneously or expand implementation past an initially identified location. In completing the checklist, the project sponsor should seek support from stakeholders that may become involved in the design, financing, implementation, and maintenance phases of the project lifecycle to ensure the form fully reflects the project's needs and opportunities. This collaborative process can be integrated into the existing capital and maintenance planning workflow and will not only ensure decision makers continue to have access to a consolidated list of wants and needs, but also enable long-term sustainability benefits to remain a priority as decision makers come and go.

The checklist can start with a list of Guiding Principles (like those at the foundation of this Plan) that should be reflected in all future investments, at both the capital planning and maintenance budget scales, and may also integrate requirements from new construction buildings that may be established in the future (see strategy H6. Develop Sustainable New Construction and Major Renovation Standards). Principles may include a commitment to improving accessibility, increasing efficiency, and decreasing carbon impact. In practice, this would ensure that all streetscape and building renovation projects include Americans with Disabilities Act (ADA) accessibility and mobility improvements, for example, and that critical equipment are replaced with more efficient models as they reach the end of their service life.

Sustainable Governance

S2 Develop an Integrated Planning Checklist to Coordinate Investments

The county can also work towards developing a "menu" of sustainable infrastructure improvements that must be incorporated into larger capital projects. The Boston Smart Utilities Program[10] can serve as a model: The Program identified five smart utility technologies (SUTs)—district energy microgrid, green infrastructure, traffic signal enhancements, smart streetlights, and telecom utilidors—and criteria for when and what SUTs must be considered for a project. For example, any development project greater than 100,000 square feet must conduct a feasibility study to consider including green infrastructure that can retain 1.25 inches of rainfall. Applying this concept to the county's predominant spending categories and sustainability priorities, the county could require that, for a parking lot with a critical number of spaces, repaving projects would also include installation of an EV-ready utility infrastructure.

For more urgent projects or projects that are already in the planning phase, the county can create an abbreviated checklist with foundational sustainability practices such as:

- Upgrading equipment to more efficient models (with respect to both energy and water use)
- Electrifying equipment that combusts fossil fuels
- Modernizing infrastructure to be ADA code compliant and integrating universal design principles
- Transitioning paved areas to permeable pavements and lawns to native plantings

The abbreviated checklist would first prompt project sponsors to provide justification for its use (e.g., to explain the need for urgency) and should still require sponsors to indicate project alignment with integrated planning Guiding Principles. However, more extensive review of alignment with other planned projects and the menu of sustainable infrastructure improvements would not be required.

10 http://www.bostonplans.org/planning/planning-initiatives/boston-smart-utilities-program

Sustainable Governance

S3 Develop an Enterprise Asset Management Plan

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities
- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: Cityworks

Teams

Lead: Facilities, Operations, and Maintenance

Support: Office of Sustainability, Information Technology, Parks and Recreation, Water Resources Commissioner

An enterprise-wide Asset Management Plan would provide county organizations with uniform and structured guidance for operation and maintenance (O&M) of assets, capital planning for new and existing assets, and evaluating asset performance in line with the sustainability Vision. As it relates to the Sustainability Plan's Guiding Principles, an Asset Management Plan can:

- **Operationalize diversity, equity, and inclusion** through rooting decision-making processes in data and organizational values to remove potential bias in asset planning and enable equitable distribution of O&M resources.
- **Create education and engagement opportunities** through creating opportunities for increased exposure to content relating to asset performance and the county's asset management practices—for asset managers and asset users alike.
- **Provide accessible services and campus environment, advance the net zero carbon goal, and improve air and water quality** through proactively identifying opportunities to improve asset efficiency, emissions, and accessibility throughout their lifecycle, not just at end of life.
- **Maximize resource efficiency** through not only optimizing county assets' performance over their entire lifecycle, but also optimizing the use of county personnel and financial resources for asset management.

The Asset Management Plan should build upon the Four Pillars of asset management (organization, data, workflows, and technology) and actions already described in S1. Standardize Business Management Tools and Workflows Across Departments.

The Asset Management Plan can be used to train new staff and refresh existing staff on the county's asset management organizational structures, data

Sustainable Governance

S3 Develop an Enterprise Asset Management Plan

streams, workflows, and tools. For example, as Cityworks is updated, the Asset Management Plan can provide guides for system configuration and customization, user administration, field staff setup, asset data entry and data updates, asset hierarchy management, map and graphical features, analytical features, report generation, and mobile applications. User guides should also dictate how often systems and information should be updated, how data should be entered (i.e., define data standards), and designate staff administrators to field questions from users.

Increasing staff familiarity and comfort with asset management data, workflow, and tools and clear delineation of roles and responsibilities through an Asset Management Plan can result in operational efficiencies, uniformity across departments, and automated workflows. Federal infrastructure funding often requires asset management plans. Establishing an Asset Management Plan may position the county to become more competitive for future federal funding opportunities.

A Sustainability Asset Management Framework is provided in Appendix E: Sustainability Asset Management Framework to guide the development of Oakland County's comprehensive Asset Management Plan. The county should identify a group of internal departmental partners that operate and maintain the county's critical assets to sit on a workgroup to develop this plan. The workgroup should meet regularly to incorporate lessons learned from its implementation, connect to the budget cycle, and audit performance and implantation of the plan to ensure the plan remains a living document. To further inspire regular updates, a member of the working group can apply to join the Michigan Infrastructure Council's Asset Management Champion Program.[11] The Program was established to share best practices to strengthen asset management programs across the state.

11 https://www.michigan.gov/mic/am-champions

Sustainable Governance

S4 Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Thriving and Inclusive Economy
- Environmental Sustainability
- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: N/A

Teams

Lead: Purchasing

Support: Office of Sustainability, Office of Diversity, Equity, and Inclusion

The county's purchasing policy was last updated in 2004 and, in summary, guides personnel to contract vendors that would provide the best overall value to the county. The definition of "best overall value" is flexible depending on the product purchased or contracted service, and bid evaluators are encouraged to consider the entire lifecycle cost of a bid and other metrics, which may—but do not have to—include environmental and social considerations.

Release of this Sustainability Plan and transitioning to a new financial information system presents the Purchasing Department with an opportunity to comprehensively update its procedures, including county purchasing policies. As it relates to the Sustainability Plan's Guiding Principles, updating purchasing policies could:

- **Operationalize diversity, equity, and inclusion** by setting standards and metrics to award more contracts to minority-, woman-, or disabled veteran-owned businesses.
- **Advance the net zero carbon goal** by incorporating sustainability considerations into all purchasing policies or developing an overarching sustainable purchasing guide.
- **Maximize resource efficiency** by addressing how county assets are disposed of and developing policies to promote reuse, sharing between departments, and other strategies to minimize excess purchasing.

Further, the county's strategic goal area of Organizational Excellence includes the KPI to increase opportunities in county procurement, as measured by the percentage of county contracts awarded to minority-, woman-, or disabled veteran-owned businesses.

The county may either amend existing sections of its purchasing policy to incorporate specific sustainability considerations unique to each section, or draft new Special Considerations or Other section(s) that broadly apply sustainability principles to all sections within the county policy. Updates may include but should not be limited to:

- Reviewing existing eligibility criteria that may be prohibitive to small or micro businesses, such as the county's insurance requirements (Section 2300.4).

Sustainable Governance

S4 Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities

- Specifying baseline eligibility standards, preferential criteria, or guidelines for vendors that reflect the county's sustainability goals. Guidelines could include vendor pledges to mitigate carbon emissions, actions to reduce or eliminate packaging (or only accept 100% recyclable packaging), B-corporation certification or other similar certifications, regular release of environmental, social, and governance (ESG) reports, active support of social justice initiatives, investment in historically disadvantaged communities, and/or other demonstrations of environmental and social care. These types of "sustainability guidelines" could be added as considerations for development of bid specifications (Section 2300.3). In cases where a primary vendor might have subcontractors, the county should consider extending these guidelines to both the primary vendor and its subcontractors.
- Adding a "Made in Michigan" or "Made in Oakland County" consideration for products manufactured locally when they are offered at a competitive price and quality, and similar "Based in Michigan" or "Based in Oakland County" considerations for rendered services. The county's existing policy gives similar preference to products made in the United States for purchases valued greater than $10,000 (Section 2400.1). Narrowing the focus to local products will reduce GHG emissions associated with the county supply chain and expand economic development opportunities for local businesses.
- Strengthening the county's policies informing proper disposal of county assets (Section 3000.3) to encourage material reuse, either through identifying opportunities to trade equipment between county organizations or auctioning to the public. For goods that cannot be reused, consider specifying preferences for durable goods, certified sustainably produced paper and wood products, products with recycling content and made of recyclable materials, used, refurbished, and/or remanufactured goods, non-toxic or organic materials, and any additional products that result in minimal/zero waste production throughout their life cycle (e.g., packaging, services). The latter may be accomplished through expanding the county's Policy to Promote Recycling (Section 3000.7).
- Expanding authorization for cooperative purchasing (Section 3000.11). Buying products in larger quantities can enable the county to leverage economies of scale and reduce supply chain emissions.

The county may seek other ideas through joining the Sustainable Purchasing Leadership Council.[12] The Council provides support toward developing sustainable purchasing practices to government, higher education, corporate, and non-profit organizations. Regional government members include Dakota County (MN), Fairfax County (VA), Hennepin County (MN), King County (WA), and Multnomah County (OR).

Ultimately, all updates to the county's purchasing policies should remain in compliance with Article I § 26 of the State Constitution, which prevents public organizations from using affirmative action in procurement (i.e., giving preference to vendors on the basis of race, sex, color, ethnicity, or national origin). Intentional marketing efforts or service provision that target small, micro, sustainable, or minority-, women-, disabled- or veteran-owned businesses is permitted by Article I § 26 and can support this strategy by increasing and strengthening the pipeline of these businesses. For example, the county established the Business Forward initiative to support small businesses and expanding this program to provide sustainability-focused services could further align with this recommendation (see strategy S6. Expand Business Forward Initiative to include Sustainability-Focused Services).

12 https://www.sustainablepurchasing.org/

Sustainable Governance

S4 Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities

While enforcing updated policies, the county should add a database or catalog of products or vendors that are well-aligned with the county's sustainability priorities to its G2G Marketplace and institute a tracking system to evaluate the sustainability impact of updated procurement policies and processes. To start, the county could track the number of contracts that are awarded to local bidders and bidders that, for their given Request for Proposal (RFP), performed best against the county's sustainability-oriented bid evaluation criteria (in addition to tracking the number of county contracts that are awarded to disadvantaged business owners).

Sustainable Governance

S5 Update the Purchasing Evaluation Handbook to Increase Diversity of Bid Evaluation Teams and Incorporate Sustainability Evaluation Criteria

Guiding Principles

Operationalize diversity, equity, and inclusion

County Strategic Goals

Organizational Excellence

Diversity, Equity, and Inclusion

Development Stage: Future

Partners: N/A

Teams

Lead: Purchasing

Support: Office of Diversity, Equity, and Inclusion, Office of Sustainability

A core component of the county's purchasing policy is its bid evaluation process. Each bid submitted in response to a county Request for Proposal (RFP) is evaluated by a team of three to five subject matter experts. The bid evaluation team is provided with a Handbook that defines the expectations for team members (e.g., to maintain impartiality) and the process through which bids are scored.

Once the county's broader purchasing policy is updated (see strategy S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities), the Handbook should similarly be revised to reflect the sustainability priorities. As it relates to the Sustainability Plan's Guiding Principles, updating the Purchasing Evaluation Handbook could:

- **Operationalize diversity, equity, and inclusion** by standardizing the process with which the county evaluates bids to prioritize partnerships with minority-, woman-, disabled veteran-owned businesses.

The Handbook should establish clear guidelines to center diversity, equity, and inclusion through all stages of the procurement process, including formation of bid review teams to mitigate explicit or implicit bias towards potential bidders. Potential bias could be resolved through appointing a member of the Purchasing Department to serve as a team "foreman" (like a jury foreman) and moderate discussions, as Purchasing Department staff are less likely to be familiar with the subject of each proposal and thus more likely to remain impartial. Increasing diversity of the evaluation team—such as through requiring, instead of recommending, that teams include representatives from different county organizations—can also mitigate potential biases.

In addition, the scoring process should be revised to explicitly require that sustainability metrics be used to evaluate bids. The existing Handbook states that cost should only be considered after other qualitative criteria are evaluated but does not provide examples of such qualitative criteria, nor does the Handbook define lifecycle cost analysis as the standard financial assessment. The Handbook can establish a baseline set of sustainability criteria that is used to evaluate every bid—such as lifecycle cost, anticipated carbon impact, and strength of the company's diversity, equity, and inclusion policy—as well as more aggressive criteria reserved for larger contract values. All proposed criteria should be reviewed for compliance with Article I § 26 of the State Constitution, which prohibits the county from establishing preference on the basis of race, sex, color, ethnicity, or national origin (e.g., the county cannot establish a quota for contracts held by disadvantaged business owners).

Sustainable Governance

S6 Expand Business Forward Initiative to include Sustainability-Focused Services

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment

County Strategic Goals

- Thriving and Inclusive Economy
- Skilled and Educated Workforce
- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: N/A

Teams

Lead: Economic Development

Support: Office of Diversity, Equity, and Inclusion, Purchasing

In March 2022, the county's Economic Development Department established "Business Forward," an initiative to provide resources and services to local small businesses, with a focus on minority-, women-, and veteran-owned businesses. Business Forward Consultants embedded in county communities will provide entrepreneurial services through individual consultations, workshops, training sessions, and other engagements. Support services cover, but are not limited to, accounting, legal support, digital marketing and advertising, eCommerce, government contracting, language translation services, food services, and market analysis. Through this initiative, the county hopes to expand support to 4,000 small businesses per year, which is 10 times more small businesses served than in the past.

As it relates to the Sustainability Plan's Guiding Principles, expanding the Business Forward Initiative to include sustainability-focused services could:

- **Operationalize diversity, equity, and inclusion** by providing education and outreach services to small businesses that can then increase the number of small businesses enterprises in the county's procurement pipeline. As a result, the number of contracts the county holds with underrepresented small business owners could be increased.
- **Provide accessible services and campus environment** by connecting small businesses to the resources and business opportunities provided by the county.

More broadly, support for small businesses increases equity in both county procurement and community economic development. Notably, these efforts can directly impact the following County Strategic Framework KPIs: increase business investment, improve minority business development, increase opportunities in county procurement, and demand the highest customer service.

The county could expand the Business Forward program to further align with county strategic priorities and Sustainability Plan strategies and Guiding Principles. To start, the county can expand outreach to a wider audience, and tailor existing services to disabled business owners, micro-businesses, and others that could benefit from targeted support.

Then, once the program is established for a broad audience, the county could expand the types of services rendered by the program. One area

Sustainable Governance

S6 Expand Business Forward Initiative to include Sustainability-Focused Services

of focus could be to advance businesses' focus on and capabilities to promote environmental sustainability, such as through providing guidance related to reducing supply chain emissions and material waste, utility efficiency incentives, etc. In addition, once the county's broader purchasing policy is updated (see strategy S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities), the county can focus new Business Forward services on educating and preparing entrepreneurs to be able to fulfill these requirements and thus become more competitive in the county's procurement process. For example, Business Forward consultants could provide guidance on various business sustainability certifications (such as B-corps certified), environmental, social, and government (ESG) impact report development, and best practices for incorporating sustainability standards into work products and obtaining related professional credentials (e.g., Leadership in Energy and Environmental Design (LEED), Envision, WELL, ParkSmart) for businesses in the development and infrastructure sectors.

Sustainable Governance

S7 Perform an ADA Compliance Study

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment

County Strategic Goals

- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Strategy Type: Informational

Partners: N/A

Teams

Lead: Facilities Management

Support: Office of Sustainability, Office of Diversity, Equity, and Inclusion, Parks and Recreation, Risk Management Department

Despite ongoing efforts to improve Americans with Disabilities Act (ADA) accessibility, the county campus has many ADA compliance challenges. A likely cause for non-compliance is the age of the campus's physical infrastructure. Most campus facilities were built before the original ADA Standards for Accessible Design were codified in 1990 and altering older buildings not originally designed with the ADA standards is costly and rigorous; however, despite these barriers, the county remains committed to improving compliance and includes accessibility measures in all construction projects.

Other examples of non-compliance at the campus include narrow passageways and cramped spaces within county facilities, a lack of accessible connections between non-motorized pathways and the street, and instances of bollards or large planters limiting accessibility of non-motorized pathways.[13] Furthermore, ADA compliance is not limited to physical infrastructure. All forms of county communications, including websites and emergency communications services, are also subject to ADA regulations.

The county should perform an ADA compliance study to, at a minimum, understand non-compliance issues, and develop a plan to adequately update campus facilities and operations. As it relates to the Sustainability Plan's Guiding Principles, performing an ADA Compliance Study could:

- **Operationalize diversity, equity, and inclusion and provide accessible services and campus environment** by understanding where existing barriers are on campus and what options are available to make the campus facilities and resources more accessible.

The study would involve a thorough survey of campus facilities, grounds, supporting physical infrastructure (e.g., wayfinding signage), and digital and phone services to develop a comprehensive list of deficiencies. These deficiencies should not only relate to physical accessibility, but also audio-visual and language accessibility. In addition, the survey should identify opportunities to exceed legally required ADA standards and implement universal design principles, which recognize a wider spectrum of abilities to create an environment that accommodates and welcomes everyone. The survey should be performed with support from a specialized contractor to increase county staff's skill with ADA standards and universal design principles.

13 Some bollards and large planters on campus were deployed to deter vehicles from driving into restricted areas or to otherwise improve safety. Bollards and large planters should be replaced or adjusted to comply with ADA requirements without compromising safety.

Sustainable Governance

S7 Perform an ADA Compliance Study

In addition to a physical walkthrough, the study can be informed by a review of county data and industry best practice resources such as:

- ADA enhancement projects identified through the capital improvement program[14]
- Complaints filed with the county's Risk Management Department through its ADA Grievance Procedure
- ADA Best Practice Tool Kits for State and Local Governments[15]
- Design Resources developed by the Center for Inclusive Design and Environmental Access at the University at Buffalo (topics include wayfinding, clearances for wheeled mobility users, and pedestrian winter accessibility)[16]

The results of the survey and literature review should be summarized in an Accessibility Master Plan that identifies and prioritizes strategies for overcoming identified deficiencies, describes any necessary follow-on studies, establishes reliable funding sources for incrementally improving compliance, and stipulates comprehensive universal design practices for all new construction projects (and major renovations, where feasible). This process should consider that not all building types must demonstrate compliance with the same rigor (e.g., in spaces in which staff jobs, tasks and activities require able bodied people, ADA requirements would fall second to local building codes, Occupational Safety and Health Administration (OHSA), and other safety standards). Still, buildings should be renovated to be adaptable to future building use and strive for full compliance wherever possible.

This process may emulate the Oakland County Parks and Recreation Department's (OCPR's) approach to improving county parks accessibility. OCPR first completed an ADA Assessment and Master Plan in 2006 and has since developed individualized ADA Transition Plans for its parks. To support completion and implementation of transition plans, OCPR designates $50,000 in annual capital improvement program funds and $50,000 in annual maintenance program funds[17] towards its ADA Transition Program.

Once the county's plan is approved and begins to be implemented, the resources it provides to local businesses and cities, villages, and townships (CVTs) through the Advantage Oakland Accessibility Initiative[18] should be updated to reflect key themes and lessons learned, such as best practices for adapting older buildings to ADA Design Standards and strategies for resolving the most common causes of non-compliance.

14 County capital improvement program documents identified $16.2 million in unfunded ADA enhancements.

15 https://www.ada.gov/pcatoolkit/toolkitmain.htm

16 http://idea.ap.buffalo.edu/resources/

17 These figures should be evaluated to determine if the recurring funds are sufficient to achieve short-term compliance, and if not, the sum that would be required.

18 https://www.oakgov.com/advantageoakland/planning/historicpreservation/Pages/Accessibility-Initiative.aspx

Health and Wellness

Foster physiological, social, purposeful, ethical, mental, emotional, and intellectual wellness.

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Thriving and Inclusive Economy
- Healthy Residents
- Livable Neighborhoods
- Environmental Sustainability
- Organizational Excellence
- Diversity, Equity, and Inclusion

WHO Definition of Wellness

"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."[19]

Oakland County Health and Wellness is centered around the employee and evaluated through an approach based on the World Health Organization (WHO) definition of wellness. This wellness approach focuses on six comprehensive wellness components: Physiological, Social, Purposeful, Mental, Ethical, and Intellectual. Wellness is interconnected with all the sustainability Focus Areas. Wellness strategies can result in benefits such as improved employee mental and physical wellness, increased employee productivity, and decreased employee stress.

Objectives and KPIs

Improve staff mental health, as measured by use of the Employee Assistance Program (EAP) program and percentage of staff diagnosed with mental health conditions documented in annual reports from the county's health consultant.

Improve staff physical health, as measured by percentage of staff diagnosed with "lifestyle conditions" (i.e., diabetes, coronary artery disease, and hypertension) documented in annual reports from the county's health consultant.

Increase access to equitable and healthy workspaces, as measured by percentage of workspaces and facilities that adhere to workplace standards.[20]

Increase employee connection with wellness initiatives at Oakland County, as measured by participation rates in OakFit wellness programs annually.

19 https://www.who.int/data/gho/data/major-themes/health-and-well-being#:~:text=The%20WHO%20constitution%20states%3A%20%22Health,of%20mental%20disorders%20or%20disabilities

20 Workplace standards are to be determined through implementation of strategy W3. Enact Healthy Workplace Guidelines and Standards.

Health and Wellness

Foster physiological, social, purposeful, ethical, mental, emotional, and intellectual wellness.

Oakland County Health and Wellness strategies require application across various scales for the employee experience: at a campus scale, at a facilities scale, and in immediate workplace environment scale. The three Health and Wellness strategies build upon each other. The first is to develop an all-encompassing Health and Wellness Vision and Values for Oakland County, expanding on the existing mission of the OakFit Wellness Program. The next two strategies focus on actionable support to promote Health and Wellness through measurable outcomes and county-wide workplace standards and guidelines to streamline the Oakland County workplace.

Table 4. Health and Wellness Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
W1	Define Health and Wellness Vision and Values for Oakland County*		X						X	X	X	X			X	Human Resources	Office of Sustainability, County Executive	Marsh & McLennan Agency
W2	Develop Actionable Support for Wellness in Employee Lifestyles	X	X		X			X	X	X	X	X				Human Resources	County Executive	External vendors
W3	Enact County-Wide Workplace Guidelines and Standards		X		X	X			X	X	X			X	X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Human Resources, Purchasing, Environmental Health Services Unit of the Health Division	Marsh & McLennan Agency, Vendor partnerships

LEGEND: (*) In Progress

Health and Wellness

W1 Define Health and Wellness Vision and Values for Oakland County

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities
- Maximize resource efficiency

County Strategic Goals

- Healthy Residents
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: Marsh & McLennan Agency

Teams

Lead: Human Resources

Support: Office of Sustainability, County Executive

Oakland County has a robust OakFit Wellness Program with a multitude of offerings to employees. This strategy further strengthens this program by building upon its existing mission statement and goals. The first step is to review the existing OakFit mission and goals to assess if they are representative of all Oakland County employees, and if the mission and goals remain progressive toward the future vision. Include Health and Wellness success factors to provide a framework that Oakland County can apply to further enhance and strengthen the OakFit Wellness Program. During an interview for the sustainability planning process, OakFit Wellness Program Human Resource leaders shared the need to develop a specific vision for Oakland County employees based on Health and Wellness. Defining and confirming the Vision, Mission, and Values will provide guiding direction and reference

OakFit Mission Statement

The mission of OakFit is to assist Oakland County employees, retirees and dependents in taking ownership of their health and wellness in order to improve quality of life, enhance productivity, and stabilize long-term employee/employer health care costs.

OakFit Program Goals

- Build countywide awareness
- Encourage participation from all employees
- Engage employees in improving overall health
- Track and measure improvement efforts in order to reduce long term health care costs

Health and Wellness

W1 Define Health and Wellness Vision and Values for Oakland County

materials during implementation of strategies to ensure alignment with and progress towards goals. As it relates to the Sustainability Plan's Guiding Principles, defining Health and Wellness Vision and Values for Oakland County could:

- **Operationalize diversity, equity, and inclusion and provide accessible services and campus environment** by identifying health and wellness stakeholders and decision makers that are representative of all county employees.
- **Provide accessible services and campus environment** by administering a Vision that prioritizes equitable access to Health and Wellness resources and considerations for the diverse needs of employees and other stakeholders.
- **Create education and engagement opportunities** by establishing a concrete universal mission with a specific and digestible set of goals from which all other educational and outreach materials could be built.
- **Maximize resource efficiency** by developing an overarching Vision and Values for Health and Wellness the county can better prioritize resources to meet specific wellness goals and track metrics to ensure that resources are being maximized.

The following three steps provide a path toward developing the Health and Wellness Vision and Values. This strategy should also align with the *2022 Mental Wellbeing Strategy* Oakland County developed.

A common understanding and definition of what Wellness means to Oakland County will be critical to understanding the desired outcomes from Wellness strategies. The definition that Oakland County creates should be used in all employee communications referring to Health and Wellness. This will confirm employee understanding of Oakland County's Health and Wellness goals, and better align personal interests and investments.

Identify Health and Wellness Stakeholders: Human Resources would lead development of the Health and Wellness Vision and Values. Human Resources can engage the wellness committee, county decision makers, and end users in the process of defining the vision and values in order to ensure this framework aligns with staff needs.

Define Vision and Values: Conduct a series of engagements with the purpose of confirming the mission and defining the corresponding vision and values. This may include first convening with the identified leadership stakeholders and understanding alignment with employee perspective. This recommended series of engagements would be active and participatory workshops with pre-read communication materials, as well as post workshop findings reports. Workshops would be led by Human Resources with support from the County Executive and Office of Sustainability. The activities from these workshops would yield draft versions of the Health and Wellness Vision, Mission, and Values created by direct input of key stakeholders. From these draft materials, Human Resources should send follow-up communications for feedback and input, to ultimately yield the final version.

Measure and Track Success Factors: Human Resources can then define success factors to track progress towards achieving the mission, vision, and values. By comparing health consultant (e.g., Segal Consulting, Marsh & McLennan Agency) employee health reports year-over-year, health outcome changes and improvements can be measured and tracked over time.

Health and Wellness

W2 Develop Actionable Support for Wellness in Employee Lifestyles

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities

County Strategic Goals

- Thriving and Inclusive Economy
- Healthy Residents
- Livable Neighborhoods
- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: External vendors

Teams

Lead: Human Resources

Support: County Executive

This strategy builds on W1. Define Health and Wellness Vision and Values for Oakland County by outlining actionable steps towards offering resources aligned with the county's health and wellness vision, mission, and values. Through implementing these steps, the county can support all aspects of Health and Wellness in employee lifestyles, at all scales, from campus-wide to individual. As it relates to the Sustainability Plan's Guiding Principles, developing actionable support for wellness in employees' lifestyles could:

- **Operationalize diversity, equity, and inclusion** by taking into account employee feedback and developing actionable support that applies to the needs and interests of a diverse campus population.
- **Provide accessible services and campus environment** by building wellness programing and tools into the built environment and conducting specific initiatives to understand and improve program and campus accessibility.
- **Create education and engagement opportunities** by using employee feedback and dedicated research to expand the channels with which wellness messaging is conveyed.

Consider the following action steps when defining wellness support initiatives:

Step 1: Define Success Factors. Define success factors for each health and wellness value. To clearly identify how wellness initiatives advance success factors, create a matrix that includes each success factor across the top row and each wellness initiative down the first column. For each wellness initiative, mark the success factor(s) with which it aligns.

Step 2: Connect OakFit Wellness Program to the Built Environment. Develop actionable support to strengthen the connection between OakFit Wellness Program offerings and the built environment. Consider the opportunity to leverage

Health and Wellness

W2 Develop Actionable Support for Wellness in Employee Lifestyles

the campus as a living lab and pilot for OakFit Wellness Program offerings. For example, consider signage on future and existing non-motorized paths to encourage and motivate employees. Signage could include distance travelled and campus walking routes.[21] The county may also explore opportunities to connect the Farmer's Market to employee nutrition. Today the OakFit Wellness Program conducts Employee Market Day[22] at the Farmer's Market. Consider how this offering can be built upon to connect further to nutrition (such as displaying nutrition facts, recipes, or hosting cooking classes in partnership with the market to tie ingredients to a satisfying meal).

Step 3: Connect Messaging and Physical Environmental Cues. Consider reconciliation between the current OakFit messaging, county policies related to wellness, and physical environmental cues. For example, removing ash pot locations from main facility entrances to reflect the OakFit smoking cessation program and Oakland County Smoking Policy. Currently, there are several ash pots located at entrance sidewalks. In addition, the Segal Annual SHAPE Health reports demonstrate the need for focusing on diet due to negative health conditions being higher than the norm, yet access to healthy foods on campus is limited.

The Segal SHAPE Report, based on the Oakland County Health Plan from 2017, states "The number of plan participants diagnosed with Coronary Artery Disease (CAD) is more than double the norm. The annual per participant per year (PMPY) cost for these participants is $19,004 which is 3.96 times higher than the PMPY cost for the average plan participant. Since this disease can be prevented and reversed with dietary modification, this should be an area of focus for plan management." These statistics matched with the lack of resources on campus to improve diet and exercise demonstrates the importance of connecting the OakFit Wellness Program to the surrounding environment.

Also, consider external partners to support and encourage participation and habit building through verifying and rewarding engagement in everyday positive actions. For example, the county could consider adopting applications (apps) and programs that encourage sustainable behavior through rewards points. Actions could include walking, biking, exercising, recycling, or any other actions that Oakland County sees fit to promote. Allowing staff to earn rewards points through sustainable behaviors also furthers the next step, providing employee incentives.

Step 4: Provide Employee Incentives. Provide employees incentives to participate in wellness programs and initiatives. The county should offer incentives that go beyond monetary and competition-driven rewards by considering the impact of positive health outcomes on the individual. Consider cost and benefit to further tie incentives and programs for wellness programs to positive health outcomes. Based on feedback from focus groups and interviews with county employees, the prevailing incentive for participation in OakFit is monetary. For example, the Health Screening is documented as the most popular initiative, as it provides monetary incentive for participation. Currently, it has been reported that messaging to employees about participation in Health and Wellness programs provides benefit to the county through cost savings. Shifting the focus to how Health and Wellness programs benefit the individual provides incentive for participation.

The county should consider the following when developing actionable support toward employee wellness: accessibility of programming, inclusion of arts and cultural initiatives, creation and promotion of non-motorized paths, and understanding effectiveness of EAP resources in supporting mental and emotional health of employees. Each is described in further detail below.

21 https://wellness.oakgov.com/resources/Pages/Maps-Trails.aspx

22 https://wellness.oakgov.com/programs/Pages/Employee-Market-Day.aspx

Health and Wellness

W2 Develop Actionable Support for Wellness in Employee Lifestyles

Consideration 1: Accessibility of Programming. This consideration pertains to equitable access to Health and Wellness resources, programs, and amenities for all worker profiles, including staff, managers, 24 hours a day, 7 days a week (24/7) employees, and essential employees, as well as for employees that work off the main campus.

Employee feedback on the accessibility of programming through the OakFit Wellness Program included perceptions that the lunch and learn programs were historically inaccessible to all employees, specifically 24/7 employees, off-campus employees, employees that do not have technology within their workplace, and staff that work in buildings that are open to the public during lunch time. However, beginning in early 2022 all lunch and learn sessions are now recorded with closed captioning and directly embedded into the OakFit website for current and previous employees to access.

Employees also provided feedback on the lack of access to healthy food options on campus, and constraints to visiting the only café located in the Courthouse. Employees expressed perceived disadvantages to having to pass through security check points before accessing the café, and inability to access the café due to work-hour constraints. Additional feedback included frustration from 24/7 employees that the only food options available are vending machines which do not include healthy options. Consider partnering with local food trucks and utilize the Farmer's Market location throughout the year.

In addition, feedback included general lack of access or knowledge of access to the current OakFit Wellness Program offerings. Consider increasing and targeting communications to both new and current employees to increase employee awareness and participation. Consider removing the requirement to subscribe to OakFit wellness emails and instead provide an opt-out option. Include OakFit communication in all general staff-wide communications such as the Telegraph or other frequent communications.

Consideration 2: Campus Inclusion of Arts and Cultural Initiatives. Define the county approach to inclusion of arts and cultural initiatives through physical representation on campus. This recommended approach is focused on the exterior campus level but could be extended to the interior built environment as the program gains support. Examples of this approach are sculpture parks, murals, and rotating installations. Consider partnering with local artists throughout Oakland County to showcase and promote their work.

Consideration 3: Creation and Promotion of Non-motorized Paths. Creating and promoting the use of non-motorized paths on Oakland County Campus is another strategy for improving employee Health and Wellness. Oakland County should consider beautifying existing non-motorized paths by planting trees, improving the pathways, and providing other amenities and enhancements, such as rest areas or mile markers, to encourage employees to access and use. The county should also consider amenities for post-use of the pathways such as bicycle parking, lockers, showers, and other amenities to support employee ease of use. Additional recreational amenities could include permanent outdoor bodyweight training structures. Wayfinding and signage is critical to this consideration. Please reference the O1. Improve Connectivity with Non-Motorized Pathways strategy and O2. Expand and Improve Signage with Accessibility strategy within the Open Space, Ecosystems, and Connectivity Focus Area for detailed information.

Health and Wellness

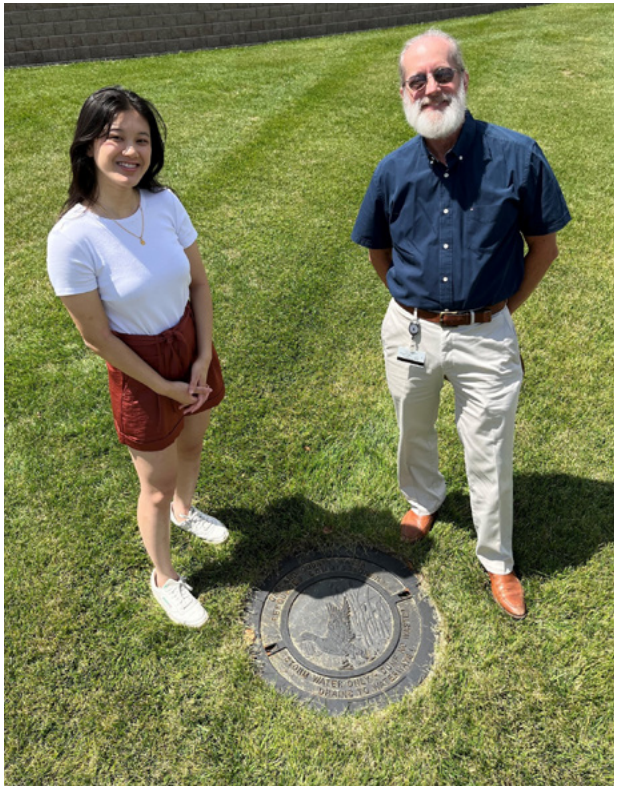
W2 Develop Actionable Support for Wellness in Employee Lifestyles

Consideration 4: Mental and Emotional Support Through EAP Resources. Focus group participants shared that currently the EAP is viewed as a disciplinary measure, not an asset for employees. Messaging around this program should shift from a disciplinary measure to a mental and emotional health resource. Due to recent county events, the EAP program has been promoted and utilized by staff and was supported by the OakFit Stamp Out the Stigma program promoting mental health awareness and wellness.

The county should consider continuous analysis to ensure that the current EAP resource is meeting the mental health needs of Oakland county employees. Information included in the county's health consultant's annual reports should be used to support this analysis.

Art and Health and Wellness

Research by the World Health Organization (WHO) demonstrates the inclusion of arts and cultural initiatives is beneficial to Health and Wellness. The WHO found that "within prevention and promotion, findings showed how the arts can affect the social determinants of heath, support child development, encourage health-promoting behaviors, help to prevent ill health, and support caregiving. Within management and treatment, findings showed how the arts can help people experiencing mental illness, support care for people with acute conditions, help support people with neurodevelopmental and neurological disorders, assist with the management of noncommunicable diseases and support end of life care."[23] Further, Harvard Health stated in an article, "Studies have shown that expressing themselves through art can help people with depression, anxiety, or cancer, too. And doing so has been linked to improved memory, reasoning, and resilience in healthy older people."[24]



Stormwater Manhole Cover Design Contest

The Water Resources Commissioner (WRC) lead a competition for high school students in the area to design artistic covers for stormwater manholes. The winner of the contest had their art included on all stormwater manholes throughout the city. The project served as an educational campaign to bring awareness to students and their families about the importance of managing storm water and keeping pollution out of storm drains. This project also had a distinct artistic component integrating art and culture into sustainability planning for the community.

23 "What is the evidence on the role of the arts in improving health and well-being? A scoping review." World Health Organization (Health Evidence Network (HEN), Fancourt D, Finn S, 1 2019, https://apps.who.int/iris/bitstream/handle/10665/329834/9789289054553-eng.pdf

24 "The Healing Power of Art." Harvard Health, Harvard Health, 1 July 2017, https://www.health.harvard.edu/mental-health/the-healing-power-of-art#

Health and Wellness

W3 Enact Healthy Workplace Guidelines and Standards

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Healthy Residents
- Livable Neighborhoods
- Environmental Sustainability
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: Marsh & McLennan Agency, Vendor partnerships

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division

Support: Human Resources, Purchasing, Environmental Health Services Unit of the Health Division

This strategy focuses on office-based workspaces in Oakland County facilities. It does not include specialized work environments, such as courtrooms, the Law Enforcement Complex, Children's Village, the Animal Shelter, Sheriff's Office Administration, and Farmer's Market. Due to the nature of the work in those specialized spaces, further investigation and modifications for workplace standardization is needed. However, administrative spaces within specialty spaces and buildings may apply to this strategy. Guidelines for nutrition apply to all facilities unless superseded by other programmatic and facility requirements. Guidelines for janitorial chemicals also apply to all facilities unless superseded by other programmatic and facility requirements.

county-wide workplace guidelines are important for office-based employees because they provide a standard approach to the workplace and resources. These guidelines strive to create transparency in the workplace and provide consistency across departments. This approach may allow for case-by-case considerations for individual employee accommodations. However, these standards should consider all users and abilities, and should be adaptable and universally designed. As it relates to the Sustainability Plan's Guiding Principles, enacting healthy workplace guidelines and standards could:

- **Operationalize diversity equity and inclusion and provide accessible services and campus environment** by creating a universal standard for offices that ensures all employees have equitable access to comfortable and healthy work environments.
- **Maximize resource efficiency** by standardizing buildings to eliminate the need for additional appliances, such as space heaters or personal microwaves and refrigerators, in buildings. By providing employees with the appliances and environmental conditions they need the county has more control over energy usage and resource management.
- **Improve air and water quality** by bringing buildings up to current industry standards for air quality and drinkable water access.

Health and Wellness

W3 Enact Healthy Workplace Guidelines and Standards

A standardized approach to the workplace, whether with furniture or janitorial operations, provides ease of maintenance, operations, and asset management across all facilities. Uniform offerings can be transferred where needed throughout county facilities through various cycles of employee growth and attrition. The following considerations are steps towards creating county-wide workplace standards and guidelines: nutritional support and access to healthy food, access to clean drinking water, task lighting, outdoor seating, ergonomic and other flexible desk configurations (e.g., standing desk, hoteling areas), and reducing and replacing janitorial chemicals with environmentally, non-toxic alternatives.

Workplace Guidelines and Standards Documents: Create Workplace Guidelines and Standards documents that outline and detail requirements across county workplaces. These documents provide a standardized approach to workspace environment types that could span from high-level approaches (guidelines) to room data sheets with specifications (standards). These documents typically include individual workstation set up, workplace space types (spaces to support every work type, from focus heads-down work to collaborative teaming and social environments), hybrid work policies, amenities, and space use etiquette. A standardized allocation of square foot per employee in the workplace provides the opportunity for rightsizing space based on departmental requirements, both today and with future growth projections. Additionally, the county's most valuable asset are its workers, who are material to its operations and success – as such, it is paramount that workplace guidelines and standards support a healthy and safe work environment. Workplace guidelines and standards should align with the Occupational Safety and Health Administration (OSHA) standards. Creating a healthy and safe work environment can involve physical measures, like those outlined in this section, as well as processes for ensuring engagement, transparency, and accountability.

Developing workplace standards and guidelines provides an opportunity for county-wide policies around supplies (e.g., office, pantry, female hygiene products, sharps containers, recycling bins, etc.) and employee wellness spaces (e.g. breakrooms, lactation rooms, respite and prayer rooms, gender neutral bathroom options etc.) (Please reference the strategies S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities and S5. Update the Purchasing Evaluation Handbook to Increase Diversity of Bid Evaluation Teams and Incorporate Sustainability Evaluation Criteria in the Sustainable Governance Focus Area section for more detail).

Focus group participants mentioned inconsistency across departments for approach to coffee or snacks. Participants stated that coffee and snacks may be provided by managers out of their own interest, and many departments didn't have basic storage or amenities for access to food during the workday (e.g., microwaves, refrigerators, utensils). Some employees address such deficiencies by bringing in personal appliances. When employees use personal appliances, it can make it difficult for the county to manage energy consumption at the building level. Equitable distribution of these appliances should be accompanied by

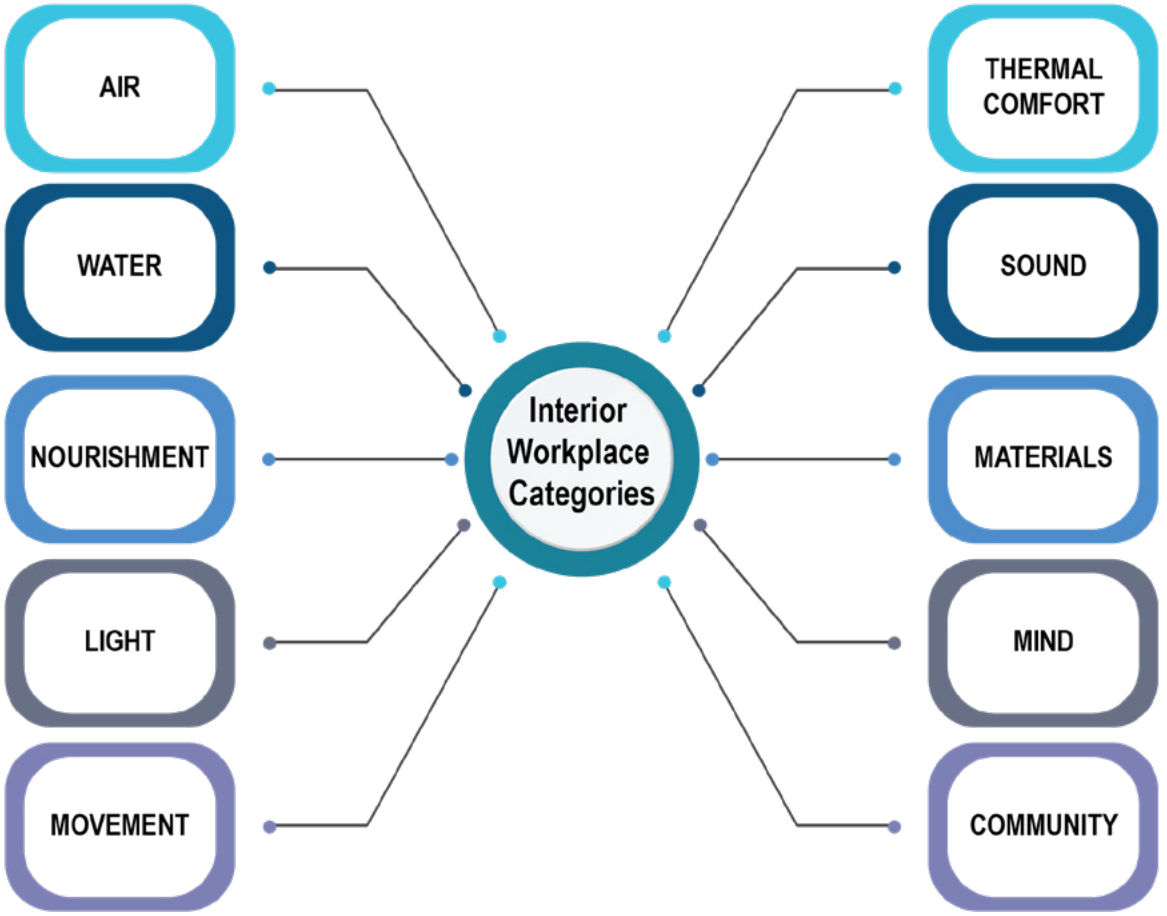
Health and Wellness

W3 Enact Healthy Workplace Guidelines and Standards

prohibiting personal devices such as dorm fridges, coffee makers, and space heaters. In addition, focus group participants discussed some departments had standing desks and others were not familiar with how to gain access to such resources. Workplace guidelines and standards can streamline the approach and policy to these resources across all departments and workplaces.

Workplace guidelines may also include recommendations for lifespan of and the intended use of furnishings. Replacement of furnishings in specialty spaces (Sheriff Administration Building, Children's Village, Law Enforcement Complex) occupied 24 hours a day requires a focus on durability or further considerations for end of useful life than other spaces that are used 8 hours a day. For example, focus group participants reported that office furniture in 24/7 workspaces may be beyond its useful life and in need of replacement. In addition to spatial, finishes, and furniture guidelines, the county may consider referencing and applying best practices of a wellbeing standard. The International WELL Building Institute's (IWBI) WELL Building Standard is the most robust wellbeing standard in the industry based on market research. Applying best practice solutions is a way to provide employee wellness benefits based on measurable outcomes and evidence-based recommendations. Categories

Figure 4. WELL Building Standard Interior Workplace Categories



Source: https://resources.wellcertified.com/articles/well-tip-understanding-the-comparison-between-well-v1-and-well-v2-pilot/

Health and Wellness

W3 Enact Healthy Workplace Guidelines and Standards

for interior workplace wellness strategies include air quality, access to daylight, light levels, thermal comfort, acoustics, and finish materials. Several of these categories affect facility-wide systems and are to be considered at a systematic level prior to adaptation.

To complement these workplace standards, the county could also consider engineering standards that include targets for mechanical systems that support healthy indoor air quality. The WELL Building Standard includes goals for indoor air quality as a benchmark for indoor air quality basis of design. These have corresponding effects to the High-Performance Buildings Focus Area strategies, reference those strategies for more information. The EPA Environmental Benefits Mapping and Analysis Program[25] is a free tool that analyzes the effect of air quality on health impacts and their economic value. This tool can be a resource to understand how air pollution in the geographical area impacts county employee health.

Consideration 1: Nutritional Support and Access to Healthy Food. The main issues described in focus groups by employees were around the lack of access to food on campus. There is a security checkpoint in the Courthouse before gaining access to the only existing on-campus café and security prevents food delivery. The county could consider developing a program for employee pick up, delivery, and office event catering from the existing courthouse café. Employees who participated in focus groups stated that they often turned to fast food off-campus because there is no access to healthy food on-campus. All worker profiles should be considered, including 24/7 workers that work double shifts and essential employees, when developing on-campus food offerings. Also consider enabling equitable access to nutritional options for on-campus and off-campus facilities. Oakland County Human Resources and Purchasing should lead this portion of the strategy with support from a partner healthy food vendor.

Consideration 2: Nutrition Options. Provide access across many scales ranging from a full-service hot food café (staffed café) to grab-and-go markets (ready-made packaged with an automated point of sale) and healthy vending (vending machines). Providing employees with a broad range of nutritional food and ensuring it is accessible will give employees nutritious options on Oakland County's campus. The Human Resource department should examine courthouse café menus and current partner vending contracts for nutritional value and also examine the percentage of vending machine products that include soda and high trans-fat food. The county can consider exploring vendors that have high nutritional value options. Finally, working with a local vendor with nutritious food options could be one way to provide not only nutritious food, but also community and local business support. This action will have an impact on facility and operational costs; however, accessible healthy food offerings are a necessary action to lead by example, and could lead to cost savings on health expenses over time due to improved health outcomes.

25 https://www.epa.gov/benmap

Health and Wellness

W3 Enact Healthy Workplace Guidelines and Standards

This nutritional approach builds upon employee access for all locations, all shifts, and raising standards for nutritional value for meals across campus. The Segal SHAPE Reports on the Oakland County Health Plan provide information on the Oakland County employee base that show how employees would directly benefit from a nutritional strategy.

The Segal SHAPE report on the Oakland County Health Plan from 2018 stated, “The number of plan participants diagnosed with CAD is more than double the norm. The annual PMPY cost for these participants is $21K which is four times higher than the PMPY cost for the average plan participant. Since this disease can be prevented and reversed with dietary modification, this should be an area of focus for plan management.”

The Segal SHAPE report on the Oakland County Health Plan from 2018 states, “The number of plan participants exceeds the norm for each of the “lifestyle conditions” (i.e., Diabetes, CAD, and Hypertension). Strategies aimed at altering diet and increasing exercise should be prioritized.”

The Segal SHAPE report on the Oakland County Health Plan from 2019 stated, “Compliance with all diabetes measures is low. In particular, the number of diabetics monitoring their A1C values typically raises a red flag. However, the risk scores of those non-compliant diabetics are very low and may be an indication that these are type II diabetics who have their condition under control with diet and exercise.” The 2018 report highlighted a similar finding.

Consideration 3: Clean Drinking Water Access. Develop policies around access to palatable drinking water in workspaces. Employees who participated in focus groups reported the lack of access to palatable drinking water, noting issues with the drinking water taste and smell. In fact, one participant even mentioned inquiring with colleagues about interest in setting up a water delivery system in the office at their own cost, because the drinking water was unpleasant in the workplace. Facility standards may include filtered water bottle filling stations across buildings and accessible to workplaces. Installing water bottle filling stations is an example of best practice in the WELL Building Standard and Leadership in Energy and Environmental Design (LEED) rating system. Environmental Health and Safety should lead this portion of the strategy with support from Facilities Management.

Health and Wellness

W3 Enact Healthy Workplace Guidelines and Standards

Consideration 4: Outdoor Seating. Provide smoke-free outdoor seating spaces at all facilities. Facilities Management and Purchasing should lead this portion of the strategy. Currently, the only observed outdoor seating outside of facilities doubles as smoking spaces. In focus groups, employees reported they desire to have smoke-free outdoor seating spaces where they can eat lunch or take a break. This consideration aligns with the county's Tobacco Cessation program by providing smoke-free seating options for staff and visitors. Further, research shows that smoking is the leading cause of chronic obstructive pulmonary disease (COPD).[26] According to Segal SHAPE Reports based on the Oakland County Health Plan from 2017-2020, Oakland County Healthcare spends about $1 million a year on COPD claims (about $1,650 per patient per year). While COPD is not the highest healthcare cost for Oakland County attributed in the SHAPE Reports, this is a significant expense that could be directly reduced by improved air quality including reduced direct smoke inhalation and second-hand smoke exposure. Providing smoke-free outdoor seating options can support those trying to limit smoking and prevent from second-hand smoke exposure.

Consideration 5: Reduce and Replace Janitorial Chemicals with Environmentally, Non-toxic Alternatives. The Oakland County Chief of Custodial Services has studied and worked to start implementing International Facility Management Association (IFMA) recommended sustainability initiatives. The Chief of Custodial Services' goal is to improve the work environment without impacting health standards or creating financial strain on operations. As of June 2021, Oakland County was ranked "Excellent" or "Satisfactory" in 9 of IFMA Benchmarks and "Needs Improvement" in 1 IFMA Benchmark. Current accomplishments include:

- A total of 99% of janitorial paper products are "Green Seal" certified or "ECO" approved
- Approximately 98% of chemicals are ready-to-use or ready-to dispense products
- All FMO vacuums have 97% or higher filtration systems
- Employees have been trained on the proper use of chemicals when treating services.

The IFMA Benchmark that was ranked as "Needs Improvement" in Oakland County facilities is "Use cleaning chemicals that meet Green Seal or similar standards." Oakland County should do an analysis of existing janitorial chemicals with industrial

26 "Smoking and COPD." Edited by David Dugdale, Mount Sinai Health System, Mount Sinai Health System, 2019, https://www.mountsinai.org/health-library/special-topic/smoking-and-copd#:~:text=Smoking%20is%20the%20leading%20cause,so%20it's%20hard%20to%20breathe.

Health and Wellness

W3 Enact Healthy Workplace Guidelines and Standards

hygienists focused on environmental health and safety in the workplace and compare against other health standards, recognizing that some facilities (e.g., the County Jail) may require hospital grade cleaners/disinfectants because of the higher risk of viral and bacterial exposure. Choosing best practice janitorial chemicals and defining proper protocols for use of these chemicals will prevent employees from being exposed to toxic and harmful chemicals that can negatively impact human health. In doing so, consider referencing the WELL Building Standards, which provides a consolidated list of best practice certifications for each class of cleaning products (including Green Seal, in some cases).

According to WELL standard cleaning, all disinfection and sanitization products must meet one of the following three requirements to be less hazardous:

1. Products are labelled as 'low-hazard' or 'safer' by an ISO 14024-compliant or by a third-party certification recognized by the local government where the project is located.[27] Hazard criteria must be specific for the product classes within the scope of this feature.
2. The Safety Data Sheet (SDS) of each product as sold discloses ingredients per EU Regulation 2015/830 (CLP) or California State Bill No. 258 and no ingredients listed in Section 3 of the SDS are classified as the following Globally Harmonized System codes and corresponding hazard statements:
    - H311: toxic in contact with skin
    - H312: harmful in contact with skin
    - H317: may cause allergic skin reaction. Individual terpenes may be present up to a concentration of 0.5% in undiluted products.
    - H334: may cause allergy or asthma symptoms or breathing difficulties if inhaled
    - H340: may cause genetic defects
    - H350: may cause cancer
    - H360: may cause damage to fertility or the unborn child
    - H372: may cause damage to organs through prolonged or repeated exposure
3. Products meet Feature X08 Materials Optimization.

Implementation of this strategy may be in conjunction with the Waste Reduction and Diversion Focus Area strategies if janitorial services and waste diversion and removal services are combined (see the Waste Reduction and Diversion section for more information). The Environmental Health Services Unit of the Health Division and Facilities Management, Chief of Custodial Services, should lead this portion of the strategy.

27 Green Seal's certification procedures follow ISO 14020/14024.

Facility and Fleet Decarbonization

The county's net zero carbon goal for government operations is to reach net zero carbon emissions by 2050, with an interim goal of 50% carbon emission reduction by 2035 from a 2018 baseline.

Expand the county's clean energy generation capabilities, convert the county's fleet to clean-energy vehicles, and advance decarbonization goals.

Guiding Principles

- Provide accessible services and campus environment
- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Objectives and KPIs

Expand carbon neutral energy generation and use, as measured by the carbon emissions from energy consumption (CO_2e).

Decarbonize county vehicle fleet, as measured by the percentage of internal-combustion engine (ICE) vehicles to non-combustion engine vehicles within the fleet.

Promote cleaner transportation alternatives, as measured by the percentage of staff commuting to work by a transportation mode other than a single occupancy internal-combustion engine (ICE) vehicle.

To support the county's target to reach net zero carbon emissions by 2050, with an interim goal of 50% carbon emission reduction by 2035 from a 2018 baseline, the following section outlines specific targeted actions for development of onsite renewable energy generation capabilities, reduction of energy use and emissions from facilities, and advancement of zero emission vehicles (ZEV) across the county fleet.

Currently, 76% of the county's emissions are from energy use and 16% of the county's emissions are from their fleet. Decarbonizing energy and transportation-sector emissions is critical to achieving carbon neutrality by 2050. Electricity consumption generates 53% of total emissions and natural gas, which supplies the Central Steam Plant, represents 23% of all emissions. As such, conversion or decommissioning of the Central Steam Plant and of other natural gas equipment and appliances on campus must be the primary focus of the county's decarbonization strategy. Replacing energy sources with renewable energy generated on-site is also key to reaching the net zero carbon goal and can increase the county's energy-resilience. Off-site renewable energy sources, including power purchase agreements, can also contribute to advancing the net zero carbon goal.

Table 5. Facility and Fleet Decarbonization Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
F1	Conduct a Decarbonization Feasibility Study for the Central Steam Plant					X		X					X		X	Facilities Planning and Engineering Division	Facilities Management: Facilities, Maintenance, and Operations Division, Engineering	
F2	Pursue On-Site Solar Generation at Key Campus Locations					X		X					X		X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing, Parks and Recreation	
F3	Develop an Electric Vehicle Infrastructure and Fleet Transition Plan for the Oakland County Campus					X		X			X		X			Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing, Parks and Recreation	

LEGEND: (*) In Progress

Facility and Fleet Decarbonization

F1 Conduct a Decarbonization Feasibility Study for Central Steam Plant

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: Future

Strategy Type: Informative

Partners: N/A

Teams

Lead: Facilities Planning and Engineering Division

Support: Facilities Management: Facilities, Maintenance, and Operations Division, Engineering

The central steam plant currently operates predominantly on natural gas and serves several of the largest facilities on the Oakland County campus, producing 18% of overall county operations greenhouse gas (GHG) emissions.

The county's Steam Plant Decommissioning Study was conducted in 2021. The research in this study found that decommissioning the Steam Plant and replacing it with a local, more efficient, natural gas boilers could result in $18,890,316 in savings in the next 10 years. Study findings also showed that the localized high efficiency boilers would result in 30% less annual carbon emissions than the current steam plant and are expected to have a longer lifecycle and fewer necessary repairs. While this solution would reduce carbon emissions to meet short term carbon reduction goals, installing a natural gas system is still a long-term investment in fossil fuels that will not help the county meet its long-term net zero carbon goal. A new boiler system is an expensive replacement that would lock the county in to a long-term dependence on fossil fuels that would delay reaching the net zero carbon target.

The goal of this additional study would be to identify the feasibility of alternatives for a decarbonized heating system, either distributed or central. This is necessary to both meet the county's long-term net zero carbon goal as well as ensuring other energy investments. For example, energy efficiency upgrades to steam-serviced facilities. All upgrades and capital investments should be performed in alignment with the capital improvement plan and decarbonization efforts. Thus, this strategy is aligned with the county's Strategic Framework goal areas of Environmental Sustainability and Organizational Excellence. Conducting a decarbonization feasibility study of the central steam plant could:

- **Advance the net zero carbon goal** by exploring steam plant alternatives that eliminate the county's long-term dependence on fossil fuels.
- **Maximize resource efficiency** by exploring alternatives that are lower in maintenance costs and increase overall water and energy efficiency.

This proposed study would evaluate all available and emerging decarbonization alternatives for the central steam plant, including those that could separate the county from fossil fuels entirely in order to work towards the net zero carbon goal. The study should investigate different alternatives whether Oakland County decides to decentralize or maintain the steam plant. Preservation of the steam plant can include looking into renewable fuel alternatives, such as biofuels. Decentralization of the steam plant can include applying carbon neutral energy sources to buildings on campus, such as heat pumps. Options for evaluation include:

Facility and Fleet Decarbonization

F1 Conduct a Decarbonization Feasibility Study for Central Steam Plant

- **Distributed, Decarbonized Systems:** Transition from a central steam plant to individual systems at each county location which operate on newer, efficient electrified technologies. This would complement the 2021 study recommending the transition to natural gas boilers, but would include the exploration of non-fossil fuel alternatives and the technical and cost analysis of each option specific to the impacted county facilities and long-term net zero goal.
- **Centralized Ground Source Heat Pump (GSHP) System:** A connected GSHP system would provide heating and cooling from stable underground temperatures and would supply heating and cooling to each facility.
- **Alternative Fuels:** Renewable natural gas, biofuels, or green hydrogen may be considered. Feasibility is based on local availability of the alternative fuel.
- **Carbon Capture and Sequestration:** Capture of on-site carbon emissions for long term underground storage may allow for continued operation of the natural gas plant. This would require evaluation of ongoing cost and local sequestration site availability.

The feasibility study should include the following relative to each technology:

- **Current and projected technological maturity:** Availability or projected availability of the technology in the market will be critical for assessment of feasibility and implementation.
- **Timelines:** Each decarbonization technology and scenario should have an identified timeline which considers technological feasibility and design, engineering, construction timeframes, relation to the GHG targets, and current remaining steam plant lifespan.
- **Alignment with county net zero carbon targets:** Projected timeline and carbon intensity of each technology should align with the county's net zero goal and interim GHG reduction targets.
- **Cost estimates:** Capital investments required for each technology, as well as required ongoing annual operations and maintenance costs will be critical to this assessment and feasibility study.
- **Funding opportunities:** Where applicable, identification of funding and financing mechanisms which may be available to support each technology.
- **Options for new developments:** Provide guidance for new developments on either connecting to the alternative system or options for decarbonized distributed systems. Phase out connections to natural gas systems in new developments.

Looking into alternatives now will allow Oakland County to integrate the selected strategy into future capital plans, facility upgrades, and electric procurement processes. It will also provide updated timelines and phasing of current efficiency measures for facilities currently served by the plant. It is important to continue monitoring state and federal legislation that may impact the economics of decarbonization, including fuel switching or electrification incentives, and carbon pricing schemes.

Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division

Support: Purchasing, Parks and Recreation

Oakland County campus presents ample opportunity for development of onsite renewable energy, which will support decarbonization goals. Additionally, increased energy efficiency paired with use of on-site renewable energy and battery storage solutions will enhance county resilience by limiting its critical energy load and reducing its reliance on the broader electrical grid. As it relates to the Sustainability Plan's Guiding Principles, pursuing on-site solar generation at key campus locations:

- **Advance the net zero carbon goal** by developing localized renewable energy sources on campus to reduce and eventually eliminate the county's dependence on fossil fuels for energy.
- **Maximize resource efficiency** by taking advantage of existing roofs that would be eligible sites for onsite solar and increasing resilience and self-sufficiency of the campus energy system.

Primary sites of development are open spaces and parking areas on campus. Due to the decreasing cost of solar energy, on-site solar resources would provide economic benefits by reducing purchased energy from the grid, thus promoting efficient use of county funding.

Considerations for development of these sites include:

Key Site Locations: Oakland County campus has several parking lots, rooftop locations, and open space that would be a good fit for solar installations. Three key site locations , as seen in Figures 5-7, were identified through the Sustainability Plan development process: the Farmers Market parking lot, the public parking lot, and open space west of the Sheriff's Administration Building. Installing ground-mount solar in the open space west of the Sheriff's Administration Building has the potential capacity to generate approximately 3 million kWh in electricity per year.

Installing a carport solar system in the Farmers Market parking lot has the potential capacity to generate approximately 1 million kWh in electricity per year. Last, installing a carport solar system in the public parking lot has the potential capacity to generate approximately 2.5 million kWh in electricity per year. The analysis prepared in informing this Plan identified that approximately 21 million kWh of electricity was used by the Oakland County campus in 2020. Investment in on-site solar generation at selected sites identified here would produce enough electricity to offset approximately 30% of this annual consumption

Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

Funding and Financing Models: There are a range of models for development of solar including those that may allow for cash-flow neutral loan and energy savings. Leases, power purchase agreements, and any future state or utility programs should be evaluated to ensure maximized financial benefits of solar installations, including the federal investment tax credit (ITC).

Streamlined Planning and Development: Where possible, coordinate solar installation with other planned projects. New developments, including facilities and parking areas, can include solar ready design to support continued growth in campus renewables in the future. For example, installation of the Farmer's Market parking lot solar canopy or inclusion of solar ready design to support future installation could be considered in the county's planned improvements to the facility and parking lot during the timeframe of FY23 through FY25.[28]

Identification of Co-Benefits: There are several co-benefits to installing solar on campus. Installing solar canopies over parking areas provides covered parking which protects vehicles and people from the weather, resulting in reduced cooling needs for vehicles and comfort for visitors and employees. Ground-mounted solar on greenspaces can be designed to include native plantings which promote stormwater infiltration and benefits to pollinators and birds. Additional evaluation is needed to consider any potential local environmental or wetland impacts, particularly for solar development of green space. Last, installing battery storage opportunities in addition to solar can provide a resiliency measure to reduce reliance on the electrical grid and reduce overall carbon emissions.

Operations and Maintenance (O&M): The National Renewable Energy Laboratory has resources to understand and minimize O&M costs as well as a tool to determine O&M costs based on system size, roof type, and environmental conditions.[29] Snow is rarely removed from solar photovoltaic (PV) systems because it is not cost effective and the reduction in productivity is 3% on average and 15% in very snowy environments. However, snow is sometimes removed when a dangerous amount of weight is on the system or snow is removed from the front of the array to provide clearance for snow to slide off. The cost for snow removal on average is about $50 to $75 per hour for labor and about $0.50/sf of array area. Ice dams should be removed to ensure that water drains off the roof properly, the cost is $70 on average for labor per ice-dam location and materials include a $50 rake and ice-melting supplies.[30]

28 https://www.oakgov.com/parks/getinvolved/Pages/cip.aspx

29 https://www.nrel.gov/docs/fy20osti/74840.pdf

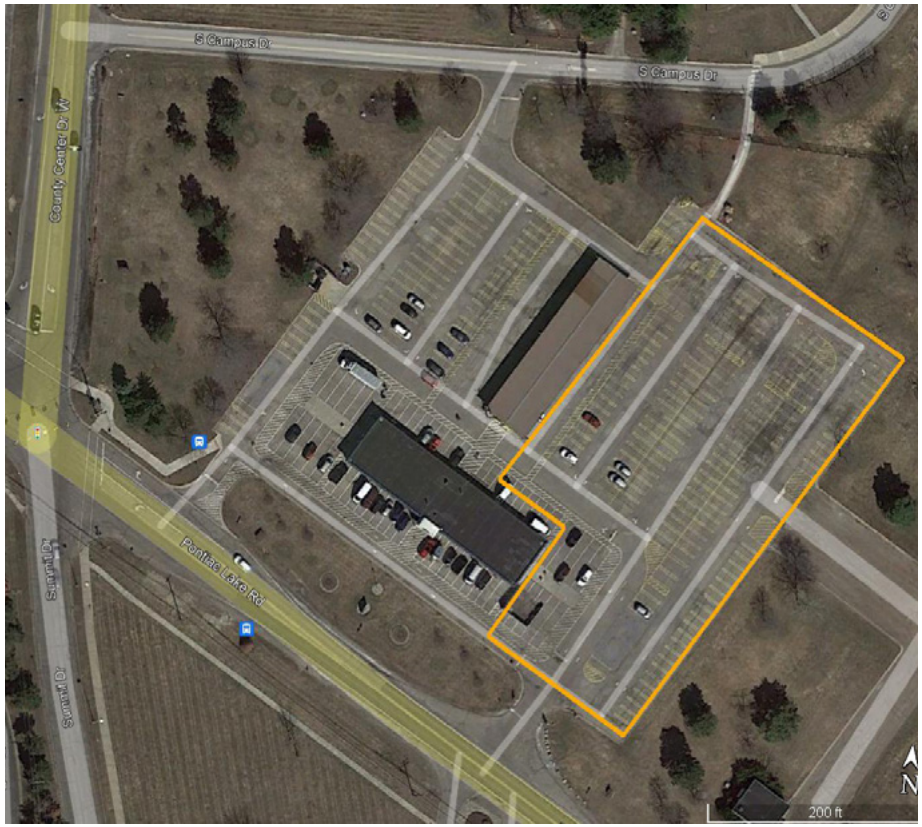
30 https://www.nrel.gov/docs/fy19osti/73822.pdf

Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

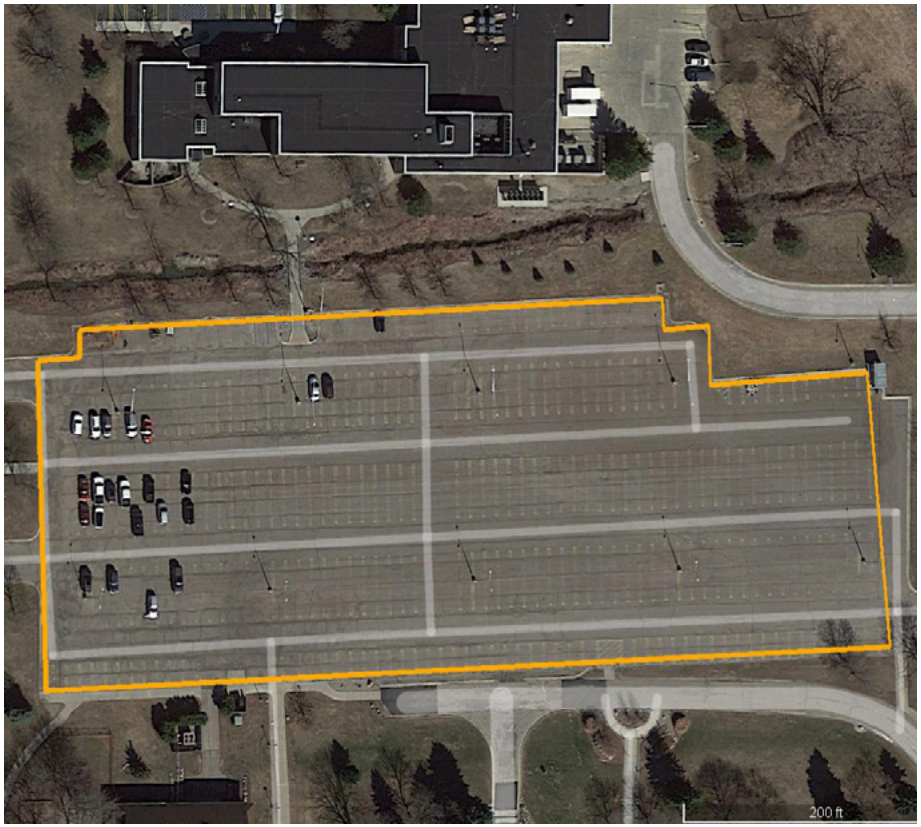
The Farmers Market parking lot could host an approximately 800 kW carport system, generating approximately 1 million kWh of electricity per year. With up front capital, ongoing O&M costs, and annual electric cost savings, it is estimated that this site would yield 4.1% ROI and have a 24.5-year payback period.

Figure 5. Potential Solar Canopy Site at Farmer's Market



The public parking lot could host an approximately 1900 kW carport system, generating about 2.5 million kWh per year. With up front capital, ongoing O&M costs, and annual electric cost savings, it is estimated that this site would yield 4.3% ROI and have a 23.3-year payback period.

Figure 6. Public Parking Lot Proposed Solar Area

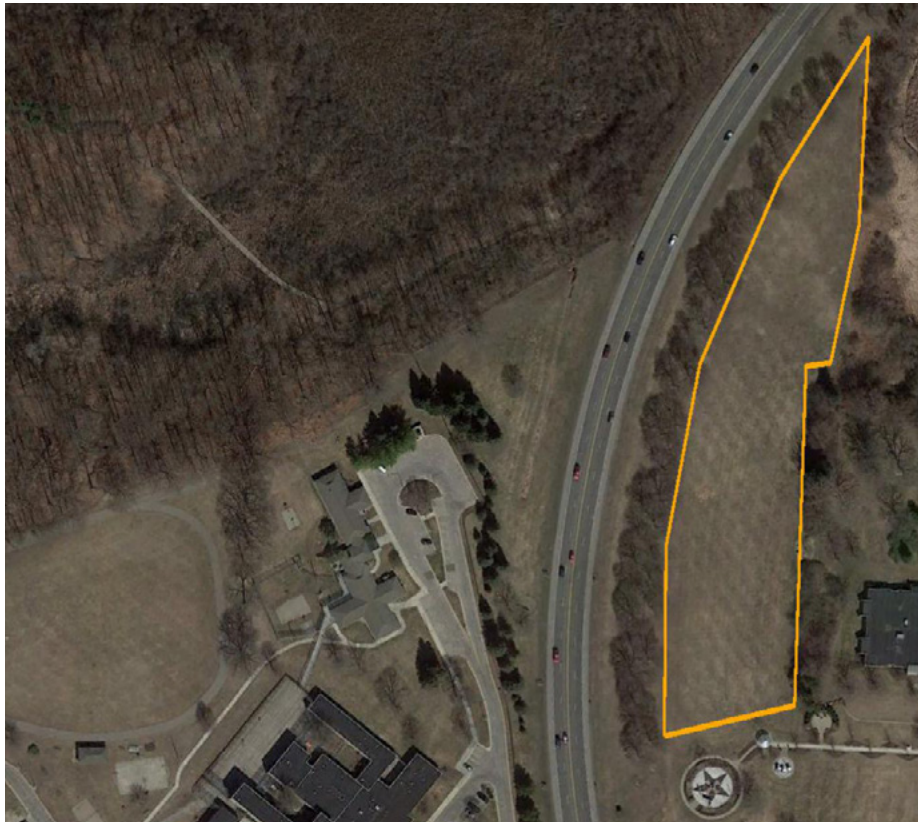


Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

The open space west of the Sheriff's Administration Building could host an approximately 2,000 kW ground-mount system, generating about 3 million kWh per year. With up front capital, ongoing O&M costs, and annual electric cost savings, it is estimated that this site would yield 9.0% ROI and have a 11.2-year payback period.

Figure 7. Possible Solar PV Site, West of Sheriff's Administration Building, Open Lot



Installation of the three preliminarily identified solar sites would result in 13% reduction in electricity emissions and 7% reduction in total emissions, from a 2018 baseline (Table 6).

Table 6. Potential GHG Emission Reduction from Solar Installation at Key Sites

	FARMERS MARKET PARKING LOT	PUBLIC PARKING LOT	OPEN SPACE WEST OF THE SHERIFF'S ADMINISTRATION BUILDING	THREE SYSTEMS COMBINED
Production (Year 1) (kWh)	1,000,000	2,500,000	3,000,000	**6,500,000**
% reduction in total 2018 electricity consumption (kWh)	2%	5%	6%	**13%**
% reduction in total 2018 electricity emissions ($MTCO_2e$)	2%	5%	6%	**13%**
Reduction in total 2018 municipal emissions	1%	3%	3%	**7%**

Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

Financial Analysis

The Farmers Market parking lot, the public parking lot, and open space west of the Sheriff's Administration Building went through initial evaluation and analysis to estimate cost, payback, and funding considerations for implementation. Based on preliminary analysis, the proposed solar installations have the following generation capacity: the Farmers Market parking lot could host an approximately 800 kW carport system, generating approximately 1 million kWh of electricity per year. The public parking lot could host an approximately 1900 kW carport system, generating about 2.5 million kWh per year. Last, the space west of the Sheriff's Administration Building could host an approximately 2,000 kW ground-mount system, generating about 3 million kWh per year.

The capital outlay, payback period, and return on investment (ROI) calculated by the county's consultants, were based on the total costs and electric savings for each of the three systems. A price per kW of $3,900 for the carport system and $1,900 for the ground-mount system respectively, including a 5% contingency, was applied to calculate the capital outlay for the carport and ground-mounted systems. By using a Tax Equity Partnership funding mechanism, bonus depreciation and the ITC was applied to the initial capital outlay (see the Partnership with Tax Equity Investor funding mechanism description for more information).

Additional costs for these systems include ongoing annual O&M costs ($5/kW) and a one-time inverter replacement cost ($10/kW) at year 15. Ongoing annual O&M costs would increase slightly each year due to inflation. Potential savings were calculated based electric cost savings. Even though solar degradation is 3% after year 1 and 1% annually thereafter, electric cost savings will increase over time due to utility rate escalation.

Capital outlay, ongoing O&M costs, inverter replacement costs, annual electric savings, payback period, and ROI for each system and the three systems combined are shown in Table 7. Figure 8 shows cumulative cashflows and breakeven points for each installation and the installations bundled.

The solar PV market is quickly evolving. As the market advances and technology improves, the costs of equipment and maintenance will decrease, and new incentives or alternative financing methods may become available. Such factors could dramatically increase the ROI and lower the payback period. Further, ground-mount systems have a higher ROI and lower payback period than the carport systems. This could be one consideration as the county prioritizes solar installations. It should also be noted that the analysis below does not place a value on the carbon reduced from the switch to solar power.

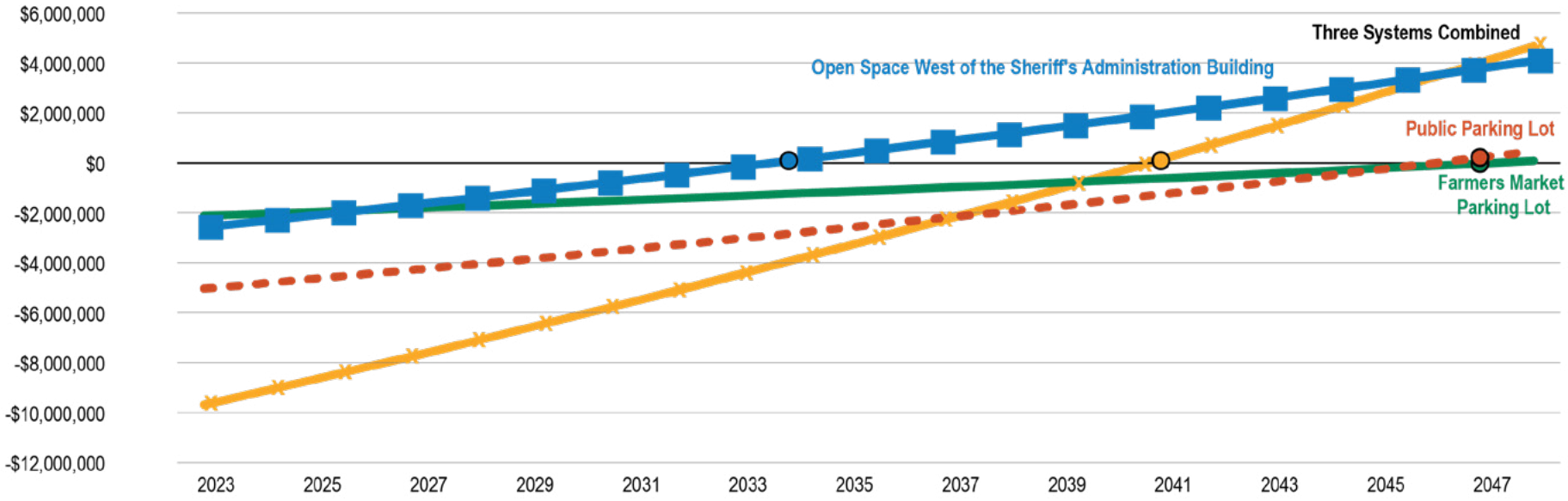
Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

Table 7. Key Solar Installation Financial Analysis Outputs

ITEM	FARMERS MARKET PARKING LOT	PUBLIC PARKING LOT	OPEN SPACE WEST OF THE SHERIFF'S ADMINISTRATION BUILDING	THREE SYSTEMS COMBINED
Capital Outlay	$2,100,000	$5,000,000	$2,600,000	$9,700,000
Ongoing Costs: Annual O&M (Year 1)	$4,000	$9,500	$10,000	$23,500
Ongoing Costs: Inverter Replacement (Year 15)	$8,000	$19,000	$20,000	$47,000
Annual Electric Savings (Year 1)	$80,000	$200,000	$240,000	$520,000
Payback Period (Years)	24.5	23.3	11.2	17.9
ROI	4.1%	4.3%	9.0%	5.6%

Figure 8. Solar Installations: Cumulative Cashflow



Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

Funding Mechanisms

Potential funding mechanisms for solar installations include:

Capital Budget: The solar PV systems costs should be included in a capital budget.

Operating Budget: Related ongoing maintenance and expenses for solar PV panels and inverters would be a part of the operating budget.

Partnership with Tax Equity Investor: Given that the ITC plays an important role in solar economics and helps lower the payback, the county should consider partnering with a tax equity investor.[31] As such, this funding mechanism was included in this financial analysis model for this strategy. The tax equity partner(s) could invest a certain percent of capital costs and claim all ITC (usually 99%) and bonus depreciation in year 1 or when the system is placed in service (per the Operating Agreement between project partners). The tax equity partner(s) would co-own the system for five to seven years to secure claimed tax benefits. After seven years, depending on the financial arrangement, the county can buy out the solar PV systems at an agreed price or Fair Market Value or transfer the ownership within the partnership.

Power Purchase Agreement (PPA): A PPA is a great option for entities that are not able to monetize tax credits or that cannot purchase solar PV systems outright. Through a PPA, a third-party solar developer would install, own, and operate an energy system on county property. The county would purchase the electricity for a predetermined period, usually 20 years. This option does not require a capital outlay from the county. The savings would be realized through the difference between the utility and PPA rates. To determine the PPA rates to calculate actual savings, the county would need to produce the RFP and collect quotes from solar developers.

Tax Exempt Bond Financing: The county could finance the solar installations through the proceeds of a tax-exempt bond issuance. The bonds would be sold to investors to raise funds for the solar installations. In return, the county would agree to repay the investors principal plus interest, which is generally exempt from federal, state, and local taxes. These bonds could qualify as green bonds to attract additional types of investors. There are two types of bonds distinguished by the source of repayment. General obligation bonds are secured by the county's pledge to repay from its taxing authority. Repayment of revenue bonds is from a specified revenue, often associated with the project being financed. When bonds are issued for solar projects, they are typically general obligation bonds; however, bonds have been issued with the savings generated by solar projects being pledged to repay the debt.

Guaranteed Energy Savings Performance Contracting (GESPC): The county can contract with an Energy Service Company (ESCO) to design, install and maintain the solar PV systems. The ESCO will guarantee that the energy savings generated from the project will be sufficient to offset the project costs, including financing. If the project does not meet the guaranteed savings, the ESCO is required to make up the shortfall to the customer. ESCOs are generally paid a negotiated fee or share in the energy savings. GESPC projects can be financed through a variety of mechanisms including bond financing or, more frequently, municipal leases. Michigan allows tax exempt lease purchases for energy conservation improvements. The lender holds title to the conservation title and

31 Tax information contained in this communication was not intended or written to be used by any person for the purpose of avoiding penalties, nor should such information be construed as an opinion upon which any person may rely. AECOM is not providing a formal opinion regarding the ITC and Depreciation. The ITC and depreciation estimate is preliminary and subject to adjustment based on actual costs.

Facility and Fleet Decarbonization

F2 Pursue On-Site Solar Generation at Key Campus Locations

leases it for the term of the financing. At the end of the term, the lender transfers ownership to the county. This form of financing is not considered debt under Michigan law and therefore does not count toward the county's authorized debt limit.

Sustainability Revolving Fund: The county can establish a Sustainability Revolving Fund (Revolving Fund) to pay for the solar projects, or other projects that generate energy cost savings (e.g., H2. Complete Campus-Wide LED Lighting Conversion). Initial capitalization of the fund can come from grants, rebates, or appropriations from the county's General Fund. As projects are completed and ongoing, an amount equal to the energy savings would be paid back to the fund over time.[32] This would replenish the Revolving Fund which could be used for additional solar projects in facilities without additional General Fund appropriations.

Funds will be repaid and available for additional projects that will generate savings that are repaid to the Revolving Fund. For example, based on the payback period model for the open space west of the Sheriff's Administration Building, $230,000 in energy savings would be repaid to the fund after the first year and the capital outlay fully replenished by energy savings in about 11 years.

Federal, State, or Regional Programs: The Infrastructure Investment and Jobs Act (IIJA) appropriated $550 million to the **Energy Efficiency and Conservation Block Grant (EECBG) Program** to assist eligible local, county, tribal, and state governments in implementing strategies to reduce fossil fuel emissions, reduce total energy use, and improve energy efficiency for transportation and buildings. This program was previously funded back in 2009 through the American Recovery and Reinvestment Act and it is anticipated that solar projects will be eligible under this refunded program.[33]

32 Some Revolving Funds only receive a portion of the energy savings. The remaining savings accrue to the general fund. By sharing the savings, leadership may be more willing to undertake future energy projects; however, the fund will be replenished more slowly.

33 https://www.energy.gov/eere/wipo/energy-efficiency-and-conservation-block-grant-program-bipartisan-infrastructure-law-2021

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

Guiding Principles

- Provide accessible services and campus environment
- Advance the net zero carbon goal

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: Future

Strategy Type: Informative

Partners: N/A

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division

Support: Purchasing, Parks and Recreation

Oakland County taking the initiative to decarbonize its fleet will result in significant progress on reaching net zero carbon emissions. Installing EV charging infrastructure on Oakland County's campus would demonstrate the county's commitment to climate action and provide amenities to employees, residents, and visitors of the campus. Oakland County could then provide real-world accounts and education of the function, success, and opportunities electrifying large fleets and installing EV infrastructure has for a government entity. Community members may also be inspired to integrate electrification into their personal lives. As it relates to the Sustainability Plan's Guiding Principles, developing an electric vehicle infrastructure and fleet transition plan for Oakland County campus could:

- **Provide accessible services and campus environment** by providing EV charging infrastructure on campus adopting EVs becomes more accessible for campus employees. Switching to EVs for the campus fleet improves air quality and health outcomes for people on campus.
- **Advancing the net zero carbon goal** by eliminating the greenhouse gas emissions caused by gas and diesel vehicles and increasing awareness of EVs to promote widespread adoptions.

Oakland County operates a fleet of 853 vehicles across multiple departments, with the majority operated by the Sheriff's Office (233 vehicles) and the Water Resources Commission (195 vehicles). Two fleet vehicles are currently electric. There are several currently available EV alternative options for Oakland County's fleet. County fleet vehicle types vary widely from standard pool vehicles and transport vans to specialized airport maintenance, snow removal, and emergency services vehicles. These vehicles were categorized into vehicle types based on their size and function. Table 8 details the specific models identified through the sustainability planning process as potential electrified county fleet vehicle options for each vehicle type. These are intended as representative options for Oakland County. The technology and industry are ever changing to include additional model types with ranges comparable to internal combustion engine (ICE) vehicles.

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

Table 8. Electric Vehicle Alternative Options

VEHICLE	EXAMPLE MODELS
Truck - Class 6	BYD, CityFreighter CF-1, Endera Motors L, Freightliner eM2, SEA Electric MD Cutaway
Pick-Up Truck	Tesla Cybertruck, Ford F-150 Lightning
Work Van	Ford E-Transit, Envirotech Logistics Van, Maxwell Vehicles ePro
Passenger Vehicle - Hatchback	Hyundai Ioniq, Chevrolet Bolt, Audi e-tron, BMW i3, Ford Mustang Mach-E, Tesla Models
Motorcycle	Harley Davidson Live Wire, Zero SR/F, Lightning LS-218,
Passenger Vehicle - SUV	Cadillac Lyriq, Kia Niro EV, Volvo XC40 AWD BEV
Truck - Class 7 and 8	BYD 8TT, Freightliner eCascadia, Lion Electric Lion8
Multi-Purpose Delivery Vehicle (MPDV)	Canoo MPDV, Bollinger Deliver-E, Lightning System F-59 Cargo Van
Super Duty	Phoenix Zeus 500, Roush Cleantech F-650, Lion Electric Lion6, Nordresa T6, Lightning System Ford E-450,

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

In undertaking this electric vehicle infrastructure and fleet transition study, the county can develop opportunities to achieve operational savings and critical electrification investments for the fleet. To develop a fleet electrification pathway, consider identifying the following:

- Future assessment of electric fleet vehicles, including duty-cycles and charging needs, charging and electric utility infrastructure, and impacts to existing vehicle procurement and maintenance needs.
- EV fleet data management approaches, to ensure mileage, performance data, and preventative maintenance schedules can be maintained.
- EV charging policy for staff and visitors to determine campus charging needs, optimized infrastructure, and usage or fee policies. The policy may also suggest operating hours for charging user types.
- Lifecycle carbon assessment for fleet vehicle types to allow for prioritization of fleet conversion based on near-term and long-term targets, as informed by the GHG inventory.
- Campus-wide charging infrastructure plan, which includes siting and timeframes to support fleet electrification and workplace electrification. DC fast charging may be considered in some locations to support rapid charge of fleet or visitor vehicles.
- Develop vehicle procurement policy which emphasizes EVs and lifecycle savings. The county will be leading by example in demonstrating the potential for EVs to serve a range of their services while providing operational savings. Likewise, more EVs would be out on road, reducing overall fuel costs. Emerging business models may be considered, including battery swap outs, alternative battery leasing frameworks, and charging-as-a-service solutions.
- Identify applicability of emerging micromobility solutions for on-campus transportation including e-scooters and bicycles.
- Consider inclusion of off-road vehicles (e.g., lawn mowers, golf carts), which make up1% of the county's total GHG emissions, for inclusion in the transition plan for zero carbon alternatives. Electrification of on-road vehicles, which make up 15% of the county's total GHG emissions, should be prioritized.

Dual-port Level 2 chargers can be placed in public parking lots and equipped to accept the

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

Financial Analysis

Fleet electrification can lead to significant cost savings and carbon reductions for the county. A fleet analysis conducted by the county's consultants shows potential cost savings of replacing three ICE vehicle types within the county fleet with comparable EV models.

Given current depreciation and the existing replacement schedule, it is assumed that 100 fleet vehicles would be replaced over a five-year period. Potential electric vehicle alternatives were selected that are comparable to example models of existing county fleet vehicle types that have been identified as near-term replacement targets (Table 9). Cost, availability, and vehicle specifications at the time of replacement will determine actual EVs purchased.

The analysis included the cost of purchasing and installing Level 2 chargers for each vehicle and one DC Fast Charger. This is a conservative estimate of the number of chargers needed. A charging plan during the planning and implementation phases will likely result in fewer chargers and lower capital costs. Charger costs were reduced to reflect DTE rebate offerings; however, this analysis took a conservative approach, reducing the rebate amount applied to reflect the potential for rebate program modifications in the future. The charger rebate amount currently offered by DTE is $2,500, but the rebate amount used for this financial

Table 9. Replacement Vehicle Type and Comparable EV Models

VEHICLE TYPE REPLACEMENT TARGETS	EXAMPLE ICE MODEL	COMPARABLE EV MODEL
Passenger Sedan	Chevrolet Impala	Hundai Ioniq
Full-Sized Pickup	GMC Sierra 1500	Tesla CyberTruck
Multipurpose SUV	Ford Explorer	Cadillac Lyriq

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

analysis is $1,500 to reflect the potential for rebate modifications in the future.[34]

The capital outlay of $1,170,000 (present value) reflects the current price differential of the EV models over ICE vehicles and the purchase and installation price of EV chargers. Cost savings were calculated based upon a comparison of EV versus ICE vehicle models' fuel costs. For purposes of this analysis, no future year escalation rate was applied to electricity prices. This provides a more conservative approach to comparing costs given recent increases and volatility of gasoline prices. Results are listed below and shown in Figure 9 and Figure 10. Although not included in the analysis, it should be noted that revenues could be produced by offering charging services to the public utilizing the charging infrastructure installed for county vehicles. A feasibility study is needed to quantify the revenue potential.

- Capital Outlay: $1,170,000
- Annual Fuel Savings for Electric Vehicle Models Versus Comparable ICE Models:
  - Ioniq: $3,790
  - CyberTruck: $4,730
  - Lyriq: $4,000
- Payback Period: 7 years
- ROI: 21.6% over ten years

Figure 9. EV Fleet and EV Chargers: Cumulative Cash Flow

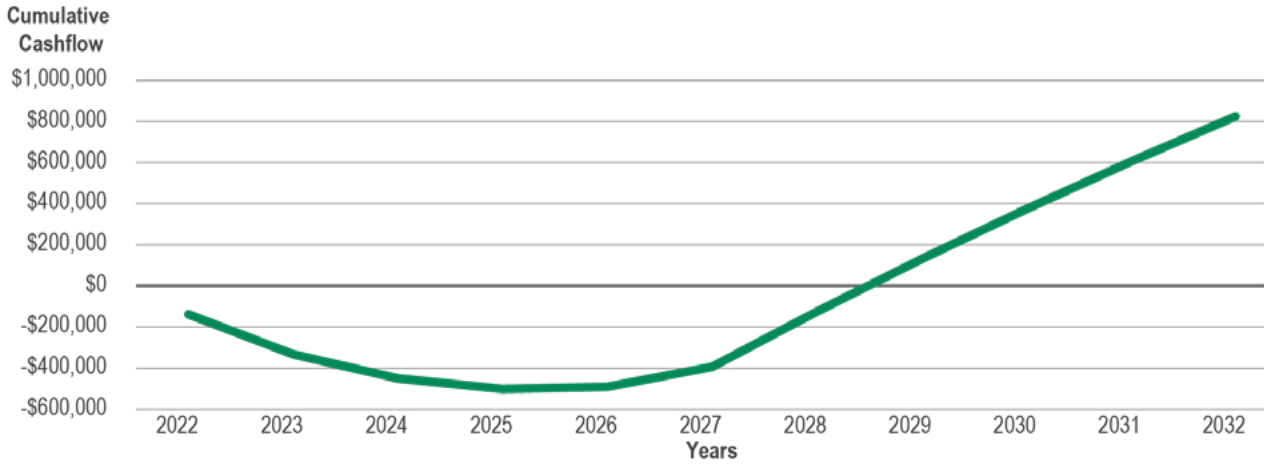
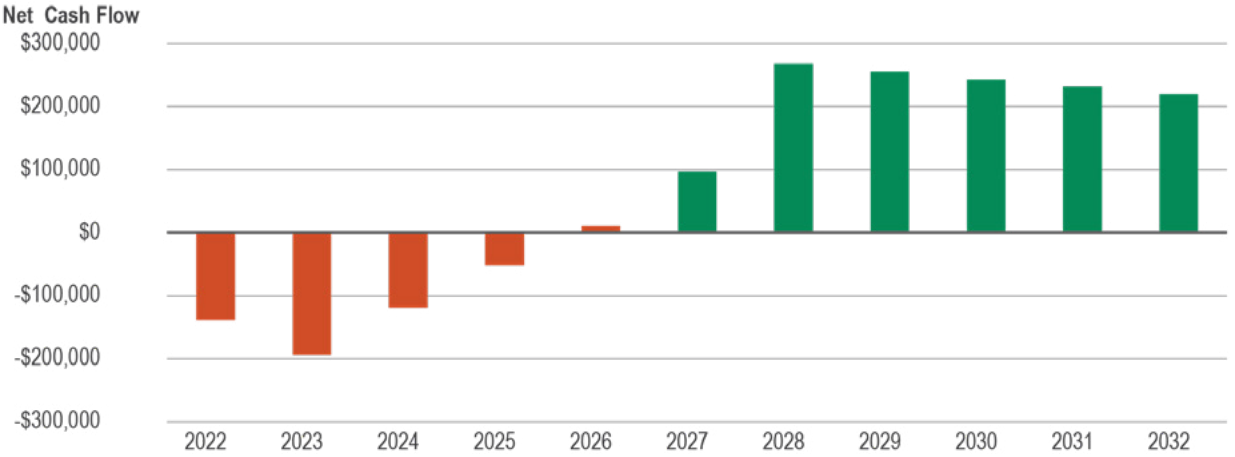


Figure 10. EV Fleet and EV Chargers: Annual Cash Flow



34 https://newlook.dteenergy.com/wps/wcm/connect/dte-web/home/service-request/business/electric/electric-vehicles/pev-biz-fleet

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

Funding Mechanisms

Potential funding mechanisms for EV replacements and associated costs could include:

Capital Budget: The scheduled replacement of existing vehicle and charger purchase costs should be included in a capital budget.

Operating Budget: Charger-related ongoing maintenance and expenses would be a part of the operating budget.

Rebates: Utility rebates are available through **DTE Energy's Charging Forward program** which offers a commercial fleet rebate of up to $2,500 per port for Level 2 chargers and up to $70,000 for DC fast chargers. These rebates are available on a first come serve basis on an installation site of up to 100 chargers and cover 30% to 50% of the cost of EV charging infrastructure.[35]

Federal, State, or Regional Programs:

The recently passed IIJA included the investment of $7.5 billion to build a national network of electric vehicle chargers in the United States with an initial goal of 500,000 EV chargers to accelerate the adoption of EVs, reduce emissions, improve air quality, and increase green jobs. Priority in funding is to be given to "rural areas; low- and moderate-income neighborhoods;" and "communities with a high ratio of multiunit dwellings to single family homes" with grant sizes up to $15 million per project.

The IIJA specifically introduced **Charging and Fueling Infrastructure Grants** which support the deployment of EV charging and other low-carbon fueling infrastructure with a set-aside for charging stations in publicly accessible locations such as public buildings and parks.

The IIJA appropriated $550 million to the **EECBG Program** to assist eligible local, county, tribal, and state governments in implementing strategies to reduce fossil fuel emissions, reduce total energy use, and improve energy efficiency for transportation and facilities. This program was previously funded back in 2009 through the American Recovery and Reinvestment Act and it is anticipated that clean transportation projects will be eligible under this refunded program.[36]

Southeast Michigan Council of Governments' (SEMCOG) Planning Assistance Program: SEMCOG has provided funding for local planning in a variety of areas since 2019. The FY2023 offering included grants of up to $50,000 for planning in six areas of regional significance, including Electric Vehicle Infrastructure Planning which could be used for feasibility studies or other EV planning efforts. These grants required an 18.5% local match. The FY2023 application window closed in May 2022; however, this program should be monitored for future opportunities.

Tax Exempt Bond Financing: The county could finance the conversion of ICE vehicles to EVs with the proceeds of a tax-exempt general obligation bond issuance. Given the relatively small size of capital outlay, the county will first determine that bond financing would be cost effective for the project.

35 https://newlook.dteenergy.com/wps/wcm/connect/dte-web/home/service-request/business/electric/electric-vehicles/pev-biz-fleet

36 https://www.energy.gov/eere/wipo/energy-efficiency-and-conservation-block-grant-program-bipartisan-infrastructure-law-2021

Facility and Fleet Decarbonization

F3 Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

Public Charging Fees: In certain locations, EV chargers can be used for county vehicles and be available for public charging for a fee. Public charging fees could be used to offset additional vehicle electrification expenses or placed in the county's General Fund.

Dual-port Level 2 chargers can be placed in public parking lots and equipped to accept the county's Voyager Card, or similar purchase card, for fleet charging and other forms of payment for the public. A feasibility study should be conducted to determine appropriate locations and revenue potential. Considerations for placement would include, among others, public access, security for fleet vehicles, and proximity and convenience for fleet vehicle users. With dual-port chargers, one port can be available on a first come, first served basis, and the other restricted to county use always or during certain hours as need to ensure fleet vehicles are adequately charged.

Two business models are possible for this opportunity. The county can administer the program, or partner with an established charging company which could be responsible for various business functions such as billing in exchange for a set fee or portion of the revenues.

