Planning Commission Meeting Agenda
Tuesday, October 15, 2024, 7:00 PM
Council Chambers, 616 NE 4th AVE

NOTE: The City welcomes public meeting citizen participation. TTY Relay Service: 711. In compliance with the ADA, if you need special assistance to participate in a meeting, contact the City Clerk's office at (360) 834-6864, 72 hours prior to the meeting so reasonable accommodations can be made (28 CFR 35.102-35.104 ADA Title 1)

To Participate Remotely:

OPTION 1 -

1. Go to www.zoom.us and download the app or click "Join A Meeting" and use Meeting ID – 828 9400 4377
2. Or, from any device click https://us06web.zoom.us/j/82894004377

OPTION 2 - Join by phone (audio only):
Dial 877-853-5257 and enter meeting ID# 828 9400 4377

For Public Comment:
Click the raise hand icon in the app or by phone, hit *9 to "raise your hand", or email to communitydevelopment@cityofcamas.us

These will be entered into the meeting record. Emails received up until one hour before the start of the meeting will be emailed to the Meeting Body prior to the meeting start time.

CALL TO ORDER

ROLL CALL

PUBLIC COMMENT

This is the public's opportunity to comment about any item on the agenda, including items up for final action.

MINUTES

1. August 20, 2024 Planning Commission Meeting Minutes

MEETING ITEMS

2. Our Camas 2045 Climate and Resiliency Element - Greenhouse Gas Inventory and Vulnerability and Risk Assessment
   Presenters: Alan Peters, Community Development Director; Emma Johnson, WSP; Claudia Denton, Parametrix

3. Strategic Plan Listening Session
   Presenter: Lauren Hollenbeck, Senior Planner

MISCELLANEOUS UPDATES

NEXT MEETING DATE

CLOSE OF MEETING

Planning Commission Meeting Minutes
Tuesday, August 20, 2024, 7:00 PM
Council Chambers, 616 NE 4th AVE

CALL TO ORDER

Commissioner Niles called the meeting to order at 7:00 p.m.

ROLL CALL

Planning Commissioners Present: Geoerl Niles, Mahsa Eshghi, Joe Walsh, Marlo Maroon and Shawn High

Commissioners Excused: Troy Hull and Paul Anderson

Staff Present: Alan Peters and Carey Certo

PUBLIC COMMENT

There was no public comment.

MINUTES

1. June 18, 2024 Planning Commission Meeting Minutes

   It was moved by Commissioner High and seconded by Commissioner Maroon, to approve the minutes of the June 18, 2024, Planning Commission Meeting. The motion passed unanimously.

MEETING ITEMS

1. Our Camas 2045 - Land Use Alternative Development
   Presenter: Alan Peters, Community Development Director

   Alan Peters reviewed the Our Camas 2045 Land Use Alternative Development and responded to Commissioners questions.

MISCELLANEOUS UPDATES

There were no miscellaneous updates.

NEXT MEETING DATE

The next meeting is scheduled for September 17, 2024.

CLOSE OF MEETING

The meeting closed at 8:42 p.m.

our Camas
Hometown. Our Town. 2045

our Downtown Camas
Hometown. Downtown. Our Town. 2045

Climate and Resiliency Element of the Comprehensive Plan

October 15, 2024

Planning Commission Meeting

Agenda

Time	Subject	Lead
7:00 5 mins	Climate and Resiliency Element	Alan Peters, City of Camas Emma Johnson, WSP
7:05 25 mins	GHG Inventory Results	Claudia Denton, Parametrix
7:30 10 mins	Vulnerability and Risk – Overview	Emma
7:40 30 mins	Vulnerability and Risk – Group Discussion	Emma
8:10 5 mins	Next Steps	Emma

Climate Change and Resiliency Element

- **Greenhouse Gas (GHG) Emissions Reduction Sub-element**
  - ***Purpose:*** Identify actions Camas will take to:
    - Reduce overall GHG emissions generated by transportation and land use;
    - Reduce per capita vehicle miles traveled (VMT); and
    - Prioritize reductions that benefit overburdened communities.
  - ***Analysis:*** Community GHG Inventory (complete)
    - Results will help Camas establish targets and strategies to reduce emissions and VMT.
- **Resilience Sub-element**
  - ***Purpose:***
    - Equitably enhance resiliency to, and avoid or substantially reduce the adverse impacts of, climate change in human communities and ecological systems.
    - Must prioritize actions that benefit overburdened communities that will be most impacted by natural hazards due to climate change.
  - ***Analysis:*** Vulnerability & Risk Assessment
    - Focused technical analysis of the vulnerability of Camas' lakes and outdoor recreational areas to extreme heat (due October 2024).
    - Identification of vulnerable assets and resiliency policies (today's exercise).

GHG Inventory Results

Claudia Denton, GHG Lead
Parametrix

GHG Inventory Agenda

- GHG Inventory 101
- 2022 GHG Inventory Results
- Q&A

GHG Inventory 101

What is a GHG Inventory?

- **Accounting of greenhouse gases** (GHGs) emitted to or removed from the atmosphere **during a specified period** for an organization or geographic boundary.
- GHGs are in large part from the **combustion of fossil fuels**, but also include emissions from other sources like **refrigerants**, **wastewater treatment**, **waste disposal**, and **land use change**.
- GHG inventories provide an **emissions baseline and a means to track emissions reductions over time and progress toward goals.**

Greenhouse Gas	Chemical Formula	Global Warming Potential
Carbon Dioxide	CO_2	1
Methane	CH_4	28
Nitrous Oxide	N_2O