High-Performance Buildings

Maximize efficient and low-carbon use of energy, water, and material resources within county facilities to the highest degree possible, while considering the design, facility operation and use, and maintenance requirements.

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Objectives and KPIs

Reduce building energy use, as measured by building energy use intensity (kWh or MMBtu/square foot).

Increase building water efficiency, as measured by gallons of potable water use per square foot.

Electrify county buildings, as measured by the percentage of buildings fully electrified.

Increase construction waste diversion rate, as measured by percent of construction waste diverted from landfills.

Buildings generate GHG emissions through their on-site energy use, making up 76% the county's GHG emissions. The majority of these emissions come from using natural gas (23%) and electricity (50% to 55%) for heating, cooling, lighting, appliances, and water heating and delivery. By increasing county building performance, the county can more efficiently use energy and water, resulting in decreased emissions, improved air quality and comfort, and reduced operational costs. Increasing energy and water efficiency is critical to reaching the county's net zero carbon goal.

The Oakland County International Airport achieved the U.S. Green Building Council's LEED Gold Certification in 2012. To obtain this certification, the building was designed to fulfill prerequisites and credits included in the LEED Green Building Rating System™ that address carbon, energy, water, waste, transportation, materials, health, and indoor air quality.[37]

37 https://www.usgbc.org

Table 10. High-Performance Building Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
H1	Perform Energy Audits at Target Facilities					X		X					X			Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing	
H2	Complete Campus-Wide LED Lighting Conversion*					X		X					X		X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Purchasing, Human Resources	
H3	Continue Investment In Energy Efficiency Measures*					X		X					X		X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Purchasing, Human Resources	
H4	Perform a Campus-Wide Water Audit					X		X							X	Facilities Management	WRC	
H5	Continue Investment in Water Efficiency and Conservation Measures*					X		X							X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Purchasing, Human Resources	
H6	Develop Sustainable New Construction and Major Renovation Standards					X							X	X	X	Office of Sustainability, Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing, WRC, Parks and Recreation	

LEGEND: (*) In Progress

High-Performance Buildings

H1 Perform Energy Audits at Target Facilities

Guiding Principles

Advance the net zero carbon goal

County Strategic Goals

Environmental Sustainability

Organizational Excellence

Development Stage: In Progress

Strategy Type: Informative

Partners: N/A

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division

Support: Purchasing

Through a previous facility energy efficiency assessment in 2010, the county began to evaluate on-site energy usage and strategies to improve energy efficiency. The assessment identified behavioral changes, retrofits, and energy management systems that would improve efficiency on campus. The implementation of these changes resulted in a 15% decrease in energy usage across campus. However, the energy needs and opportunities for efficiency improvements have changed since 2010 with aging buildings and advancements in available technology.

Campus-wide energy audits completed every five years would fill persisting information gaps, keep data up to date and relevant, and identify opportunities to improve system-wide infrastructure condition and enable efficiencies. As it relates to the Sustainability Plan's Guiding Principles, performing energy audits on campus facilities could Advance the net zero carbon goal by identifying short term energy efficiency improvements to reduce emissions from on-site energy use.

This strategy is aligned with the county's Strategic Framework goal areas of Environmental Sustainability and Organizational Excellence by providing energy saving investments that also have associated cost savings and carbon reduction potential.

The first step for conducting audits is to gather data, both regarding energy consumption and the equipment or facilities that consume energy. Data on facilities that consume energy would include an examination of building envelope, lighting, HVAC, domestic hot water, plug loads, and compressed air for all buildings. Energy usage data can be used to determine base loads, seasonal variation, and efficient energy costs. Further assessment can include building air quality, temperature, ventilation, humidity, and other conditions that affect energy performance. This data can then be used to model the impacts of potential energy efficiency changes and produce reports of energy efficiency recommendations. Completing energy audits every five years can ensure that building energy data remains up to date and allows for new improvements in efficiency to be implemented. Major, non-steam plant connected facilities, such as the IT Data Center, should be prioritized for auditing and implementing energy efficiency mechanisms. Energy audit identified upgrades for facilities connected to the steam plant should align with outcomes of the county's steam plant decarbonization study efforts. In addition, the current county lifecycle plan for heating and cooling system upgrades and replacements involves an opportunity for revision every five years. Completing energy audits on a five-year cycle as well can help inform these heating and cooling revisions.

High-Performance Buildings

H1 Perform Energy Audits at Target Facilities

Energy audits should be performed in line with industry standard approaches, such as American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Level II. The county may also leverage utility or other funding opportunities to help offset the cost of energy audit studies, such as programs offered by DTE. Energy audits can also be expanded in scope to include consideration of opportunities for beneficial electrification, such as use of newer efficient, electric appliances.

Table 11. Facilities Connected to the Central Steam Plant

Administrative Annex II
Central Garage
Central Services Building
Courthouse Complex 12E/
Day Care Center
Health Center – Pontiac
Information Technology
L Building (attached to Heat Plant)
Law Enforcement Complex
MCF – Lab Only
North Oakland Health Center
North Office Building
Sheriff's Administration Building

Table 12. Campus Facilities Not Served by Central Steam Plant

Administrative Annex I
Animal Shelter and Pet Adoption Center
Children's Village "A" Bldg.
Children's Village "C" Bldg.
Children's Village "D" Bldg.
Children's Village "G" Bldg.
Children's Village "H" Bldg.
Children's Village "J" Bldg.
Children's Village "K" Bldg.
Children's Village School
D Building
East Annex
Executive Office Building
Health Center – Southfield
Medical Examiner's Facility
Oakland Pointe – East
Oakland Pointe – West
Paint Shop (Near RR Tracks)
Patrol Services
Public Works Building
Rochester District Court
Service Center – Pontiac
South Oakland Office Building

High-Performance Buildings

H2 Complete Campus-Wide LED Lighting Conversion

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation

Support: Purchasing, Human Resources

LED lighting is an industry standard energy efficient technology which can support major energy savings on short time scales. The county has already begun the process of replacing incandescent, fluorescent, high-pressure sodium, and other energy-intensive lighting technologies with newer, highly efficient LED bulbs and fixtures. However, many opportunities for LED retrofit remain, and there is limited current tracking of retrofitted and non-retrofitted areas. A comprehensive, one-time assessment and investment in conversion is recommended to complete this transition. As it relates to the Sustainability Plan's Guiding Principles, completing campus-wide LED lighting conversion could:

- **Advance the net zero carbon goal and maximize resource efficiency** by switching to a lighting system that uses less energy, increasing energy efficiency, and reducing campus dependence on greenhouse gases.

This strategy also aligned with the county's Strategic Framework goal areas of Environmental Sustainability and Organizational Excellence as LED lighting conversion and lighting controls can result in both energy and cost savings.

The strategy also supports standardization of workplace guidelines by promoting consistent lighting technologies and controls.

A campus-wide lighting inventory, including indoor and outdoor lighting, can establish the current extent of LED upgrades and inform gaps in the current transition. The inventory should include a count of non-LED bulbs, identify the lighting control (switches, schedule, motion sensor, 24/7 operation), identify the current bulb and fixture specifications, and any current lighting issues or deficiencies. The inventory should also identify any barriers to implementation, including the need to replace fixtures where a drop in LED is not feasible.

In addition to more efficient lighting, control types and levels may be assessed. This can allow for either automated operation, such as motion sensors or schedules, or increased manual controls to enable staff to selectively turn on lights when present outside of normal operating hours. Day-light harvesting may be an additional solution, where lights near windows are controlled based on sunlight levels and dim up or down to maintain proper illumination throughout the day.

Following the inventory, the campus should include all new LED fixtures in its procurement plans and policies to ensure persistence of savings and continued availability of replacement bulbs as needed (see strategy S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities).

High-Performance Buildings

H2 Complete Campus-Wide LED Lighting Conversion

Financial Analysis

Completing the lighting inventory detailed in this strategy would allow the county to determine remaining LED lighting conversion and lighting control opportunities as well as other information, such as bulb and fixture specification needs. For the purpose of this preliminary financial analysis, it is assumed that 80% of the county's building square footage has not yet had lighting converted to LED. Similarly, while there are various lighting control opportunities that should be assessed for applicability on a site-by-site basis, only installation of motion sensors for the purpose of this analysis were included.

These high-level assumptions were used by the county's consultants to determine the capital outlay, payback period, and ROI for the remaining LED lighting conversion and motion sensor installation based on estimated equipment costs, labor costs, and energy savings. Based on the market value of lamps, fixtures, controls, and associated installation labor, an initial capital outlay of approximately $3,4000,000 was calculated. Given that state and utility rebates and incentives are available for energy efficiency upgrades, a 10% rebate was applied to determine the upfront cost. The actual value of rebates would depend on the specifics of the final conversion which would be determined through the inventory. Potential savings were calculated by estimating electricity cost savings due to more energy efficient fixtures, and less overall energy use through the utilization of motion sensor lighting controls. Additional savings were calculated via avoided maintenance and materials given that LED lighting fixtures have a 1% failure rate compared to 20% and 10% failure rates for existing fluorescent bulbs and ballasts respectively. Electric and maintenance cost savings would increase slightly each year due to escalation of electric rates and inflation rates for lighting and control equipment and labor. Results are listed below and shown in Figure 11 and Figure 12.

- Capital Outlay: $3,400,000
- Annual Savings (Year 1):
  - Electric: $500,000
  - Maintenance: $166,000
- Payback Period: 4.8 years
- ROI: 20.6%

High-Performance Buildings

H2 Complete Campus-Wide LED Lighting Conversion

Figure 11. LED Lighting Conversion and Motion Sensor Upgrade: Annual Cash Flow

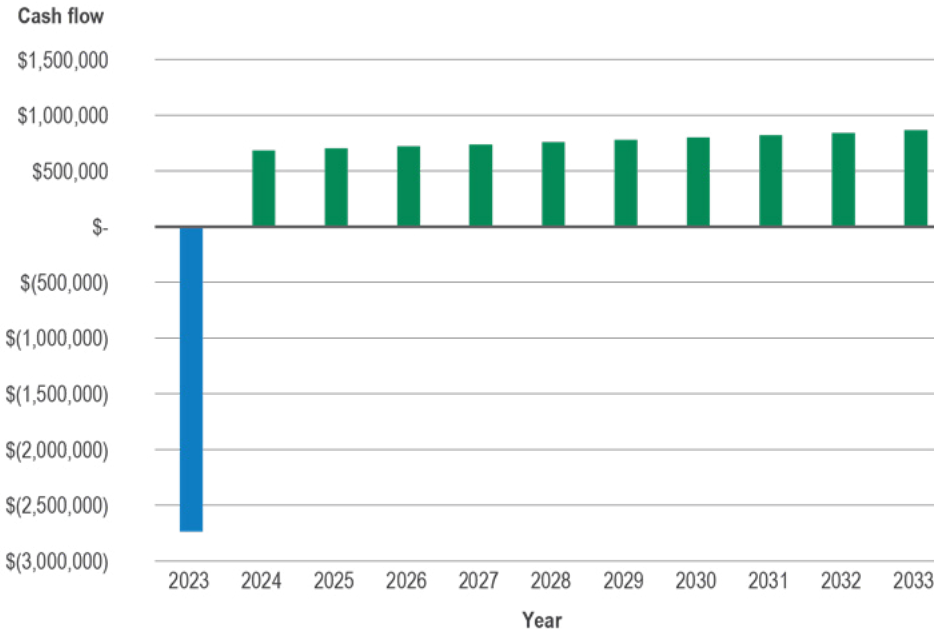
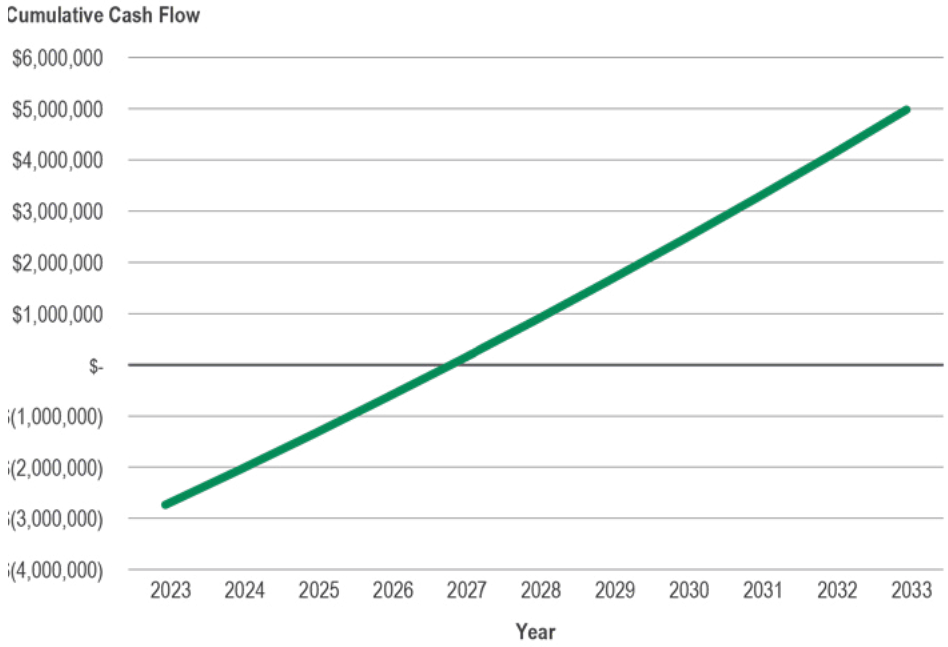


Figure 12. LED Lighting Conversion and Motion Sensor Upgrade: Cumulative Cash Flow



High-Performance Buildings

H2 Complete Campus-Wide LED Lighting Conversion

Funding Mechanisms

Potential funding mechanisms for LED light conversion and lighting controls installation include:

Capital Budget: The modest, upfront LED lighting conversion costs should be included in a capital budget.

Operating Budget: If there are increased ongoing maintenance and expenses, they would be a part of the operating budget.

Rebates: DTE offers the following programs:

- **Lighting Instant Discount Program:** DTE has partnered with participating distributors to make it easy to purchase qualifying LED lamps (usually bulbs only). Products are discounted instantly, with no additional rebate forms or applications to fill out.[38]
- **Prescriptive Incentives:** These incentives are paid based on the quantity, size and efficiency of the equipment.[39]
- **Michigan Saves Energy Efficiency Program for Business:** DTE Energy, in partnership with Michigan Saves, is offering 0% financing up to $150,000 for an energy efficiency project that receives prescriptive measure incentives through their Energy Efficiency Program for Business.[40]

Sustainability Revolving Fund: The county can establish a Sustainability Revolving Fund (Revolving Fund) to pay for the LED lighting conversion, or other projects that generate energy cost savings (e.g., F2. Pursue On-Site Solar Generation at Key Campus Locations). Initial capitalization of the fund can come from grants, utility rebates, or appropriations from the county General Fund. As projects are completed and ongoing, an amount equal to the energy savings would be paid back to the fund over time.[41] This would replenish the Revolving Fund which could be used for additional energy efficiency projects in Oakland County facilities without additional General Fund appropriations.

The LED lighting conversion is an ideal initial project to establish the Revolving Fund given the short payback period. Funds will quickly be repaid and available for additional projects that will generate savings that are repaid to the Revolving Fund. Based on the payback period model for this strategy, more than $250,000 in energy savings would be repaid to the fund after the first year and the capital outlay fully replenished by energy savings in less than seven years.

Tax Exempt Bond Financing: The county could finance the LED lighting conversion through the proceeds of a tax-exempt bond issuance. The bonds would be sold to investors to raise funds for the LED lighting conversion. In return, the county would agree to repay the investors principal plus interest, which is generally exempt from federal, state, and local taxes. These bonds could qualify as green bonds to attract additional types of investors. When bonds are issued for energy efficiency projects, they are typically general obligation bonds; however, bonds have been issued with the savings generated by the project being pledged to repay the debt.

38 https://www.newlook.dteenergy.com/wps/wcm/connect/dte-web/home/save-energy/business/programs+and+offers/lighting+discounts

39 https://www.newlook.dteenergy.com/wps/wcm/connect/dte-web/home/save-energy/business/incentives/presctiptive+incentives

40 https://www.newlook.dteenergy.com/wps/wcm/connect/dte-web/home/save-energy/business/incentives/michigan+saves

41 Some Revolving Funds only receive a portion of the energy savings. The remaining savings accrue to the general fund. By sharing the savings, leadership may be more willing to undertake future energy projects; however, the fund will be replenished more slowly.

High-Performance Buildings

H2 Complete Campus-Wide LED Lighting Conversion

Guaranteed Energy Savings Performance Contracting (GESPC): The county can contract with an Energy Service Company (ESCO) to design, install and maintain LED lighting conversions, or other energy efficiency projects. The ESCO will guarantee that the energy savings generated from the project will be sufficient to offset the project costs, including financing. If the project does not meet the guaranteed savings, the ESCO is required to make up the shortfall to the customer. ESCOs are generally paid a negotiated fee or share in the energy savings. GESPC projects can be financed through a variety of mechanisms including bond financing or, more frequently, municipal leases. Michigan allows tax exempt lease purchases for energy conservation improvements. The lender holds title to the conservation title and leases it for the term of the financing. At the end of the term, the lender transfers ownership to the county. This form of financing is not considered debt under Michigan law and therefore does not count toward the county's authorized debt limit.

Federal, State, or Regional Programs:

The Infrastructure Investment and Jobs Act (IIJA) appropriated $550 million to the **Energy Efficiency and Conservation Block Grant (EECBG) Program** to assist eligible local, county, tribal, and state governments in implementing strategies to reduce fossil fuel emissions, reduce total energy use, and improve energy efficiency in the transportation, building, and other appropriate sectors. This program was previously funded back in 2009 through the American Recovery and Reinvestment Act and it is anticipated that energy efficiency projects will be eligible under this refunded program.[42]

The IIJA introduced a new program, **Energy Efficiency Revolving Loan Fund Capitalization Grant Program**. This program is still being defined but will result in additional funds to States to support revolving loan funds. The program should be monitored as the county may have access to expanded or new revolving funds from the State for energy efficiency projects.[43]

42 https://www.energy.gov/eere/wipo/energy-efficiency-and-conservation-block-grant-program-bipartisan-infrastructure-law-2021

43 https://www.energy.gov/bil/energy-efficiency-revolving-loan-fund-capitalization-grant-program

High-Performance Buildings

H3 Continue Investment In Energy Efficiency Measures

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation

Support: Purchasing, Human Resources

Energy efficiency is a core component of any net zero strategy and often produces the most immediate and low-cost opportunities for carbon emissions reductions. Demonstration of the technologies and practices that lead to increased energy efficiency at key campus facilities and communication of associated savings and technologies deployed may serve as a model for the broader community. As discussed in strategy H1. Perform Energy Audits at Target Facilities, the county performed a successful energy audit in 2010 that identified opportunities for energy efficiency improvements that upon implementation resulted in a 15% reduction in energy usage campus wide.

The county has made energy efficiency investments at various campus locations, including use of variable speed drives in the HVAC systems and use of efficient technologies in newer facilities. These efficient technologies included the installation LED lighting discussed the previous strategy, replacement of single paned windows with double paned windows in campus buildings to improve insulation, and installation of smart meters in campus buildings to track energy usage. Other improvements were behavioral such as shifting custodial schedules to work in the same parts of the building at the same time so lighting could be turned off in other areas, adjusting the heating and cooling set points, establishing no-mow zones on campus to reduce mower emissions, and removing all personal appliances from offices.

This strategy aims to work with the momentum of these existing energy efficiency measures by continuing to invest in energy efficiency improvements as they arise. As it relates to the Sustainability Plan's Guiding Principles, continuing investment in energy efficiency measures could:

- **Maximize resource efficiency and advance the net zero carbon goal** by continuing to seek out technologies, behaviors, and management systems that reduce the amount of energy used to conduct campus operations, reducing energy needs of the county, dependence on fossil fuels, and energy cost.

Every five years when energy audits are completed, the county will identify new opportunities for improvements and can continue to make energy efficiency changes. Technical interviews with stakeholders for this report highlighted more efficient roofing and updating HVAC systems as additional energy efficiency improvements the county could consider. Also, as available technology advances the county can stay vigilant about taking advantage of opportunities to install new technology, perform retrofits, or implement new behavioral best practices for energy efficiency.

High-Performance Buildings

H4 Perform a Campus-Wide Water Audit

Guiding Principles

Maximize resource efficiency

County Strategic Goals

Environmental Sustainability

Organizational Excellence

Development Stage: In Progress

Strategy Type: Informative

Partners: N/A

Teams

Lead: Facilities Management

Support: Water Resources Commissioner's Office

Through past facility condition assessments, the county has begun to evaluate the condition of on-site water infrastructure. However, the condition of several water mains serving campus facilities is still unknown, and there may be irregularities in other data used to assess facility water performance. For example, in 2019, some facilities consumed several times (up to about 11.5 times) more water in July than in other summer months.

A campus-wide water audit would fill persisting information gaps, uncover potential reasons for data inconsistencies, and identify opportunities to improve system-wide infrastructure condition and enable efficiencies. As it relates to the Sustainability Plan's Guiding Principles, completing a campus-wide water audit could:

- **Maximize resource efficiency** by taking a data driven approach to understanding the campus water system and water waste in order to better manage and implement water efficiency measures.

A campus-wide water audit can identify:

- Water leaks in water mains or facility-level equipment and solutions to minimize losses and rebalance water consumption.
- Facilities with service lines that are incompatible with low-flow plumbing fixtures (if service lines are too large, water-efficient fixtures may provide insufficient flow to completely flush solids through the system) and potential resolutions.
- Opportunities to install flow meters to increase the accuracy and reliability of collected data.

The first step for conducting a water audit is to gather data, both regarding water consumption and the equipment or facilities that consume water (e.g., building occupancy, equipment specification sheets). A preliminary review of existing asset condition and water usage data can be used to identify areas of focus during the audit and develop a clear schedule of events to ensure all assets are evaluated in a streamlined manner. Next, auditors perform a thorough site survey to validate or identify inconsistencies and gaps in existing data. Together, these resources will enable auditors to develop a water balance and identify water losses and conservation opportunities. The American Water Works Association's (AWWA) manual for Water Audits and Loss Control Programs could be a useful tool to facilitate the audit process.[44] The Public Building Water Auditing Best Practices guide developed by the Nevada Governor's Office of Energy is a less technical resource that could also provide initial direction.[45]

44 The full manual must be purchased and can be done so here. The table of contents and first chapter are freely available.

45 Nevada Governor's Office of Energy (2017). Public Building Water Auditing Best Practices. https://energy.nv.gov/uploadedFiles/energynvgov/content/Programs/Public%20Building%20Water%20Auditing%20Best%20Practices.pdf

High-Performance Buildings

H4 Perform a Campus-Wide Water Audit

Analysis of and investment in water infrastructure not owned by the county will require coordination between the City of Pontiac and Waterford Township. Each community serves half of the campus. To streamline the audit process, the county should request the utility share any available data that is not provided on bills and be present at site surveys.

The audit can be paired with implementation of other strategies, such as an energy audit, to maximize resource efficiency by identifying efficiency solutions across the energy-water nexus. In addition, the scope of the audit could be expanded past domestic water systems to also consider irrigation and stormwater systems, and thus potentially identify solutions to optimize the county's irrigation system.

What is the energy-water nexus?

Energy is used to extract, transport, purify, and heat or cool water – this relationship is the water-energy nexus.

High-Performance Buildings

H5 Continue Investment in Water Efficiency and Conservation Measures

Guiding Principles

Maximize resource efficiency

County Strategic Goals

Environmental Sustainability

Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management, Parks and Recreation

Support: Water Resources Commissioner's Office

In addition to campus-scale water efficiency opportunities uncovered by the campus water audit, the county can expand implementation of low-flow plumbing fixtures as existing fixtures require replacement, existing facilities undergo renovation, and new facilities are constructed. Low-flow plumbing fixtures include low-flow sink faucets (e.g., faucets with aerators, which have already been installed in service center buildings), low-flow shower heads, dual flush toilets, and waterless urinals. Implementing water conservation measures are a relatively low-cost avenue for improving water efficiency and result in long-term cost savings.

Furthermore, water conservation measures limit energy required to transport, heat, or cool water, resulting in improved facility energy efficiency and mitigated carbon emissions. As it relates to the Sustainability Plan's Guiding Principles, continuing investment in water efficiency and conservation measures could maximize resource efficiency by implementing new technology and management strategies to reduce water waste and reduce inefficiencies in the water system. Improving the water system can also improve energy efficiency and further maximize resource efficiency on campus.

In addition, the county may consider opportunities to reduce potable water consumption through utilizing graywater or collected rainwater for non-potable applications (e.g., to flush toilets, for lawn irrigation, as process water in cooling or other industrial applications). To start, the county could conduct a study to assess feasibility of supplying graywater to facilities from one of its treatment plants, or if annual rainfall would provide sufficient capacity to offset irrigation demand and generate a return on the investment. Any strategies that result from this study should be designed in compliance with Appendix A of the 2015 Michigan Plumbing Code.[46]

Adoption of low-flow and graywater or rainwater collection systems will require the county to provide education and training opportunities on proper use and maintenance of these systems (particularly to abate any negative perspective of graywater recycling systems, even when use is limited to non-potable functions). Proper use and maintenance of low-flow fixtures will sustain the lifespan of the new, water conservation measures, providing usage and cost savings over time.

46 https://up.codes/viewer/michigan/mi-plumbing-code-2015/chapter/A/nonpotable-water-systems#A

High-Performance Buildings

H6 Develop Sustainable New Construction and Major Renovation Standards

Guiding Principles

- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability

Development Stage: In Progress

Strategy Type: Foundational

Partners: N/A

Teams

Lead: Office of Sustainability, Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division

Support: Purchasing, WRC, Parks and Recreation

Establishing a sustainable building standard for new construction and major renovation aligned with the county's sustainability Focus Areas and Guiding Principles can result in reduced greenhouse gas emissions, increased resilience to climate change and extreme weather events, healthier buildings, and reduced energy costs. Establishing and implementing a sustainable building standard is critical to achieving the county's net zero emissions goal as the buildings and facilities sector accounts for 76% of total county operational emissions. These emissions result from on-site use of electricity (53%), natural gas (23%), and fuel oil (1%). Sustainable buildings can support enhanced energy resilience by limiting critical energy load and increase climate resilience by helping to normalize indoor temperatures during extreme heat and cold events. Further, sustainable building features can create healthier building environments for county staff and visitors.

This strategy can advance the following sustainability Guiding Principles:

- **Advance the net zero carbon goal** by Implementing building standards that require measures to decrease energy use and reliance on fossil fuels. Also, require construction waste diversion requirements to limit emissions from solid waste disposal processes. When appropriate, adopt enabling infrastructure standards for county fleet electrification that will lead to reduced vehicle fleet emissions.
- **Improve air quality** through healthy building measures, like sealing and ventilation. In addition, reduce greenhouse gas emissions and harmful air pollutants from energy use, improving air quality. Reduce impact on the environment and contribute to diversity of the biosphere.
- **Maximize resource efficiency** by reducing utility costs through implementation of energy and water efficiency measures and energy demand management.

The county does not have an existing sustainable building standard. However, Michigan commercial buildings must comply with the International Energy Conservation Code (IECC) 2015 model energy code and ASHRAE 90.1-2013 energy efficiency standard. Michigan is in the process of updating their commercial building model energy code to IECC 2021. The Michigan Healthy Climate Plan also includes a strategy to include provisions to the IECC 2021 model energy code to support electric vehicle charging and other climate mitigation solutions (e.g., energy storage, renewable energy, and building decarbonization). Along with other

High-Performance Buildings

H6 Develop Sustainable New Construction and Major Renovation Standards

local governments, the county joined the U.S. Green Building Council's 2022 Leadership in Energy and Environmental Design (LEED) for Cities and Local Government Leadership Program to receive support for attaining LEED certification.

Sustainable building standards can cover various subject areas in addition to energy, such as planning and design, water, material management, environmental quality, governance, and socio-economic impact. Various funding mechanisms can be considered to reduce costs of sustainable building measures, such as utility incentives and rebates, state or federal funding opportunities, energy savings performance contracting (ESPC), or tax-exempt bond financing.[47] To integrate sustainability Guiding Principles and advancement of sustainability objectives into building new construction and renovation projects, it is recommended that the county establish a holistic sustainable building standard.

The county can follow the phases outlined below to develop its sustainable building standard:

Phase 1: Develop a goal framework. Review both existing and aspirational priorities and requirements to identify goals for the sustainable building standard. Existing priorities and requirements that the sustainable building standard should align with can include, but may not be limited to, the county's net zero carbon goal, sustainability objectives and key performance indicators (KPIs), OSHA standards, and Americans with Disabilities Act (ADA) compliance standards. Aspirational priorities might include specific targets that the county would set through decarbonization planning based on its greenhouse gas (GHG) inventory. The county can conduct a benchmark review of buildings standards adopted by peer municipalities or organizations with campus style sites to further understand current best practices.

Phase 2: Define the scope for the building standard. The county can determine what facility specifications (e.g., size, function, occupancy type) are included and not included under the sustainable building standard. Further, the county can specify what level of renovation is included and not included under the sustainable building standard. The county could consider requiring tiered levels of standard depending on scope. For example, the county could require new buildings to achieve net zero carbon energy use or net zero carbon energy-ready design while requiring majorly renovated facilities to attain a lower tiered level of energy performance. In addition to net zero carbon requirements, the county can create a product database that declares the product contents, where it's coming from, and where it goes at the end of its life. This could help contractors match materials to indoor air quality standards, understand the safety of certain chemicals, and, where possible, source materials closer to the building site.

Phase 3: Develop sustainable building standards to achieve the established goals for in-scope buildings. Ensure that standards align with building and engineering solutions presented in existing sustainability and resilience planning efforts (e.g., sustainability plan strategies, future vehicle fleet decarbonization planning, future decarbonization planning, transparency platform for materials and products).

Phase 4: Establish a process to integrate the sustainable building standard into decision making processes, like budget planning and bid processes.

Phase 5: Establish a process to check compliance and goal performance. Measure compliance and goal performance by tracking each building's energy consumption data, water usage data, material removal and installation quantities, and other relevant building information aligned with the goal framework for 12 consecutive months.

47 All listed potential funding mechanisms do not apply to all sustainable building measures. At the same time, any listed funding mechanism can apply to multiple types of sustainable building measures.

High-Performance Buildings

H6 Develop Sustainable New Construction and Major Renovation Standards

Use tracking outputs to understand building performance compared to similar buildings and understand how performance changes over time. The county could also consider requiring a certain level of goal performance at key events (e.g., building refinancing, building certifications, and inspections) or at the time of safety upgrades.

Phase 6: Determine a cadence (e.g., every 5 years) for updating the sustainable building standard.

Waste Reduction and Diversion

Reduce the amount of waste generated and sent to landfills through increased material reuse, recycling and composting, and implementing other strategies to reduce overall material consumption.

Guiding Principals

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Objectives and KPIs

Increase the non-construction waste diversion rate, as measured by percent of waste generated on campus diverted from landfills; and percent of material recycled or composted.

Waste also contributes to the county's overall GHG emissions. Waste that goes to landfills from the campus and parks generates almost 4% of total government operations emissions and composting green waste from county parks generates less than 1% of total government operations emissions. Waste diversion strategies, the process of diverting waste from landfills (such as reduced material use, composting, and recycling), can help reduce emissions linked to waste generation and processing. Waste diversion strategies are measured by the total weight of diverted material compared to total waste generated and reported as an overall percentage. This metric is important to keep track of the successes and opportunities for sustainable waste management. Education along with supportive waste collection processes, purchasing practices, and policies are foundational to increasing the county's waste diversion rate. By reducing waste, the county would utilize resources more efficiently and protect natural resources, such as water quality, air quality, and natural habitat.

Table 13. Waste Reduction and Diversion Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
D1	Review and Renegotiate Waste Hauling Contracts*							X							X	Facilities Management, Parks and Recreation	Office of Sustainability, Purchasing	
D2	Expand Recyclable Material Collection					X		X					X		X	Facilities Management, Parks and Recreation	Office of Sustainability	
D3	Expand Organic Material Collection					X		X					X		X	Facilities Management, Parks and Recreation	Office of Sustainability	
D4	Deploy Smart Waste Management Systems							X							X	Facilities Management	Office of Sustainability, Parks and Recreation	
D5	Develop Policies to Minimize Office Supply Consumption							X							X	Purchasing	Office of Sustainability	

LEGEND: (*) In Progress

Waste Reduction and Diversion

D1 Review and Renegotiate Waste Hauling Contracts

Guiding Principles

Maximize resource efficiency

County Strategic Goals

Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management, Parks and Recreation

Support: Office of Sustainability, Purchasing

The county contracts with a third-party vendor, Priority Waste, for solid waste pickup and disposal. The contract is structured so costs are fixed based on container size and number of weekly pickups. The county incurs the same cost if a container is half or completely full, and because Priority Waste does not report waste collection or disposal data, the county cannot quantitatively validate whether pickup schedules are optimized.

The COVID-19 pandemic has illuminated county employees' capability and interest in teleworking and renewed the value of public open spaces like Waterford Oaks County Park. As the county continues to respond and adapt to these trends—and also divert additional solid waste to recycling or compost (see the strategies D2. Expand Recyclable Material Collection and D3. Expand Organic Material Collection) —waste disposal volumes are likely to become more variable. The county should regularly evaluate the filled volume of collection containers and level of necessary service and remove, resize, and/or adjust pick-up schedules for under- or over-utilized bins. As it relates to the Sustainability Plan's Guiding Principles reviewing and renegotiation waste hauling contracts could:

- **Maximize resource efficiency** by developing contracts that allow the county to document the quantity of waste being produced on campus in order to develop strategies to reduce waste and maximize efficiency. New contracts could also work to reduce greenhouse gas emissions produced from transporting waste from campus to waste facilities.

The county should also consider renegotiating its waste hauling contracts so pricing is based on the volume or weight of waste collected, rather than a fixed rate per bin. Doing so would mitigate sunk costs from receiving service for relatively empty dumpsters and enable the county to more accurately track and report progress towards waste diversion goals but may require a change in vendor. Some vendors may not be able to provide precise measurements if the county's waste is picked up by trucks that service other customers. When the county reissues a Request For Proposal (RFP) for waste collection services, ability to measure volume or weight of collected waste should be a metric for bid evaluation.

Waste Reduction and Diversion

D2 Expand Recyclable Material Collection

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management, Parks and Recreation

Support: Office of Sustainability

The county collects some, but not all, recyclable materials. Paper and cardboard are collected at county facilities and parks, but plastics, glass, and metals are not. Expanding the county's recycling program to include collection of these materials would support the county's sustainability priorities. As it relates to the Sustainability Plan's Guiding Principles, expanding recycling materials collection could:

- **Advance the net carbon goal** by mitigating county Scope 3 GHG emissions from waste disposal at landfills and creating opportunities to preserve natural resources that might otherwise be converted into landfills. Scope 3 emissions are any emissions produced not from the county's facilities or operations but from external processes necessary for the operations of the county. So, emissions from a local landfill or incinerator where county waste is sent are an example of Scope 3 emissions.
- **Maximize resource efficiency** by expanding the number of materials that can be recycled and converted into new products, maximizing the productive lifespan of raw materials.

To best support the county's emissions reduction goals and enable profitability, it is recommended that the county collect plastics, glass, and metals separately from paper and cardboard using dual-stream recycling. Although dual-stream recycling is less convenient for building occupants and parkgoers (as well as janitorial staff and park managers), dual-stream programs can result in less contamination than single-stream programs. For example, the University of Colorado-Boulder's transition to single-stream recycling collection at its residential halls in hopes of increasing recycling participation was short-lived: the university reverted to its original dual-stream program after a single school year due to significantly higher contamination rates (which, in turn, limited the university's ability to sell collected paper at a good price).[48] In applying these lessons learned and considering both county staff's strong interest in waste reduction and recycling and their statements that janitorial staff often find contamination in existing paper/cardboard recycling streams, dual-stream recycling appears to be the more appropriate solution than single-stream.

Still, to overcome any trepidation that dual-stream recycling may be burdensome for building occupants and parkgoers, the county can implement the following best practices:

- Robust education and communication around recycling as new plastics, glass, and metals collection bins are deployed.

48 A full case study on this pilot is available to Association for the Advancement of Sustainability in Higher Education members at https://hub.aashe.org/browse/casestudy/14309/testing-single-stream-versus-dual-stream-recycling-at-cu. A summary of the pilot—and discussion on how it impacted design of other universities' recycling programs—is publicly available and can be found at https://operations.tufts.edu/recycle/news/2014/10/06/single-stream-vs-dual-stream/.

Waste Reduction and Diversion

D2 Expand Recyclable Material Collection

- Centralized waste and recycling station should have three color-coded bins (one for non-recyclable waste, one for paper products, and one for plastic, glass, and metal products). Office environments should also have small under-the-desk or deskside paper bins.
- All bins should have clear labels and be accompanied by graphic signage depicting what can and cannot be disposed in each bin and other rules for proper material disposal.
- To further build recycling competency, the county can also develop signage and/or digital newsletters spotlighting materials that are most often disposed improperly, and even sponsor competitions between facilities/departments to increase recycling rates and “accuracy”.
- The county can leverage resources from the University of Michigan (including a publicly accessible Dropbox of printable materials[49]) and State of Michigan “Recycling Raccoon” Program[50] to develop signage and other education and communications materials.

49 https://www.dropbox.com/sh/g4ckx1n7jin3pwk/AAAxUXOaXfCSbe7A0FxIFOUea?dl=0

50 https://recyclingraccoons.org/

Waste Reduction and Diversion

D3 Expand Organic Material Collection

Guiding Principles

- Advance the net zero carbon goal
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management, Parks and Recreation

Support: Office of Sustainability

As with recycling, the county collects some, but not all, organic materials generated at the campus and parks. Green waste (e.g., landscape clippings, leaves, raw wood) is composted and reused, but for the most part, food scraps and other organic waste (e.g., compostable utensils) is not composted.[51] Through diverting additional solid waste streams, composting can further advance county sustainability goals. As it relates to the Sustainability Plan's Guiding Principles, expanding organic material collection could:

- **Advance the net zero carbon goal** by mitigating the Scope 3 GHG emissions from waste disposal at landfills.
- **Maximize resource efficiency** by creating opportunities to preserve natural resources that might otherwise be converted into landfills.

These impacts can be realized quickly: the volume of solid waste collected from 50 tenant organizations housed in three commercial buildings in Montreal nearly halved within less than a year of when the development started its compost program.[52]

To start, the county should identify a hauling vendor to pick up organic materials, as the county does not have the physical infrastructure or resources to compost on-site. Alternatively, the county could explore selling collected materials to local farms or other organizations that manage organic waste. Selling organic waste could serve as a source of revenue. Organics collection bins (typically brown or yellow) should be placed at all commercial kitchens, break rooms, office lounges and other locations where organics are generated. Bins should have a closed lid and clear signage. Building occupants and janitorial staff should be trained on proper sorting and collection practices (education and communications materials generated for the expanded recycling program can also address composting). Consider having designated staff members for each facility be trained and responsible for organic waste management to assist the greater facilitations team with education, sanitation, and collection.

Once the composting program is more firmly established, the county could consider transitioning to on-site composting. This would require the county to identify the proper method for composting onsite, and which is most appropriate based on

51 Potential food waste from the Farmer's Market is diverted through means other than composting. Make Food Not Waste and Food Rescue USA to pick up excess food from Market vendors and share it amongst the community.

52 https://plus.lapresse.ca/screens/1c83f1a6-f96c-4405-8422-164c5301f260__7C___0.html

Waste Reduction and Diversion

D3 Expand Organic Material Collection

facility generation. For example, windrow composting, vermicomposting, or in-vessel units. Windrow composting is a process in which compostable materials are layered in long rows and turned periodically, this process is used in agricultural settings to produce large quantities of compost. Vermicomposting uses worms to convert organic material into compost. In-vessel composting is a process where organic materials are kept in a small, contained vessel with controlled environmental characteristics to facilitate composting in a compact space. The campus and parks grounds crews could then utilize the material in landscaping throughout county properties. This would also result in improved soil and plant health and cost savings on fertilizers.

Waste Reduction and Diversion

D3 Expand Organic Material Collection

Financial Analysis

The collective goal of the strategies to expand recycling and organic materials collection is to protect the environment and create new economic opportunities. Diverting waste from landfills will reduce GHG emissions while supporting the transition to a circular economy and development of recyclable materials and compost commodities markets.

The financial model developed for Strategies D2 Expand Recyclable Collection and D3 Expand Organic Material Collection by the county's consultants reflects the progressive changes in tonnages and hauling costs between trash, recycling, and composting categories, assuming a goal to reduce total waste generation by 20% and divert 75% of generated waste by 2030. This benchmark was established through referencing the State of Michigan's recycling goal,[53] peer county waste diversion goals, and public and private real estate owners and operators' corporate sustainability and/or ESG reports.

Assuming the county achieves the 2030 goals, the county's anticipated waste breakdown is:

- Trash (Landfill): 25%
- Recyclables: 60%
- Organic materials: 15%[54]

The capital budget includes:

- Recycling (dual-stream) and composting equipment, including BigBelly solar-powered compactor bins
- Resources to develop waste reduction and diversion education, awareness, performance monitoring, and auditing programs

Increasing diversion rates results in less waste sent to landfills. Figure 13 shows the progressive changes in weight across trash, recycling, and organic materials waste categories. So, while waste hauling costs will decrease, operational expenses from hauling recyclables and organic materials will increase as is shown in Figure 14. The greatest opportunity to offset increasing operational expenses from recycling and composting is to deploy smart waste management systems, such as BigBelly compactor bins. The bins' built-in compaction technology can yield up to a 5-to-1 compaction ratio, resulting in fewer pickups. Reducing collection frequency decreases labor, transportation, and material expenses (i.e., decreases the person-hours, transportation fuels, and plastic bags required to collect and dispose waste), as well as the emissions associated with transportation. This analysis assumes that compacting waste could decrease collection frequency, on average, from twice a day to once a day. In addition, the county can offset costs through new revenue streams, including sale of recycling commodities and processed compost.

- Capital Outlay: $1,200,000
- Payback Period: 21.9 years
- ROI: 4.6%

Annual and cumulative cashflows are shown in Figure 15. Foundational assumptions in the financial analysis are relatively conservative, considering that the recycling and composting markets in southeast Michigan are nascent but have potential for significant growth. As these markets mature, the estimated recycling and organic material hauling costs are likely to decrease, while revenues from commodities sales would increase—resulting in a lower payback period. This analysis does not yet consider funding mechanisms that would both reduce the upfront capital cost owed by the county and accelerate market growth, nor policies that place financial costs on environmental or social externalities (e.g., a social cost of carbon).

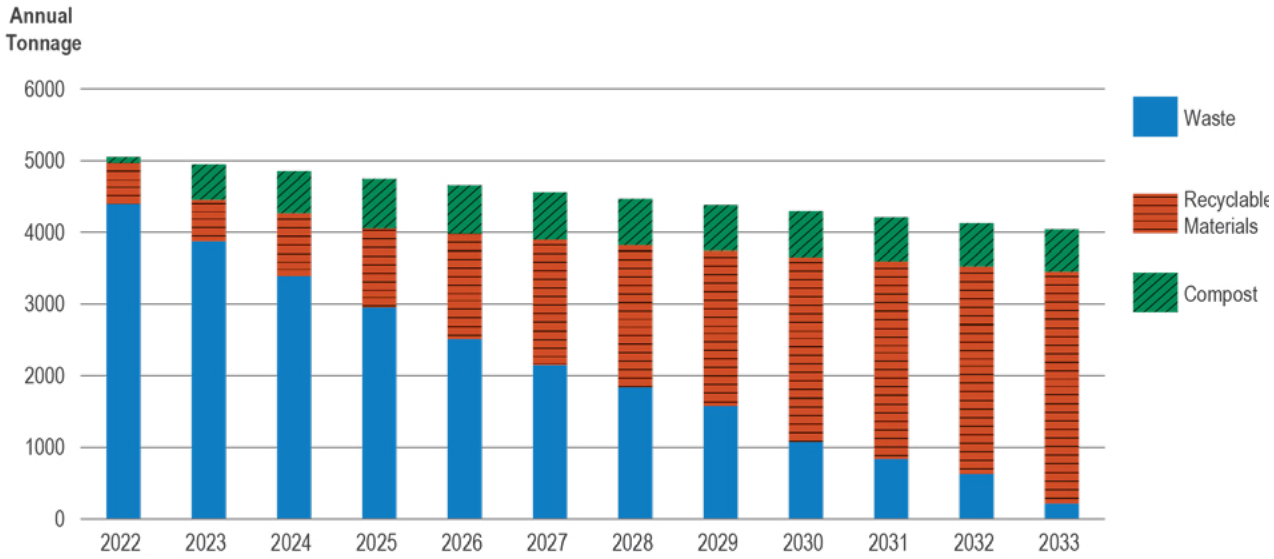
53 https://www.michigan.gov/egle/about/groups/solid-waste-and-recycling-advisors

54 U.S. Environmental Protection Agency data suggests 14.6% of municipal solid waste is food waste and yard trimmings accounted for about 2% of the county's collected waste in 2020 (https://archive.epa.gov/epawaste/nonhaz/municipal/web/html/). To achieve a 75% diversion rate, the remaining 60% of diverted waste will be recycled materials.

Waste Reduction and Diversion

D3 Expand Organic Material Collection

Figure 13. Projected Weight of Generated Waste by Category



Waste Reduction and Diversion

D3 Expand Organic Material Collection

Figure 14. Projected Operating Costs by Category

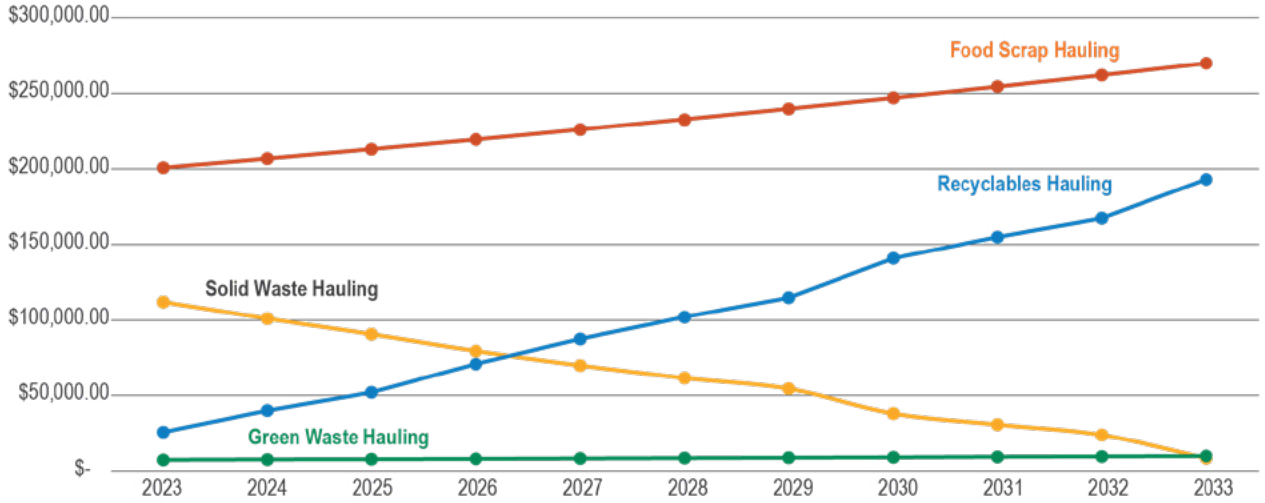
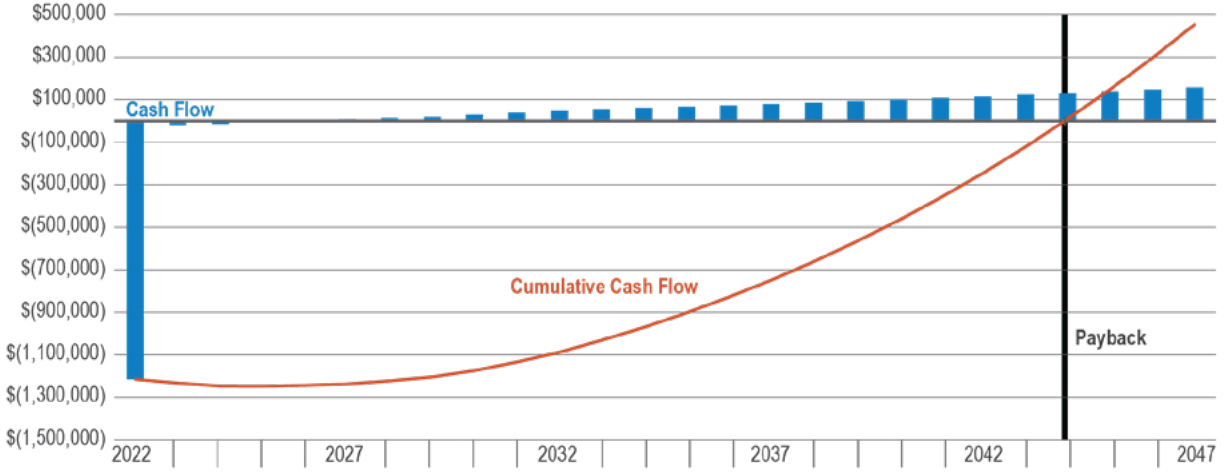


Figure 15. Expand Recyclable and Organic Material Collection: Annual and Cumulative Cash Flows



Waste Reduction and Diversion

D3 Expand Organic Material Collection

Funding Mechanisms

Potential funding mechanisms for the recycling and composting program include:

Capital Budget: The recycling and composting programs' initial costs should be included in a capital budget.

Operating Budget: Ongoing maintenance and waste hauling expenses would be a part of the county's operating budget.

Federal, State, or Regional Programs:

The Infrastructure Investment and Jobs Act (IIJA) funded a new grant program aimed at improving post-consumer materials management and infrastructure locally called the Solid Waste Infrastructure for Recycling Grant program. The program is still under development, but has funding allocated at $275 million.[55]

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) provides grants to support state-wide recycling goals. In 2022, EGLE will provide matching grants to support Governor Gretchen Whitmer's climate priorities by supplementing efforts to increase the state-wide recycling rate, ensure diversity, equity, and inclusion, and grow recycling markets and recycling supply chains through the NextCycle Michigan Initiative (NextCycle). A total of $15 million was made available for NextCycle Michigan Recycling Grant projects in FY 2022, and some funding categories are still accepting applications.

The NextCycle Michigan Recycling Grants have the following categories:

- **Michigan Recycling Infrastructure Grants:** Eligible projects increase collection and processing capacity of recyclable materials or food waste, access to recycling or food waste composting infrastructure, and participation rates in recycling or food waste composting programs. Applications are closed for the FY 2022 cycle, so the county should monitor the program site for notice of new funding opportunities.
- **Michigan Recycling Market Development Grants:** Eligible projects create new markets or expand existing markets and supply chains for recycled materials; stimulate demand for recycled materials and recycled content products; assist businesses that manufacture, market, and use recycled-content products; commercialize technologies to replace materials with recycled content; or research and develop new uses for recycled materials. Applications are closed for the FY 2022 cycle, so the county should monitor the program site for notice of new funding opportunities.
- **Michigan Small Community Education Grants:** Eligible projects provide access to recycling education resources for communities with fewer than 10,000 households. The county could qualify by targeting education towards one of its CVTs of this size. Applications are rolling until all funds are distributed.

For additional information on Michigan Recycling Grants, please reference the program RFP.[56]

55 https://www.epa.gov/rcra/solid-waste-infrastructure-recycling-grant-program

56 https://www.michigan.gov/egle/-/media/Project/Websites/egle/Documents/Programs/MMD/Recycling/2022-RFP.pdf?rev=bf089736d4f34a14880b8c21f7ba8964&hash=AF2E9087322515BF3C70E7A448766A89#:~:text=The%20NextCycle%

Waste Reduction and Diversion

D3 Expand Organic Material Collection

Partnerships:

- Partnerships with other public entities and/or residential and commercial buildings to achieve economies of scale for waste and recycling collections (e.g., collectively negotiate reduced hauling rates).
- Partnerships with non-profit organizations such as The Recycling Partnership, which provides grants for public education and outreach as well as other helpful resources and programs to improve recycling rates and reduce the bin contamination. If the county chooses to pursue an expanded waste and recycling public outreach program through **Advantage Oakland**[57], these partnerships could be especially beneficial.

Tax Exempt Bond Financing:

The county could finance the recycling and organic materials collection program through the proceeds of a tax-exempt bond issuance. The bonds would be sold to investors to raise funds for the program. In return, the county would agree to repay the investors principal plus interest, which is generally exempt from federal, state, and local taxes. These bonds could qualify as green bonds to attract additional types of investors. The county could generate revenue through the recycling and compost program through selling processed recyclables and compost. When bonds are issued for recycling and compost programs, they are typically general obligation bonds; however, bonds could be issued with the savings generated by the project being pledged to repay the debt.

57 https://www.oakgov.com/advantageoakland/planning/wasteandrecycling/Pages/default.aspx

Waste Reduction and Diversion

D4 Deploy Smart Waste Management Systems

Guiding Principles

Maximize resource efficiency

County Strategic Goals

Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management

Support: Office of Sustainability Parks and Recreation

Smart refuse systems can be deployed throughout the county campus and Waterford Oaks County Park to optimize trash pickup schedules, increase diversion rates, and improve site aesthetics. As it relates to the Sustainability Plan's Guiding Principles, deploying a smart waste management system could:

- **Maximize resource efficiency** by minimizing unnecessary trips to transport waste from campus to recycling facilities and landfills. Also, monitor recycling to reduce contamination and make recycling more efficient.

The county can consider two types of smart refuse systems: solar-powered trash compactor bins and dumpster monitoring systems.

Solar-powered Trash Compactor Bins: Municipalities and major development sites have increasingly begun to deploy solar-powered trash compactor bins in areas with significant non-vehicular traffic (e.g., retail/entertainment districts). When a bin becomes full, it will use energy produced by its embedded solar panels to compact collected trash or recyclables and allow room for more trash to be thrown away. Bins may go through this cycle several times before they are nearly full of compacted waste, at which point they use integrated "smart" systems to signal that collection is needed. As opposed to standard sidewalk bins, which either may only be half-full or overflowing onto the sidewalk when haulers come to collect trash, solar-powered trash compactor bins are only serviced when necessary—and before overflowing trash can cause clutter and unpleasant odors in the public way.

County leadership has already approved installing solar-powered trash compactor bins and, as of this writing, is negotiating a contract with BigBelly. Once the contract is finalized, the county should identify areas with significant non-vehicular traffic as priority locations for bin installation. Locations may include the Courthouse complex, Farmer's Market, Waterford Oaks County Waterpark, and at trailheads throughout the park.

Dumpster Monitoring Systems: Sensors and cameras can be placed inside standard dumpsters to monitor and analyze the volume and type of disposed materials, as well as vendor pick-up schedules. These systems can record instances of dumpsters being serviced when relatively empty or when a pick-up is missed, and for recycling bins, detect non-recyclable materials that contaminate the load. Collected datapoints across the service campus (or across county parks) can be integrated into reporting software and used to optimize hauler service schedules and routes, introducing cost savings, and if necessary, renegotiate hauler contracts (refer to the strategy D1. Review and Renegotiate Waste Hauling Contracts).

Dumpster monitoring systems have demonstrated significant returns on investments. A pilot of dumpster monitoring systems across several

Waste Reduction and Diversion

D4 Deploy Smart Waste Management Systems

developments in Texas yielded $1,000 in savings per container, the result of instituting corrective actions for dumpsters being serviced when they were as little as 31% full and haulers missing, on average, 2.5 pickups per month.[58] By comparison, the cost of dumpster monitoring is $10 to $20 per month.[59]

Given the potential benefit, the county should consider expanding the Smart Waste Program to include dumpster monitoring. A first step is to solicit quotes from potential vendors to better understand suitability for the county's campus and the associated costs and benefits.

58 https://www.forbes.com/sites/jeffkart/2020/09/14/trash-tech-from-realpage-and-compology-reduces-collection-costs-improves-recycling/?sh=255f2acb5453

59 https://www.cnn.com/2020/12/18/tech/compology-artificial-intelligence/index.html

Waste Reduction and Diversion

D5 Develop Policies to Minimize Office Supply Consumption

Guiding Principles

Maximize resource efficiency

County Strategic Goals

Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Purchasing

Support: Office of Sustainability

The county's waste strategy should not only include opportunities to expand waste diversion, but also reduce material consumption upfront. To start, the county should develop an enterprise-wide policy to reduce consumption of office supplies. As it relates to the Sustainability Plan's Guiding Principles, developing policies to minimize office supply consumption could:

- **Maximize resource efficiency** by adopting strategies that minimize supplies needed for office operations and implementing strategies to manage, reuse, and recycle necessary supplies to maximize efficiency.

The policies could include, but should not be limited to, the following strategies:

- Establishing a paperless office standard (e.g., only circulate digital copies of documents and scan existing hard copies rather than creating new copies). In cases where this is infeasible, limit paper purchases to recycled paper and establish default preferences for word processing software so files have reduced margins, use single spacing, and print double-sided.
- Eliminating provision of Styrofoam and single-use plastic dishware, drinkware, and utensils. Instead, the county can provide adaptive recyclable metal straws and compostable—or at least biodegradable—dishware, drinkware, and utensils, encourage use of personal dishware, drinkware, and utensils, and require that all beverages sold in vending machines and at the campus cafeteria be provided in recycled aluminum containers.[60] In addition, the county could offer branded reusable water bottles, utensils, etc. as an incentive for significant and/or consistent participation in sustainability-related programming.
- Similarly limiting purchases of pens and pencils to biodegradable options.
- Establishing centralized office supply stations for supplies that can be easily shared (e.g., staplers, tape holders) and encourage supply reuse as much as possible (e.g., for paper and binder clips).
- Centralizing purchase of office supplies to mitigate excess orders and alleviating inconsistent supply availability/quality. As the lead implementer, the Purchasing Department would be best suited for coordinating centralized purchases with support from individual department "champions". Department "champions" would not only coordinate purchases, but also encourage changes in their facility and educate staff.
- Requiring county staff that continue to regularly work from home to purchase personal supplies for their home offices through a county

60 Ball Arena (home to the Denver Nuggets and Colorado Avalanche) has transitioned to infinitely recyclable aluminium cans, bottles, and cups for all beverage concessions and, per a February 17, 2022 press release: "…is on pace to eliminate more than 1 million single-use plastic cups and bottles in 2022." (information sourced from https://www.ball.com/newswire/article/124110).

Waste Reduction and Diversion

D5 Develop Policies to Minimize Office Supply Consumption

portal, from a list of pre-approved sustainable alternatives. This list would be developed through implementation of S4. Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities, which includes a recommendation to develop a catalog of products that are well-aligned with the county's sustainability priorities.

These policies could be established through similar means as the county's policy and procedure for establishing and implementing its Copier Fund (Section 3000.2 of its purchasing policy), which centrally governs enterprise-use of copier resources. The Fund appoints a single organization, the Oakland County Support Services Division, to review all departmental requests to lease copiers and monitor a centralized inventory of copier machines. A broader policy to minimize office supply consumption would apply these principles to other common office equipment and materials.

Alternatively, the policy could be free-standing from the county's main purchasing policy to provide individual organizations with more flexibility to adapt specific provisions to best meet their needs.

Open Space, Ecosystems, and Connectivity

Protect and enhance the natural and built environments of Oakland County Campus and Waterford Oaks County Park through ecological restoration, accessible design and connectivity, and restorative landscaping and planting areas.

Guiding Principals

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities
- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Healthy Residents
- Skilled and Educated Workforce
- Livable Neighborhoods
- Environmental Sustainability
- Organizational Excellence
- Diversity, Equity, and Inclusion

Objectives and KPIs

Convert lawns to native meadows or forest, as measured by acres of lawn converted to native meadows or forest.

Reduce run off, as measured by gallons of stormwater captured.

Enhance the connectivity of campus through non-motorized paths, as measured by linear feet of pathways.

Increase county tree canopy, as measured by number of trees planted per year.

Reduce impermeable surfaces, as measured by the square footage of impermeable surfaces removed.

In addition to reducing the county's carbon emissions from energy, transportation, and building sectors, carbon sequestration can help us meet the county's net zero carbon goal. Through carbon sequestration, carbon dioxide is captured and stored through nature-based systems such as forests, meadows, trees, and wetlands. The county can maximize carbon sequestration by expanding and enhancing the natural environment. Nature-based solutions, ecosystem restoration, reducing impervious surfaces, and other efforts can increase the resiliency of county properties and surrounding environments by improving storm water management, protecting waterways, and supporting native plants and animal species.

Whether people come to county sites for work, services, or recreation, the open space and pathways impact staff and visitors alike. County open space, recreation spaces, and pathways are critical infrastructure assets. Ensuring equitable outdoor amenities, such as accessible pathways and open spaces, contribute to positive employee and visitor mental and physical wellness. Adequate, accessible wayfinding increases connectivity and access to the county's properties and improves visitor interaction.

Table 14. Open Space, Nature, and Ecosystems Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
O1	Improve Connectivity with Non-Motorized Pathways*		X		X	X			X	X	X		X			Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Parks and Recreation	Oakland County Road Commission, MDOT, SMART, SEMCOG
O2	Expand and Improve Signage with Accessibility in Mind			X	X			X	X	X	X	X				Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division; Parks and Recreation: Wayfinding Group and Sign Standards Work Group	Office of Diversity, Equity, and Inclusion; Media and Communications; Office of Sustainability	Oakland County Road Commission, MDOT
O3	Convert Lawns to Forest or Meadow					X		X					X	X	X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division; Parks and Recreation	Office of Sustainability, WRC	
O4	Implement Ecological Restoration Projects				X	X							X	X	X	Office of Sustainability	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division; Parks and Recreation; WRC	City of Pontiac, Waterford Township, Plant Wise
O5	Reduce Paved Areas and Transition to Permeable Pavements or Greenspace*					X		X						X	X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Office of Sustainability, WRC	City of Pontiac, Waterford Township, Oakland County Road Commission, MDOT

LEGEND: (*) In Progress

Open Space, Ecosystems, and Connectivity

01 Improve Connectivity with Non-Motorized Pathways

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Advance the net zero carbon goal

County Strategic Goals

- Healthy Residents
- Livable Neighborhoods
- Environmental Sustainability
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: Oakland County Road Commission, MDOT, SMART, SEMCOG

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division

Support: Parks and Recreation

This strategy supports the county's Livable Neighborhoods Strategic Framework community objective of ensuring access to parks and recreation, transportation, and healthy food. The strategy also supports the county's Environmental Sustainability community objective of ensuring access to transportation by supporting infrastructure for alternative modes of transportation. In addition, this strategy supports the county's Healthy Residents Strategic Framework community objective of improving community mental health and connects to the Health and Wellness Focus Area (see the strategy W2. Develop Actionable Support for Wellness in Employee Lifestyles) by providing paths and spaces that promote employee interaction and provide mental refreshment to reduce stress and increase physical fitness. As it relates to the Sustainability Plan's Guiding Principles, improving connectivity with non-motorized pathways could:

- **Operationalize diversity, equity, and inclusion** and provide an accessible campus environment by making it safer and more accessible to travel to and from campus by modes of transportation besides the car. This expands access to the outdoor spaces and resources offered on campus.
- **Advance net zero carbon goal** by reducing the necessity of cars that emit greenhouse gases.

Non-motorized connections are incomplete in most areas of the county and prevents people from walking, biking, and using mobility devices safely throughout campus. Access around the county campus has largely favored vehicular traffic, and east campus is much more connected by non-motorized pathways than west campus. Expanding the non-motorized pathway network would increase access to and around the county campus and create a more equitable distribution of pathways between different parts of campus. Figure 16 shows potential non-motorized pathways, including sidewalks, trails, pathways, active transportation connections, and potential crossings.

A design goal would be to identify loop paths offering a 15- or 30-minute walk, preferably in naturalized areas, to promote employee walking during lunch or breaks. All the above result in a financial return to the county in the form of increased employee productivity and reduced health care costs. The county should also

Open Space, Ecosystems, and Connectivity

implement planned non-motorized pathways as identified by SEMCOG's 2020 Bicycle and Mobility Plan for Southeast Michigan.[61] The county should identify opportunities for infrastructure installation, such as bike lanes, and/or intersection reconfiguration, such as pathway connectivity and safe street crossings, to support a safe and comfortable experience for all users and all abilities, specifically focusing on the crossings at the existing bus stops and across Telegraph Road (see Figure 16). Consider installing supporting amenities such as bike parking, e-bike charging, lockers, showers, and bike repair stations. SEMCOG provides a compilation of bicycle, pedestrian, and supporting infrastructure design guidelines that should be referenced when implementing various non-motorized pathway types. These guidelines are included in the SEMCOG's 2020 Bicycle and Mobility Plan for Southeast Michigan and are based on design guidance provided by the American Association of State Highway and Transportation Officials (AASHTO), the National Association for City Transportation Officials (NACTO), the Federal Highway Administration (FHWA), and the Michigan Department of Transportation (MDOT).[62]

61 https://semcog.org/desktopmodules/SEMCOG.Publications/GetFile.ashx?filename=BicycleAndPedestrianMobilityPlanForSoutheastMichiganMarch2020.pdf

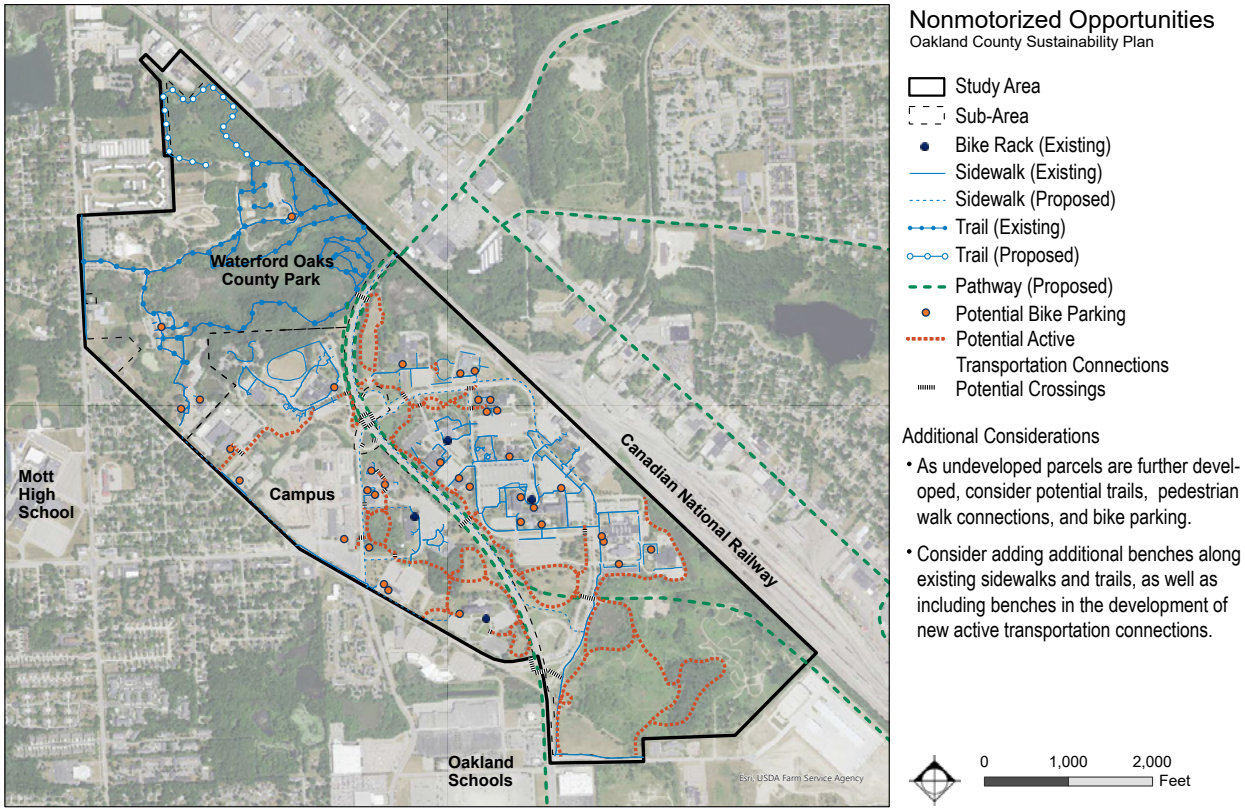
62 https://semcog.org/desktopmodules/SEMCOG.Publications/GetFile.ashx?filename=BicycleAndPedestrianMobilityPlanForSoutheastMichiganMarch2020.pdf

63 https://semcog.org/desktopmodules/SEMCOG.Publications/GetFile.ashx?filename=BicycleAndPedestrianMobilityPlanForSoutheastMichiganMarch2020.pdf

O1 Improve Connectivity with Non-Motorized Pathways

Trails are non-motorized pathways through natural areas that are usually unpaved. Pathways are regional non-motorized pathways identified by SEMCOG's 2020 Bicycle and Mobility Plan for Southeast Michigan[63] that include both trails and paved walking and biking pathways. Active Transportation Connections are county campus-specific pathways identified by the Oakland County Sustainability Plan development process that could be either trails or paved walking and biking pathways.

Figure 16. Potential Non-Motorized Pathways



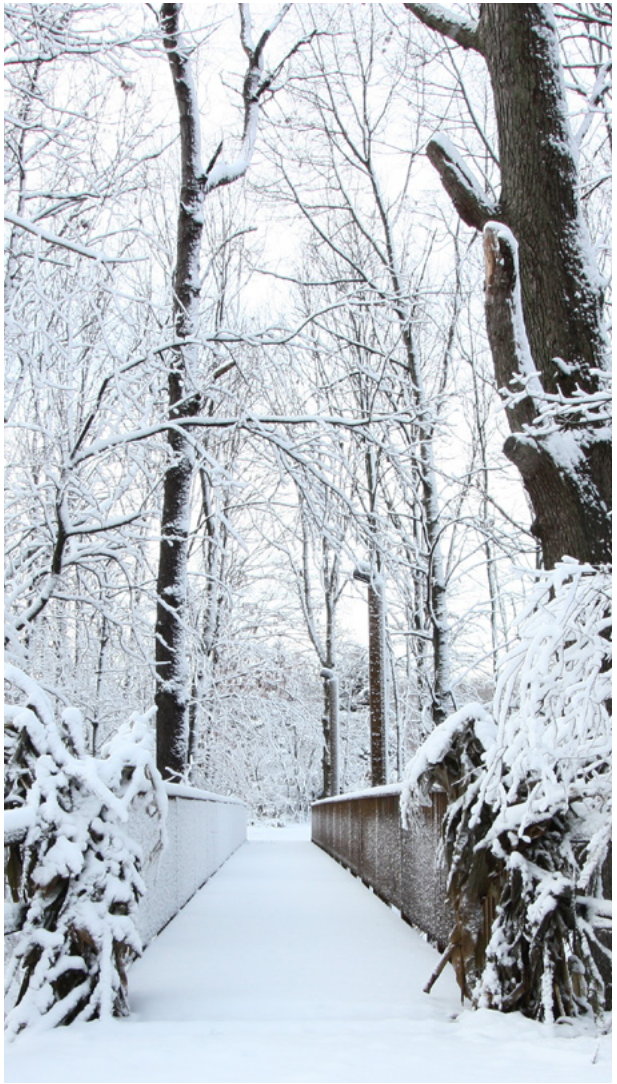
Open Space, Ecosystems, and Connectivity

01 Improve Connectivity with Non-Motorized Pathways

A bike or e-bike rental program is another consideration that may appeal to those who come to campus via vehicle or bus but want to get around campus during the day and should be coordinated with Facility and Fleet Decarbonization strategies.

Partnership with external agencies will be crucial for implementing new crossings and non-motorized pathways. The county owns most of the roadways on campus, and their maintenance falls under the Oakland County Road Commission's jurisdiction. Therefore, updates to existing facilities and their upkeep will need to be coordinated with the Road Commission. Telegraph Road is a state road, so any changes to this corridor will need to be coordinated with MDOT. Access to bus stops should be considered by coordinating with Suburban Mobility Authority for Regional Transportation (SMART). Finally, SEMCOG has identified future non-motorized pathways and can help the county access funding for their design and construction.

Maintenance is another crucial consideration for implementing non-motorized pathways on campus. If non-motorized paths are to provide equitable access, be part of a fitness strategy, and provide year-round health benefits, there should also be a program to keep these paths snow- and ice-free in the winter. Under current procedures, snow removal is prioritized at 24/7 facilities, then 7-day facilities, then facilities only open during business hours (within this last tier, buildings with the most public traffic are given most attention). Non-motorized paths should be factored into the county's snow removal procedures and location prioritization.



Open Space, Ecosystems, and Connectivity

O1 Improve Connectivity with Non-Motorized Pathways

Financial Analysis

The financial analysis developed by the county's consultants for this strategy demonstrates the potential financial benefit realized through increased employee walking following the creation of additional campus non-motorized paths. Physical activity can play a significant role in employees' health, wellness, quality of life, and productivity. The analysis focuses on benefits associated with walking including increased productivity[64] and decreased healthcare costs.[65]

Capital outlay, payback period, and ROI was determined based on the construction of 15,000 linear feet of pathways, assuming that 500 employees on campus would utilize the new paths. The initial capital outlay of $1.4 million to construct non-motorized pathways is based on market prices for labor, goods, and pathway development. Operation and maintenance costs were not included in the analysis as it was impossible to determine at this stage which areas of trail would be cheaper to maintain than the current surfaces or landscapes and which would be more expensive.

The ongoing positive impacts, however, are more difficult to measure. It was conservatively assumed that the full health and productivity impacts would be realized incrementally over a five-year period. Increased walking, physical activity, and breaks improve cognitive processes and attention,[66] ability to focus,[67] enthusiasm, and relaxation,[68] all of which are associated with increased productivity. While it is established that walking improves employees' ability to be productive, no studies were identified that provided a link to the actual economic output or value to the increased productivity. With that, the analysis utilized a modest assumption of positive economic benefit of 1% of salaries for affected employees. This economic benefit represents increased productivity and ability to provide additional services to Oakland County taxpayers and residents. Reductions in healthcare costs were based on a study authored by Masayuki Kato in 2013 and calculated at 2.6% per year.[69] In today's dollars, this assumed increase in productivity and savings in health care costs would be $1.26 million greater than the initial upfront investment (net present value) which over the 10-year time frame would be the equivalent to a 17.4% return.

- Capital Outlay: $1,400,000
- Annual Savings (year 6 and thereafter):
  - Healthcare Costs: $183,500
  - Productivity: $288,700
- Payback Period: 6.4 years
- ROI: 17.4%

64 https://redbooth.com/blog/walking-productivity-scientific-links
65 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4020264
66 https://doi.org/10.1080/01443410.2012.723612
67 https://doi.org/10.1016/j.cognition.2010.12.007
68 https://doi.org/10.1111/sms.12398
69 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4020264.

Open Space, Ecosystems, and Connectivity

01 Improve Connectivity with Non-Motorized Pathways

Figure 17. Pathways Development: Annual Cash Flow

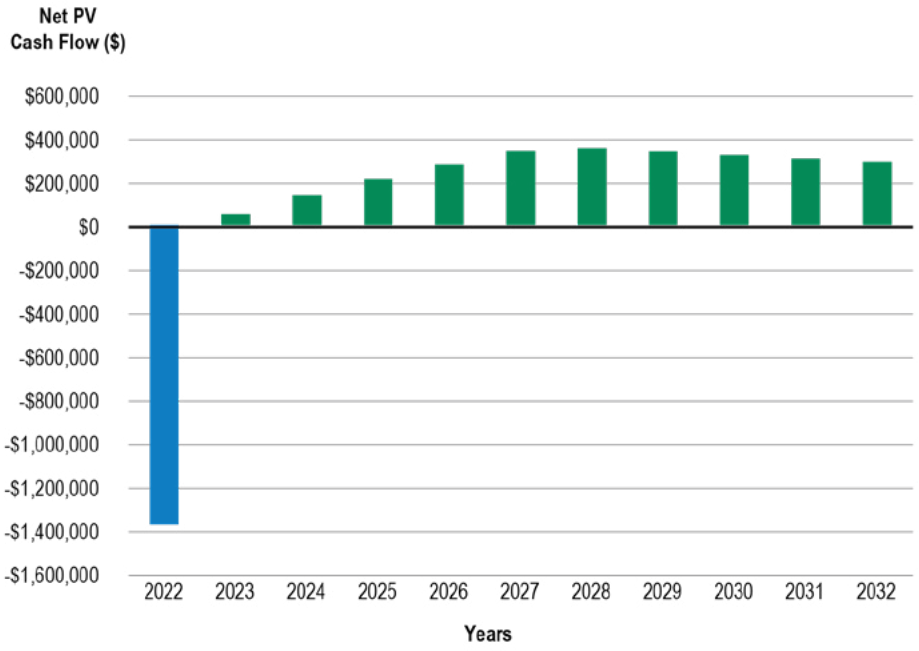
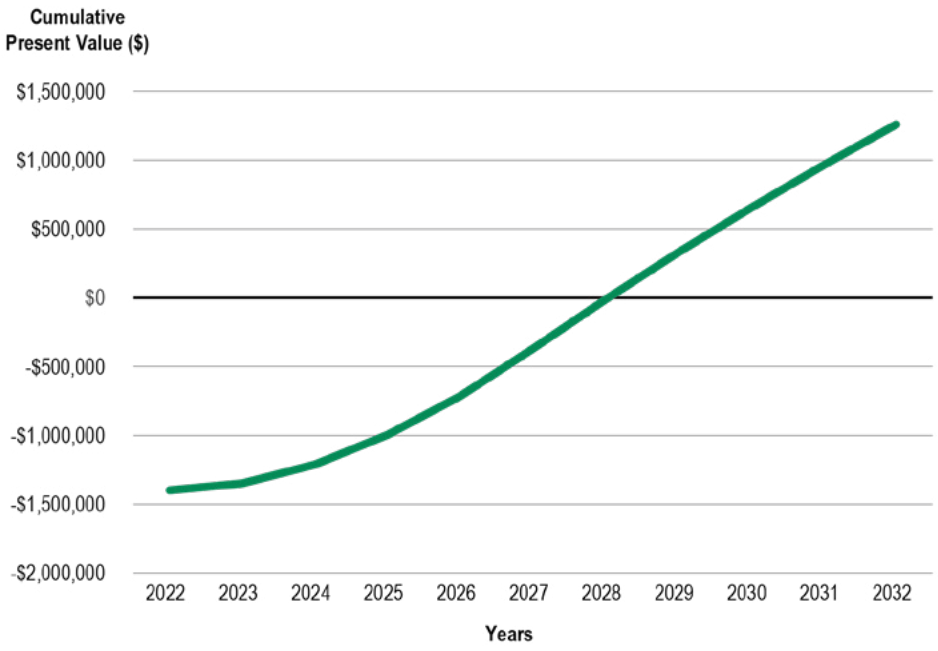


Figure 18. Pathways Development: Cumulative Cash Flow



Open Space, Ecosystems, and Connectivity

01 Improve Connectivity with Non-Motorized Pathways

Funding Mechanisms

Potential funding mechanisms for non-motorized pathways include:

Capital Budget: The non-motorized pathways program's initial costs should be included in a capital budget.

Operating Budget: Ongoing maintenance and expenses would be a part of the operating budget.

Federal, State, or Regional Programs:

The Infrastructure Investment and Jobs Act (IIJA) appropriated $550 million to the EECBG Program to assist eligible local, county, tribal, and state governments in implementing strategies to reduce fossil fuel emissions, reduce total energy use, and improve energy efficiency for transportation and facilities. This program was previously funded back in 2009 through the American Recovery and Reinvestment Act and at that time projects that reduced energy use for transportation, including new pathways and connections, were eligible.[70]

The **Michigan Department of Transportation's Transportation Alternatives Program** (TAP) is administered in Southeast Michigan through SEMOCOG. Typical projects funded by the program seek to improve mobility through bicycle and pedestrian infrastructure such as pathways, sidewalks, pedestrian crossings, and bike lanes. While counties are not eligible to apply, the county could partner with other eligible applicants such as the City of Pontiac or the Oakland County Public Transportation Authority for funding.[71] Grants require local match of at least 20%. In 2021, the Southeast Michigan Council of Governments awarded $2.8 million in TAP funds.[72]

The **Michigan Department of Natural Resources** (DNR), has recreation grant programs which could provide funding for non-motorized pathways:

- DNR makes recommendations to the National Park Service for outdoor recreation grants through the **Land and Water Conservation Fund**. Governmental entities with DNR approved community five-year recreation plans are eligible to apply for grants of up to $500,000 which require a 50% local match.
- **The Michigan Natural Resources Trust Fund** provides grants to local units of government for public outdoor recreation including trails. Applicants must have an approved five-year recreation plan to be eligible for grants up to $300,000. A 25% local match is required.[73]
- **The Recreation Passport Program** provides approximately $2 million per year for indoor and outdoor public recreation projects. Preference is given to rehabilitation of existing facilities. Grants require a 25% match and cannot exceed $150,000.[74]
- **The Michigan Trails Fund** provides grant opportunities to governmental organizations for regional non-motorized trail projects. Eligible uses include planning, design, engineering, and construction.[75]

Tax Exempt Bond Financing: The county could finance the additional campus non-motorized paths through the proceeds of a general obligation tax-exempt bond issuance. Given the relatively small size of capital outlay, the county will first determine that bond financing would be cost effective for the project or package with other projects.

70 https://www.energy.gov/eere/wipo/energy-efficiency-and-conservation-block-grant-program-bipartisan-infrastructure-law-2021, https://www.nlc.org/article/2021/12/03/what-you-need-to-know-the-energy-efficiency-and-conservation-block-grant/

71 https://www.michigan.gov/mdot/programs/grant-programs/transportation-alternatives.

72 https://eu.detroitnews.com/story/business/autos/2021/12/12/mobility-project-grants-millions-awarded-southeast-michigan-council/49517195/.

73 https://www.michigan.gov/dnr/buy-and-apply/grants/rec/mnrtf.

74 https://www.michigan.gov/dnr/buy-and-apply/grants/rec/rec-pp.

75 https://www.michigantrailsfund.org/new-page#

Open Space, Ecosystems, and Connectivity

O2 Expand and Improve Signage with Accessibility Standards

Guiding Principles

- Operationalize diversity, equity, and inclusion
- Provide accessible services and campus environment
- Create education and engagement opportunities

County Strategic Goals

- Skilled and Educated Workforce
- Livable Neighborhoods
- Organizational Excellence
- Diversity, Equity, and Inclusion

Development Stage: Future

Partners: Oakland County Road Commission, MDOT

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation: Wayfinding Group and Sign Standards Work Group

Support: : Media and Communications, Office of Sustainability, and Office of Diversity, Equity, and Inclusion

It is critical to coordinate with the Office of Diversity, Equity, and Inclusion and Communications to ensure all signage is accessible for all visitors. county branding and cohesion should be integrated into any signage or wayfinding displays on and off campus, at all county-owned property. As it relates to the Sustainability Plan's Guiding Principles, expanding and improving signage with accessibility standards could:

- **Operationalize diversity, equity, and inclusion and provide accessible services and campus environments** by setting a standard to ensure that the signage on campus is informative and useful for all employees and visitors on campus without the need for additional support. Improving accessibility of signage also improves accessibility of spaces by making it so everyone who visits campus can find their way around and take advantage of the green spaces and resources offered on campus.
- **Create education and engagement opportunities** by providing interpretive signage to learn about sustainability through the campus environment.

The county has already installed a drive-up information map with paper maps that visitors can take (see Figure 19), extensive operational and wayfinding signage across county park facilities, as well as interpretive signage. However, the drive-up information map is only accessible by car and some signage is located where it cannot be viewed at all (see Figure 20). There is an opportunity to make the same kind of information available along routes accessible by people walking and biking.

Strategy components for both wayfinding and interpretive signage follow. Both digital (e.g., Wi-Fi Kiosks) and non-digital modalities can be considered for signage.

Open Space, Ecosystems, and Connectivity

O2 Expand and Improve Signage with Accessibility Standards

Wayfinding Signage

As a 600-acre campus with 28 different departments, the county campus can be disorienting for visitors. Some wayfinding signage is currently provided, but more is needed to clearly orient visitors to the various departments, parking, and accessible entrances and routes for users of all abilities. A professionally designed wayfinding signage system is also an effective way to "brand" the county campus by using consistent colors and materials as well as defining the extents of the campus to visitors. The county may also consider developing a wayfinding app for the campus that connects to the Access Oakland data portal.[76]

By improving accessibility of county sites and services, this strategy for wayfinding signage supports the county's Livable Neighborhoods Strategic Framework community objective of ensuring access to parks and recreation and transportation as well as the Organizational Excellence Strategic Framework community objective of demanding the highest customer service.

Interpretive Signage

The county should also design and install interpretive signs located along non-motorized pathways to explain and illustrate sustainability topics to employees and visitors. Interpretive signage can also be placed in other locations, such as parking lots, under solar carports, or within facilities to share information. Interpretive signs are envisioned as separate from wayfinding signs but using consistent design themes. Interpretive sign content could include health benefits of walking, wetland restoration benefits, carbon sequestration effects of trees, clean energy benefits, or sustainable infrastructure (e.g., solar carport, greenhouse) information. Signage could include QR codes or website links for people to learn more.

Interpretive signage expansion also advances the county's Skilled and Educated Workforce Strategy Framework community objective of ensuring children get a great start in early learning and by more broadly providing an education opportunity.

76 https://accessoakland.oakgov.com/datasets/oakgov::oc-government/explore?location=42.659169%2C-83.384309%2C10.00

Open Space, Ecosystems, and Connectivity

O2 Expand and Improve Signage with Accessibility Standards

Figure 19. Existing Information Map

Figure 20. Existing Interpretive Signage

Open Space, Ecosystems, and Connectivity

O3 Strategically Convert Lawns to Forest or Meadow

Guiding Principles

- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: N/A

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation

Support: Office of Sustainability, Water Resources Commissioner

This strategy supports the county's Environmental Sustainability Strategic Framework community objectives of protecting drinking water and lakes and reducing county government energy use due to reduced lawn maintenance. It also supports the county's Organizational Excellence objective of maintaining the highest fiscal stewardship. Converting lawn to meadows would also contribute to enhancing pollinator habitats and visual diversity. As it applies to the Sustainability Plan's Guiding Principles, strategically converting lawns to forest or meadows could:

- **Advance the net zero carbon goal** by increasing carbon sequestration and reducing emissions from mowing. It is estimated that 50 acres of lawn conversion to forest would result in 40 tons of carbon reduction or sequestration per year.
- **Improve air and water quality** by reducing fertilizer and pesticide use, reducing the presence of greenhouse gases in the atmosphere, and capturing run off water.
- **Maximize resource efficiency** by reducing grounds maintenance costs and water used in lawn maintenance.

The county Facilities Department should collaborate with the Parks and Recreation Department to determine best conversion sites, as well as optimal plant selection, installation, and maintenance best suited for Oakland County properties. Prioritization should include areas that experience flooding, as buffers along natural resources, such as stream banks or drains, and areas that do not negatively impact visibility such as open fields or areas that can be integrated into existing landscaping areas. It is also important to consider land use and future land use. For example, not planting trees over critical underground infrastructure or in areas slotted for future development.[77]

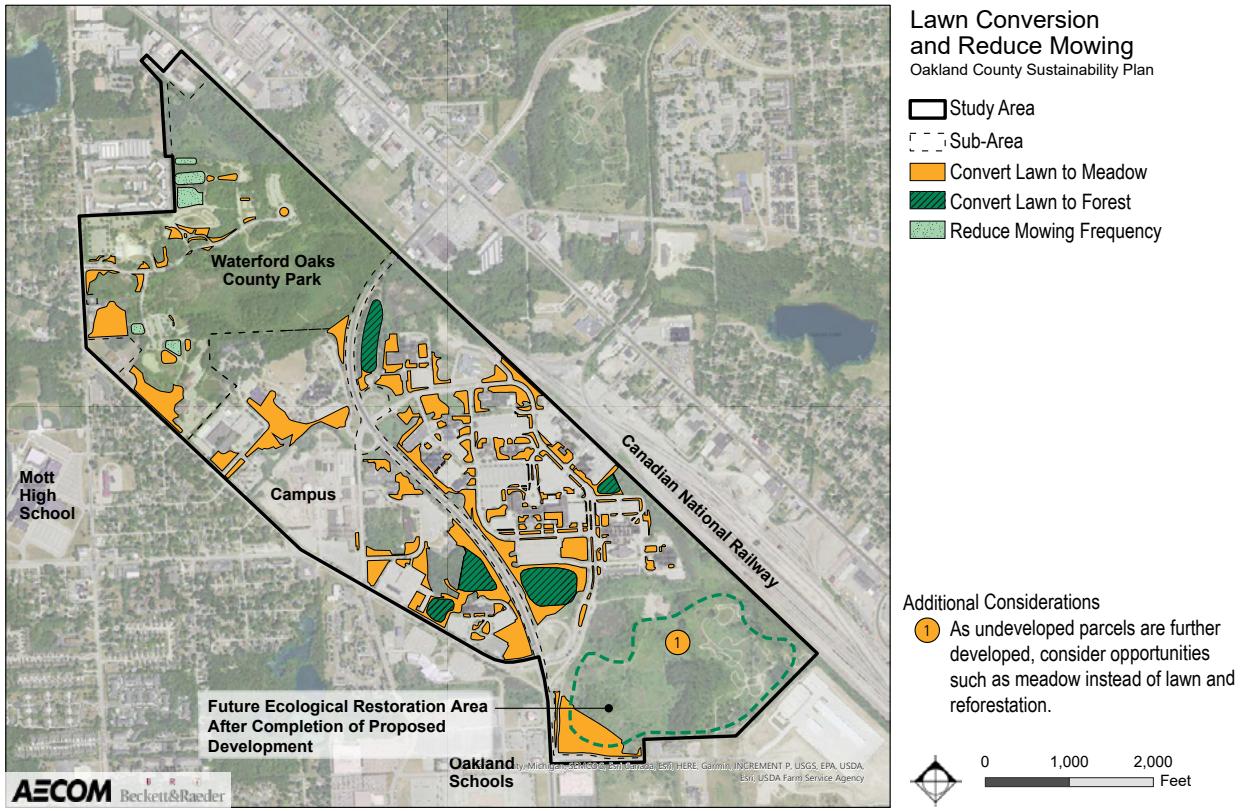
77 The campus landscape plan should also include tree planting locations (see the O4. Implement Ecological Restoration Projects strategy).

Open Space, Ecosystems, and Connectivity

O3 Strategically Convert Lawns to Forest or Meadow

It is estimated that there is potential for approximately 50 acres of lawn conversion on the county campus. Figure 21 shows opportunities for lawn conversion to meadow or forest. The figure also shows areas that could remain as lawns but be mowed less frequently. Opportunities to convert lawn to forest primarily occur west of the Sheriff's Administration building, north of the County Executive building, and south of the Circuit Court building. The open space west of the Sheriff's Administrative Building was also identified as a potential site for groundmount solar. If the county installs solar at this site, this space can be designed to include meadow with native plantings which promote stormwater infiltration and benefits to pollinators and birds. Forests should be planned with solar installations in mind, avoiding trees in locations that would block light from rooftop solar.

Figure 21. Potential Lawn Conversion Areas



Open Space, Ecosystems, and Connectivity

O3 Strategically Convert Lawns to Forest or Meadow

Converting lawn to native meadow plantings requires several steps and considerations. First, all turf grass needs to be removed and tilled to prep the area. Consider selecting drought tolerant native grasses and wildflowers in most areas. For areas that experience flooding, consider drought tolerant species and planting diagram recommendations. There are several community organizations that have resources supporting these types of installations, such as the SEMCOG Green Infrastructure Plan and the Clinton River Watershed Council. Meadows can take two to three years to fully establish and require regular maintenance to reduce noxious weed introduction and ensure optimal plant health. Adequate training and resources should be developed and provided to ensure county staff are trained properly.

Open Space, Ecosystems, and Connectivity

04 Implement Ecological Restoration Projects

Guiding Principles

- Advance the net zero carbon goal
- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Livable Neighborhoods
- Environmental Sustainability

Development Stage: In Progress

Partners: City of Pontiac, Waterford Township, Plant Wise

Teams

Lead: Office of Sustainability

Support: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation, Water Resources Commissioner

Wetland restoration and tree plantings support the county's Livable Neighborhoods Strategic Framework community objective of ensuring access to parks and recreation by adding green space to the county campus. This strategy also supports the Environmental Sustainability community objective of protecting drinking water and lakes. Furthermore, these recommendations would enhance habitat and the campus aesthetic. As it applies to the Sustainability Plan's Guiding Principles, implementing ecological restoration projects could:

- **Advance the net zero carbon goal** by sequestering carbon and reducing heat island effects.
- **Improve air and water quality** and **maximize resource efficiency** by relieving flooding, filtering runoff pollutants, and taking up nutrients.

Wetland Restoration

Streambank and wetland restoration projects are critical in improving water quality, providing flood relief, and maintaining natural habitat. Oakland County, by implementing critical restoration projects, will align with the new stormwater requirements developed by the Water Resources Commission, demonstrate commitment to preserving natural environments, and participate as stewards of the watershed.

Mainland Drain North is a 4,000-foot-long drainage corridor centrally located in the county campus, conveying runoff from more than 200 acres of the campus as well as large areas off campus (see Figure 22). It is reported that this area floods frequently. The county Facilities group in cooperation with WRC should sponsor creation of a stream restoration plan to restore and enlarge existing wetlands and restore the channelized ditch to a naturalized stream channel. Wetland enlargement would serve multiple purposes including increased stormwater flood storage volume, increased wetland vegetation to filter pollutants and uptake nutrients, enhance wildlife habitat, and improve campus aesthetic.

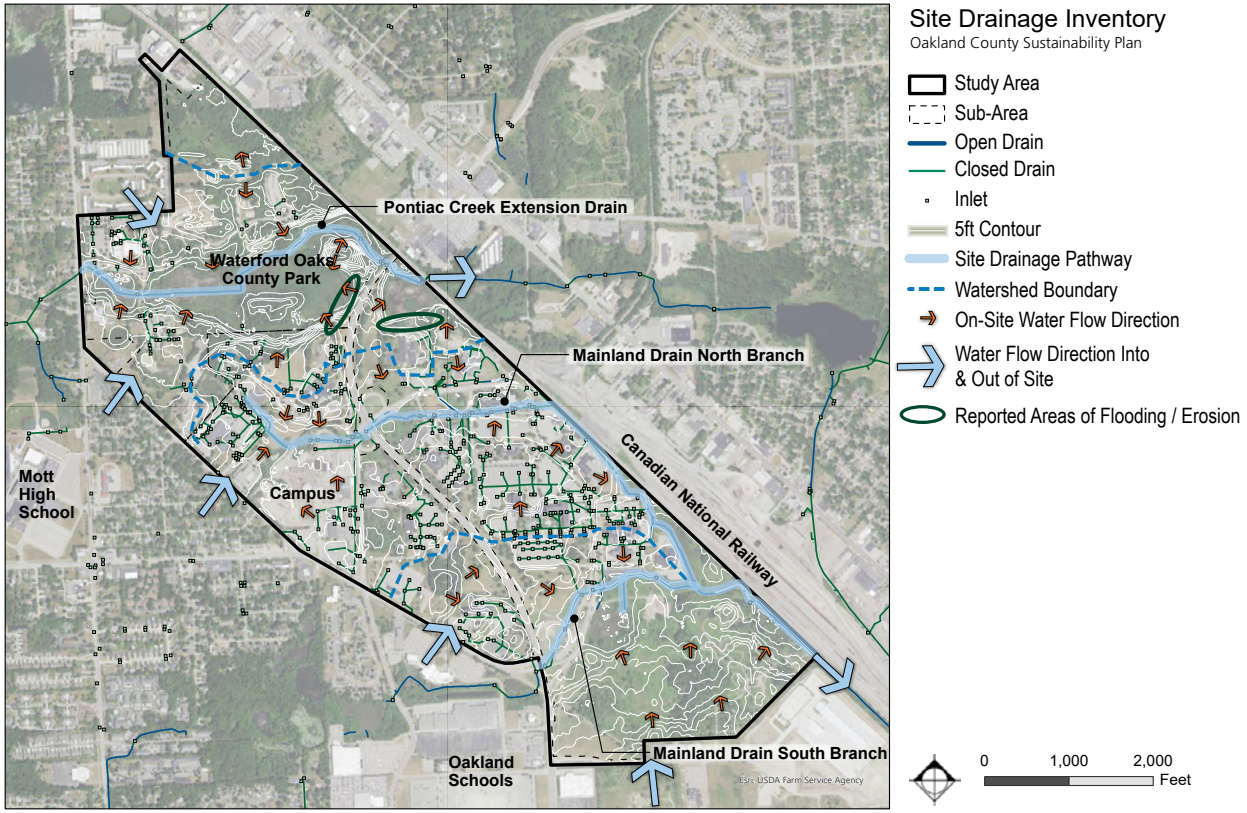
Open Space, Ecosystems, and Connectivity

O4 Implement Ecological Restoration Projects

Reforestation

The county should develop a campus landscape plan to identify feasible tree planting locations along streets, in parking lots, and near buildings.[78] There is an estimated potential for up to 1,000 trees to be planted on campus. The carbon absorption and runoff reduction benefits are significant. One published rule of thumb is that one tree can absorb 48 pounds of carbon per year;[79] therefore 1,000 trees could absorb 24 tons of carbon per year. Another published rule of thumb is that one tree can intercept an average of 1,700 gallons of rainfall per year; therefore, 1,000 trees could reduce runoff by over 1.5 million gallons per year. The tree planting plan should focus on utilization of a diverse mix of native species arranged in informal groupings.

Figure 22. County Campus Drainage



78 The campus landscape plan should also lawn maintenance and conversion areas (see the Strategically O3. Strategically Convert Lawns to Forest or Meadow strategy).

79 Various factors determine the amount carbon a tree can sequester, such as tree size, species, and health. Online calculators, such as the North Carolina State University Carbon Calculator, can be used to estimate carbon sequestration from trees. North Carolina State University Carbon Calculator: http://www.carboncalculator.ncsu.edu/

Open Space, Ecosystems, and Connectivity

O5 Reduce Paved Areas and Transition to Permeable Pavements or Greenspace

Guiding Principles

- Improve air and water quality
- Maximize resource efficiency

County Strategic Goals

- Environmental Sustainability
- Organizational Excellence

Development Stage: In Progress

Partners: City of Pontiac, Waterford Township, Oakland County Road Commission, MDOT

Teams

Lead: Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation

Support: Office of Sustainability, Water Resources Commissioner

The county should evaluate additional opportunities to install green stormwater installations, such as permeable pavements or bio-infiltration areas, in new parking lot installations and assess parking lot pavement rehabilitation projects. The county Facilities Management Department integrated bioswales into the Administrative Complex parking area and paved one of the campus parking lots with porous asphalt. Learning from the successes and challenges of these existing installations, the county has an opportunity to implement similar infrastructure in other locations throughout campus. Green stormwater infrastructure implementation in parking areas should be coordinated with electric vehicle infrastructure installation (see strategy F3. Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus), as well as efforts to reduce overall parking space requirements wherever feasible. As it applies to the Sustainability Plan's Guiding Principles, reducing paved areas and transitioning to permeable pavements or greenspace could:

- **Improve air and water quality** by reducing and filtering stormwater runoff.
- **Maximize resource efficiency** by relieving local flooding, reducing roadway maintenance costs, and preventing the high costs and resources required to respond to serious flooding events.

The Executive Office Building parking lot at the northwest corner of Telegraph Road and Pontiac Lake Road should be considered as a high priority for pavement reduction or elimination due to very minimal use. The county should perform soil testing for infiltration rates as part of permeable pavement project planning and consider how the pavement will be maintained over time. Resources include the US EPA's Toolkit on Permeable Pavement[80] and the Minnesota Department of Transportation's Guidance on Permeable Pavements in Cold Climates report.[81]

The county does not use any coal-tar-based products. However, a formal policy should be adopted to ensure that the practice continues, and that products containing other harmful chemicals such as other polycyclic aromatic hydrocarbon (PAH) are not used. Furthermore, the county may consider placing a ban on PAH sealants, as many communities in Michigan and around the Great Lakes region have implemented. have implemented. For example, the Minnesota

80 https://www.epa.gov/soakuptherain/soak-rain-permeable-pavement

81 http://www.dot.state.mn.us/research/TS/2015/201530TS.pdf

Open Space, Ecosystems, and Connectivity

O5 Reduce Paved Areas and Transition to Permeable Pavements or Greenspace

Legislature banned the sale and use of coal tar-based sealants in 2014. The coal tar-based sealants contributed to 67% of PAHs in 15 Minnesota metro-area stormwater ponds.[82]

These recommendations support the county's Environmental Sustainability Strategic Framework community objective of protecting drinking water and lakes.

In the longer term, the county should evaluate the elimination of the two left-turn cloverleaf intersections on Telegraph Road at Pontiac Center Road and County Center Road which would reduce the surface area of impermeable pavement in the area. In partnership with the Road Commission and MDOT the traffic patterns at these locations should be evaluated under current traffic conditions for conversion to traditional perpendicular intersections consistent with the Telegraph Road corridor to the north and south of the county campus. This recommendation also aligns with strategy O1. Improve Connectivity with Non-Motorized Pathways This recommendation supports the county's Environmental Sustainability Strategic Framework community objective of protecting drinking water and lakes as well as the Organizational Excellence objective of maintaining the highest fiscal stewardship. In addition, this recommendation would free up land for the county's use.

The Huron River Watershed Council

The Huron River Watershed Council is an advocacy group that has worked with the Michigan Environmental Council, the League of Conservation Voters, and other interested groups to monitor the presence of PFAS in drinking water and lakes in the Michigan area. PFAS are a family of thousands of chemicals associated with many health problems, the pollution of which is widespread in the United States. The state of Michigan has established drinking water standards for seven PFAS chemicals and state rules are in place for cleanups regarding the seven chemicals. The Huron Rivers Watershed Council continues to monitor PFAS rates in drinking water and other bodies of water and has seen very low rates in the Michigan area due to successful legislation. This case study is an example of the impact the county could have on protecting drinking water by implementation a formal policy to ensure that coal tar and PAH based products are not used. The Huron River Watershed Council was able to reduce harmful chemicals in drinking water through strategic legislation and advocacy. Along with banning these chemicals from the source, the county can implement permeable pavements to reduce runoff and prevent chemicals in the environment from entering the water supply.

82 https://www.pca.state.mn.us/business-with-us/coal-tar-based-sealants

Next Steps

AECOM developed this Sustainability Plan on behalf of Oakland County to achieve their Sustainability Vision and advance their sustainability Guiding Principles through strategic action in the Focus Areas of Sustainable Governance, Health and Wellness, Facility and Fleet Decarbonization, High-Performance Buildings, Waste Reduction and Diversion, and Open Space, Ecosystems, and Connectivity. Through implementation of sustainability initiatives set forth in this Plan, Oakland County can advance the broader Strategic Framework. Most importantly, by advancing sustainability within county sites and operations, the county can further provide positive service experience for all, through efficient, equitable, and low-carbon operations – extending sustainability impact and resources throughout the greater community and continuing to lead by example.

This Sustainability Plan identified 29 strategies. The next step is to implement these strategies, supported by the guidance provided in the Change Management Plan. Progress will be monitored throughout the process through critical KPIs and metrics associated with each strategy. The Plan will be reassessed and evaluated periodically to ensure that it continues to align with county priorities and policies, as well as regional and state priorities.

Implementing Sustainability Strategies

Successful implementation of the sustainability strategies presented in this Plan hinges on the collaboration of county staff to keep moving sustainability forward. As such, purposeful communication of the county's Sustainability Framework and staff roles for strategy implementation is key. Effective communication can result in:

- Mainstreaming sustainability concepts and priorities amongst staff
- Reinforcing that all county decisions must be aligned with its sustainability priorities
- Empowering staff to take ownership of the county's current and future sustainability actions
- Increasing transparency and accountability for organizational processes

Achieving these objectives will require consistent messaging to encourage continued enthusiasm for pursuing and operationalizing sustainability. The steps below provide a roadmap for providing this messaging:

Step 1 Communicate the Sustainability Framework

Step 2 Define Roles

Step 3 Develop Sustainability Framework Brand Identity

Step 4 Connect Employees to the Brand

Step 5 Provide a Platform for Safe and Open Feedback Loop

Additionally, a supporting communications strategy and Change Management Plan will provide guiderails so the county can easily identify *who* needs to be engaged, *how* they are expected to contribute to the county's Sustainability Framework, *when* they are expected to achieve certain milestones, and *what* additional resources or measures, if any, need to be identified to overcome barriers in reaching these milestones.

STEP 1: Communicate the Sustainability Framework

When sharing the Sustainability Plan with Oakland County employees, the Sustainability Framework should be clearly communicated so all employees have unified understanding of the county's goals and how they should inform future decision-making. Consistent messaging will ensure the material resonates with staff.

STEP 2: Define Roles

Provide all individuals within county organizations with a clear definition of their role in progressing next steps. Defining roles immediately when projects are kicked off will help employees envision how they can contribute to a project's success and the county's broader sustainability Vision, ultimately ensuring efficient project delivery. Each strategy within this Plan identifies the lead, supporting, and external teams that are expected to contribute to project implementation. Building off this foundation, project leadership can create a responsible, accountable, consulted, and informed (RACI) matrix to align roles and responsibilities for each team member and concisely communicate them to the entire team.[83] A RACI matrix will support role clarity by ensuring all team members share a common understanding of their respective contributions, as well as how to coordinate amongst each other to achieve cohesive success

STEP 3: Develop Sustainability Framework Brand Identity

Develop a content calendar to ensure consistency and integration with other county-wide communications. A strong brand identity for sustainability within Oakland County will ensure that any communication distributed about sustainability has the same look, feel, and is instantly recognizable as on-topic. The Sustainability Framework should be at the foundation of the county's sustainability brand, and the triple bottom line should be visible in all messaging.

The Michigan Department of Environment, Great Lakes, and Energy's Recycling Racoons[84] campaign is an example of a sustainability brand. The Recycling Raccoons educate, engage, and mobilize Michigan residents on how to recycle correctly. Each member of the Recycling Raccoon Squad personifies a recyclable material (Gladys Glass, Paper Mackay, Nyla P. Lastic, Carlos Cardboard, and Precious Metale), who articulate important rules for recycling common household materials.

Branding also involves curating distribution channels so stakeholder groups (e.g., county staff, elected officials, and visitors) will have an individualized sustainability experience. Distribution channels may include digital platforms, printed materials, and permanent signage[85] solutions. A content calendar can be developed to identify an appropriate mix of digital and traditional mediums to make content accessible to a variety of patrons and reduce redundancies in planned communication.

83 Reference Appendix D: Change Management Plan for detailed information about stakeholder preparation and alignment towards role definition, among other Change Management strategies.

84 https://recyclingraccoons.org/

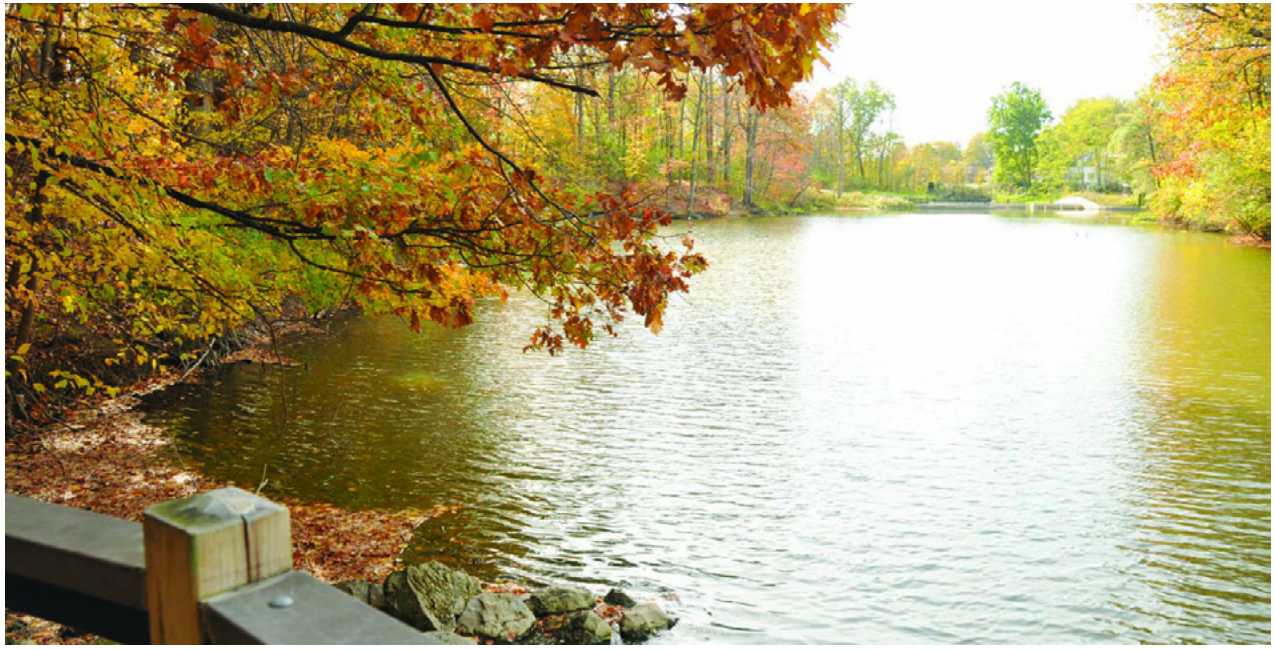
85 Please see O2. Expand and Improve Signage with Accessibility Standards for more detail.

STEP 4: Connect Employees to the Brand

The next step is to connect employees with the importance of the brand message—for their own work, the entire county organization, the environment, and the community at large. Simply put, the county needs buy-in from its employees to progress its sustainability agenda. Reiterating to employees the critical role they play in measuring and promoting, and providing them with the tools to do so, is foundational and ultimately achieving progress. As Oakland County's policies and programs evolve to reflect the Sustainability Framework, it is critical that sustainability leadership explain the reason for these changes.[86] As much as possible, leadership should point to the Guiding Principle(s) that justify the change and the objectives that will be advanced by this change. In addition, establishing county employee education and outreach programs will bring sustainability to the forefront and mainstream sustainability for staff and day-to-day operations. To incentivize collective sustainability action, the county can also consider connecting sustainability metrics to annual employee work plans and performance evaluations, leverage behavioral change applications to develop individualized sustainability coaching and training plans, and reward county departments and teams that achieve desired performance and seek partnerships with vendors that articulate the same values.

STEP 5: Provide a Platform for Safe and Open Feedback Loop

Provide a safe two-way communication channel for employees to provide feedback, including opportunities for anonymous comments. County and staff leadership are best positioned to receive and respond to employee feedback. Responses, particularly an explanation of how the sustainability program will be strengthened in response to comments, should be communicated to staff in a timely manner.



86 In focus groups facilitated as part of the Plan's development process, county employees reported that they often did not know the reason behind recent changes and expressed interest in county and staff leadership communication around why the change is happening.

Tracking Sustainability Progress

The Sustainability Framework defined in this Plan provides a set of Objectives and KPIs to monitor and review progress. The county can continuously monitor progress by tracking and analyzing performance according to the sustainability Objectives and KPIs. Progress towards achieving stated sustainability goals should be tracked on an internal or public dashboard to increase transparency and accountability for organizational processes.

The following steps can be taken to streamline progress reporting processes:

- Catalo ging and standardizing data streams required for tracking KPIs
- Hosting trainings to ensure consistent use of KPI evaluation methodologies (including quality control procedures) and reporting templates across departments and teams
- Identifying opportunities to integrate performance reporting procedures into existing workstreams
- Including strict reporting requirements in Request for Proposals (RFPs) (e.g., require waste haulers to regularly report the volume or weight of collected materials)

Monitoring performance can serve as a feedback mechanism that enables the county to identify areas for improvement and areas of success. The county can then use performance results to review its Sustainability Framework, strategies, and implementation practices to improve performance or better align with county priorities and policies.

A Message from Erin Quetell, Environmental Sustainability Officer

"Whenever you are asked if you can do a job, tell 'em, 'Certainly I can!' Then get busy and find out how to do it." – Theodore Roosevelt

To the residents and community members of Oakland County,

Thank you for your time and consideration in reviewing this plan. There is no blueprint for sustainability. It is a complex idea, and difficult to define. Politicians, scholars, and subject matter experts have tried to define sustainability with ever changing jargon and ideas as new technologies or thought processes emerge.

Acknowledging that, this inaugural Sustainability Plan attempts to define and establish strategies around sustainability to support advancement and efficiencies in Oakland County-owned facilities and operations. It aligns with the County Executive Strategic Framework and links to the overall goal of net zero carbon emission by 2050 for the county, and interim reduction of 50% carbon emissions for county operations by 2035. We have a lot of work ahead of us.

It is my pleasure to conclude this planning document and welcome feedback, critical and supportive, to continue to discover ways to implement sustainable practices into Oakland County. Together, we can work towards an equitable social infrastructure, preserve and enhance our natural environmental infrastructure, and continue to prosper as an economic driver for the State of Michigan.

Sincerely,

Erin Quetell
Chief Environmental Sustainability Officer

Appendix A

Urban Sustainability Directors Network Equity Principles and Commitments

This appendix includes the Urban Sustainability Directors Network's Equity Principles and Commitments.[87]

In the summer of 2019, the Planning and Advisory Committee (PAC) tasked the Equity Advisory Committee (EAC) with creating a strategy to prioritize equity network-wide. In response, the EAC collaborated to draft Equity Principles and Commitments, which outline USDN's foundational equity values and the resulting commitments the organization is making. In August of 2020, the EAC presented its work to the PAC, and the PAC unanimously endorsed the Equity Principles and Commitments (see below), which will help guide USDN's staffing, programming, and budget decisions.

Equity Principles

USDN recognizes that:

1. **The root causes of climate change, environmental injustice, and racial inequity are the same.** Climate change, environmental injustice, and racial inequity are systemic outcomes of colonization: the exploitative extraction of natural and human resources to generate profit for the few. Solutions that do not directly address these common causes will not succeed.
2. **Successful solutions prioritize the most marginalized.** We believe that to design better solutions, we must practice targeted universalism, prioritizing those who experience the most vulnerability to climate change, disproportionate exposure to environmental injustice, and the biggest barriers to benefiting from climate solutions. By doing so, we will produce solutions that meet the needs of everyone. By not doing so, we are upholding current disparities.
3. **Prioritizing marginalized communities means leading with race.** Race is the leading predictor of outcomes across the United States and Canada, yet governments have not systemically acknowledged or addressed disparities by race or their role in creating them. Because of this, racial analysis must be a priority. "Leading with race" does not mean "only race." It is a practice of starting with a racial equity analysis to understand how race impacts outcomes, recognizing how the intersectionality of identities and groups also impacts outcomes.
4. **Equity is a professional competency.** The skills associated with advancing equity make us better public servants, preparing us to deal with the complex nature of the social, economic, and environmental challenges our communities face. Equity is responsible governance. The government has a fiscal and moral responsibility to address the long-term implications that inequity has on prosperity, health, and safety for residents and stakeholders. Governments can either create or eliminate barriers for better outcomes through their policies, programs, and relationships.
5. **Diversity is an asset.** Increasing diversity within the sustainability field, and particularly in decision-making positions within government, will increase the long-term relevance and accountability of our work to communities who have been systematically denied influence. Diverse perspectives produce more sophisticated solutions. To diversify successfully, the sustainability field must consciously build an inclusive culture.

87 https://www.usdn.org/about/usdn-equity-principles-and-commitments.html#/

Equity Commitments

USDN commits to:

6. **Creating a learning community.** Developing equitable solutions that will produce the change needed in our communities will be hard, complicated work. USDN is a space for us to be authentic and make mistakes, but it will also push us to do better and be better.
7. **Supporting our members' individual racial equity work.** To build our professional competency and confidence in racial equity work, we must honor the vulnerability, courage, and humanity required. Although systemic racism negatively impacts us all, Black, Indigenous, and People of Color bodies and white bodies will have different needs, from healing to humility. We will support each member's individual anti-racism practice.
8. **Building the pipeline of diverse sustainability professionals and developing leaders.** We are committed to using our positional power and influence to attract, train, and retain members from communities underrepresented in the sustainability field, particularly Black, Indigenous, and People of Color practitioners. We also commit to creating growth and leadership opportunities for these individuals.
9. **Structuring USDN funding and resources to support our equity principles.** USDN will use our equity principles to inform staffing, programming, and budget decisions for both our organization and the funds we make available to members.
10. **Accelerating adoption of equity values and commitments in our field of practice.** USDN will work with partners that share our values, and we will use our organizational influence to set an example of racial equity work for our community of practice.
11. **Creating an inclusive culture.** USDN will create spaces where members, staff, and partners feel welcome to participate fully with their identities, experiences, and positions.
12. **Being accountable to our principles.** USDN will evaluate and publicly report on how we are living up to our explicitly stated equity principles and our opportunities to do better.

Appendix B

Summary of Strategies

Table 15. Summary of Strategies

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
S1	Standardize Business Management Tools and Workflows Across Departments							X			X	X			X	County Executive	Information Technology, Management and Budget, Office of Sustainability, Purchasing, Departmental Leadership	
S2	Develop an Integrated Planning Checklist to Coordinate Investments							X							X	Facilities Management, Parks and Recreation	Office of Sustainability, WRC, Information Technology, Management and Budget, Planning Division	DTE Energy, Consumers Energy, City of Pontiac, Waterford Township, Plante Moran, Oakland County Road Commission
S3	Develop an Enterprise Asset Management Plan							X	X	X	X	X	X	X	X	Facilities, Operations, and Maintenance	Office of Sustainability, Information Technology, Parks and Recreation, Water Resources Commissioner	Cityworks
S4	Update Purchasing Policies to Reflect County Diversity, Equity and Inclusion, Zero-waste, Carbon Reduction, and Other Sustainability Priorities	X				X		X	X	X			X		X	Purchasing	Office of Sustainability, Office of Diversity, Equity, and Inclusion	

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
S5	Update the Purchasing Evaluation Handbook to Increase Diversity of Bid Evaluation Teams and Incorporate Sustainability Evaluation Criteria							X	X	X						Purchasing	Office of Diversity, Equity, and Inclusion, Office of Sustainability	
S6	Expand Business Forward Initiative to include Sustainability-Focused Services	X		X				X	X	X	X					Economic Development	Office of Diversity, Equity, and Inclusion, Purchasing	
S7	Perform an ADA Compliance Study*							X	X	X	X					Facilities Management	Office of Sustainability, Office of Diversity, Equity, and Inclusion, Parks and Recreation, Risk Management Department	
W1	Define Health and Wellness Vision and Values for Oakland County*		X						X	X	X	X			X	Human Resources	Office of Sustainability, County Executive	Marsh & McLennan Agency
W2	Develop Actionable Support for Wellness in Employee Lifestyles	X	X		X			X	X	X	X	X				Human Resources	County Executive	External vendors
W3	Enact County-Wide Workplace Guidelines and Standards		X		X	X			X	X	X			X	X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Human Resources, Purchasing, Environmental Health Services Unit of the Health Division	Marsh & McLennan Agency, Vendor partnerships

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
F1	Conduct a Decarbonization Feasibility Study for the Central Steam Plant					X		X					X		X	Facilities Planning and Engineering Division	Facilities Management: Facilities, Maintenance, and Operations Division, Engineering	
F2	Pursue On-Site Solar Generation at Key Campus Locations					X		X					X		X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing	
F3	Develop an Electric Vehicle Infrastructure and Fleet Transition Plan for the Oakland County Campus					X		X			X		X			Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing, Parks and Recreation	
H1	Perform Energy Audits at Target Facilities					X		X					X			Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing	

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
H2	Complete Campus-Wide LED Lighting Conversion*					X		X					X		X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Purchasing, Human Resources	
H3	Continue Investment in Energy Efficiency Measures*					X		X					X		X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Purchasing, Human Resources	
H4	Perform a Campus-Wide Water Audit					X		X							X	Facilities Management	WRC	
H5	Continue Investment in Water Efficiency and Conservation Measures*					X		X							X	Facilities Management, Parks and Recreation	WRC	

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
H6	Develop Sustainable New Construction and Major Renovation Standards					X							X	X	X	Office of Sustainability, Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Purchasing, WRC, Parks and Recreation	
D1	Review and Renegotiate Waste Hauling Contracts*							X							X	Facilities Management, Parks and Recreation	Office of Sustainability, Purchasing	
D2	Expand Recyclable Material Collection					X		X					X		X	Facilities Management, Parks and Recreation	Office of Sustainability	
D3	Expand Organic Material Collection					X		X					X		X	Facilities Management, Parks and Recreation	Office of Sustainability	
D4	Deploy Smart Waste Management Systems							X							X	Facilities Management	Office of Sustainability, Parks and Recreation	
D5	Develop Policies to Minimize Office Supply Consumption							X							X	Purchasing	Office of Sustainability	

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
O1	Improve Connectivity with Non-Motorized Pathways*		X		X	X			X	X	X		X			Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division	Parks and Recreation	Oakland County Road Commission, MDOT, SMART, SEMCOG
O2	Expand and Improve Signage with Accessibility in Mind			X	X			X	X	X	X	X				Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division; Parks and Recreation: Wayfinding Group and Sign Standards Work Group	Office of Diversity, Equity, and Inclusion; Media and Communications; Office of Sustainability	Oakland County Road Commission, MDOT
O3	Strategically Convert Lawns to Forest or Meadow					X		X					X	X	X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division; Parks and Recreation	Office of Sustainability, WRC	

LEGEND: (*) In Progress

		County Strategic Goal								Sustainability Guiding Principle						Teams		Partners
ID	NAME	THRIVING AND INCLUSIVE ECONOMY	HEALTHY RESIDENTS	SKILLED AND EDUCATED WORKFORCE	LIVABLE NEIGHBORHOODS	ENVIRONMENTAL SUSTAINABILITY	PUBLIC SAFETY AND FAIRNESS IN THE CRIMINAL JUSTICE SYSTEM	ORGANIZATIONAL EXCELLENCE	DIVERSITY, EQUITY, AND INCLUSION	OPERATIONALIZE DIVERSITY, EQUITY, AND INCLUSION	PROVIDE ACCESSIBLE SERVICES AND CAMPUS ENVIRONMENT	CREATE EDUCATION AND ENGAGEMENT OPPORTUNITIES	ADVANCE THE NET ZERO CARBON GOAL	IMPROVE AIR AND WATER QUALITY	MAXIMIZE RESOURCE EFFICIENCY	LEAD	SUPPORT	
O4	Implement Ecological Restoration Projects				X	X							X	X	X	Office of Sustainability	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division; Parks and Recreation; WRC	City of Pontiac, Waterford Township, Plant Wise
O5	Reduce Paved Areas and Transition to Permeable Pavements or Greenspace*					X		X						X	X	Facilities Management: Facilities, Maintenance, and Operations Division and Facilities Planning and Engineering Division, Parks and Recreation	Office of Sustainability, WRC	City of Pontiac, Waterford Township, Oakland County Road Commission, MDOT

LEGEND: (*) In Progress

Appendix C

Stakeholder Engagement

This appendix describes the various engagement activities and the departments, programs, or organizations engaged.

Engagement Activities

Steering Committee Meetings:

The Steering Committee included members of the county's Environmental Committee and select county employees with a keen interest in sustainability. Three Steering Committee meetings were held throughout the Sustainability Plan development process. This Committee provided general guidance, direction, and feedback.

Each Steering Committee meeting included information on the Sustainability Plan overall, development progress, and a discussion activity to gather participant input. The initial Steering Committee meeting was designed to gather input needed to inform the project vision. The second meeting focused on testing vision concepts and receiving feedback on Focus Areas and Guiding Principles. The third meeting focused on reviewing components of the draft Sustainability Plan.

Technical Interviews:

Five large group interviews were held to confirm or clarify technical information gathered through a Request for Information process. Interviewees were selected by the county based upon the employees' knowledge of specified subject matters. Each group interview had a topic of focus. These topics were:

- Campus Grounds
- Campus Facilities
- Parks Grounds
- Parks Facilities
- Health and Wellness

In addition to large group interviews, multiple smaller group and individual interviews with county staff relating to waste, procurement, health and wellness, asset management, and finance were held. These interviews were conducted to gather information from staff not available during the larger group interviews or to discuss topics in more detail than was possible in the large group interviews.

Focus Groups

Focus Groups were held in two rounds. The first round was held as analysis of Oakland County's operations was beginning. The second round of Focus Groups was held as potential sustainability strategies were being developed.

Round One:

During the first round, two Focus Groups were utilized to gather information, opinions, and insights relating to employee health and wellness. The members of these Focus Groups were selected based upon the organization in which they worked and the building in which they were located. A third Focus Group was used to test the visioning results from the first Steering Committee meeting.

Focus Group participants were selected based on a set of criteria to reflect a variety of job types, work locations, ethnicity and length of service with the county.

Round Two:

During this round of Focus Groups, two groups were used to gather feedback on potential sustainability strategies regarding ease of implementation and impact on employees. These groups consisted of employees randomly selected as well as employees that could have a role in strategy implementation. The third Round Two Focus Group was primarily designed to gather input about employees' readiness and resistance to change, knowledge about the Sustainability Plan project, and methods of communication. The Round Two Focus Group members were chosen randomly using criteria to approximate the racial and gender make up of Oakland County Employees.

The Focus Groups were held virtually and included an overview of project information followed by interactive activities to gather participant insights with introductory and project information provided through a slide presentation.

Virtual Room and Surveys

An online Virtual Engagement Room was created to provide the opportunity for employees to learn about the development of the Sustainability Plan and various topics relating to sustainability. Survey questions embedded in the Virtual Engagement Room sought information regarding how employees view sustainability, their vision of success for the county's sustainability efforts, and obstacles to success. Virtual Room engagement levels were low.

A separate online survey with questions like those in the Virtual Room was prepared to solicit information regarding employees' views regarding sustainability, their vision of success for the county's Sustainability efforts, and obstacles to success. Survey response rate was low.

Public Review

It is important that the county be transparent about its activities. A summary of the Plan and information about sustainability was provided via a Story Map on the county's website.

Engagement Participants

Almost 100 individual county employees took part in virtual engagement events, with some participating in multiple meetings. In total, employees provided input through meetings, the Virtual Room, and surveys in approximately 185 instances. Fifty different county divisions, programs, or organizations participated in engagement meetings.

County Department, Program, or Organization Participating in Engagement Meetings:

County Executive Administration
Corporation Counsel
Risk Management
Management & Budget Administration
Purchasing
Equalization Administration
Fiscal Services Administration
Fiscal Services Reimbursement
Facilities Management Administration
Facilities Management/Support Services Division
Facilities Maintenance & Operations Administration
Facilities Maintenance & Operations Building Custodial
Facilities Maintenance & Operations Building Maintenance
Facilities Planning & Engineering
Human Resources Administration
Human Resources Recruitment
Human Resources Benefits Administration
Human Resources Retirement
Human Resources Employee Benefits
Health Administration
Neighborhood & Housing Development
Public Services Administration
Children's Village Administration
Animal Control Administration
IT Administration
IT CLEMIS
Economic Development Administration
Planning & Local Business Development Division
Planning & Local Business Development/Trails Transportation & Environment
National & International Business Attraction
Emergency Management and Homeland Security
Department of Public Communications Community Engagement Unit
Circuit Court Civil/Criminal
Circuit Court Family Friend of the Court
Probate Estates & Mental Health
Prosecuting Attorney/Litigation
Sheriff/Sheriff's Staff
Sheriff/ERP/Administration
Sheriff/Patrol Service/Traffic
Emergency Communications Operations
Board of Commissioners/Administration
Library Board/Administration
Parks & Recreation Administrative Services
Parks & Recreation Programs & Services
Parks & Recreation Red Oaks Waterpark
Parks & Recreation Parks Facilities Maintenance & Development
Water Resources Commission Administration
Water Resources Commission Financial Services
Water Resources Commission Plan Review and Permit Services
Treasurer/Administration

Appendix D

Change Management Plan

This Change Management Plan is founded on the Prosci Change Management approach. Prosci is a global leader in Change Management. Training and certification as a Certified Change Practitioner is provided by Prosci.

Introduction

The Office of Environmental Sustainability will utilize this Change Management Plan when implementing strategies provided in this Sustainability Plan. This Change Management Plan includes an approach to identify the cause of any internal resistance to sustainability initiatives and is developed from practices defined by Prosci. Prosci's Change Management methodology is founded on scientific principles and applied research that is results-oriented to manage organization-wide change, one person at a time.

The Change Management Attachment is an Excel file to use in conjunction with this **Change Management Plan** as part of the Oakland County Sustainability Plan. The tabs in the Excel file correlate to the phases in the written Change Management Plan.

The change management team identified by the county to deliver this plan will utilize the following tools at these specified phases: 1) complete the Change Impact Assessment and Stakeholder Matrix tabs during Phase 1 of the Change Management Plan, and 2) complete the Communications Plan, Leadership Sponsor Roadmap, and Resistance Management Plan during Phase 2 of the Change Management Plan.

Defining Change Management

Change Management is an applied process and set of tools to help lead the people side of change, in parallel to the technical side of change, and reach organization desired outcomes. Change Management aids in mobilizing teams to understand why change is happening and provides transition allowing employees to be successful through times of change. Change Management has both a technical side and a people side. The technical side focuses on designing, developing, and delivering technical solutions, while the people side has a focus on employees to embrace, adopt, and use the change. The sustainability strategies outlined in the first half of this document represent the technical side of change. Change occurs one person at a time in an organization - going from current, to transition, to future state - and can occur at an individual, project team, or organizational level. It is important that change is viewed as a process, and the actions and activities are customized to the needs the county's organization. For Change Management to be successful, it is important to have a network of stakeholders across the organization that support the vision and key behaviors. Critical actions to ensure the success of any change include transparent and honest communication, leadership role-modeling behaviors, developing tools to help employees through change, building trust in leadership and the program, and ensuring measures are in place to sustain changes.

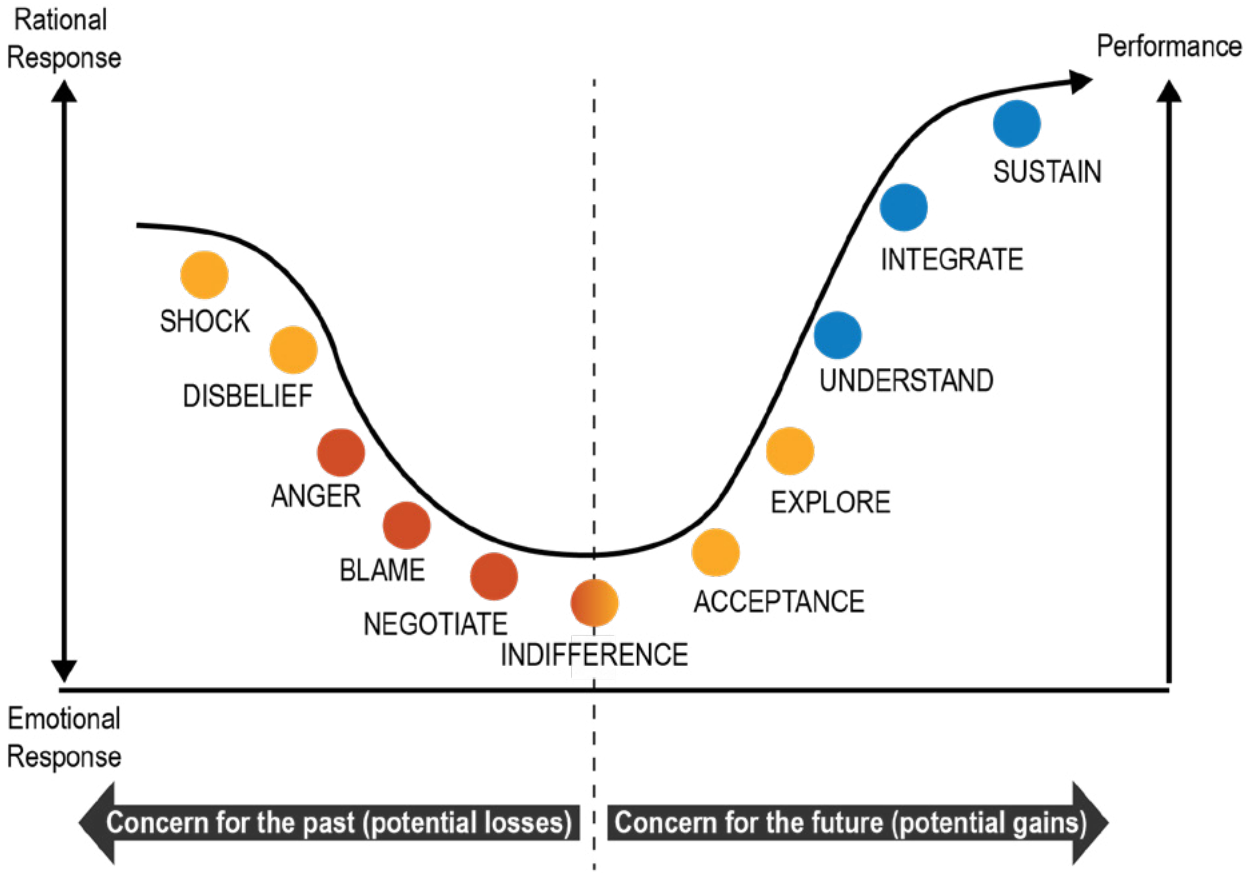
The Value of Change Management

When Change Management initiatives have good performance, they are six times more likely to meet project goals and objectives than initiatives with poor Change Management.[88] This success demonstrates the connection between employees realizing expected benefits and that change is a strategic capability that helps organizations become more resilient.

Models for Change Management – Individual Level

There are several approaches to setting a Change Management framework to develop a common and shared vocabulary around change and how individuals respond and react. The Kubler-Ross[89] change curve is a diagrammatic tool used today by many organizations to show how people respond to and experience change over time.

Figure 23. Kubler-Ross Change Curve



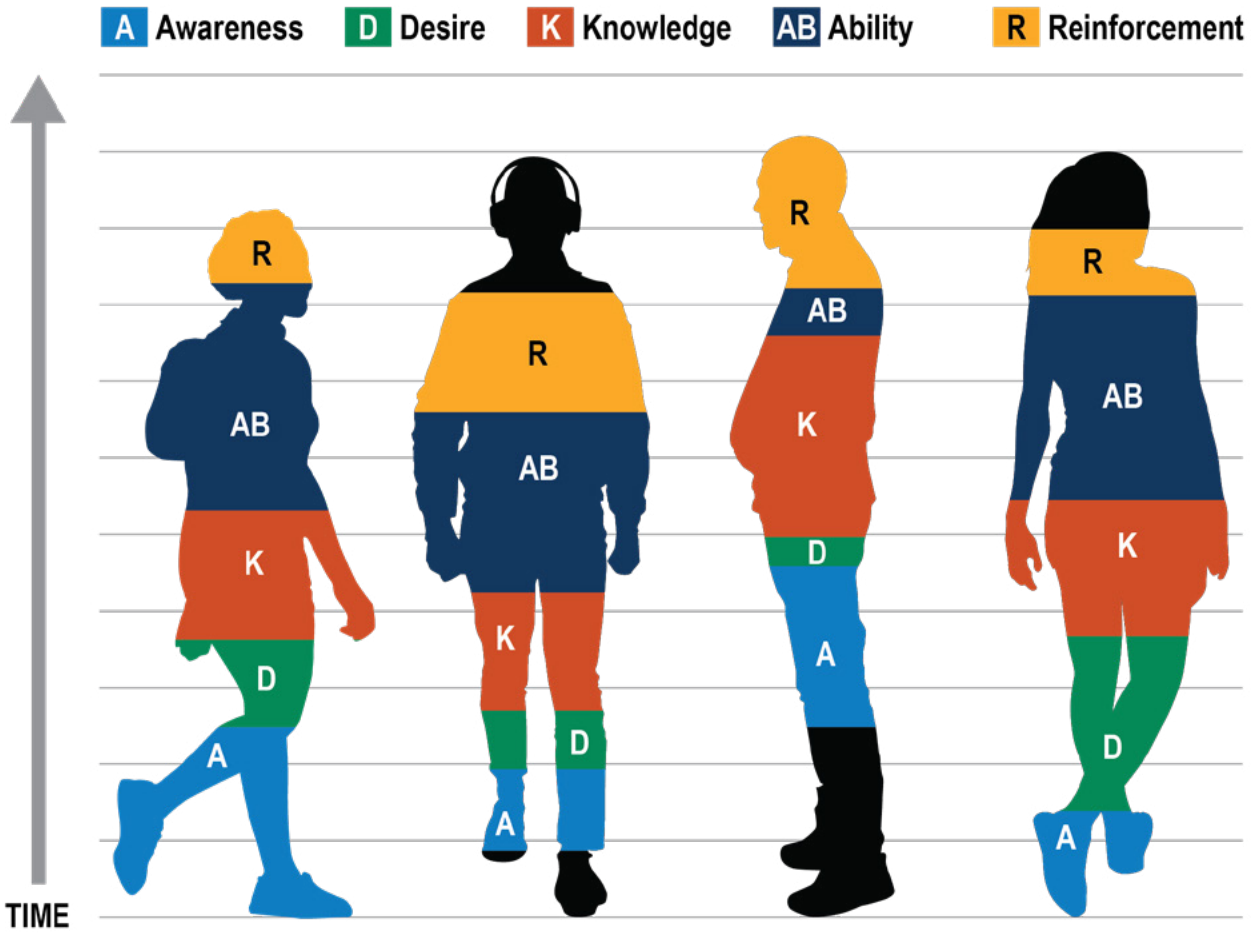
88 Prosci Benchmarking data 2007-2019

89 https://www.ekrfoundation.org/5-stages-of-grief/change-curve/

Procsi's change model, ADKAR[90], shares recognizable traits with the Kubler-Ross Change Curve, as the ADKAR steps could hypothetically be mapped across time. ADKAR is an acronym for: awareness, desire, knowledge, ability, and reinforcement. Procsi's ADKAR model is a framework to understand where people are in the change process when they are going through a change, and at which stage each individual is currently in – whether that is being aware of, desiring, knowledgeable of, able to adopt, or reinforcing a change.

Another Change Management model, the SCARF model[91], consists of five motivators, including: Status, Certainty, Autonomy, Relatedness, and Fairness. When people feel intimidated, it leads to a decrease in performance at work. On the contrary, when people feel recognized or rewarded, their performance increases. The SCARF model focuses on recognizing and addressing fears and maximizing the recognition from team members. Using the SCARF model can improve team performance and encourage constructive feedback from team members.

Figure 24. ADKAR Model Over Time per Person: Change Occurs at Different Times for Different People



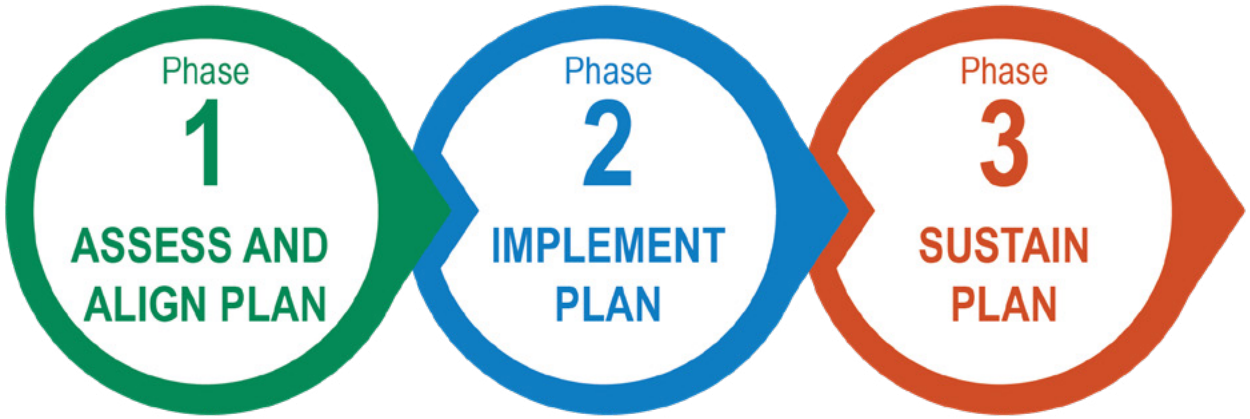
Source: https://pminb.ca/images/downloads/SelfGrowth_Professional_Development_Days_2021/pminb_change_management_presentation_may_13_2021.pdf

90 https://www.prosci.com/methodology/adkar?utm_term=prosci%20adkar&utm_campaign=ADKAR&utm_source=adwords&utm_medium=ppc&hsa_acc=5529787200&hsa_cam=10286811822&hsa_grp=100632746377&hsa_ad=497488228964&hsa_src=g&hsa_tgt=aud-1241589768885:kwd-302580028780&hsa_kw=prosci%20adkar&hsa_mt=e&hsa_net=adwords&hsa_ver=3&gclid=Cj0KCQjwjN-SBhCkARIsACsrBz4VrstbxkyIM8fUlW12ic6vWeriwMf3tK5Rk545LuJ7LWIaaSEY1SQaAsSaEALw_wcB

91 http://web.archive.org/web/20100705024057/http://www.your-brain-at-work.com/files/NLJ_SCARFUS.pdf

How to Use This Plan

This Change Management Plan includes three phases: **Phase 1 | Assess and Align Plan**, **Phase 2 | Implement Plan**, and **Phase 3 | Sustain Plan**. Throughout all three phases of this Change Management Plan thorough, consistent, and clear communication with all relevant stakeholders across Oakland County is critical to success. Throughout this Change Management Plan, there are references to 'projects' or a 'project.' This plan assumes that strategies in this Sustainability Plan will ultimately manifest in individual and specific projects implemented towards achieving the county's strategy. Additionally, this plan references 'project management' teams, assuming that individual projects are managed and delivered through this specific team, which is distinct from 'Change Management' teams.



Stakeholder Engagement for Change Management

Throughout the development of the Sustainability Plan, Oakland County employees have been engaged from a cross-section of the organization. Please reference Appendix C: Stakeholder Engagement to see all Stakeholder Engagement conducted towards the county's Sustainability Plan, and the outcomes and takeaways from that engagement. Engagement throughout Change Management at the employee level is crucial for employee buy-in when the time comes to implement sustainability strategies. This summary provides the stakeholder engagement key takeaways thus far that have informed the Change Management Plan and approach. While stakeholder engagement key takeaways are fully defined in the Stakeholder Engagement section of this plan, a high level summary of engagements is provided here through the change management lens. This summary provides the highest level of sentiment from employees engaged that should be considered when delivering change management.

Throughout all engagement activities, employees raised a consistent concern that resource constraints are a barrier to sustainability initiatives. Employees expressed that leadership needs to improve two-way communication and implement employee feedback. Employees engaged seemed to be interested in sustainability initiatives if they had the budget to implement them.

From technical interviews, the takeaway is that facilities maintenance and operations teams understand the value of sustainability improvements and are eager for resources to deliver them. Additionally, organization-wide baseline use of specific software to collect and dispatch maintenance work orders and monitor asset condition (i.e., Cityworks) is a step Oakland County is taking to streamline efforts and track progress towards O&M goals. Currently the county is not utilizing all Cityworks functions. Having specific software that tracks progress towards project goals allows the county to see what areas of a change are successful and what areas may need additional attention.

Nature, ecosystem, and trails related technical interviews provided the insight that Parks and Recreation has two existing committees dedicated to sustainability initiatives, which can be a resource for implementing successful Change Management.

Employees in Parks and Recreation understand the value of sustainability initiatives and are eager for the resources to deliver them.

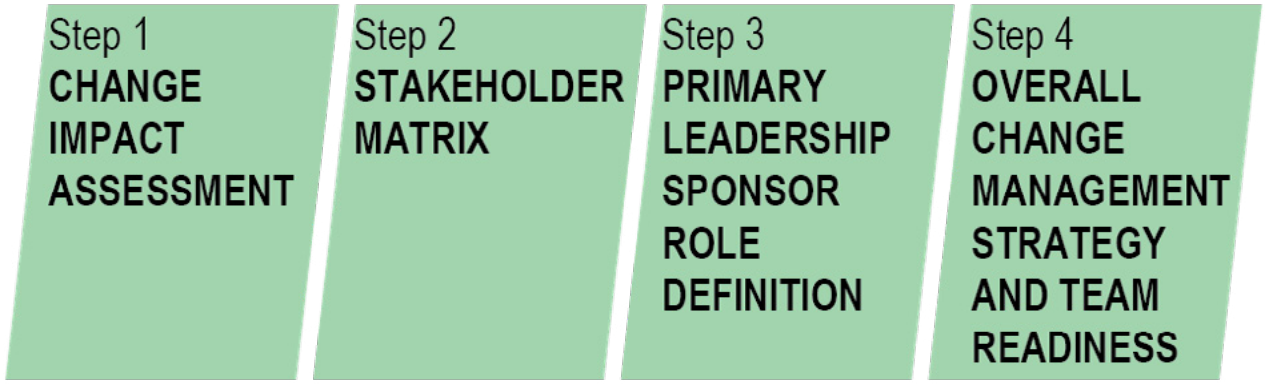
Technical interview outcomes on the topic of energy centered on the need for more clarity around energy goals and how this affects current roles and responsibilities of building engineers. Employees have implemented some forms of energy efficiency, like retrofitting LEDs, and have yet to tackle more complex efficiency issues. There currently is no database to track energy efficiency building updates.

Technical interviews and focus groups provided insights on Health and Wellness on the county's campus. These insights led to the takeaway that there is not a consistent approach to resources or offerings for employee wellness. Examples include: the standing desk approach being different per department, and wellness offerings are not universally available for different work schedules and locations. Additionally, findings demonstrated that the OakFit Wellness Program currently bases messaging on ROI to the county rather than the benefit directly to the individual.

Phase 1 | Assess and Align Plan

Phase 1 prepares teams for conducting the Change Management Plan itself. There are two goals of this phase of the Change Management Plan. One goal is to define why Oakland County has developed the Sustainability Plan, and why changes are occurring as related to its implementation. The other goal is to define who relevant stakeholders are, including those impacted by Sustainability Plan implementation changes and those critical to successful and lasting change and operations.

The specific steps to be complete during Phase 1 include: 1) conduct Change Impact Assessment, 2) prepare the Stakeholder Matrix, 3) prepare the Primary Leadership Sponsor Role, and 4) coalesce the overall Change Management strategy based on these developed items 1-3 in partnership with specific project management teams. Find a Change Impact Assessment Template and Stakeholder Matrix Template in the **Change Management Attachment**. This section will also explain how to use these templates in the appropriate steps.



Step 1 | Change Impact Assessment

Impact assessments are critical engagement activities meant to highlight the size and breadth of the change and gather information to ensure resources are allocated to implementing the change effectively.

The purpose of this Change Impact Assessment is to provide an understanding of the size of the change and the gap between the current situation and the desired future state, and finally to identify areas that need to be supported through the transition. Change impacts can include people, technology, behavior, processes, systems, workplace, and services. Conduct a Change Impact Assessment for every major Sustainability Plan Focus Area, Strategy, and project as applicable. The change impact may be the same for an entire Focus Area, so it isn't always necessary to complete a change impact assessment for every project. Additionally, it may be beneficial to revisit the impact assessment at key milestones throughout the project. It is important to continue to capture the impacts as the project progresses and outcomes gain increasing clarity.

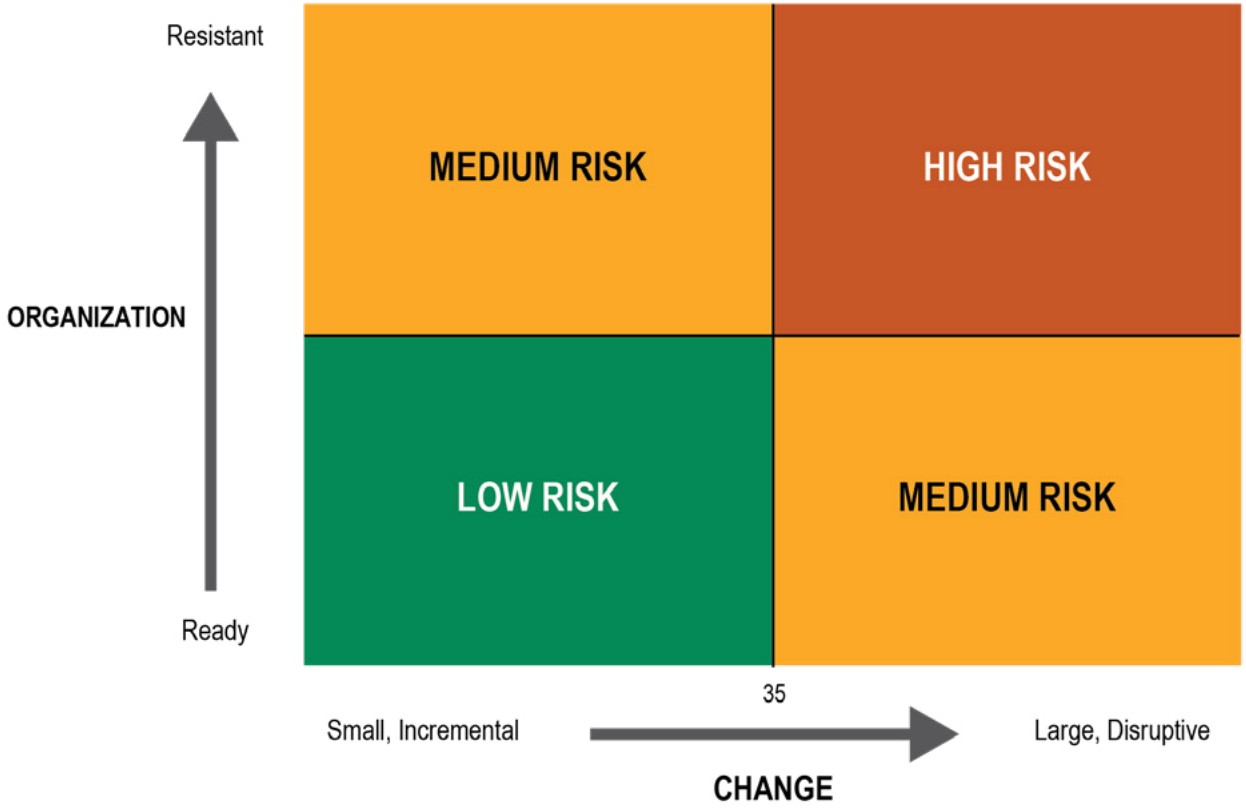
The steps that follow are to complete an impact assessment, through hosting and facilitating an interactive workshop. The goal of the workshop is to define details of sustainability implementation and changes. The workshop participants will be completing the Impact Assessment Matrix, using the template provided in **Change Management Attachment**, by defining the type and level of impact associated with the change. Completing this matrix includes identifying who will have an active role in completing the change and who will be impacted by the change. The outcome of completing the Change Impact Assessment is that areas of drastic change will be identified, and the project and change team can understand where resources are needed to mitigate and lead successful change.

Change impacts assessments may be completed in collaboration with a Change Leader Group and other key project team members. A Change Leader Group consists of a key group of individuals who form an important part of the change network. The role of the Change Leader Group is to support and engage employees through the change journey by being the conduit between the business units they represent and the project implementation team. Each Change Leader is nominated by business unit leaders based on desired attributes towards group makeup. The Change Leader Group role includes providing support to the change team by collecting feedback, cascading messages, and role-modelling behaviors. The Change Leader Group is a tool towards sustaining and embedding changes long term. The recommended size of this group is approximately 15 to 25 people and dependent on the number of departments that need representation. The Change Leader Group will be aware of what is changing, what is not changing, who is impacted, the timelines of the impact, the source of the change, the scope of change, and the risks of not changing.

Considerations while completing the Change Impact Assessment include identifying impacts and what motivators at an individual level are affected. This will help the county develop actions to respond to these impacts and motivators of change. A helpful tip is to remember is – do not just focus on negative impacts of change. Make sure that the positive impacts of the change are also discussed. These will help create positive messages, to bring users through a successful change journey. Once the impact assessment is complete, speak to department leads across the organizations to confirm alignment on impacts and that no major themes have been overlooked.

Defining change impact includes defining risk associated to any given project. A project's risk depends on organizational attributes and change characteristics. If the organization is supportive of the change, the project will have a lower amount of risk. When changes are small and incremental, they have less risk than large and disruptive changes. The diagram shown in Figure 25 depicts different levels of risk based on where a project falls within a change matrix. The matrix shows change characteristics (x-axis) and organizational attributes (y-axis). Information from your analysis of the change impact will inform a project's location on the change matrix. Once determined, communication of the project risk to the Primary Leadership Sponsor (this role is defined below in Phase 1, Step 3) is key because additional Change Management tactics and resources may be required to mitigate risk on a project. The risk level is not good or bad. The risk level informs the Change Management strategies needed to achieve success.

Figure 25. Organizational Attributes and Change Characteristics Risk Mapping



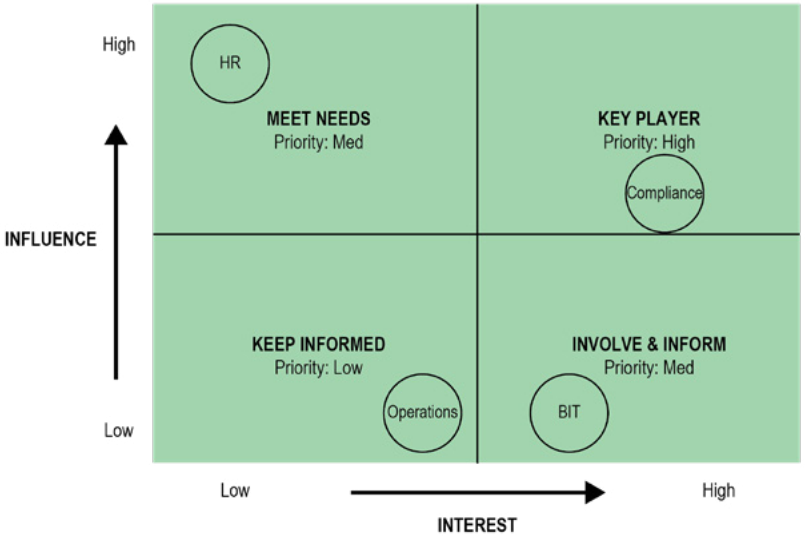
Source: https://blog.prosci.com/keys-to-prepare-for-change

Step 2 | Stakeholder Matrix

Development of the Stakeholder Matrix provides identification of all relevant stakeholders impacted through the county's Sustainability Plan. Due to the current parameters of the county's Sustainability Plan, the Stakeholder Matrix defined here is focused on Oakland County employees. Oakland County employees that are included in the Stakeholder Matrix may include: leadership, managers, change leaders, project and Change Management teams, communications teams, operations, human resources, information technology, and all other staff. Stakeholders will not necessarily know what is expected of them or understand the future vision at the onset of implementing the Change Management Plan or a specific project. Therefore, managing stakeholders and clearly defining roles and outcomes is necessary for project success. This Stakeholder Matrix tool in the **Change Management Attachment** will provide clarity in understanding stakeholder perspectives, in order to track and monitor progress with them throughout the change journey. Additionally, this tool can help identify both advocates and blockers of change. Identifying and understanding stakeholders, and if they will advocate or block the changes, will be essential in tailoring the communications and engagement approach (defined in Phase 2 | Implement Plan). All impacted stakeholders within an organization should be included on the matrix to confirm the best groups are engaged.

Stakeholder management is an ongoing process and needs to be reviewed frequently throughout the project. Consider applying the identified stakeholder attributes from the matrix to a stakeholder mapping exercise to visually map out the elements. The example stakeholder map provided in Figure 26 can help identify where to designate Change Management resources to help ensure that the change is successful. Stakeholders who have a high level of interest in the change occurring and a high level of influence within the organization will be crucial in the success of the change. Stakeholders who have a high level of interest, but a low level of influence should be informed throughout the change.

Figure 26. Stakeholder Matrix



Key Player

- When stakeholders have a high level of interest in the change and a high level of influence, work closely with them to achieve results.

Meet Needs

- Keep stakeholders who have a strong influence but a low interest in the change satisfied and confident throughout the program.

Involve and Inform

- Stakeholders who have high interest in the change but have limited influence need to be kept informed throughout the program. Involve them in low-risk areas to maintain interest.

Keep Informed

- Stakeholders with limited influence and low interest in the change should receive general communications and responses to questions asked. Aim to engage and increase interest in these stakeholders.

Step 3 | Primary Leadership Sponsor Role Definition

The Primary Leadership Sponsor role needs to be defined at the onset of Sustainability Plan implementation and builds upon the defined change characteristics and organizational attributes of the change impact assessment. The Primary Leadership Sponsor role is crucial for successful change initiatives and is an essential deliverer of key messages about change with employees. It is best practice to have active and visible executive sponsorship as projects with strong, effective sponsorship demonstrate strong successful outcomes.[92] The Primary Leadership Sponsor will also inform direction on influential employees within the organization, usually managers or leaders, who in turn advocate for and approve of any changes.

The Primary Leadership Sponsor for the county's Sustainability Plan will take one of the following forms: 1) someone on the project and Change Management team, 2) a mid-level manager, 3) both an executive leader and a mid-level manager, or 4) a steering committee member and an executive leader. Progressively each of these four models requires more resources and power regarding project sponsorship. The higher organizational attributes (change-resistant) and change characteristics (large and disruptive) the project is, the greater the need for strong project sponsorship. The higher the impact and risk identified during the Change Impact Assessment, the more critical support and sponsorship from leaders in the organization is for project success.

The Primary Leadership Sponsor participates actively and visibly throughout the project and must build a needed coalition of sponsorship with peers and other managers. The Primary Leadership Sponsor will set expectations and establish clear objectives for the project while holding the project team accountable for results. The Primary Leadership Sponsor will attend frequent project review meetings and actively review progress. Employees will look to senior leaders, such as the Primary Leadership Sponsor, for messages (both spoken and unspoken) about the project's importance and the organization's commitment to the change. The Primary Leadership Sponsor has been identified as the number one contribution to change success when there is active and visible sponsorship across benchmarking case studies. Finally, the Primary Leadership Sponsor, in a senior leadership role, is one of the two preferred senders of messages about change, especially when the topic is about business drivers for change (the other being directly from an employee's manager, on topics of day-to-day impacts).

An additional effective tool around Change Management leadership is establishing an Executive Leadership Team for sustainability at the county, which would include the Primary Leadership Sponsor. All impacted groups/departments should be represented in the Executive Leadership Team. An example makeup of an Executive Leadership Team may have approximately five members, all executive peers who convene to receive progress updates and provide guidance, input, and leadership at a regular cadence. This is made possible with the collaboration and action of the Executive Leadership Team as a whole. Convening a team with decision-making authority all in one place to document decisions to move a project forward is an effective way to ensure schedules, scopes, and budgets can be maintained.

The support system for the change includes the Executive Leadership Team and the Primary Leadership Sponsor. Together they make the change possible. It is important that endorsement of change be given and that expectations are clear at the beginning of the project to ensure leaders can commit the appropriate amount of time and resources to the Change Management process. It can often be helpful to discuss with the Executive Leadership Team what they perceive to be the traits of effective (and ineffective) leadership, and how this relates to the change process. Examples of engagements with the Executive Leadership Teams include: setting a vision for the future, defining reason and context for change, discussing ways of promoting change, and defining challenges to understand where the barriers lie. A helpful tip for the Executive Leadership Team is to not assume everyone is advocating for the change at the onset, not everyone will be on board with change – each Executive Leadership Team member is somewhere on the change curve too. Work with the Executive Leadership Team and share the importance of their role in supporting other people through their journey.

92 https://www.prosci.com/resources/articles/change-management-best-practices

Step 4 | Overall Change Management Strategy and Team Readiness

Defining an overall, actionable Change Management strategy per project will require collaboration with the project management team, to understand project parameters that feed into the strategy. There are four actions that are required to define an overall Change Management strategy per project, including: scope definition, identifying stakeholders impacted, defining change type, and defining change magnitude.

The first action, defining the scope, needs to be considered for each specific project within the overall Sustainability Plan to scope the change. The scope of change will be informed by the specific project scope, which will be coordinated through the project management team. Similar projects may align to the same change management needs and can be combined in one change management approach to streamline processes. One example of projects with similar change management needs is a compost program strategy and a recycling program strategy. These have similar impacts on end users, so one change management approach to ensure end user buy-in, and therefore, strategy success, can be utilized. The second action is to determine the number of individuals impacted by the change. For example, any specific project may impact a single workgroup, department, division, or the entire county employee base. The third action is to define what type of change is occurring per project and implementation initiative. Change types that apply to the county's Sustainability Plan include policy, process, system, operations, organization, job roles, staffing level, and strategy. Additionally, defining what type of change is occurring can be informed by the six Focus Areas (Sustainable Governance, Facility and Fleet Decarbonization, High-Performance Buildings, Waste Reduction and Diversion, Open Space, Ecosystems, and Connectivity, and Health and Wellness). The final step in defining the Change Management strategy is to determine the amount of change that is occurring. Determine if the change is an incremental improvement, a dramatic change, or if the change falls somewhere in the middle.

Defining the future state will help to gain insight into crafting a Change Management strategy for a sustainability project. Specifically, knowing the ideal future state will help articulate the "why" behind the need for a change and build support from other stakeholders. Additionally, defining the future state will inform if the change has been a success during project delivery, tracking outcomes against progress. Identifying the future state will also identify gaps before the project commencement, align stakeholders so that everyone knows what change is occurring, and assist with prioritizing actions and resource allocation.

Finally, setting up the Oakland County team delivering Change Management is part of an effective leadership sponsor structure necessary for successful change. The Change Management team makeup can be one of the following: 1) project team members assigned Change Management tasks, 2) team external to the project team dedicated to the project to perform Change Management, 3) a combination of the previous two (with Change Management team on the project team, and also supported with a team outside to perform Change Management tasks). The third team makeup example may best support the county based on how it is structured today: with specific teams at the county who lead communications, trainings, and other necessary activities being specialized and supporting a Change Management team that is embedded within a project team.

The key is to have the Change Management team cohesively integrated with both the project team and the Primary Leadership Sponsor. The identified Change Management team will execute the Change Management Strategy through the specific plans detailed in Phase 2 | Implement Plan. The Change Management team members must have proven leadership qualities and be able to successfully manage multiple priorities and stakeholders in a fast-paced environment. Change Management team members must have excellent communication skills, high emotional intelligence and empathy, and be passionate about contributing to the successful implementation of the Sustainability Plan. Necessary key attributes of Change Management team members include the ability to inspire others, a strong understanding of Oakland County practices, forward-thinking, forward-looking, solution-oriented, confidence, and integrity.

Phase 2 | Implement Plan

Phase 2 actively engages project and Change Management teams through implementation of Change Management, using these planning tools that can be found in the **Change Management Attachment**: Communications Plan Template, Leadership Sponsor Roadmap Template, and Resistance Management Plan Template. These planning tools are integrated across overall implementation and specific project schedules to drive towards change buy-in and adoption. Once implementation is in motion, progress towards change and milestones are tracked to ensure Change Management plan alignment, and these findings are synthesized to report out to teams and leadership at regular check-ins.

The Communications Plan is a detailed matrix developed and tailored to topics specific to the Sustainability Plan strategies and Focus Areas. The items identified in the Communications Plan include the following for specific communications: targeted audiences, key messages, timeframe and frequency for issuance, and delivery methods and channels. Depending on the Change Management team structure, the Communications Plan may also include who is responsible and accountable to prepare and deliver specific communications. Additionally, when preparing the Communications Plan, it will be critical to have a current project schedule related to the Sustainability Plan strategies implementation. Knowing key project milestone dates and deadlines will directly relate to when communications are issued to staff and stakeholders. Once the Communications Plan is prepared, it should be discussed and issued with the project and Change Management team, the Primary Leadership Sponsor, and any department leaders who are needed to support changes in the Oakland County Sustainability Plan.

The Communications Plan template in the **Change Management Attachment** is to be used to complete this step in the process. Based on the Prosci ADKAR model referenced at the beginning of this Change Management Plan, the ADKAR steps the Communications Plan helps clarify on an individual bases are Awareness and Reinforcement. The following are critical details to consider and include when developing the Communications Plan:

- **WHO** is going to communicate the message to employees? Employees receive messages about change best from senior leaders or executives in the organization. Once the sender is identified, who will communicate the message to employees, consider the platform for presentation (e.g., live, recorded, text, and other platforms)
- **WHAT** behind-the-scenes information do employees need to know, or what is the reason for the project? For example, if a certain change could produce a positive result towards Oakland County's desire to lead by example, the important message is that Oakland County leads by example for sustainability.
- **WHEN** is it necessary to communicate information to employees? Communication is crucial for employees to buy-into the project, so delivering the message before the design or development has started is helpful. The best timing to introduce a project is at the project start-up. Reference the project timeline and pick the appropriate date and time for this message.
- **HOW** is the message going to be delivered? This message can be communicated via email, newsletter, meetings, etc. For example, Oakland County may determine a newsletter or a post on the Intranet site is the best fit to deliver the message.

The Leadership Sponsor Roadmap clearly outlines roles and responsibilities by project phase for the Primary Leadership Sponsor and Executive Leadership Team necessary to support the change project. Not only is this expressed in terms of roles of the Primary Leadership Sponsor by project phase, but also by stakeholder group in each phase. Creating identifiable actions that the Primary Leadership Sponsor and/or the Executive Leadership Team will complete to sponsor the change is a key activity of the Change Management team, outlined on the Leadership Sponsor Roadmap. The Primary Leadership Sponsor typically has a role in project management and Change Management. The Primary Leadership Sponsor will make project management decisions regarding resources, scope, strategy, and schedule for the project. The Primary Leadership Sponsor will also act to support change management through actively participating in the project, directly communicating with employees, and building buy-in with managers and employees.[93]

93 https://pminb.ca/images/downloads/SelfGrowth_Professional_Development_Days_2021/pminb_change_management_presentation_may_13_2021.pdf

All of these roles, responsibilities and expectations of the Primary Leadership Sponsor are included and detailed in the Roadmap. The Leadership Sponsor Roadmap will directly affect the Prosci ADKAR model steps of Awareness, Desire, and Reinforcement. The Primary Leadership Sponsor has less of a direct and active role in impacting Oakland County employees development of knowledge and ability, which is more likely to be developed through managers and peers through training. The Leadership Sponsor Roadmap template in the **Change Management Attachment** is to be used to complete this step in the process. The process for the Change Management team to follow in development and delivery of the Leadership Sponsor Model is as follows:

- **Prepare** the Leadership Sponsor Roadmap for the Primary Leadership Sponsor using the template provided in the attachment.
- **Provide** the Primary Leadership Sponsor with this Roadmap through review and discussion to confirm understanding and commitment from leaders of the change.
- **Facilitate** and assist the Primary Leadership Sponsor in completing the Roadmap throughout the project process. The Change Management team will be an ongoing aide to the primary sponsor to support the project team, align any other critical sponsors of the change, and provide direction and create awareness with employees.

The Resistance Management Plan is a proactive approach to managing resistance, and entails preparing for areas of resistance at all levels of the organization. The Resistance Management Plan can be built with the foundation of the Change Impact Assessment results from Phase 1 | Assess and Align Plan, that forecasted areas where issues may need to be confronted. The Resistance Management Plan provides guidelines for handling resistance before encountering actual resistance. This will help find the source of resistance during project delivery and increase the success of the Change Management Plan.

Once the Resistance Management Plan is prepared, one of the key aspects of executing the plan will be to have conversations with individuals identified as resistant to the change. Preferably, these discussions would be led by the individual's direct supervisor and conducted face-to-face. In order to prepare for these conversations, to generate dialogue and response, consider these question prompts:

Prosci's top ten tips for leading these conversations:

For changes being implemented that are radical changes with medium to high risk, one key tool to proactively manage resistance is to offer opportunities for employees of Oakland County to engage at the on-set of projects and throughout the project delivery process. An early focus on reinforcement helps create employee buy-in through co-creation and ultimately increase the likelihood of sustaining the changes being implemented. It is also recommended to ensure alignment and tracking against the remainder of the other elements of the Change Management Plan if areas of resistance to the project implementation are identified within Oakland County. For example, if the Communications Plan as detailed is not following and meeting plan, this could be a source of resistance, because adequate communications are not reaching employees. If everything is tracking as planned, the Resistance Management Plan can then be relied upon as the most important area of focus.

Based on the outcomes of the Resistance Management Plan, individual coaching and training plans can be developed to bring each person along with the change – meeting them where they are, with what they need, in response to changes that impact them. It is recommended that coaching and training development align with Oakland County employee training means and methods for content development and delivery. Based on the Prosci ADKAR model referenced in this plan, the step of that model the Resistance Management Plan helps effect on an individual basis is Desire. The Resistance Management Plan template in the attachment of this document is to be used to complete this step in the process. Below are critical details to consider and include when developing the Resistance Management Plan:

- **WHAT** might resistance look like when implementing the Oakland County Sustainability Plan? How will the Change Management team identify resistance? What strategy will you use for managing resistance for employees of all levels? Direct supervisors or high-level managers are typically the best way to manage resistance to change coming from an individual.
- **WHEN** implementing the Oakland County Sustainability Plan, where are different levels of employees within the organization anticipated to become resistant?
- **HOW** has the prepared approach to managing resistance been reviewed and discussed with the Primary Leadership Sponsor?
- **HOW** has the Resistance Management Plan been communicated to managers and coaches, so they use it during employee sessions? Sessions include all-staff meetings, coaching, training, and individual development planning.

Finally, while change implementation is ongoing, ensure that you are tracking project and change milestones through the use of the Change Management Plan and tools. These findings are to be shared at regular project and Change Management check-ins to either redirect course or celebrate alignment.

Phase 3 | Sustain Plan

Phase 3 focuses on sustaining change adoption and integration long-term. This entails measuring performance, celebrating success, identifying and addressing areas of resistance, and integrating the project and changes into day-to-day operations within Oakland County. When focusing on sustaining the Change Management Plan, gather feedback across all levels of the organization. Create corrective action strategies based on feedback received from the organization. Use resistance management to understand and identify where resistance may exist and strategize how to manage that resistance.

Within 30 to 60 days after project completion, a reflective session is encouraged to be held with leaders (including both project and Change Management leaders, and overall Sustainability Primary Leadership Sponsor as required) to document lessons learned throughout the project. This will be the first line of feedback about the Change Management Plan delivery across the Sustainability Plan implementation. These sessions can be held per project or per Focus Area. They can be repeated when a major delivery milestone is reached for other areas of implementation.

The primary focus of this session will be to identify what worked well and what needs improvement during project implementation, and where gaps are that impacted the success of the change. This session should focus on Change Management application of communication, stakeholder, and leadership strategies in relation to project delivery. The project team can be included to debrief on lessons learned for the technical project delivery as well.

The next step to gathering feedback is to conduct employee end user feedback sessions about Sustainability Plan implementation and project delivery. Employee and end user feedback sessions will include prompts aimed at learning where the responder is on the change curve, utilizing the ADKAR model, to know how to interpret the feedback. From this feedback, it can be determined if there are any corrective actions required because of identified resistance or issues to realign and maintain progress toward sustaining implemented changes. Additionally, another area of focus in feedback sessions can be to understand areas that are cause for celebration because of successful change adoption. This can be done throughout the project as a vital tool to build momentum and positive buzz around an atmosphere of rewarding success.

Feedback can occur formally or informally and can be proactive or reactive. Planned and organized feedback, considered formal feedback, may include online forms, team meetings, and question and answer sessions. Examples of informal feedback include conversations in passing, general emails, and casual discussions with colleagues. Managers and supervisors are key sources of feedback. Employees are more likely to discuss change honestly and openly on a daily basis with their peers and in many cases their supervisors. This candid feedback is helpful in diagnosing gaps and developing approaches to managing resistance. The lessons that emerge from this informal feedback may not be fully disclosed in your organized, formal feedback channels.

Employee and end user feedback can be gathered across various channels and methods including surveys, comment boxes at live events, focus groups, outreach within business units and direct supervisors inquiry to teams, and finally, a resource through which employees can reach out with questions and input (such as a generic email where all feedback can be received throughout the project process).

Finally, to reiterate the significance of their role, leaders and sponsors are critical influencers to sustaining lasting change over time. It is important to have a discussion with leadership to determine how they feel they can support the change going forward. Leadership and sponsor visibility is critical throughout and after change.

To reiterate and support resistance management (Resistance Management Plan developed in Phase 2 | Implement Plan, to be utilized here) leaders across Change Management should continue to be role models and listen to the feedback from team members. More key actions include celebrating milestones and rewarding behaviors that are in line with the change, calling out behaviors that do not align with the change, and continuing to monitor impacted teams and individuals through the change curve and ADKAR model. Remember that some colleagues will take longer to accept the change than others.

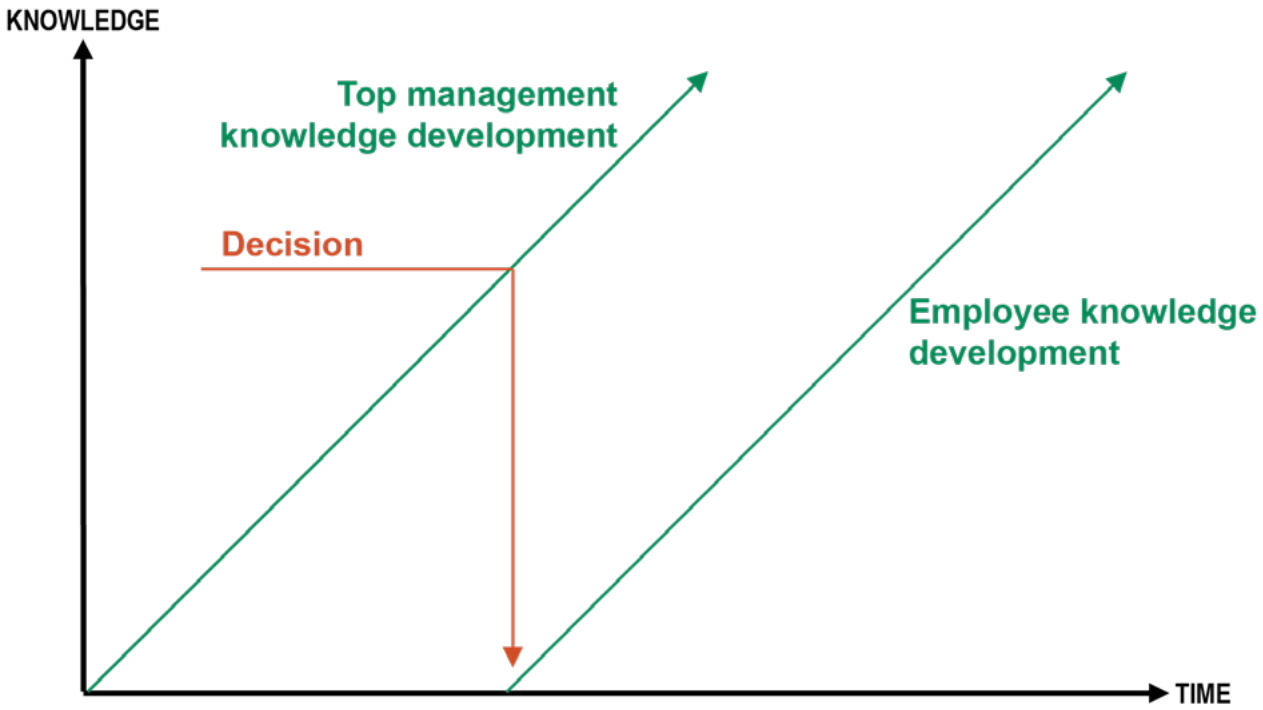
Change Management Plan | Conclusion

Two final tools are provided here to both provide empathy for those in Change Management roles, and to assist with mitigating resistance, in parallel to the Resistance Management Plan. Diagnosing gaps and managing resistance is an ongoing process. Although depicted in the Change Management process at the conclusion, the Change Management team can view these and other tools as ongoing activities through the project. These two models conclude planning and action of the Change Management Plan; however, these phases, tools, and teams can be applied cyclically throughout any given change or project as needed, to ensure successful change adoption.

The motivation gap shown in the diagram in Figure 27 demonstrates that knowledge about a specific topic or change is different per stakeholder group over time. Knowledge about the importance of the change can lead to motivation gaps between stakeholder groups. This tool can be used in workshop sessions with leaders, managers, and staff to empathize with colleagues. When used with leaders to empathize with colleagues, it can help reframe challenges their colleagues may experience when attempting to assimilate new information, behaviors, or protocols. When the motivation gap model is applied to Change Management, it highlights two things: the lag in time that exists between the development of a strategy, vision, or decision, and how to be successful with communications to inform employees about it.

When using the motivation gap model, consider the following engagement activity: Visualize a time they heard about a change in their life, and what other stakeholders were involved. Ask them to discuss what helped them during the change process, and how they can use their experiences to apply to the Sustainability Plan.

Figure 27. Motivation Gap



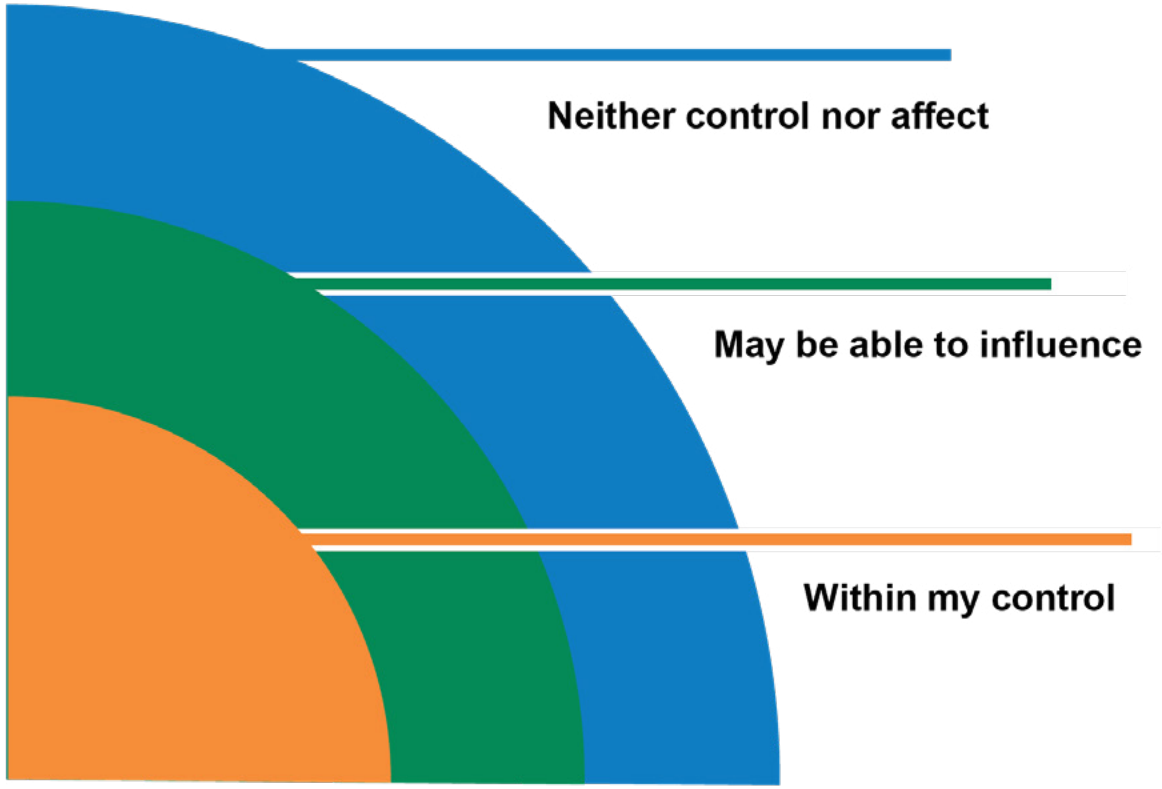
Finally, the influence model aims to assist employees in identifying areas of change that they can influence or control.

When a change process begins, use the influence model to reflect upon the following prompts with various stakeholders: *can you challenge this decision, can you influence the implementation of the decision, and what actions can you take to help embed and embrace the change?*

These prompts can be asked for each aspect of the change, whether it be a policy, work process, or team-based change, and each aspect could be mapped onto the model diagram in Figure 28 in a workshop setting with participants. Visually mapping and documenting specifically where their span of control is per aspect of the change could aid in change acceptance, and therefore progress towards success.

This Change Management Plan, tailored for the county's Sustainability Plan implementation, is a tool to establish end user adoption to provide successful and lasting change. This plan defines a process running in parallel for the 'people' side of change, alongside technical solutions implementation. In turn, the success of specific sustainability strategy implementation will help advance the county's Strategic Framework community objectives and goals.

Figure 28. Influence Model



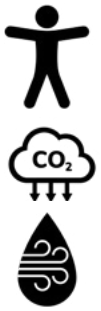
Appendix E

Sustainability Plan Vision and the Asset Management Framework

A key component of the county's sustainability Vision is to create an accessible, safe, and welcoming campus that contributes to a positive service experience for all and demonstrates efficient, equitable, and low-carbon operations. Establishing an asset management framework grounded in sustainability is a foundational step towards transparent and achievable action in this regard. As it relates to the county's Sustainability Plan's Guiding Principles, an asset management framework can:

Operationalize diversity, equity, and inclusion through rooting decision-making processes in data and organizational values to remove potential bias in asset planning and enable equitable distribution of O&M resources.

Create education and engagement opportunities through increasing exposure to content relating to asset performance and the county's asset management practices—for asset managers and asset users alike.



Provide accessible services and campus environment, **advance the net zero carbon goal**, and **improve air and water quality** through proactively identifying opportunities to improve asset efficiency, emissions, and accessibility throughout their lifecycle, not just at end of life.

Maximize resource efficiency through not only optimizing county assets' performance over their entire lifecycle, but also optimizing the use of county personnel and financial resources for asset management.

This framework is meant to serve as a foundation from which the county can develop a comprehensive Asset Management Plan, like that described in the strategy S3. Develop an Enterprise Asset Management Plan in the Sustainable Governance Focus Area section. The framework reflects the county's Sustainability Framework through integrating examples of how implementation of asset management best practices can enable environmental, social, and economic sustainability.

Asset Management Overview

Asset management is an integrated process that involves interdisciplinary and interdepartmental collaboration to manage existing and planned assets. When developed and applied correctly, asset management programs streamline organizational and data processes, reduce operational costs, and increase resource and operational efficiencies. An enterprise-wide Sustainability Asset Management Framework would help county government realize these benefits and, more specifically, provide departments with uniform and structured guidance for O&M of assets, capital planning for new and existing assets, and evaluating asset performance in line with the county's sustainability Vision. In turn, county residents, businesses, and CVTs experience benefits as well.

Benefits to County Staff and Operations:

- Lower long-term maintenance, operations, and preservation costs through streamlining existing procedures to improve operational efficiency
  - Introducing uniformity across departments to increase staff familiarity and comfort with asset management data, workflow, tools and clearly defined roles and responsibilities
  - Consolidating and automating workflows
- Access to new state and/or federal infrastructure funding streams that require applicants to demonstrate an established asset management program
- More effective utilization of available resources (including taxpayer dollars) and pursuit of funding opportunities available to priority projects

Benefits to County Residents, Businesses, and Local Governments:

- Improved performance of shared or publicly used assets and mitigated risk from reducing maintenance backlog
- Improved credibility and accountability for decision-making through clear demonstration that investments are aligned with the county's goals and resources, and as a result, improved communication between staff, elected officials, and the public
- More equitable distribution of Country resources

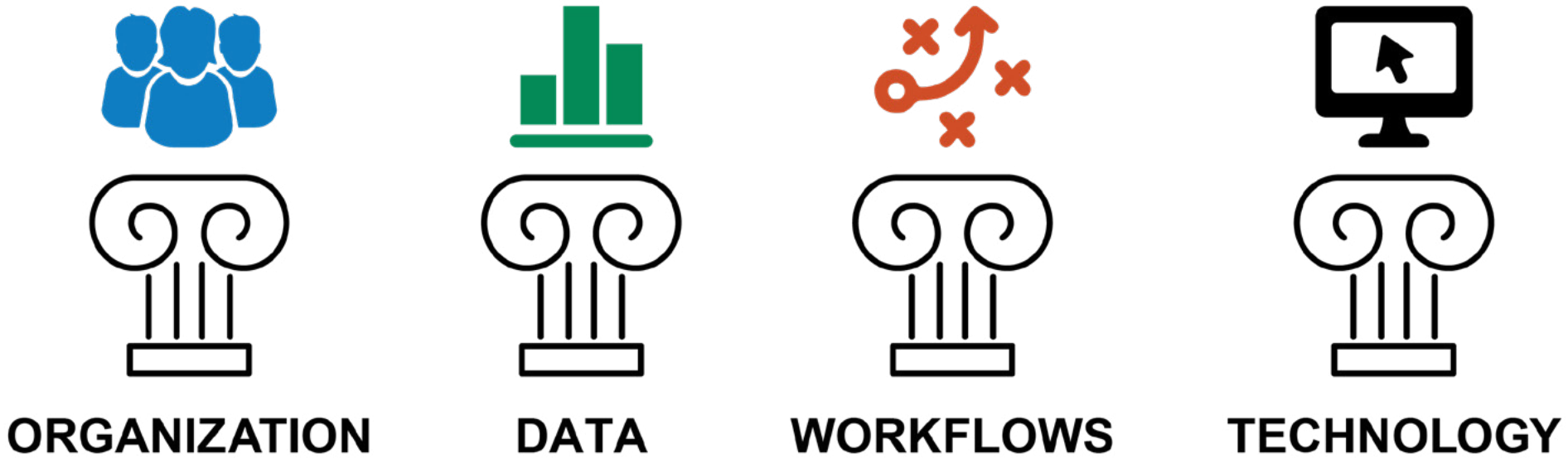
To capture these and additional benefits, the Sustainability Asset Management Framework builds upon the Four Pillars of Asset Management (organization, data, workflows, and technology), the Sustainability Framework, S1. Standardize Business Management Tools and Workflows Across Departments, and Tracking Sustainability Progress. The Framework is organized according to the Four Pillars, with Sustainability Plan ideals woven throughout.

Asset Management Framework Pillars

AECOM's Four Pillars of Asset Management—organization, data, workflows, and technology—collectively provide a structured framework for evaluating current asset management practices and identifying opportunities to incrementally improve performance.

As with sustainability planning, a key tenet of asset management is that beginning to make some improvements is better than making none. This Framework was designed recognizing that the county, the county's departments and divisions, and even the CVTs the county serve will progress along a maturity continuum of improving asset management capabilities. As such, the Four Pillars can be adapted and "right-sized" to reflect any organization's vision, resources, and experience, so that it can be applied at the county level, within specific departments and divisions, and by other peer municipal and regional governments.

The following principles, organized by Pillar, represent best practices for establishing an asset management strategy that empowers sustainable procurement and O&M of assets at any scale. The connection between each Pillar and the triple bottom line of sustainability is also exemplified in the following sections.



Organization

People and leadership are vital to successful implementation and sustainable operation of asset management programs. To establish cross-departmental accountability and an ongoing collaborative approach to asset management, the Sustainability Asset Management Framework was developed from the county's overarching sustainability Vision and goals that should resonate equally with county subject matter experts in finance, decision-making, and planning and operations within different service areas.

The following organizational best practices help establish standards, assign roles and responsibilities, and systematizes hierarchies for decision making.

1. Develop a standardized and coordinated approach to asset management across organizations while recognizing that operating units may have differing levels of maturity, have varying capabilities or capacity to track data, operate under different missions, and leverage different funding sources that may carry specific requirements.
    - 1.1. Adopting a standardized the asset management approach can position the county to leverage economies of scale for maintenance activities and support more accurate budget forecasting and capital planning.
        - 1.1.1 Coordinating bulk shipments of materials can not only save costs, but also reduce the county's supply chain emissions.
    - 1.2. Increased cross-departmental coordination from standardization can facilitate knowledge sharing and build collective capacity.
2. Establish indicators for evaluating asset performance that reflect sustainability principles, such as lifecycle cost, environmental impact, and asset criticality to continued operations.
    - 2.1. Regularly monitor and use indicators to re-evaluate asset management priorities and strategies.
    - 2.2. Include Sustainability Framework objectives and KPIs in asset management performance frameworks.
3. Explicitly map roles to asset management workflows for the most active participants (both at the enterprise and departmental or divisional levels) and establish expertise redundancy.
    - 3.1. Establish an asset management charter to formalize stakeholder (e.g., county staff, contracted vendor) roles and maintain accountability for accomplishing responsibilities according to defined workplans and schedules.
        - 3.1.1 Be alert to unconscious biases when forming stakeholder teams and assigning responsibilities.
        - 3.1.2 Plainly state the team's sustainability values and how they are reflected in the Asset Management Plan.
        - 3.1.3 Include budget, grant awards, or other funding requirements as an on/off ramp for critical workflows.
    - 3.2. Develop organizational maps that associate both individual staff members and generalized roles with fundamental workflows.
        - 3.2.1 Consider workflows at the enterprise, department, and division levels, and link to asset data and performance reporting (including that for sustainability) so it can also be rolled up through this hierarchy.
        - 3.2.2 Identify feedback channels between stakeholders and opportunities for succession and expertise redundancy.
            - 3.2.2.1 Establishing expertise redundancy can improve organizational resilience to natural hazards.
        - 3.2.3 Indicate generalized roles alongside specific contacts at multiple levels of the hierarchy to support more efficient information transfer as staff transition into new roles.

Example of an Existing Best Practice

The Parks and Recreation Department manages a dashboard to track implementation of Strategic Plan actions (including actions related to asset management), asset usage and user satisfaction, and asset financial value. Additionally, the Department established a "Priority Investment Rating" to direct funding towards assets that are highly valued by the community but may be underperforming (i.e., assets are unable to completely fulfill community needs in their current condition).

Data

Data collection, analysis, and management is where much of the effort to implement an asset management framework and plan is expended. Understanding best practices for data management related to existing asset inventories, recorded characteristics, and projected performance can help inform more effective planning, purchasing, and implementation of future assets.

1. Assign assets unique but standardized numerical IDs that are tied into an asset hierarchy.
    - 1.1. Continue to assign IDs at the time of purchase.
        - 1.1.1 Assign entirely numerical or alphanumeric IDs for improved data processing.
        - 1.1.2 Provide indication of the asset owner, location, and type within asset ID taxonomies and hierarchy.
        - 1.1.3 Structure IDs so they are easily interpretable to staff with varying levels of experience in asset management.
        - 1.1.4 Retain an up-to-date record of asset IDs. If IDs are changed to conform with a new naming convention, show a history of old and new IDs.
    - 1.2. Tag assets with scannable barcodes or QR codes (generated from their IDs) that map to their asset inventory profile.
        - 1.2.1 Ideally, tag all assets greater than $5,000 in value and interrelate tag numbers and asset IDs.
        - 1.2.2 Using RFID and GPS-enabled tags saves staff time and resources to locate assets.
2. Prioritize thorough data collection and maintenance for the division's most critical assets; right-size the appropriate level of effort at the divisional level.
    - 2.1. Remain vigilant against potential biases when prioritizing asset criticality.
    - 2.2. Involve the teams or individual staff performing O&M to define a "right-sized" data collection approach, both with respect to the number of assets for which data is collected and the amount of data collected for each asset.
        - 2.2.1 Involving the teams that perform O&M in data collection will mitigate potential resistance toward accepting new data collection workflows and tools.
    - 2.3. Where possible, consider implementing remote data collection and monitoring tools for critical assets to support early identification of potential failures.
        - 2.3.1 Remote data collection and monitoring for critical assets can improve organizational resilience to natural hazards.

3. Fill gaps in existing asset inventories so each asset profile includes a comprehensive maintenance history (e.g., link work orders to an asset profile to track historical asset condition data).
    3.1. Confirm lifecycle data (e.g., depreciation, level of deferred maintenance, replacement/demolition value) is gathered and regularly updated for each asset.
        3.1.1 Automated computation and updates to asset deterioration curves from lifecycle data can mitigate risk of asset failure.
        3.1.2 Maintaining up-to-date asset data can help teams more accurately forecast maintenance budgets.
    3.2. If not already included, consider updating lifecycle cost methodologies to reflect environmental and social costs (e.g., potential carbon pricing schemes)
    3.3. Expand inventories to include indicators of asset criticality to continued operation to support maintenance prioritization, especially when funding is constrained.
        3.3.1 Consider equity in prioritizing near-term levels of service.
4. Within data standards, specify who is responsible for completing each field, rules for completing each field (e.g., character types and limitations, and consistent nomenclature), and how often each field should be updated.
    4.1. Develop data standards so they can be clearly interpreted by staff with varying levels of experience in asset management.
    4.2. Review definitions of asset criticality or condition (i.e., language as being in "poor" versus "average" or "good" condition) for potential implicit biases.
    4.3. Align data collection cycles with internal budgeting and external funding application cycles and emissions reporting cycles.

Example of an Existing Best Practice

The Parks and Recreation Department inventories assets at the system, facility, and equipment level. At the equipment level, completed asset profiles include a numerical asset ID, type, location, manufacturer, model number, serial number, installer, utility requirements, start/end/length of life cycle, and cost. The profile also indicates when it was last updated and by whom.

Workflows

Workflows, or processes, help asset managers align budgetary and O&M decisions, recognize and respond to risk, and receive and address feedback from asset users. Workflow best practices involve designing, implementing, and clearly communicating processes to provide streamlined and effective services.

1. Perform condition assessments at least once every five years to maintain accurate asset deterioration forecasts.
    1.1. Define assessment cycles based on an asset's criticality and the level of risk associated with asset deterioration (i.e., assets critical to county operation/that carry higher risk of failure when deteriorated should be assessed more frequently).
        1.1.1 Where feasible, perform energy, water, and waste audits as part of broader condition assessments to improve operational efficiencies (see strategies H1. Perform Energy Audits at Target Facilities and H4. Perform a Campus-Wide Water Audit for more information).
        1.1.2 Collect data related to safety, ADA compliance, and other accessibility considerations to support implementation of strategy S7. Perform an ADA Compliance Study and the study's resulting recommendations.

1.2. Integrate assessment templates into software tools to allow more automated data entry and comparison across assets.

1.2.1 For teams that use Cityworks, leverage field applications that will become available through the latest software upgrade; for teams that do not, leverage digital forms that integrate into databases or output information into spreadsheets (e.g., Microsoft Forms).

1.2.2 Use compatible data standards to increase interpretability and effectiveness of assessment data.

1.3. Structure assessment templates to translate observations into a prioritized list of O&M tasks and/or new capital investments.

1.3.1 Use sustainability criteria (e.g., carbon reduction potential normalized by dollar value) to prioritize O&M tasks and capital investments.

2. Prioritize proactive maintenance to enable long-term savings and improved performance across the triple bottom line (e.g., prolonged equipment efficiency, increased reliability of budget forecasts, and reduced risk of sudden failure and associated safety hazards and expenses).

2.1. Build organizational capacity to conduct proactive maintenance through upfront investment in work order systems

2.1.1 When new assets are purchased, establish recurring work order tickets for preventative maintenance tasks

2.2. Leverage asset maintenance history to proactively schedule and prioritize maintenance.

2.2.1 Develop a library of formalized workflows specific to the most common maintenance requests or work orders and other asset management tasks.

3. Provide asset users with instructions of how to submit a work order for routine maintenance requests and notify staff of emergency maintenance needs.

3.1. Streamlined communications procedures can provide shorter repair and replacement turn-around times and more efficient use of funding sources.

3.2. Establish separate processes, contacts, response time expectations, etc. for addressing emergency maintenance requests.

3.2.1 Provide additional instruction regarding the types of failures that warrant emergency maintenance (to both users and maintenance teams).

3.2.2 When the county is facing increased risk of a natural hazard, remind users of emergency maintenance procedures to increase site resilience.

3.3. Work order and emergency notification systems should be accessible to customers with disabilities. Provide accessible alternatives if primary systems are not accessible (e.g., a telecommunications relay service or text service for deaf and hard of hearing staff).

Example of an Existing Best Practice

Use of a work order system provides the necessary foundation for the county's Facilities Maintenance and Operations Division (FMO) to efficiently track asset maintenance history and manage maintenance resources. Additionally, in their using of recurring work orders for preventative maintenance and creation of templates for recurring maintenance requests, FMO has begun to automate/streamline maintenance workflows. Cityworks can also autogenerate cyclically recurring work orders following customer submission of a reactive maintenance request so staff can further improve proactive maintenance in the future. Finally, FMO has established a separate workflow to elevate emergency maintenance requests: county staff are directed to call directly rather than go through Cityworks.

Technology

Technology is the means of delivering the Asset Management Framework and subsequent Plan. By using technology to collect, store, and interpret data, asset managers can better articulate data trends, reconcile outlier data points, and use data to make decisions about how to most effectively prioritize resources. Transitioning to a standardized system across all county departments would allow for increased operational efficiencies, but the system should provide flexibility so county departments can customize how it best serves them.

Technology best practices help distill objective information and thus better allow staff to apply subjective judgment for critical decisions, allowing for greater data transparency, justification in decision-making, and clearer understanding of processes, data limitations, and risk management.

1. Integrate asset, labor, material, equipment, and other financial data in one enterprise-wide system, or link asset management and mapping tools (e.g., Cityworks, GIS Indoors) and financial information systems so data streams are automatically shared between platforms.
    - 1.1. Establish enterprise-wide, platform-agnostic data standards and implement data governance gateways to enforce standards within data processing workflows.
        - 1.1.1 Leverage or map to a common asset ID system (i.e., translate between Cityworks, Workday, and GIS/CAD asset IDs).
    - 1.2. Incorporate asset condition data into system-scale drawings/maps to more easily identify hotspot areas of poor/good performance.
    - 1.3. Leverage user acceptance testing and sign-off to confirm software meets scoped requirements.
2. Compliment detailed step-by-step user guides for software systems with one-pagers (often provided by the software vendor).
    - 2.1. To ensure guides are user friendly, include a table-of-contents, version control table, annotated screenshots, and information on who to contact for additional information.
        - 2.1.1 Only distribute guides electronically to conserve paper resources.
        - 2.1.2 Guides should be accessible to staff with disabilities (e.g., annotated graphics should include alternative text).
    - 2.2. Structure guides so different teams can easily distinguish between foundational, capacity building, and more innovative modules and determine the optimal level of investment for their needs.
    - 2.3. Update the guides after major software upgrades or every three years (whichever is more frequent) to reflect new features and gained efficiencies from becoming more comfortable with the software over time.
3. Establish clear communication channels between software administrators from the vendor, IT, and individual user organizations.
    - 3.1. Ask software account managers to share best practices for how users can best leverage systems to advance environmental sustainability goals.
    - 3.2. Establishing strong technology support teams can facilitate expedited knowledge sharing and build collective capacity, enabling teams to more efficiently maximize the value of software systems.

Example of an Existing Best Practice

Cityworks is a well-regarded asset management tool. Most county facilities have been integrated into the tool, and it has been implemented at an appropriate scale for the county's operations. The county's pursuit of additional upgrades to the system will further enable efficient and sustainable asset management.

Additionally, the county has developed two step-by-step guides to educate county employees on how to complete the following tasks in Cityworks: submit and process work orders, add or delete a task associated with the work order, add internal labor and/or contracted estimates to a work order, and add materials from the stock room to a work order. The guide is searchable and includes annotated screenshots and, where applicable, a clear definition of different dropdown menu choices.

Appendix F

Financial Analysis Methodology

Oakland County's consultants conducted a financial analysis for the strategies listed below. This appendix includes the analysis methodology for each of these strategies.

F2. Pursue On-Site Solar Generation at Key Campus Locations

F3. Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

H2. Complete Campus-Wide LED Lighting Conversion

D2. Expand Recyclable Material Collection and D3. Expand Organic Material Collection

O1. Improve Connectivity with Non-Motorized Pathways

F2. Pursue On-Site Solar Generation at Key Campus Locations

Following industry practice and taking into account the nuance of the solar purchase investment, a market standard solar analysis template for cash purchase was utilized. It accounts for the capital costs of the carport and ground-mounted systems along with electric savings from energy production.

The Farmers Market parking lot, the public parking lot, and open space west of the Sheriff's Administration Building were used as indicative investment locations for the purpose of this analysis. Based on preliminary desktop analysis, the Farmers Market parking lot could host an approximately 800 kW carport system, generating approximately 1 million kWh of electricity per year. The public parking lot could host an approximately 1900 kW carport system, generating about 2.5 million kWh per year. Last, the space west of the Sheriff's Administration Building could host an approximately 2,000 kW ground-mount system, generating about 3 million kWh per year.

To calculate the upfront capital costs, a turn-key price per kW for carport and solar PV systems was used and a 5% contingency was added.

To calculate the payback period, the values of ITC and depreciation were subtracted from the total cost of installing the solar PV systems. The ITC for 2024 is assumed to be 22%. By using a Tax Equity Partnership funding mechanism, the net capital outlay after application of bonus depreciation and the ITC was calculated. For this analysis, as the county does not have tax liability to apply tax credit against, so it was assumed that only 80% of tax benefits would be received back through tax equity partnership. In other words, the county would buy a $1 tax credit for 80 cents. This calculation also assumes a 26% tax rate.

Table 16. Solar Installation Type, Size, Production, and Cost

ITEM	FARMERS MARKET PARKING LOT	PUBLIC PARKING LOT	OPEN SPACE WEST OF THE SHERIFF'S ADMINISTRATION BUILDING	THREE SYSTEMS COMBINED
System Type	Carport	Carport	Ground-mount	Carport, Ground-mount
System Size (kW-DC)	800	1,900	2,000	4,700
Production (Year 1) (kWh)	1,000,000	2,500,000	3,000,000	6,500,000
Production Ratio (kWh/kW)	1,250	1,316	1,500	
Turn-Key Price per KW[95, 96]	$3,900	$3,900	$1,900	
System Price	$3,120,000	$7,410,000	$3,800,000	$14,330,000
System Price after 5% Contingency	$3,276,000	$7,780,500	$3,990,000	$15,046,500
Net System Price after ITC and Bonus Depreciation	$2,121,850	$5,039,393	$2,584,304	$9,745,546

Additional costs after system installation include ongoing annual O&M costs ($5/kW) and one time inverter replacement cost ($10/kW) at year 15.[97] Ongoing annual O&M costs would increase slightly each year due to a 3% inflation rate.

On the revenue side, the electricity savings were calculated based on the estimated electricity production. The National Renewable Energy Laboratory's (NREL) PVWatts calculator was used to determine estimated electricity production for each system type.[98] Production would then decrease slightly over time due to a 3% solar degradation in year one and 1% annual solar degradation thereafter.[99] An electric rate of $0.08/kWh with a 2.25% annual escalation factor was assumed to calculate electric cost savings.[100]

95 The average market price is $3,000-4,500/kW depending on the design and features, such as built-in lighting, stormwater management system, columns configuration, steel pricing etc.

96 The average market price is between $1,700-$2,000/kW.

97 The typical warranty for inverters is 12 to 15 years.

98 https://pvwatts.nrel.gov/

99 The exact degradation rate would be based on the solar panels specifications. Solar panel performance warranties generally allow for 2-3% degradation in their first year and 0.5%- 1% each year after.

100 The base utility rate is derived from actual 2020 utility bills and escalated to the year of 2022.

Given the initial capital outlay, ongoing costs, and potential savings, the market standard solar analysis model yielded results in Table 17.

Table 17. Key Solar Installation Financial Analysis Outputs

ITEM	FARMERS MARKET PARKING LOT	PUBLIC PARKING LOT	OPEN SPACE WEST OF THE SHERIFF'S ADMINISTRATION BUILDING	THREE SYSTEMS COMBINED
Capital Outlay	$2,100,000	$5,000,000	$2,600,000	$9,700,000
Ongoing Costs: Annual O&M (Year 1)	$4,000	$9,500	$10,000	$23,500
Ongoing Costs: Inverter Replacement (Year 15)	$8,000	$19,000	$20,000	$47,000
Annual Electric Savings (Year 1)	$80,000	$200,000	$240,000	$520,000
Payback Period (Years)	24.5	23.3	11.2	17.9
ROI	4.1%	4.3%	9.0%	5.6%

F3. Develop Electric Vehicle Infrastructure and Fleet Transition Plan for Oakland County Campus

Given a five-year depreciation schedule, the consultant calculated a regular replacement schedule that evenly replaced 100 existing vehicles over a five-year time frame. They have identified three vehicle types within the county fleet for near-term replacement. These vehicle types, along with example models in the county's fleet, comparable EV models, and the number of each replaced in the analysis are shown in Table 18. Cost, availability, and vehicle specifications at the time of replacement will determine actual EVs purchased.

Table 18. Fleet Vehicles Replaced

REPLACEMENT TARGETS	EXAMPLE ICE MODEL	COMPARABLE EV MODEL	NUMBER OF VEHICLES REPLACED
Passenger Sedan	Chevrolet Impala	Hundai Ioniq	25
Full-Sized Pickup	GMC Sierra 1500	Tesla CyberTruck	50
Multipurpose SUV	Ford Explorer	Cadillac Lyyriq	25

The cost to the county is shown as the difference between the higher priced EV versus the comparable ICE model in the Detroit market. The annual fuel costs for ICE vehicles and EVs were calculated and compared to determine the relative annual savings offered by EVs. ICE vehicle costs included the average price of regular fuel in Michigan on May 22nd, 2022. EV costs were calculated using the average electricity rate paid by the county in 2021 and accounted for battery capacity when determining annual electricity consumption. Assumptions relating to vehicles can be seen in Table 19.

Table 19. EV Assumptions

ITEM	ASSUMPTION
Miles driven per year[101]	20,000
Average Electric Rate[102]	$0.08/kWh
Unused Electric Battery Capacity[103]	10%
Gasoline Price[104]	$4.56/gal
Chevy Impalas Replaced	25
Chevy Impala Cost[105]	$37,662
Chevy Impala Fuel Economy[106]	4.5 gal/100 miles
Hyundai Ioniq Cost[107]	$38,829
Ioniq Battery Capacity[108]	38.3 kWh/170 miles
GMC Sierras Replaced	50
GMC Sierra Cost[109]	$35,655
GMC Sierra Fuel Economy[110]	5.9 gal/100 miles
Tesla CyberTruck Cost[111]	$40,000
CyberTruck Battery Capacity[112]	200 kWh/476 miles
Ford Explorers Replaced	20
Ford Explorer Cost[113]	$39,991
Ford Explorer Fuel Economy[114]	5 gal/100 miles
Cadillac Lyriq Cost[115]	$60,000
Cadillac Lyriq Battery Capacity[116]	100.4 kWh/300 miles

101 Based on the county's normal replacement of target of a vehicle of 60 months and/or 100,000 miles.

102 Based on Oakland County historical electricity bills. For purposes of this financial analysis, no escalation rate was applied for future years. This provides a more conservative approach given recent increases in and volatility of gas prices which impact the cost differential between ICE vehicles and EVs.

103 https://www.drivingelectric.com/your-questions-answered/96/electric-car-battery-life-how-preserve-your-battery

104 Average price per gallon of regular gasoline in Michigan on May 22, 2022 (https://fuelinsights.gasbuddy.com/home).

105 https://www.edmunds.com/chevrolet/impala/2020/vin/1G1105S37LU105021/?radius=6000

106 https://www.fueleconomy.gov/feg/bymodel/2016_Chevrolet_Impala.shtml

107 https://www.edmunds.com/hyundai/ioniq-electric/2021

108 https://www.hyundaiusa.com/us/en/vehicles/ioniq-electric/compare-specs

109 https://www.cargurus.com/Cars/new/nl-New-GMC-Sierra-1500-Detroit-d116_L16090

110 https://www.fueleconomy.gov/feg/bymodel/2016_GMC_Sierra.shtml

111 https://www.carwow.co.uk/tesla/news/4408/tesla-cybertruck-price-specs-release-date#gref

112 https://ev-database.uk/car/1248/Tesla-Cybertruck-Single-Motor

113 https://www.patmillikenford.com/ford-explorer-detroit-mi

114 https://www.fueleconomy.gov/feg/bymodel/2016_Ford_Explorer.shtml

115 https://www.edmunds.com/cadillac/lyriq/

116 https://www.autoblog.com/2021/04/21/2023-cadillac-lyriq-luxury-ev-crossover-reveal/

Although an optimization study should be conducted to determine the number of chargers needed, the consultant assumed the purchase and installation of a dual-port Level 2 charger in conjunction with each vehicle purchase. Dual-port chargers can be used for the county fleet and, potentially, to provide additional revenues from public charging. Without a feasibility study, these additional revenues are unknown but would have a net positive impact on the financial analysis. Given this uncertainty, they have not been included in the analysis. Public charging would not be appropriate in all fleet vehicle locations due to security needs or inconvenience to the public. Assuming that dual-port chargers would be purchased for each vehicle is a conservative approach and the charger investment is likely to be lower than the amount assumed. In addition to Level 2 chargers, a single DC Fast charger unit is purchased and installed at the beginning of the investment process. With each charger installed there is an associated operation and maintenance cost that is accrued on an annual basis which was factored into the analysis. Cost assumptions relating to chargers can be found in Table 20. Charger related costs were obtained from interviews with Dunamis Energy Partners.

Table 20. EV Charger Assumptions

ITEM	ASSUMPTION
Level 2 Charger and Software Cost per Charger	$3,650
Level 2 Charger Installation per Charger	$2,350
Level 2 Charger Annual O&M	$800
DC Fast Charger and Software	$45,000
DC Fast Charger Installation	$55,000
DC Fast Annual O&M	$1,750
Rebate Amount per Level 2 Charger	$1,500

The cost of each charger purchase is offset by a $1,500 purchase rebate. This number is lower than current charger rebates of up to $2,500 being offered by DTE.[117] The rebate amount was reduced below DTE's current offering to reflect the potential for rebate modifications in the future.

Given the initial capital outlay and potential savings, the payback period model yielded the below results.

- Capital Outlay: $1,170,000
- Annual Fuel Savings for Electric Vehicle Models Versus Comparable ICE Models:
  - Ioniq: $3,790
  - CyberTruck: $4,730
  - Lyriq: $4,000
- Payback Period: 7 years
- ROI: 21.6% over ten years

117 https://newlook.dteenergy.com/wps/wcm/connect/dte-web/home/service-request/business/electric/electric-vehicles/pev-biz-fleet

H2. Complete Campus-Wide LED Lighting Conversion

While the level of savings of each replaced fixture in terms of energy consumption and decreased maintenance can be calculated at a reasonable level of confidence, the range in magnitude of its application due to uncertainty in the amount of remaining LED lighting conversion needs creates material uncertainty. As such, given reasonable assumptions, the utilization of a payback period model indicates a worthwhile investment.

While only motion sensors were included in the payback period model, other lighting control solutions should be assessed for each site based on applicability during the lighting inventory. Examples of additional lighting control strategies include daylight harvesting sensors, bi-level fixtures, and network 'smart' controls. These controls should be implemented during major renovations as renovations present the best opportunity to improve lighting layouts and incorporate more advanced control strategies. The lighting contractors should refer to the most recent energy codes and base their design on these standards.[118]

Lighting control best practices include:

- Dimmable LED fixtures for all lighting (e.g., overhead, sconce, accent, desk lamps)
- Occupancy or vacancy sensors in all spaces that timeout 10 to 20 minutes after occupants have left
- Daylight sensors that dim or turn off lights when daylight is available
- Daylight sensors in open-plan offices (>500 sq. ft.) within daylight zones (e.g., near windows or skylights)
- Dimmers or switches with bottoms that provide continuous dimming or different levels of lighting (e.g., 0%, 50%, 100%)
- Bi-level fixtures for stairwells and parking areas that have 10% to 30% brightness when not occupied and100% brightness during occupancy. The percentage should be specified in Foot Candles in accordance with the building code.
- LED exit signs that are no more than five watts per side

Based on technical interviews and site visit initial observations, the consultant assumes that 80% of the available building square footage had yet to have lighting converted to LED (Table 21). They assume that this same portion of building stock would require motion sensor installation. An accurate amount of remaining building square footage for LED lighting conversion and lighting control upgrades would be determined through an LED lighting and controls inventory.

Table 21. Buildings Data

ITEM	ASSUMPTION
Total Building Sq. Ft.	1,922,091
LED and Controls Upgrade Sq. Ft. as a Percent of Total Building Sq. Ft.	80%
LED and Controls Upgrade Sq. Ft.	1,537,673

The number of fixtures for replacement was estimated based on the assumption that the Lighting Power Density (LPD) for the existing lighting is 1.30 W/sq. ft.[119, 120] (i.e., 1,537,673 sq. ft. x 1.30 W/sq. ft. = 1,998,974.64 W). Assuming the average common fixture is 64 W,[121] the total number of fixtures for replacement would be 31,234 fixtures (Table 22).

Table 22. Office Lighting Power Density

ITEM	ASSUMPTION
Baseline LPD	1.30 W/sq. ft.
Average Wattage per Fixture	64 W
Retrofitted LPD	0.64 W/sq. ft.[122]

118 ASHRAE 90.1-2019 Energy Standard (Table 9.6.1) or International Energy Conservation Code (IECC) 2021.

119 2010 Energy Code level (https://lightingcontrolsassociation.org/2011/04/18/ashrae-releases-90-1-2010-part-1-design-scope-administrative-requirements/).

120 2001 ASHRAE Energy Standard for offices.

121 Typical T8 fluorescent lamps wattage is 32 Watts (https://www.lrc.rpi.edu/programs/nlpip/lightinganswers/t8/03-t8-power.asp). 2x4 troffers can have 1-4 lamps per fixture. In this case, they assume a typical fixture has two lamps (tubes) and have a 64 W power load (2 x 32 Watts).

122 2021 IECC International Energy Conservation Code.

The total capital budget was estimated assuming that the county can retrofit 70% of the existing 31,234 fixtures with new LED lamps (bulbs only). The remaining 30% of the existing fixtures would be replaced with new LED fixtures. Additionally, costs for one wall switch motion sensor[123] per every 500 sq. ft. and one ceiling motion sensor per every 2,500 sq. ft. were factored in. Market value cost for lamps, fixtures, controls, and associated installation labor was used. Lastly, a 25% contingency factor and 10% in rebates was applied to total LED lighting and motion sensor upgrade costs. The resulting capital outlay was $3,403,543 (Table 23).

Cost savings were then calculated based on reduction in energy consumption due to reduced wattage from LED lighting replacements and reduced lighting operating time from the motion sensors. A baseline wattage per square foot for the existing lighting was assumed as 1.30 and the new retrofitted wattage per square foot was assumed as 0.64. Daily light operating time was assumed as 16 hours before motion sensor installation and 8 hours after motion sensor installation for each of the 260 business days.[124] Based on these factors, an annual electric savings of 6,268,784 kWh resulted. To calculate electric cost savings, the consultant used an electric rate of $0.08/kWh with a 2.25% annual escalation factor.[125] Electric savings in the first year would be $501,503.

Table 23. Equipment and Installation Costs

FIXTURE TYPE	MIXED	FIXTURE QUANTITY	BULBS/ FIXTURE	PRICE PER UNIT (INCLUDING INSTALLATION)	TOTAL COSTS
Lamps (bulbs)	70%	21,864	2	$20	$874,551
New Fixtures	30%	9,370		$200	$1,874,039
Motion Sensors (Wall Switches)	1/every 500 sq. ft.	308		$100	$30,753
Motion Sensors (Ceiling)	1/ every 2500 sq. ft.	615		$400	$246,028
				Total Costs	$3,025,371
				Contingency 25%	$3,781,714
				Cost after 10% Rebate	$3,403,543

123 Ceiling motion sensors mostly in restrooms.

124 Average across facilities.

125 The base utility rate is derived from actual 2020 utility bills and escalated to the year of 2022.

Along with the assumptions noted in Table 24, they used three main assumptions to calculate annual maintenance cost savings. Given the 20% failure rate of fluorescent lamps, it was estimated that the county would expect to replace 6,247 of the existing 31,234 fluorescent bulbs, resulting in a total annual associated material and labor costs of $81,208. Given the 10% failure rate of the electronic/magnetic ballasts, it was estimated that the county would expect to replace 3,123 of the existing 31,234 electronic/magnetic ballasts, resulting in a total annual associated material and labor cost of $124,936. Comparatively, given the 1% failure rate of LED fixtures, the county would expect to replace 312 of existing 31,234 fixtures if a lighting conversion was conducted, resulting in a total annual associated material and labor cost of $40,604. Considering the difference between costs of existing bulb and ballast replacements ($206,144) and costs of new LED fixture replacements ($40,604), the potential annual maintenance savings after LED lighting conversion is $165,540 in the first year. The financial model applies a 3% annual inflation rate after the first year, increasing savings gradually over time.

Table 24. Maintenance Savings Assumptions

ITEM	ASSUMPTION
Maintenance Staff Labor Rate[126]	$30.00
Time for Spot Lamp Replacement	0.10 hr. (6 min.)
Time for Spot Ballast Replacement	0.5 hr. (30 min.)
Time for Spot LED Fixture Replacement	1 hr. (60 min.)
LED Lamp Failure Rate	1%
Motion Sensors Failure Rate	1%
Existing Fluorescent Lamp Failure Rate	20%
Existing Fluorescent Ballast Failure Rate	10%
Costs per Lamp	$10.00
Costs per Ballast	$25.00
Costs per LED Fixture	$100.00
Inflation Rate	3%

Given the initial capital outlay and potential savings, the payback period model yielded the below results.

- Capital Outlay: $3,400,000
- Annual Savings (Year 1):
  - Electric: $500,000
  - Maintenance: $166,000
- Payback Period: 4.8 years
- ROI: 20.6%

126 Maintenance staff labor rates are based on the average of base rates for Building Maintenance Technician and Lighting Technician positions (https://www.indeed.com/career/building-maintenance/salaries/MI?from=top_sb, https://www.indeed.com/career/lighting-technician/salaries/MI?from=top_sb#common-benefits). 38% of the average base salary was then added to the maintenance staff labor rate to account for overhead and benefits (https://www.bls.gov/news.release/ecec.nr0.htm). Assumed avoided maintenance labor time resulting from this lighting upgrade scenario can be reallocated to time needed for other maintenance projects.

D2. Expand Recyclable Material Collection and D3. Expand Organic Material Collection

Methodology:

The volume of generated waste (by category) was projected using the 2020 waste schedules and proposed reduction and diversion goals. The county's waste schedule data included the number of containers, container size, and pickup frequency for each container, but not the actual volume of waste collected. The containers' "fullness" at the time of pickup and composition of disposed waste (i.e., volume-to-weight conversion factors) were assumed to estimate the weight of collected waste.[127, 128]

For example, two 6-yard containers located at Waterford Oaks County Park are serviced seasonally (four months per year). During the season, they are serviced twice a week (Tuesday and Friday).

Total Cubic Yardage = 6 yards x 2 containers x 2 times week x 4.33 weeks/month x 4 months x 75% full container = 312 cubic yards

To convert from cubic yards to tons, the following EPA Volume-to-Weight Waste Conversion Factors[129] were applied for each waste type:

- Commercial (all waste, uncompacted): 138 lbs per cubic yard
- Mixed Waste (compacted): 650 lbs per cubic yard
- Recycling paper (loose): 200 lbs per cubic yard
- Commercial Organics: 135 lbs per cubic yard
- Mixed Yard (uncompacted): 250 lbs per cubic yard

Returning to the example calculation, the waste collected from these Waterford Oaks County Park bins would be: 312 cubic yards x 138 lbs per cubic yard = 43,023 lbs = 19.36 tons (1 lb = 0.00045 metric tons).

This logic was used to estimate the total weight and cost of collected waste at each county park and service center pickup location.

Table 25. Waste and Cost Projections

ITEM	TONS	%	COSTS	BLENDED RATE
Trash	4,400	87%	$123,494	$28.07
Recyclables (paper/ cardboard)	570	11%	$24,576	$43.13
Organic Materials (including yard trimming[130])	82	2%	$7,200	$88.18
Total	5,052	100%	$155,270	

The projection assumes overall waste generation (tonnage) will be reduced by 2% every year through new procurement policies and applying the 5R Principles (Refuse, Reduce, Reuse, Repurpose, Recycle).

127 The county also provided monthly reports from its recycling vendor, Green for Life (GFL), with the volume and weight of paper collected from the service campus. Because 2020 data is not representative of a "typical year" (i.e., because county facilities were not fully occupied during the height of the COVID-19 pandemic), it is believed to underestimate the volume of paper generated in and cannot be used as a "true" baseline. Thus, the recycling baseline was determined using the same methodology for estimating the volume and weight of disposed trash: based on the container size, volume-to-weight conversion factors, pickup frequency of containers listed in the waste schedule.

128 The county should continually monitor collection container "fullness" relative to contracted service levels and contractually require vendors to weigh collected materials (refer to strategy D1. Review and Renegotiate Waste Hauling Contracts for more information). If vendors cannot collect reliable weight data (e.g., if a vendor's truck services multiple sites per trip), the county should adopt a similar methodology to measure and compare tonnages year over year.

129 https://www.epa.gov/sites/default/files/2016-04/documents/volume_to_weight_conversion_factors_memorandum_04192016_508fnl.pdf

130 All references to yard trimmings only encompass green waste produced at county parks. It is assumed that FMO will continue to manage green waste produced on the service campus; yard trimmings produced on campus will not be collected by a third party and the county will not incur additional third-party hauling costs.

The volume of waste generated per category was estimated based on the following assumptions:

- **Organic Materials:** starts at 10% during the first year of program implementation, and then progressively increases to 15% of total waste generated by Year 3 and then plateaus.[131]
- **Recyclables:** progressively increases from 11% to 60% of total waste generated by 2030. Assuming 15% of generated waste is organic materials, 60% of generated waste will need to be recycled in order to achieve a 75% diversion rate. The county will continue to expand recyclables collection past 2030, eventually reaching an 80% recycling rate by 2033.
- **Solid Waste:** progressively scales down from 87% to 25% of the waste stream by 2030, and only 5% of the waste stream by 2033.

After estimating the tonnage for each waste stream, the annual costs were calculated for the following scenarios. The difference between these scenarios represents incremental savings/ expenses in hauling and operational costs.

- Business as usual
- After the recycling and composting program is implemented

To calculate the total hauling costs, the average rate for trash, recycling, and yard trimming collection across county pickup locations was applied. The rates were averaged by dividing the estimated total annual costs by the estimated total annual tonnage. The collection rate for other organic materials (e.g., food scraps) was estimated from market data.

- Trash: $28.07 per ton
- Recycling: $43.13 per ton[132]
- Yard Trimming: $88.18 per ton[133]
- Composting: $5 per bin pickup (pickup 5 days per week) based on market data. Midtown Composting offers weekly pickups starting for $16 per month ($4 per pickup on average).[134]
- Escalation factor: 3% per year

While waste hauling costs decrease, operational expenses for hauling recyclables and organic materials will increase. Additional operating expenses will include ongoing education, performance monitoring, and auditing activities to encourage anti-contamination behavior.

The composting program will likely be the most cost-intensive program given the spread of bins throughout facilities. Program costs will depend on vendor rates (local vendors include My Green Michigan,[135] Midtown Composting,[136] and Unlimited Recycling[137]) and collection logistics, including proximity and capacity of local composting sites. Important considerations that may impact cost include:

- The number of collection points. The vendor could collect from multiple locations throughout the service campus and county parks or a central location to reduce logistical costs.
- If collected from a central location, the means for getting food waste to the pickup site. Janitorial staff could collect compost daily and bring it to the designated location, or facility occupants could store compost in break room freezers and deliver to a publicly accessible drop off location (e.g., the County Farmers Market) when needed. In the latter case, the county should prioritize compost pickup at the Farmers Market.

On the other hand, BigBelly compactors carry the greatest savings potential through reducing the number of pickups and associated labor, transportation, and material expenses.

131 EPA data suggests 14.6% of municipal solid waste is food waste and yard trimmings accounted for 2% of the county's collected waste in 2020 (https://archive.epa.gov/epawaste/nonhaz/municipal/web/html/).

132 The county's vendors charge a monthly rate for each pickup location based on service frequency and container volume.

133 The county pays a flat fee per service call ($235) and an additional charge per ton of waste collected ($30 per ton). The blended rate per ton was estimated assuming a container is serviced twice a month when they are nearly full (collecting about 2 tons of waste), so each service call carries an average charge of $300.

134 https://midtowncomposting.com/product/weekly-residential-food-waste-composting/

135 https://www.mygreenmi.com/?utm_source=CompostNow&utm_campaign=Friends&utm_medium=web#home

136 https://midtowncomposting.com/

137 https://unlimitedrecycling.com/food-waste-composting/?utm_source=CompostNow&utm_campaign=Friends&utm_medium=web

Assumptions:

2020 Baseline

- Trash: 4,400 tons
- Recycling (Paper): 570 tons
- Yard Trimming: 82 tons

TOTAL: 5,052 tons

2020 Diversion Rate: (570 tons + 82 tons) / 5,052 tons = 13%

2030 Goals (Suggested)

Total generated waste: 2% annual reduction

2030 Diversion Rate: 75%

2030 Waste Breakdown (Suggested):

- Trash (Landfill): 25%
- Recyclables: 60%
- Composting: 15%

Hauling Rates

- Trash/Landfill: $28 per ton
- Recycling: $43 per ton
- Yard Trimming: $88 per ton
- Composting: $5 per pickup per bin, estimating pickup 5 times per week (150 pickup locations/ bins). Facilities may have multiple pickup locations per building or centralized curb side pickup areas.

Equipment Quantity and Pricing

- Recycling Stations: every 2,500 square feet.
- Under-desk paper bins: every 500 square feet (3,460 desks)
- Composting bins: every 10,000-13,000 square feet, or one to two per floor (primarily located in kitchens, lounges, breakroom, etc.). For some facilities, totters or rollout containers with capacity of up to 50 gallons can be used in addition to or instead of small buckets with lids.

Extra bins can be placed in facilities with greater demand for composting and recycling collections than anticipated. In some locations where both recycling and composting are needed (e.g., cafeterias), the county should provide a four-stream bin instead of separate trash, dual-stream recycling, and composting bins. Four stream bins include:

- Trash
- Paper
- Glass, plastic, metal
- Composting

Estimated costs are based on average market prices (standard design).

Table 26. Equipment Quantity and Pricing

ITEM	QUANTITY	AVERAGE MARKET PRICE
Recycling Station (Triple-stream Bins with Trash, Paper/ Cardboard, Glass/ Plastic/Metal)	769	$501 per unit
Under Desk Paper Bins	3,460	$14 per unit
Outdoor Dual-stream BigBelly Units	75	$8,000 per unit
Small Composting Bins	150	$40 per unit
Extra Tumblers or Bins	100	$155 per unit
Container Sensors[138]		$10,000 (one time)
Additional Signage and Education Program		$35,000 (one time)

Total estimated costs also account for 10% contingency on all the categories above.

138 The county can place sensors in large collection containers to monitor container "fullness" at the time of service and identify missed pick-ups. Data can be used to reevaluate service schedules.

BigBelly Assumptions

The following (conservative) assumptions are based on the case study from the University of Houston.[139] These metrics should be reviewed with BigBelly during the contract negotiation process and updated once the contract is final.

- Number of Triple Station Kiosks (Trash and Dual-stream Recycling): 75[140]
- Collection Frequency for Standard Sidewalk Bins (times per week): 14
- Collection Frequency with BigBelly (times per week): 7
- Time to Empty a Bin: 20 minutes including logistics
- Labor Rate ($ per hour): $20
- Fuel Savings per Bin (from reduced travel): $100
- Reduced Number of Plastic Bags per Bin: $50
- Total Savings from per BigBelly Bin: $2,577

Recyclables Sales

The prices for recycled paper, plastics, glass, and scrap metals are very volatile and future regulations, tariffs, international trade policies or other initiatives may cause supply and demand of materials and resulting commodity prices to continue to fluctuate.

An online commodity pricing index for post-consumer recovered materials illustrates the wide range of recycling commodity prices between different grades of materials.[141] As of May 2022, the average market price for recyclables is:

- **Plastic:** between $1 and $1,000 per ton, depending on the plastic quality and chemical composition. For example:
  - Mixed, unsorted plastic materials (e.g., soda bottles, milk jugs, shampoo bottles, and yogurt cups): $1 to $2 per ton
  - Mixed, sorted Polyethylene Terephthalate (PET) and HDPE (High Density Polyethylene) plastic bottles, jars, and containers: $60 to $140 per ton
  - PET bottles only: $840 to $1,000 per ton
- Sorted office paper: $125 per ton
- Mixed glass: $10 to $30 per ton
- Mixed steel cans: $12.50 to $210 per ton

The county's net revenues would depend not only on the market (foreign and domestic), but also on the local MRF's processing costs, fuel costs, brokerage fees, collected material quality, recycling stream breakdown, etc. The following per ton commodities costs are based on low-end market prices, deduct processing costs, and assume the county would share profits with the recycling hauler/broker.[142]

- Recyclables: $20 per ton
- Compost: $10 per ton
- Escalation Rate: 5% per year

Additionally, contamination rates impact the county's potential revenues. Recycling contamination occurs when materials are sorted into the wrong recycling bin (e.g., placing a glass bottle into a mixed paper recycling bin). Incorrect disposal can cause a whole bag of recyclables to be rejected and sent to the landfill, resulting in a reduced revenue from recycling or composting materials. For example, if 50% of collected recyclables are contaminated, the county will only capture 50% of its revenue potential. This analysis assumes a gradual improvement in contamination rates:

- Years 1-2: 50% contamination rate
- Years 3-5: 25% contamination rate
- Years 6-7: 20% contamination rate
- Year 8: 15% contamination rate
- Years 9-onwards: 10% contamination rate

To achieve higher yield in recyclable material sales, the county needs to minimize contamination in the recycling stream.

139 https://uh.edu/facilities-services/programs/sustainability/Use_of_Solar_Powered_Recycling_and_Trash_Units_on_Campus.pdf

140 The first kiosks should be strategically placed near building entrances (on average, two stations per building (e.g., at a front and back entrance) with additional stations at high-traffic facilities (e.g., the Courthouse)), gathering areas, and along high-traffic non-motorized pathways and trails. Additional kiosks can be installed as needed, based on the success of the program's first phase.

141 www.recyclingmarkets.net

142 As recycling commodities markets mature, the profit share for recyclables sales should be outlined in the RFP process for the county's recycling vendor and/or recycling broker. For reference, Waste Management (WM), a publicly traded waste and recycling company, offers a fee-for-service profit share model to their customers. With this model, the price of recyclable materials is structured as a charge or "tip fee" when the commodities' price does not cover WM's cost to process the recyclable materials or as a "rebate" when the commodities' price is higher than WM's processing costs. In the latter case, WM and their customer share the benefit. WM's pricing schematic is either based on fixed contractual rates or on defined minimum per-ton rates. For more information on WM's practices, refer to: https://investors.wm.com/static-files/6f36d219-fd4c-43ce-93f6-35f5928eb2eb

O1. Improve Connectivity with Non-Motorized Pathways

To meet sustainability goals, such as improving campus connectivity and creating nature and fitness walks, it is estimated that 15,000 linear feet (LF) of trails would be needed. For purposes of this analysis, it is assumed that each trail would be eight feet wide with a two-foot shoulder each side leading to (12' x 15,000 LF) 4.2 acres of lawn displacement. Capital costs for pathway construction is estimated at $1.4 million assuming that construction, signage, engineering, and landscaping could be accomplished at the cost of $65.33 per linear foot. Thirty percent was added for contingency (Table 27). It is assumed all of the cost of this construction will be expended in year one.

Table 27. Pathway Construction Assumptions

ITEM	ASSUMPTION
Linear Feet of Trails Constructed	15,000
Cost per Linear Foot	$65.33
Contingency	30%
Total Cost of Construction, Signage, Engineering and 30% Contingency	$1,400,000[143]

To determine the positive productivity and healthcare impacts, it was assumed that 500 employees would take advantage of the new pathways on a regular basis. It was assumed that the economic output of increased productivity of those taking advantage of the new pathways be 1% of each employee's salary calculated using the average Oakland County employee salary of $57,740.[144] It was assumed that the full benefit of walking, productivity increases and healthcare cost reductions, would not be realized immediately. As such, these benefits were scaled up incrementally over five years, with the full cost savings benefit being realized in year six and each year thereafter. Healthcare savings were calculated using 2.6%[145] of the county's average annual healthcare costs of $14,112 per year over the five year scale up period.

Table 28. Economic Benefit Assumptions

ITEM	ASSUMPTION
Number of Affected Employees[146]	500
Increased Productivity	1%
Average Annual Salary of Employees	$57,740[147]
Scale Up Period to Realize Full Cost Savings	5 Years
Average Annual Healthcare Costs	$14,112[148]
Health Care Cost Savings Over Scale Up Period	2.60%[149]

Given the initial capital outlay and potential savings, the payback period model yielded the below results.

- Capital Outlay: $1,400,000
- Annual Savings (year 6 and thereafter):
  - Healthcare Costs: $183,500
  - Productivity: $288,700
- Payback Period: 6.4 years
- ROI: 17.4%

143 AECOM estimate

144 Human Resources, Oakland County

145 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4020264

146 Approximately one-tenth of the county's workforce.

147 Human Resources, Oakland County

148 Human Resources, Oakland County

149 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4020264

Appendix G

List of Acronyms

24/7 24 hours a day, 7 days a week

AASHTO American Association of State Highway and Transportation Officials

ADA Americans with Disabilities Act

ADKAR Awareness, desire, knowledge, ability, and reinforcement

ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers

CAD Coronary artery disease

CH_4 Methane

CO_2 Carbon dioxide

CO_2e Carbon dioxide equivalents

COPD Chronic obstructive pulmonary disease

County Oakland County, Michigan Government

CVT Cities, villages, and townships

DNR Department of Natural Resources

EAP Employee Assistance Program

EGLE Environment, Great Lakes, and Energy

ESCO Energy service company

ESG Environmental, social, and governance

EV Electric vehicle

FHA Federal Highway Administration

GHG Greenhouse gas

GESPC Guaranteed energy savings performance contracting

GSA General Service Agreement

GSHP Ground source heat pump

GWP Global warming potential

HDPE High density polyethylene

HFC Hydrofluorocarbon

ICE Internal-combustion engine

ID Identifier

IFMA International Facility Management Association

IIJA Infrastructure Investment and Jobs Act

ITC Investment tax credit

IWBI International WELL Building Institute

KPI Key performance indicator

LED Light-emitting diode

LEED Leadership in Energy and Environmental Design

LF Linear feet

LGOP Local Government Operations Protocol

LPD Lighting power density

LPG Liquified petroleum gas

MDOT Michigan Department of Transportation

MRF Material recovery facility

MT Metric tonnes

N_2O Nitrous oxide

NACTO National Association for City Transportation Officials

NREL National Renewable Energy Laboratory

O&M Operation and maintenance

OCPR Oakland County Parks and Recreation Department

OHSA Occupational Safety and Health Administration

P3 Public-private partnership

PAH Polycyclic aromatic hydrocarbon

PET Polyethylene terephthalate

PFC Perfluorocarbon

PMPM Per patient per month

PMPY Per participant per year

PPA Power purchase agreement

RACI Responsible, accountable, consulted, and informed

RFP Request for proposal

ROI Return on investment

RTV Rough terrain vehicles

SCARF Status, Certainty, Autonomy, Relatedness, and Fairness

SDS Safety Data Sheet

SEMCOG Southeast Michigan Council of Governments

SF_6 Sulfur hexafluoride

SMART Suburban Mobility Authority for Regional Transportation

Strategic Framework Oakland County Strategic Framework

SUT Smart utility technology

TAP Transportation Alternatives Program

USDN Urban Sustainability Directors Network

VMT Vehicle miles traveled

WHO World Health Organization

WRC Water Resources Commissioner

ZEV Zero emission vehicle

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OAKLAND COUNTY SUSTAINABILITY PLAN

OAKLAND COUNTY MICHIGAN

2023 | https://www.oakgov.com/community/sustainability

A2ZERO

EQUITABLE • SUSTAINABLE • TRANSFORMATIVE

ANN ARBOR'S

LIVING CARBON NEUTRALITY PLAN

APRIL 2020

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WELCOME LETTER

Friends –

Even during the COVID-19 global pandemic, we face no greater threat than climate change.

It already affects us locally in the significant increase in precipitation falling on our community compared to previous years. We feel it in increasing temperatures and greater weather volatility. We see it in the spread of disease and infection. We know it's in disruptions to our supply chains, our agricultural systems, and our Great Lakes. We anticipate it in regard to the movement of people from vulnerable regions to areas with less susceptibility to climate disruption.

These existing and future changes will cause significant impacts to our public health, safety, general welfare, local economy, transportation networks, natural environments, and our overall quality of life. We cannot solve this crisis on our own, but in an era of national retreat, state and local communities must do their part. It is because of this that the Ann Arbor City Council unanimously declared a climate emergency and directed the City to immediately begin crafting an aggressive and living strategy to achieve community-wide carbon neutrality by 2030.

We recognize that this is an ambitious goal, but we know that Ann Arborites have the passion, intellect, creativity, and the compassion necessary to see it met. To be clear, achieving carbon neutrality within a decade will necessitate that we all work together. It will necessitate collaboration, innovation, and disruption. If we are to achieve our goal, Ann Arbor 2030 must be vastly different from Ann Arbor 2020.

As the following pages describe, carbon neutrality means that we must adopt new land use strategies and break our dependence on internal combustion engine vehicles. It means that we must power our homes, businesses, vehicles, and recreational sites with 100% renewable energy. It means that we must change the way we interact with materials and resources. It means that we must reinvest in our relationships with our vulnerable neighbors, elders, and youth. We must rethink an Ann Arbor that is open and accessible to all.

Every person -- every home owner, renter, student, visitor, community member, business owner, worker, youth, and elected leader has a significant role to play in achieving community-wide carbon neutrality. This living A^2Zero Carbon Neutrality Plan tells us what we need to do and begins to detail how we get there. Over the coming months and years, the City of Ann Arbor and our 60+ partner organizations will work with community members and stakeholders to get the job done. We hope that you will join us because together, we can achieve a rapid and equitable transition to community-wide carbon neutrality.

Sincerely,

Christopher Taylor
Mayor

EXECUTIVE SUMMARY

The global climate is changing and nowhere are the effects felt more acutely than at the local level. Moreover, the growing economic, social, political, environmental, and cultural impacts associated with a changing climate are causing immediate and long-term damages to our society, public health, safety, and our overall quality of life.

In light of these realities, on November 4th, 2019, Ann Arbor City Council unanimously adopted a Climate Emergency Declaration, stating that climate change is one of the most important issues of our time and that responding to the climate crisis necessitates a mobilization on par with those activated during times of disaster. In passing the resolution, the Council also committed to charting a path for how the entire Ann Arbor community could achieve carbon neutrality by the year 2030.

This is an ambitious goal, but one that aligns with the values and sentiments of Ann Arborites. Ann Arbor is a community of great strength, leadership, intellect, compassion, and ability. It is only by unlocking the full potential in all of these areas that we will be able to achieve carbon neutrality within the next decade.

This document outlines the path needed to achieve a just transition to carbon neutrality, community-wide, by the year 2030. This was created with input from thousands of Ann Arborites over the course of an intensive four month planning process. The result is this living A^{2}Zero Carbon Neutrality Plan which centers around six core strategies and one catch-all strategy:

1. Power our electrical grid with 100% renewable energy
2. Switch our appliances and vehicles from gasoline, diesel, propane, coal, and natural gas to electric
3. Significantly improve the energy efficiency in our homes, businesses, schools, places of worship, recreational sites, and government facilities
4. Reduce the miles we travel in our vehicles by at least 50%
5. Change the way we use, reuse, and dispose of materials
6. Enhance the resilience of our people and our place
7. Other

Forty-four actions have been identified to fully implement these seven strategies. Each of these actions is outlined in the following pages. Combined, these actions get us to carbon neutrality, based on our current greenhouse gas emissions profile. By necessity, this Plan is considered living since many things, can and likely will, change in the coming years.

To achieve carbon neutrality, the entire Ann Arbor community must eliminate 2.1 million metric tons of carbon dioxide equivalent emissions annually – this is the quantity of greenhouse gas emissions we emitted, as an entire community, in 2018. Although the City recognizes the importance of upstream and embedded emissions, this figure does not include emissions associated with the production of the goods and services Ann Arborites

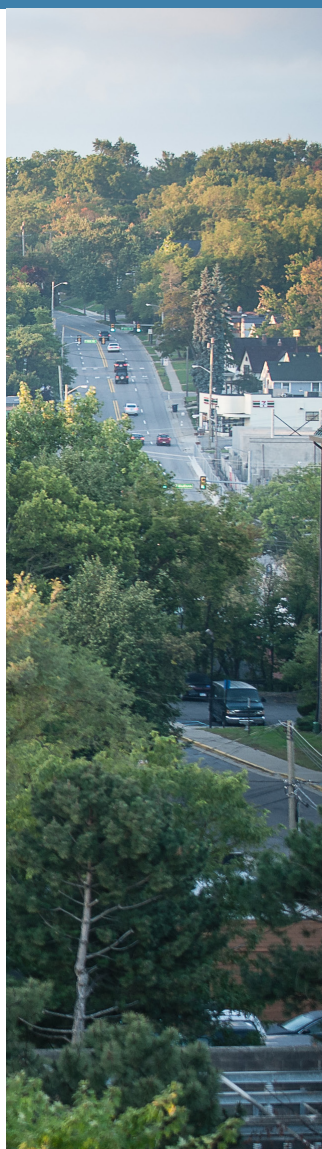
use. As the science and policy around carbon neutrality grows, we will continue to look for and contribute to methodologies to calculate community-wide upstream and embedded emissions in future inventories.

For now, this Plan focuses on eliminating the 2.1 million metric tons of carbon dioxide equivalent that primarily come from natural gas, electricity, gasoline, coal, and diesel used by residents, visitors, students, and businesses in Ann Arbor. Importantly, the seven overarching strategies proposed in this Plan are intrinsically linked. This means that care was taken to understand how given actions work together to achieve carbon neutrality. This also means that removing one action from consideration has a more significant impact than is denoted on any one given actions' summary page. As such, caution should be taken before removing any given action from consideration without fully understanding how it interacts with and informs other actions proposed in this Plan.

Where available, cost estimates are also provided for each action in the Plan. These cost estimates integrate soft, physical, and human capital costs associated with various actions. All costs estimated are incremental, meaning that the dollars allocated for each action are additional to resources, if relevant, already supporting a given action. In our analysis, the value of externalities was often calculated for information purposes. We did not, however, include those values in each individual cost calculation.

Additionally, we have identified an array of co-benefits associated with each action in the Plan. In total, 10 co-benefits were identified, including:

- **Supports local economy**
- **Improves public health**
- **Produces local energy**
- **Cost savings accrued**
- **Improves air quality**
- **Supports biodiversity preservation**
- **Creates jobs and/or develops workforce**
- **Benefits the most vulnerable**
- **Improves local resilience**
- **Scalable or transferable to other communities**



EXECUTIVE SUMMARY

Combined, the seven overarching strategies and accompanying 44 actions outlined in this Plan are projected to reduce emissions by 2.1 million metric tons of carbon dioxide equivalent and cost just over $1 billion additional dollars over the next ten years (Figure ES-1; ES-2; and ES-3). As we move forward with implementation, we will make tough decisions about how to fund and finance the actions outlined in this Plan.

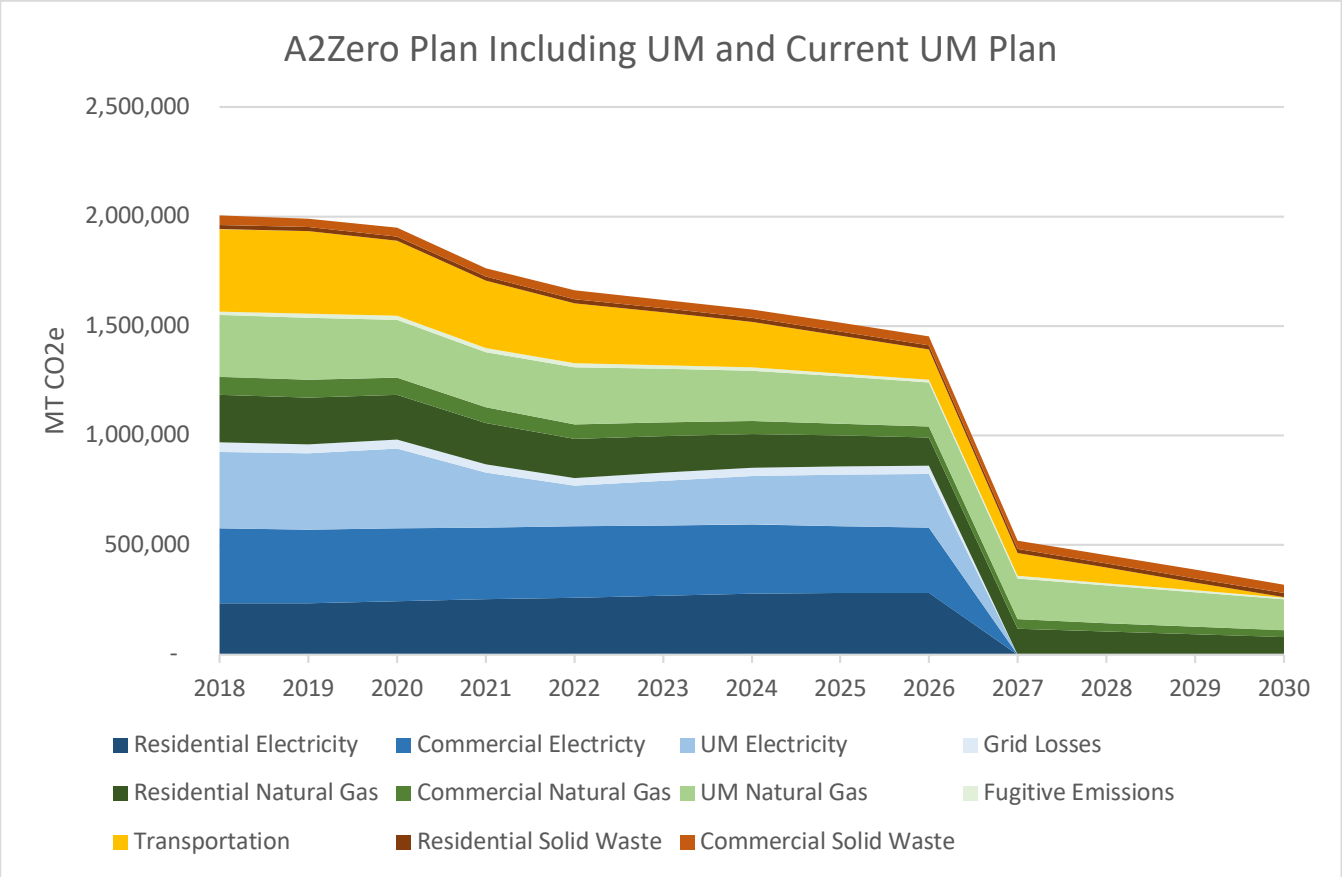


Figure 1: A "Win Scenario" outlining one possible path towards achieving carbon neutrality by 2030. The actions outlined in this Plan are centered on achieving this "win scenario". This "win scenario" assumes that the University of Michigan mirrors the actions of the City.

However, the University is currently undertaking their own carbon neutrality planning process so these assumptions will change once more information is available. Overall, this Plan is considered living and iterative, meaning that changes to this "win scenario" will be necessary over time.

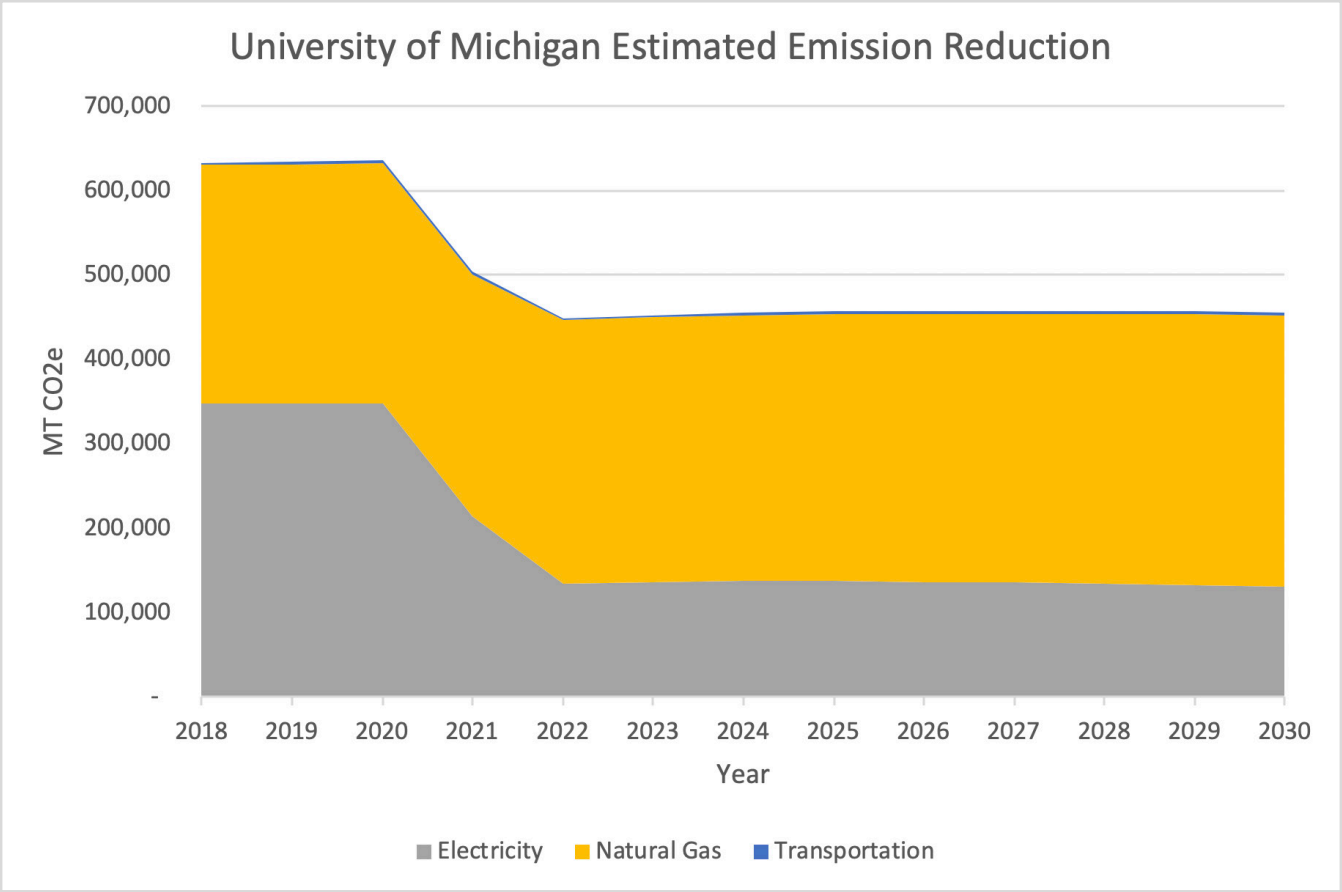


Figure 2: Summary of the University of Michigan's current strategies to reduce their emissions over the next two years. The University of Michigan is currently developing recommendations to achieve carbon neutrality by an undetermined date. Since the University's Plan was not finalized by the time the City's Plan was drafted, their participation in the actions outlined in this Plan was modeled. An update will be provided to this Plan once the University has formally adopted a path towards carbon neutrality. For now, this graph shows the University's currently projected emissions reduction activities.

One of the most pressing first steps in implementing this strategy is ensuring we have the human capital needed to immediately begin taking action. Models run as part of this analysis showed that a minimum staffing of 15 full time equivalent employees are needed, combined with a varying number of consultants, to fully implement this Plan. Not surprisingly, the more physical staff that are focused on the Plan, the more likely the Plan is to succeed. As such, decisions will need to be made not only about how best to fund the actions outlined in this Plan, but how best to build the human capital needed to design and support implementation of the Plan. Guiding this work as a living A^{2}Zero Investment Plan, A^{2}Zero Prioritization Framework, and an A^{2}Zero Governance Model.

Achieving a just transition to carbon neutrality, community-wide, by the year 2030 is audacious, ambitious, and inspirational. This Plan outlines a concrete path for how we can immediately make progress towards that goal. Time is of the essence if Ann Arbor is to seriously achieve this goal. From the engagement we've already seen with A^{2}Zero, we know City employees, partner organizations, technical advisors, neighborhoods associations, businesses, and members of the public stand ready to take this audacious goal and turn it into a reality. The time to start is now.

ACTION SUMMARY TABLE

STRATEGY 1	Total Costs	GHG Reduction	%total emissions	$/ton	Co-Benefits
Community Choice Aggregation	$3,245,000	784,000	35.8%	$4	AIR; $$; EQU; SCALE
Bulk Purchase of Renewables	$605,000	85,000	3.9%	$7	LOCAL; NRG; AIR; JOBS; RES; $$; SCALE
Community Solar Program	$205,000	11,500	0.5%	$18	LOCAL; NRG; AIR; JOBS; RES; $$; EQU; SCALE
Landfill Solar Project	$80,000	23,000	1%	$3.5	LOCAL; NRG; AIR; SCALE
STRATEGY 2	**Total Costs**	**GHG Reduction**	**%total emissions**	**$/ton**	**Co-Benefits**
Home & Business Electrification	$7,100,000	362,200	16.5%	$ 20	LOCAL; AIR; JOBS; HEALTH; SCALE
Bus Electrification	$86,000,000	13,800	0.6%	$ 5,839	LOCAL; AIR; RES; HEALTH; EQU
Bulk Purchase EVs	$700,000	122,900	5.6%	$6	AIR; JOBS; RES; HEALTH; $$; SCALE
Private EV Fleets	$123,000	Not Calculated			AIR; RES; $$; HEALTH; SCALE
City EV Fleet	$4,000,000	1,100	0.05%	$3,636	AIR; JOBS; RES; HEALTH; $$; SCALE
EV Infrastructure	$42,000,000	Not Calculated			AIR; JOBS; HEALTH; SCALE
STRATEGY 3	**Total Costs**	**GHG Reduction**	**%total emissions**	**$/ton**	**Co-Benefits**
Bulk Purchase of Energy Efficiency	$950,000	242,500	11.1%	$ 4	LOCAL; AIR; JOBS; HEALTH; $$; EQU; SCALE
Building Code Requirements	$1,935,000	48,300	2.2%	$ 40	LOCAL; JOBS; RES; $$; EQU; SCALE
LED Lighting	$3,140,000	2,600	.1%	$1,208	AIR; $$
Benchmarking	$2,370,000	Not Calculated			JOBS; $$; SCALE
Loan Loss Reserve	$1,578,000	Not Calculated			LOCAL; JOBS; RES; HEALTH; $$; EQU; SCALE
Energy Concierge & Community Education	$820,000	Not Calculated			JOBS; $$; EQU; SCALE
Net Zero Energy Affordable Housing	$800,000	400	0.0%	$2,000	LOCAL; NRG; AIR; JOBS; RES; HEALTH; $$; EQU
Green Rental Housing Program	$530,000	Not Calculated			LOCAL; AIR; JOBS; RES; HEALTH; $$; EQU; SCALE
Green Business Challenge	$700,000	Not Calculated			LOCAL; NRG; AIR; JOBS; RES; $$; SCALE
Aging in Place Efficiently	$155,000	Not Calculated			LOCAL; JOBS; RES; HEALTH; $$; EQU
Weatherization Expansion	$1,550,000	Not Calculated			LOCAL; JOBS; RES; HEALTH; $$; EQU

KEY					
EQU	Benefits the most vulnerable	RES	Improves local resilience	LOCAL	Produces local energy
COST	Cost savings accrued	HEALTH	Improves public health	ENV	Supports biodiversity preservation
$$	Supports local economy	SCALE	Scalable or transferable to other communities		
AIR	Improves air quality	JOBS	Creates jobs and/or develops workforce		

ACTION SUMMARY TABLE

STRATEGY 4	Total Costs	GHG Reduction	%total emissions	$/ton	Co-Benefits
Non-Motorized Plan	$2,400,000	60,400	2.8%	$40	AIR; RES; HEALTH; $$; EQU
Local and Regional Transit	$656,780,000	93,200	4.3%	$7047	LOCAL; AIR; JOBS; RES; HEALTH; $$; EQU
Park and Ride	$170,000,000	28,400	1.3%	$5,986	AIR; EQU; SCALE
Increase Housing Diversity	$250,000	2,200	0.1%	$114	LOCAL; AIR; RES; SCALE
Mixed-Use Zoning	$365,000	Not Calculated			LOCAL; AIR; RES; HEALTH
Parking Rates	$4,500,000	Not Calculated			LOCAL; AIR
STRATEGY 5	**Total Costs**	**GHG Reduction**	**%total emissions**	**$/ton**	**Co-Benefits**
Year Round Composting	$26,000,000	400	0.0%	$65,000	LOCAL; NAT; JOBS; SCALE
Commercial Recycling	$18,400,000	5,600	0.3%	$3,286	JOBS; SCALE
Sustainable Material Use and Reuse	$270,000	Not Calculated			LOCAL; ERS: HEALTH; $$; NAT; EQU
Circular Economy	$270,000	Not Calculated			LOCAL; JOBS; RES; HEALTH; $$; NAT
Plant-Based Diets	$208,400	Not Calculated			HEALTH; NAT
Refrigerant Recycling	$179,400	Not Calculated			JOBS; HEALTH
STRATEGY 6	**Total Costs**	**GHG Reduction**	**%total emissions**	**$/ton**	**Co-Benefits**
Resilience Hubs	$5,025,000	2,500	0.1%	$2,010	LOCAL; NRG; RES; HEALTH; EQU; SCALE
Neighborhood & Youth Ambassadors	$350,000	Not Calculated			LOCAL; JOBS; RES; HEALTH; EQU; SCALE
Tree Canopy	$1,160,000	450	0.0%	$2,578	AIR; RES; HEALTH; NAT; EQU; SCALE
Neighborhood Asset Mapping	$300,000	Not Calculated			LOCAL; RES: EQU; SCALE
Emergency Kits	$350,000	Not Calculated			RES; HEALTH; EQU; SCALE
Sensors and Data Monitoring	$300,000	Not Calculated			RES; HEALTH; $$; NAT; EQU; SCALE
STRATEGY 7	**Total Costs**	**GHG Reduction**	**%total emissions**	**$/ton**	**Co-Benefits**
Equity Programs	$200,000	Not Calculated			LOCAL; RES; EQU
SA2T Grant Program	$1,000,000	Not Calculated			LOCAL; RES
Internal Carbon Tax	$75,000	Not Calculated			LOCAL; NRG; RES; $$; SCALE
Offsets	$9,440 ,000	298,500	13.6%	$32	SCALE
Total	**$1,056,408,800**	**2,188,950**	**100.0%**		

Figure 3: Summary of Strategies, Actions, Cost, and Co-Benefits for Proposed Actions in the A²Zero Plan. Estimates incorporate engagement with the University of Michigan.

INTRODUCTION

In November 2019, Ann Arbor City Council passed Resolution 19-2103: A Resolution in Support of Creating a plan to Achieve Ann Arbor Community-Wide Carbon Neutrality by 2030. In this Resolution, City Council called on the City to work with the public to create a living plan for achieving carbon neutrality, and to present that plan by Earth Day 2020.

To initiate this work, the Office of Sustainability and Innovations launched A^{2}Zero: the City's carbon neutrality planning and implementation initiative. From the outset, A^{2}Zero was designed to be iterative, transparent, failure-positive, and grounded in justice and equity. A^{2}Zero was crafted so as to have extensive and broad public input and engagement, to be technically robust, to be visionary, and to be inclusive.

Achieving a just transition to carbon neutrality, community-wide, by 2030 will necessitate action from all members of our community. It will necessitate some subtle as well as some significant changes to our community. Not everyone will be excited about every change. But we know the goal – carbon neutrality – is a scientific imperative and one that Ann Arborites are ready to embrace.

But what does carbon neutrality mean? Simply defined, carbon neutrality is reducing the emissions our community puts into the air down to zero, through actions that minimize output and/or by purchasing greenhouse gas emissions offsets. Ann Arbor regularly conducts a greenhouse gas emissions inventory to track our emissions. From this, we know that community-wide emissions, as of 2018, were 2.1 million metrics tons (Figure 4). This means that we have to devise a plan to reduce emissions by 2.1 million metric tons over the next 10 years.

Simultaneously, we need to ensure that we continue preparing our community for the impacts of climate change that are already here, as well as those projected to come. For example, we already know that:

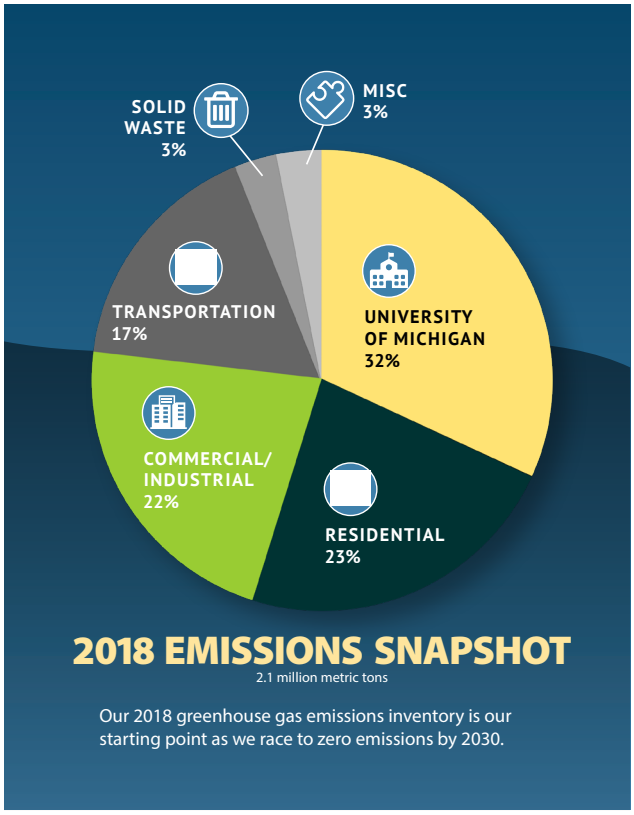


Figure 4: 2018 Greenhouse Gas Emissions by Sector.

- The average annual temperature in Ann Arbor has already increased nearly 1°F since the 1900s. And temperatures are expected to rise by 3-7°F more by 2050.
- Ann Arbor is projected to have 12-36 more days per year above 90°F by 2050 and 30-42 more by end of the century.
- Average annual precipitation has increased by 44% since the 1950s and continues to rise.
- The total amount of rain falling during extreme events has increased by 37% since 1981.

Given these realities, A^{2}Zero was designed to develop actions that change how we manage the unavoidable impacts of climate change by ensuring we invest in the resilience of our people and place, while avoiding the unmanageable impacts of climate change by doubling down on our efforts to reduce greenhouse gas emissions in an effective and timely manner. And, at the core of all of this work is equity; ensuring that our work does not disproportionately burden our low-income, minority, and frontline populations (Figure 5). This is A^{2}Zero.

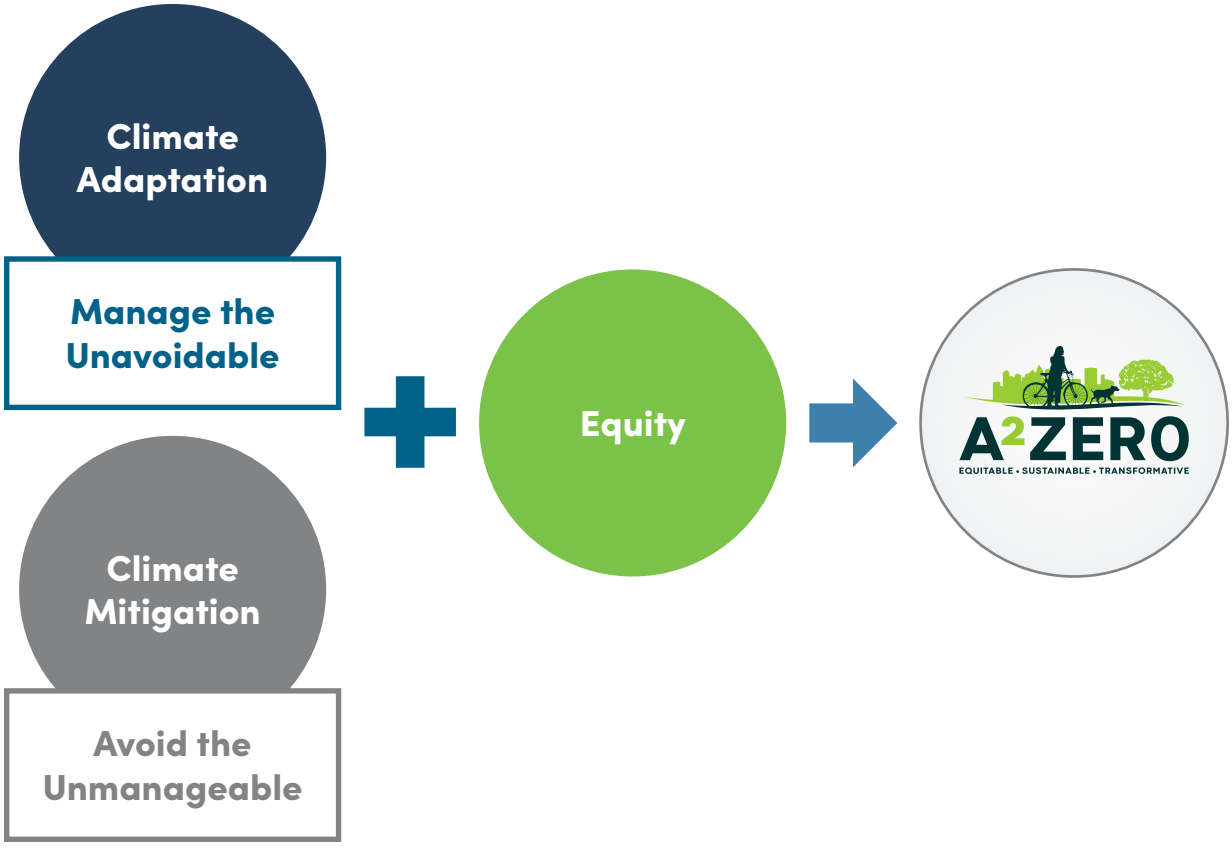


Figure 5: The Core Components of A²Zero.

A²ZERO VALUES

Three overarching values are fundamental to and guide the A²Zero initiative: Equity, Sustainability, and Transformation. The table below highlights what each of these values mean and what characteristics were applied to integrate these values into the A²Zero.

	Equity / Equitable	Sustainability / Sustainable	Transformation / Transformative
Definition	Ensuring everyone gets what they need to succeed based on where they are and where they need to go.	Capable of enduring, able to be sustained in perpetuity. Meeting the needs of the present without jeopardizing the ability of future generations to meet their own needs.	Causing a major change to something or someone, especially in a way that makes it or them better.
Characteristics	• Transparent • Community-Led • Inclusive • Prioritizes Frontline Populations	• Living / Iterative • Holistic	• Failure-Positive • Diversified • Accessible to All

A²ZERO MISSION

The A²Zero mission is the same as the City of Ann Arbor's mission: deliver exceptional services that sustain and enhance a vibrant, safe, and diverse community.

A²ZERO VISION

A²Zero strives toward one unifying vision: Together, creating and implementing a just transition to carbon neutrality, community-wide, by the year 2030. This vision guides all things related to A²Zero.

A²ZERO STRATEGY

Combing the A²Zero values, mission, and vision allowed us to land on seven overarching strategies that are essential to and make up the backbone of the A²Zero Carbon Neutrality Plan:

1. Power our electrical grid with 100% renewable energy
2. Switch our appliances and vehicles from gasoline, diesel, propane, coal, and natural gas to electric
3. Significantly improve the energy efficiency in our homes, businesses, schools, places of worship, recreational sites, and government facilities
4. Reduce the miles we travel in our vehicles by at least 50%
5. Change the way we use, reuse, and dispose of materials
6. Enhance the resilience of our people and our place
7. Other

Public input, guidance from technical advisory committees and peer communities, combined with staff expertise determined that 44 specific actions were needed to fully achieve the seven strategies outlined above. The majority of this Plan outlines these specific actions and how we, as a community, can immediately get started working towards carbon neutrality.

A²ZERO PLANNING PROCESS

Ann Arbor has been working on climate action since the early 2000s. A²Zero builds upon nearly two decades of planning, action, and local leadership. The City initiated A²Zero on November 13th, 2019 with a deadline of plan completion by mid-March 2020 - an incredibly accelerated, four-month creation period. What's unique about this Plan is the urgency and speed with which this Plan was created. In this four month period, the Ann Arbor Office of Sustainability and Innovations mobilized dozens of community partners and volunteers, thousands of members of the public, dozens of technical advisors, and peer communities to provide input into this Plan.

THE PROCESS

82 working days:

- 3 Public surveys
- Over 60 public events
- 2 large town halls
- Over 80 technical advisors
- 66 partner organizations

Figure 6: The A²Zero Planning Process. The process involved three phases, four main sources of input (including technical documents and the peer reviewed literature), over 60 public events, more than 80 technical advisors, three public surveys, and support from over 60 organizations.

This reminder of this section provides detail on the planning processes undertaken to arrive at this living A²Zero Carbon Neutrality Plan.

A²ZERO'S FIVE PILLARS OF PLANNING

To complete a holistic, comprehensive, and realistic carbon neutrality plan, the Office of Sustainability and Innovations designed a planning process that rests on five pillars:

1. Public Engagement
2. Technical Advisory Committees
3. Partner Support
4. Staff Expertise
5. Peer Learning and Literature Review

PUBLIC ENGAGEMENT

Public engagement is at the heart of A²Zero. Three primary means of public engagement were undertaken in order to create this Plan: 1) public events; 2) public surveys; and 3) regular communication via traditional means and social media. In terms of public events, staff in the Office of Sustainability and Innovations hosted 68 public events between November 13th, 2019 and March 12th, 2020 (Appendix 1). Public events focused on engaging underrepresented constituencies and leveraging partner networks to reach as wide of a swath of the community as possible. Partner organizations also encouraged to their members to take the three surveys as part of the planning process. Finally, the City leveraged its social media channels and partner networks to let people know about events, opportunities for feedback, and to share general information about the A²Zero initiative.

Three public surveys were administered as part of A²Zero:

Survey 1: Gathered ideas from the public about what they would like to see in the City's carbon neutrality work.

Survey 2: Collected feedback on which ideas the public supported to reduce greenhouse gas emissions as well as how the City should fund carbon neutrality efforts.

Survey 3: Focused on identifying what stakeholders need to support implementation of the final carbon neutrality strategy.

TECHNICAL ADVISORY COMMITTEES

Technical advisory committees (TACs) were established to ensure that experts within the community could help identify what would technically be needed to achieve carbon neutrality. Four TACs were established: 1) energy; 2) mobility; 3) resource reduction; and 4) adaptation and resilience. Over 80 individuals volunteered their time as technical advisors on at least one of the four committees. Technical advisors helped identify potential actions, evaluate actions (including those recommended by the public), and create a prioritized list of candidate strategies for potential inclusion in the final Plan (see Appendix 2 for TAC meetings).

PARTNER ORGANIZATIONS

To support outreach and engagement, as well as the eventual implementation of the A²Zero, the Office of Sustainability and Innovations sought partner organizations. Partner organizations had to agree to co-host a carbon neutrality event with the Office, share information about the initiative with their membership/networks, and to share their logo on partner messaging materials. As of early March 2020, 67 organizations had signed up to be partners of A²Zero, including:

Every month, from December – March, a partner messaging kit was developed and circulated to make it easy for partners to share updates about A²Zero with their networks.

The National Wildlife Federation; The Neutral Zone; Community Action Network; Citizens Climate Lobby - Ann Arbor; The Ecology Center; The Ann Arbor 2030 District; Interfaith Council for Peace and Justice; Michigan Environmental Council; Washtenaw 350; Ann Arbor Area Elders Climate Action Chapter; The American Institute of Architects Huron Valley Chapter; The University of Michigan; Washtenaw Climate Reality; Building Matters Ann Arbor; Michigan League of Conservation Voters; Sierra Club Huron Valley Group; A2 Climate Mobilization; Leslie Science and Nature Center; The Hands on Museum; Michigan Climate Action Network; Ann Arbor/Ypsilanti Regional Chamber; Ann Arbor Housing Commission; THRIVE Collaborative; Michigan Interfaith Power and Light; Washtenaw County Democrats; American Society of Adaptation Professionals; Washtenaw Bicycling and Walking Coalition; Colonial Square Cooperative; Walker Miller Energy Services; United Way of Washtenaw County; Lean and Green Michigan; Washtenaw Housing Alliance; Citizens Climate Lobby - UM Chapter; Forest Hills Cooperative; Ann Arbor Meals on Wheels; International Brotherhood of Electrical Workers Local 252; Ann Arbor Center for Independent Living; UM College Democrats; Students for Clean Energy; Great Lakes Renewable Energy Association; UM Climate Action Movement; Washtenaw Area Apartment Association; Washtenaw County; The Ride;

Ann Arbor SPARK; National Association for the Advancement of Colored People-Ann Arbor Chapter; Ann Arbor Public Schools; Ann Arbor Indivisible; University of Michigan President's Commission on Carbon Neutrality; Washtenaw County Food Policy Council; Huron Valley Democratic Socialists of America; Bee Safe Ann Arbor; City of Ypsilanti; Ann Arbor Summer Festival; Ann Arbor District Library; Pesticide-Free Ann Arbor; Slow Food Huron Valley; Common Cycle; Earth Sciences; Natural Resources Defense Council; Ann Arbor Main Street Association; Washtenaw Optimal Wellness; Downtown Development Authority; Mindful City Ann Arbor; and The Old Fourth Ward.

STAFF EXPERTISE

Staff expertise and research and analysis of published carbon neutrality literature, including Project Drawdown, were an integral component of planning. This included reviewing historical planning initiatives within the City, identifying existing successful initiatives, and reaching out to staff across the City to round out planning and engagement aspects of A^{2}Zero.

PEER LEARNING AND LITERATURE REVIEW

A key piece of our work was reaching out to and learning from peer communities working on carbon neutrality. This involved reading other community plans, talking to peer community liaisons, and researching key recommendations on community carbon neutrality from peer reviewed and technical sources.

OTHER

In addition to the aforementioned activities, the Office of Sustainability and Innovations also:

- Created a website to track activities around A^{2}Zero: www.A2Zero.org
- Created a listserv where stakeholders could continue to learn about A^{2}Zero
- Created a meeting-in-a-box kit that included materials so individuals could host their own A^{2}Zero events

  The meeting-in-a-box toolkit includes the following:

  - Guide on how to host your own A^{2}Zero meeting
  - A^{2}Zero slide deck with talking points, including discussion questions
  - A terminology sheet
  - A^{2}Zero overview sheet with is a 1-page document that summarizes the A^{2}Zero process and provides a snapshot of the initiative
  - Climate Change Overview – which is a 1 page document that introduces folk to the existing and projected climate change impacts in Ann Arbor
  - Sign-In sheet to track the individuals attending an event
  - Links to relevant A^{2}Zero surveys
  - Event results form to gather feedback about the event
  - Trivia questions to help make events more interactive and fun
  - Photo release form in case anyone was taking photos they intended to share
- Hired a communications firm to create a brand for the City's carbon neutrality work, through which A^{2}Zero emerged.

- Worked with Elevate Energy to assess the greenhouse gas reduction potential and costs associated with each action included in the final Plan.
- Created a 1-page fact sheet about A²Zero and the City's carbon neutrality work.
- Created a 1-page document summarizing the different sectors included in the City's carbon neutrality planning.
- Sent 11,000 backpack fliers to all K-5th grade students in Ann Arbor Public Schools.
- Developed A²Zero flyer for Ann Arbor Meals on Wheels to distribute to home bound residents.
- Developed flyer for all partners to display advertising the February 22nd Town Hall and the final A²Zero survey.

All of these activities were integral to creating A²Zero. In the end, this Plan was made by the community, for the community

THE LIVING CARBON NEUTRALITY PLAN

The remainder of this document highlights the actions that are part of the City's living A²Zero Carbon Neutrality Plan.

These actions are organized around the seven overarching strategies:

1. Power our electrical grid with 100% renewable energy
2. Switch our appliances and vehicles from gasoline, diesel, propane, coal, and natural gas to electric
3. Significantly improve the energy efficiency in our homes, businesses, schools, places of worship, recreational sites, and government facilities
4. Reduce the miles we travel in our vehicles by at least 50%
5. Change the way we use, reuse, and dispose of materials
6. Enhance the resilience of our people and our place
7. Other

STRATEGY 1:

Power Our Electrical Grid with 100% Renewable Energy

This strategy focuses on ensuring that all of the electricity used within our community is powered with renewable energy such as solar, geothermal, and wind. To achieve this strategy, four specific actions are proposed:

1. Implement Community Choice Aggregation
2. Support Onsite Renewables and Battery Storage
3. Develop Community Solar Program
4. Launch Landfill Solar Project

Combined, these four actions are projected to reduce community-wide greenhouse gas emissions by 41% and cost just over $4,100,000.

1. IMPLEMENT COMMUNITY CHOICE AGGREGATION

Community Choice Aggregation (CCA) program is an agreement among stakeholders to allow local governments to procure power on behalf of their residents, businesses, and municipal accounts from an alternative supplier while receiving transmission and distribution services from their existing utility providers. CCA allows communities to have more control over the production of their energy, including integrating community values such as 100% renewable energy into their purchasing decisions. Generally, a CCA is an opt-out program meaning that it allows economies of scale to be achieved which leads to close to or actual cost parity to existing electricity costs. In order to implement a CCA, the State will need to enact legislation to allow for CCA.

Vision for Implementing Community Choice Aggregation

Community Choice Aggregation legislation has been enabled by the State and Ann Arbor administers its first bulk buy of 100% new renewable energy by 2027. Through an opt-out structure and little change in energy rates, all residents and commercial entities, including the University of Michigan, participate.

Party Responsible for Implementation

Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- State legislature
- Other Michigan municipalities
- Michigan Municipal Association on Utility Issues (MI-MAUI)
- Michigan nonprofits focused on energy choice

Assumptions

- 100% of residential customers participate in the CCA
- 100% of commercial and industrial enterprises participate in the CCA
- 100% of any municipal operations not yet powered by renewable energy are included in the CCA
- Capacity of program accounts for changes in consumption due to (a) reductions in consumption achieved through widespread energy efficiency improvements, (b) increases in consumption related to switching from fossil fuel powered heating and vehicles to renewable energy, and (c) projected growth rates
- Renewable energy credits from the sources procured through the program are retired, and the energy sources offset fossil fuel generation

Equity Impacts

CCA provides clean, renewable energy for the whole community. This is a particularly useful option for residents who may not have the ability to otherwise install renewable energy systems at their residence, whether due to renting or to cost. A CCA program would provide renewable energy to those who may not otherwise be able to access this resource.

Indicators of Success / Goals

By 2030, 100% of our community's electrical needs are met with renewable energy sources, thanks in large-part to the CCA.

Target Demographic

Entire community

Timeline and Initial Actions

2020
The City begins working on recommendations for what to include in a CCA program.

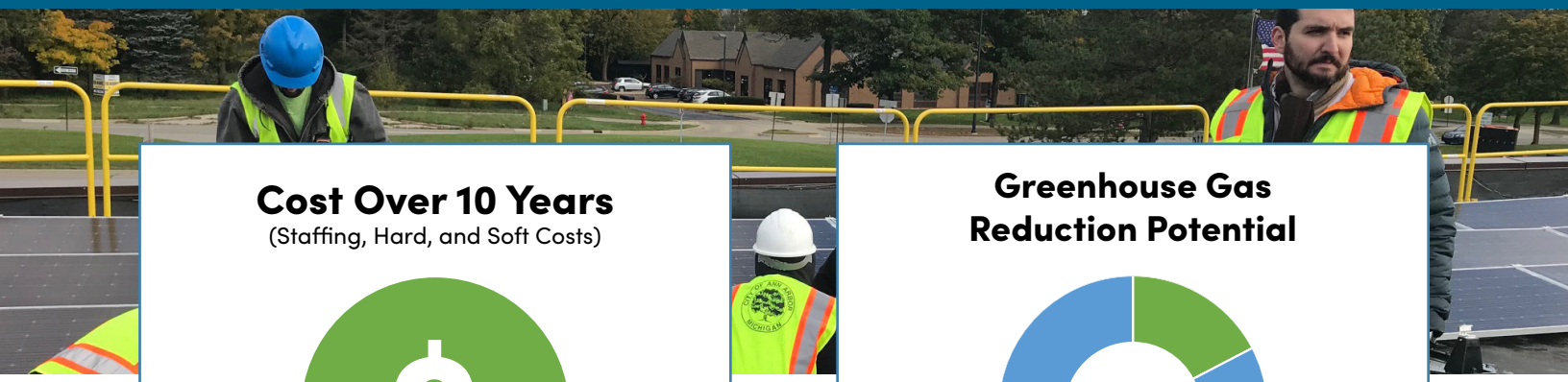
2021
The City begins working with legislators to develop CCA legislation. Public education begins. about CCA

2024
The City begins planning the startup of the CCA program, undertaking feasibility studies, public engagement, and business model planning.

2025
CCA is enabled in Michigan through the passing of state legislation.

2026
Ann Arbor public vote to allow a local CCA purchase.

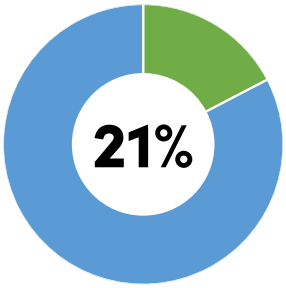
2027
CCA program launches in Ann Arbor and continues.



Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$3,245,000

Greenhouse Gas Reduction Potential



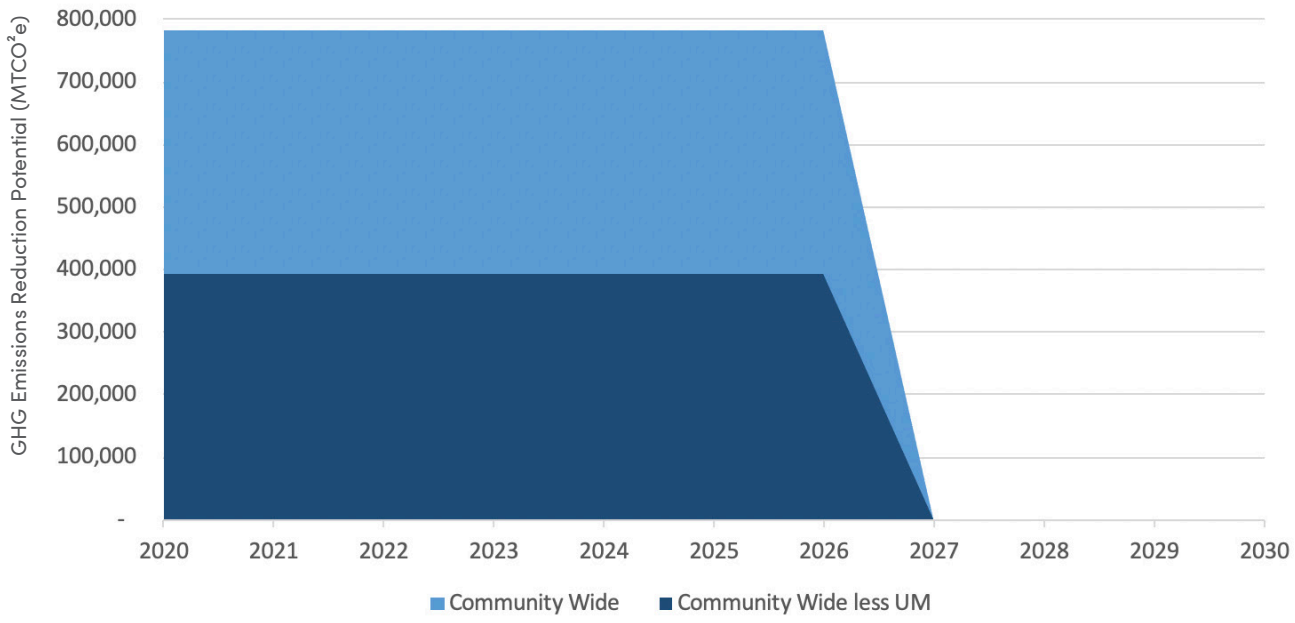
462,100 metric tons carbon dioxide equivalent (21% community-wide emissions)

If the University of Michigan participants, an additional 321,900 metric tons carbon dioxide equivalent could be reduced, resulting in a total of 784,000 metric tons carbon dioxide equivalent (~36% community wide emissions).

By 2027, the Implement **Community Choice Aggregation** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the total emissions reduction potential of Community Choice Aggregation (in light blue) assuming the community and University participate in the program. The dark blue shows the impact of Community Choice Aggregation if only the community (not the University) participates in the program.

IMPLEMENT COMMUNITY CHOICE AGGREGATION



2. SUPPORT ONSITE RENEWABLE ENERGY GENERATION WITH BATTERY STORAGE (BULK BUYS)

Renewable energy systems like geothermal, solar, and energy storage pay for themselves over their lifetime, but the upfront costs of installation can be a barrier for many people. To help reach our A²Zero goals, the City proposes establishing a bulk purchase program that enables residents and businesses to procure onsite renewables for a discounted price by achieving economies of scale.

Vision for Supporting Onsite Renewable Energy Generation with Battery Storage

By 2030, through the provision of bulk buys and discount programs, 78MW of local renewable energy is being generated on viable buildings, parcels of land, and carports. At least ¼ of these installations also have some form of battery storage, which is helping enhance the resilience of our local community and economy.[1]

Party Responsible for Implementation

Office of Sustainability and Innovations' Solarize Coordinator, with support from the OSI team

Collaborators / Project Co-Designers

- City of Ann Arbor Building, Rental, and Inspection Services
- Renewable energy contractors and installers
- Michigan Saves
- Potentially local banks

Assumptions

- 78MW of local renewable energy generation is achieved by 2030
- Pricing discounts of 5%, 10%, and potentially 15% are offered through the program
- The capacity generated through this initiative is not included in the CCA

Equity Impacts

Nonprofit organizations and public institutions may benefit from this program, but the benefits flow primarily to property owners.

Indicators of Success / Goals

78MW of new, local, onsite renewable energy generation is installed in Ann Arbor by the year 2030.

Target Demographic

Individuals who can install renewable energy on the buildings they own or operate, including homeowners, businesses, schools, and institutions

[1] In administering this program, OSI will also be looking to tie in energy efficiency support and electrification support so that each household or business receives a package of support as opposed to multiple different programmatic offerings.

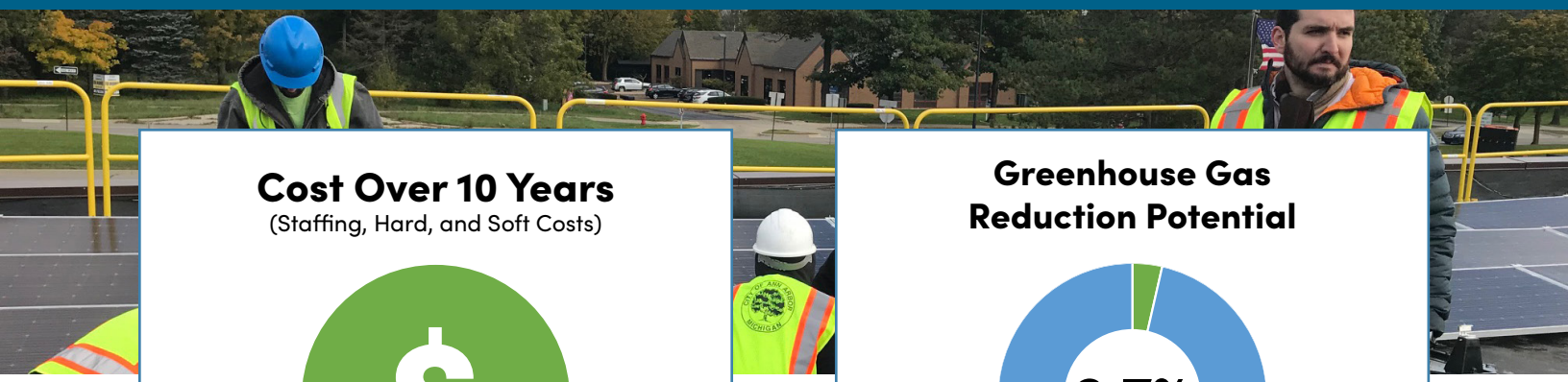
Timeline and Initial Actions

2020

Pilot test group buy in residential sector. Coordinate program with contractors. Conduct public outreach.

2020

Revise program based on lessons learned. Scale and continue to administer until at least 2030 (or until the program stops generating demand).



Cost Over 10 Years

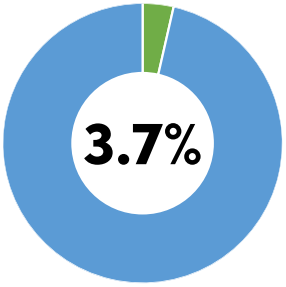
(Staffing, Hard, and Soft Costs)

Estimated

$605,000

($540,000 in staffing and $65,000 in stipends to community residents)

Greenhouse Gas Reduction Potential



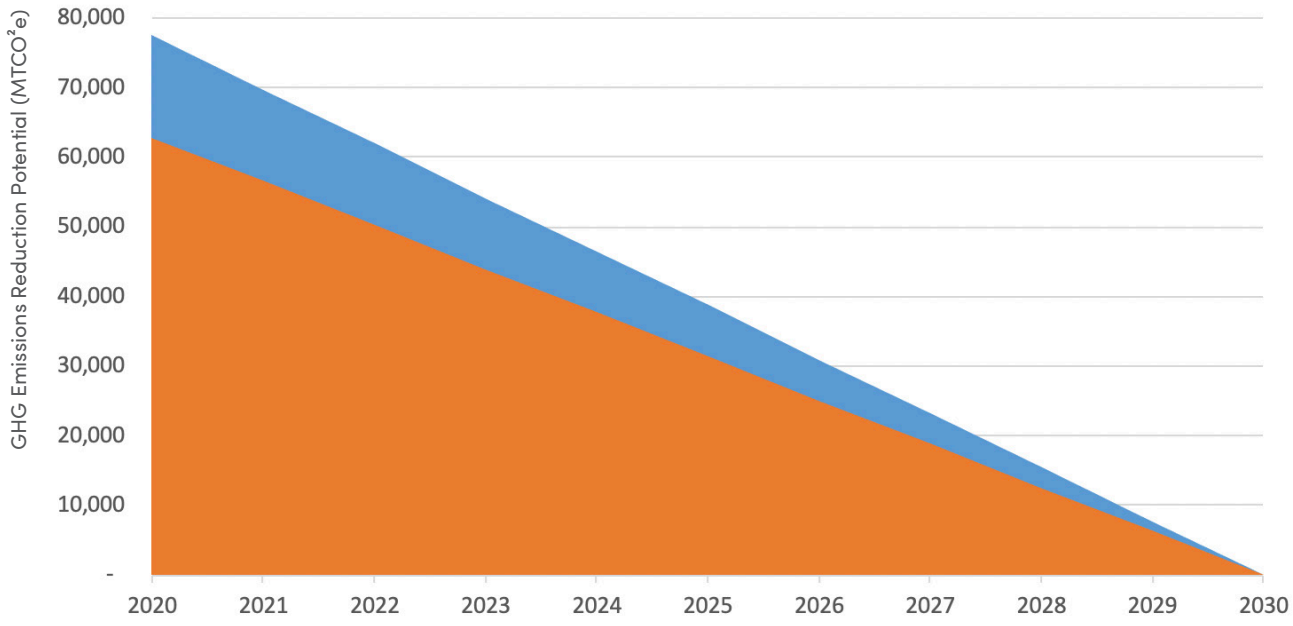
81,000 metric tons carbon dioxide equivalent (3.7% of community-wide emissions).

If the University of Michigan participates in this action, an additional 4,000 metric tons carbon dioxide equivalent could be reduced, resulting in a total of 85,000 metric tons carbon dioxide equivalent (3.9% community-wide emissions).

By 2030, the Support **Onsite Renewable Energy Generation with Battery Storage (Bulk Buys)** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the total emissions reduction potential of onsite renewable energy generation (in light blue) assuming the community and University participate in the program. The orange shows the impact of onsite renewable energy generation if only the community (not the University) participates in the program.

SUPPORT ONSITE RENEWABLE ENERGY GENERATION WITH BATTERY STORAGE (BULK BUYS)



3. DEVELOP COMMUNITY SOLAR PROGRAM

Not all residents and businesses are able to install solar on their property. This may be because of inadequate solar exposure, not owning one's home, or financial barriers associated with renewable energy. To provide options to all who want to invest in solar locally, the City of Ann Arbor, in partnership with our utility, will create and support a robust community solar program which allows solar installations on public properties. Community solar programs allow residents and business to purchase solar panels from an existing solar farm and receive an on-bill credit as if those panels were actually on their roof. State legislation is needed to enable community solar programs but the City is already working with state legislators to move this idea forward.

Vision for Developing Community Solar Program

By 2030, 11 MW of community solar has been established locally. As our community builds demand for community solar, the landfill solar site in opened for public subscriptions and the City's demand for renewable energy is moved to create even more local renewable energy generation.

Party Responsible for Implementation

Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- DTE Energy
- State of Michigan
- Partner organizations

Assumptions

- Community solar is enabled at the state
- Demand for community solar reaches at least 11MW by 2030
- On-bill financing is possible

Equity Impacts

Community solar primarily benefits those without the ability to install their own renewable energy projects.

Indicators of Success / Goals

By 2030, 11MW of new renewable energy has been created and is subscribed through a community solar program.

Target Demographic

Those who face barriers to installing solar on the buildings they inhabit, including renters, low-income residents, and those with shaded or obstructed roofs

Timeline and Initial Actions

2021

Enabling legislation passed and City works with DTE Energy to create local pilot community solar program.

2022

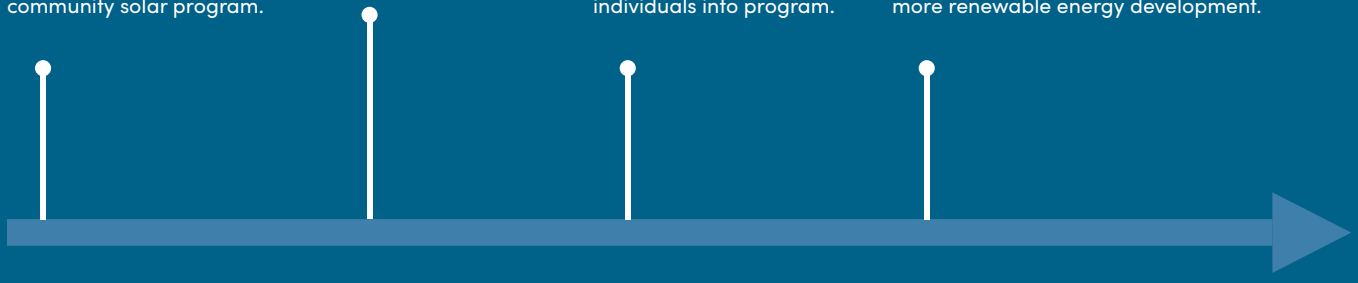
Local pilot program launches.

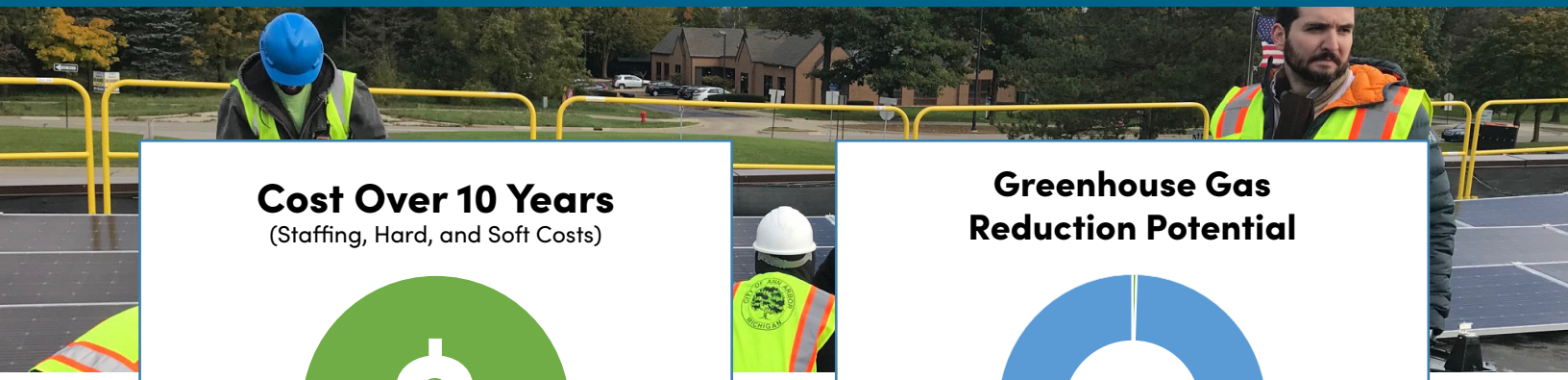
2024

Expansion of community solar program locally. Includes recruitment of individuals into program.

2026

Landfill solar site opens up for community subscriptions given the success of the initiative. Allows City to take its demand to stimulate more renewable energy development.





Cost Over 10 Years

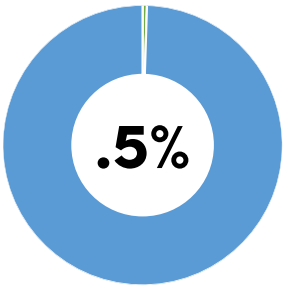
(Staffing, Hard, and Soft Costs)

Costs to the City are

$205,000

over 10 years to help administer the program. If the City becomes an anchor tenant, the costs would rise.

Greenhouse Gas Reduction Potential

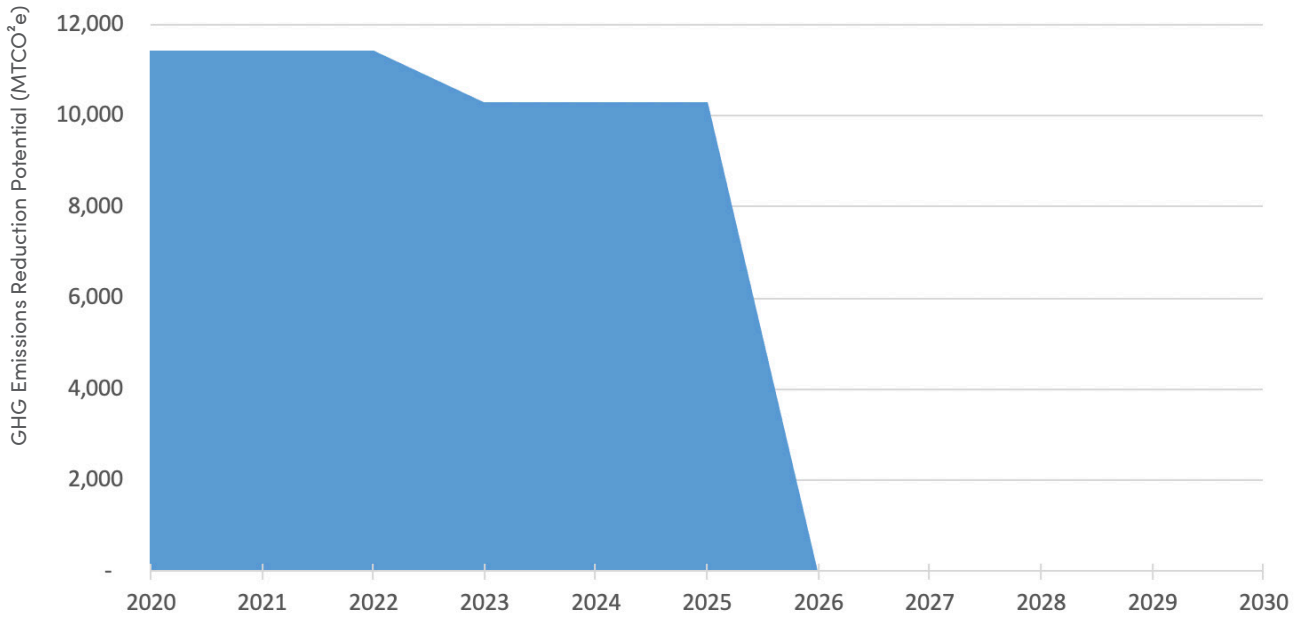


11,500 metric tons carbon dioxide equivalent (.5% of community-wide emissions)

By 2026, the Develop **Community Solar Program** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the total emissions reduction potential of onsite renewable energy generation (in light blue) assuming the community and University participate in the program.

DEVELOP COMMUNITY SOLAR PROGRAM



4. LAUNCH LANDFILL SOLAR PROJECT

The City of Ann Arbor is developing a utility scale solar project with DTE Energy to operate on the City-owned landfill and in Pittsfield Township. The intention is that this installation will provide enough energy to offset roughly 80% of Ann Arbor municipal energy usage. In addition to ground mounted solar, the project incorporates a pilot of solar panels installed on a retention pond, provides a portion of clean energy for Pittsfield Township to offset their municipal operations, and has many co-benefits including creating habitat for local pollinators. If demand exists and enabling legislation is passed, the solar project may be integrated into a community solar program.

Vision for Launching Landfill Solar Project

By 2030, the City-owned landfill and surrounding property has 24 MW of installed solar capacity, the vast majority of it used to offset Ann Arbor municipal energy use.

Party Responsible for Implementation

Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- DTE Energy
- State of Michigan
- Partner organizations

Assumptions

- The landfill is deemed a viable site for utility-scale solar
- Current federal tax credits are leveraged to reduce cost of project

Equity Impacts

Should the landfill solar project include community solar provisions, it could serve many Ann Arborites who cannot install their own solar arrays, whether due to renting, cost, or those with roofs not optimal for solar.

Indicators of Success / Goals

By the end of 2023, a 24MW solar installation is fully operational at the former Ann Arbor landfill and on the land held in PUD with Pittsfield Township.

Target Demographic

The City of Ann Arbor and Pittsfield Township. Once local demand is established, the project may be turned into a community solar program

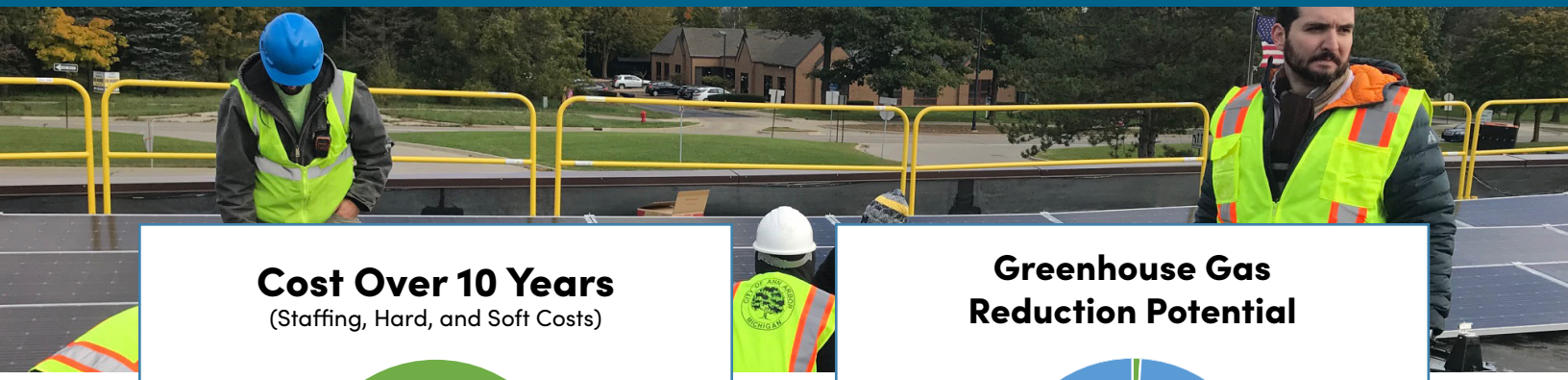
Timeline and Initial Actions

2020

The City of Ann Arbor, in partnership with DTE Energy and Pittsfield Township, completes feasibility and technical assessments of the site. If the project is deemed feasible, an RFP is released and safe harboring of equipment is undertaken.

2023

The landfill solar project begins operation, providing local renewable energy.

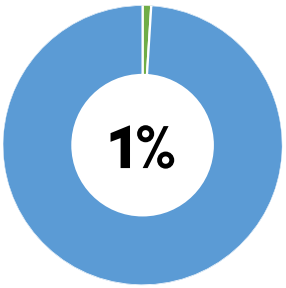


Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

Estimated
$80,000
for staffing support

Final cost to be determined based on any required costs to upgrade the grid at the point of intersection.

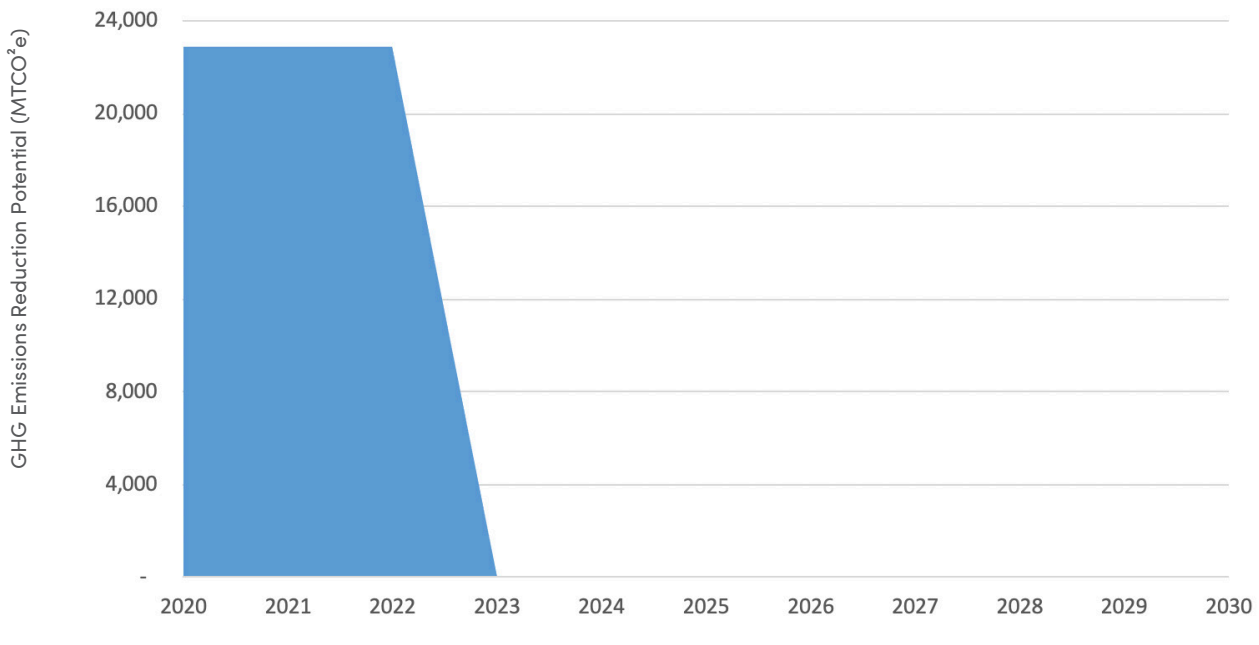
Greenhouse Gas Reduction Potential



23,000 metric tons carbon dioxide equivalent (1% of community-wide emissions)

By 2023, the Launch **Landfill Solar Project** strategy will have achieved all of its potential greenhouse gas emissions reduction potential.

LAUNCH LANDFILL SOLAR PROJECT



STRATEGY 2:

Switch our Appliances and Vehicles from Gasoline, Diesel, Propane, Coal, and Natural Gas to Electric

This strategy focuses on converting the vast majority of our existing gasoline, diesel, propane, coal, and natural gas powered equipment, appliances, and vehicles to electric. This is particularly important since we are working to ensure our electrical grid is powered with 100% renewable energy. To achieve this strategy, 6 specific actions have been identified:

1. Promote Home & Business Electrification
2. Electrify Buses
3. Support Community Electric Vehicle and Solar Bulk Buys
4. Electrify City Fleet
5. Electrify Private Fleet
6. Expand Electric Vehicle Charging Infrastructure

Combined, these six actions are estimated to reduce community-wide emissions by 23% and cost just over $143,000,000.

1. PROMOTE HOME & BUSINESS ELECTRIFICATION

The use of natural gas for heating space and water, as well as cooking in buildings represents over 25% of our community's greenhouse gas emissions. Transitioning away from natural gas to electric, especially given our work to ensure that all electricity is powered with renewable energy, is a pivotal component of A^{2}Zero. To support the electrification of appliances, the City of Ann Arbor will work to establish policies that promote electrification of heating and cooking systems by evaluating options in codes, inventive programs, and through other avenues. The City of Ann Arbor will lead this effort by electrifying all municipal buildings.

Vision for Promoting Home & Business Electrification

By 2030, 100% of city facilities, 30% of owner-occupied homes, and 25% of rental properties have fully electrified and conducted air sealing and insulation improvements. The electricity now used by these systems is sourced from renewable energy, and the additional capacity has been incorporated into plans for community-wide renewable energy purchasing initiatives. Additionally, building occupants benefit from better indoor air quality.

Party Responsible for Implementation

- Office of Sustainability and Innovations
- For City buildings – Facilities with support from Office of Sustainability and Innovations

Equity Impacts

Few equity impacts from this action except as part of the community solar program (above).

Collaborators / Project Co-Designers

- City of Ann Arbor legal team
- City of Ann Arbor Building, Rental, and Inspection Services
- Michigan Saves
- Home Improvement Stores
- Contractors (i.e., energy efficiency, repair, installation)

Indicators of Success / Goals

By 2030, 100% of city facilities, 30% of owner-occupied homes, and 25% of rental properties have fully electrified and the electricity powering those homes is coming from renewable energy sources.

Assumptions

- 30% of single family homes are all electric by 2030, not including the 20% already using electric heat
- 25% of rentals are all electric by 2030
- City commits to and achieves 100% electrification by 2030
- A 1:1 replacement of natural gas energy to electricity, with 1CCF gas transitioning to 30.36kWh electricity
- All new residential and commercial buildings are designed and built to operate without the use of natural gas, reducing the increased cost associated with retrofitting existing systems
- All additional electric consumption is powered by an associated increase in renewable energy sources

Target Demographic

All buildings in Ann Arbor, including single-family homes, rentals, and businesses. The action was modeled to show the impact if the University of Michigan participates as well as if it does not

Timeline and Initial Actions

2020

Conduct legal analysis and finalize electric vehicles (EV) readiness ordinance.

2021

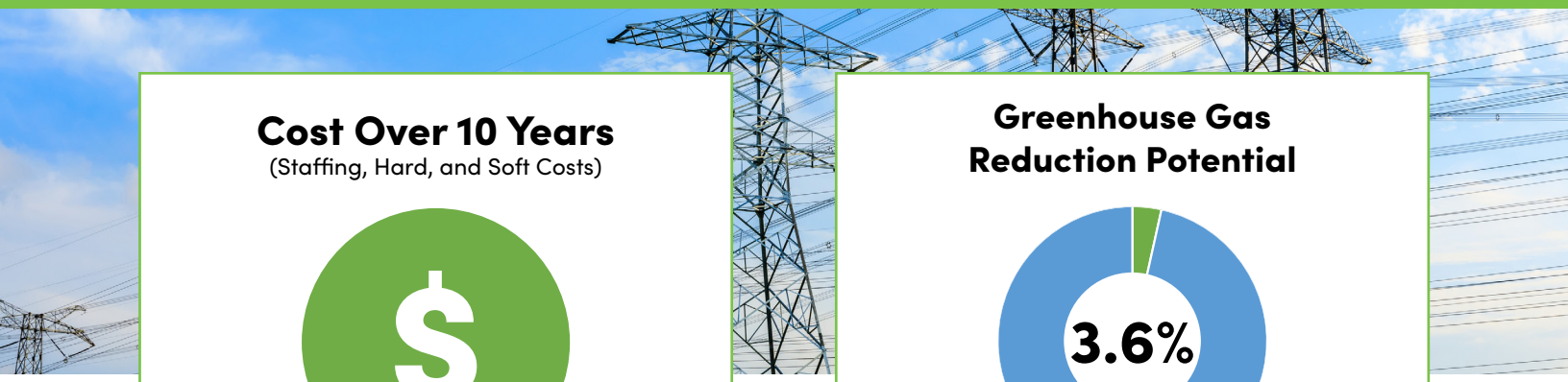
Develop electrification policy. Begin planning administrative program. Capacity building by ensuring enough contractors are trained in electric heating systems appropriate for Ann Arbor's climate. EV readiness ordinance adopted.

2023

Public outreach and education, including visible and accessible alternatives to natural gas systems. Program launches and is enforced.

2024

Buildings transition at a steady rate annually.



Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

Estimated

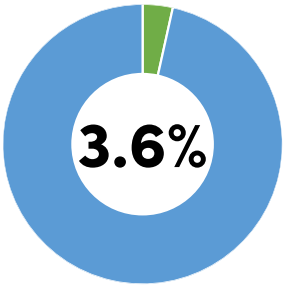
$1,400,000

staffing, trainings, and administrative costs for community portion of electrification program.

$5,700,000

for transitioning City facilities to all electric.

Greenhouse Gas Reduction Potential



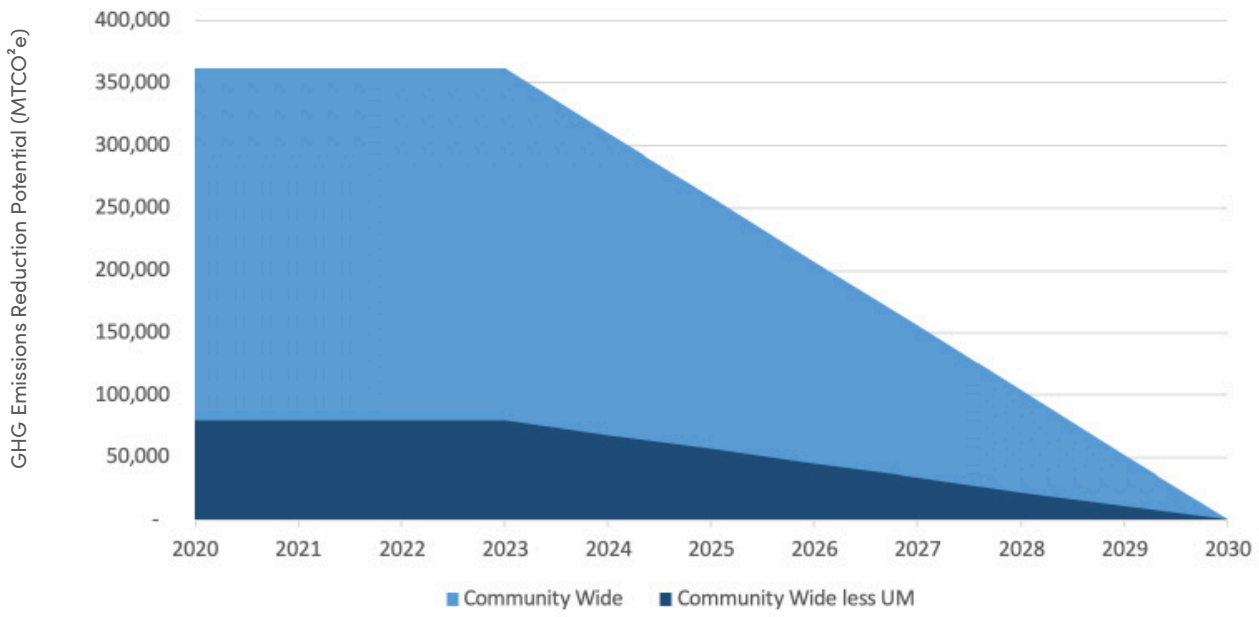
79,200 metric tons carbon dioxide equivalent (3.6% of community-wide emissions) for residential and municipal electrification.

If the University of Michigan were to electrify all of their operations and power that additional electrical demand with clean energy, it would be an additional reduction of 283,000 metrics tons of carbon dioxide equivalent (13% of community-wide greenhouse gas emissions), resulting a total of 362,200 metric tons of carbon dioxide equivalent (16.5% of community-wide emissions).

By 2030, the **Promote Home & Business Electrification** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the total emissions reduction potential of home and business electrification (in light blue) assuming the community and University participate in the program. The dark blue shows the impact of home and business electrification if only the community (not the University) participates in the program.

PROMOTE HOME AND BUSINESS ELECTRIFICATION



2. ELECTRIFY BUSES

This action involves electrifying TheRide's diesel and diesel-hybrid fleet of 87 buses as well as the University of Michigan's ethanol, biodiesel, and gasoline buses on an aggressive time line.

Vision For Electrifying Buses

By 2030, TheRide and UM's bus fleet have transitioned to electric propulsion. Consequentially, both entities are enjoying lower maintenance, operating, and fuel costs. Solar has been installed on AATA and UM properties so that the electricity running the buses is 100% carbon-free.

Party Responsible for Implementation

- TheRide, with support from the Office of Sustainability and Innovations' Sustainability Analyst
- UM Transportation Department, with support from the Office of Sustainability and Innovations

Party Responsible for Implementation

- DTE Energy
- Michigan Department of Environment, Great Lakes, and Energy (EGLE)
- UM Energy Institute
- UM Carbon Neutrality Commission

Equity Impacts

Electrifying buses will give riders a cleaner, more comfortable, and healthier ride. Communities who live along electrified bus routes will benefit from reduced asthma and COPD rates, which disproportionately impact communities of color and low-income communities.

Indicators of Success / Goals

By 2030, TheRide and UM's entire fleet of buses are electric and their power is drawn from renewable energy.

Assumptions

- Annually, 9 new electric buses are purchased starting in 2021 for TheRide
- UM replaces buses at a rate of approximately 5 per year
- Bus fleets stay at their current level
- A traditional bus is $525,000; an electric bus is $750,000
- No value calculated for selling diesel or gasoline buses
- 2 additional electric buses are purchased per year to grow the fleet and expand service
- Assumes limited operational savings in the first few years of operation as facilities adjust to new types of buses
- Costs are only calculated for TheRide's portion of electric buses
- Air quality improves along the bus corridors

Target Demographic

Bus riders and potential bus riders

Timeline and Initial Actions

2020

Planning for e-buses commences. Grant applications filed.

2021

TheRide purchases 9 new e-buses and installs EV charging infrastructure that will be needed for first 5 years of operation. UM purchases first 5 buses and EV charging infrastructure.

2030

All buses operated by TheRide and UM are electric.

Cost Over 10 Years

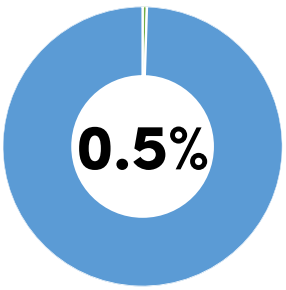
(Staffing, Hard, and Soft Costs)

Estimated

$86,000,000

(only accounting for TheRide's electric buses)

Greenhouse Gas Reduction Potential

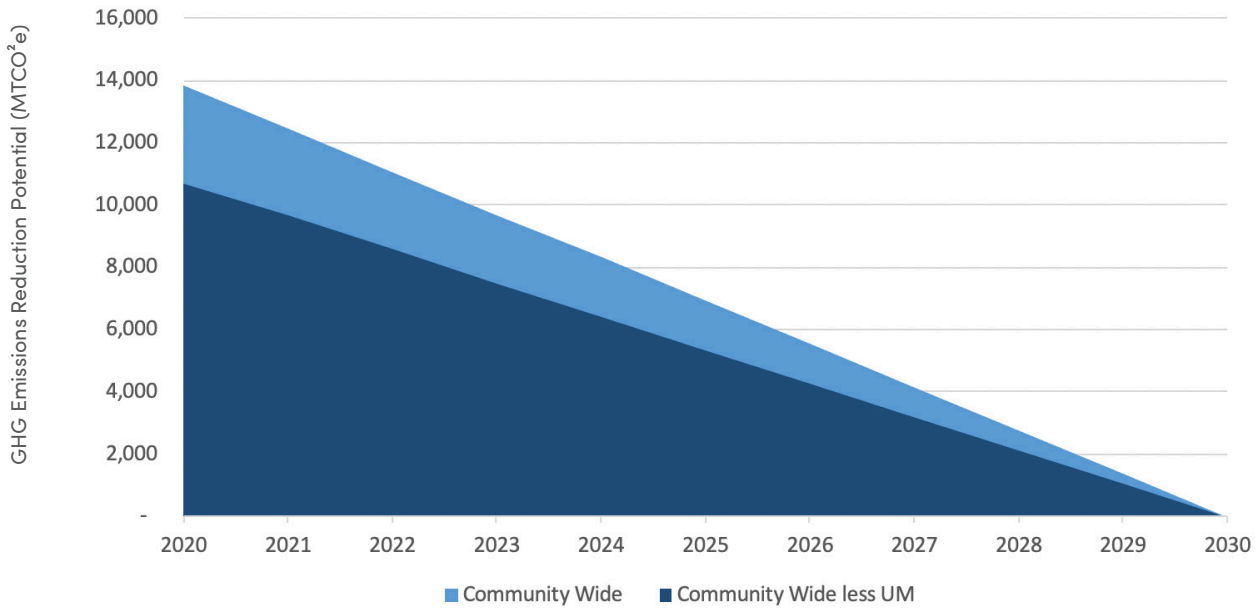


10,700 metric tons of carbon dioxide equivalent (0.5% of community-wide emissions) if TheRide buses are electrified. If the University of Michigan participates and also converts their buses, an additional 3,100 metric tons of carbon dioxide equivalent (0.1% of community-wide emissions) are also reduced. In total, 13,800 metric tons of carbon dioxide equivalent (0.6% of community-wide emissions)

By 2030, the **Electrify Buses** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the total emissions reduction potential of bus electrification (in light blue) assuming the community and University participate in the program. The dark blue shows the impact of bus electrification if only the community (not the University) participates in the program.

ELECTRIFY BUSES



3. SUPPORT COMMUNITY ELECTRIC VEHICLE AND SOLAR BULK BUYS

Group-buy programs increase the accessibility of EVs by allowing potential EV purchasers to take advantage of bulk purchase or lease discounts. In order to promote immediate EV purchases, group-buy programs are only offered for a limited time, typically a few months. Coupling EV group-buy programs with purchase programs for residential solar installation allows EV owners to reduce their EV charging costs, while helping the City of Ann Arbor transition towards clean, renewable energy. The program includes the creation of incentives for low-income residents to purchase off-lease or used EVs.

Vision for Supporting Community Electric Vehicle and Solar Bulk Buys

Residents and businesses in Washtenaw County can purchase new and used EVs at a discount of 10-15%. Local dealerships participate with their auto manufacturers to ensure ample EV stock is available on dealerships' lots and that their sales teams are educated about EVs. Residents are able to pair solar (through Solarize program) with EVs, which should significantly reduce the payback period for solar and the EV.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- DTE Energy
- Michigan Saves
- Energy Commission
- Transportation Commission
- Washtenaw Electric Auto Association
- Urban Sustainability Directors Network
- Local auto dealerships
- Major auto companies (OEMs)
- Plug In America's PlugStar program
- Smart Columbus Electrified Dealers program
- University of Michigan

Equity Impacts

We will explore offering bulk buys for EVs that are coming off leases, and offer bulk buys for e-scooters and e-bikes to ensure equitable and affordable options for all.

Indicators of Success / Goals

By 2030, 50% of all vehicles miles traveled are in electric vehicles.

Assumptions

- DTE Energy will continue partnering with the City
- OEMs will have enough cars to meet demand
- Reduced rates are available through the bulk buy
- The CCA purchase will help reduce new electricity demand from Ann Arbor EV owners

Target Demographic

Residents and local car dealership employees

Timeline and Initial Actions

2020

OSI and DTE Energy kick off a group buy program for City staff with one or two OEMs participating.

2021

OSI and DTE Energy expand the program to all DTE Energy customers in their service territory. The program also includes more OEMs and dealerships participating.

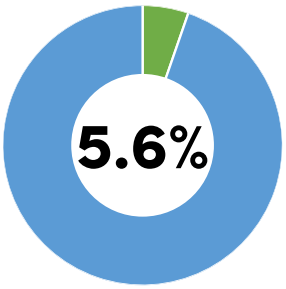
2022

OSI and DTE Energy expand the offering to include paired solar installations.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$700,000

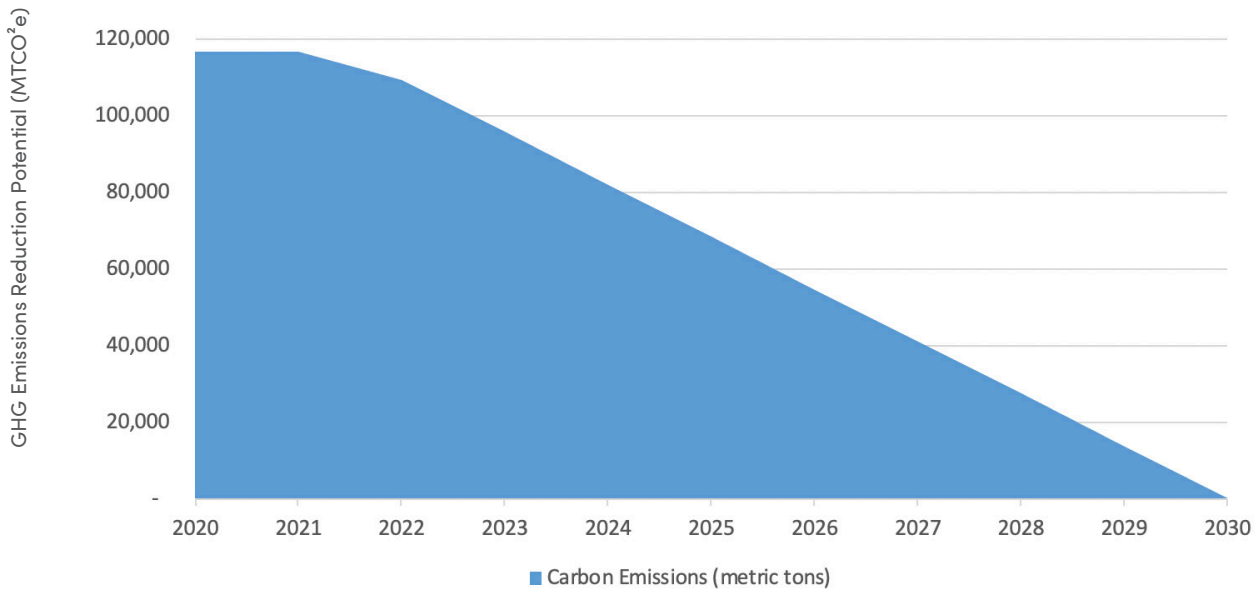
Greenhouse Gas Reduction Potential



122,900 metric tons carbon dioxide equivalent (5.6% of community-wide emissions)

By 2030, the **Support Community Electric Vehicle and Solar Bulk Buys** strategy will have achieved all of its potential greenhouse gas emissions reductions.

SUPPORT COMMUNITY ELECTRIC VEHICLE AND SOLAR BULK BUYS



4. ELECTRIFY CITY FLEET

In June 2017, City Council approved Resolution R-17-237, directing the City Administrator to update and revive the City's Green Fleets Policy, promote the purchase of plug-in electric vehicles, and incorporate updated best practices and lessons learned from peer municipalities. The Green Fleets Team (GFT) was given until the first quarter of 2020 to develop a plan for electrifying the City fleet by 2025. Because there are so many more electric vehicle options for light duty vehicles at this time, the GFT focused first on transitioning those and then on electrifying construction equipment and medium- and heavy-duty vehicles.

Vision for Electrifying City Fleet

By 2025, 90% of the City's fleet has transitioned to electric. The remaining 10% are pieces of medium- and heavy-duty vehicles and equipment that cannot be electrified.

Party Responsible for Implementation

- Fleets and Facilities Department, with support from the Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Green Fleets Team
- The Electrification Coalition
- Ecology Center

Equity Impacts

Improved local air quality for all.

Indicators of Success / Goals

By 2025, 90% of the City's fleet has transitioned to electric.

Assumptions

- EV market continues to grow and move into new market shares
- Electricity from the EVs is powered through CCA or onsite solar

Target Demographic

Ann Arbor City Employees

Timeline and Initial Actions

2020

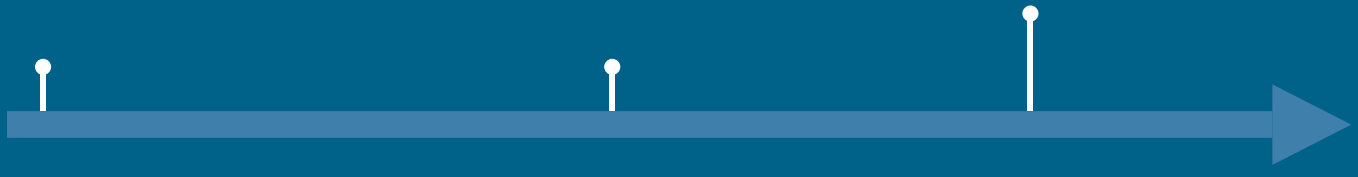
Municipal fleet electrification strategy complete and updated fleet replacement rates calculated.

2021

New fleet replacements rates integrated into the budget.

2025

90% of fleet is transitioned to electric.



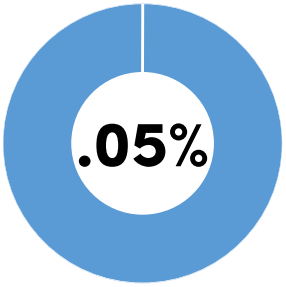
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$4,000,000

(only accounting for TheRide's electric buses)

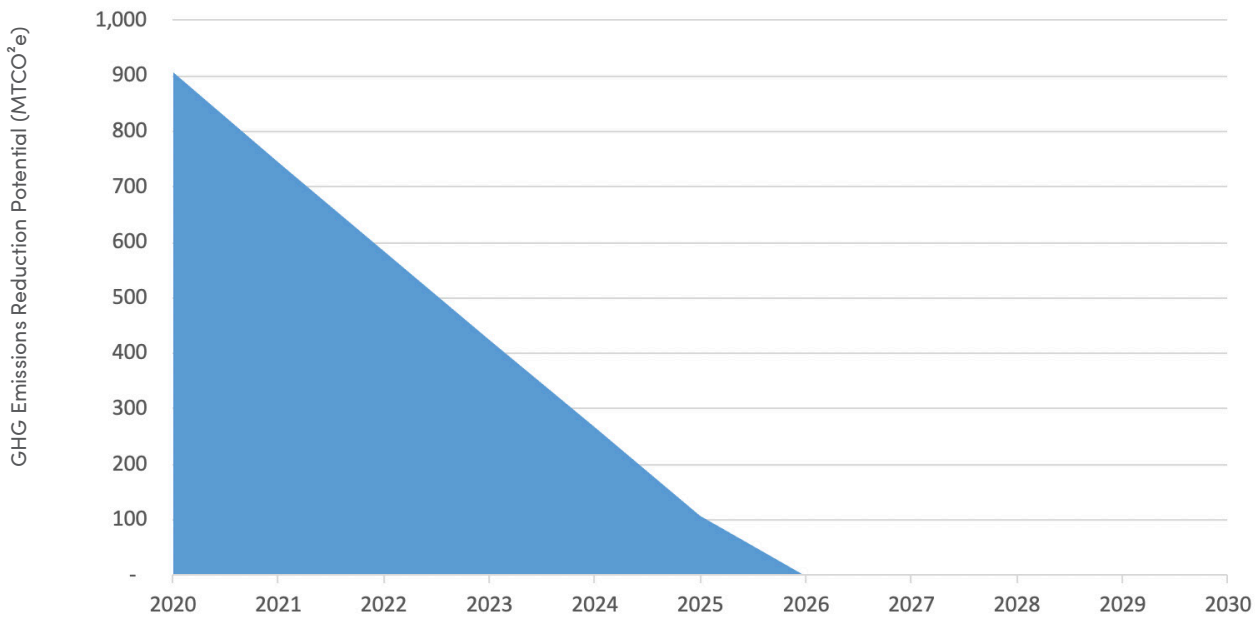
Greenhouse Gas Reduction Potential



1,100 metrics tons of carbon dioxide equivalent (0.05% of community-wide emissions)

By 2026, the **Electrify City Fleet** strategy will have achieved all of its potential greenhouse gas emissions reductions.

ELECTRIFY CITY FLEET



5. ELECTRIFY PRIVATE FLEETS

Programmatic support is offered, along with an ambitious outreach and education program, to support private companies with transitioning their fleets to electric. This includes working with the State and utilities to offer more rebates and incentive programs, and sharing information about existing rebates for charging.

Vision for Electrifying Private Fleets

Medium and large companies in Ann Arbor help the City meets its ambitious climate neutrality goal by transitioning their fleets to electric, encouraging their employees to drive EVs, and installing EV charging infrastructure. Ridesharing companies have agreed to franchise agreements which require that at least half of their fleets are EVs.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Equity Impacts

Improved local air quality for all.

Collaborators / Project Co-Designers

- DTE Energy
- The Electrification Coalition
- Ecology Center
- Washtenaw Electric Automobile
- Association
- Ann Arbor 2030 District
- Ceres
- DDA
- EGLE
- Employers in Ann Arbor with large fleets
- Ridesharing and ride hailing companies
- Delivery companies

Indicators of Success / Goals

By 2030, 50% of private fleets within the City are electric.

Assumptions

- Corporate fleets will encourage a transition to EVs
- The State and utilities will continue to provide incentives for fleet electrification

Target Demographic

Employees and owners of medium to large business in Ann Arbor

Timeline and Initial Actions

2021

Installation of 20 new level 2 EV chargers in each DDA parking garage and lot (using DTE Energy rebates).

2022

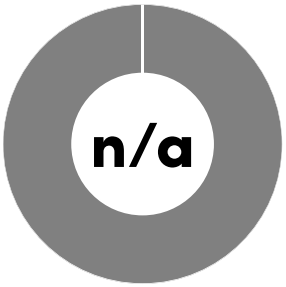
As needed, install more level 2 chargers in garages (75% cap for EV parking charging spots in any garage). Create new Direct Current Fast Chargers (DCFC) infrastructure for use by ride hailing companies, car sharing services, and the public (not fee based).

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$123,000

Greenhouse Gas Reduction Potential



The impact of this action was not calculated separately but included in the EV bulk buy action.

ELECTRIFY PRIVATE FLEETS

6. EXPAND ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

In the next three decades, electric vehicles (EVs) will replace internal combustion engine (ICE) vehicles as the dominant type of vehicles on the market. This action item aims to significantly increase electric vehicle charging infrastructure at parking lots and garages, park and ride lots, ride sharing spots, workplaces, and City facilities to support this transition.

Vision for Expanding Electric Vehicle Charging Infrastructure

Ann Arbor has plentiful EV charging infrastructure deployed to meet the needs of a burgeoning transition from ICE vehicles to EVs. While 80% of EV charging will continue to happen at home, public and workplace charging has expanded to fill in the remaining gaps.

Party Responsible for Implementation

- Office of Sustainability and Innovations, in partnership with Downtown Development Authority
- City's Engineering Department Transportation Group

Collaborators / Project Co-Designers

- State of Michigan (EGLE)
- Private businesses for workplace charging
- Property owners for multifamily charging
- Residents for home-based charging
- UM for campus charging
- Transportation Commission
- Ann Arbor 2030 District
- EV charger manufacturers and installers
- Affordable housing community
- Project developers for new housing and commercial projects
- DTE Energy

Equity Impacts

Placement of new EV chargers prioritizes renters in multifamily housing and street-side for residents who do not have a garage or driveway. Expanded public charging in garages and lots will ensure that some basic level of charging is available to all who need it.

Indicators of Success / Goals

10% of all public and private parking spaces are equipped with level 2 EV chargers and 2% with Direct Current Fast Chargers (DCFCs).

Assumptions

- 1,250 level two chargers are installed a year starting in 2021; each year 200 of these chargers are paid for through utility rebates
- 2 fast chargers are installed in the community each year; both are paid for through utility rebates
- Any additions to electrical capacity will be paid for separately
- New EV chargers will be prioritized for placement in low-income areas
- All additional electricity demand is integrated into the CCA

Target Demographic

Current and future EV owners who drive in Ann Arbor

Timeline and Initial Actions

2021

Installation of 20 new level 2 EV chargers in each DDA parking garage and lot (using DTE Energy rebates).

2022

As needed, install more level 2 chargers in garages (75% cap for EV parking charging spots in any garage). Create new Direct Current Fast Chargers (DCFC) infrastructure for use by ride hailing companies, car sharing services, and the public (not free to use)

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$42,000,000

Greenhouse Gas Reduction Potential

This action does not directly lead to greenhouse gas reductions but contributes to the ability of residents and businesses to invest in electric vehicles.

EXPAND ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

STRATEGY 3:

Significantly Improve the Energy Efficiency in our Homes, Businesses, Schools, Places of Worship, Recreational Sites, and Government Facilities

This strategy focuses on drastically improving the energy efficiency of our homes, businesses, schools, places of worship, government buildings, and recreational sites. To achieve this strategy, 11 specific actions have been identified:

1. Transition to More Energy Efficient Homes and Businesses
2. Update Building Codes
3. Power Street Lighting and Traffic Signals with LED
4. Benchmark and Disclose Energy Usage
5. Establish Loan Loss Reserve
6. Develop Energy Concierge and Community Engagement Program
7. Transition Affordable Housing Sites to Net Zero Energy
8. Promote Green Rental Housing Program
9. Launch Green Business Challenge
10. Support Aging in Place Efficiently
11. Expand Weatherization Program

Combined, these 11 actions are projected to reduce community-wide emissions by 13.4% and cost just over $14,500,000.

1. TRANSITION TO MORE ENERGY EFFICIENT HOMES AND BUSINESSES

As much as 80% of energy consumed in our buildings is wasted, through gaps in building envelopes or unnecessary operation of lights and electronics. Improving building envelopes with better insulation and windows, efficient lighting and appliances, and advanced heating and cooling systems can have a significant impact on the amount of energy our community uses to heat and cool our buildings. While energy efficiency improvements pay for themselves through energy savings over time, the upfront cost of installing them can be a barrier for many. Through a widespread, comprehensive group-buy program, the City of Ann Arbor can encourage and enable residents and businesses to procure energy efficiency products for a discounted price.

Vision for Transitioning to More Energy Efficient Homes and Businesses

Through a broad-reaching public engagement campaign, 80% of residents and businesses participate in energy efficiency group-buys, incentivized through discounts achieved through economies of scale. The campaign is inclusive, designed with input from the public and helps reduce energy use of participating buildings by 20%.

Party Responsible for Implementation

- Ann Arbor Building, Rental, and Inspection Services, with support from the Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Local contractors and energy efficiency financers, like Michigan Saves
- City of Ann Arbor Building, Rental, and Inspection Services
- Community liaisons, including neighborhood ambassadors
- Ann Arbor 2030 District
- DTE Energy

Equity Impacts

If coupled with the Green Rental Housing Policy, all rental housing in homes will be mandated to achieve energy efficiency standards as part of maintaining a rental license through the City.

Indicators of Success / Goals

85% of owner occupied homes, 80% of tenant occupied homes, and 80% of businesses achieve a 20% reduction in electricity usage and 15% reduction in natural gas usage by 2030.

Assumptions

- 85% of owner occupied homes are retrofitted and achieve a 20% electricity savings and 15% natural gas savings
- 80% of tenant occupied and commercial enterprises are retrofitted and achieve a 20% electricity savings and 15% natural gas savings

Target Demographic

This program reaches all homeowners, landlords, and businesses through targeted engagement strategies

Timeline and Initial Actions

2020

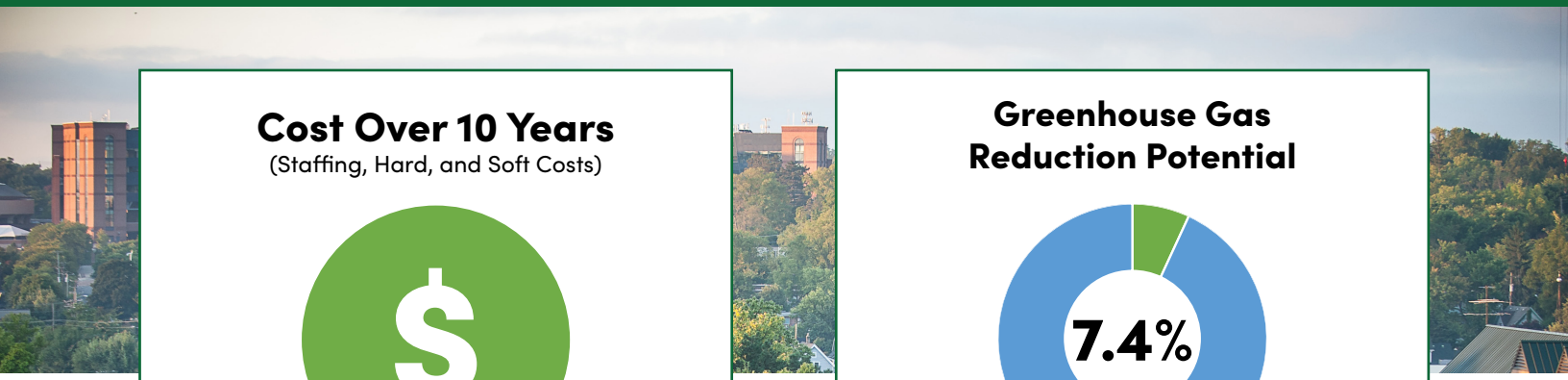
Program design and contractor outreach and education.

2021

Program launches and first bulk buy takes place. Participation steadily increases annually.

2030

85% of owner occupied homes, 80% of tenant occupied homes, and 80% of businesses have had an energy efficiency improvement.

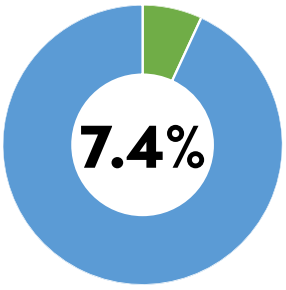


Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$950,000

Greenhouse Gas Reduction Potential



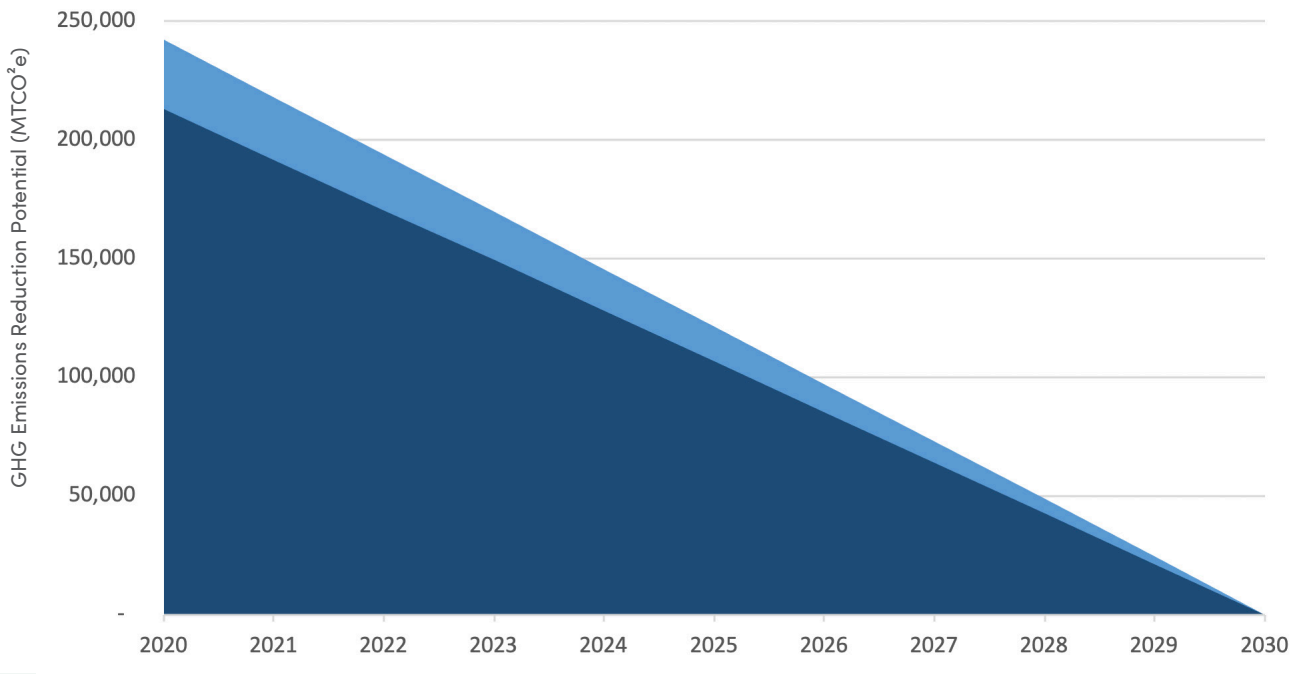
161,000 metric tons of carbon dioxide equivalent (7.4% of community wide emissions).

If the University of Michigan participates and achieves a 20% reduction in total energy usage, an additional 81,500 metric tons of carbon dioxide equivalent could be reduced, resulting in a total of 242,500 metric tons of carbon dioxide equivalent (11.1% of community-wide emissions).

By 2030, the **Transition to More Energy Efficient Homes and Businesses** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the total emissions reduction potential of efficiency initiatives (in light blue) assuming the community and University participate in the program. The dark blue shows the impact of efficiency initiatives if only the community (not the University) participates in the program.

TRANSITION TO MORE ENERGY EFFICIENT HOMES AND BUSINESSES



2. UPDATE BUILDING CODES

Buildings are the largest source of greenhouse gas emissions locally. Doing all we can to reduce their energy consumption and greenhouse gas emissions will have a significant impact on our ability to achieve carbon neutrality. In Michigan, local municipalities are constrained by the State's building code, meaning that efforts to advance more energy efficient and ideally net zero energy buildings will need to be done through changes in the State's building code. This action focused on working with the state to pass the 2021 building code and the zero code appendix so that all new developments and major renovations in Ann Arbor can be net zero energy.

Vision for Updating Buildings Codes

By 2030, through an update to the State's building code, all new buildings and major renovations have been built to net zero energy standards. Any and all growth in Ann Arbor is done so sustainably and equitably.

Party Responsible for Implementation

- Ann Arbor Building, Rental, and Inspection Services, with support from the Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- State of Michigan
- Developers and contractors

Equity Impacts

At first, primarily higher income residents will occupy the new buildings that will be more energy efficient. However, over the long term, all Ann Arborites will benefit from stronger building codes.

Indicators of Success / Goals

By the end of 2030, 2,120 residential units and 160 commercial units are net zero energy buildings.

Assumptions

- All new construction from 2022 through 2030 (and beyond) is built to net zero energy standards, which includes no natural gas consumption and all electricity usage offset through the CCA
- Annual growth rate of 265 housing units for residential, based on past growth rate of housing units per census data
- Annual growth rate of 21 units annually for commercial enterprises, based on past growth rate of commercial units per building permit data
- Does not include savings associated with renovations as those are calculated in other areas of this Plan

Target Demographic

Developers constructing new and renovating buildings

Timeline and Initial Actions

2020

Work with state and local partners to garner support for adopting the 2021 building code and zero code appendix.

2021

State adopts updated building code. City creates infrastructure to support developers, the construction community, electricians, and others in achieving the Code. City works with state on educational material and trains inspectors. Enforcement begins.

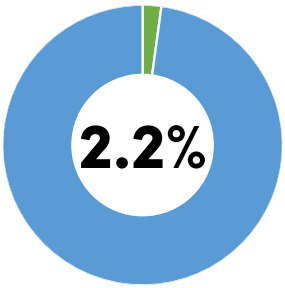
2022

City maintains administrative support to achieve code. Enforcement continues. City works with 2030 District to launch net zero energy districts.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$1,935,000

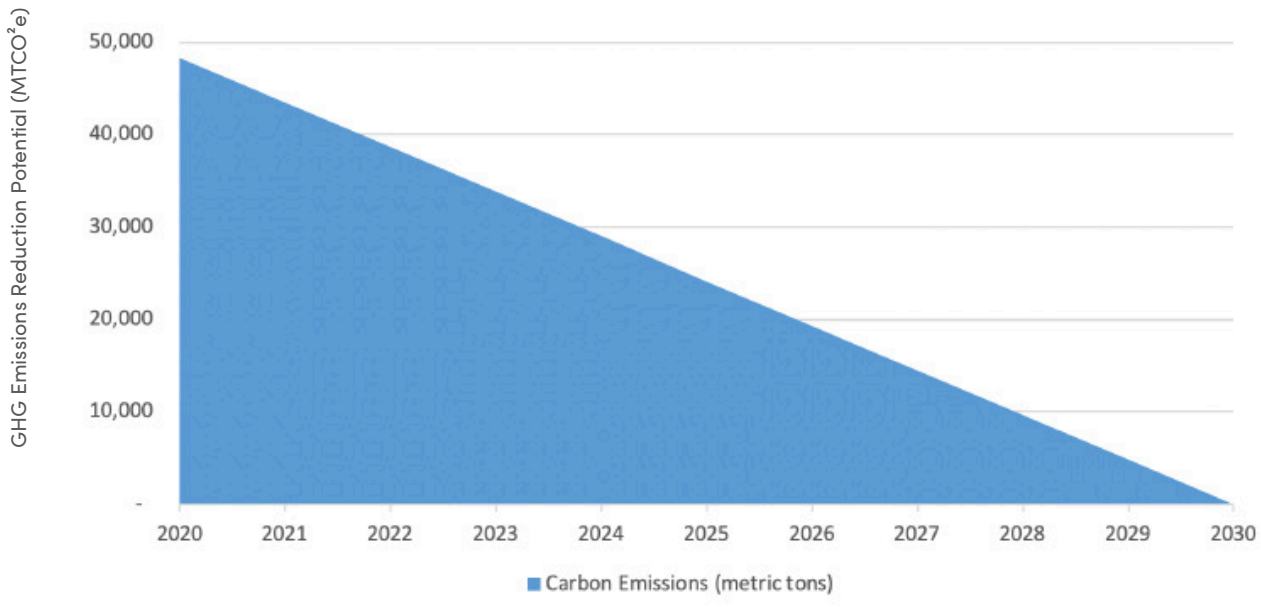
Greenhouse Gas Reduction Potential



48,300 metric tons carbon dioxide equivalent (2.2% of community-wide greenhouse gas emissions)

By 2030, the **Update Building Codes** strategy will have achieved all of its potential greenhouse gas emissions reductions.

UPDATE BUILDING CODES



3. POWER STREET LIGHTING AND TRAFFIC SIGNALS WITH LED

Lighting accounts for 15 percent of global energy use and a significant portion of municipal energy consumption in the form of lighting our streets for safety. The City has started converting streetlights in our community from conventional lights to LEDs, the most energy-efficient bulbs available. This can reduce energy usage by up to 70 percent, significantly reduce maintenance costs, and offer more control over when and how lights shine.

Vision for Powering Street Lighting and Traffic Signals with LED

By 2030 all of our community's public streetlights and traffic signals are LED.

Party Responsible for Implementation

- City of Ann Arbor Signs and Signals

Collaborators / Project Co-Designers

- Office of Sustainability and Innovations
- DTE Energy

Equity Impacts

Few equity issues except slightly increased pedestrian safety.

Indicators of Success / Goals

By 2029, all streetlights and traffic signals have been converted to LEDs.

Assumptions

- City will gain ownership of 2/3 of the streetlights currently owned by utility
- 60% kWh savings by replacing 4,467 lights with LED lighting; Average savings are between 50-70%
- City will replace all traffic lights with LED; 85% efficiency savings
- City will assess/identify opportunity to replace all crosswalk lighting with LED efficient lighting

Target Demographic

This action applies to municipal streetlights, crosswalks, and outdoor lighting

Timeline and Initial Actions

2020

The City initiates negotiations with DTE Energy about purchasing streetlights.

2021

City begins purchasing streetlights and replacing with LEDs. Traffic signals are replaced on a rolling basis.

2029

Replacement of streetlights and traffic signals complete.

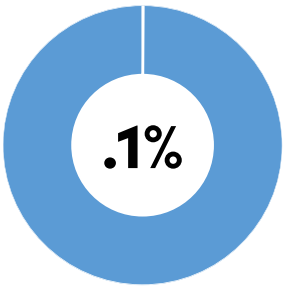
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$3,100,000

including the cost to purchase the assets from DTE Energy and finance the conversion to LEDs.

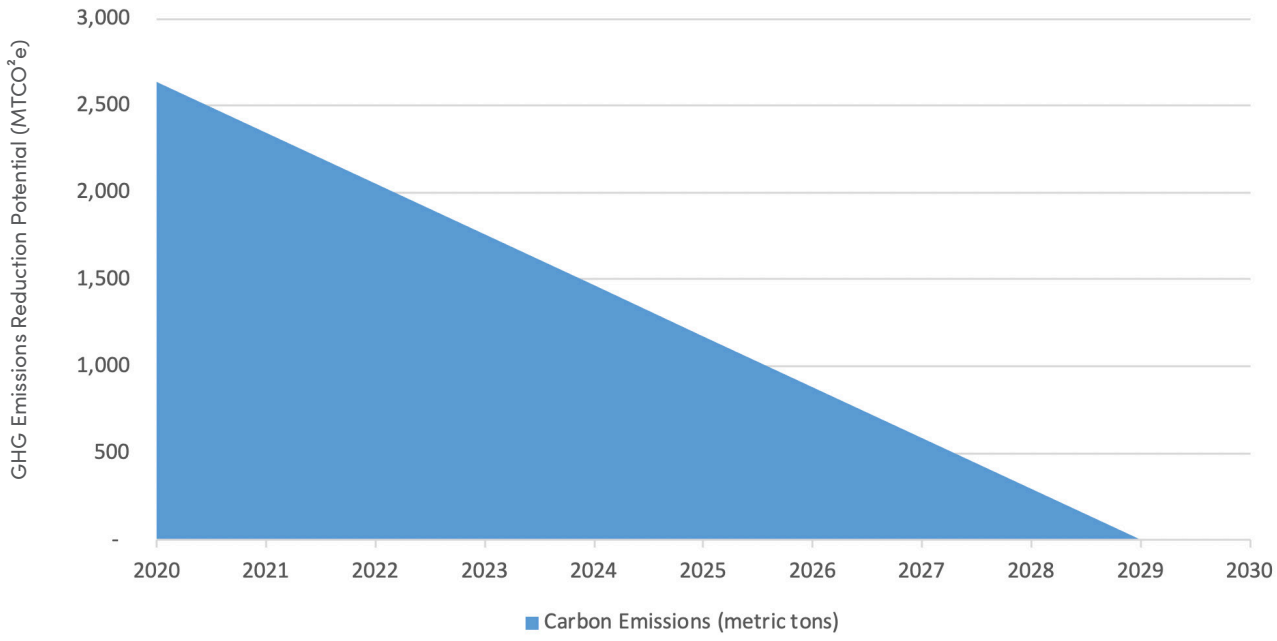
Greenhouse Gas Reduction Potential



2,600 metrics tons of carbon dioxide equivalent (.1% of community-wide emissions)

By 2029, the **Power Street Lighting and Traffic Signals with LED** strategy will have achieved all of its potential greenhouse gas emissions reductions.

POWER STREET LIGHTING AND TRAFFIC SIGNALS WITH LED



4. BENCHMARK AND DISCLOSE ENERGY USAGE

In order to understand our community's potential for and achievement of energy efficiency improvements, we need more granular information about how we use energy. Benchmarking, through the disclosure of energy usage, identifies where we can make the most significant impacts, and serves to motivate performance improvements.

Vision for Benchmarking and Disclosing Energy Usage

Through standardized energy audits and self-reporting, residents and businesses take ownership of their energy usage, and have worked towards significant energy improvements. Achievements have been recognized across sectors, and as a community we have reduced our energy usage by 20%.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Ann Arbor Information Technology Department
- Commercial property owners and tenant Real estate agents, brokers, and homeowners
- Energy auditors
- DTE Energy and Consumers Energy
- Ann Arbor 2030 District

Equity Impacts

Lower-income homeowners may suffer lower sales prices for their homes if they have inefficient homes. Rents may rise for highly efficient rental units, which may further exacerbate race and income disparities in the community.

Indicators of Success / Goals

Benchmarking requirements are passed, with 90% compliance by the residential, commercial, and institutional sectors by 2025.

Assumptions

- A back-end portal to automatically report energy usage is built between the utilities and the City
- Sufficient Code Enforcement staff exist to ensure compliance in the program
- Support resources are available to help building owners and tenants reduce energy after benchmarking; this initiative contributes to participation in other energy efficiency initiatives in this Plan

Target Demographic

Homeowners, landlords, businesses, and institutions

Timeline and Initial Actions

2021

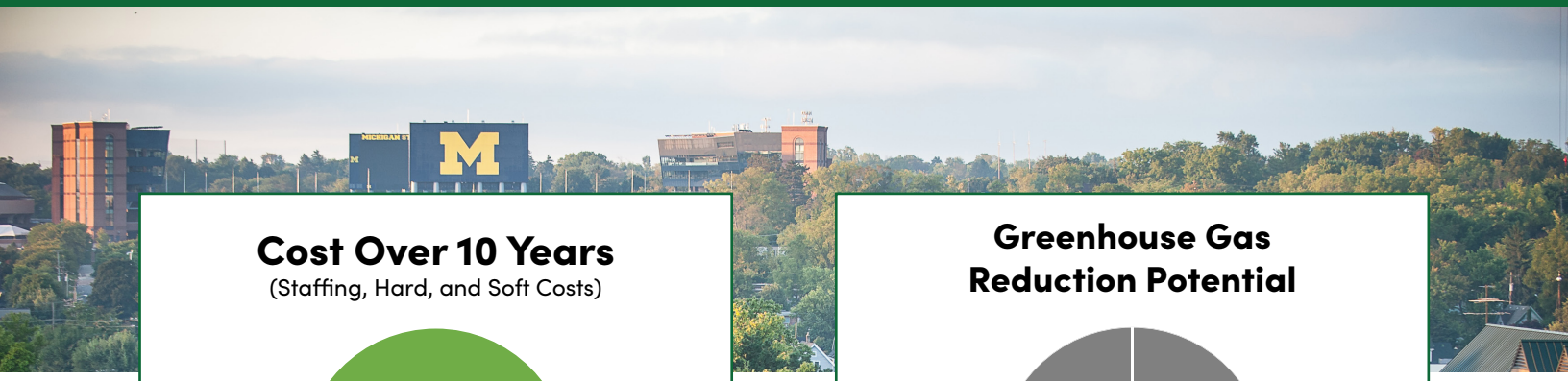
Design program. Conduct building inventory for all sectors. Create reporting platform, educate, and pilot.

2022

Fully administer the program. Continually revisit customer service support, enforcement, and program administration for areas of improvement.

2025

Achieve 90% compliance in the residential, commercial, and institutional sectors.



Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$

$2,370,000

Greenhouse Gas Reduction Potential

Not assumed to directly reduce greenhouse emissions but action is foundational for work.

BENCHMARK AND DISCLOSE ENERGY USAGE

5. ESTABLISH LOAN LOSS RESERVE

Well-designed renewable energy, energy efficiency, and electrification improvements pay for themselves over their lifetime. However, the upfront cost of installation can be a barrier to many, especially to those who cannot secure financing. The City of Ann Arbor proposes establishing a loan loss reserve to provide credit enhancements for residents with lower credit scores, expanding those who can finance energy efficiency, renewable energy, fuel switching, and electric vehicle purchases.

Vision for Establishing Loan Loss Reserve

All Ann Arborites can secure the financing they need, at a reasonable rate, to make the energy efficiency, renewable energy, and fuel switching activities needed to achieve carbon neutrality.

Party Responsible for Implementation

- Michigan Saves, with support from the Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Local and regional banks
- Ann Arbor Finance Department

Equity Impacts

Homeowners with lower credit scores will benefit from the City establishing a loan loss reserve. Banks and Michigan Saves can lower the minimum credit scores needed to qualify for loans to do energy efficiency and renewable projects.

Indicators of Success / Goals

By 2021, Ann Arbor has created a $1,000,000 loan loss reserve fund that enables lenders to loan to low-income residents to undertake energy efficiency and renewable energy improvements.

Assumptions

- $1,000,000 is placed into a loan loss reserve to initiate the program
- Average loan terms of 6% APR over 10 years
- The seed funding has a leverage ratio of 1:20
- 5% default rates

Target Demographic

Low-income residents

Timeline and Initial Actions

2020

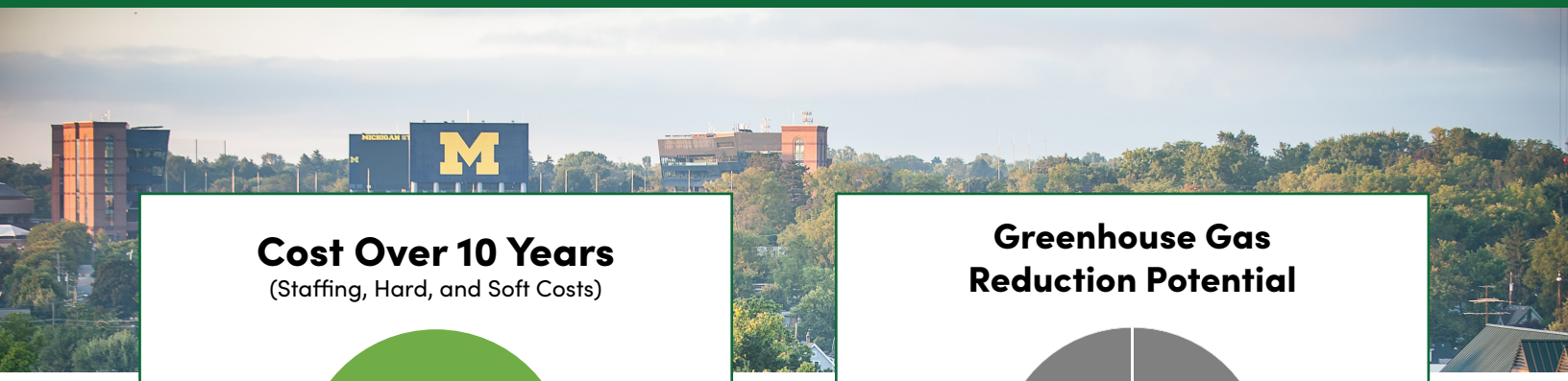
Meet with Michigan Saves to initiate concept. Work on program design and secure lenders.

2021

Launch loan loss reserve.

2022

Monitor progress and revise.



Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$1,578,000

Greenhouse Gas Reduction Potential

This action does not directly lead to greenhouse gas reductions but contributes to the ability of residents and small businesses with lower credit scores being able to access financing for energy efficiency, renewable energy, electrification, and other activities outlined in this plan.

ESTABLISH LOAN LOSS RESERVE

6. DEVELOP ENERGY CONCIERGE AND COMMUNITY ENGAGEMENT PROGRAM

Many of the actions proposed rely on effective, inclusive, and accessible community engagement programs to reach the required levels of participation to achieve carbon neutrality. The City of Ann Arbor proposes creating an easy to use energy concierge service to help residents and businesses understand the best, highest impact, and most affordable methods to carry out greenhouse gas reduction activities.

Vision for Energy Concierge and Community Engagement

It is 2030, and through an easy to reach energy concierge service and effective, widespread community education, we have reached our carbon neutrality goal. Efforts to install renewable energy, improve energy efficiency, and transition away from fossil fuels have been coordinated at both a community-wide and individual level to ensure that we use the least amount of energy possible.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Contractors
- Michigan Saves
- Solarize Coordinator
- DTE Energy

Assumptions

- Programs are highlighted through the concierge that serve all members of our community
- High levels of outreach achieved for all sectors of our community

Equity Impacts

Property owners, including owners of rental housing, will primarily benefit from this program. Low-income residents may benefit from programs targeted to help them achieve energy savings.

Indicators of Success / Goals

By 2025, the Energy Concierge has helped 2,500 Ann Arborites access energy-related program, funding, and support resources, leading to the implementation of activities that have reduced community-wide greenhouse gas emissions.

Target Demographic

This action is foundational to the entire carbon neutrality effort, and includes all Ann Arborites

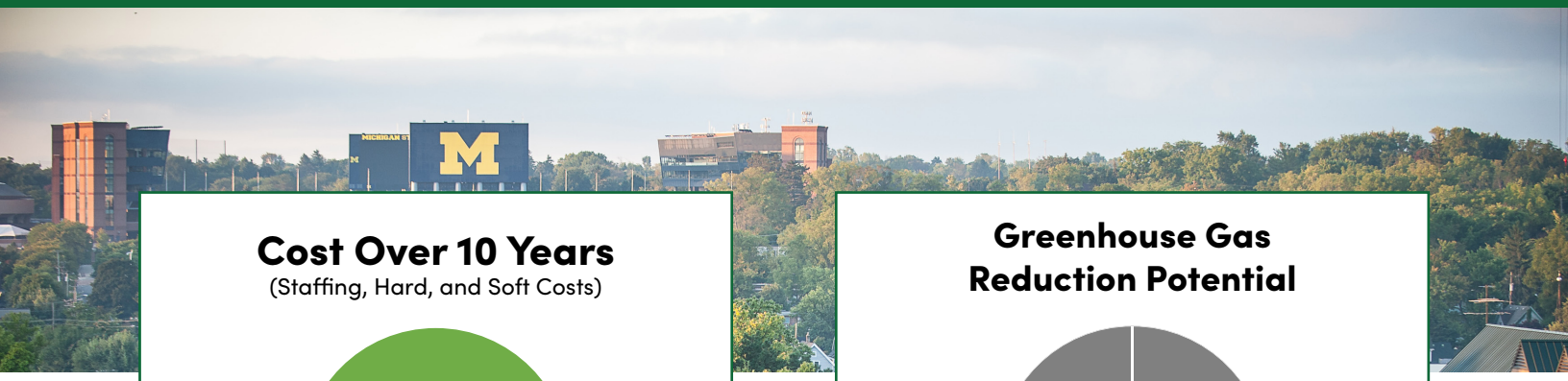
Timeline and Initial Actions

2021

The City develops an energy concierge and engagement program and soft launches

2022

The program continues to operate throughout the community even after carbon neutrality is achieved. The program is continuously improved based on community needs and emerging programs



Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$820,000

Greenhouse Gas Reduction Potential

This action does not directly lead to greenhouse gas reductions but contributes to the ability of residents and businesses to find, access, and implement energy efficiency, renewable energy, electrification, and other activities outlined in this Plan.

DEVELOP ENERGY CONCIERGE AND COMMUNITY ENGAGEMENT PROGRAM

7. TRANSITION AFFORDABLE HOUSING SITES TO NET ZERO ENERGY

Through a deep and collaborative partnership, the Office of Sustainability and Innovations and the Ann Arbor Housing Commission have been working to transition all existing and new affordable housing sites to net zero energy. These systems are also being designed to handle electric vehicle charging and battery storage.

Vision for Net Zero Energy Affordable Housing

Every affordable housing site in the City is net zero energy by 2030. Savings accrued through the program are directly invested in more programming for Housing Commission tenants and into more affordable housing sites.

Party Responsible for Implementation

- Office of Sustainability and Innovations, in partnership with Ann Arbor Housing Commission

Collaborators / Project Co-Designers

- UM Battery Lab
- Energy Contractors
- U.S. Housing and Urban Development
- DTE Energy

Equity Impacts

Ann Arbor Housing Commission funding that would have assisted in paying energy bills can be redirected to help meet Ann Arbor's annual affordable housing goals.

Indicators of Success / Goals

By 2030, every affordable housing site in the City is net zero energy.

Assumptions

- The Office of Sustainability and Innovations continues to provide $200,000 to support energy efficiency improvements and renewable energy at Housing Commission sites through 2021
- Starting in 2022 through 2025, the Office of Sustainability and Innovations provides $100,000 in direct support to the Housing Commission
- Fundraising is conducted to finance the rest of the energy improvements

Target Demographic

Those currently residing in affordable housing and those in need of affordable housing

Timeline and Initial Actions

2020

City continues partnership with AAHC to retrofit existing facilities to highest energy standards possible.

2021

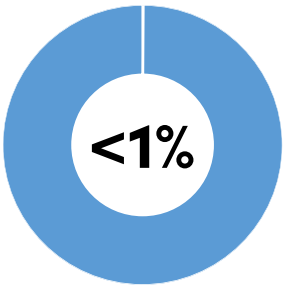
City seeks external funding to support more rapid transition of sites.

Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$800,000

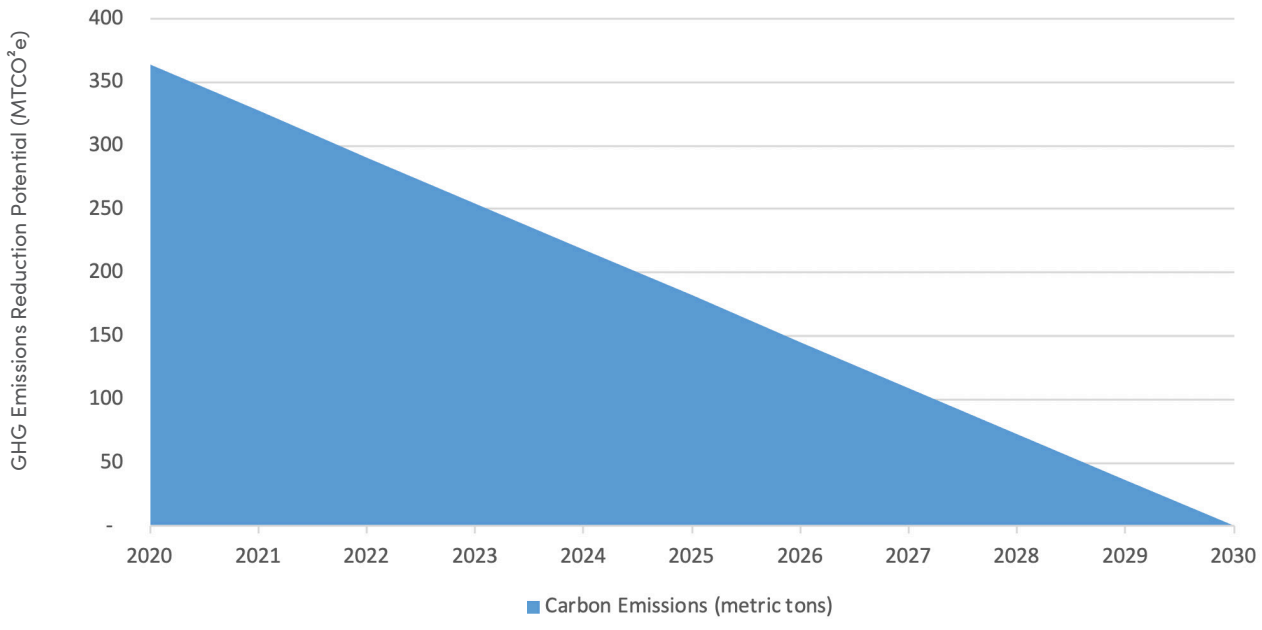
Greenhouse Gas Reduction Potential



400 metric tons of carbon dioxide equivalent (less than 1% of community-wide emissions)

By 2030, the **Transition Affordable Housing Sites to Net Zero Energy** strategy will have achieved all of its potential greenhouse gas emissions reductions.

TRANSITION AFFORDABLE HOUSING SITES TO NET ZERO ENERGY



8. PROMOTE GREEN RENTAL HOUSING PROGRAM

The Green Rental Housing Program improves energy efficiency and reduces greenhouse gas emissions associated with our rental buildings. Since rental units make up 55% of Ann Arbor's housing stock, actions in this area are vital to reducing greenhouse gas emissions. The Green Rental Housing program is accomplished by adding energy efficiency requirements into the existing City rental licensing process, thereby ensuring that every rental unit in Ann Arbor meets a minimum energy efficiency performance standard. Trainings, rebates, and financing support are provided as well to help transition rental units to greater efficiency.

Vision for Promoting Green Rental Housing Program

Renters are living in vastly more energy efficient homes and are saving on their energy bills and/or rents. Property owners are investing in the value of their properties and are seeing increased tenant retention and satisfaction.

Party Responsible for Implementation

- Office of Sustainability and Innovations and Community Services

Collaborators / Project Co-Designers

- Rocky Mountain Institute
- Urban Sustainability Directors Network
- University of Michigan's Beyond the Diag
- Washtenaw Area Apartment Association
- Michigan Saves
- DTE Energy

Equity Impacts

Renters in Ann Arbor may be able to rent more energy efficient homes as soon the ordinance goes into effect, and as more buildings become more energy efficient.

Indicators of Success / Goals

10% reduction in energy usage in rental properties within the City by 2030.

Assumptions

- We are able to integrate energy efficiency requirements into existing City rental licensing processes
- 80% compliance with the policy after the policy has been in effect for 4 years
- No net increase in average rents, outside of normal market inflation, 5 years post policy adoption

Target Demographic

Renters in Ann Arbor, with a special emphasis on low-income and student renters

Timeline and Initial Actions

2020

Stakeholder engagement and policy development commences.

2021

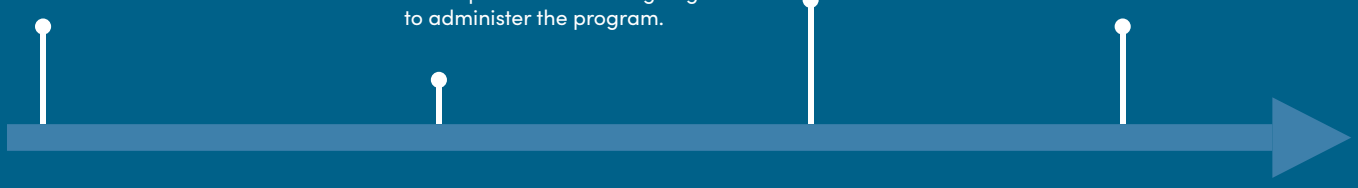
Policy brought forward and adopted by Council; workforce development and training begins to administer the program.

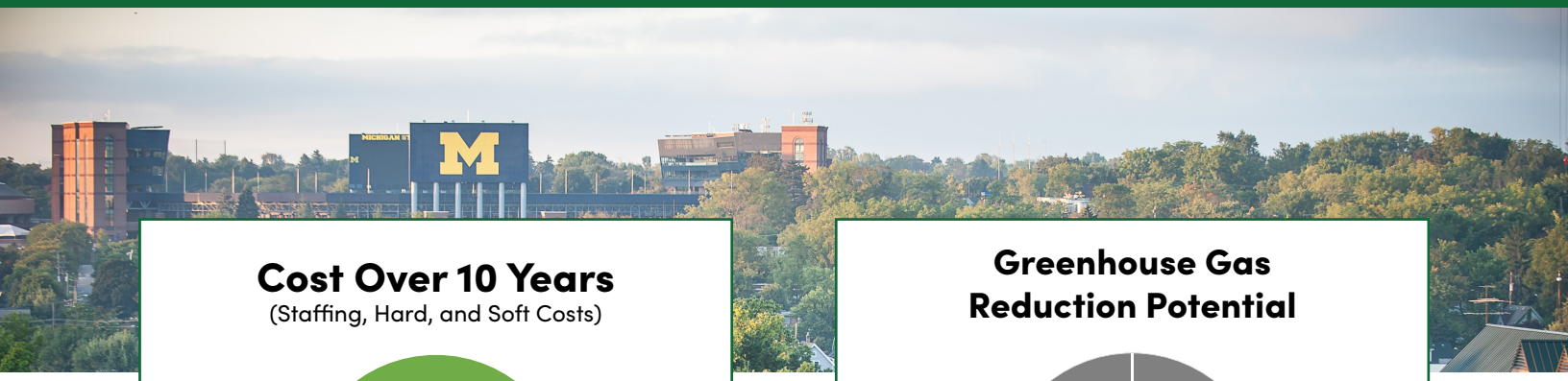
2022

Policy goes into effect.

2025

Policy reviewed and revised, if needed.





Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$530,000

Greenhouse Gas Reduction Potential

Impact of this action is included in other calculations.

PROMOTE GREEN RENTAL HOUSING PROGRAM

9. LAUNCH GREEN BUSINESS CHALLENGE

This action encourages our businesses to engage in more sustainable behaviors by providing technical assistance, guidance, and recognition to local businesses that voluntarily become more sustainable and lower their environmental footprint. At the core of the program are energy efficiency, renewable energy usage, waste reduction and material reuse, water reduction, and alternative transportation.

Vision for Launching Green Business Challenge

Ann Arbor businesses are some of the most sustainable in the nation, thanks in part to the City's Green Business Challenge. By providing incentives, guidance, and recognition for local businesses, the Green Business Challenge helped businesses lower their operating costs and reduce their environmental footprints. It has also increased support for the City's thriving small, medium, and large businesses.

Party Responsible for Implementation

- TheRide, with support from the Office of Sustainability and Innovations' Sustainability Analyst
- UM Transportation Department. with support from the Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Ann Arbor – Ypsilanti Regional Chamber of
- Commerce
- Ann Arbor SPARK
- Public Services
- DTE Energy
- Consumers Energy
- Ecology Center
- Huron River Watershed Council
- Michigan Saves
- Local banks
- Downtown Development Authority
- Ann Arbor 2030 District
- TheRide

Equity Impacts

Few equity impacts.

Indicators of Success / Goals

By 2025, participating businesses have reduced their energy consumption by 10%, increased waste diversion by 10%, reduced water consumption by 10%, and eliminated single-use plastics.

Assumptions

- 2030 District is a partner in educating and engaging/recruiting businesses
- 50 local businesses are participating by 2025

Target Demographic

Local businesses – initially those in the downtown but eventually any local business in town

Timeline and Initial Actions

2020

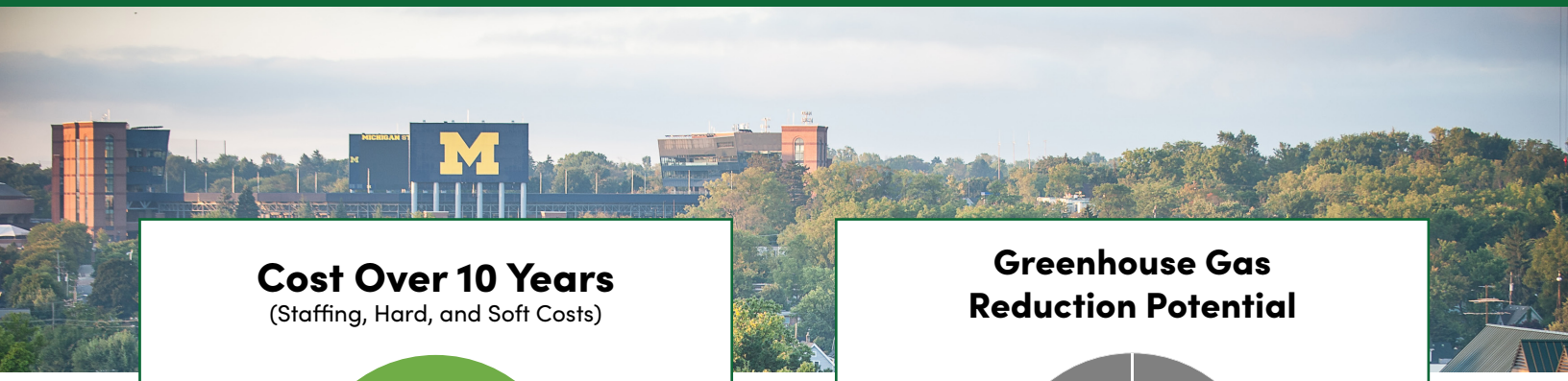
Launch Green Business Challenge stakeholder committee.

2021

Design the Challenge; recruit participants.

2022

Administer the first year of the Challenge.

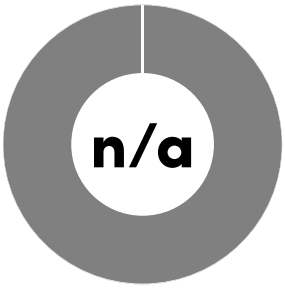


Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$700,000

Greenhouse Gas Reduction Potential



Impact of this action is included in other calculations.

LAUNCH GREEN BUSINESS CHALLENGE

10. SUPPORT AGING IN PLACE EFFICIENTLY

The Aging in Place Efficiently program helps low-income seniors age in a place of their choosing for longer by providing physical and energy efficiency improvements to their residences. More specifically, this program aims to integrate energy efficiency improvements into a wide variety of existing services available to seniors in our community.

Vision for Supporting Aging in Place Efficiently

It is 2035 and all low-income seniors in our community have healthier outcomes. Thanks to physical improvements to their homes and energy efficiency upgrades that reduce their monthly expenditures, they are able to age gracefully and stay in their homes longer.

Party Responsible for Implementation

- Office of Sustainability and Innovations
- Washtenaw County Department of Community and Economic Development
- Meals on Wheels

Equity Impacts

This program will provide expanded weatherization services to a broader segment of low-income senior citizens than the County program is allowed to currently serve.

Collaborators / Project Co-Designers

- Local aging organizations
- Energy efficiency experts
- Michigan Saves
- Dr. Tony Reames
- DTE Energy
- Housing Bureau of Seniors
- City Transportation Team
- TheRide

Indicators of Success / Goals

By 2023, at least 20 low-income seniors have reduced their energy bills by at least 15% and are recording improved quality of life thanks to improvements made in the program.

Assumptions

- Funding is secured through Partners for Places Grant
- Existing partners continue to engage in the initiative
- The model proves scalable and replicable throughout the City and region

Target Demographic

Low-income seniors

Timeline and Initial Actions

2020

Apply for external funding to initiate program. If successful, hire program assistant.

2021

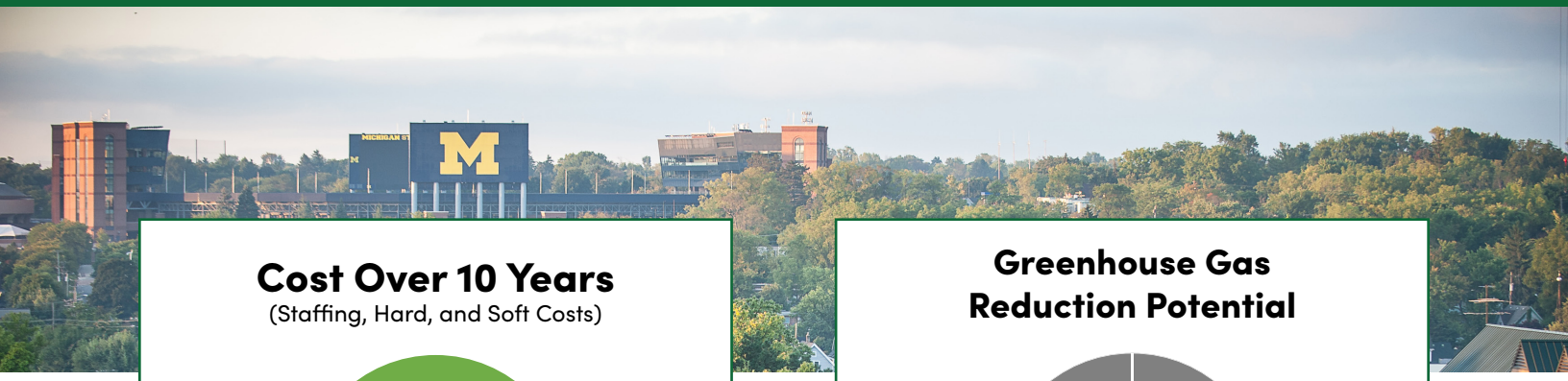
Pilot the program in Ann Arbor.

2022

Review, make revisions, and work with partners to expand in Ann Arbor and begin piloting throughout Washtenaw County.

2025

Program at full scale in the City and launched in the County.



Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$150,000

Greenhouse Gas Reduction Potential

n/a

Impact of this action is included in other calculations.

SUPPORT AGING IN PLACE EFFICIENTLY

11. EXPAND WEATHERIZATION PROGRAM

Washtenaw County and multiple nonprofits offer weatherization services to low-income homeowners in Ann Arbor. Weatherization is the practice of protecting a building and its interior from the elements, particularly from sunlight, precipitation, wind, and of modifying a building to reduce energy consumption and optimize energy efficiency. Through this program, the City of Ann Arbor will expand weatherization support so that more low-income homeowners can access these services.

Vision for Expanding Weatherization

By 2030, all low-income residents have been offered weatherization services.

Party Responsible for Implementation

- Washtenaw County Office of Community and Economic Development

Collaborators / Project Co-Designers

- Office of Sustainability and Innovations
- Michigan Saves
- Ann Arbor Meals on Wheels
- Habitat for Humanity
- DTE Energy
- Consumers Energy

Equity Impacts

This program will expand weatherization services to more low-income Ann Arbor homeowners than can be served by the County weatherization program.

Indicators of Success / Goals

By 2030, all low-income residents in the City have been offered weatherization services.

Assumptions

- Expansion of weatherization includes funding to support electrification of homes
- Contract is passed by Council to support program and administering of funds to County to implement

Target Demographic

Low-income residents in Ann Arbor

Timeline and Initial Actions

2020

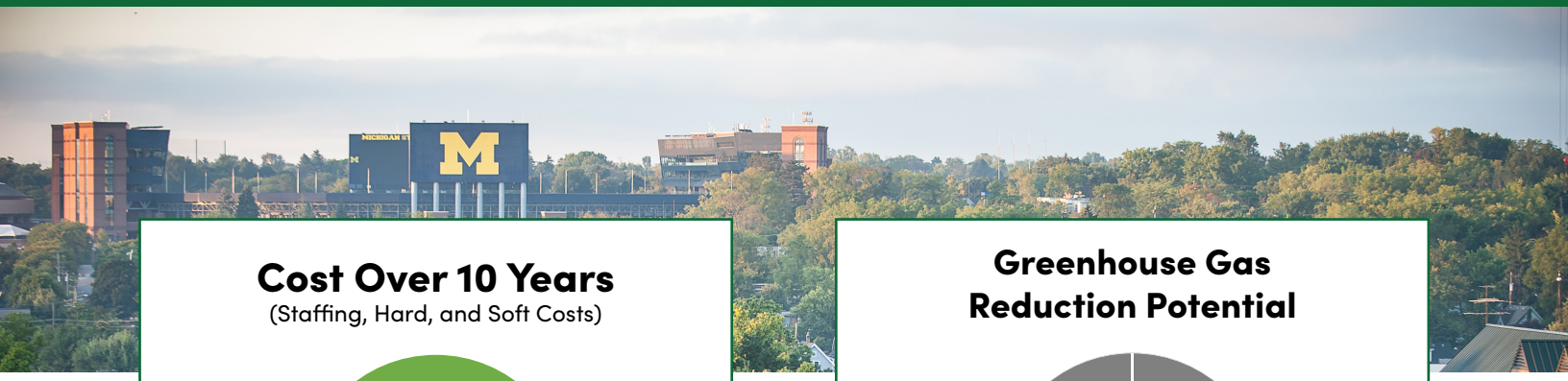
Background research into the number and needs of low-income homeowners in Ann Arbor; work with County Office of Community and Economic Development to design weatherization expansion program.

2021

Create operating agreements with Washtenaw County and pilot program.

2022

Review, make revisions, and work to serve more individuals in Ann Arbor.



Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$1,550,000

Greenhouse Gas Reduction Potential

Impact of this action is included in other calculations.

EXPAND WEATHERIZATION PROGRAM

STRATEGY 4:

Reduce the Miles we Travel in our Vehicles by at least 50%

This strategy focuses on reducing the miles we travel in our vehicles, regardless of type, by at least 50%. This is particularly important as emissions from transportation are on the rise, meaning that if we don't act to curtail this source, our greenhouse gas emissions reductions in other areas may be offset by gains in transportation-related emissions. To achieve this strategy, 7 specific actions have been identified:

1. Implement Non-Motorized Transportation Plan
2. Expand and Improve Local Transit
3. Expand and Improve Regional Transit
4. Increase Number of Park and Rides and Ensure Seamless Connection to Transit
5. Increase Diversity of Housing
6. Establish Mixed-Use Neighborhoods
7. Tiered Parking Rates

Combined, these seven actions are projected to reduce just over 8% of community-wide emissions and cost just over $901,000,000 due to mainly physical infrastructure costs.

1. IMPLEMENT NON-MOTORIZED TRANSPORTATION PLAN

The City's Non-Motorized Transportation Plan was designed to ensure an interconnected network of options to achieve 25% of in-city trips through non-motorized transit. New infrastructure such as sidewalks, road crossings, separated bike lanes, streetlights, traffic devices, and connections between public transit and active transport modes will be needed to achieve this goal, which strongly overlaps with the A²Zero initiative.

Vision for Implementing Non-Motorized Transportation Plan

All Ann Arbor residents, employees, students, and visitors have safe, convenient, and enjoyable choices to move around the City, whether by foot, bicycle, or other self-propelled modes.

Party Responsible for Implementation

- Ann Arbor Engineering Department Transportation Team, with support from Ann Arbor City Council

Collaborators / Project Co-Designers

- Transportation Department
- Transportation Commission
- Planning Commission (Capital Improvement Plan)
- Downtown Development Authority
- Ann Arbor Area Transit Authority
- Michigan Department of Transportation
- Washtenaw Bicycling and Walking Coalition
- University of Michigan
- Smart City group
- Private micromobility companies
- Private employers

Equity Impacts

Residents who cannot afford to buy and maintain private automobiles often bike, walk, or travel by micromobility modes. Investing in new infrastructure will enable those already using non-motorized modes of travel to have safer, more convenient, and faster trips. These investments will also encourage more residents to travel by bike or foot. However, pedestrians and cyclists are often vulnerable road users, and have faced increasing injuries and deaths from traffic collisions. Safe, ubiquitous infrastructure is needed.

Indicators of Success / Goals

By 2030, 25% of in-city trips are conduct by walking or bicycling thanks to ubiquitous and safe infrastructure.

Assumptions

- 25% of in-city trips are done with bicycling and walking
- These trips are in-city trips only
- 5 miles of new bike lanes installed per year – the majority are protected
- At least 5 major mid-block crosswalks and 2 minor mid-block cross-walks installed per year
- 90% of sidewalk gaps are filled by 2030

Target Demographic

Implementing the Non-Motorized Transportation Plan will primarily benefit pedestrians and bicyclists, although the increased safety and access to infrastructure will also reduce vehicle collisions. Drivers will also benefit from less congested streets as people switch to walking and biking

Timeline and Initial Actions

2020

Continue implementing elements on the Non-Motorized Plan. Finalize the VisionZero Transportation Plan update.

2021

Continue hosting public meetings to understand weaknesses in current infrastructure and opportunities for improvement.

2026

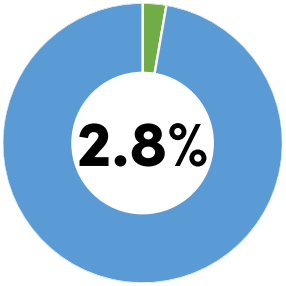
Full implementation of the Non-Motorized Transportation Plan.

Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$2,400,000

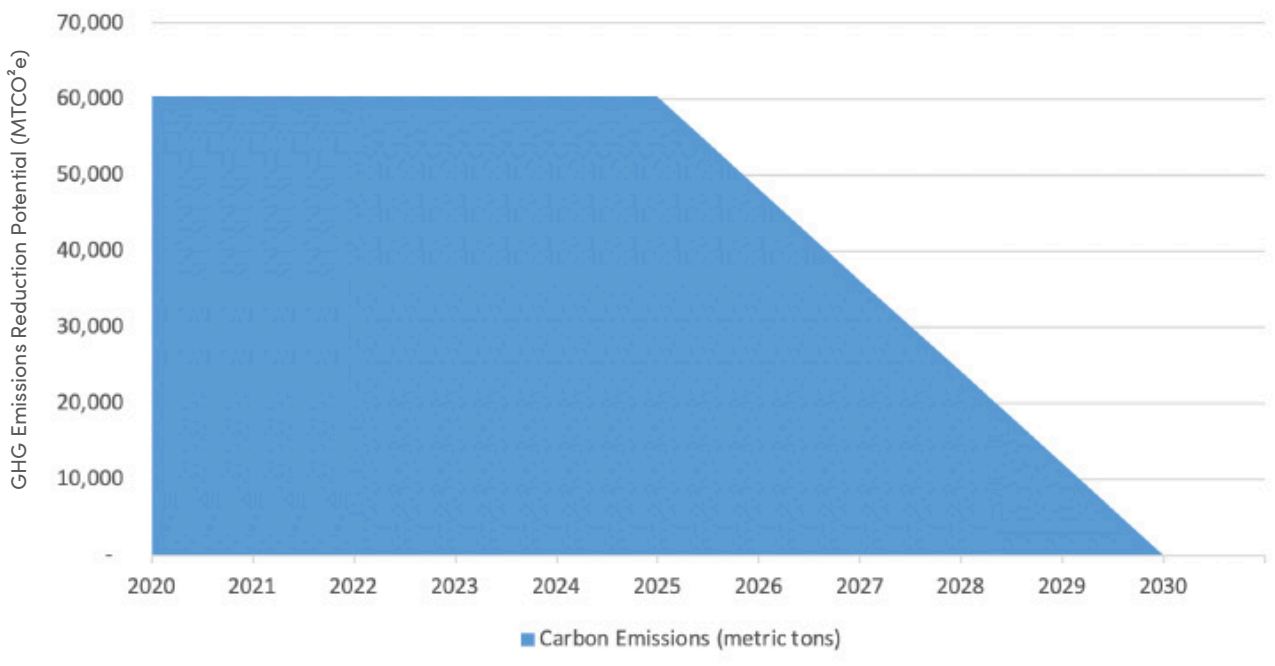
Greenhouse Gas Reduction Potential



60,400 metric tons carbon dioxide equivalent (2.8% of community-wide emissions).

By 2030, the **Implement Non-Motorized Transportation Plan** strategy will have achieved all of its potential greenhouse gas emissions reductions.

IMPLEMENT NON-MOTORIZED TRANSPORTATION PLAN



2. EXPAND AND IMPROVE LOCAL TRANSIT

An extremely common theme during public outreach was the need to expand and improve local transit services. Ideas suggested included longer service, new service routes, dedicated bus lines and bus rapid transit along major transportation corridors, and expanding the Get Downtown Program to companies outside of downtown. This action focuses on how we can expand and improve transit service with the aim of significantly increasing ridership.

Vision for Expanding and Improving Local Transit

By 2030, ninety-five percent of Ann Arbor residents have access to transit within a 10 minute walk with frequencies of 20 minutes or faster. This leads to residents taking transit for 40% of their journeys to work. This extensive transit service is powered with electric vehicles, all fueled with renewable energy.

Party Responsible for Implementation

- Ann Arbor Area Transit Authority, with support from the Regional Transit Authority of Southeast Michigan

Collaborators / Project Co-Designers

- Ann Arbor Transportation Commission
- Southeast Michigan Council of Governments (SEMCOG)
- Washtenaw Area Transportation Study (WATS)
- Federal Transit Administration (FTA)
- Senator Stabenow, Senator Peters, and
- Congresswoman Dingle
- Downtown Development Authority (DDA)
- University of Michigan
- Michigan Department of Transportation (MDOT) SPARK
- Ann Arbor 2030 District
- Ann Arbor Engineering Department
- Transportation Team
- Private employers

Target Demographic

All residents of Ann Arbor

Equity Impacts

Those who stand to benefit the most are those who may not have access to many forms of transportation due to disability, age, or income. The entire community can become economically stronger and more resilient from investments such as improved transit since investments in public transportation generate 31 percent more jobs per dollar than new construction of roads and bridges. Since property values tend to increase with new transit investments which would directly benefit property owners, it is important to find ways of keeping fares low for these new services so low-income residents are not disproportionately burdened by these improvements.

Indicators of Success / Goals

Residents take transit for 40% of their journeys not done through walking and biking.

Timeline and Initial Actions

2020

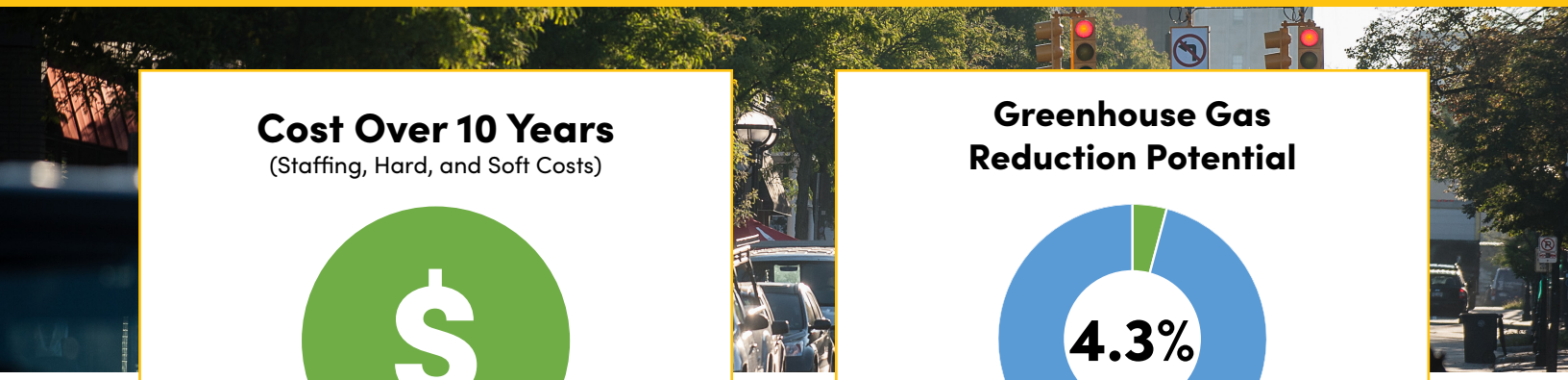
Vision Zero Transportation Master Plan is finished and adopted by Council. Work with AAATA to include bus rapid transit, electric buses, and solar, in millage renewal.

2021

The Get Downtown Program is expanded to include all businesses with more than 20 employees in Ann Arbor, and also to Ann Arbor residents who ae not working for a participating company.

2030

Bus Rapid Transit is built along transportation corridors.

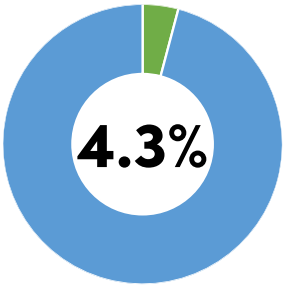


Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$656,780,000

Greenhouse Gas Reduction Potential



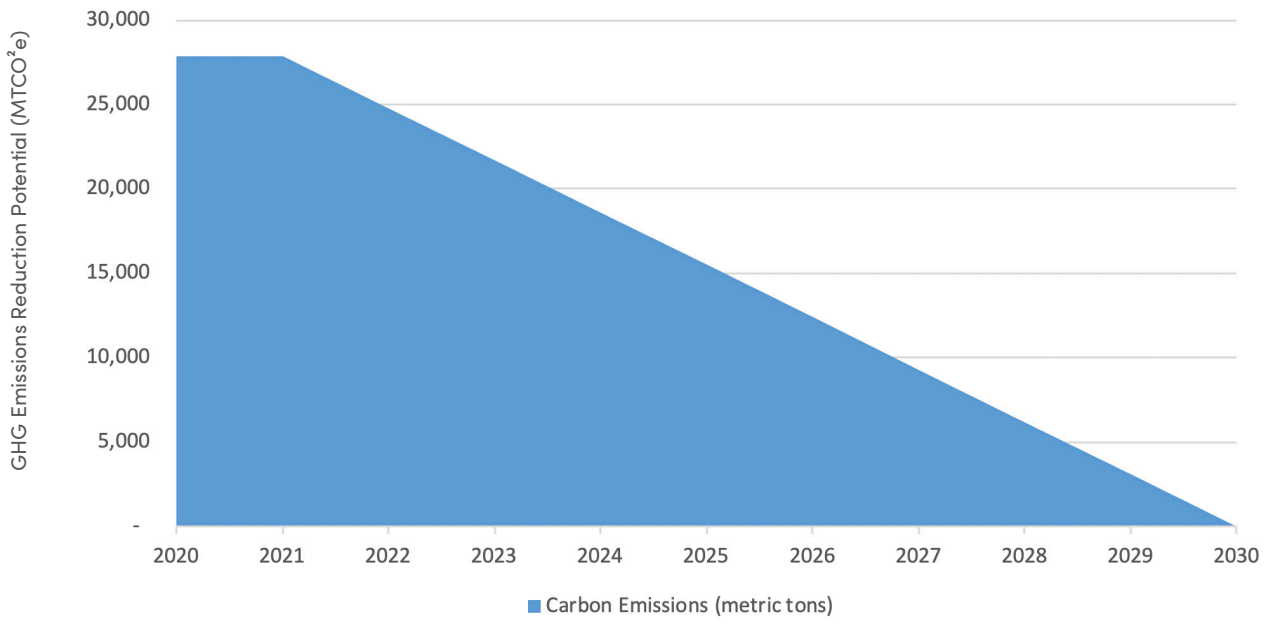
93,200 metric tons carbon dioxide equivalent (4.3% of community-wide emissions).

Assumptions

- Quadrupling of current bus ridership, with the average of 3.5 miles per trip
- Includes costs of new bus rapid transit lines
- Weekday bus rapid transit trips are assumed to run along routes of roughly 8 miles, for 5 days a week, or 48 weeks
- Weekend bus rapid transit trips are assumed to run along routes of roughly 8 miles, for 2 days a week,
- for 52 weeks
- Includes 22 queue jump facilities for regular buses
- Includes stop amenities and signal priority equipment for priority corridors
- Only calculates emissions reductions starting at the border of Ann Arbor (note: staff are working to gather comprehensive origin and destination data to update these figures)
- 2 new electric buses a year for 10 years added to the fleet to expand service

By 2030, the **Expand and Improve Local Transit** strategy will have achieved all of its potential greenhouse gas emissions reductions.

EXPAND AND IMPROVE LOCAL TRANSIT



3. EXPAND AND IMPROVE REGIONAL TRANSIT

Upwards of 80,000 individuals commute into Ann Arbor on any given day for work, school, or recreation. Regional transit service can help significantly reduce these numbers, thereby decongesting roads, improving local health, and reducing stress. Regional transit service into and from Plymouth, Jackson, Detroit, Brighton, Ypsilanti, and Ypsilanti Township are the areas prioritized at this time.

Vision for Expanding and Improving Regional Transit

By 2030, a high capacity transit and express transit system exists that connects Ann Arbor with nearby jurisdictions such as Detroit, Ypsilanti, Chelsea, and Brighton. Twenty-five percent of commuter trips into and out of Ann Arbor occur through these highly effective regional transit services.

Party Responsible for Implementation

- Ann Arbor Area Transit Authority, with support from the Regional Transit Authority of Southeast Michigan

Collaborators / Project Co-Designers

- Engineering Department Transportation Group
- Washtenaw, Oakland, and Wayne counties and the cities and townships in those counties
- Ann Arbor Transportation Commission
- Southeast Michigan Council of Governments
- Washtenaw Area Transportation Study (WATS)
- Federal Transit Administration
- Federal Railroad Administration WATCO
- Senator Stabenow, Senator Peters, and
- Congresswoman Dingell
- University of Michigan
- Michigan Department of Transportation

Equity Impacts

High capacity regional transit and express transit will primarily benefit commuters to and from Ann Arbor. Such service would broaden opportunities and access to jobs for those without access to other forms of transportation. Quality regional transit can also attract occasional riders and all-purpose riders who find it desirable to take transit to and from Ann Arbor to avoid traffic, parking fees, and the hassles of driving. It will be important to ensure that low-income riders have convenient and affordable access to expanded transit opportunites.

Indicators of Success / Goals

By 2030, 25% of the regional commuting trips into the City are done via regional transit options.

Assumptions

- Bus rapid transit lines are created and can be utilized by regional transit lines
- The average regional trip is 8 miles or less, running 5 days a week for 48 weeks
- 25% of the commuter trips will be taken by regional transit
- Includes calculations related to supporting more work from home programs. Estimated 5% participation
- rate for those with a one-way commute of 10 miles or less and a 10% participation rate for those with a
- one-way commute of 11 miles or more.

Target Demographic

Regional transit will primarily benefit people who work or school in Ann Arbor and the jurisdictions where transit stops exist

Timeline and Initial Actions

2020

Work with AAATA to include bus rapid transit, electric buses, and solar, in millage renewal. Regional transit to Detroit is established.

2021

Regional transit to surrounding municipalities is established.

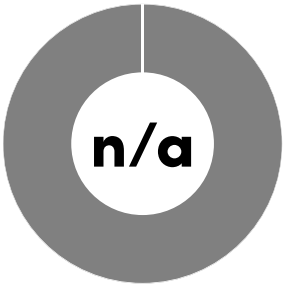
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$

The majority of costs for this action are covered in other actions.

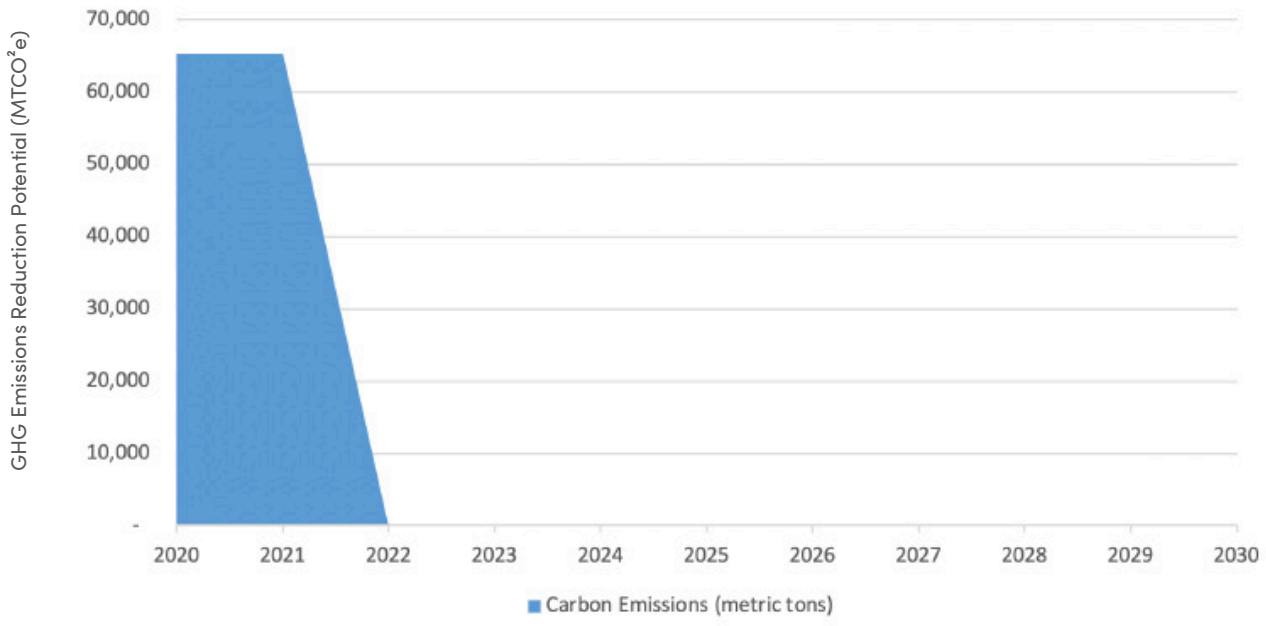
Greenhouse Gas Reduction Potential



The greenhouse gas reduction potential of this action in captured in other actions

By 2022, the **Expand and Improve Regional Transit** strategy will have achieved all of its potential greenhouse gas emissions reductions.

EXPAND AND IMPROVE REGIONAL TRANSIT



4. INCREASE NUMBER OF PARK AND RIDES AND ENSURE SEAMLESS CONNECTION TO TRANSIT

More than 80,000 individuals commute into the City every day for work, school, or recreation. Intercepting people as soon as they arrive and diverting vehicular traffic to park and rides that provide electric vehicle charging and seamless connection to public transit so they can rapidly get to where they need to go is an important component of reducing vehicular miles traveled in the city. Right now, there are just over 1,300 available free Park and Ride parking spaces. We propose at least a 10x increase in the number of spots to reduce in-city traffic.

Vision for Increasing Park and Rides with Seamless Connection to Transit

Through a significant increase in park and ride infrastructure that is seamlessly connected to transit, we have displaced 25% of commuter trips into the City.

Party Responsible for Implementation

- Michigan Department of Transportation with support from the Ann Arbor Area Transit Authority

Collaborators / Project Co-Designers

- Engineering Department Transportation Group
- Downtown Development Authority
- Washtenaw Area Transportation Study
- Employers
- Transportation

Equity Impacts

Park and Rides primarily benefit commuters coming into Ann Arbor, including low-income residents of nearby towns. Parking at Park and Rides would remain free, which would save drivers money, as compared to paying for parking downtown.

Indicators of Success / Goals

By 2030, commuter trips from the border of the City to their destination within the City has declined by 25%.

Assumptions

- 10x more parking spots are provided at park and rides; These spots are free
- Increased transit ridership accounted for in other actions
- Integrates demand management programs such as carpooling and ridesharing

Target Demographic

Transit riders, bicyclists, pedestrians, and car drivers would all benefit from reduced traffic congestion in the downtown core and by major work and educational centers

Timeline and Initial Actions

2020

Initiate planning for desired park and ride locations.

2021

Begin working with MDOT to acquire necessary properties and fundraise for infrastructure costs.

2023

Begin building new park and ride lots.

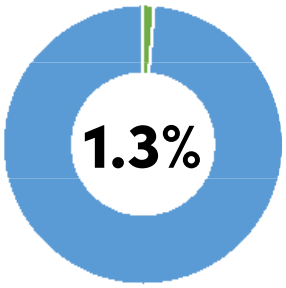
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$170,000,000

(Note: This does not include the costs to purchase the land on which park and rides will reside)

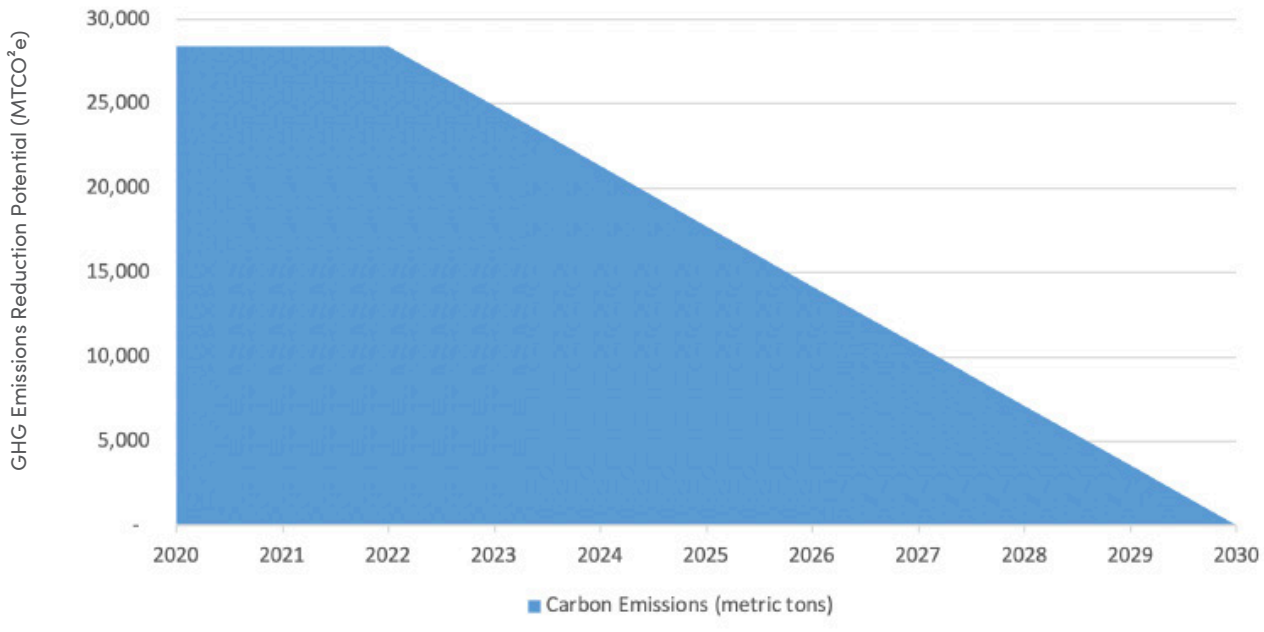
Greenhouse Gas Reduction Potential



28,400 metric tons carbon dioxide equivalent (1.3% of community-wide emissions).

By 2030, the **Increase Number of Park and Rides and Ensure Seamless Connection to Transit** strategy will have achieved all of its potential greenhouse gas emissions reductions.

INCREASE NUMBER OF PARK AND RIDES AND ENSURE SEAMLESS CONNECTION TO TRANSIT



5. INCREASE THE DIVERSITY OF HOUSING

This action focuses on supporting policies to increase housing opportunities within the City. This action was identified numerous times as a way to reduce greenhouse gas emissions, diversify housing options, and address affordability concerns. Overall, this action focuses on increasing the walkability and livability of neighborhoods while creating more accessible housing to a wider array of community members.

Vision for Increasing the Diversity of Housing

Ann Arbor neighborhoods grow slightly while maintaining their character and charm. Ann Arbor begins meeting its goal for reducing single occupancy trips by half while making notable progress toward providing more accessible and afforable housing.

Party Responsible for Implementation

- Ann Arbor Planning Department, with support from the Planning Commission and City Council

Collaborators / Project Co-Designers

- Office of Sustainability and Innovations
- Ann Arbor Housing Alliance
- Ann Arbor Historic District Commission

Equity Impacts

Allowing, multi-units and promoting ADUs will benefit renters, lower-income residents, in-commuters, and project developers. Reduced income disparity benefits all of Ann Arbor, both socially and economically.

Indicators of Success / Goals

2,000 new units of residential multi-family or ADUs are built in residential neighborhoods by 2030.

Assumptions

- City Council will approve an updated Comprehensive Master Plan
- 7-10% increase in housing availability
- Reduces new occupants commute by 20 miles each way and increases public transit usage
- 85% of new residential units are in mixed use areas

Target Demographic

Renters and property owners

Timeline and Initial Actions

2020

Public Engagement on Master Plan Update.

2021

Complete Comprehensive Master Plan Update. Present to Planning Commission and Council.

2024

If needed, zoning code amendments are adopted and implementation begins.

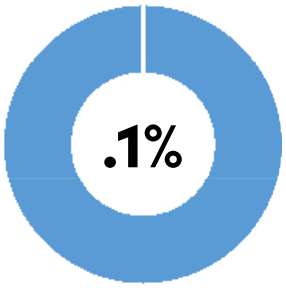
2028

Planning staff and Planning Commission review the code and make suggestions to Council for changes.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$250,000

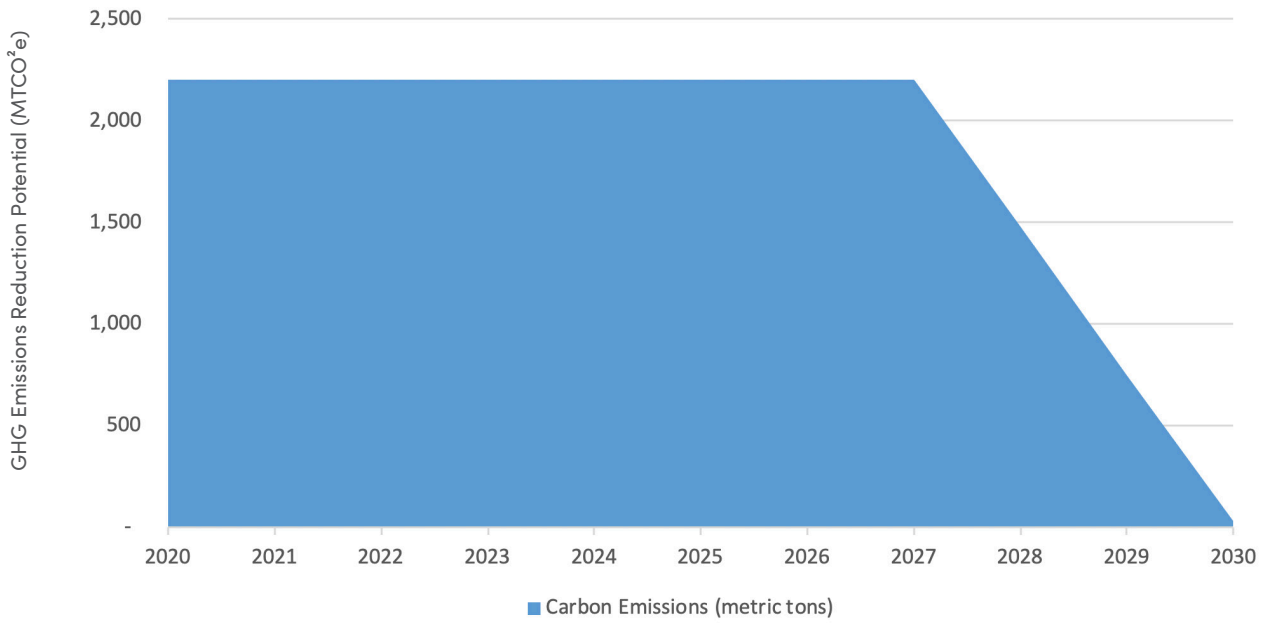
Greenhouse Gas Reduction Potential



2,200 metric tons of carbon dioxide equivalent (.1% of community-wide emissions)

By 2030, the **Increase the Diversity of Housing** action will have achieved all of its potential greenhouse gas emissions reductions.

INCREASE THE DIVERSITY OF HOUSING



6. DEVELOP MIXED-USE NEIGHBORHOODS

Helping residents walk and bike to places of their choosing necessitates having the proper infrastructure in place as well as having the places they desire going within walking and biking distance. This action focuses on updating the zoning code to allow mixed-uses in residential neighborhoods so that things such as bakeries, grocery stories, breweries, coffee shops, etc. can be accessible in nearly all of our neighborhoods. This increases walkability and reduces vehicular miles driven.

Vision for Developing Mixed-Use Neighborhoods

More errands and entertainment are accessible by foot and bike thanks to mixed-use zoning, which has allowed us to maintain the integrity of Ann Arbor's neighborhoods while adding in amenities that enhance quality of life.

Party Responsible for Implementation

- Ann Arbor Planning Department, with support from the Planning Commission and City Council

Collaborators / Project Co-Designers

- Neighborhood associations
- Local businesses
- Ann Arbor Historic District Commission

Equity Impacts

Increasing mixed-use zoning positively impacts residents and small business owners in mixed use neighborhoods.

Indicators of Success / Goals

By 2030, 20% of in-city trips are done by walking or biking

Assumptions

- Increased social cohesion
- Increased walking and biking
- Reduced driving and car ownership in mixed use neighborhoods

Target Demographic

Residents and small business owners

Timeline and Initial Actions

2020

Initiate Comprehensive Master Plan Update.

2021

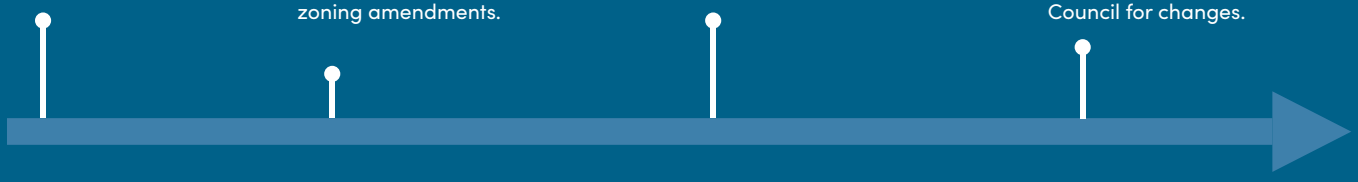
Complete Comprehensive Master Plan Update. Start working on corresponding zoning amendments.

2024

Zoning code amendments are adopted and implementation begins.

2028

Planning staff and Planning Commission review the code and make suggestions to Council for changes.



Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$365,000

Greenhouse Gas Reduction Potential

Emissions reduction potential included in other actions.

DEVELOP MIXED-USE NEIGHBORHOODS

7. ESTABLISH TIERED PARKING RATES

This action focuses on dis-incentivizing driving into the City by having a sliding parking fee structure that increases the cost to park, but has lower rates for low-income residents, residents with disabilities/specific parking needs, and electric vehicle drivers. This includes deploying smart metering and establishing dynamic pricing. Excess on-street parking in the DDA will be removed and replaced with more beneficial street uses, such as infrastructure for pedestrians, bicyclists, transit, and street activities (such as outdoor restaurant seating). Action includes eliminating all parking minimums and setting low parking maximums through the Plan review process.

Vision for Establishing Tiered Parking Rates

Many city streets will be transformed into Complete Streets through the repurposing of on-street parking to more active and pedestrian friendly activities.

Party Responsible for Implementation

- Downtown Development Authority with the Ann Arbor Engineering Department Transportation Group

Collaborators / Project Co-Designers

- Michigan Department of Transportation
- Office of Sustainability and Innovations
- Transportation Commission
- Ann Arbor 2030 District
- Ann Arbor Area Transit Authority
- Ann Arbor Smart City group
- University of Michigan
- Planning Department
- Planning Commission
- US Department of Transportation

Equity Impacts

Biking and walking become safer and more convenient ways to get around, which will open more mobility options for lower-income residents who cannot afford a car. For lower-income residents who must drive, parking rates will be tiered so as to offer lower cost options.

Indicators of Success / Goals

10% increase in walking and biking in the downtown corridor.

Assumptions

- More transportation users help active and sustain transportation modes
- Reduced parking rates for EV drivers and for low-income drivers

Target Demographic

This action will prioritize users of active and sustainable transportation modes

Timeline and Initial Actions

2020

Investigate what equipment and software other cities have used to enable dynamic parking rates.

2021

Develop a partnership to launch new parking technology and pilot dynamic parking rates somewhere in the DDA; eliminate parking minimums in UDC and replace with parking maximums.

2022

Full scale launch of tiered rates.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$4,500,000

Greenhouse Gas Reduction Potential

Emissions reduction potential included in other actions.

STRATEGY 5:

Change the Way We Use, Reuse, and Dispose of Materials

This strategy focuses on changing our relationship with what we buy and use, how we buy and use materials, and how we dispose of materials once we are done using them. The calculations in this section only focus on the greenhouse gas savings associated with reducing the disposal of materials and products. City staff will continue working on a methodology to capture upstream emissions associated with extracting and creating the goods and materials we use. For now, however, upstream emissions are not included in calculations. To achieve this strategy, six specific actions have been identified:

1. Expand Composting Program
2. Expand Commercial Recycling
3. Require Sustainable Materials in New and Existing Developments
4. Move Toward a Circular Economy
5. Support a Plant Rich Diet
6. Enhance Refrigerant Recycling and Reuse Program

Combined, these six actions reduce baseline community-wide greenhouse gas emissions by 0.3% and cost just over $45,000,000.

1. EXPAND COMPOSTING PROGRAM

The action focuses on moving to year round composting, which includes diverting food and yard waste from the waste stream into more productive uses in our compost system. This reduces methane emissions and helps produce valuable compost that can be used locally.

Vision for Expanding Compost Program

As food waste gets discarded as compost there's a gross reduction in the amount of methane produced from rotting food and a reduced impact on our GHG production.

Party Responsible for Implementation

- Department of Public Works

Collaborators / Project Co-Designers

- Office of Sustainability and Innovations
- Food collection and distribution organizations
- Restaurants
- Communication Department

Equity Impacts

Through the new market for imperfect produce, low-income residents could benefit from being able to access more affordable fruits and vegetables.

Indicators of Success / Goals

By 2022, year round and commercial composting has led to over 5,000 tons of yard and food waste being diverted from our waste stream annually.

Assumptions

- Solid Waste Resource Management Plan (SWRMP) estimates that increasing to year round composting would put collection at 1,000 – 2,784 tons
- SWRMP estimates increasing collection of food from food-related businesses would add another 1,000– 2,400 tons per year
- Includes creating markets for imperfect fruit and vegetables to ensure they don't enter waste stream
- Increased education to ensure food waste doesn't freeze to cart
- Necessitates changes in the downtown area to allow compost pick-up; These costs are not factored into the cost estimate below

Target Demographic

All business and residences in Ann Arbor

Timeline and Initial Actions

2020

Adoption of a Solid Waste Resource Management Plan or at least elements related to compost expansion.

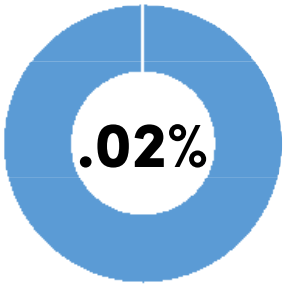
2021

Year round composting begins along with extensive outreach and engagement with businesses and residents about what is compostable and what is not.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$26,000,000

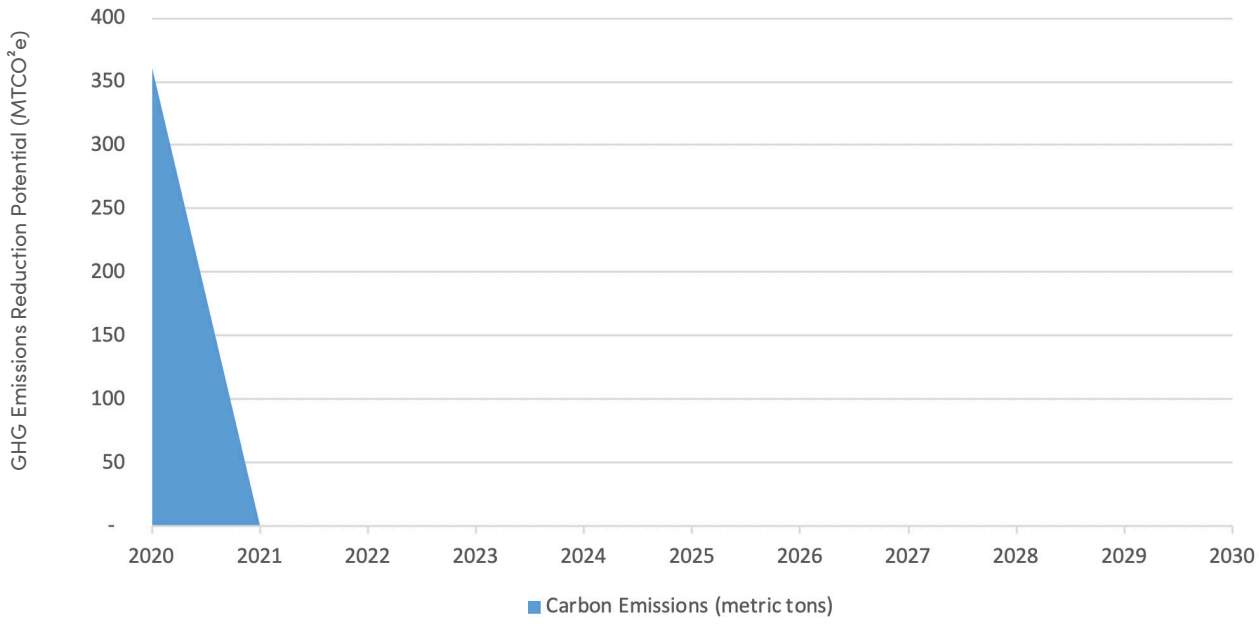
Greenhouse Gas Reduction Potential



400 metric tons carbon dioxide equivalent
(.02% of community-wide emissions)

By 2021, the **Expand Composting Program** strategy will have achieved all of its potential greenhouse gas emissions reductions.

EXPAND COMPOSTING PROGRAM



2. EXPAND COMMERCIAL RECYCLING

Through incentives, education, and enforcement policies, this action focuses on getting commercial sector recycling rates to at least 30%.

Vision for Expanding Commercial Recycling

The Solid Waste Resource Management Plan (SWRMP) estimates a range of 1700 to 4400 tons of waste diverted from landfill as a result of increased participation in commercial sector recycling.

Party Responsible for Implementation

- Department of Public Works, with support from Resource Recycling Associates

Collaborators / Project Co-Designers

- Office of Sustainability and Innovations
- Commercial businesses
- State of Michigan

Equity Impacts

No equity impacts explicitly identified.

Indicators of Success / Goals

By 2028, City of Ann Arbor diverts 30% of commercial sector recyclable waste from the landfill to recycling centers.

Assumptions

- Requiring recycling at restaurants will increase recycling rates in the commercial sector
- Businesses will divert more recyclables from landfill
- Commercial sector diversion rate is 4,400 annual tons
- Increase in enforcement of commercial establishments who don't recycle and compost

Target Demographic

Ann Arbor businesses

Timeline and Initial Actions

2020

Adoption of a Solid Waste Resource Management Plan, or at least elements related to expanding commercial recycling, and education begins.

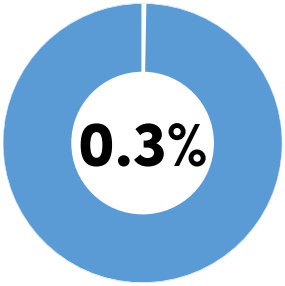
2021

Policies enacted and formal enforcement begins along with extensive outreach and engagement with businesses about what is recyclable and what is not.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$18,400,000

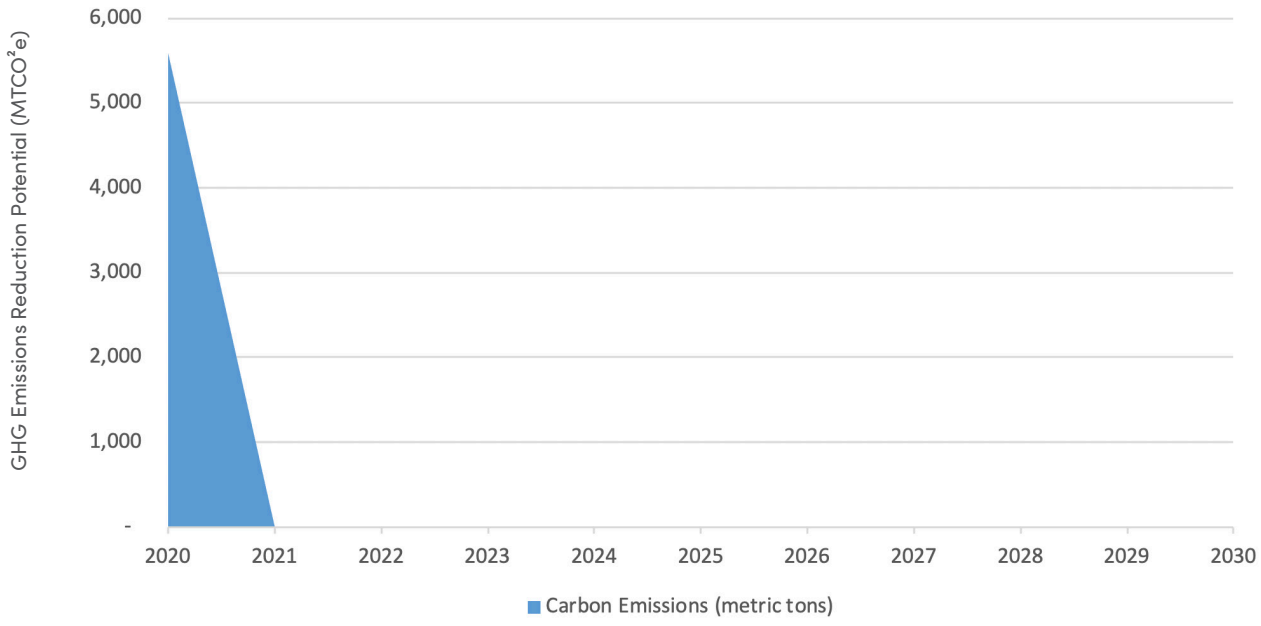
Greenhouse Gas Reduction Potential



5,600 metric tons carbon dioxide equivalent (.3% of community-wide emissions)

By 2021, the **Expand Commercial Recycling** strategy will have achieved all of its potential greenhouse gas emissions reductions.

EXPAND COMMERCIAL RECYCLING



3. REQUIRE SUSTAINABLE MATERIALS IN NEW AND EXISTING DEVELOPMENTS

This action involves the implementation of existing draft City plan for Construction and Demolition Waste to ensure 100% of debris is captured and repurposed. This includes expanding the plan to require sustainable designs in new building approval processes.

Vision for Requiring Sustainable Materials in New and Existing Developments

Ann Arbor has moved one step closer to a circular economy by removing 80% of construction and demolition waste from the landfill and supports it being repurposed for other constructive uses.

Party Responsible for Implementation

- Ann Arbor Department of Public Works, with support from Planning Department

Collaborators / Project Co-Designers

- Office of Sustainability and Innovations
- Resource Recycling Associates
- Construction community

Equity Impacts

No equity impacts explicitly identified.

Indicators of Success / Goals

Would consist of development of an ordinance to require construction and demolition projects to submit waste and diversion data as a component of their building permit or occupancy permit.

Target Demographic

Construction companies, developers, businesses, and community at large

Timeline and Initial Actions

2020

Review existing draft policy and revise, as necessary.

2021

Bring policy to Council for consideration. If passed, begin developing education and outreach materials immediately.

2022

Full scale implementation of policy.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$270,000

Greenhouse Gas Reduction Potential

Not calculated

REQUIRE SUSTAINABLE MATERIALS IN NEW AND EXISTING DEVELOPMENTS

4. MOVE TOWARD A CIRCULAR ECONOMY

This action focuses on moving towards a circular economy, including actions to promote resource reduction, material reuse, and regeneration. By working with peer municipalities, we can create tools that allow for more transparency, traceability, and the calculation of embedded greenhouse gas emissions for different materials, goods, and services.

Vision Statement for Moving Toward a Circular Economy

The City of Ann Arbor will create a model of Circular Economy where goods and materials are recovered, reused, and recycled.

Party Responsible for Implementation

- Department of Public Works, with support from the Office of Sustainability and Innovations

Equity Impacts

Lower-income residents may benefit from being able to buy repurposed and refurbished items.

Collaborators / Project Co-Designers

- Peer Municipalities
- Repair Centers
- Tool Libraries /Lending Libraries
- Thrift Stores
- Curbside textile collection companies

Indicators of Success / Goals

• Repair centers for bicycles, appliances, etc. are promoted as first choice as opposed to replacement
• Support for toy, book and tool libraries to decrease the number of new purchases
• Support for thrift stores and reuse centers, along with having curbside textile collection to reduce the number of materials entering the landfill
• There is no City-coordinated textile collection program; curbside collection of textiles would be contracted for by the City with a private collector to provide weekly curbside collection from single family homes initially with potential future expansion to multi-family properties

Target Demographic

Ann Arbor residents and businesses

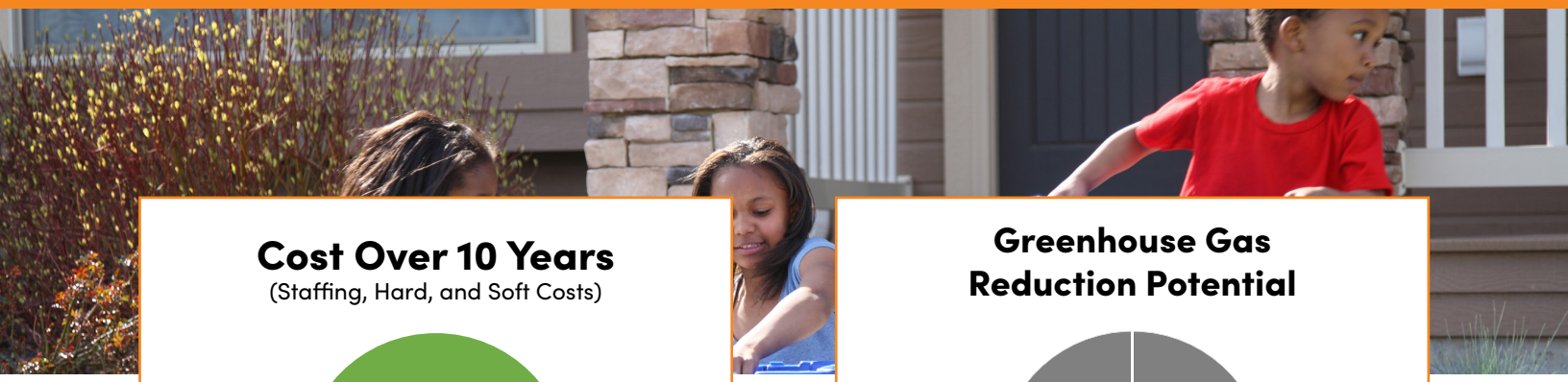
Timeline and Initial Actions

2020

Solid Waste Resource Management Plan gets adopted.

2022

Circular Economy strategy gets finalized and integrated into other planning initiatives.

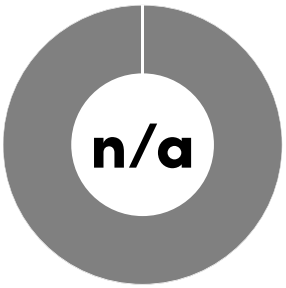


Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$270,000

Greenhouse Gas Reduction Potential



Not calculated

MOVE TOWARD A CIRCULAR ECONOMY

5. SUPPORT A PLANT RICH DIET

Eating less meat and more fruits, vegetables, legumes, whole grains, nuts, and seeds is known to reduce one's environmental footprint and improve one's overall health. This action focuses on educating the community about the benefits of reducing meat consumption. Included in the action is the exploration of a greenhouse gas emissions footprint disclosure (like a calorie disclosure) on food sold at City facilities in order to educate people on the environmental footprint of their dietary choices.

Vision for Supporting a Plant Rich Diet

Ann Arborites are healthier, happier, and more sustainable by increasing the amount of fruits, vegetables, and grains they consume and lowering the amount of meat they consume.

Party Responsible for Implementation

- Office of Sustainability and Innovations, with support from Farmer's Market staff

Collaborators / Project Co-Designers

- Ann Arbor City Council
- Local farmers
- Washtenaw Optimal Wellness
- Department of Public Works
- Growing Hope
- Local grocery stores
- Local Chefs and restaurant owners
- Cultural centers

Equity Impacts

Food deserts exist in our region meaning residents do not have access to healthy and nutritious food. This action can help ensure that everyone in the City, especially our low-income residents, have access to healthy, nutritious options.

Indicators of Success / Goals

When asked, consumers indicate that they are better educated about the environmental impacts of their consumption choices and factor environmental impacts into their decision making.

Target Demographic

All Ann Arbor residents

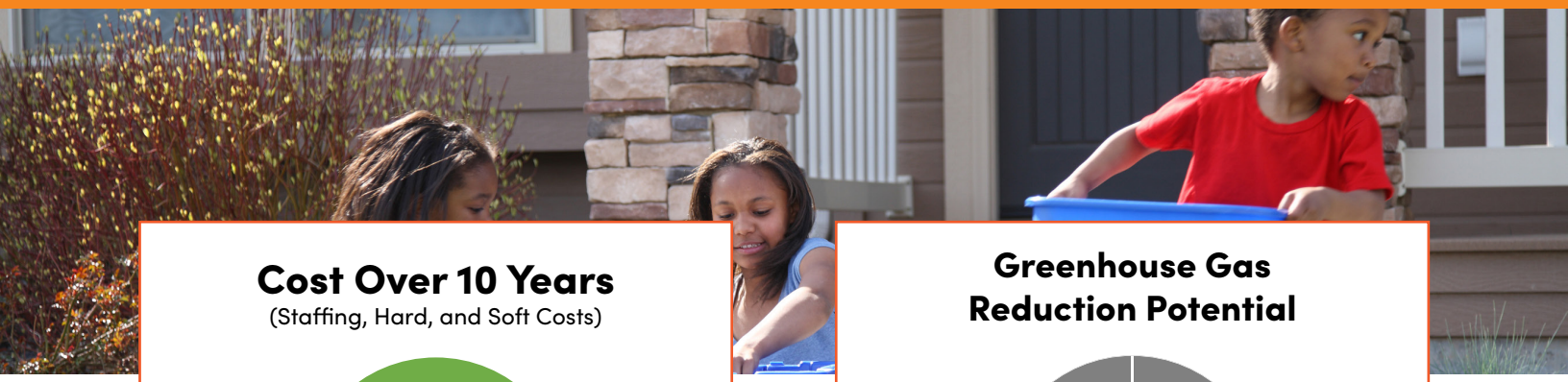
Timeline and Initial Actions

2021

Work with University of Michigan to understand environmental food labeling program; explore expanding to all City facilities where food is stored.

2022

Continue working with partner organizations to develop and disseminate materials about the benefits of a plant rich diet.



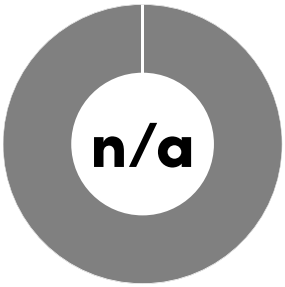
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$

$208,400

Greenhouse Gas Reduction Potential



Not calculated

SUPPORT A PLANT RICH DIET

6. ENHANCE REFRIGERANT RECYCLING AND REUSE PROGRAM

The use of refrigerants emits potent greenhouse gases, and removing them from use can have a significant impact on emissions reduction. This action focuses on enhancing refrigerant recycling programs and discouraged refrigerant use where possible.

Vision for Enchancing Refrigerant Recycling and Reuse Program

By banning refrigerants from disposal at City of Ann Arbor landfills we will drastically reduce greenhouse gas emissions from refrigerant emissions.

Party Responsible for Implementation

- Department of Public Works, with support from the Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Local businesses
- City Communication Team

Equity Impacts

No equity impacts explicitly identified.

Indicators of Success / Goals

95% reduction in the amount of refrigerants disposed of at City facilities.

Assumptions

- Program focuses on education; explores penalties for violation

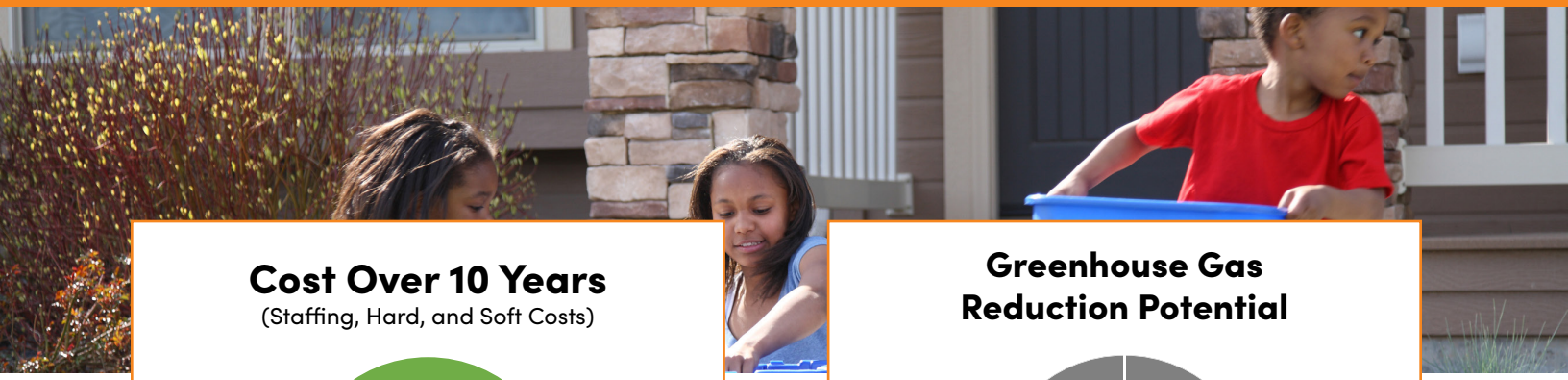
Target Demographic

All Ann Arborites, especially renters, homeowners, and businesses

Timeline and Initial Actions

2021

Work with partners to launch an aggressive refrigerant education campaign; ensure systems are in place to properly recycle all refrigerants that are disposed of in the community.

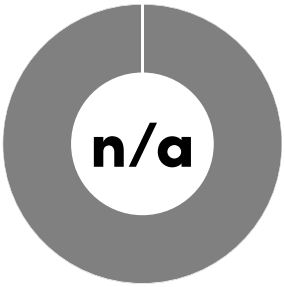


Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$179,400

Greenhouse Gas Reduction Potential



Not calculated

ENHANCE REFRIGERANT RECYCLING AND REUSE PROGRAM

STRATEGY 6:

Enhance the Resilience of Our People and Our Place

This strategy focuses on enhancing the resilience of our people and our place. In particular, this strategy focuses on ensuring our community can not only survive, but thrive, regardless of what disruptions or changes may take place. To achieve this strategy, six actions were prioritized:

1. Invest in Resilience Hubs
2. Foster Neighborhood and Youth Ambassador Program
3. Preserve and Enhance the Local Tree Canopy
4. Conduct Asset and Needs Mapping of Neighborhoods
5. Assist in Assembling and Distributing Emergency Preparedness Kits
6. Implement Sensors to Monitor and Manage Heat, Air Quality, Waterways, and Flooding

While reducing greenhouse gas emissions were not the priority in selecting these actions, they do have a modest value to the community's carbon neutrality goals. In total, these actions contribute a 0.1% reduction in community-wide greenhouse gas emissions and cost around $7,500,000.

1. INVEST IN RESILIENCE HUBS

Resilience hubs are community-serving facilities augmented to support residents and coordinate resource distribution and services before, during, or after a natural hazard event. At their core, resilience hubs empower communities to take action around preparedness and increase community and neighborhood capacity. Resilience hubs operate at the nexus of climate mitigation, climate adaptation, and equity, and they strive to enhance community sustainability and resilience through a bottom-up approach centered on co-development and leadership.

Vision for Investing in Resilience Hubs

Ann Arbor's five resilience hubs are equitably enhancing community resilience while reducing greenhouse gas emissions. The hubs improve local quality of life for all of our residents, especially for our front line communities. Our robust network of resilience hubs empower residents to care for one another during a disaster for up to five days before government assistance resources may be needed. The hubs have reduced the poverty rate, increased local economic opportunities, reduced crime rates, and significantly increased people's satisfaction with their community.

Party Responsible for Implementation

- Office of Sustainability and Innovations, with support from Emergency Management

Collaborators / Project Co-Designers

- Residents
- Local businesses
- Community-based organizations
- The city's communications team
- Police department
- Fire department
- Finance and procurement
- Washtenaw County Department Of Community and Economic Development
- City planning team
- Washtenaw County Health Department
- Public Works
- Legal
- Transportation Manager
- Local community institutions
- Parks and Recreation
- Others as co-determined with

Equity Impacts

Many lower-income residents do not have access to a variety of resources in case of an emergency. Resilience hubs provide residents the ability to support one another in a crisis as well as to access community and City services day to day.

Indicators of Success / Goals

Every Ward within the City has a functioning, community-designed and -operated resilience hub that helps improve community sustainability, resilience, and social cohesion by 2030.

Target Demographic

The first few hubs will be placed in our underserved neighborhoods. Eventually, the goal is to have at least one resilience hub in each Ward and, ideally, a resilience hub in all of our front line communities/ neighborhoods

Assumptions

- External funding will be available to support the development of hubs
- External parties will be able and interested to operate the hub once developed
- The community is able to come to near consensus on what to include in their hub

Timeline and Initial Actions

2020

Continue working with community to explore resilience hub in southeastern Ann Arbor; continue seeking funding to support the hub.

2021

Initiate planning and community involvement for second hub; continue seeking funding for hubs and work on design with the community.

2022

Aim to launch first resilience hub.

2023+

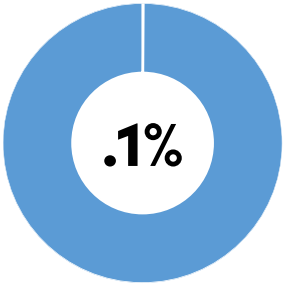
Continue working with community to design, fundraise for, and launch hubs throughout the community.

Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$5,025,000

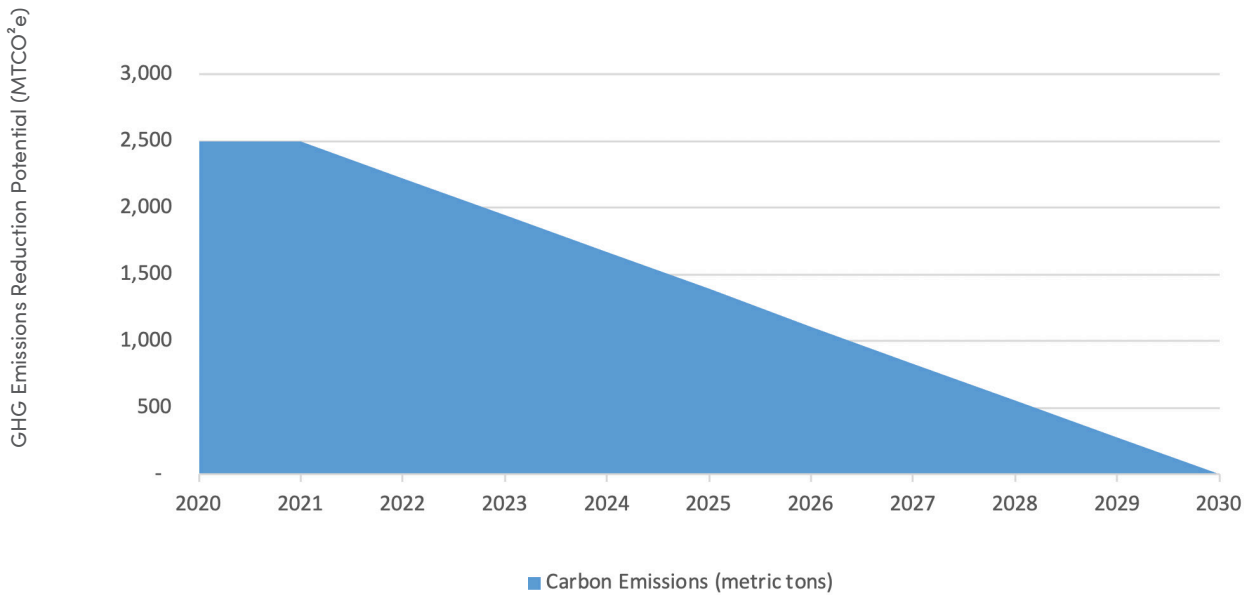
Greenhouse Gas Reduction Potential



2500 metric tons carbon dioxide equivalent (0.1%)

By 2030, the **Invest in Resilience Hubs** strategy will have achieved all of its potential greenhouse gas emissions reductions.

INVEST IN RESILIENCE HUBS



2. FOSTER NEIGHBORHOOD AND YOUTH AMBASSADOR PROGRAM

Achieving carbon neutrality will require mobilization of Ann Arborites on a nearly unprecedented scale. This action seeks to work with interested stakeholders to rapidly scale up and out our carbon neutrality work and the actions outlined in this Plan. In particular, this action calls for the creation of neighborhood as well as youth ambassadors. These individuals will be trained and given the tools and resources to work with their peers to implement many of the actions identified in this document.

Vision for Fostering Neighborhood and Youth Ambassador Programs

Through education and engagement, youth elevate their voices and take ownership of mitigation and adaption initiatives – helping to drive significant community-wide action. Neighborhood ambassadors lead a variety of projects related to energy and water consumption, waste reduction and recycling, transportation, and local food efforts. These actions foster community resource stewardship, climate action, and enhance local social cohesion.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Neighborhood associations
- A^2Zero youth representatives
- Ann Arbor Public Schools
- Community Action Network
- United Way
- Neutral Zone

Assumptions

- Individuals will want to serve as neighborhood or youth ambassadors
- All regions of the City will have someone volunteer to serve as an ambassador (or be recruited to serve) so that there aren't spatial gaps

Equity Impacts

OSI could partner with a nonprofit like United Way to train a cohort of adult residents who are living in affordable housing or who are low-income to be Climate Ambassadors. There could also be a youth cohort who are from underserved communities who could be trained as Youth Ambassadors. Participants in each of these groups would receive stipends. OSI could lead a group of other adults who would not need as much training in a similar program. These people would not get a stipend.

Indicators of Success / Goals

100 individuals are trained as youth or neighborhood ambassadors by 2025 and are actively working with their peers and neighbors to implement that A^2Zero strategy.

Target Demographic

All Ann Arborites interested in helping support the implementation of the A^2Zero Plan

Timeline and Initial Actions

2020

Design the neighborhood and youth ambassador program; work with interested stakeholders.

2021

Launch training and first tranche of ambassadors.

2022

Revise the ambassador program and scale throughout the City.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$350,000

Greenhouse Gas Reduction Potential

Not calculated

FOSTER NEIGHBORHOOD AND YOUTH AMBASSADOR PROGRAM

3. PRESERVE AND ENHANCE THE LOCAL TREE CANOPY

This action begins with conducting an analysis and creating a shared inventory of the local tree canopy as well as updating the master plan to incentivize shade tree and vegetation planting for private projects. This will increase the impact of shade trees as a natural cooling mechanism in urban areas. Tree type and placement are important considerations in advancing this action.

Vision for Preserving and Enhancing the Local Tree Canopy

A properly managed and diverse urban forest increases resiliency against invasive insects that carry diseases and impact the human population. By planting diverse tree species, the community benefits from increased shade and decreased heat island effects, while supporting biodiversity. Careful planning and management help the City mitigate and adapt to changing climate conditions.

Party Responsible for Implementation

- City Forrester/Public Works, with support from the Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Local nurseries
- Neighborhood associations
- Ambassadors

Equity Impacts

Studies have found that tree canopies in low-income communities and communities of color tend to be smaller. Ann Arbor's first Health Impact Assessment should be updated to ensure equitable enhancement of tree canopy in underserved neighborhoods is prioritized.

Indicators of Success / Goals

By 2030, 10,000 new trees are planted on city property and in the right of way and 10,000 new trees are planted on private property.

Assumptions

- City continues to plant 1,000 trees per year on City property and in the right of ways
- Community plants 1,000 trees per year on private property; These trees all survive
- Over the duration of this Plan, a single tree will absorb 48 pounds of carbon dioxide

Target Demographic

City facilities and private property owners

Timeline and Initial Actions

2020

City to continue annual tree planting.

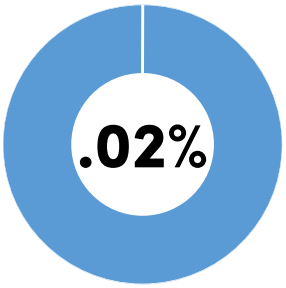
2021

Launch neighborhood tree planting initiative.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$1,160,000

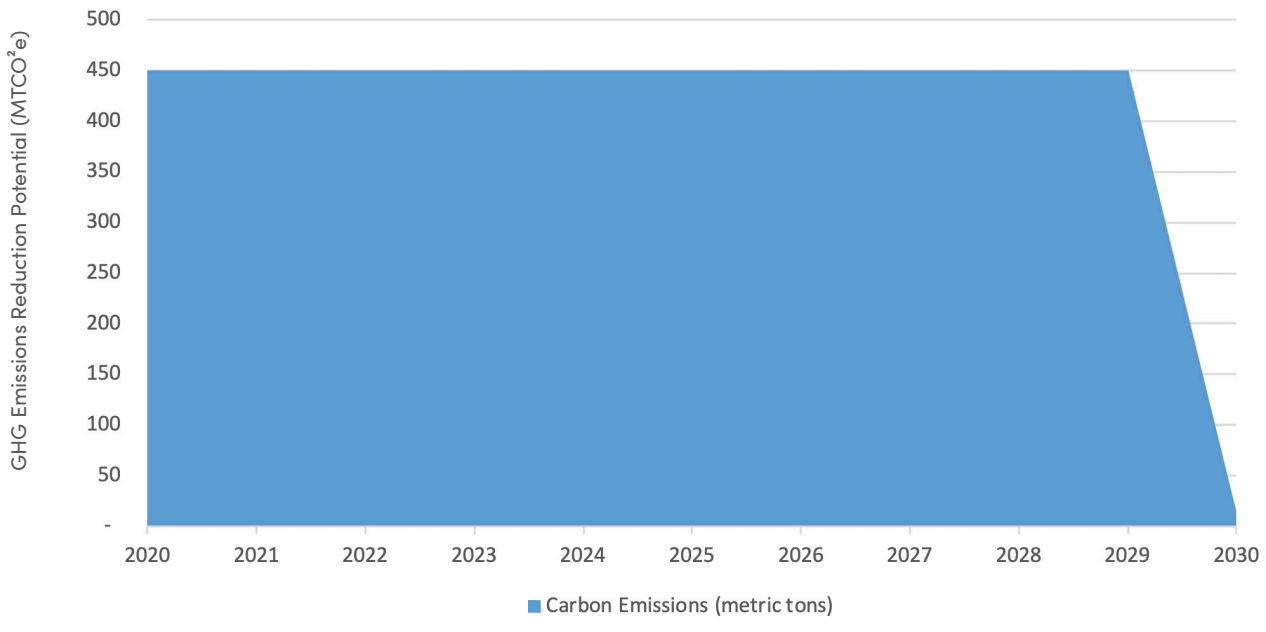
Greenhouse Gas Reduction Potential



450 metric tons of carbon dioxide equivalent (0.02% of community-wide emissions)

By 2030, the **Preserve and Enhance the Local Tree Canopy** strategy will have achieved all of its potential greenhouse gas emissions reductions.

PRESERVE AND ENHANCE THE LOCAL TREE CANOPY



4. CONDUCT ASSET AND NEEDS MAPPING OF NEIGHBORHOODS

This action involves working with neighborhoods to systematically identify what assets and needs exist in the area. Local assets are then leveraged to create a plan that prioritizes and addresses community needs.

Vision for Conducting Asset and Needs Mapping of Neighborhoods

Community mapping leads to the identification of safe gathering points in neighborhoods when events such as natural disasters and power outages occur. Physical spaces, such as homes, are activated as shelters during necessary times.

Party Responsible for Implementation

- Office of Sustainability and Innovations, with support from Emergency Management

Collaborators / Project Co-Designers

- Red Cross
- Neighborhood Associations
- Meals on Wheels
- Neighborhood Ambassadors
- Youth Ambassadors
- Ann Arbor Public Schools

Equity Impacts

Many residents do not have financial security when faced with crisis situations. By identifying assets in advance, community mapping will help residents better rely on each other in crisis situations.

Indicators of Success / Goals

By 2025, every neighborhood in Ann Arbor has an asset map and knows how to activate it in the case of an emergency.

Assumptions

- Enough individuals volunteer to help with the exercise to ensure the entire community is covered
- Capacity exists to update and maintain the asset map

Target Demographic

All Ann Arborites

Timeline and Initial Actions

2020

Develop asset mapping exercise; convene neighborhood associations and those interested in neighborhood ambassador program to get feedback on mapping.

2021

Launch neighborhood asset mapping exercise; create methodology to update and maintain asset map.

2022

Work with volunteers to ensure all neighborhoods have a preliminary asset map at least.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$300,000

Greenhouse Gas Reduction Potential

Not calculated

CONDUCT ASSET AND NEEDS MAPPING OF NEIGHBORHOODS

5. ASSIST IN ASSEMBLING AND DISTRIBUTING EMERGENCY PREPAREDNESS KITS

This action involves working directly with partners and community organizations to educate Ann Arborites on emergency preparedness and prepare emergency preparedness kits and plans that residents can keep to ensure they are safe during an emergency.

Vision for Assembling and Distributing Emergency Preparedness Kits

Residents have the resources they need to care for themselves and their families for multiple days during a disaster situation.

Party Responsible for Implementation

- Office of Sustainability and Innovations, with support from Emergency Management

Collaborators / Project Co-Designers

- Red Cross
- Neighborhood Associations
- Meals on Wheels
- Neighborhood Ambassadors
- Youth Ambassadors
- Ann Arbor Public Schools

Equity Impacts

Many residents, whether due to cost, language, or other barriers may not the resources to build emergency preparedness kits for their families on their own. Working as a group will help all residents be better prepared for emergencies.

Indicators of Success / Goals

1000 residents have emergency preparedness kits by 2030 thanks to support from this action.

Assumptions

- AAPS partners with the City on hosting emergency preparedness events
- Some supplies are donated by local businesses

Target Demographic

All Ann Arbor residents with a priority given to low-income residents

Timeline and Initial Actions

2020

Work with Emergency Management to create a list of essential emergency supplies and a template emergency plan.

2021

Work with schools to launch emergency preparedness sessions with students and caregivers throughout the community.

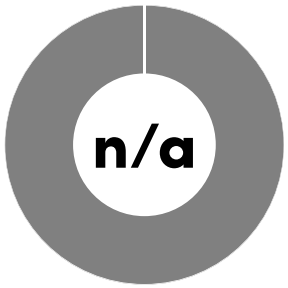
2022

Integrate emergency preparedness module into the Neighborhood and Youth Ambassador programs.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$350,000

Greenhouse Gas Reduction Potential



Not calculated

ASSIST IN ASSEMBLING AND DISTRIBUTING EMERGENCY PREPAREDNESS KITS

6. IMPLEMENT SENSORS TO MONITOR AND MANAGE HEAT, AIR QUALITY, WATERWAYS, AND FLOODING

This action focuses on collecting data and using sensors to proactively understand risks and mitigate vulnerabilities. Includes the usage of drones and sensors to collect data and to respond to events, when necessary.

Vision for Implementing Sensors to Monitor and Manage Heat, Air Quality, Waterways, and Flooding

Ann Arbor's ubiquitous system of sensors and monitors allows the City to proactively manage threats and risks, while ensuring that Ann Arborites enjoy an exceptional quality of life. Monitors and sensors throughout the City provide real-time data that helps protect the public health, safety, and general welfare.

Party Responsible for Implementation

- Ann Arbor Information Technology Unit

Equity Impacts

Few equity impacts.

Collaborators / Project Co-Designers

- Stormwater, wastewater, and water system
- Office of Sustainability and Innovations
- Emergency Management
- University of Michigan
- Huron River Watershed Council
- Downtown Development

Indicators of Success / Goals

Ann Arbor's landscape of sensors and monitors provides real-time information that has been utilized to protect the public from acute and chronic disruptions.

Assumptions

- Any technology adopted can tie into the City's existing IT infrastructure
- The various technologies used can inter-operate

Target Demographic

This action mostly impacts local government staff and regional decision-makers/planners

Timeline and Initial Actions

2020

Finish Smart City Strategy; include needs for monitoring.

2021

Pilot sensors throughout the City with UM and other partners.

2024

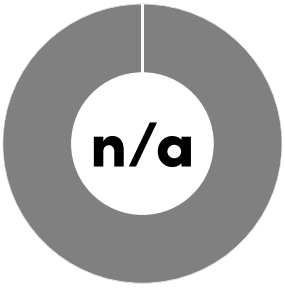
Install sensors and monitors throughout the City as an interconnected network.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$300,000

Greenhouse Gas Reduction Potential



Not calculated

IMPLEMENT SENSORS TO MONITOR HEAT, AIR QUALITY, WATERWAYS, AND FLOODING

OTHER STRATEGIES:

This strategy covers the remaining programs and activities that don't fit into other areas. It also includes greenhouse gas emissions offsets to close out any lingering gaps in achieving community-wide carbon neutrality. To achieve this strategy, four specific actions have been identified:

1. Advance Equity Programs
2. Promote Sustaining Ann Arbor Together Grant Program
3. Establish Internal Carbon Price
4. Offset Greenhouse Gas Emissions

Combined, these four actions equate to just under 14% of community-wide emissions reductions and are estimated to cost just under $6,000,000.

1. ADVANCE EQUITY PROGRAMS

The Office of Sustainability and Innovations (OSI) is committed to ensuring climate protection and mitigation work improves the lives of Ann Arbor residents who have been historically underrepresented and under-resourced. Our Equity Program works to ensure that equity is embedded in all of the work we do – from the programs we advance, to the stakeholders we engage with, to the advisors we seek.

Vision for Advancing Equity Programs

By 2028, all of OSI's programs have an equity focus, OSI staff reflect the diversity of Ann Arbor and Washtenaw County, and staff have developed strong working relationships with members of local low-income communities and communities of color.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Washtenaw County's Racial Equity Program Manager
- Dr. Tony Reames
- Urban Sustainability Directors Network
- City Administrator
- All City Service Areas
- OSI's Equity Fellow
- City of Ann Arbor's Diversity, Equity and Inclusion Manager

Equity Impacts

OSI will continue to center equity in their work, and will expand their decision-making and implementation to authentically include marginalized communities who are most at risk due to climate change.

Indicators of Success / Goals

By 2028, all of OSI's programs have an equity focus.

Assumptions

- Resources will continue to exist to support racial equity training for staff

Target Demographic

Ann Arbor City employees and staff of allied organizations, Ann Arbor residents of color, and low-income Ann Arbor residents and workers

Timeline and Initial Actions

2020

OSI staff will receive and lead continuing education about equity issues (ongoing); hire equity fellow to help with aging in place efficiently work

2021

OSI staff will conduct baseline equity trainings with the Energy and Environmental Commissioners; hire summer equity fellow

2023

OSI Equity Advisory Commission formed

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$

$200,000

Greenhouse Gas Reduction Potential

Not calculated

ADVANCE EQUITY PROGRAMS

2. PROMOTE SUSTAINING ANN ARBOR TOGETHER GRANT PROGRAM

This program provides small grants to residents, schools, local nonprofits, and local businesses to advance sustainability-related activities in Ann Arbor's right of way.

Vision for Promoting Sustaining Ann Arbor Together Grant Program

Through the Sustaining Ann Arbor Together grant program, Ann Arborites are able to unlock financial capital to implement solutions that are making our community a healthier, more sustainable place to live.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Nonprofit organizations serving Ann Arbor residents
- Neighborhood associations
- University of Michigan
- Ann Arbor Public Schools

Equity Impacts

These resources can help undeserved areas of the community unlock capital to address their specific sustainability concerns and opportunities.

Indicators of Success / Goals

At least 10 grants are awarded, per year, through the Sustaining Ann Arbor Together grant program.

Assumptions

- $100,000 will continue to be available, annually, for the program
- The program will be fully subscribed

Target Demographic

Ann Arbor residents

Timeline and Initial Actions

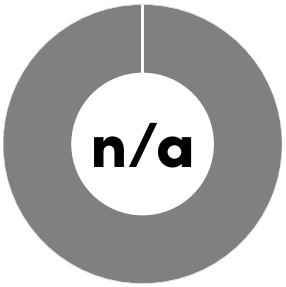
2020

OSI staff continue to administer the program, conducting outreach regularly to let people know about the opportunity.

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

$1,000,000

Greenhouse Gas Reduction Potential



Not calculated

PROMOTE SUSTAINING ANN ARBOR TOGETHER GRANT PROGRAM

3. ESTABLISH INTERNAL CARBON PRICE

This action creates a financial mechanism whereby all City Service Areas holistically integrate greenhouse gas emissions and their impacts into decision-making. This will happen through the use of an internal carbon tax (e.g., payment by each service area for each ton of greenhouse gases emitted). These resources will then be given back in the form of energy efficiency improvements and renewable energy installations at City facilities.

Vision for Establishing Internal Carbon Price

Citywide greenhouse gas emissions are carbon neutral thanks in part to our internal carbon tax that encourages Service Areas to reduce emissions while providing funding support through the fee collected to finance energy efficiency and renewable energy improvements.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Equity Impacts

No explicit equity impacts were identified.

Collaborators / Project Co-Designers

- Finance
- Information Technology
- DTE Energy
- City Administrator
- Consumers Energy
- Fleet and Facilities

Indicators of Success / Goals

All City operations are powered with 100% clean and renewable energy by the year 2030.

Assumptions

- Funding generated by enterprise funds will remain available for use only by the enterprise funds
- Any funds generated will be applied to energy efficiency work and/or renewable energy activities that reduce the overall greenhouse gas emissions of the unit
- Price will not grow to more than the social cost of carbon

Target Demographic

All City Service Areas

Timeline and Initial Actions

2020

OSI staff create internal carbon tax work plan and work with finance to pilot a $5/ton charge

2021

OSI work to increase fleet rates and administer a $10/ton charge

2022

Review program and suggest any needed revisions

Cost Over 10 Years
(Staffing, Hard, and Soft Costs)

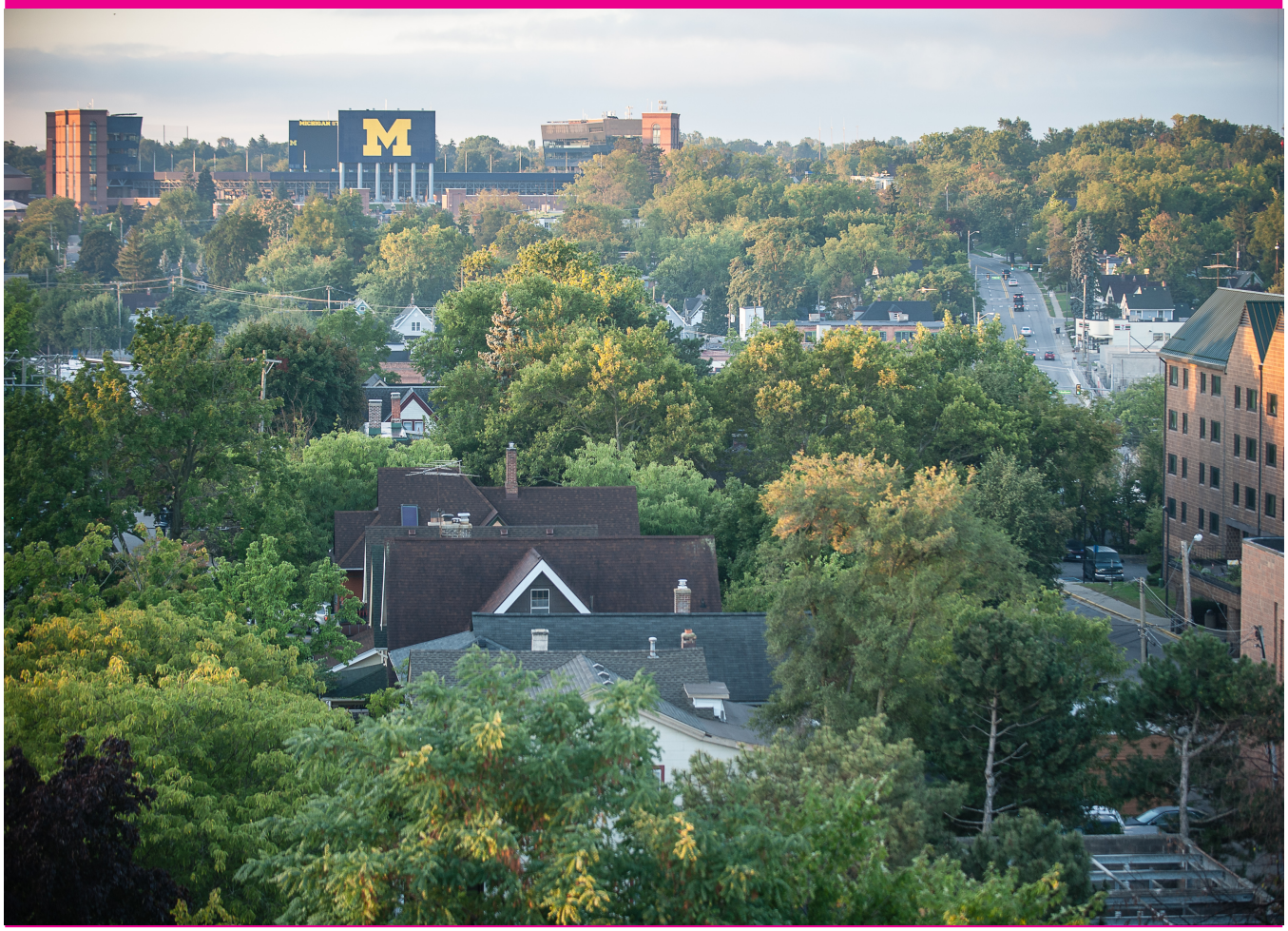
$75,000

Greenhouse Gas Reduction Potential

n/a

Not calculated

ESTABLISH INTERNAL CARBON PRICE



4. OFFSET GREENHOUSE GAS EMISSIONS

Our community has a lot of work to completely eliminate our greenhouse gas emission by 2030. For the activities that we cannot currently reduce emissions from, due to a lack of technical or financially feasible solutions, we can purchase carbon offsets to reduce greenhouse gas emissions outside of our community. Because greenhouse gases act the same way in the Earth's atmosphere, regardless of where they are produced, our community can purchase and retire renewable energy credits replacing fossil fuels to offset our own emissions as we work towards our target.

Vision for Offsetting Greenhouse Gas Emissions

Offsets are only used to close the greenhouse gas emissions gap between what we are able to do locally and what needs to be offset to achieve our goal of carbon neutrality by 2030.

Party Responsible for Implementation

- Office of Sustainability and Innovations

Collaborators / Project Co-Designers

- Energy Commission
- Environmental Commission
- University of Michigan

Equity Impacts

While local offsets may or may not be feasible, the City will aim to invest our carbon offset funds into programs that will decrease income and/or racial justice inequities. This includes looking at potentially making investments in the global south which has been disproportionately burdened by extractive economies.

Indicators of Success / Goals

The amount of greenhouse gas emission offsets purchased decline over time as the City undertakes more local actions.

Assumptions

- All offsets are additional, meaning that they wouldn't have happened without our investment
- Reduces demand for fossil fuels and other greenhouse gas emissions sources
- Preference given to investing in projects that take place in low-income and front line communities
- Any renewable energy credits generated will be retired
- Includes investigating options for a local carbon offset program

Target Demographic

Entire community

Timeline and Initial Actions

2020

Provide recommendations on characteristics of offsets and get Council's agreement

2021

Solidify the source for purchasing greenhouse gas emissions offsets

2028

Undertake first greenhouse gas emissions offset purchase and continue as needed.

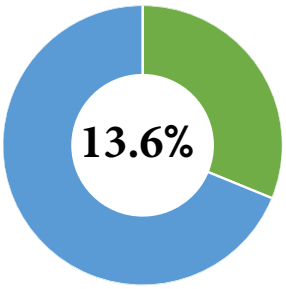
Cost Over 10 Years

(Staffing, Hard, and Soft Costs)

$9,440,000

– this assumes two years of purchasing offsets and the staffing support to set-up the purchase.

Greenhouse Gas Reduction Potential

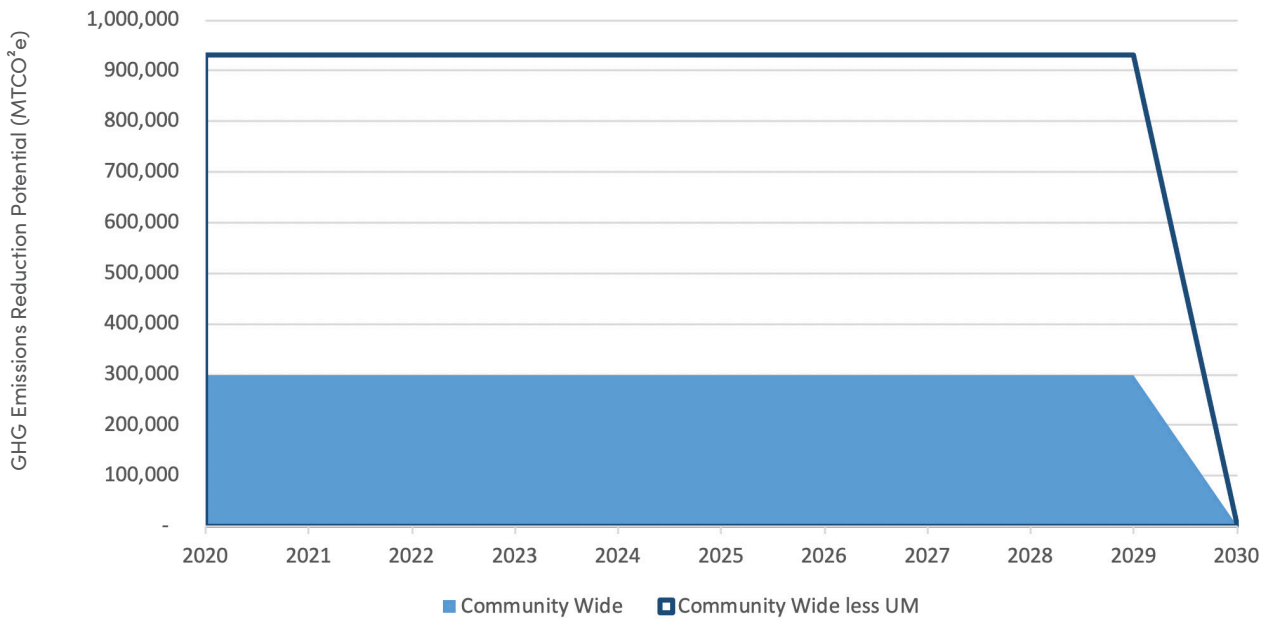


298,500 metric tons carbon dioxide equivalent (13.6% of community wide emissions if UM participates in all programs).

By 2030, the **Offset Greenhouse Gas Emissions** strategy will have achieved all of its potential greenhouse gas emissions reductions.

The figure below shows the estimated total amount of offsets (in light blue) that will need to be purchased assuming the community and University participate in all actions of the Plan outlined above. The dark blue outline shows the amount of offsets that will need to be purchased if the University does not participate in any of the actions outlined.

OFFSET GREENHOUSE GAS EMISSIONS



CLOSING

The A²Zero Plan is a holistic living Plan. It will change. It will evolve. It will get better as the community comes together to implement these and other actions. It is also the beginning of the journey that many other Michigan municipalities will follow in their own efforts to achieve carbon neutrality. With no blueprint for us to follow, A²Zero is our effort to reimagine Ann Arbor in a manner that's equitable, sustainable, and transformative for all Ann Arborites while ensuring we create a more resilient community.

Grounded in equity, the Plan works to ensure the most vulnerable in Ann Arbor can thrive as we bounce forward from any shock or stressors the future may hold. The Plan recommends investing in land use strategies that allow for denser and mixed use neighborhoods to both close the wealth gap by providing more affordable housing so those who work here can also live here ,and by providing more accoutrements within walking and biking distance to our homes. A²Zero encourages more residents and visitors to use an expanded, energy efficient multimodal transportation network to move about our community. It encourages investment in local renewable energy and in our connection to each other and our place.

A²Zero also gives respite to those seniors who desire to age in the places they are most familiar with by ensuring they have access to weatherization programs that lower their energy costs, by launching aging in place programs, and by fostering greater neighborhood social networks.

A²Zero builds upon the significant recent science indicating that society needs to move as rapidly as possible to achieve significant reductions in greenhouse gas emissions in order to avoid the most catastrophic impacts associated with climate change. That is why staff within the Office of Sustainability and Innovations created this Plan as a foundation for achieving community-wide carbon neutrality by 2030.

Time is of the essence, and action is desperately needed. Some of the programs in this Plan will be wildly successful. Others will be moderately successful. And yet others will prove inadequate for the challenge ahead. Our job is not to be beholden to what is written in the pages of this document, but to move intentionally, aggressively, and wholeheartedly towards a significant reduction in local greenhouse gas emissions.

Ann Arbor has the intellect, the human power, the resources, and the skills needed to move climate action and sustainability forward. What is currently missing is the will, and what is lacking is time. Join us as we combat the most significant crisis of our era. Together we can avoid the unmanageable, manage the unavoidable, and create a more equitable and just society for all.

APPENDIX 1 – LIST OF PUBLIC EVENTS

1. November 13, 2019 – Public launch of the A²Zero initiative at Cobblestone Farm. Over 250 individuals attended.
2. November 18, 2019 – Washtenaw International High School sustainability talk to 60 High School students.
3. November 19, 2019 – met with leader of Old Fourth Ward Neighborhood Association to discuss A²Zero.
4. November 20, 2019 – Lunch and Learn with City Staff on A²Zero.
5. November 21, 2019 – Climate Reality Presentation at Vertex Coffee.
6. November 26, 2019 – Ypsilanti Sustainability Committee Climate Reality Presentation at Park Ridge Community Center.
7. December 3, 2019 – Power Hour at Westgate Library discussing energy efficiency and solar power.
8. December 4, 2019 - Meeting to discuss how we can disseminate the word about A²Zero and launch a neighborhood climate ambassadors program.
9. December 4, 2019 - Commercial Power Hour in partnership with the 2030 District & large scale commercial building owners.
10. December 10, 2019 – Cohosted event at Forest Hills Cooperative to begin teaching recycling and composting to over 15 residents and children. Including an introduction to A²Zero.
11. December 11, 2019 – Met with Extinction Rebellion to explain and gather feedback about A²Zero.
12. December 15, 2019 – Tabled at Homegrown at The Cobblestone Art Show to share information about A²Zero.
13. December 18, 2019 – Convened 12 High School and 1 middle school student to glean their thoughts on how they would like to assist in A²Zero at their schools.
14. December 19, 2019 – Tabled about A²Zero at the Ann Arbor Hands on Museum.
15. December 20, 2019 – Climate Reality Presentation at Wheeler Service Center to 140 staff; included an introduction to A²Zero.
16. January 6, 2020 – A²Zero Meeting with Fire Department Management.
17. January 6th, 2020 – A²Zero meeting with Safety unit.
18. January 8, 2020 – Tabled at Veterans Memorial Park during High School Hockey game.
19. January 11, 2020 - A²Zero discussion with Washtenaw 350.
20. January 13, 2020 – Discussed A²Zero and opportunities for resident engagement with property manager of Arrowwood Hills.
21. January 14, 2020 – A²Zero presentation and discussion with the Energy Commission.
22. January 14, 2020 – A²Zero discussion with Clerks Office.
23. January 15, 2020 – Presentation and discussion on A²Zero to the Washtenaw Food Policy Council.
24. January 15, 2020 – A²Zero presentation at the Ann Arbor Housing Commission meeting.
25. January 17, 2020 – Youth and A²Zero discussion with local youth leaders.
26. January 17, 2020 – A²Zero and the Transportation, Energy, Environmental, and Planning Commissions.
27. January 21, 2020 – A²Zero discussion at the Slow Food Huron Valley member meeting.

28. January 21, 2020 – A²Zero presentation and discussion with the Huron Valley Sierra Club members.
29. January 21, 2020 – A²Zero meeting with Forest Hills Cooperative.
30. January 23, 2020 – Arrowwood Youth Conversation.
31. January 23, 2020 – A²Zero discussion with the Attorney's Office.
32. January 26, 2020 – A²Zero presentation and discussion with Citizens Climate Lobby members.
33. January 28, 2020 – A²Zero discussion with Ann Arbor's IT Department.
34. January 29, 2020 – A²Zero presentation to the Ann Arbor School Board.
35. January 30, 2020 – A²Zero Lunch and Learn United Way of Washtenaw County.
36. January 30, 2020 – Sustainability Forum in A²Zero and the Energy Sector.
37. January 30, 2020 – A²Zero presentation and discussion with neighbors in Pittsfield Village.
38. February 6, 2020 – A²Zero presentation and discussion with Main Street Association members.
39. February 8, 2020 – A²Zero tabling at the Ann Arbor Farmers Market.
40. February 12, 2020 – A²Zero presentation at Michigan Municipal League event.
41. February 13, 2020 – Sustainability Forum on A²Zero and Mobility.
42. February 13, 2020 – Shared details about A²Zero at Michigan Environmental Justice Summit.
43. February 15, 2020 – A²Zero presentation and discussion with Ann Arbor Indivisible.
44. February 18, 2020 – A²Zero materials shared at The Polar Vortex Climate Change and Weird Weather event.
45. February 19, 2020 – Bryant Community Center, A²Zero, & A2 Housing Commission Outreach.
46. February 19, 2020 – A²Zero presentation and discussion with the Transportation Commission.
47. February 19, 2020 – A²Zero and Climate Night Trivia.
48. February 20, 2020 – Presentation to Zingerman's Community of Businesses on A²Zero.
49. February 20, 2020 – Presentation on A²Zero to the Washtenaw Area Apartment Association.
50. February 20, 2020 – Presentation to the Ann Arbor Street Design Team on A²Zero.
51. February 22, 2020 – Dive-In Movie (Moana) and Climate Brainstorming.
52. February 22, 2020 – 2nd Carbon Neutrality Town Hall.
53. February 22, 2020 – Washtenaw 350 Environmental Justice Dialogues, including sharing details about A²Zero.
54. February 24, 2020 – A²Zero presentation and discussion with Finance Department.
55. February 26, 2020 – 21 Day Equity Challenge Summit and opportunity to share about A²Zero.
56. February 26, 2020 – A²Zero discussion at the Ann Arbor Climate Partnership meeting.
57. February 27, 2020 – A²Zero discussion with Environmental Commission.
58. February 27, 2020 – Climate change and the Great Lakes presentation and discussion about A²Zero.
59. February 27, 2020 – A²Zero forum with local and regional solar installers.
60. February 29, 2020 – A²Zero tabling at the Ann Arbor Farmers Market.

61. March 2, 2020 – A²Zero and Sustainability presentation to Washtenaw International High School.
62. March 4, 2020 – Climate Leadership Conference– Presentation on A²Zero.
63. March 6, 2020 – Presentation at the New Strategies for Resilient Local Economies about A²Zero.
64. March 9, 2020 – ²Zero presentation at the Local Food Summit.
65. March 9, 2020 – A²Zero presentation at Symposium on Societal Engagement in Climate and Space Sciences.
66. March 9, 2020 – A²Zero presentation to Old West Side Neighborhood Association Board of Directors.
67. March 18, 2020 – A²Zero discussion with Transportation Commission.
68. March 19, 2020 – Sustainability, A²Zero and Local Climate Action at Ford School.
69. March 26, 2020 – A²Zero discussion with Environmental Commission.

Postponed or Delayed Events

1. TBD: Neutral Zone Environmental Justice Forum with A²Zero (rescheduled due to weather).
2. March 11, 2020 – Climate Action Teach-In at University (Cancelled due to Coronavirus Pandemic).
3. March 11, 2020 – A²Zero and Student Engagement presentation (Cancelled due to Coronavirus Pandemic).
4. March 12, 2020 – Michigan Climate Action Summit and Panel on A²Zero and local climate action (Cancelled due to Coronavirus Pandemic).
5. March 12, 2020 – Wege Lecture on Sustainability (Cancelled due to Coronavirus Pandemic)
6. March 12, 2020 – Rise Up for the Earth – Community Earth Day Celebration brief introduction to A²Zero (Cancelled due to Coronavirus Pandemic).
7. March 14, 2020 – Finding the Middle Ground and American Climate presentation (Cancelled due to Coronavirus Pandemic).
8. March 14, 2020 – Climate Strategies: What actions will keep us at 1.5-2oC presentation (Cancelled due to Coronavirus Pandemic).
9. March 14, 2020 – Climate Change and the Great Lakes (Cancelled due to the Coronavirus Pandemic).
10. March 19, 2020 – Sustainability Forum on Carbon Neutrality in the Resource Sector at Downtown Library (Postponed due to Coronavirus Pandemic).
11. March 22, 2020 – Solar Faithful Workshop and discussion on A²Zero (Cancelled due to the Coronavirus Pandemic).

APPENDIX 2 – LIST OF TECHNICAL ADVISORY COMMITTEE MEETINGS

1. November 13, 2019 – Hosted four technical advisory committee meetings simultaneously to launch this element of our work. The four technical advisory committees were: 1) mobility; 2) energy; 3) resource reduction; and 4) adaptation and resilience.
2. December 16, 2019 – Adaptation and Resilience TAC meeting.
3. December 17, 2019 – Resource Reduction TAC meeting.
4. December 17, 2019 – Energy TAC meeting.
5. December 19, 2019 – Mobility TAC meeting.
6. January 9, 2020 – Adaptation and Resilience TAC meeting.
7. January 16, 2020 – Energy TAC meeting.
8. January 22, 2020 – Resource Reduction TAC meeting.
9. January 23, 2020 – Mobility TAC meeting.
10. January 27, 2020 – Adaptation and Resilience TAC meeting.
11. January 31, 2020 – Mobility TAC meeting.
12. February 6, 2020 – Resource Reduction TAC meeting.
13. February 11, 2020 – Adaptation and Resilience TAC.
14. February 21, 2020 – TAC celebration breakfast.

APPENDIX 3 – LIST OF A²ZERO PARTNER EVENTS

1. December 13, 2019 – Hosted first meeting of the A²Zero partners.
2. December 19, 2019 – Hosted equity and climate training for A²Zero partners.
3. March 20, 2020 – A²Zero partners only unveiling of the final strategy.

APPENDIX 4 – COUNCIL RESOLUTION IN SUPPORT OF CREATING A PLAN TO ACHIEVE ANN ARBOR COMMUNITY-WIDE CLIMATE NEUTRALITY BY 2030

..Title

Resolution in Support of Creating a Plan to Achieve Ann Arbor Community-Wide Climate Neutrality by 2030

..Body

Whereas, By adopting the Climate Action Plan (CAP) in 2012, the Ann Arbor City Council ("City Council") committed to an ambitious, multi-strategy vision to address climate change by reducing community-wide greenhouse emissions (8% by 2015, 25% by 2025, and 90% by 2050 relative to year 2000 baseline carbon dioxide equivalent (CO_2e) emissions levels);

Whereas, The Environmental Commission and many community and student groups have advocated for Ann Arbor's declaration of a climate emergency;

Whereas, The Office of Sustainability and Innovations ("OSI") was created in FY19 in order to actualize the goals created and reaffirmed by City Council;

Whereas, The Office of Sustainability and Innovations has created a 5-year work plan that will help the City achieve a 25% reduction in community-wide greenhouse gas emissions by the year 2025, based on 2000 levels;

Whereas, Despite the City's goals and progress to-date, the global climate is changing at a rate that necessitates bolder action to reduce greenhouse gas emissions, including getting to net zero emissions as soon as possible;

Whereas, Over 19,000 scientists have signed a Second Warning to Humanity proclaiming that "a great change in our stewardship of the Earth and the life on it is required, if vast human misery is to be avoided",

Whereas, City Council realizes that climate change has direct and pressing impacts on all aspects of public health, safety, and general welfare;

Whereas, Great community interest exists to support the efforts to achieve community-wide carbon neutrality in a just and equitable manner;

Whereas, The University of Michigan has convened The President's Commission on Carbon Neutrality (PCCN), which commission includes Ann Arbor staff, for the purpose of working together with community and regional partners toward shared carbon neutrality goals;

Whereas, Creating a climate neutrality plan is necessary to identify, plan for, budget, and work towards implementing the actions required to achieve community-wide carbon neutrality; and

Whereas, Funding for public engagement is available in the FY2020 Office of Sustainability and Innovations budget;

RESOLVED, That the Ann Arbor City Council declares a climate emergency and commits to take action as a result of that declaration;

RESOLVED, The Ann Arbor City Council supports a public engagement process, beginning immediately, that helps outline how the entire Ann Arbor Community could achieve carbon neutrality by the year 2030, a target date that is both ambitious and achievable;

RESOLVED, City Council requests that the City Administration develop a draft plan for how the Ann Arbor community could achieve carbon neutrality ("2030 Carbon Neutral Ann Arbor Plan") to be presented to Council not later than March 31, 2020 to support its presentation on Earth Day 2020;

RESOLVED, City Council directs the City Administrator to design and execute a community engagement process that culminates with a draft strategy for how the Ann Arbor community could achieve carbon neutrality around the year 2030;

RESOLVED, City Council direct the City Administrator to seek and facilitate collaboration with the University of Michigan and the PCCN to create and realize the 2030 Carbon Neutral Ann Arbor Plan; and

RESOLVED, City Council request the City Administrator to consider the likely outcomes of the in-development 2030 Carbon Neutral Ann Arbor Plan as he develops the FY21 Budget Planning process and, ultimately, the FY21 Budget.

Sponsored by: Mayor Taylor, Councilmembers Bannister, Smith, Ramlawi, Grand, Ackerman, Eaton, Nelson and Griswold

As Amended and Approved by Ann Arbor City Council on November 4, 2019

APPENDIX 5: LIST OF IDEAS CONSIDERED FOR A²ZERO

Through the A²Zero process, we received input from a diverse group of stakeholders, including technical experts, partner organizations, residents, and the general public interested in providing feedback to the A²Zero Initiative. Ideas were generated at public events, like the first A²Zero Town Hall, through multiple public surveys, and from four technical advisory committees. The Plan presented above includes the ideas evaluated to be the most impactful to reducing our community-wide emissions, fairly improving our community's quality of life, and the most feasible to implement. The list of ideas below serves to document the full list of ideas received, and to be turned to should adjustments to the Plan be required. Many of the ideas listed below would enhance our community, and is a testament to our community's dedication, creativity, and hopes and dreams.

TOPIC: ENERGY

Energy Production

- Regional methane digester
- Solar energy on greenbelt
- County/city energy efficiency and renewable energy concierge service
- Create microgrids
- Create community solar on non-city property, university of Michigan, municipal property, or Ann Arbor Public Schools
- Bulk-buy purchasing opportunities for renewable energy, energy efficiency, and electric vehicles and infrastructure
- Target high-energy "districts" with renewables, energy efficiency, electrification: residential, commercial
- Change solar incentives
- Create volunteer solar opportunities

Energy Efficiency

- New building requirements: energy efficiency, renewables
- Net zero affordable housing
- Reduce property taxes based on energy efficiency upgrades to buildings
- Develop carbon neutral districts: zero energy zones, 2030 districts
- DTE Energy on-bill financing for energy efficiency improvements
- Geothermal districts
- Require green/white roofs
- Energy disclosure policies: rental/single family/commercial

Electrification

- Require all existing appliances and HVAC systems be electrified
- Increase grid capacity for electrification

Financing

- Create financing opportunities/loan loss reserve
- Create carbon tax
- Create on-bill financing for renewable energy and energy efficiency projects

Sequestration

- Increase carbon sequestration practices in Ann Arbor

Offsets

- Offset programs

Education, Outreach, and Marketing

- Youth education on carbon neutrality
- Create information sessions on energy efficiency, electrification, renewables, and electric vehicles for different sectors

- Spread information about DTE Energy's existing energy efficiency programs
- Increase awareness of existing programs
- Change zoning laws to allow for more density
- Expedite permitting for more efficient construction
- Create more zoning opportunities for solar

TOPIC: MOBILITY

Motor Vehicle Electrification

- Require new construction to include EV charging stations and expand existing charging (chargers in low demand areas, car-sharing, ride-hailing, Park and Ride lots)
- Allow homeowners to make chargers available/charge others to use
- Encourage/support electrifying car-sharing. Implement a shared-use program (City)
- Incentivize/Convert fleets to EV (City, car sharing, ride-hailing, commercial delivery needs)
- Create a total cost of ownership target commitment for EVs
- Pair EV charging stations (both private and public) with solar power (and storage)
- Set up EV bulk buy program (for individuals, institutions, employers)
- Subsidize EVs and charging for low income households
- Organize buyback program for ICE vehicles
- Encourage pilot/autonomous vehicle programs, electric delivery options. Infrastructure (5G, DSRC, Wifi) that enables connected and autonomous vehicles
- Reduce congestion at chargers by using rotating system (people could be employed to switch chargers between cars?) that emphasizes fast charging, not charging to full battery
- Make battery recycle program for utility batteries to be used in school and public buses
- Hub deliveries to downtown (larger vehicles stay outside of downtown area and transfer deliveries to smaller green vehicles)
- DTE Energy: Coordinate a Workplace Charging Challenge with DTE, Leverage DTE rebates
- Require/encourage electrifying lawn equipment

Active Transportation

- Implement e-bike and e-scooter program to electrify short-distance travel. Offer safe options for riding e-bikes and e-scooters.
- Expand sidewalks and crosswalks in areas that are currently un-walkable
- Maintain and repair bike lanes preferentially (including clearing gravel). Improve snow-clearing to encourage biking and walking year-round.
- Make more bike lanes. Improve bike access to downtown. Increase regional/connected bikeways
- Make more protected bike lanes or elevated bikeways. Prioritize safety on scenic bike routes. Increase bike lanes separated from roads (greenways)
- Expand services like "Common Cycle," a volunteer-based bike repair clinic
- Encourage bike banks/bike sharing
- Provide City snow clearing of sidewalks
- Make interconnecting with public transit easier (allow bikes inside buses)
- Enforce codes protecting bikes and bike lanes (driving distance, parking and obstructions in bike lanes)
- Traffic signals reflect active transport needs and prioritize safety. Safer lighting for crosswalks and bike lanes.
- Add skywalks between major buildings

Transit and Paratransit

- Make public transportation free
- Expand Go-Pass area. Reduce transit fees/offer pass deals (annual)
- Expand TheRide bus routes and connect routes more
- Increase the speed and efficiency of bus transit. Provide rapid transit along major corridors
- Use better technology to make bus system more accurate, on-time, etc.
- Power bus stop shelters with solar power (security lighting, cameras, and info)
- Create bus and carpool lanes
- Create student shuttles to reduce demand for student cars (e.g. shuttle from campus to nearest grocery stores). Collaborate with/address UM transit. Work with UM to create incentives for students not to bring cars on campus. Make shuttle to WCC.
- Develop light rail (commuter, local). Develop electrified regional public transit
- Electrify TheRide vehicles
- "Right size" transit vehicles
- Create "mobility hubs" dispersed through city that act as home-base for multiple transit options (e-bikes, e-scooters, zip cars, bus stops, EV chargers, autonomous delivery vehicles, carpools, etc.)
- Improve public school transit (school of choice, etc.)
- Increase availability and convenience of Park and Ride lots for commuters
- Allow multiple modes of fare payment
- Encourage alternatives to flying (increase trains, etc.)

Policies, Funding, Public Outreach, and Education

- "Upzone" to encourage density and affordability. Make zoning allowances for mixed-use neighborhoods. Walkable grocery stores. Encourage tiny houses and accessory dwelling units (ADUs). Transit-oriented urban planning along transit corridors
- Build affordable workforce housing near workplaces to reduce commuting
- Incentivize work-from-home, 4-day-work-week, and shorter work day policies (with health care credits, bonuses, etc.) to reduce employee commuting. Provide free internet to support telecommuting
- Reduce availability of parking, reduce/eliminate parking minimums. Work towards a parking-space free campus. Tax vacant lots and development of new parking lots
- Enact car-free (or petrol-free) zones. Make downtown pedestrian-only on weekends, linked with shuttles from Park-n-Rides
- Implement odometer tax or congestion tax. Price vehicles on occupancy. Implement City gasoline tax on pumps/new development. Tax large local industries. Implement City income tax
- Enforce no idling laws
- Alter Act 51 (act for distributing funds for road infrastructure) to give locals more control over types of projects. Lobby for state policy that creates a dedicated funding source for non-motorized and electric transportation (like there is for highways)
- Lobby to eliminate state registration fees for EVs
- Increase education about biking and walking through middle and high school (there is nothing after Safety Town). Incentivize driver's education programs use EVs
- Create education, certification, and/or incentive program for auto dealers to sell EVs. Develop certification program for EV-qualified maintenance shops
- Leverage Forth Mobility for education and outreach
- Work with health-care systems to educate patients about health benefits of active transportation
- Leave behind level of service measures – use a better method like people through-put

- Adopt transportation pyramid (walking as priority to single occupancy driving at the bottom). Carbon neutrality mobility requirements in master plan
- Permeable pavement
- One-way street design
- Encourage carpooling for larger companies using apps
- Spotlight organizations who are taking action/success stories. Provide sample sites, pilots, and working examples of new ideas
- Help people understand their carbon footprint related to transportation and impact of changes

Process-Related

- Improve GHG tracking from transportation
- Using property taxes for funding can create equity concerns
- Always consider accessibility concerns
- Run lifecycle analysis on all ideas to see what is most effective
- Youth need to be at the table
- Carbon off-sets and sequestration (for travel)
- Plans from other communities with carbon neutrality goals (statewide coalition to move legislation at the state level)

TOPIC: RESOURCE REDUCTION

Waste Reduction

- Conduct environmentally-extended input-output analysis: City, University, hospitals
- Create a Zero Waste Plan
- Require all city-wide events be Zero Waste
- Leverage partnerships
- Report out on what happens to recovered waste
- Discourage landfilled waste:
  - Extend time between trash pick ups
  - Initiate payment by amount of trash model
  - Limit size of/availability of containers
  - Use funds from trash can fees for educational campaign
- Reduce single use plastics:
  - Organize a local cohort of business who do not use single use plastics
  - Tax/ban single use plastics (bags, takeaway containers, etc.)
  - Require bottle-filling stations
  - Encourage/enable price incentives for using reusable containers
  - A^2Zero branded compostable alternatives to single-use plastics
- Electrify waste truck fleet
- Choose/require methane recovery at landfills in active use

Recycling

- Renovate city-owned Materials Recovery Facility
- Develop new city-owned Materials Recovery Facility
- Educate public/resolve recycling uncertainty
- Eliminate drop-off fees for recycling

- Multi-stream recycling pick-up
- Neighborhood level recycling rather than drop-off
- Improve textile recycling
- Enforce recycling

Organics

- Address waste water
- Methane recovery on waste water (Cross cutting: Energy)
- Improve composting pick up:
- Accessible to commercial, industrial, multi-family
- Ease of use
- Year round composting
- Local composting:
- Compost in neighborhoods/locally
- Return to local farmers
- Provide free compost to residents
- Create compost market
- Encourage/incentivize/educate on homeowner composting
- Provide information on environmental impacts of different compostable materials

Plant Based Diets

- Scale pledge programs, Blue Zone Program
- Incorporate AAPS and institutions
- Provide cooking classes focused on plant-based, local, seasonal foods (Rec & Ed)
- Education/ban on commodity beef/CAFO meat

Local Food Production

- Scale community gardens/local food production
- Local food waste recovery (gardeners, farms, restaurants, grocery stores)
- Farmers Markets Expansion
- Year round
- More locations
- Expanded food hubs/food stops/local food in grocery stores
- Protect SNAP in appropriate scaled sizes
- Pilot local food subscription meals with circular/reusable packaging
- Collaborate with AAPS, UM on food planning, purchasing, and waste

Circular Economy

- Reskilling and skill sharing opportunities
- Repair centers for bikes, appliances, etc.
- Toy and tool library/shed, shared play areas
- Support thrift stores, reuse center, flea markets
- Create a time bank/local currency

Sustainable Purchasing

- Charge a carbon price on the embedded GHG of products
- Create a local market for reusable goods
- Closed loop reusable packaging
- Offer refillable bulk containers, takeout containers, cups (at point of sale)
- Create/enforce purchasing policies, guidelines, or incentives for:
  - Municipal operations
  - Institutions
  - Individuals
- Create consumption-based inventories for:
  - The City
  - Institutions

Construction and Development

- Require sustainable materials in new development

Community Engagement

- Engage with commercial and institutional sector
- Commercial reuse packaging program
- Accelerate/scale current data collection/plans:
  - Green Business Challenge
  - Engagement with private sector
  - Require/encourage disclosure from businesses/community groups

Community/Education

- Publicize available data/educate on:
  - Decreasing and recovering food waste
  - Reducing packaging, single use plastics
  - Purchasing transparency: traceable, embedded GHG, recyclability/compostable, Energy Star
  - Increasing composting and its benefits
  - What is recyclable and how to recycle
- Ongoing community engagement team (provide inventory management)
- Demystify terminology
- Compost at schools, local food at schools
  - School curriculum on environmental science
- Link to public health initiatives (diet, pollution)
- Recognition program for successes, spotlight organizations who are taking action
- Promote sample sites, pilots, and working examples

TOPIC: RESOURCE REDUCTION

Preparation

- Develop new/leverage existing infrastructure as resilience hubs
- Activate some homes as shelters with resources, energy, etc.
- Identify safe gathering points in neighborhoods during power outages, extreme heat/cold, etc.
- Conduct needs mapping of neighborhoods based on specific support residents require
- Generate neighborhood-based resiliency plans, incorporate residential best practices.

- Activate neighborhood climate ambassadors/captains to help
- Enable/organize ongoing training via Red Cross/CERT/partners
- Coordinate across Red Cross/AmeriCorps/partners
- Develop redundant communication (e.g., Code Red), not dependent on internet
- Assist/organize preparing/distribute residential emergency kits
- Host a National Preparedness Month campaign
- Engage behavior change scientists and define actors/actuators
- Conduct risk assessments and incorporate into planning
- Conduct a resilience-aesthetic charrette
- Strengthen relationships with other local governments

Community cohesion

- Activate strong neighborhood community networks that support local efforts
- Activate neighborhood welcome ambassadors
- Educate and engage community on the expected risks/how to prepare/how to respond, sharing experiences, climate tours
- Increase local workshops and space for public input
- Youth participation/education through actions/videos/ambassadors/curriculum/training/competitions
- Develop a program to recognize neighborhood-level efforts
- Enable/organize block parties for energy/resilience themes
- Provide support for emotional resilience, grief management, psychological services, etc.
- Create shared childcare programs.
- Create communal kitchens

Response

- Develop climate refugee support/networks
- Develop program to use city buses for evacuation and power sources during a disaster

Urban Planning

- Implement/leverage sensors and data to monitor heat, air quality, waterway and floods. Assist with drones for data/response.
- Track public health metrics from state and CDC
- Urban planning to moderate heat via shade trees, lighter contract, more rain gardens
- Design for increased urban density and walkability/bike-ability. Update city zoning.
- Street trees: Analysis of shading/inventory/update master plan/incentivize private tree planting
- Improve parking lot design standards for shading, storm water retention, heat island mitigation, trees
- Incentivize white/green roofs
- Purchase repetitive loss properties. Redevelop vacant space as green space.
- Prioritize affordable housing.
- Require all City functions be zero waste.
- Allow/encourage telecommuting

Energy

- Transition to underground power lines
- Create redundancy in energy systems (storage)
- Decentralize energy infrastructure. Incentivize individual energy production.
- Increase renewable energy systems, storage, microgrids, and community solar.

- Plan for higher energy loads due to increasing temperatures.

Green Spaces

- Connect green spaces
- Increase natural area preservation and stewardship for carbon sequestration and storm water management
- Educate on native and invasive plants
- Increase land use for local food production. Host an improved food infrastructure innovation challenge.
- Encourage fruit trees/foraging, collect fallen fruit. Allow food production on city lands in neighborhoods.

Water

- Enable/encourage water generation and reuse and natural water/flood capture systems
- Design flexible water systems that adapt to conditions
- Remove dams/coordinate dam management
- Use accessory dwelling units for drinking water security
- Add vegetated buffers along waterways for storm water management
- Stricter floodway/floodplain management/planning

Transportation

- Design roads for flexibility, networked, alternative transportation, slower traffic, storm water management, trees, boulevards, durability. Fully implement green streets.
- Leverage Common Cycle to keep bikes on the road
- Encourage/enable car sharing
- Minimize parking available
- Install EV chargers at stores/apartments

Residential/Commercial Support

- Define and educate on residential best management practices
- Create a resilience fund/funding focused on equity
- Educate on DTE Energy support for energy efficiency upgrades
- Strengthen building code for efficiency/weatherization. Require 2030 District standards across all buildings.

A2ZERO
EQUITABLE • SUSTAINABLE • TRANSFORMATIVE

Developing the Climate Strategy

Climate Equity Advisory Council

The Climate Equity Advisory Council (CEAC) provided feedback and guidance on developing actions that best support community needs. It informed the development of indicators used in the Community Vulnerability Assessment. The CEAC also developed equity-centered implementation recommendations for the strategy, called **Community Guidelines**.

1. Act in equitable and just ways
2. Build engagement through shared vision, goals, and practices
3. Put people first
4. Build community leadership & community action
5. Link & leverage actions to accelerate impacts
6. Strengthen policy and action that directly reduce emissions

Community Engagement

In 2021, the Office of Sustainability and Climate Strategy project team facilitated three town hall meetings and six focus group sessions to better understand resident perspectives and priorities for climate action.

Cross-Dept. Coordination

City departments were engaged throughout the development of the Detroit Climate Strategy to ensure that the strategies and actions align with City priorities.

Addressing Climate Change in Detroit

The City of Detroit's Climate Strategy is a framework for residents, businesses, City departments, and industry to achieve the City's greenhouse gas (GHG) emission goals and increase resilience as climate change impacts our daily lives.

This strategy builds on the Sustainability Action Agenda released by Mayor Duggan in 2019 and updated in 2022. It was developed collaboratively by the Office of Sustainability, the Climate Equity Advisory Council (CEAC), and was informed by extensive community engagement.

> *"Detroit has always been known for its determination, innovation and resilience. These qualities have shaped our history and will continue to be assets as we confront the pressing challenges posed by climate change."*
>
> Mayor Duggan, City of Detroit

Detroit Climate Strategy

This document outlines **4 strategies** and **35 actions** centered on mitigation (reducing GHG emissions) and resilience (adapting to the impacts of climate change).

1. **Transitioning to Clean Energy**
2. **Increasing Sustainable Mobility**
3. **Accelerating Energy Efficiency and Reducing Waste**
4. **Prioritizing Vulnerable Residents and Adapting to Change**
   - a. Reducing Flood Risks
   - b. Protecting from Extreme Heat
   - c. Improving Air Quality

scan this for full document

Want to learn more?

Learn more about the impacts of climate change, actions and targets to lower GHG emissions, and share your vision for a climate-friendly Detroit.

detroitmi.gov/sustainability

Detroit is transforming 250 acres of vacant land into solar energy

Prompted by a challenge issued by President Joe Biden for cities to use more solar power and the passage of the Inflation Reduction Act, Mayor Duggan launched an initiative to transform blighted areas into solar arrays. The initiative is paired with community benefits that can be used for energy efficiency upgrades to reduce residents' energy burden.

Office of Sustainability

Detroit Climate Strategy

Four Priorities

1 Transitioning to Clean Energy

Almost 70% of our citywide GHG emissions in 2018 came from the generation of electricity from dirty sources. Clean energy, like solar, does not produce GHG emissions, is renewable and is critical to cleaning up the air we breathe.

2 Increasing Sustainable Mobility

Sustainable mobility like walking, biking, transit and zero emission vehicles is critical to reducing GHG emissions and improving quality of life. Increasing mobility options ensures that all Detroiters can access clean, safe, affordable, and efficient ways to get around.

3 Accelerating Energy Efficiency and Reducing Waste

Reducing energy consumption in homes and buildings will reduce our GHG emissions, lower energy bills, and improve indoor and outdoor air quality. Recycling, composting, and reducing the amount of waste that we create also lowers GHG emissions, saves natural resources, and creates more jobs.

4 Prioritizing Vulnerable Residents and Adapting to Change

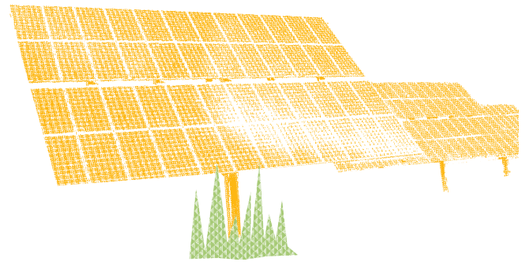
The intensity and frequency of extreme weather events have increased, and it is vital to strengthen the resilience of the city with a focus on our most vulnerable residents. For example, expanding the City's basement back up protection program ensures that more Detroiters stay dry during heavy rains.

View the full Detroit Climate Strategy Online

Find out more about the 35 actions and three-year targets that will help us meet our climate goals and improve everyone's quality of life.

www.detroitmi.gov/sustainability

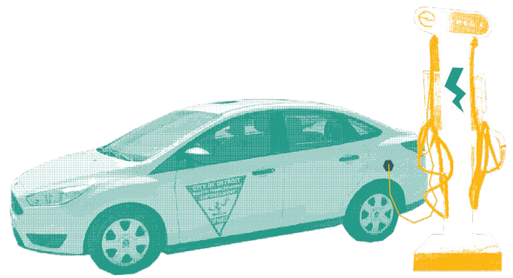
Action Highlights:



Clean Energy

Powering Detroit with Solar

The City has a goal of powering 100% of its municipal buildings with clean energy by 2034. This year, the Office of Sustainability, and Department of Neighborhoods partnered with environmental and energy organizations and community residents to host solar arrays and receive community benefits.



Sustainable Mobility

Installing EV Chargers Across the City

The Office of Mobility and Innovation is working to ensure Detroiters in every District have access to EV charging locations. In the next 3 years, 200+ publicly accessible EV chargers will be installed in City facilities, garages, on-street, and surface parking lots across Detroit.

Energy Efficiency

Assisting Residents and Lowering Energy Costs

Leveraging home repair programs, the City will support residents with roof and windows repairs, and weatherization, ensuring they can improve the insulation of their homes. This will help increase their comfort, and lower their energy costs.

Prioritizing Vulnerable Residents

Building Community Resilience

In October 2023, the City opened its first Resilience Hub at A.B. Ford Park. This Community Center is equiped to provide critical resources during outages, floods, heatwaves, and other climate emergencies. This Hub will be part of a broader network of Resilience Hubs across Detroit.

Detroit Climate Strategy: Implementation Table

STRATEGY	#	ACTION	3-YEAR TARGET	LEAD	PARTNERS
Transitioning to Clean Energy	1.1	Source 100% of municipal electricity from clean energy by 2034	Power 50% of municipal electricity with clean energy	OoS	INFRA
			Establish a pathway to 100% clean electricity		
	1.2	Launch a solar program to generate clean energy on City-owned sites and provide community benefits to residents	Issue a Request for Proposals for the deployment of solar energy on City-owned sites	OoS	INFRA
	1.3	Work with utility provider and private property owners to source 50% of Detroit's electricity from clean energy	Coordinate bulk purchasing of clean energy with businesses and other large energy users	OoS	INFRA
			Support community solar efforts		
Increasing Sustainable Mobility	2.1	Install 200+ public EV chargers at City facilities, garages, on-street and surface parking lots, covering every District	Install EV chargers in 7 commercial corridor lots	OMI	MPD
			Issue Executive Order requiring all municipal facilities with parking, including Recreation Centers, to have EV chargers installed by 2025		
			Leverage Federal funding to expand on-street charging		
	2.2	Pilot EV carshare services in neighborhoods underserved by transit	Ensure the presence of at least 2 publicly accessible EV car share vehicles at each Recreation Center	OMI	OoS
	2.3	Adopt ordinance requiring EV infrastructure for new developments	Adopt an ordinance requiring 20% of spaces in new developments be EV-capable	OMI	Legislative Policy
	2.4	Transition City light-duty vehicle fleet to 100% zero emission by 2034	Issue Executive Order requiring purchase of zero emission light-duty vehicles	GSD	OMI OCP
			Require that every Department have light duty Zero Emission Vehicles in their fleet		
	2.5	Transition City heavy-duty vehicles to zero emission and clean fuel options	Complete City fleet conversion plan	GSD	OMI OCP
			Implement City fleet conversion plan		
	2.6	Transition City bus fleet to electric or clean fuel buses	Procure zero emission buses as part of fleet transition	DDOT	OMI OCP
	2.7	Adopt a single pass for all forms of public transportation	Integrate at least 2 mobility modes (i.e. DDOT and MoGo)	OMI	DDOT
	2.8	Make equitable investments in pedestrian and cyclist infrastructure	Complete 8 miles of the Joe Louis Greenway, with a MoGo bike station at every mile of the greenway	DPW	PDD
			Invest $31 million in intersection safety improvements		
	2.9	Invest in public transit infrastructure to increase ridership	Improve reliability and timing of buses per the DDOT Reimagined Plan	DDOT	OoS
	2.10	Reduce miles traveled to goods and services	Launch master planning process citywide—increase policies for mixed use development and Transit Oriented Development (TOD)	DDOT	OoS
	2.11	Support mobility innovation and investment	Pilot inductive charging and associated activations on city roadways	OMI	OoS
			Expand the Transportation Innovation Zone		
			Launch a program to prepare youth for future mobility and innovation jobs		
Accelerating Energy Efficiency and Reducing Waste	3.1	Adopt an energy benchmarking ordinance	Collect annual energy and track water data for City buildings greater than 10,000 sq. ft	CDD	GSD
			Adopt an ordinance requiring benchmarking for targeted public and private buildings		
	3.2	Retrofit municipal facilities to reduce their use of energy and fossil fuels	Upgrade 25% of the largest energy using critical facilities, achieving at least 25% energy reduction	CDD	GSD
	3.3	Require all new municipal buildings to be all-electric or all-electric ready	Issue Executive Order requiring new municipal buildings to be all-electric or all-electric ready	OoS	BSEED
	3.4	Expand access to energy efficiency programs and electrification upgrades by leveraging existing home repair programs	Complete roof replacements for senior, low-income, and disabled Detroiters via the Renew Detroit Program	HRD	OoS
			Weatherize Detroiters' homes through the Low Income Home Energy Assistance Program and other programs.		

continue on next page

STRATEGY	#	ACTION	3-YEAR TARGET	LEAD	PARTNERS
Accelerating Energy Efficiency and Reducing Waste	3.5	Support development of financing programs for energy efficiency and electrification projects	Launch pilot financing program for commercial or multi-family buildings	DEGC	HRD
	3.6	Accelerate energy reductions in buildings of all scales through increased participation in education, incentives, and recognition programs	Work with partners to identify opportunities for broader buildings decarbonization	OoS	Detroit 2030 District
	3.7	Increase participation in waste reduction and recycling	Divert 15% of municipal solid waste from landfills	DPW	OoS
			Increase participation in curbside recycling to 60%		
			Increase the amount of food rescued and reduce food waste		
	3.8	Develop a zero waste plan to increase waste diversion	Publish a Zero Waste Strategy identifying long term targets for waste diversion and materials management	DPW	OoS
	3.9	Pilot community and commercial-scale composting initiatives	Pilot community food scrap and yard waste drop-off sites in partnership with local compost processor	DPW	OoS
			Pilot commercial composting in municipal buildings		
			Train health inspectors onfood donation and rescue,and provide resources toDetroit businesses		
	3.10	Work with other municipalities in the region to drive down industrial emissions	Create task force with relevant regional stakeholders to address industrial emissions	OoS	OoS
Prioritizing Vulnerable Residents and Adapting to Change	4.1	Develop a network of Resilience Hubs that serve as a resource in times of extreme weather events	Launch two additional Resilience Hubs in Detroit	GSD	DHSM
	4.2	Increase resident participation in Detroit's emergency management notification system - Detroit 365	Increase participation in Detroit 365 by 10%	DHSM	Comms
	4.3	Support neighborhood-level action on climate resilience and emergency preparedness	Launch 3 community engagements to support local communities on climate resilience	DoN	Comms
	4.4	Expand access to resources for recovery post extreme weather events at the household level	Develop a disaster recovery guide for residents and coordinate distribution via Resilience Hubs	DWSD	
	4.5	Coordinate with DTE on energy reliability improvements and support prioritization of power restoration to vulnerable communities	Work with DTE on pilot to bury electrical assets underground	OoS	DTE
			Upgrade at least three recreation centers with back up power		
	4.6	Advocate for electric service continuity during extreme weather events	Work with partners to support the continuity of electric service during extreme weather events	INFRA	OoS
	4.7	Implement large scale green stormwater infrastructure projects and conduct sewer system improvements and maintenance on a regular basis	Invest $30 million in infrastructure in Rouge Park	DWSD	
			Invest $42 million in infrastructure in Brightmoor		
	4.8	Expand sewer protection program resources in flood-prone areas of the City	Complete 10,000 lead service line replacements by 2025	DWSD	Grants
			Protect 1,000 homes with basement back up retrofits		
	4.9	Incorporate small-scale green stormwater infrastructure into City-funded capital projects	Incorporate green stormwater infrastructure in the design checklist for City capital projects	CDD	Grants
	4.10	Reduce the urban heat island effect and mitigate the impacts of extreme heat on public health	Plant 30,000 trees, starting with most blighted properties and areas	GSD	Health
			Update the Extreme Heat Action Plan		
	4.11	Work with partners to reduce truck pollution in areas with low air quality	Launch program for clean freight	BSEED	OMI
			Complete two green buffers (phytoremediation) along truck corridors and expand to other locations		
			Strengthen air quality mitigation at new industrial developments		

BSEED Buildings, Safety Engineering, and Environmental Department
CDD Construction & Demolition Department
DDOT Detroit Department of Transportation
DEGC Detroit Economic Growth Corporation
DHSM Department of Homeland Security and Emergency Management
DoN Department of Neighborhoods
DPW Department of Public Works
DWSD Department of Water and Sewage
GSD General Services Department
HRD Housing and Revitalization Department
INFRA Chief of Infrastructure
OMI Office of Mobility and Innovation
OCP Office of Contracting and Procurement
OoS Office of Sustainability
PDD Planning and Development Department

Sustainable Rochester

DEVELOPMENT FRAMEWORK

DRAFT March 1, 2018

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Acknowledgments

Thank you!

The participation and cooperation of Rochester community leaders, residents and members of the business community and other stakeholders in the preparation of the Sustainable Rochester Plan is greatly appreciated and we thank everyone who participated in its development.

The content in this Plan reflects the Rochester's commitment to sustainability and the on-going collaboration between the various City officials, administration, and boards and commissions.

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Purpose and Needs

Sustainable Rochester is a toolkit to help City administration, elected officials, decision makers, and potential developers understand and communicate about many, often competing impacts and benefits associated with development. Rochester is in a great position to guarantee the City's long-term environmental and fiscal sustainability. The City's current plans, policies, and regulations ensure that new development will be designed to be respectful of community norms. Sustainable Rochester will bridge a gap between code and creation with a common framework for discussing community benefits and potential impacts of new projects. Upon completion City Council, Planning Commission, and the Downtown Development Authority (DDA) will consider passing resolutions to adopt the Sustainable Rochester Development Framework as a current policy to assist in project evaluation. New projects in the City will be provided a Project Evaluation Worksheet to evaluate how the project contributes to each of the Development Components identified in the framework.

Guided by the City of Rochester staff and a Sustainable Rochester Steering Committee, the conceptual framework defines the following purpose for Sustainable Rochester:

PURPOSE

Sustainable Rochester is defined in terms of the quality of life for Rochester residents. Specifically, if the economic, social and environmental systems that make up Rochester are providing a healthy, productive, meaningful life for all residents, present and future. Sustainability is about understanding the connections and trade-offs between each element of a community's quality of life and analyzing and mitigating the effects of those trade-offs. Ultimately, Sustainable Rochester achieves balance between each element of quality of life and the needs of the current and future community.

Sustainable Rochester

Sustainable Rochester will be used to ensure responsible and sustainable development decisions. It embraces the City's existing sustainability goals, which are compiled into six Sustainability Values: Environmental Health, Mobility, Fiscal Strength, Public Services, Strong Neighborhoods, and Downtown Viability. Each element captures a facet of sustainability that positively influences Rochester's quality of life.

Together, this set of interrelated factors represents the primary elements that are necessary to evaluate the trade-offs associated with a specific commercial/residential/industrial development and how it affects the long-term sustainability of Rochester.

Sustainability Values and Development Components

The Sustainable Rochester Development Framework takes a similar approach to many communities throughout the United States that seek to measure quality of life and evaluate progress towards reaching specific targets. This framework combines the concepts identified in prescient studies along with the specific needs of City of Rochester to compose the underpinning framework for future evaluation. Specifically, we consider sustainable development evaluation in a systematic and comprehensive way, with a framework that is comprised of sustainable values, development components, and indicators (regional or local, illustrated on the following page).

» Six **Sustainability Values** represent the broad conceptual categories that define sustainability. Each sustainability value corresponds to existing City goals and policies.

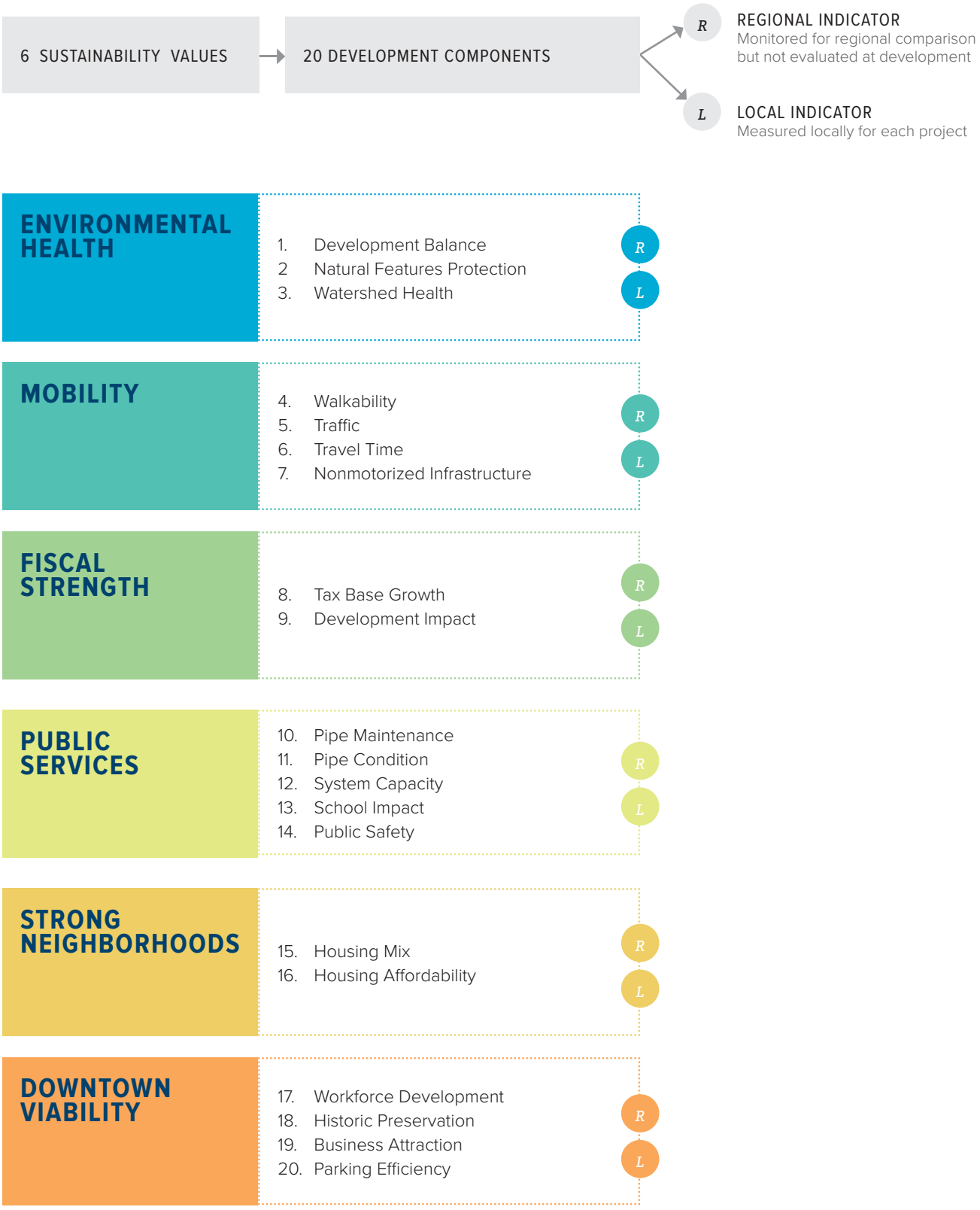
» Within each dimension are twenty **Development Components**: unique but related concepts that together make up each Sustainability Value.

» Each Development Component is divided into **indicators** that measure as many valid aspects of that Development Component as possible. Indicators are categorized as either regional or local:

- A **regional indicator** is a measurement that compares components of sustainability regionally (either to Rochester's surrounding communities or peer communities with similar historic downtowns). These measurements provide context to the City, serving as a measure of comparison and/or showing the City's regional position. These indicators also represent larger regional trends that the City of Rochester may not have a direct influence over such as traffic flow along major corridors, average commute time, and environmental factors concerning the regional watershed. Regional indicator data should be collected and evaluated every five years to illustrate changes in regional trends or how the City compares to other communities.

- A **local indicator** is a measurement that compares components of sustainability locally and at the time of development. These measurements can be obtained and/or changed on a property by property basis. A local indicator shows how a specific development project increases, maintains, or reduces the quality of life for Rochester residents. While these indicators are often able to be compared regionally (i.e. Parks & Open Space Acres / 1,000 Residents or Average Unit Price) they are meant to provide a fact-based comparison across developments and to existing conditions within the City.

FIGURE 1: PROJECTS EVALUATED BASED ON THE 6 SUSTAINABILITY VALUES AND 20 DEVELOPMENT COMPONENTS.



Project Scoring

A Project Evaluation Worksheet has been developed as an appendix to this report for developers to evaluate how their projects score based on the Development Components and identified local indicators, baselines and targets. Each indicator is a threshold criterion which will either be met or not met by the projects. If a project moves the needle in the right direction, it will be given a point for meeting the threshold criteria for the respective indicator. The final Sustainability Score for each project will be a 1 to 20, with 20 being the highest score.

Threshold Criteria out of 20 Points

0-7	8-14	15-20
NOT SUSTAINABLE	**MUST MITIGATE**	**SUSTAINABLE**
[does not meet City goals]	[report exceeds criteria(s)]	[meets City Goals]

The City's appointed Sustainability Coordinator will provide a Sustainable Project Evaluation Report for each project to assess project strengths and weaknesses. Projects that score in the lower third will generally be asked to revise submissions to better conform with City requirements. Projects that score in the middle third (8 to 14) may have some areas where they excel and can mitigate for project impacts or values where there are project deficiencies. The upper third will generally be determined to have met the City's sustainability goals and the Project Evaluation Report will describe the benefits associated with the project.

The result of this process will be consistent and fair evaluation across project submittals and no one project will be required to address all goals. Using this method the City can over time evaluate development trade-offs and move toward a sustainable vision for the future.

Strategic Action Plan

The Strategic Action Plan outlines strategic actions for the City and others to pursue in order to implement the Sustainable Rochester Development Framework. The strategies and actions outlined for each Sustainability Value will help the City to implement and institutionalize Sustainable Rochester.

1	Development Framework Implementation	PRIORITY	TIMEFRAME	PARTNERSHIPS
STRATEGIES + ACTIONS	**1.1** Adopt the Sustainable Rochester Development Framework by resolution as a formal City policy for evaluating development at City Council, Planning Commission, and the Downtown Development Authority.	A	< 6 Months	CITY, CC, PC, DDA
	1.2 Appoint Sustainability Coordinator to formally evaluate projects and support City Administration, Council/Commissions, and the public.	A	< 6 Months	CITY
	1.3 Appoint a Sustainable Rochester Committee to monitor indicator progress and make recommendations on implementation activities or assign this to Planning Commission.	B	1 year	CITY, CC, PC, DDA, CM, BO
	1.4 Complete an annual Sustainable Rochester progress report to provide status updates on indicator progress and project evaluation results.	B	1 year	CITY
	1.5 Conduct a Master Plan and Zoning Ordinance Audit to identify necessary revisions and amendments to implement Sustainable Rochester and incorporate the revisions identified.	C	1+ years	CITY

A	Environmental Health	PRIORITY	TIMEFRAME	PARTNERSHIPS
STRATEGIES + ACTIONS	**A.1** Consider developing a green initiative program that incentivizes green roofs and/or solar panel titles/roofs.	C	1+ years	CITY, UC, DPW, PC
	A.2 Identify high priority parks and open space activities in and near Downtown and continue to maintain a current Parks and Recreation Plan.	C	1+ years	CITY, DPW
	A.3 Develop a Citywide geolocated tree inventory and update tree mitigation requirements in the Zoning Ordinance.	C	1+ years	CITY, DPW
	A.4 Continue to work with the Clinton River Watershed Council in evaluating projects that affect the Sustainable Rochester development indicators.	B	1 year	CITY, DPW, CRWC

B	Mobility	PRIORITY	TIMEFRAME	PARTNERSHIPS
STRATEGIES + ACTIONS	**B.1** Complete a City of Rochester Mobility Plan to plan infrastructure, operations, technology and behavioral strategies to improve network function in the City.	C	1+ years	CITY, DPW, MDOT, DDA, PC, CC, CM, BO
	B.2 Set an overall Citywide Vehicle Level Of Service (LOS) goal of C and consider Multimodal Level of Service indicators in all traffic evaluation.	B	1 year	CITY, DPW, CC, PC, DDA
	B.3 Identify high priority planned trail, biking, and pedestrian connections and amenities in the City for near-term mobility improvements. Specifically consider strategic placement of bike lanes, bicycle racks, and designated cut out lanes for ridesharing pickups and drop-offs.	A	< 6 Months	CITY, DPW, CM
	B.4 Consider piloting a bike-sharing program.	C	1+ years	CITY, CC

C	Fiscal Strength	PRIORITY	TIMEFRAME	PARTNERSHIPS
STRATEGIES + ACTIONS	**C.1** Continue to maintain and update the City Capital Improvement Plan (CIP) and identify projects that are supported by the Sustainable Rochester Development Framework.	C	1+ years	CITY, DPW, CC, PC
	C.2 Track increases to taxable value resulting from development projects evaluated using the Sustainable Rochester Development Framework and consider revising the City budget to use the value added to achieve the City's Sustainability Values.	C	1+ years	CITY, DPW, CC
D	**Public Services**	**PRIORITY**	**TIMEFRAME**	**PARTNERSHIPS**
STRATEGIES + ACTIONS	**D.1** Identify the top 5 public works projects outlined in the City's asset management planning process that will most benefit Rochester's long-term sustainability and work to develop partnerships for implementation.	B	1 year	CITY, DPW, CC
	D.2 Consider the adoption of Smart City infrastructure initiatives.	C	1+ years	CITY, DPW, CC
	D.3 Address City emergency response times through operational and capital investment and update Sustainability measures as improvements are made.	B	1 year	CITY, CC
E	**Strong Neighborhoods**	**PRIORITY**	**TIMEFRAME**	**PARTNERSHIPS**
STRATEGIES + ACTIONS	**E.1** Consider developing a local affordable housing incentive program and work with the Oakland County Community & Home Improvement Division to coordinate implementation.	C	1+ years	UC, CITY, DDA
	E.2 Consider to implement the local historic district, historic commission, and historic preservation guidelines and work with the Oakland County Community Historic Commission and the Rochester-Avon Historical Society to coordinate implementation.	C	1+ years	BO, CITY, DDA
F	**Downtown Viability**	**PRIORITY**	**TIMEFRAME**	**PARTNERSHIPS**
STRATEGIES + ACTIONS	**F.1** Develop incentives for new developments to provide public parking or event parking to serve Downtown.	B	1 year	DDA, BO, CM
	F.2 Develop an updated retail and job market study to quantify retail and office space needs in the downtown area and work with developers to incorporate suitable tenant spaces into structures.	C	1+ years	DDA, CM, BO
	F.3 Continue marketing and outreach efforts to maintain Rochester's role as the regions premier Downtown.	Ongoing	Ongoing	DDA, CITY, CM, BO

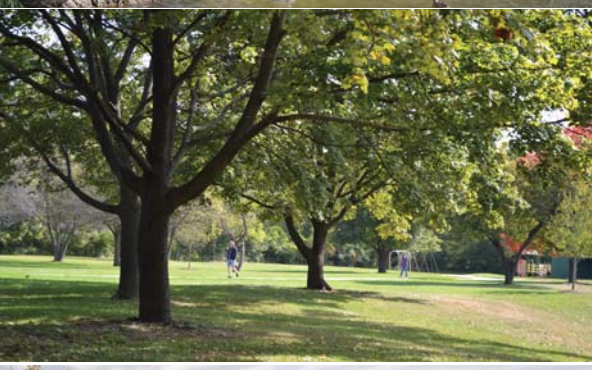
LEGEND

PRIORITY

- A Top Priority
- B Near-Term Priority
- C Long-Term Priority

PARTNERS

BO	Business Owners
CC	City Council
CITY	City of Rochester Administration
CM	Community Members
CRWC	Clinton River Watershed Council
DDA	Downtown Development Authority
DPW	Department of Public Works
OC	Oakland County
PC	Planning Commission
MDOT	Michigan Department of Transportation
UC	Utility Companies



Environmental Health
Sustainability Value #1

PROACTIVE APPROACH

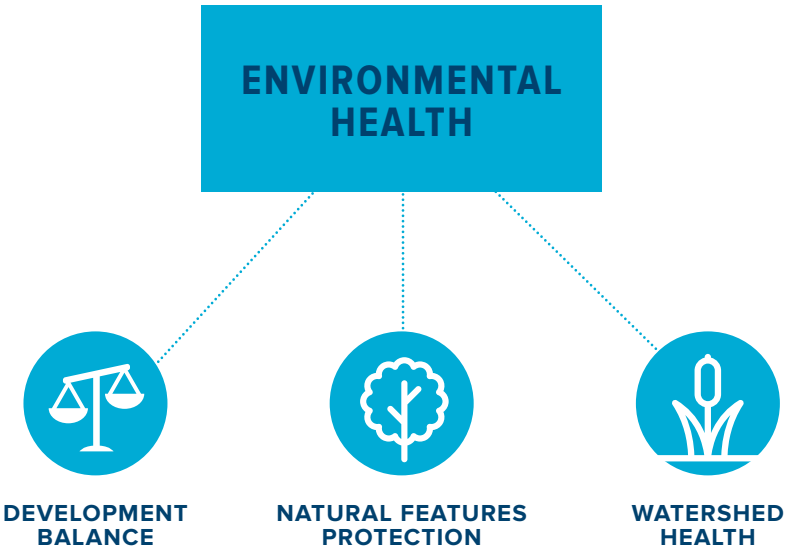
The following goals and strategies have been adopted by the City of Rochester in an effort to proactively work towards environmental sustainability. Additional policies can be found in the City's adopted Master Plan.

MASTER PLAN GOALS

1. Preserve, maintain and protect sensitive natural features.
2. Provide park facilities for the enjoyment of all residents and visitors.

MASTER PLAN STRATEGIES

1. Carefully consider methods to preserve natural features for the enjoyment of the current and future population.
2. Improve park facilities in order to maintain them as viable recreation areas.
3. Enhance Rochester's facilities by developing existing land for parks and recreation.



DEVELOPMENT COMPONENT	INDICATOR	BASELINE	TARGET / FUTURE TREND
1 *Development Balance*	**1.1 Regional** Percent of Land Use: Impervious Surfaces	36.6%	Reduce
	1.2 Local Parks and Open Space Acres / 1,000 residents	24.8 acres / 1,000 residents	10% increase
2 *Natural Features Protection*	**2.1 Regional** Percent of Land Use: Tree Canopy	31.1%	Grow
	2.2 Local Net Tree Change	Site specific	15% increase in total number of trees
3 *Watershed Health*	**3.1 Regional** Beneficial Use Impairments (BUI) of the Clinton River Watershed	8 BUIs	Reduce
	3.2 Local Development within Flood Hazard Zones	Existing development within flood hazard zones	0% net increase

Development Balance

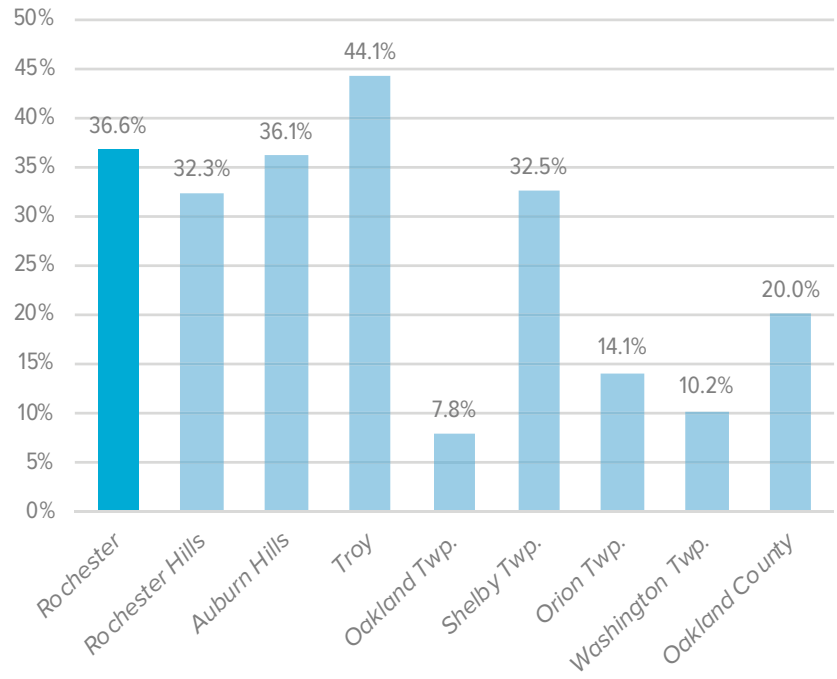
1.1 **Percentage of Land Use: Impervious Surface**

BACKGROUND:

Impervious surface cover refers to anything that water cannot penetrate. Ranging from residential rooftops, patios and driveways to city roads, public buildings, commercial surfaces, and parking lots. Impervious cover prevents rain and snow from soaking into the ground, turning it into stormwater runoff. Impervious cover also changes the quantity and speed of runoff causing more rapid and intense flooding.

The percent of land use classified as impervious surface measures development within a jurisdiction, specifically development that is sprawling and/or intensive in use compared to the amount of property available to develop.

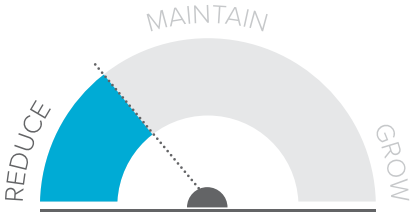
PERCENT OF LAND USE: IMPERVIOUS SURFACE (2010)



BASELINE

36% of land use covered by impervious surface

FUTURE TREND



Reduce

CURRENT TREND:

Of the City's surrounding communities, Rochester has the second largest percentage of its land use dedicated to impervious surface (36.65%), second only to the City of Troy.

In comparison to the adjacent Townships, Rochester is nearly completely built out with few green fields left for development.

A focus on greening roofs could help reduce Rochester's impervious surfaces.

Source: SEMCOG Land Use Estimate, 2010

Development Balance

1.2 **Parks and Open Space Per 1,000 Residents**

BACKGROUND:

Parks and open space are critical to preserving natural resources and wildlife habitats, which offer significant social and economic benefits. The number of residents per park serves as a proxy for measuring the degree of development and population density as it relates to provision and preservation of open space.

The National Recreation and Parks Association publishes annual research that benchmarks the country's park providers' averages and recommended standards for this measure. In 2017, the national park acreage per 1,000 residents was 9.6.

AREA WITHIN 0.5 MILES OF A PUBLIC PARK OR OPEN SPACE

See **Map 10** in the Sustainable Rochester Map Book Appendix.

BASELINE

24.8 acres per 1,000 residents

TARGET EVALUATION

10% increase

EVALUATION CRITERIA

1. Number of units
2. Acres of open space

CURRENT TREND:

Rochester has 24.8 acres of park area for every 1,000 residents. While this number exceeds the 9.6 acres / 1,000 residents' standard established by the National Recreation and Park Association, nearly 100% of residents live within 0.5 miles of a park facility.

Land use patterns indicate that many portions of Rochester are built-out and/or contain environmentally sensitive areas which cannot easily be developed into parks facilities. Eastern Rochester (as compared to the downtown and western Rochester) has less public recreational facilities. However, private open spaces located within newer subdivisions may be addressing the need of those neighborhoods.

Source: City of Rochester Parks and Recreation Plan, American Community Survey, 2016

Natural Features Protection

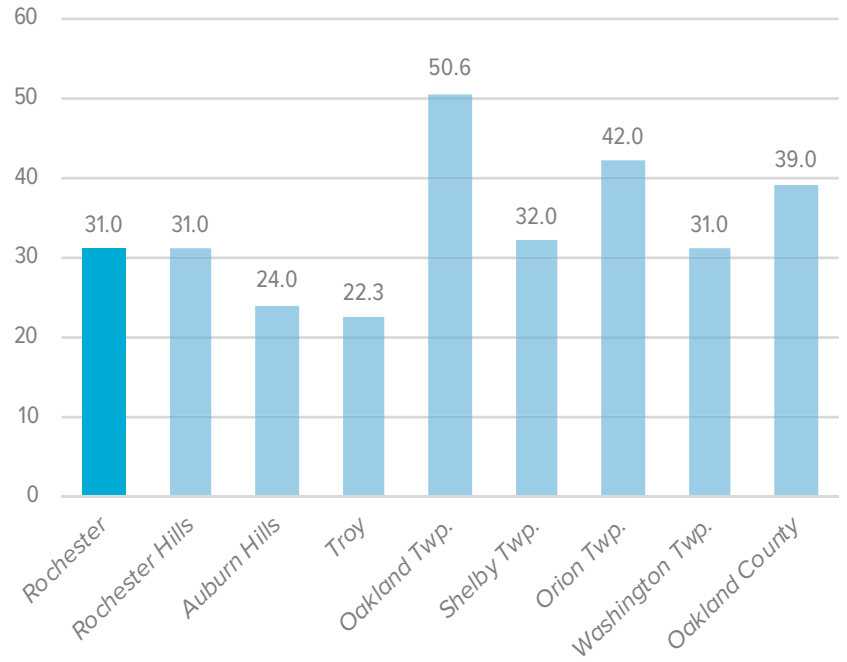
2.1 **Percentage of Land Use: Tree Canopy**

BACKGROUND:

Tree canopy provides multiple benefits to the region and to communities. It enhances quality of life and improves aesthetics of the area. Tree canopy also provides habitat and connections for wildlife and shades streams to provide cooler water for area fish.

Tree canopies improve water quality by interrupting rainfall during storms and slowing the rate of flow of rainwater into storm sewers, rivers, and streams. This allows more rainwater to infiltrate the ground, reduces erosion, and reduces the amount of pollution carried by rain into water bodies.

PERCENT OF LAND USE: TREE CANOPY (2010)



BASELINE

31% of land use covered by the tree canopy

FUTURE TREND

Grow

CURRENT TREND:

Despite its relatively high percentage of impervious surface cover (compared to adjacent communities), Rochester is about average in the amount of its land that is covered by tree canopy. Its percentage is larger than the more urban inner ring communities (Auburn Hills and Troy) but less than the developing Townships. The percentage of tree canopy varies from over 50.6% to 22% in the counties and municipalities throughout Southeast Michigan. In order to realize the multiple benefits of tree canopy (e.g., air quality benefits, improved sense of place, habitat connection, reduced stormwater into our rivers and lakes), SEMCOG recommends a 40 percent target.

Source: SEMCOG Land Use Estimate, 2010

Natural Features Protection

2.2 **Net Tree Change**

BACKGROUND:

Tree canopy is an important sustainability measure that supports numerous social and sustainable outcomes.

Trees provide necessary habitat, improve aesthetics, add to a pedestrian friendly downtown, increase local property values—including local business revenue—and provide water- and air-quality benefits.

The net number of trees shows the community's effort in preserving and/or expanding tree coverage within a community.

EXISTING TREES IN ROCHESTER

BASELINE

Site specific

TARGET EVALUATION

15% increase in total number of trees

EVALUATION CRITERIA

1. Existing number of trees
2. Number of trees to be removed
3. Number of trees proposed for planting (or payment in lieu, if applicable)

CURRENT TREND:

No benchmark data is available at this time. We recommend that the City of Rochester begin tracking the number of trees planted / removed annually, as well as for each development project.

This indicator will be crucial to determine, on a project by project bias, if a development will bring the City closer to its goal to protect natural features by ensuring there is a positive number of trees added to the City each year.

Watershed Health

3.1 Beneficial Use Impairments (BUI) of the Clinton River Watershed

BACKGROUND:

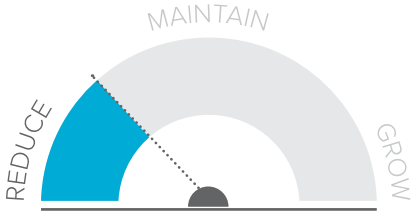
The Clinton River and Paint Creek are just two of the incredible natural resources that contribute to the environmental quality of life in Rochester. The Clinton River, specifically, is a major resource throughout the region. However, due to historic industrial and municipal discharges the watershed was labeled as an Area of Concern by the Environmental Protection Agency.

The original listing of Areas of Concern (AOC) within the Clinton River was based on the presence of beneficial use impairments (BUI). The Clinton River currently has eight identified BUIs out of 14 possible. The Clinton River BUIs are: 1) Restrictions on Fish and Wildlife Consumption; 2) Degraded Fish and Wildlife Populations; 3) Beach Closings; 4) Loss of Fish and Wildlife Habitat; 5) Eutrophication and Undesirable Algae; 6) Degradation of Benthos; 7) Degradation of Aesthetics; 8) Restrictions on Dredging Activities.

BASELINE

Eight BUI's identified for the Clinton River Watershed

FUTURE TREND



Reduce

CLINTON RIVER WATERSHED, MICHIGAN

CURRENT TREND:

The Clinton River Public Advisory Council (PAC) has successfully been working in partnership with the Michigan Department of Environmental Quality (MDEQ) and the U.S. Environmental Protection Agency Great Lakes National Program Office (EPA-GLNPO) to prioritize restoration projects that will lead to BUI delistings.

In 2015, $20 million dollars were awarded for major Great Lakes Restoration Initiative projects in the Clinton River Area of Concern. These funds contribute to the removal of the loss of fish and wildlife habitat, restrictions on fish and wildlife consumption, and degradation of fish and wildlife populations through wetland and habitat restoration.

The City has received $1.3 Million in grants for upgrade and restoration of Paint Creek, a stream within the Clinton River watershed, which is one of the few natural reproducing cold water trout streams in southeast Michigan.

Source: U.S. Environmental Protection Agency, 2018

Watershed Health

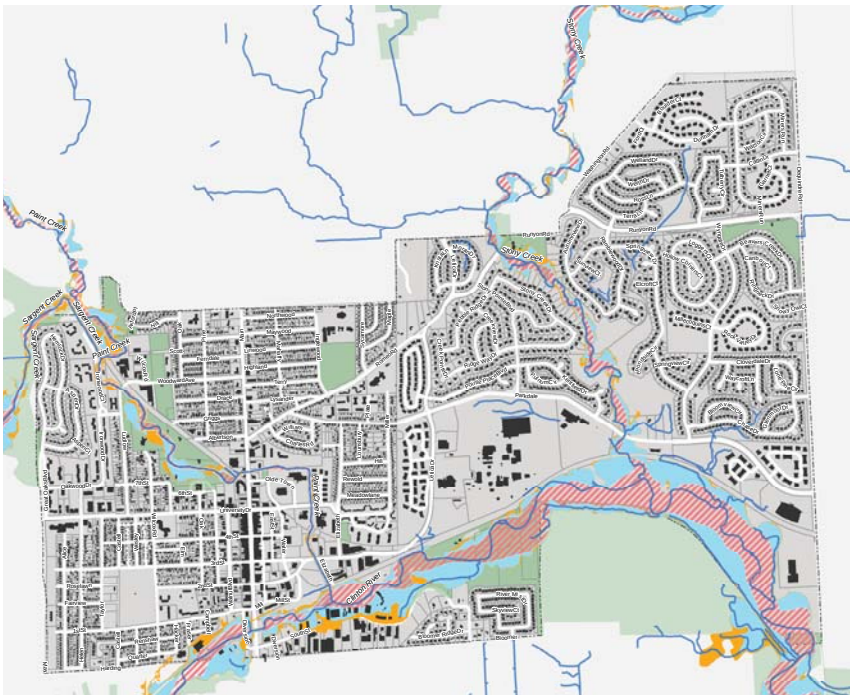
3.2 **Development within Flood Hazard Zones**

BACKGROUND:

Floodplains or flood hazard zones are land areas adjacent to rivers and streams that are subject to recurring high waters. There are different classifications of flood hazard zones that illustrate the probability and consequences of a flooding event. Owing to their continually changing nature, floodplains and other flood-prone areas need to be examined in the light of how they might affect or be affected by development.

The City of Rochester should strive to keep development at a minimum in its flood risk zones or ensure that development mitigates its impact to the flood system by incorporating best practices in stormwater management.

FLOOD HAZARD ZONES

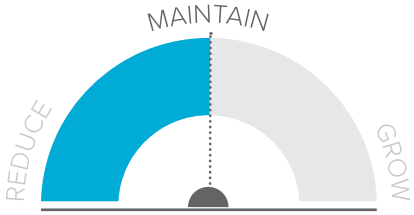


*See **Map 12** in the Sustainable Rochester Map Book Appendix.*

BASELINE

Existing development within flood hazard zones

FUTURE TREND



0% increase

EVALUATION CRITERIA

1. Existing site location
2. Mitigation strategies (if location is within Flood Hazard Zones)

CURRENT TREND:

The flood hazard zones within the City extend into the flat areas from the Clinton River, Stoney Creek, and Paint Creek. The flood hazard zones surrounding Paint Creek and Stony Creek have been preserved from development, with most of the land being dedicated open space.

Along the Clinton River, the flood hazard zones are also largely undeveloped with just one identified building within the 0.2% Annual Change Flood Hazard Zone.

Source: Federal Emergency Management Agency, 2018

Mobility
Sustainability Value #2

PROACTIVE APPROACH

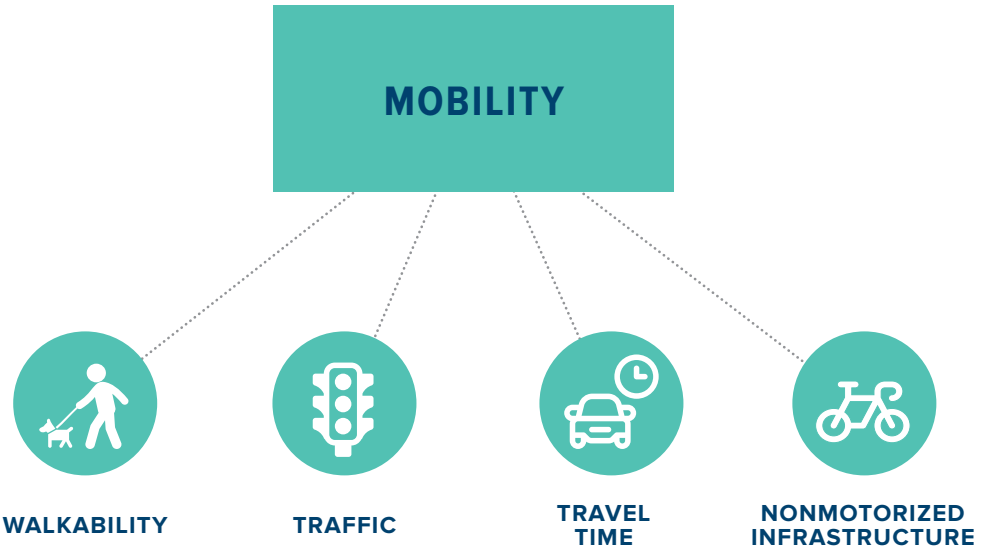
The following goals and strategies have been adopted by the City of Rochester in an effort to proactively work towards mobility - to improve traffic access and flow, and promote the use of pedestrian-friendly and bike-oriented facilities throughout the City. Additional policies can be found in the City's adopted Master Plan.

MASTER PLAN GOALS

1. Promote a pedestrian-friendly atmosphere throughout the community.
2. Develop better methods to control traffic flow through the City.

MASTER PLAN STRATEGIES

1. Evaluate traffic signal placement and enforce speed limits in order to promote a more pedestrian-friendly downtown.
2. Continue development of a pedestrian and bicycle route network as an alternative means of non-motorized transportation.
3. Evaluate and improve traffic signal timing for a more efficient movement of traffic.
4. Improve the public transportation system by working with neighboring communities and educational institutions.
5. Maintain roadways so as to provide safe and efficient access throughout the community.
6. Evaluate developing enhanced roadway access and connectivity from downtown to the southern and eastern areas of the City.



DEVELOPMENT COMPONENT	INDICATOR	BASELINE	TARGET / FUTURE TREND
4 *Walkability*	**4.1 Regional** National Walkability Index	4.3 - 11.2 walkability index score	Grow
	4.2 Local Intersection Density	20.8 - 192.3 / square mile	10% increase
5 *Traffic*	**5.1 Regional** Overall Traffic Counts	8,833 - 31,799 AADT	Maintain baseline
	5.2 Local Trip Generation	Site Specific - ITE peak hour trip generation average of adjacent parcel(s)	5% higher trip generation than average of adjacent parcel(s)
6 *Travel Time*	**6.1 Regional** Average Commute Time	27.7 minutes	Reduce
	6.2 Local Intersection Delay	Site specific	15% higher peak hour intersection delay
7 *Nonmotorized Infrastructure*	**7.1 Regional** Regional Nonmotorized Infrastructure	2,291 miles	Grow
	7.2 Local Nonmotorized Transportation Infrastructure	61 miles	15% increase

Walkability

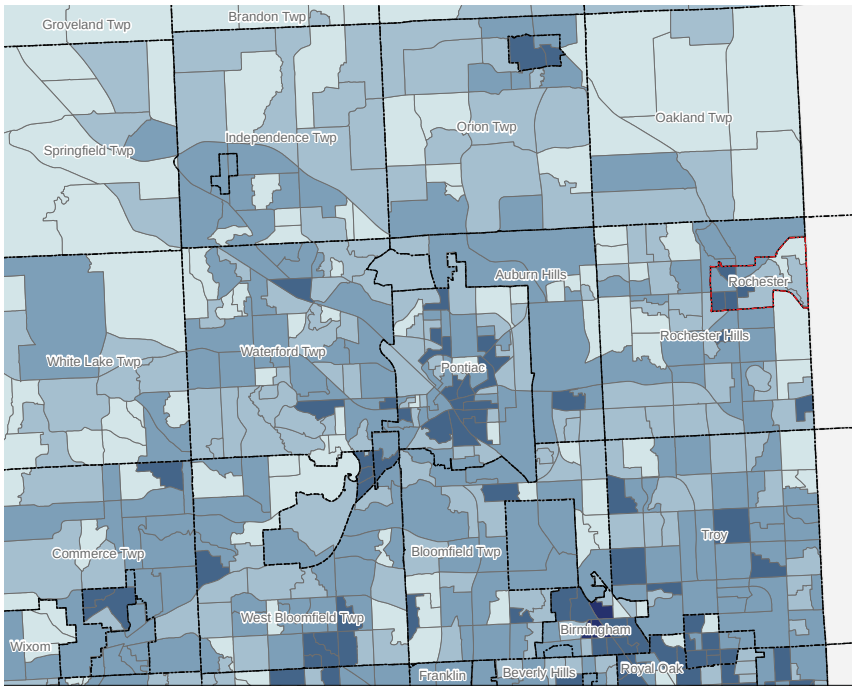
4.1 **National Walkability Index**

BACKGROUND:

Walkability indicates sustainability by demonstrating the viability of place independent of motor vehicles.

When a place is highly walkable, people are more likely to conduct daily errands within walking distance of where they live, are more likely to visit multiple businesses, and are more likely to contribute positively to the economic well-being of their community. Thriving walkable areas in Southeast Michigan are seen as highly desirable places to live.

NATIONAL WALKABILITY INDEX (1-20)

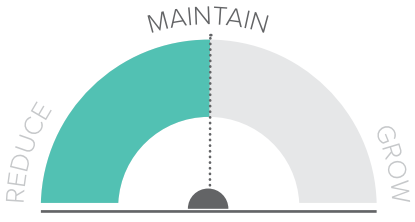


*See **Map 13** in the Sustainable Rochester Map Book Appendix.*

BASELINE

4.3 to 11.2 walkability index score

FUTURE TREND



Grow

CURRENT TREND:

Rochester's highest walkability index score (11.2) is concentrated in the southwest corner and the northwest/northeast parts of the downtown. Within proximity to Rochester, there are only a few walkable areas, reinforcing the fact that the City's downtown serves as the city center and as a destination for Oakland Township, Shelby Township, Rochester Hills and beyond. The downtown area of Birmingham scores as the most walkable area in Oakland County and is also considered one of the area's downtown and destination centers.

Source: U.S. Environmental Protection Agency, 2018

Walkability

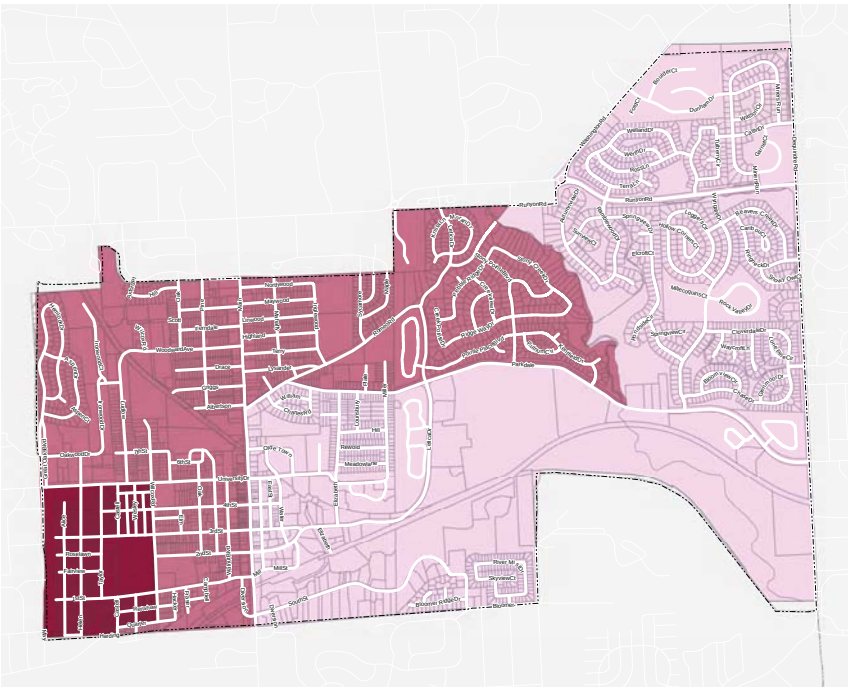
4.2 **Intersection Density**

BACKGROUND:

Intersection density uses the number of intersections in the roadway network and other information as a measure of the walkability of a location. When intersections are close together, the resulting blocks are smaller which encourages people to walk through a place rather than around it.

Intersection density can be measured using two different ways. Some state DOTs have requirements for a certain level of intersection density for new developments.

INTERSECTION DENSITY

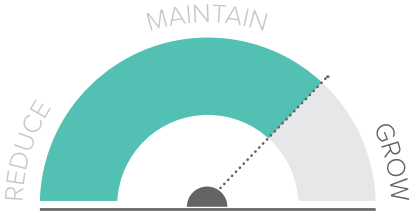


*See **Map 14** in the Sustainable Rochester Map Book Appendix.*

BASELINE

20.8 to 192.3 per square mile

TARGET EVALUATION



10% increase

EVALUATION CRITERIA

1. Number of proposed pedestrian connections

CURRENT TREND:

The traditional grid network of roads, often seen in older cities, generally has a high intersection density. The subdivisions typically built in the postwar era with curvy roads and cul-de-sacs, often seen in the suburbs, generally has a low intersection density. The western half of Rochester which is built out in a grid has a higher intersection density than the eastern half.

Source: U.S. Environmental Protection Agency, 2018

Traffic

5.1 **Overall Traffic Counts**

BACKGROUND:

Traffic counts are collected at certain locations along the roadway to calculate the Average Annual Daily Traffic (AADT) at a particular time (and are adjusted to account for seasonal variations in traffic patterns). SEMCOG gathers traffic count data for the Southeast Michigan region from county road commissions, local communities in Southeast Michigan, the Michigan Department of Transportation, and by consultants specializing in traffic data collection. Traffic counts often follow the roadway functional class as each roadways are designed to handle a certain traffic volume.

Traffic counts can indicate sustainability in different ways - a low traffic count is potentially indicative of a safe, walkable area for pedestrians, but it could also mean there is not much in the immediate area to attract people (and vehicles). A high traffic count may indicate a congested environment that is not very walkable, but it could also mean that the area is thriving with activity and increased opportunities for mixed use.

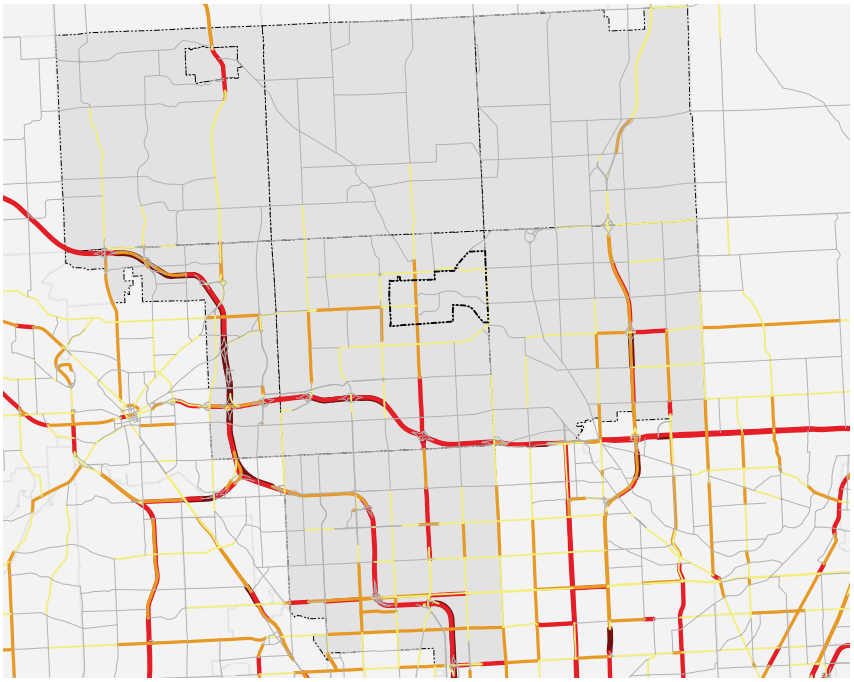
BASELINE

8,833 to 31,799 AADT

FUTURE TREND

Maintain baseline

TRAFFIC COUNTS AADT



See ***Map 15*** *in the Sustainable Rochester Map Book Appendix.*

CURRENT TREND:

Rochester's traffic volume increases from Rochester Road and Main Street, south to M-59, with the busiest roads being Main, University and Dequindre. Parkdale and Runyon are key secondary roads, while Romeo and Washington feature comparatively low traffic volumes.

Source: SEMCOG, 2017

Traffic

5.2 **Trip Generation**

BACKGROUND:

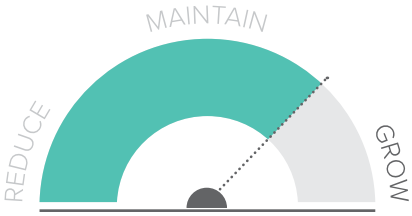
The Institute of Transportation Engineers (ITE) publishes, on a regular basis, the Trip Generation Manual which gathers data on the number of trips generated for specific land uses, taking into account factors such as time of day, urban, suburban, or rural character, and others. This data provides insight into the activity level that can be reasonably expected by a certain land use.

Trip generation data is a sustainability indicator because by providing a common unit of measurement, the data helps communities understand the magnitude of the impacts of new developments. Additionally, if a community wants to generate more trips in an area to encourage activity or further business growth, it can encourage land uses that will generate more trips.

BASELINE

Site Specific – ITE peak hour trip generation average of adjacent parcel

TARGET EVALUATION



5% higher trip generation than average of adjacent parcels

EVALUATION CRITERIA

1. ITE existing peak trip generation estimates for adjacent parcels
2. Estimated ITE peak trip generation for proposed development

TRAFFIC CONGESTION

CURRENT TREND:

Trip generation is measured on a site-specific bias. The estimated number of trips generated by a specific development is affected by a variety of factors including type of use, square footage of the development, and time of day. Trip generation is calculated as part of a traditional traffic study.

Source: Institute of Transportation Engineers Trip Generation Manuel

Travel Time

6.1 **Average Commute Time**

BACKGROUND:

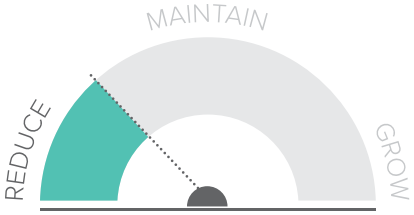
Commute time describes the amount of time people spend in a motor vehicle for their everyday travels, which affects the natural environment, traffic congestion, and many other aspects of sustainability.

Commuting data is collected by the United States Census Bureau and can be used to determine certain characteristics of a community. For communities outside of major job centers, commute time generally increases the further away a place is from the job center. Commute time also depends on what types of roads are available to connect the community to the region, traffic volume and potential congestion and other factors.

BASELINE

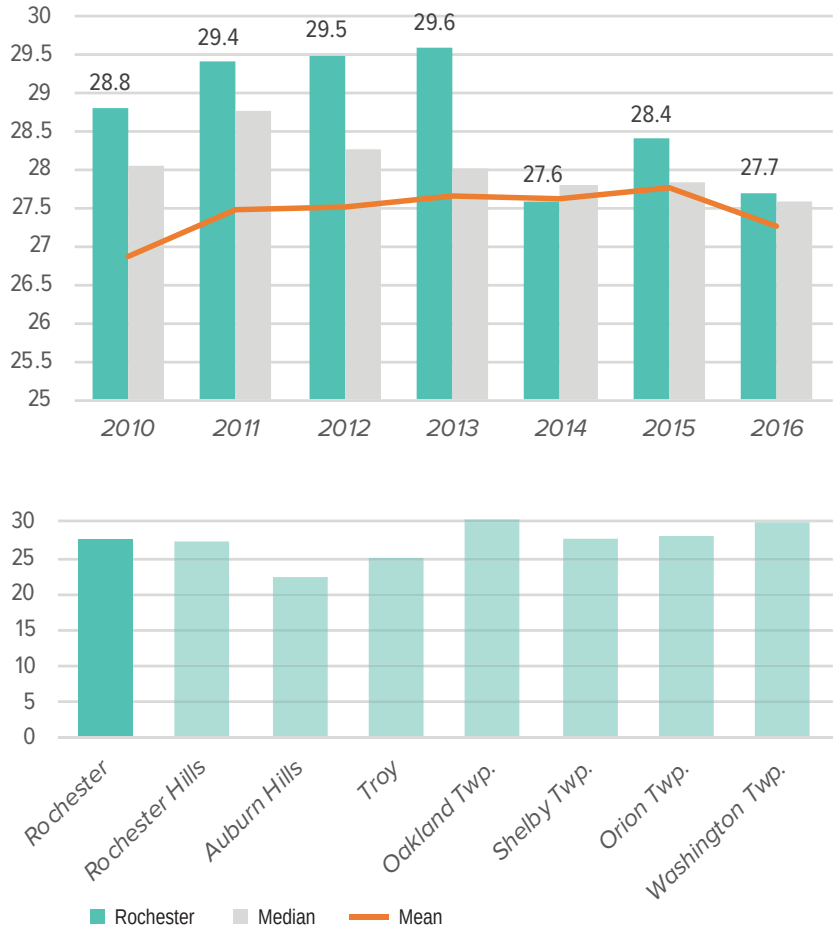
27.7 minutes

FUTURE TREND



Reduce

AVERAGE COMMUTE TIME (MINUTES) & AVERAGE COMMUTE TIME (2016)



CURRENT TREND:

The average commute time for all adjacent communities, including Rochester rose from 2010 to 2013. Generally cities (vs. townships) have shorter commute times. Rochester's average commute time is longer than the average in Rochester Hills, Auburn Hills, Troy and Shelby Township.

Rochester experienced a two-minute decline in average commute time between 2013 and 2014, however, the City's commute time has since increased.

Source: American Community Survey, 2016

Travel Time

6.2 **Intersection Delay**

BACKGROUND:

Intersection Delay is used to evaluate the performance of intersections in allowing traffic to enter and pass through, or to enter and turn onto another route. Specifically, this indicator measures the delay that results when congestion causes a vehicle to reduce speed or to stop at a signal in comparison to a free flow intersection. Delay is considered one of the most important measures of effectiveness used to design, optimize, and evaluate the operation of signalized intersections.

INTERSECTION

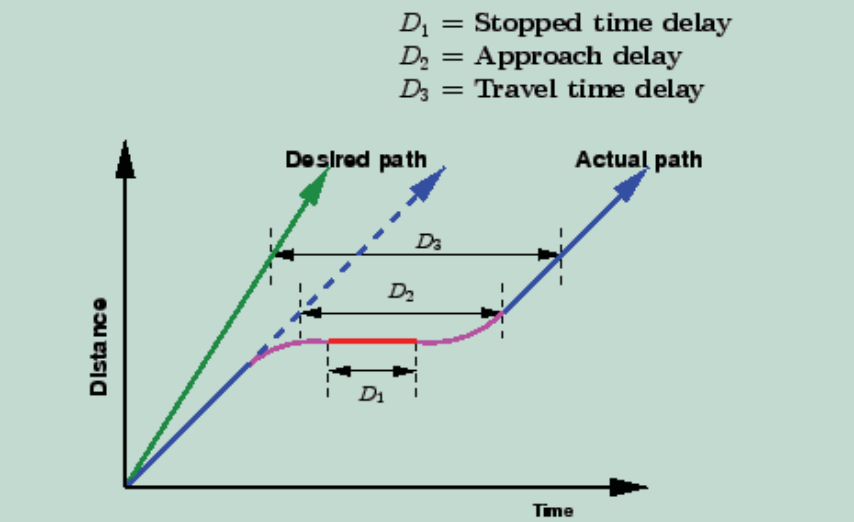
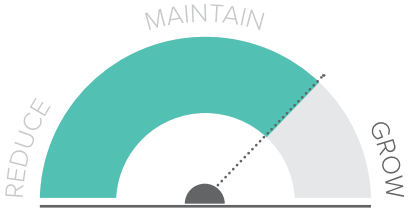


Figure 1: Illustration of delay measures

BASELINE

Site Specific

TARGET EVALUATION



15% higher peak hour intersection delay

EVALUATION CRITERIA

1. Existing intersection delay
2. Proposed intersection delay

CURRENT TREND:

Intersection delay is measured on a site-specific basis. The degree of intersection delay is affected by a variety of factors including time of day, traffic signal timing, street design, and pedestrian usage. Intersection delay is calculated as part of a traditional traffic study.

Source: Synchro Software

Nonmotorized Infrastructure

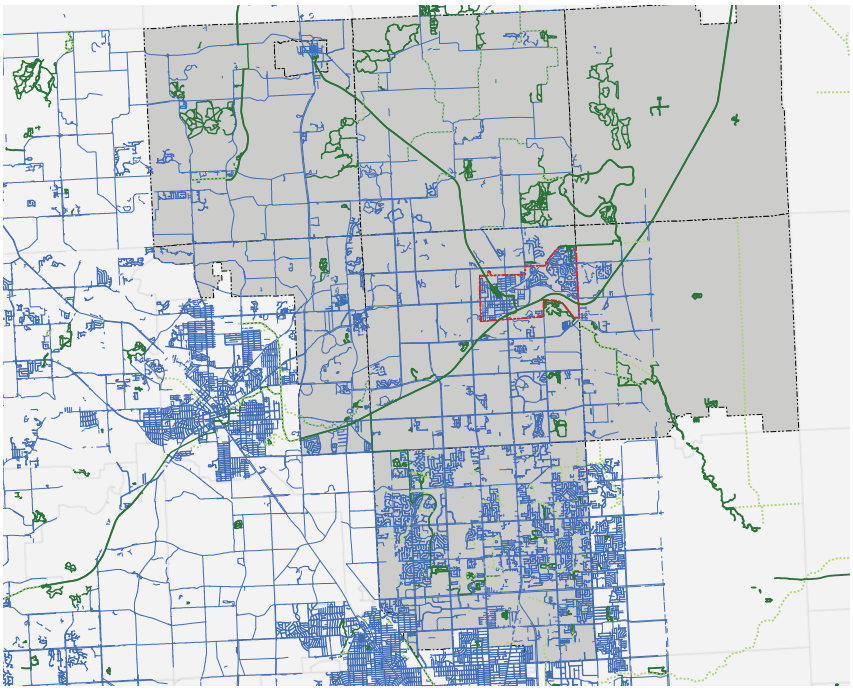
7.1 **Regional Nonmotorized Infrastructure**

BACKGROUND:

Biking and walking are major modes of transportation that are receiving more attention than ever, especially with the concept of Complete Streets and planning for all modes of transportation.

Communities are working to ensure that sidewalks and multi-use paths are included in new developments and that they connect to the overall transportation network. Regions have also been seeking to build new long-distance non-motorized facilities to create opportunities for transportation and recreation.

REGIONAL NONMOTORIZED INFRASTRUCTURE

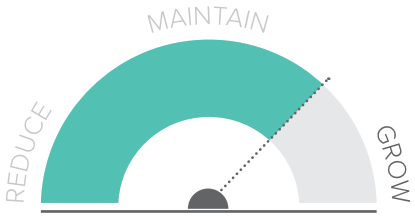


*See **Map 16** in the Sustainable Rochester Map Book Appendix.*

BASELINE

2,291 miles of nonmotorized infrastructure

FUTURE TREND



Grow

CURRENT TREND:

Oakland County's nonmotorized infrastructure, of approximately 2,291 miles, includes the Clinton River Trail and Paint Creek Trail.

The Clinton River Trail connects Rochester to Macomb County communities such as Romeo, Armada and Richmond to the east via the Macomb Orchard Trail, and connects to the areas west of the City, such as Rochester Hills, Pontiac and West Bloomfield.

Source: SEMCOG, 2017

Nonmotorized Infrastructure

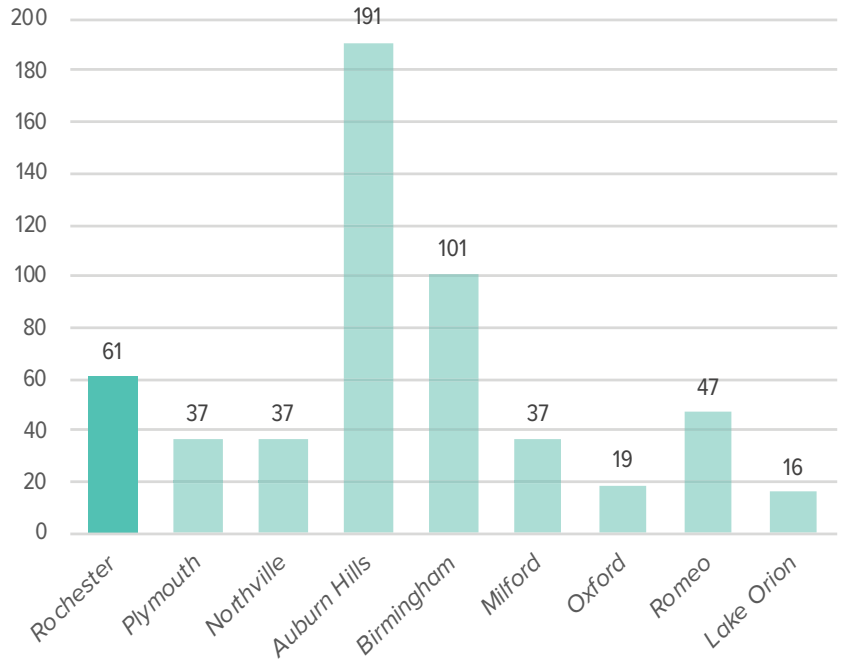
7.2 **Nonmotorized Transportation Infrastructure**

BACKGROUND:

Nonmotorized infrastructure within a community is an indicator of sustainability as it demonstrates the community investment in bicycling and walking facilities. Communities with such nonmotorized facilities create the opportunity to reduce motor vehicle trips.

Reducing motor vehicle trips contributes in many ways to the City's overall environmental sustainability, including relieving traffic congestion, and reducing space necessary for parking.

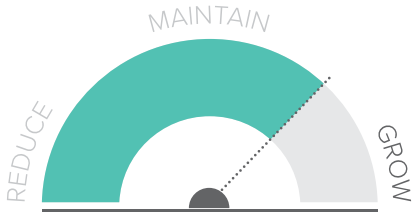
MILES OF BICYCLE AND PEDESTRIAN FACILITIES



BASELINE

61 miles

TARGET EVALUATION



15% Increase

EVALUATION CRITERIA

1. Linear feet of proposed nonmotorized infrastructure

CURRENT TREND:

Rochester currently features 61 miles of nonmotorized infrastructure, which includes sidewalks and pathways.

Rochester has the third greatest number of miles of nonmotorized infrastructure, after Auburn Hills and Birmingham, out of its adjacent and peer downtown communities. Rochester currently does not have any bicycle infrastructure, including shared lane markings or dedicated bike lanes.

Source: SEMCOG, 2017

Fiscal Strength
Sustainability Value #3

PROACTIVE APPROACH

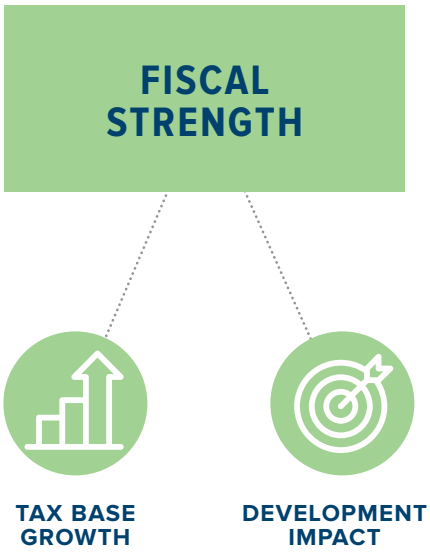
The following goals and strategies have been adopted by the City of Rochester in an effort to proactively work towards fiscal strength. Additional policies can be found in the City's adopted FY 2017 Budget.

FY 2017 BUDGET GOALS

1. Promote economic development
2. Financial stability
3. Provide safe, efficient, well maintained infrastructure
4. Promote our positive image
5. Maintain and enhance services
6. Improve employee productivity and morale

STRATEGIES

1. Accumulate cash reserves in advance of major capital projects (utilizing long term debt judicially in order to meet financial goals and policies of the City Council).
2. Maintain a cash balance reserve of six (6) months operating expenditures in the City's reserve fund.
3. Operate enterprise activities on a self-supporting basis.



DEVELOPMENT COMPONENT	INDICATOR	BASELINE	TARGET / FUTURE TREND
8 *Tax Base Growth*	**8.1 Regional** Rochester Tax Revenue Per Acre	$3,681.12 per acre	Maintain baseline
	8.2 Local Increase in Taxable Value Per Acre	Average SEV / acre of four surrounding properties	15% above the average adjacent parcels SEV / per acre
9 *Development Impact*	**9.1 Regional** Cost of Living Index	123.1 index score	Maintain baseline
	9.2 Local Housing Units per Acre	1 - 5 residential units per acres	10% increase of block group residential units per acre

Tax Base Growth

8.1 **Rochester Tax Revenue Per Acre**

BACKGROUND:

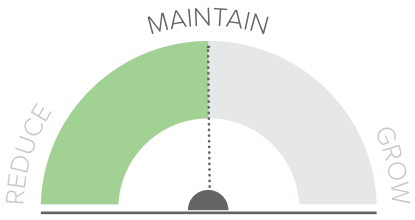
Local government finance measures are an important set of indicators for determining fiscal health. The revenue collected from property taxes is the backbone of municipal finances. This revenue allows Cities to provide a range of services to residents such as public safety, public works, parks and recreation, and utility services. The greater a City's tax revenue, the greater its ability to provide quality services, invest in future needs, and spur economic development.

Tax revenue can be measured in multiple ways but by looking at the tax revenue per acre City officials can determine how productively the land is currently being used. This measure shows the amount of resources the City has to invest and the distribution of the tax burden across the resident base by the size of a parcel and the intensity of development.

BASELINE

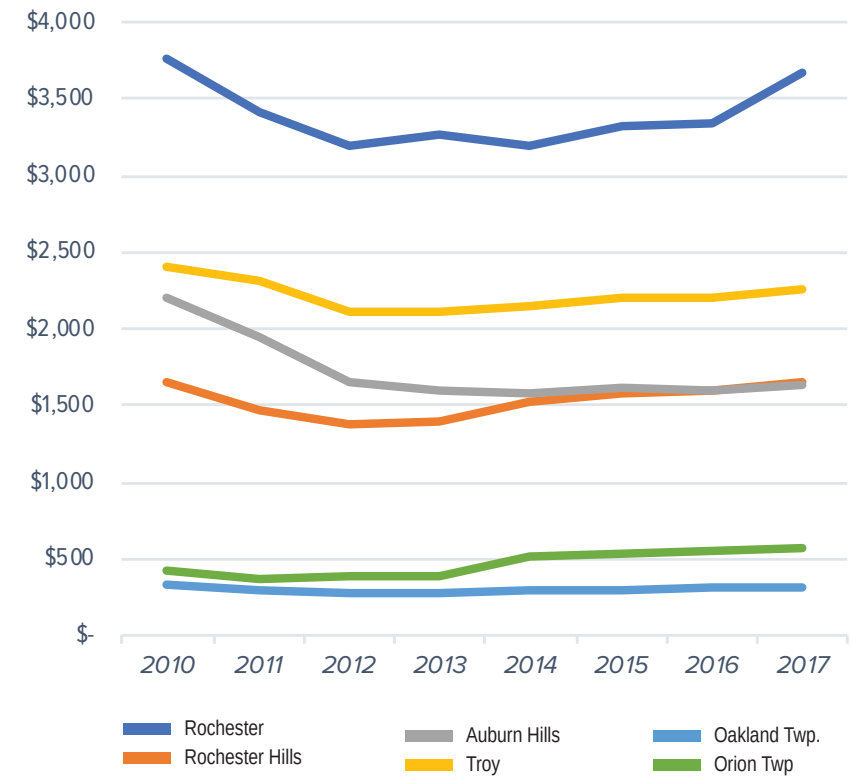
$3,681.12 per acre

FUTURE TREND



Maintain baseline

TAX REVENUE PER ACRE (2010-2017)



CURRENT TREND:

Rochester collects the most tax revenue per acre of the adjacent communities. This number has been on the rise indicating that taxable values are increasing and/or land is being redeveloped. This is likely because the City is small in area and nearly fully developed compared to the larger but undeveloped Townships. This number will increase with more intense / dense development.

Source: Oakland County Department of Equalization, 2017

Tax Base Growth

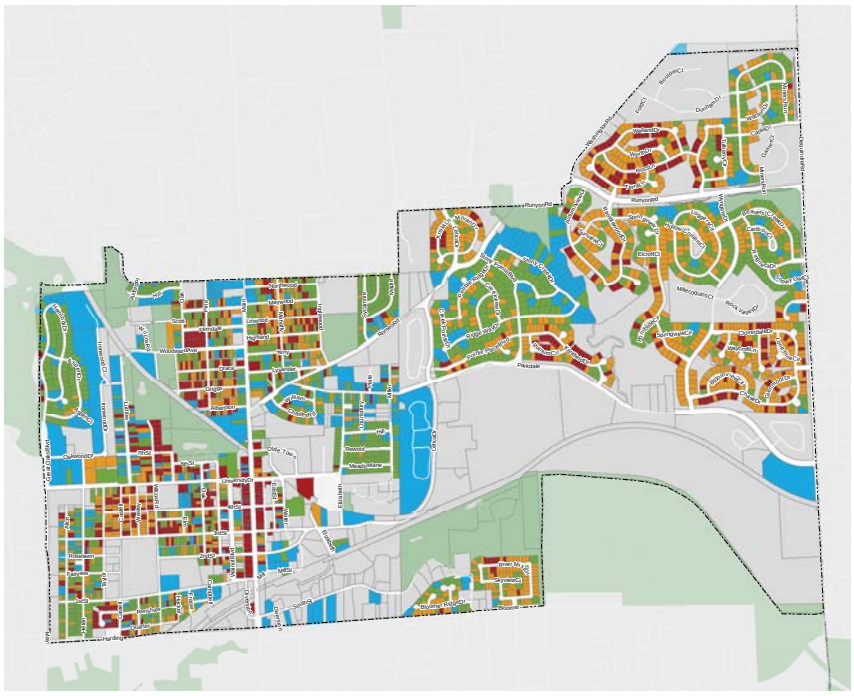
8.2 **Increase in Taxable Value Per Acre**

BACKGROUND:

The change in taxable value per acre shows a property's change in value due to a project's redevelopment.

When a parcel is redeveloped to increase the taxable value per acre, the City gains an increase in taxable value without increasing tax rates for the rest of the City. Large increases in taxable value per acre show the productive redevelopment of the land and the proposed intensity/quality of a development.

STATE EQUALIZED VALUE PER ACRE (2017)

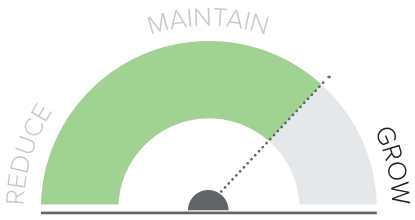


*See **Map 18** in the Sustainable Rochester Map Book Appendix.*

BASELINE

Average SEV / acre of four surrounding properties

TARGET EVALUATION



15% above the average adjacent parcels SEV / per acre

EVALUATION CRITERIA

1. Existing SEV / acre of adjacent parcels and development property
2. Proposed SEV / acre of development property

CURRENT TREND:

There is a range of State Equalized Value (SEV) per acre for individual properties across the City of Rochester (between $1,300 to $10,900,540 per acre).

Downtown Rochester and the small lot subdivisions to the north have the highest concentration of parcels with the highest taxable value per acre. Areas east and south of downtown Rochester have redevelopment potential to increase tax revenue per acre. From 2016 to 2017, the City of Rochester increased it tax revenue per acre by 10%.

Source: Oakland County Department of Equalization, 2017

Development Impact

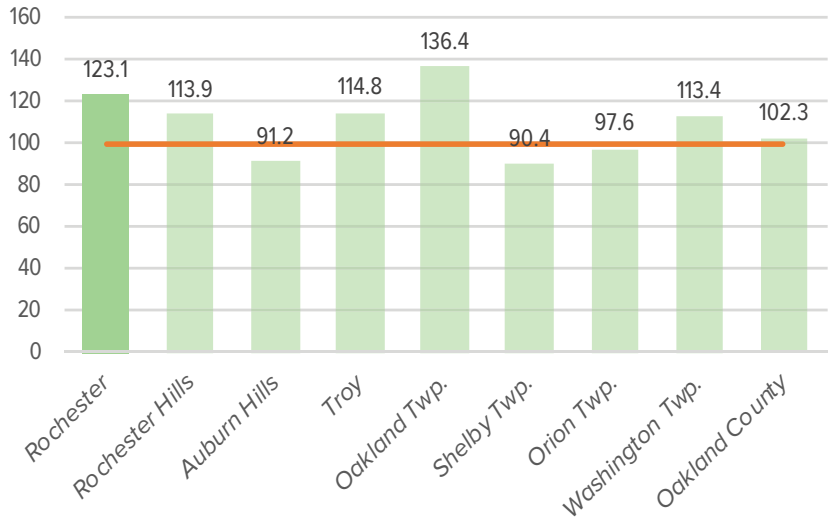
9.1 Cost of Living Index

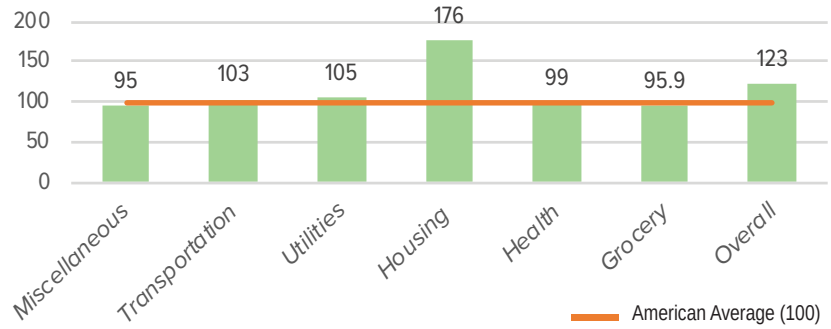
BACKGROUND:

The Cost of Living Index measures relative price levels for consumer goods and services in participating areas.

The average for all participating places, both metropolitan and nonmetropolitan, equals 100, and each participant's index is read as a percentage of the average for all places. This measure shows how specific elements of life compare to other cities and how the expense of those elements relate to the national average.

COST OF LIVING INDEX & ROCHESTER COST OF LIVING





BASELINE

123.1 cost of living index score

FUTURE TREND

Maintain baseline

CURRENT TREND:

Rochester's cost of living index score is significantly higher than the national average and many its adjacent communities. Housing expense is largest factor in the cost of living difference. The City can make strides to lower its cost of living by providing an array of housing options that are affordable and meet the needs of a diverse population (condos, apartments, small and large lot housing).

Source: Sperling's BestPlaces, 2017

Development Impact

9.2 **Housing Units Per Acre**

BACKGROUND:

The number of housing units per acre measures the density of residential development within a specific area. In terms of sustainability, specifically within geographic constraints, the more housing units per acre illustrates a city's efficient provision of housing.

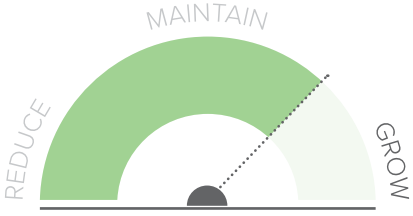
HOUSING UNITS PER ACRE -- YEAR?

*See **Map 20** in the Sustainable Rochester Map Book Appendix.*

BASELINE

1 - 5 residential units per acres

TARGET EVALUATION



10% increase of block group residential units per acre

EVALUATION CRITERIA

1. Number of residential units per acre of block group
2. Number of proposed residential units per acre

CURRENT TREND:

The number of housing units per acre within Rochester ranges from 1 to 5 units. Downtown and adjacent neighborhoods have the greatest number of housing units per acre within their Census Block Group.

There are very few housing units per acre south of downtown and on the east side of the City. Large lots subdivisions, industrial businesses, and open space characterize these low-density areas.

Source: American Community Survey, 2016

Public Services
Sustainability Value #4

PROACTIVE APPROACH:

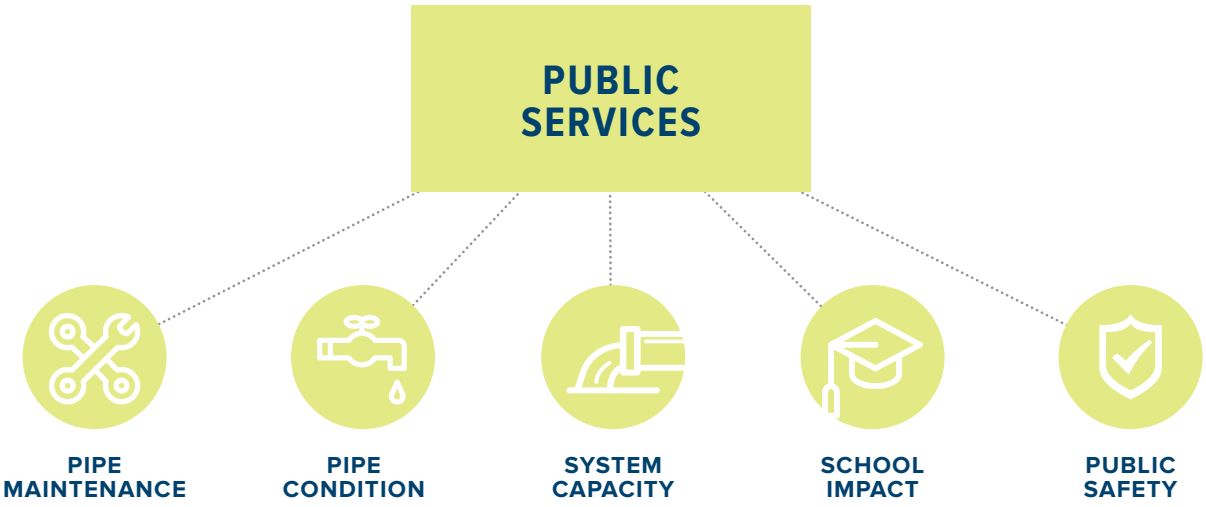
The City of Rochester has adopted the following goal and strategy to show its commitment to proactively investing in and providing quality public services. The City's adopted Master Plan details additional strategies.

MASTER PLAN IDEA

1. Maintain a safe and effective infrastructure system.

MASTER PLAN STRATEGIES

1. Repair, replace and expand infrastructure in order to properly serve the community.



DEVELOPMENT COMPONENT	INDICATOR	BASELINE	TARGET/ FUTURE TREND
10 *Pipe Maintenance*	**10.1 Regional** Municipal Water and Sewer Expenditures Per Capita	$406.13 water and sewer expenditures / capita	Maintain baseline
	10.2 Local Linear Feet of Pipe	Combined Pipe Length – 398,723 linear ft.	2% increase
11 *Pipe Condition*	**11.1 Regional** Age of Water and Sanitary System	1869	Reduce
	11.2 Local Percent of Deficient / Critical Pipes	High Risk Sanitary Pipe – 9,985 linear ft. Water Pipes < than 8 in. (diameter) – 88,207 linear ft.	Sanitary – reduce 15% Water – reduce 5%
12 *System Capacity*	**12.1 Regional** U.S. Census Urbanized Area	Rochester within UZA and half of Oakland Township	Maintain baseline
	12.2 Local Net Change in ERU	At capacity	0% change
13 *School Impact*	**13.1 Regional** Overall School District Enrollment	15,187 students	Maintain baseline
	13.2 Local Tax Generated by School District	$2,333,461	5% increase
14 *Public Safety*	**14.1 Regional** Crime Index	18.8 (property) 25.7 (violent)	Reduce
	14.2 Local Emergency Response Time	9 minutes	0% change

Pipe Maintenance

10.1 Municipal Water and Sewer Expenditures Per Capita

BACKGROUND:

Public utilities such as water, sanitary sewer, and storm sewer are major amenities provided by municipal governments in many communities. The water and sewer expenditures of a municipal government per capita illustrate the degree to which a municipality maintains and invests in its system in relation to its number of residents.

MUNICIPAL WATER & SEWER EXPENDITURES PER CAPITA (FY 2016/17)

BASELINE

$406.13 water and sewer expenditures/ capita

FUTURE TREND

Maintain baseline

CURRENT TREND:

The City of Rochester spends the least per capital on municipal water and sewer. Northville, Auburn Hills, and Birmingham spend over twice as much as Rochester per capita.

Source: City Budgets, 2016/2017

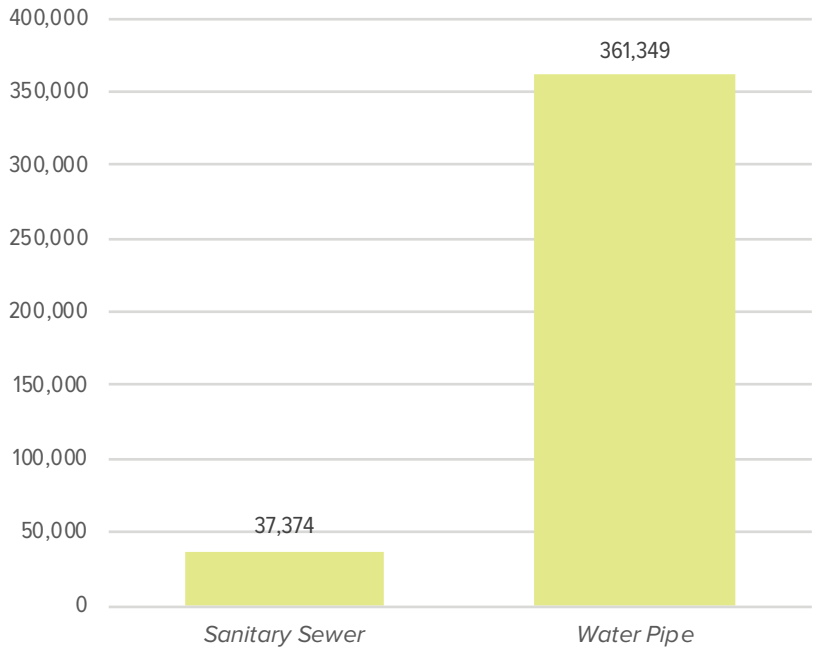
Pipe Maintenance

10.2 **Linear Feet of Pipe**

BACKGROUND:

Although public utilities are useful amenities, they can be expensive to operate and maintain over the long term. The length of pipe within a utility system serves as an indicator of the expense and magnitude of municipal maintenance and oversight. While new development often brings new residents and tax dollars, it also often brings more piping that the City will be responsible for maintaining throughout the life of the development.

LINEAR FEET OF PIPE



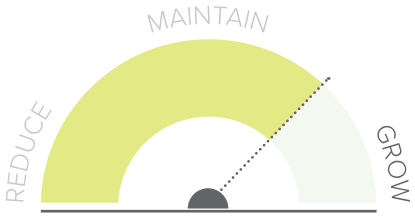
BASELINE

Sanitary
269,223 linear ft.

Water
361,349 linear ft.

Combined Pipe Length
398,723 linear ft.

TARGET EVALUATION



2% increase

EVALUATION CRITERIA

1. Proposed linear feet of public pipe

CURRENT TREND:

The City of Rochester currently has 269,223 linear feet of sanitary pipe and 361,349 linear feet of water pipe.

Source: City of Rochester Water and Sewer Asset Management Plans

Pipe Condition

11.1 **Age of Water and Sanitary System**

BACKGROUND:

Many infrastructure systems were established as Cities and Villages were growing and incorporating. The age of a City can serve as a proxy the age of the utility system within a community. The older the system the more maintenance and replacement will be needed to prevent system failures, such a pipe bursts or system backups. Some communities throughout Michigan, still have original wooden pipes functioning within the utility system.

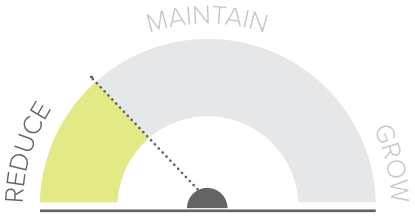
YEAR MUNICIPALITY INCORPORATED

VILLAGE/CITY	YEAR OF INCORPORATION	AGE
Lake Orion	1859	159
Birmingham	1864	154
Plymouth	1867	151
Northville	1867	151
Rochester	**1869**	**149**
Milford	1869	149
Oxford	1876	142
Auburn Hills	1921	97

BASELINE

Rochester incorporated as a village in 1869
(149 years ago)

FUTURE TREND



Reduce

CURRENT TREND:

Despite incorporating over 149 years ago, Rochester is the fourth youngest municipality of its peer communities. Lake Orion, which incorporated 10-years before Rochester, was the first of the peer communities to incorporate followed by Birmingham in 1864. While many original pipes have been replaced since incorporation, it is likely that each municipality has pipes that are over 100-years old and in operation.

Source: History of Oakland County, Michigan (Thaddeus D. Seeley) 191

Pipe Condition

11.2 **Percent of Deficient / Critical Pipes**

BACKGROUND:

Deferred maintenance on public utilities can be problematic for local municipal budgets, and older infrastructure can become less reliable and inefficient. Municipal systems regularly conduct asset management assessments of their public utility systems in which they access the condition of the system's pipes. Municipalities use that information to prioritize pipe replacement to prevent system failures especially if the pipes will experience increased pressure and/or usage because of new development.

SANITARY SEWER CRITICALITY RATING SYSTEM

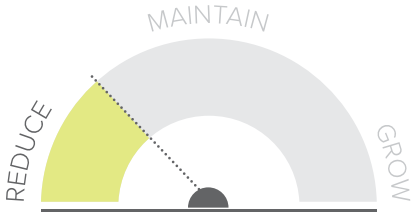
Business Risk Evaluation (BRE) Total Score	
Business Risk Evaluation Scoring	
Business Risk	**Total BRE Score**
Critical / Intolerable Risk	16.00 - 25.00
High Risk – Tolerable and Manageable – Aggressive Monitoring	10.00 - 15.99
Medium Risk –Tolerable and Manageable – Monitoring	5.00 - 9.99
Low Risk –Failure is Tolerable	0.00 - 4.99

BASELINE

High Risk Sanitary Pipe:
9,985 linear ft.

Water Pipes less than 8 inches (diameter):
88,207 linear ft.

TARGET EVALUATION



Sanitary – Reduce 15%

Water – Reduce 5%

EVALUATION CRITERIA:

1. Proposed linear feet of sanitary and water pipe replacement

CURRENT TREND

The City of Rochester underwent a comprehensive Sewer and Water asset management planning process in 2017. During the process, 9,985 linear feet of sanitary pipe were identified as high risk and 88,207 linear feet of water pipe were identified as deficient (less than 8 inches in diameter).

Source: City of Rochester Water and Sewer Asset Management Plans

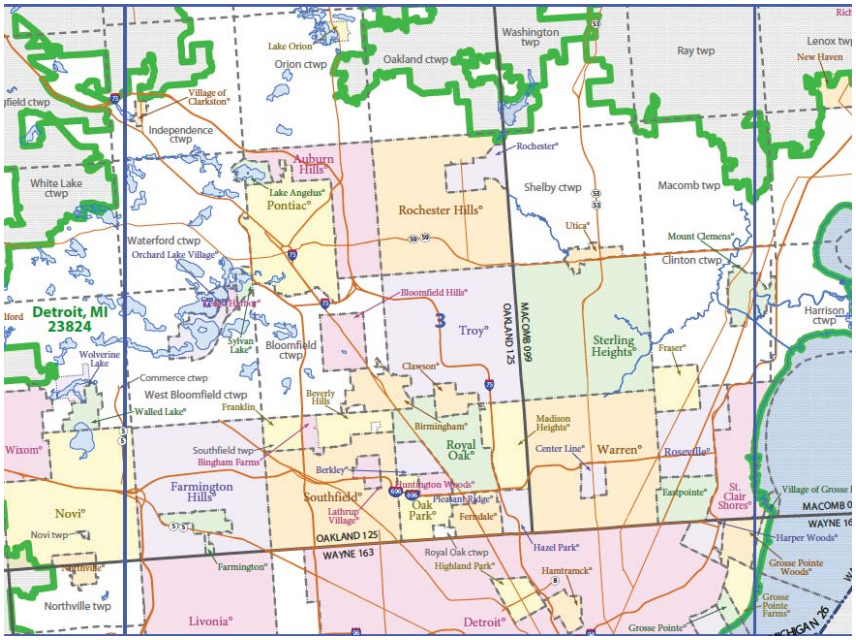
System Capacity

12.1 **U.S. Census Urbanized Area**

BACKGROUND:

The 2010 Census Bureau defines an urbanized area as a densely settled core of census tracts and/or census blocks that meet minimum population density requirement. The Census Urbanized Area serves as a proxy for determining the availability of public utilities and infrastructure capacity.

U.S. URBANIZED AREA



BASELINE

Rochester within UZA and half of Oakland Township

FUTURE TREND

Maintain baseline

CURRENT TREND:

The City of Rochester is on the edge of the Detroit urbanized area. New growth in Oakland Township and other areas to the north may expand the urbanized area in that direction.

Source: US Census, 2010

System Capacity

12.2 **Net Change in ERUs**

BACKGROUND:

An Equivalent Residential Unit (ERU) is the portion of a user's facility that has an impact on the water and wastewater system equivalent to a single family residence. The ERUs would be equivalent to what would be used by typical single-family residences, if they were using the water or wastewater system. The result is an estimate of total system service capability expressed as the number of ERUs the water system serves, or could serve. As a system develops (increases in ERUs) the ability of the mains to carry the increasing flows is stressed. Without capacity improvements, areas of the water system might have inadequate system pressures because of increased development (increased ERUs).

BASELINE

At capacity

FUTURE TREND

0% change

EVALUATION CRITERIA:

1. Proposed capacity improvement
2. Expected ERU
3. Net ERU

CURRENT TREND:

The City of Rochester is currently at capacity and any proposed increase in ERUs would result in a need for system capacity improvements.

Source: Oakland County Schedule of Units

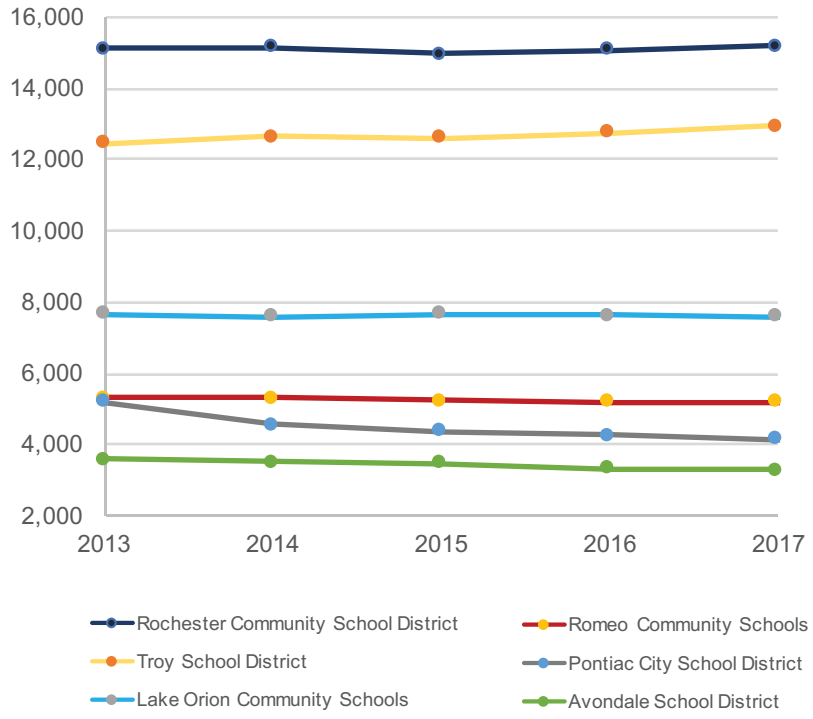
School Impact

13.1 **Overall School District Enrollment**

BACKGROUND:

A strong school can serve as an anchor for the neighborhood and the community. Families want to send their children to the best schools possible, and a good school indicates the desirability of the community. Schools can have positive spillover effects by having a visible presence throughout the entire community and by generating other activities in the surrounding neighborhoods.

TOTAL DISTRICT ENROLLMENT



BASELINE

15,187 students

FUTURE TREND

Maintain baseline

CURRENT TREND:

Rochester is part of the Rochester Community School District, which covers the entire City of Rochester and parts of Rochester Hills, Orion Township, Oakland Township, Washington Township, and Shelby Township. The Rochester Community School District enrollment numbers have remained consistent (hovering around 15,100) from 2013 to 2017. In 2017, the district reached its highest enrollment figures, 15,187 students. More students are enrolled in the Rochester Community School District than the surrounding districts.

Source: Michigan Department of Education, 2017

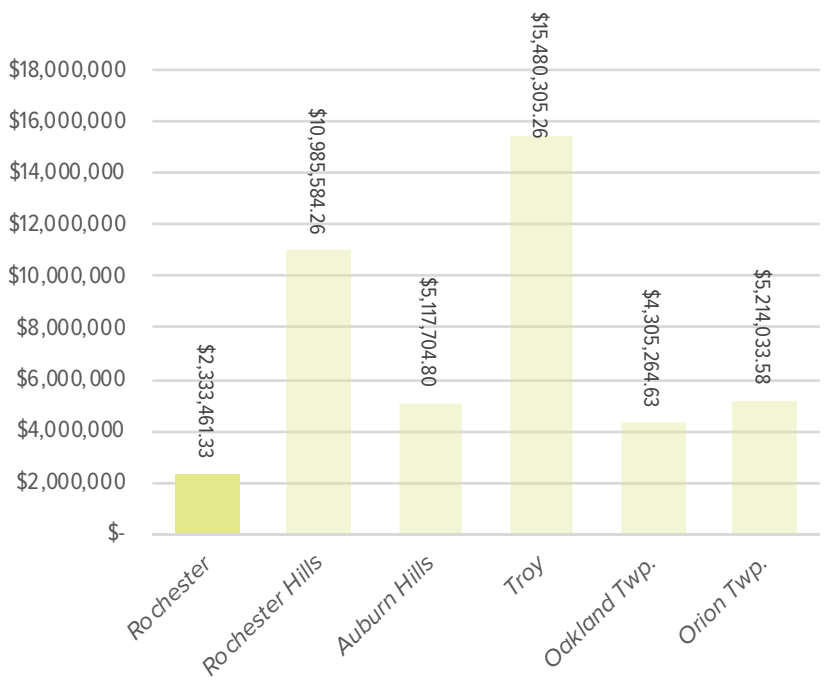
School Impact

13.2 **Tax Revenue Generated for School District**

BACKGROUND:

Maintaining the quality of schools available to Rochester residents is vital to the quality of life of the community. The quality of a school effects the desirability of a community. The tax revenue generated for school districts shows that ability of the community to sustain school quality and to share the prosperity created by development.

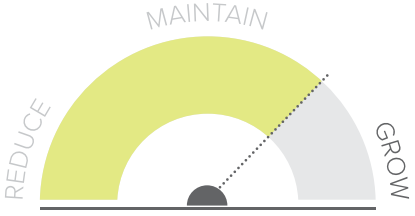
TAX REVENUE GENERATED FOR SCHOOL DISTRICT (2017)



BASELINE

$2,333,461 tax revenue generated

TARGET EVALUATION



5% increase

EVALUATION CRITERIA

1. Proposed increase in taxable value

CURRENT TREND:

In 2017, the City of Rochester generated $2,333,461 for the Oakland Intermediate School District. Increases in taxable value within a community, can positively impact the revenue collected for each school district and/or redistribute the tax burden on residents while providing adequate resources for the school district.

Source: Oakland County Department of Equalization, 2017

Public Safety

14.1 **Crime Index**

BACKGROUND:

Communities can see major effects from variations in the crime rate. Areas with low crime rates are seen as desirable and often attract additional businesses and activities. The additional people generated from the new businesses and activities also help deter crime.

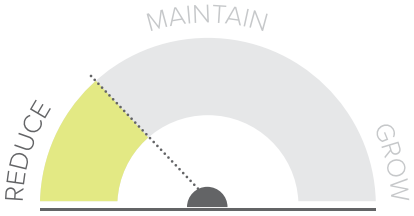
Crime rates are a sustainability indicator because of how they relate to the economic success of an area. Communities with high crime rates suffer from an increased strain on the police and other public service providers. Disinvestment in local businesses also threatens the economic vitality of a community as well as its ability to generate a reliable tax base. Places with low crime rates benefit from reliable tax revenue and steady public services.

BASELINE

18.8 – Property Crime

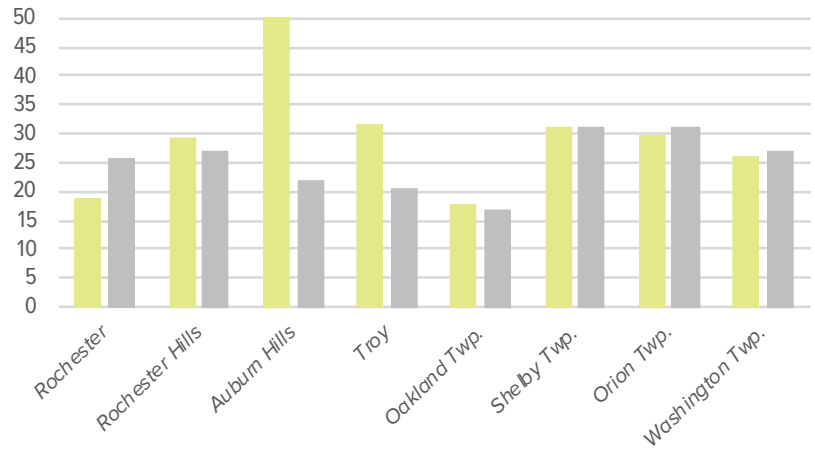
25.7 – Violent Crime

FUTURE TREND

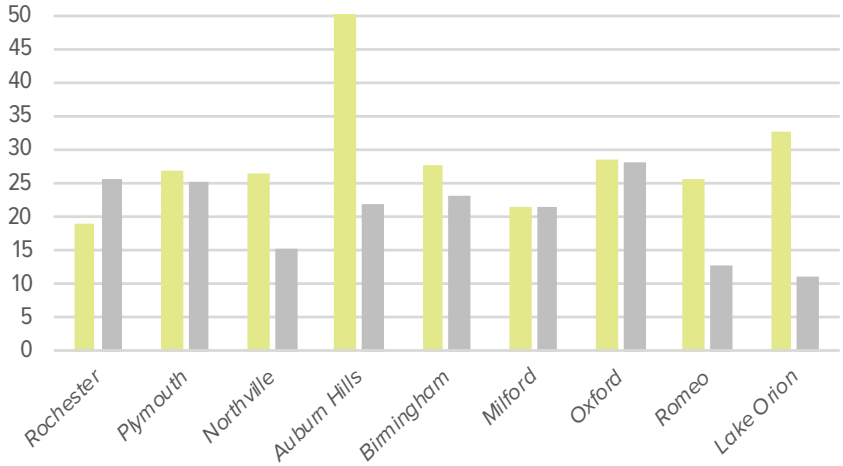


Reduce

CRIME RATE INDEX (1-100) ADJACENT COMMUNITIES



CRIME RATE INDEX (1-100) PEER COMMUNITIES



CURRENT TREND:

Rochester has low crime rate index (less than 26 for both property crime and violent crime). Rochester's property crime index score is less than all communities (both peer and adjacent) except for Oakland Township. The violent crime index score for Rochester is like many of its peer and adjacent communities. Romeo and Lake Orion have the lowest violent crime index of 12.9 and 10.9 respectively.

Source: Sperling's BestPlaces, 2017

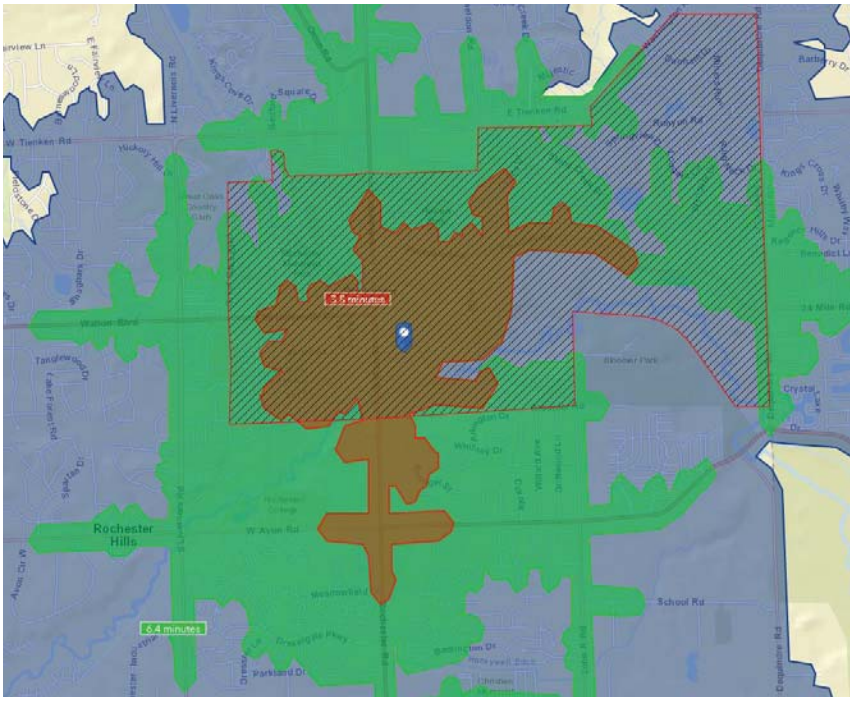
Public Safety

14.2 **Emergency Response Time Coverage**

BACKGROUND:

The National Fire Protection Association standard emergency response time for municipal services is 9 minutes. To reach all parts of a community within the 9-minute standard, the municipalities may consider several options when maintaining emergency services, on-call volunteers, full-time resident staff, and/or multiple fire stations. However, each option to increase service comes at an additional expense to the municipality. Municipalities balance what is fiscally responsible while also considering the safety of its residents when determining the provision of emergency services.

EMERGENCY RESPONSE TIME COVERAGE



*See **Map 21** in the Sustainable Rochester Map Book Appendix.*

BASELINE

9-minute response time (brown coverage)

TARGET EVALUATION

0% change

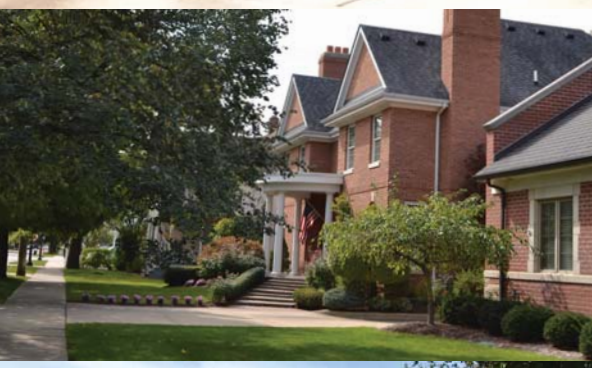
EVALUATION CRITERIA

1. Travel time from fire station to development at 35 mph

CURRENT TREND:

Currently, the City of Rochester maintains a volunteer fire fighter force, where the average volunteer lives three miles from the station. When an emergency occurs, the volunteer must travel on average 5.14 minutes to the station from their home and will then have 3.86 minutes to travel to the emergency. The emergency response map illustrates the emergency response time coverage with a volunteer on-call firefighting force.

Source: ESRI Business Analyst



Strong Neighborhoods
Sustainability Value #5

PROACTIVE APPROACH:

In an effort to proactively strengthen neighborhoods, the City of Rochester has adopted the following goal and strategies to encourage the provision of appropriate housing options, affordability, and historic character. Additional strategies can be found in the City's adopted Master Plan.

MASTER PLAN GOAL

1. Provide a variety of housing options for City residents in various stages of their lives, while maintaining the historic character and sense of community in Rochester.

MASTER PLAN STRATEGIES

1. Encourage residential developments which are needed by persons of all ages, incomes and household sizes.
2. Maintain the historic character and sense of community in Rochester.

DEVELOPMENT COMPONENT	INDICATOR	BASELINE	TARGET/ FUTURE TREND
15 *Housing Mix*	**15.1 Regional** Housing Tenure & Type	36% of housing stock multiple family / 37% of housing stock renter occupied	Grow
	15.2 Local Number of Multifamily Units	2,144 units	20% increase of total multifamily units
16 *Housing Affordability*	**16.1 Regional** Percent of Households with Housing Cost Burden	17.2% (mortgage) / 44.2% (renters)	Maintain baseline
	16.2 Local Median Unit Price	$361,735 (median house value) / $861 (median rent)	10% of units at median housing cost

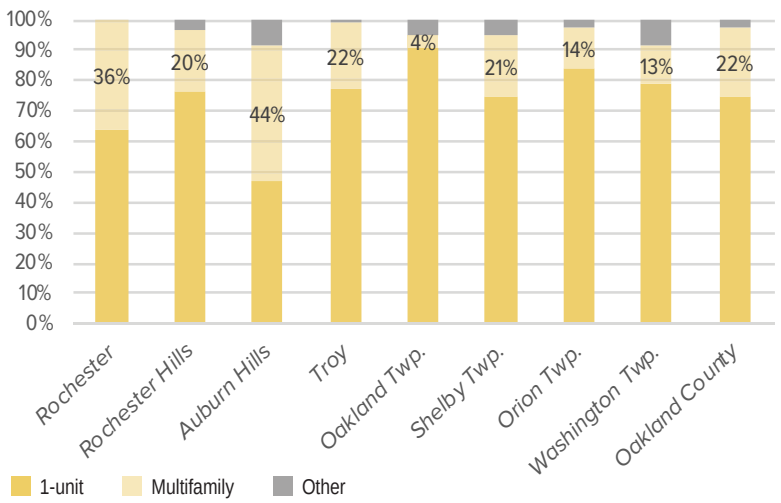
Housing Mix

15.1 **Housing Type and Tenure**

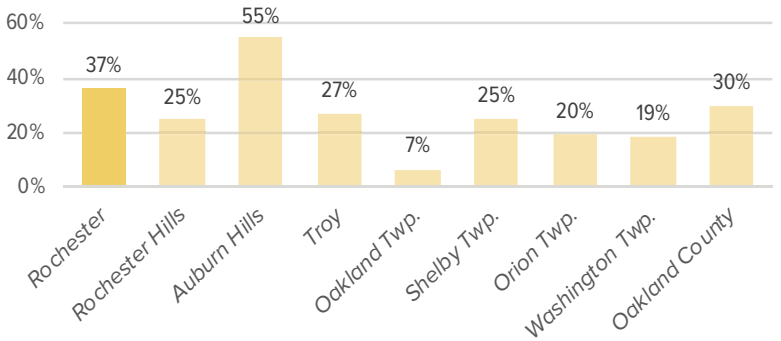
BACKGROUND:

Housing tenure and housing type often determine neighborhood strength. Housing tenure measures whether housing is owner occupied, or rented, and housing type measures the number of units within a housing structure (multiple family, single family, etc.). A mix of different housing types (e.g., rental and for sale, multifamily and detached, and large and small) can accommodate people in different life phases, from starting out in the workforce to raising a family to retiring.

PERCENT OF HOUSING UNITS, 2016



PERCENT OF HOUSING UNITS RENTER OCCUPIED, 2016

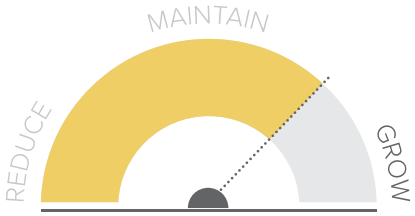


BASELINE

36% of housing stock **multiple family**

37% of housing stock **renter occupied**;

TARGET EVALUATION



Grow

CURRENT TREND:

Of the City's adjacent communities, Rochester has the second highest percentage renter-occupied housing, 37%. Adjacent townships provide the least rental housing. Like housing tenure, Rochester has the second highest percentage of multiple family units, 36%. However, Rochester has the highest percentage of its housing stock considered medium density. This size structure, which is often characterized as the "missing middle," includes housing structures that have 2-4 residential units. Medium density housing is often consistent with the style and size of single-family homes, while utilizing land in an efficient way.

Source: American Community Survey, 2016

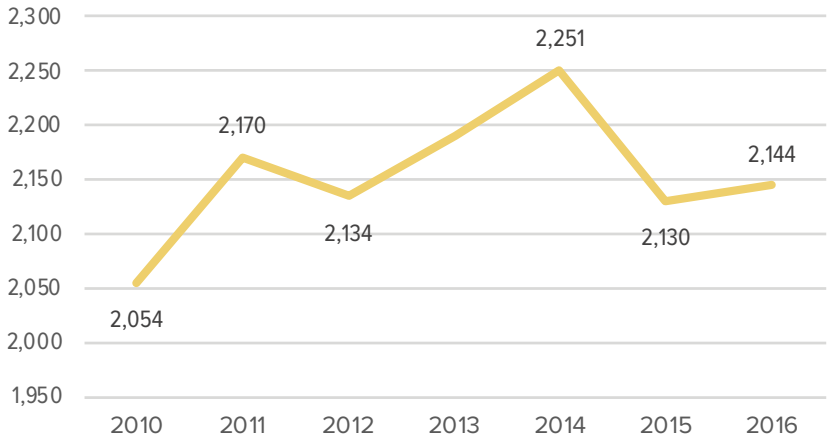
Housing Mix

15.2 **Number of Multiple Family Units**

BACKGROUND:

Multifamily residential is a classification of housing where multiple separate housing units for residential inhabitants are contained within one building or several buildings within one complex. As the demand for housing within the City increases, the provision of multiple family units increases the overall housing stock while making best use of limited developable space. The ability for the City of Rochester to provide multiple family units signals its ability to accommodate population increase with its limited space for greenfield development.

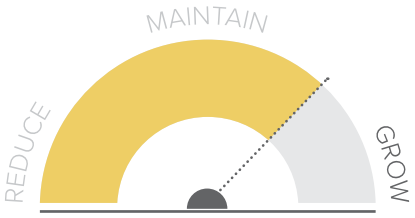
NUMBER OF MULTIPLE FAMILY UNITS (2010-2016)



BASELINE

2,144 units within the City (does not include assisted living units)

TARGET EVALUATION



20% increase of total multifamily units

EVALUATION CRITERIA

1. Number of multiple family units

CURRENT TREND:

The number of multiple family units within the City reached its peak in 2014 with 2,251 units. This number declined in 2015, but has since seen an increase to 2,144 units.

The baseline measure (2,144 units) is obtained using the US Census American Community Survey. This data source defines and measures multiple family units as the City's combined total of attached condominiums, apartment complexes, and senior independent living facilities (which includes 55 and older independent housing). The US Census does not consider assisted living facilities (complexes where individuals are under the full-time care of medical professionals) and other group homes in this measure. However, it is important to note that the City of Rochester does have a significant number of senior independent living communities and assisted living facilities. To further the goal of affordability and to ensure that housing is being provided to meet the needs of this growing community, the City should strive to develop a separate measure of both the number of units classified as "Senior Independent Living" and "Assisted Living".

Source: American Community Survey, 2016

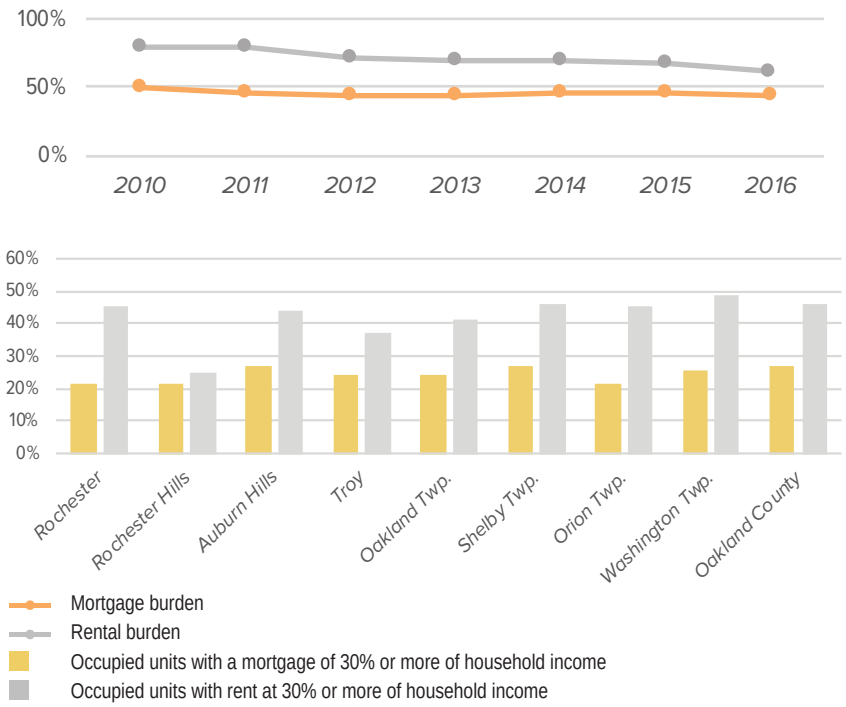
Housing Affordability

16.1 Percent of Households with Housing Cost Burden

BACKGROUND:

Housing affordability is an important factor in determining the long-term sustainability of a community. Cities must provide housing at prices people can afford to maintain stable neighborhoods and allow existing residents to age in place. As well as serve as a community where individuals of all income levels can move and grow. Housing affordability is measured as the percent of households paying more than 30% of their income towards housing costs (either as gross mortgage payments or rent).

PERCENT OF HOUSEHOLDS WITH HOUSING COST BURDEN (2010-2016) & HOUSING COST BURDEN (REGIONAL COMPARISON, 2016)

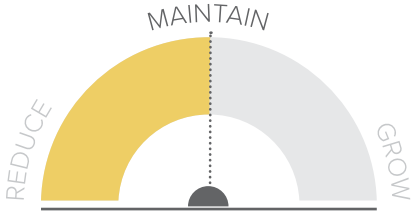


BASELINE

17.2% housing cost burden (home-owners with mortgages)

44.2% housing cost burden (renters)

FUTURE TREND



Maintain baseline

CURRENT TREND:

The percentage of households with a mortgage who are "cost burdened" due to paying over 30% of their income towards their housing costs has been consistently lower than the percentages of residents in Rochester's adjacent communities. However, over time the percent of those cost burdened has reduced. In 2016 nearly one in five households in Rochester with a mortgage paid more than 30% of their income.

In terms of rental units, all communities have a higher percentage of renters who are cost burdened. Rochester's percentage of renters who are cost burdened has remained near the average for the region and has started to trend downwards over the past six years. Townships—which likely have a constrained supply of rental housing have larger percentages of renters who are cost burdened.

Source: American Community Survey, 2016

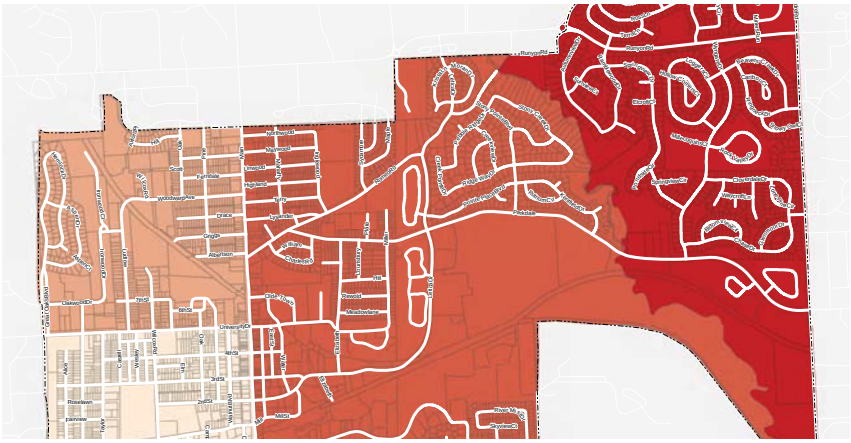
Housing Affordability

16.2 **Median Unit Price**

BACKGROUND:

Median unit price measures a developments ability to provide housing that is affordable to the median resident currently within Rochester. While, population growth and economic growth are often positive changes within the community, maintaining or slowing the increase unit prices will help keep current residents within the City.

MEDIAN GROSS RENT



*See **Map 24** in the Sustainable Rochester Map Book Appendix.*

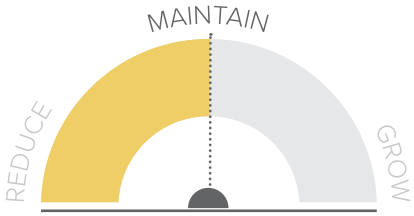
MEDIAN HOUSING VALUE

*See **Map 25** in the Sustainable Rochester Map Book Appendix.*

BASELINE

$361,735 (median housing value) / **$861** (median gross rent)

FUTURE TREND



Maintain baseline

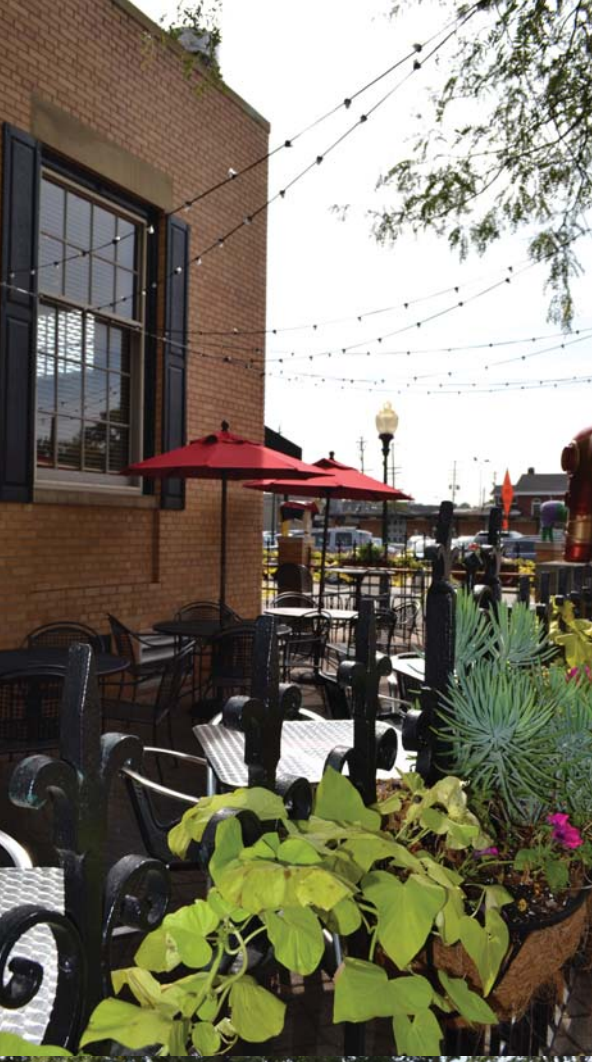
EVALUATION CRITERIA

1. 10% of units at median housing cost

CURRENT TREND:

The median house value and median gross rent indicate the point at which half the homes / rent prices within the area are more expensive / less expensive. These values vary by their location within the City. The eastern edge of the City has the highest median rent ($1,500) while the south western corner of the City has the most affordable median rent ($762). The median house value within the City ranges between less than $270,000 to greater than $310,000.

Source: American Community Survey, 2016



Downtown Viability
Sustainability Value #6

PROACTIVE APPROACH:

The City of Rochester has adopted the following goal and strategies to ensure downtown viability by proactively seeking a mix of uses and by calling for effective design decisions that balance parking and circulation needs without negatively its character. Additional strategies can be found in the City's adopted Master Plan.

MASTER PLAN IDEA

1. Develop and maintain a variety of retail and entertainment uses with appropriate pedestrian and vehicular access while preserving the character of the downtown.

MASTER PLAN STRATEGIES

1. Design parking areas and circulation patterns in order to accommodate the needs of downtown users without negatively impacting the pedestrian environment of the community.

2. Actively seek a variety of unique and compatible uses for the downtown which do not negatively impact adjacent land uses.

DEVELOPMENT COMPONENT	INDICATOR	BASELINE	TARGET/ FUTURE TREND
17 *Workforce Development*	**17.1 Regional** Number of Jobs	7,028 jobs	Grow
	17.2 Local Mixed Use Percentage	72% commercial use	5% increase within DDA district
18 *Historic Preservation*	**18.1 Regional** Percentage of Housing Structures Over 50 Years Old	33.1% of housing structures over 50 years old	Grow
	18.2 Local Compliance with Sight Lines	Existing skyline	0% change
19 *Business Attraction*	**19.1 Regional** Number of New Businesses within DDA District	432 businesses within DDA	Grow
	19.2 Local Proportion of Businesses in DDA District	57% of businesses within the DDA	5% increase within DDA district
20 *Parking Efficiency*	**20.1 Regional** Number of Event Days	56 event days	Maintain baseline
	20.2 Local Public Parking Provided	1,314 paid parking spots 367 free parking spots	10% increase

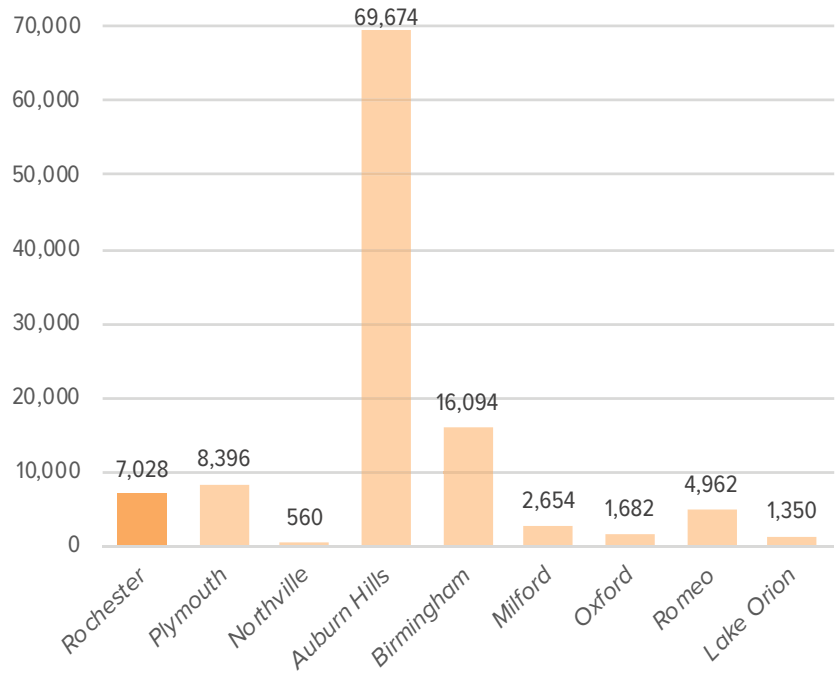
Workforce Development

17.1 **Number of Jobs**

BACKGROUND:

The number of jobs within a community is the foundation of any economic growth strategy. By building on what already exists, cities can support current businesses and create a strong foundation on which to attract new businesses, residents, and employment.

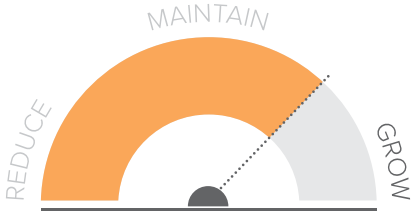
JOBS WITHIN THE CITY



BASELINE

7,028 jobs

FUTURE TREND



Grow

CURRENT TREND:

Rochester currently has 7,028 jobs within the City. Of the peer downtown communities, Rochester has the fourth largest amount of jobs after Auburn Hills, Birmingham, and Plymouth.

Source: American Community Survey, 2016

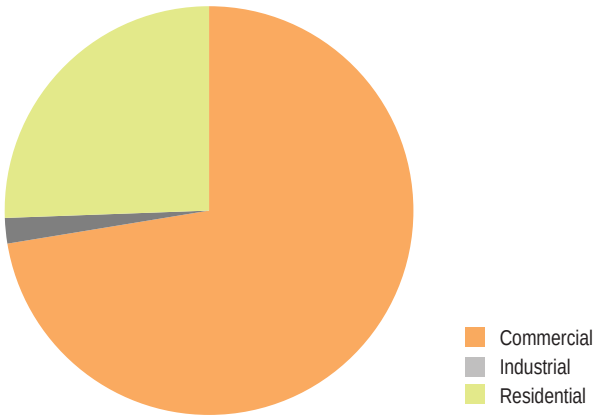
Workforce Development

17.2 **Mixed Use Percentage**

BACKGROUND:

The business mix of an area describes the different types of businesses located there including retail and commercial, restaurants, personal services, offices, and more. An area such as a downtown can foster a mix of businesses based on its design and level of activity. When people are coming downtown for work and other activities, a well-designed space provides them an opportunity to go to multiple destinations on one visit. Different businesses can also focus on their activities at different times of the day, which helps prevent the area from being empty especially in the evening.

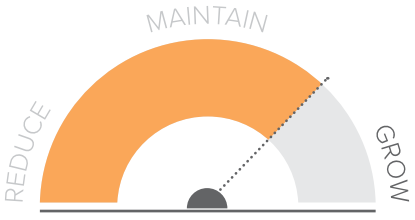
USE MIX WITH DDA



BASELINE

72% commercial use

TARGET EVALUATION



5% increase within DDA

EVALUATION CRITERIA

1. Percentage of property nonresidential use

CURRENT TREND:

Rochester's downtown is currently comprised of approximately 72% commercial uses. Another quarter of uses are strictly to residential uses, and a small percentage of properties, just 2%, is devoted to industrial uses.

Source: Oakland County Department of Equalization

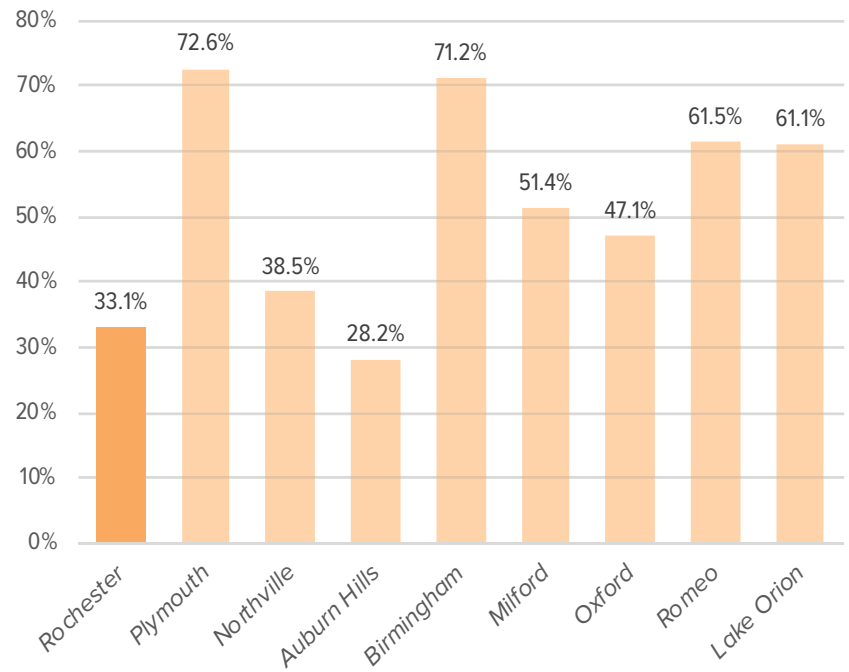
Historic Preservation

18.1 Percentage of Housing Structures Over 50 Years Old

BACKGROUND:

During times of increased development, it is important for a community to maintain the places and institutions that make it special, such as natural landscapes, gathering places, and historic buildings. These places, along with attractive streetscapes and storefronts, contribute to a sense of place and neighborhood identity. While, it is difficult to compare community character change across peer communities and over time, the percentage of housing structures over fifty years old can serve as a proxy to quantify the degree of change within a community.

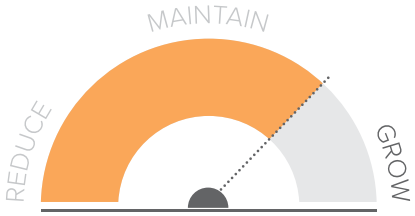
PERCENTAGE OF HOUSING STOCK BUILT BEFORE 1970 (2016)



BASELINE

33.1% of housing structures over 50 years old

FUTURE TREND



Grow

CURRENT TREND:

Rochester has the second smallest percentage of its housing built before 1970, after Auburn Hills. This low percentage is likely due to the large, modern subdivisions on the City's east side. Plymouth and Birmingham have the greatest percentage of housing over 50 years, 72.6% and 71.2% respectively.

In the past five years, the City of Rochester experienced 57 residential tear downs, where the existing structures were demolished and rebuilt.

Source: American Community Survey, 2016

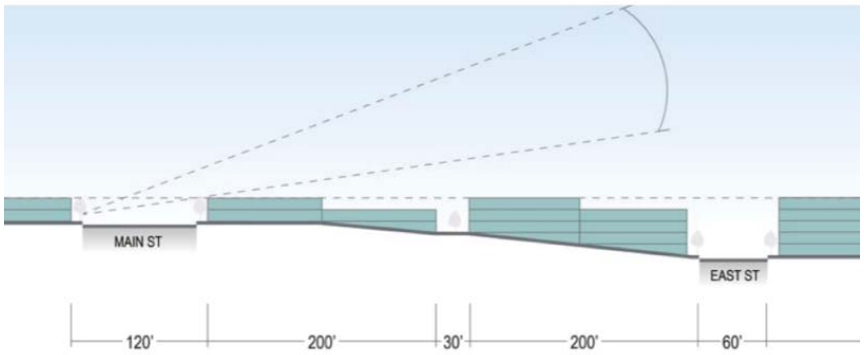
Historic Preservation

18.2 **Compliance with Sight Lines**

BACKGROUND:

The downtown has traditionally been the visual and economic center of the City of Rochester. Downtown has historic small-town character, and is a walkable, predominantly commercial area designed at a pedestrian scale. In the Rochester 2025 Masterplan a "Skyline Test" was established to preserve the historic nature of the downtown.

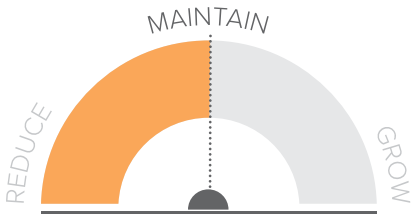
SIGHT LINE ILLUSTRATION



BASELINE

Existing skyline

TARGET EVALUATION



0% Change

EVALUATION CRITERIA

1. Sight diagrams

CURRENT TREND:

The Skyline Test is a measurement of height of a building based on its visibility from the Downtown Core. Buildings of height greater than the height permitted may be permitted, subject to demonstration through line of sight diagrams that the building will not detract from the appearance of Main Street's skyline.

Source: City of Rochester

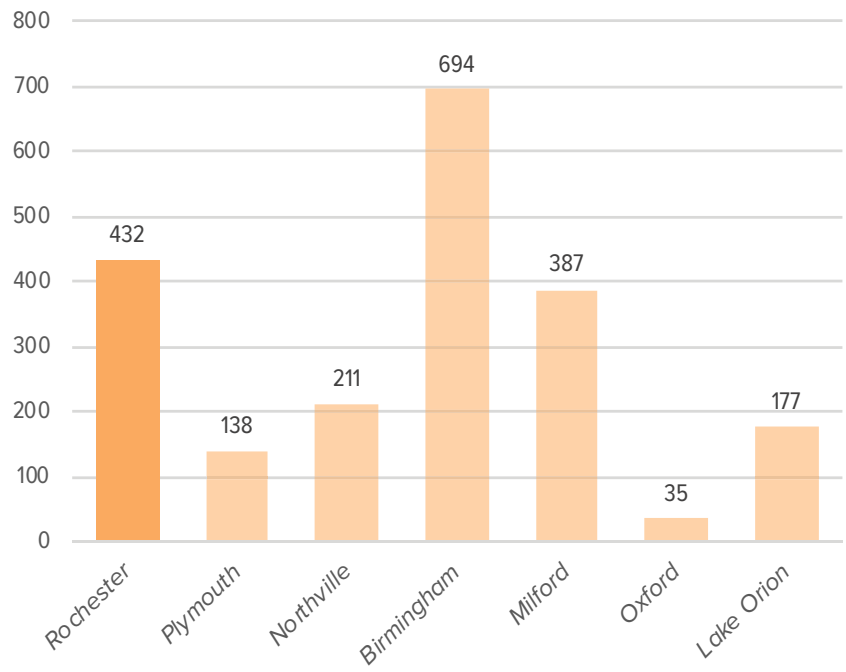
Business Attraction

19.1 Number of New Businesses within DDA District

BACKGROUND:

Supporting and expanding existing businesses and attracting new businesses can help support the viability of a community's downtown. As new businesses arrive, economic development opportunities are created for the district such as job growth, the expansion and diversification of the tax base, and improvements to quality of life with new services and amenities.

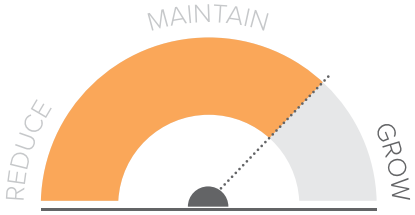
NUMBER OF BUSINESSES WITHIN THE DDA



BASELINE

432 businesses within DDA

FUTURE TREND:



Grow

CURRENT TREND:

Rochester has the second most businesses within its DDA, after Birmingham. Oxford has the fewest businesses located within its DDA.

Source: City of Rochester DDA

Business Attraction

19.2 **Proportion of Businesses in DDA District**

BACKGROUND:

The proportion of businesses within the DDA district is number of businesses located within the DDA divided by the total number of businesses within the City. For an economic activity center such as a downtown, a high proportion of businesses shows that the area is desirable, businesses are successful, and a variety of activities are taking place.

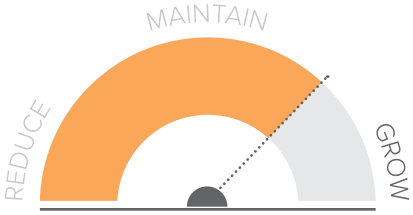
EXISTING LAND USE

*See **Map 4** in the Sustainable Rochester Map Book Appendix.*

BASELINE

57% of businesses within the DDA

TARGET EVALUATION



5% increase

EVALUATION CRITERIA

1. Number of tenet spaces within the DDA / outside the DDA district

CURRENT TREND:

A majority of the businesses within Rochester are located within the City's DDA, 57%. However, there are industrial uses located along South Street and Letica Drive. Additional commercial uses extend west from downtown along University Drive.

Source: Oakland County Department of Equalization

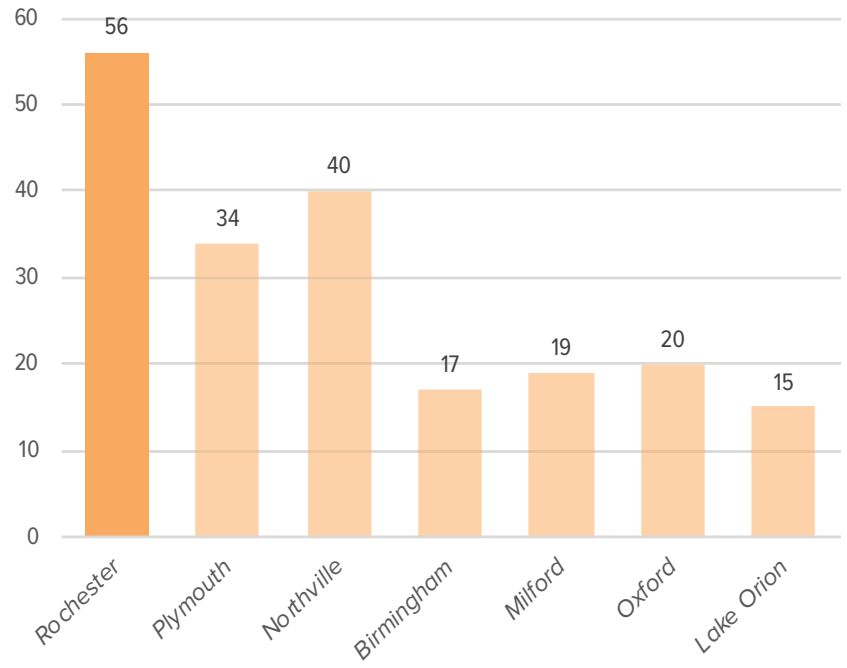
Parking Efficiency

20.1 **Number of Event Days**

BACKGROUND:

Ongoing public events help drive positive awareness of a City and its downtown. Bringing people from across the city and from other areas within the region to downtown on a regular basis, serves to make citizens aware of the unique amenities that exist in the central part of the community. Awareness of the amenities and foot traffic in the City's downtown helps to strengthen businesses and supports the City's quality of life.

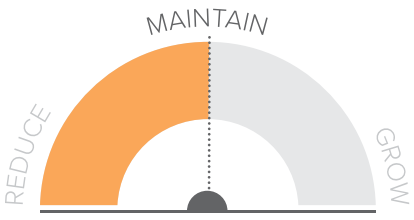
NUMBER OF EVENT DAYS A YEAR



BASELINE

56 event days

FUTURE TREND



Maintain baseline

CURRENT TREND:

Downtown events in Rochester far exceed the number of events that occur in its peer communities. Rochester has 16 more events a year than Northville, which has the second most of all peer communities. The high number of events likely are attracting residents from all over the region to enjoy the amenities found in the City's downtown.

Source: City of Rochester DDA

Parking Efficiency

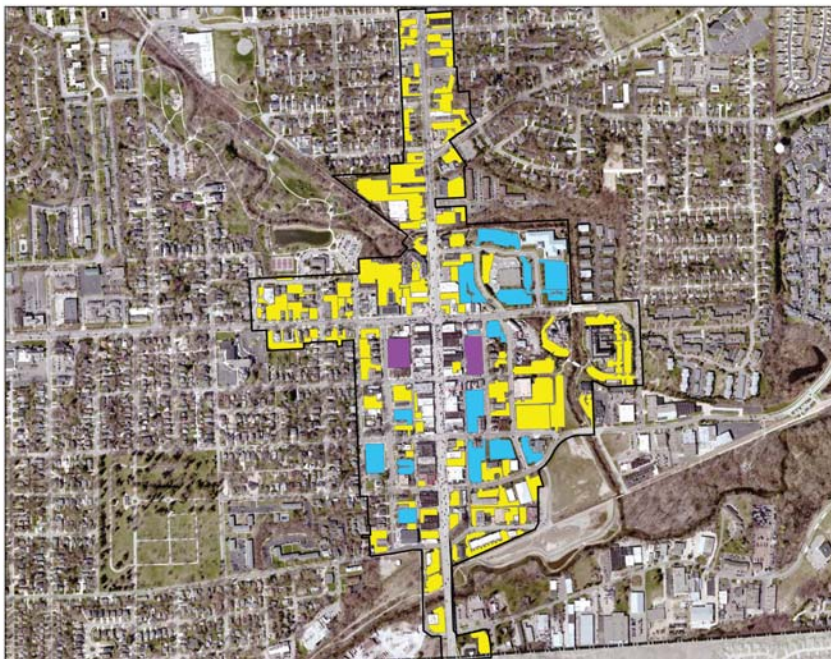
20.2 **Public Parking Provided**

BACKGROUND:

Parking areas have great impacts on the areas surrounding them. Walkable areas generally have parking located on side streets or in structures accessed from side streets. The main streets contain storefronts to put the activity in a visible place and encourage people to visit multiple businesses. A parking structure can be an effective way for the community to provide a large volume of parking behind their main street. Structures can also reduce the overall amount of impervious surface taken up by parking lots, allowing for improved management of storm water, additional open space and landscaping, and other benefits.

Parking lots indicate sustainability based on several factors. Well-utilized parking areas indicate that the area is a highly desirable destination. Parking located on side streets allows the main street to thrive and encourage activity.

DOWNTOWN PARKING AREAS

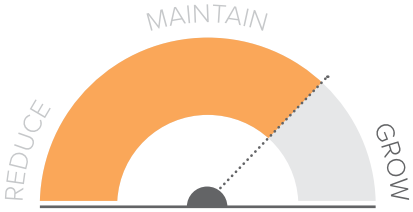


*See **Map 26** in the Sustainable Rochester Map Book Appendix.*

BASELINE

1,314 paid parking spots
367 free parking spots

TARGET EVALUATION



10% increase

EVALUATION CRITERIA

1. Public parking provided
2. Event parking provided
3. Drop-off space provided

CURRENT TREND:

Parking is provided in the City of Rochester's downtown through a variety of options – parking platforms and private and public surface lots. The City currently maintains 1,314 paid parking spots, with many of those spots located in platforms and in the northern half of the DDA district.

The City also maintains 367 free parking spots, which are located around the City's largest municipal park and at the north and south edges of the DDA district.

Source: City of Rochester DDA

TROY
MICHIGAN

PLAN TROY 2040

Resolution #2023 To Be Included

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Zoning and Compliance Specialist
Jackie Ferencz, *Office Manager*

INFORMATION TECHNOLOGY DEPARTMENT

Alex Bellak, *I.T. Director*

CITY PLANNING CONSULTANT

Carlisle/Wortman Associates

PHOTOGRAPHER

All Troy photos, unless otherwise credited, were provided by Acacia Photography of Troy, MI

Executive Summary

In 2008, the City of Troy adopted a new Master Plan, the first updated Master Plan since 1965. The 2008 Master Plan recognized Troy's place in a changing post-Recession world. Rather than control growth, the 2008 Master Plan identified opportunities and strategies for competing in the global economy.

2015 Revision:
In 2015, the city determined that the 2008 Master Plan still represented Troy's long-term vision, goals, and policies for development and growth. However, while the plan was still relevant and effective, due to shifts in economic, demographic, and development patterns the City felt that the 2015 plan update should focus on specific geographic areas. The 2015 plan update incorporated three (3) special area plans. Special area plans were chosen for areas where substantial development and redevelopment activity was likely to occur. Special area plans provide an illustrative framework to guide development in a way that fosters a sense of place and establishes community identity in key locations. The special area plans provide schematic representations of potential development areas at a variety of scales and levels of detail, and may include illustrative configurations for new streets, buildings, parking, open space, and circulation as may be appropriate to the area.

2015 Special Area Plans:
Rochester Road
The Rochester Road Special area plan provides a unifying framework built around public and private improvements that will change the function and character of the corridor over time. The plan identifies three (3) complementary concepts for dealing with these issues and creating a solution that all users will welcome. The first concept deals with restructuring the pattern of land use and development lining the corridor, the second involves incorporating the redesign of the public right-of-way, and finally, the third creates a cohesive image and stronger identity for the corridor.

Maple Road
Maple Road presents an opportunity to build on the existing diversity of land uses, transportation options, and proximity to residential properties. For properties lining the corridor, revitalization requires a restructuring of development patterns, with less emphasis on land use and more focus on quality, accessibility, and innovative redevelopment. For those parcels in the industrial areas located off the corridor, a focus on protection and reinvestment of the industrial and technology development base should be emphasized. The repurposing of Maple Road offers three (3) key priorities based on the following land patterns: the development nodes at major mile intersections, the linear segments of the corridor between the major mile intersections, and the industrial and employment areas located off the corridor.

North Troy
North Troy faces a turning point. Its original development pattern must evolve to meet new challenges in the marketplace. Both employers and employees must be flexible and nimble to respond to demands in competition. As such, their facilities must adapt to fulfill evolving, diverse requirements in the workplace. Many of today's knowledge workers expect entertainment and service amenities nearby as well as opportunities and spaces to connect and share ideas. The isolated buildings in North Troy do not reflect this trend. There is no central, defining place that represents the heart and vision of North Troy. Creating this balanced mix of uses and a sense of place will create a symbiotic relationship with the adjacent neighborhoods, where employment, service, and residential uses are interconnected. Fortunately, North Troy has ample opportunities to evolve and create a modern, preferred employment hub.

2023 Revision:
In 2020, the City again reviewed the Master Plan to determine if it was still relevant and continued to represent Troy's long-term vision, goals, and policies for development and growth. This review was conducted during the COVID-19 Pandemic, one of the most impactful events of the 21st Century. The City found that many of the strategies that aided the recovery from the Great Recession – flexibility in use, encouraging mixed use, permitting residential density in appropriate locations – are the same strategies that should assist the City as it recovers from the effects of the Pandemic.

At the start of the process, it was agreed upon that the Master Plan continued to be relevant. It was forward thinking at the time and many of the issues that were focused on are still applicable. However, there were a few key issues that needed updating, specifically the planning for the Neighborhood Nodes.

Revised Neighborhood Node Intent Statement
The Neighborhood Node Intent Statement lays out the overall purpose of the neighborhood nodes. The revised intent statement reflects the historical past and current conditions, and better articulates the planned vision of the nodes.

Revised Neighborhood Node Language
The City reviewed each node in detail to revise their specific intent based on the revised node intent statement, historical past, current conditions, and future anticipated vision. Each node was revised based on this detailed review.

Language has been revised for the following nodes:
- B (Maple and Dequindre)
- C (John R. and Maple)
- D (Big Beaver and Dequindre)
- E (Wattles and Dequindre)
- F (John R and Wattles)
- I (Crooks and Wattles)
- J (Dequindre and Long Lake)
- K (John R and Long Lake)
- N (Dequindre and Square Lake)
- O (John R and Square Lake)
- P (Rochester and Square Lake)
- Q (Livernois and Square Lake)
- R (John R and South)
- T (Livernois and South)
- U (Crooks and South)

Based on detailed review, the City eliminated the following nodes:
- A (Dequindre and Maple)
- G (Rochester and Wattles)
- H (Livernois and Wattles)
- L (Rochester and Long Lake)
- M (Livernois and Long Lake)
- S (Rochester and South)

Concept Plans
To best visually portray the intended vision for the nodes, three (3) concept plans were included. These concept plans include elements of mixed use, architectural quality, transitions between intensity on roadways to adjacent single-family neighborhoods, infill development, and landscape buffers.

Future Land Use Plan
The Future Land Use Plan was updated to reflect changes in Neighborhood Nodes. In addition, the Future Land Use Plan for Big Beaver Road on the northside of Big Beaver Road between Crooks and Coolidge is amended to be consistent with the existing zoning and land use pattern of the surrounding area, and to provide an appropriate transition.

Introduction
The Master Plan introduction was strengthened to clearly articulate the relationship between Master Plan and Zoning Ordinance.

Eliminate Big Beaver Pedestrian Special Area Plan
This was made redundant with the construction of the I-75 Diverging Diamond Interchange and the adoption of the Downtown Development Area Landscape Plan.

Refresh Format and Layout
The Master Plan layout and format was updated including graphics and images. In addition, relevant data and demographics were updated based on the most current data.

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7 – Green City: Responsibility to Natural & Energy Resources

Every level of government bears responsibility for the protection of the natural environment.

The United States Government sets policy and protects national resources, like the national parks and other important wildlife refuges. The State of Michigan regulates wetlands and sets uniform statewide policies for the protection of critical Michigan resources. The State also empowers local units of government to establish laws to protect those resources in their own front yards. Local units of government are the front line of environmental protection and natural resource conservation. This Chapter will establish the philosophy of environmental sustainability in Troy, framed around a series of policies designed to make the most of the tools available to the City.

Troy is characterized as a vibrant and engaging place to live and work, where environmental and ecological resources play a role in creating a community that will draw the best workforce in the region. Troy can be an environmental leader, demonstrating to others how to grow while embracing its natural resources and making wise use of energy resources. As discussed in Chapter 2, sustainable cities integrate the concepts of sustainability into policies covering social, economic, and environmental topics. Troy and its citizens can use the community's environmental resources responsibly without compromising the ability of tomorrow's residents to meet their needs.

Preservation and Enhancement of Existing Natural Features

Economic growth and environmental preservation are elements that are commonly perceived as two forces that must be at odds. However, environmental considerations have the ability to enhance economic development. Efficiency reduces the cost of products and services, and preservation of natural features increases the value of developed properties.

The City of Troy is nearly built out. However, the City manages over 900 acres of parkland. Some of the existing park land is used for active recreation areas, and some is maintained as natural areas for passive recreation and general open space. The City's current Parks and Recreation Master Plan identifies these City-owned properties and provides a brief description of each.

Development and Natural Feature Preservation

The value of home sites adjacent to open space, parks, wetlands, greenbelts and other green amenities is greater, all things being equal, to similar sites not adjacent to such amenities. A report published by the Metropolitan Council, a regional planning agency for the Twin Cities of Minneapolis and St. Paul and surrounding seven-county metropolitan area, showed a conclusive positive impact of open space on residential property values.[1]

In addition, preservation of the existing natural systems can reduce infrastructure costs. For example, the preservation of woodlands and open space reduces the amount of stormwater infrastructure necessary to accommodate the site's runoff. Clustering of home sites is another preservation technique that reduces costs in that the developer does not need to unnecessarily extend underground infrastructure to accommodate a more sprawling site layout. The reduction of infrastructure costs results in a greater return on investment.

1: http://www.metrocouncil.org/Directions/development/dev2006/OpenSpaceStudyNov06.htm

Low Impact Development

Low Impact Development (LID) represents a different way of thinking about stormwater. It is a series of design techniques that manage rainfall at the source using uniformly distributed, decentralized techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source.

Under LID, stormwater runoff is not a waste product, but a resource. For instance, LID techniques such as cisterns and rain barrels use collected rain water for irrigation, or as gray water for toilet flushing. LID also advances the idea that almost all elements of a site plan (open space and built features) can be used for stormwater control. For instance, the parking lot can be made out of porous pavement. When stormwater drains through the pavement, it recharges the groundwater. Similarly, rooftops can be used as planting areas, soaking up rainwater and reducing runoff.

LID techniques often cost less to construct than traditional closed designs. Case studies conducted by the Low Impact Development Center show a 25-30 percent reduction in site development costs over traditional techniques. One reason for the lower costs is that LID techniques keep stormwater on top of the ground, rather than building the infrastructure underground to handle stormwater. Another reason is that small infiltration areas are generally less expensive to construct than one large detention area, particularly if the site is designed to limit the amount of stormwater generated by impervious surfaces.

Low Impact Development Center, www.lowimpactdevelopment.org

Encouraging natural feature preservation can be accomplished through ordinance regulations or guidelines that ensure the least amount of impact on a site so that it continues to function at its pre-development level. This can be done by limiting disturbance, imitating natural systems with built replacements, and mitigating the reduction in vegetation and infiltration when the land is covered with impervious surfaces. These design techniques are called Low Impact Development (LID) techniques. While these techniques generally concentrate on stormwater management, they also help preserve existing natural features, like woodlands, that contribute more to the community than just absorbing stormwater runoff. Troy does not have wetland or woodland protection ordinances in place.

The City of Troy must engage its neighbors to preserve features that cross more than one jurisdiction, such as a wetland system or watershed. Natural features provide significantly more benefits if they are maintained in larger units, such as a complex system of woodlands, wetlands, and rivers or streams. These larger, connected systems are more successful at maintaining their ecological integrity. The less fragmented natural features are, the higher quality they remain.

Urban Redevelopment

Troy Futures suggested several development methods that will influence natural feature preservation within the City. Villaging, for instance, will act to cluster commercial and cultural services in higher density locations within the community. This, in turn, will allow the few remaining greenfields, or undeveloped areas, to be less densely developed, enhancing the possibility of natural feature preservation on these sites.

For the remaining undeveloped parcels, emphasis should be placed on preserving any existing natural features to the greatest extent possible, clustering in already cleared areas of each site, and ensuring that open spaces are contiguous with adjoining open spaces.

Redevelopment of obsolete or underutilized properties provides opportunities to restore or recreate vegetated communities that enhance the site's ecological value. While not completely natural systems, tree plantings mimic woodlands or native wildflowers plantings that simulate a meadow can be aesthetically pleasing and provide environmental benefits. For instance, one LID technique is to plant deep rooted plants, such as tall grasses typically found in a prairie. The root systems of these grasses grow up to 8 feet deep, and as they grow and die, they provide tiny waterways through the soil that improves infiltration of stormwater runoff. While these techniques would provide benefits in any situation, they could be especially effective in the case of a redevelopment property.

Brownfield Redevelopment Authority

The City Council established the Brownfield Redevelopment Authority in 1999, expressing Troy's interest in redeveloping brownfield and other idle or underutilized sites in the City. The Brownfield Redevelopment Authority can offer financial incentives for cleanup and redevelopment or for demolition of functionally obsolete buildings in the form of Tax Increment Financing (TIF) reimbursements.

TIF Reimbursement: The Brownfield Authority may capture the incremental real and personal property tax revenues generated by a developer's project to pay for eligible environmental clean up and contamination prevention incurred on the property.

Single Business Tax Credit: A tax credit of 10 percent up to ten million dollars is available for an owner or operator of a facility for capital and equipment expenditures for redevelopment.

The Troy Brownfield Redevelopment Authority has assisted in the redevelopment of sites throughout the community. Its first project was the redevelopment of the former Ford New Holland Tractor Plant at the southwest corner of Maple Road and Coolidge Highway. The site, which sat underutilized for nearly a decade because of liability and other issues concerning contamination, is now know as Midtown Square, a $200 million mixed use development boasting 600,000 square feet of retail space and 285 residential units.

Benefits of Brownfield Redevelopment

There are obvious environmental benefits to cleaning up brownfield sites in a community. These actions create a cleaner and safer environment, reducing risks to public health, safety and welfare, and other benefits:

- Redeveloping a brownfield site transforms property that is most likely not generating substantial tax revenues to a property that contributes to the local tax base, eliminating an opportunity cost. Also, by not redeveloping brownfields, they could potentially have a depressing effect on property values, leading to further tax revenue loss.
- Idle properties that were once viable businesses do not contribute to the job base. Turning them over for new, productive uses creates new job opportunities.
- It is likely that brownfield sites have the infrastructure in place to serve a new land use. This can represent a substantial savings by a community or developer compared to building on a green field site.
- Re-using property in urban areas decreases development pressure in green fields, which in turn, increases the opportunity to preserve open space and combat urban sprawl.

Brownfield Redevelopment Guide; Consumers Renaissance Development Corporation; 1998.

Redevelopment Incentives

Ordinance regulations are the first line of environmental stewardship in many communities. However, there are other ways of encouraging sustainable development. The following incentive-based techniques encourage sustainable development:

- Fee adjustments for infill housing: Riverside, California waives certain fees, such as grading permit fees and water distribution fees, if the property being redeveloped meets the definition of residential infill.[2]
- Smart Growth Zone: Developments in Smart Growth Zones in the City of Austin Texas are charged reduced fees for zoning, subdivision, and site plan applications, and for water and wastewater capital recovery fees.[3]
- Primary employer incentives: Incentives such as application fee waivers, utility and transportation improvements, streetscape improvements, and expedited processing of development applications are offered by the City of Austin, Texas to guide large employers to the Desired Development Zone. These types of employers generate significant levels of growth, both within their specific project and in the surrounding area.[4]
- Built Green Program: In partnership with local counties and builders, the City of Seattle promotes best known practices in energy, air quality, stormwater management, and water efficiency to give homeowners added value and home builders a competitive advantage. To stimulate growth in Built Green-certified homes, the City launched a design competition, and highlighted winners on their website.[5]
- Green Review Track: King County, Washington, offers a dedicated "Green Track" for green buildings and projects that incorporate Low Impact Development techniques. Proposals on this track are assigned to a green team, composed of County staff with expertise in green development practices. Staff provides assistance to customers on sustainable development techniques including green roofs, alternative energy systems (solar, wind, geothermal), rain water collection, resource efficient framing, recycled materials, and Low Impact Development site design. Green developments follow a customized review schedule with a single point of contact.[6]

Transportation

Methods to reduce the dependence on the automobile were introduced in Chapter 5. Improving opportunities for non-motorized transportation, transit-oriented development, mixed-use, and technological pathways will contribute to the changing mobility needs of Troy.

Green Building

There is an emerging, global trend to encourage the development of environmentally sustainable buildings and neighborhoods. Commonly referred to as "green building," this trend has been fueled by numerous organizations who have worked to develop standards around which architects and builders can design their projects. The most prominent of these groups is the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program.

The LEED rating system was originally designed for individual buildings. LEED Certification can be achieved through the use of green techniques applied to new construction or renovations to existing buildings, including historic structures. Over 4,000 buildings have either already been LEED certified or are registered and going through the certification process in the U.S. Michigan has almost 200 LEED-certified buildings including office buildings, university buildings, churches, nature centers and private residences.

Many green buildings across the country have been completed because the owner was self-motivated, based on the benefits those buildings enjoy. However, communities can also develop incentives to encourage green buildings and green site design techniques. Incentives could include property tax credits, tax abatement and tax exemptions, density bonuses, expedited permit review, and waiving of permit fees.

In Troy, several notable green buildings have gained regional notoriety. The Kresge Foundation, highlighted on this page, is a model of green development located on Big Beaver Road. Walsh College is also adopting a green building philosophy. The College's 15 million dollar expansion at the Troy Campus will seek LEED Certification by choosing recycled or environmentally sensitive material, incorporating rain water harvesting for irrigation and other uses, and using design techniques to capitalize on solar energy for heating.

Troy is also home to the first previously existing building in Michigan to earn LEED Certification. Bank of America's facility in Troy earned gold status due to its use of many environmentally-friendly technologies. The Bank of America facility has the second largest green roof in Michigan, over 53,000 square feet in area. The building also uses heat generated from the computer servers to warm the building, heat water, and melt snow. Other features include the use of underground well to provide water to the decorative fountain, whose wastewater is used to irrigate the landscaping and pull heat from the building during hotter periods.

In addition to LEED, the National Association of Homebuilders have developed their own, voluntary certification program for residential construction, which the Michigan Association of Homebuilders have adopted as part of their program known as GreenBuilt. GreenBuilt is a program intended to allow Michigan homebuilders to create more sustainable home developments that are energy efficient and more respectful of natural resources. The GreenBuilt program requires that all members who elect to secure GreenBuilt status attend a 3-hour GreenBuilt training session. GreenBuilt also provides professional assistance to members.[7]

In Troy, the Cedar Pines of Troy project is the only entirely GreenBuilt project in southeast Michigan. This project includes homes that are designed to use 52 percent less electricity, 54 percent less natural gas, and 46 percent less water. The development also features homes with dual flush toilets, rain water harvesting, low flow faucets, renewable flooring materials, no VOC Paints, trim made from sustainable forests and plantations, high efficiency dual stage furnaces, high efficiency water heaters, and photovoltaic solar cells.[8]

Other green development techniques are reflected in projects such as Caswell Town Center, which incorporated innovative stormwater management techniques.

Urban Form and Neighborhood Design

Neighborhoods can be designed to reduce energy consumption by providing opportunities for shorter vehicle trips and the use of alternative forms of transportation. Some techniques include the locating of residential units near neighborhood shops and existing utilities, the provision of bicycle and transit facilities, and proximity to schools and parks.

The U.S. Green Building Council is piloting a program for energy-efficient neighborhoods. The LEED Neighborhood Development Pilot Program includes many site design techniques that preserve natural features, habitat, and open space, such as:[9]

- Limit parking to encourage people to use alternative methods of transportation, like walking or bicycling.
- Promote local food production to minimize the impacts of transporting food long distances. Farmer's markets allow such goods to be sold locally.
- Use energy saving technology for infrastructure needs such as street lights, water, and waste water pumps.
- Capture and use stormwater runoff and use in place of potable water for irrigation and toilet flushing.
- Use recycled concrete and asphalt for roadways and parking lots.

2: www.riversideca.gov/planning/infill.htm
3&4: www.ci.austin.tx.us/smartgrowth/sgincentives.htm
5: www.seattle.gov/dpd/GreenBuilding/OurProgram/DesignToolsStrategies/BuiltGreen/default.asp

6: http://www.metrokc.gov/dnrp/swd/greenbuilding/

7: www.greenbuiltmichigan.org

8: Wake-Pratt Construction Company
9: Pilot Version, LEED for Neighborhood Development Rating System, U.S. Green Building Council

Sustainable Design Projects (SDP)

Troy's SDP program promotes environmentally sustainable and energy efficient design and development practices for the construction of new and the rehabilitation of existing buildings and sites within the City. It is a voluntary option that encourages property owners to incorporate features designed to minimize the adverse impacts on the environment.

There are numerous categories from which the applicant can seek relief, including lot coverage and front yard parking. Each category has specific design measures that must be met to qualify as a Sustainable Design Project. The design measures offset the effects of granting relief. For example, to offset the relief granted to exceed lot coverage, the applicant could provide measures related to stormwater quality control, stormwater quantity control, and reduction of the heat island effect.

An example of an approved and constructed SDP project is 966 Livernois. The applicant, O'Brien Construction Co. Inc., sought to construct four front yard parking spaces in the IB Industrial and Business Zoning District. To offset the effects of the impervious parking spaces, the applicant provided the following improvements:

- Rain garden and swale
- Underground storage tank to capture rainwater runoff from roof
- Runoff from garage captured in rainbarrels
- Exterior lights on timers

The applicant met the three Prerequisite Measures (Stormwater Quality and Quantity and Light Pollution) and one Qualifying Measure (Water Efficient Landscaping).

City Demonstration Projects

Many of the ideas presented in this chapter for environmental preservation and energy efficiency are long-term techniques. However, there are many initiatives the City can accomplish relatively quickly to communicate its commitment to the environment. These "next steps" will engage citizens and inspire community members to think about the environmental issues Troy is facing.

What is LEED?

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. LEED gives building owners and operators the tools they need to have an immediate and measurable impact on their buildings' performance. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. LEED provides a roadmap for measuring and documenting success for every building type and phase of a building lifecycle.

United States Green Building Council, www.usgbc.org

Hands-On Projects

One way to foster a bond between residents and a particular natural feature, such as a wetland or stream, is to get them involved in a hands-on restoration or clean-up project on City-owned properties. Once people have been introduced to the plants in the ecosystem, and the function that those plants play, they have a greater understanding and appreciation for that place. Hands-on projects give residents a chance to learn about the ecosystems in the City. Once the project is complete, interpretive signage should be installed to describe the "why," "what," and "who" of the project.

Maintenance of Parks and Recreation Facilities

Another relatively short-term effort is to ensure that the City staff maintain parks and natural areas in an environmentally friendly way. New alternatives for maintaining turf, ball fields, roadways, and other elements of City parks are now available. Better practices ensure that facility maintenance does not negatively impact adjacent wetlands or other natural features. A regular evaluation of how City activities are done should be considered in light of natural feature preservation objectives. If practices do change, interpretive signage can be used to inform the public of changes to a park's visual appearance.

Planting Trees

Climate change and stormwater management are two important environmental topics. One common thread between these two is the impact trees have on each. Trees sequester a large amount of carbon. For example, a 2.5 acre Oak woodland can sequester about 3 tons of carbon in one year. Trees also intercept and absorb a large amount of stormwater. A typical woodland can absorb 20,000 gallons of rain in one hour through holding water on its leaves and trunk, absorption into the tree, and absorption into the deep leaf litter on the woodland floor.

The City can lead community planting programs and encourage additional trees with incentive techniques in the Zoning Ordinance.

Planting trees can be an annual community event that is also relatively inexpensive. The City is now working with the Alliance of Rouge Communities (ARC) to conduct a City-wide tree canopy survey using City Green software to quantify and evaluate the City's urban forest.

KRESGE FOUNDATION HEADQUARTERS

Kresge Foundation

In 2006, the Kresge Foundation has completed renovations to its headquarters in Troy in 2006 and 2015, which include the addition of a new a series of environmentally friendly site improvements. The project also restored 19th Century farm buildings on the 3 acre site. The use of green roof materials, geothermal wells, and recycled materials help the facility function efficiently. The Kresge Foundation is one of the top 20 largest private foundations in the U.S. The Kresge Foundation advances its mission to promote human progress by expanding opportunity for people with low incomes in America's cities. A staff of over 100 employees work to expand opportunities in America's cities for people with low incomes through grantmaking and social investing nationally in arts and culture, education, environment, health, human services and placed-based work in Detroit, Memphis, New Orleans and other parts of the country. (see https://kresge.org/about-us/careers/) .

Source: www.worldarchitecturenews.com

LEED Across Michigan

Michigan is a national leader in the area of green building. As of 2013 there are 410 LEED certified projects in Michigan. West Michigan is especially successful in its encouragement of green building. In fact, the City of Grand Rapids has been recognized by the U.S. Green Building Council as a national award-winner in green building. Grand Rapids has more square footage per capita of LEED certified buildings than any other city in the United States. The City itself lead the way with the development of its own new LEED certified Water and Environmental Services Facility, which uses 23 percent less gas and 35 percent less water than similar buildings of its use and size.

Private industry in Grand Rapids has also taken the green building initiative seriously. Steelcase and Herman Miller have voluntarily followed environmentally safe procedures for manufacture of furniture and Crystal Flash, a gasoline station chain, has begun offering biodiesel on a more widespread scale.

These and other Michigan companies, including large corporations like Ford, have begun to realize the benefits to green building in more ways than one. Not only do these companies realize actual savings in terms of building maintenance and energy use, but they also contribute to their public image by encouraging environmental stewardship.

Michigan Business Report; Michigan Economic Development Corporation, Volume 5, Issue 2, 2007

Waste Reduction

While the City has an extensive recycling program for its residents, the City could also institute a waste reduction program for its own operations. Waste reduction makes good business sense because it saves money through reduced purchasing and waste disposal costs. The US Environmental Protection Agency has a program called “WasteWise” that provides free technical assistance to help develop, implement, and measure waste reduction activities.

Adaptive Reuse

The economic impacts of the Covid-19 Pandemic, particularly the office market, continue to play out over time. Many zoning districts in Troy permit flexibility in the use of space, including the repurposing of offices into residential buildings. In October, 2022, the Planning Commission granted Preliminary Site Plan Approval to Forum Flats, a 200-unit multi-family development on Kirts Boulevard. This project included the conversion of a vacant 3-story office into 90 apartments. In addition, the development included two new 4-story, 55-unit apartments. This project had the effect of replacing underperforming office space while adding 200 new housing units to the market. This adaptability is important as Troy continues to evolve.

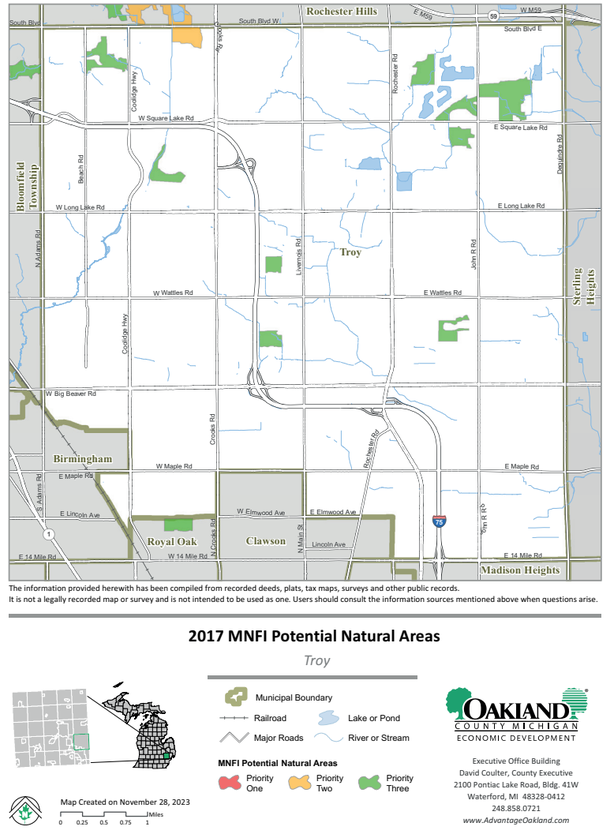
The City should also continue to identify opportunities for adaptive reuse of obsolete properties within its own facilities network. A good example of City-initiated adaptive reuse is the creation of the Sanctuary lakes Golf Course from a former landfill site. This 18-hole golf course is a critically acclaimed asset to the City and makes use of challenging property to create a significant asset for the community.

Natural Features Inventory

The Michigan Natural Features Inventory has been documenting and tracking the location and condition of Michigan's rare species and habitats for more than 40 years. The program is now run by the Michigan State University Extension since 2000.

In 2017, MNFI prepared an update for Oakland County. Portions of Troy have been designated as Priority II and Priority III areas. Most of the areas in the MNFI data are located along waterways or related to floodplains that are part of the Gibson Drain, Lane Drain, or Ferry Drain systems that are tributaries to the Clinton River. Additionally other sites are located along the River Rouge watershed tributaries and floodplains within the city.

The MNFI and Oakland County examined each natural area based upon specific scaled criteria to prioritize sites. Criteria included size, stream corridor, landscape connectivity, restorability of surrounding lands, vegetation quality, parcel fragmentation, and number of known rare species and natural communities. Based on scored criteria, sites were ranked high (priority I), medium (II), and low (III) for priority protection status.



For more information please visit:
https://www.oakgov.com/home/showpublisheddocument/494/638027377124100000

Electric Vehicles and EV Charging Stations

Electric vehicles offer an alternative to gasoline and diesel-powered vehicles. The benefits of electric vehicles and EV infrastructure include reduced air pollution and noise and reduced expenditures on gasoline. As the automobile industry ramps up efforts to produce more electric vehicles, EV infrastructure must also expand.

The Southeast Michigan EV Resource Kit and Planning Hub gives local communities and stakeholders quick access to key data and background information, the current status of infrastructure and deployment, funding opportunities, and local case studies and best practices. The EV Hub will be updated and expanded as needed to address emerging issues and respond to changes in technology, the market, grant programs, laws and regulations, state and federal Policies, and requests and recommendations from communities, organizations, educational institutions, and other stakeholders.

The Hub maintains real time data related to publicly accessible charging locations by community. As of November 23, 2022, Troy had the most EV charging stations in Oakland County with 21. Zoning is not a barrier for the construction of EV charging stations in Troy. EV charging stations are permitted by right on any property, subject to review and approval of appropriate permits including electrical permit. (Source: SEMCOG, Electric Vehicle Resource Kit & Planning Hub).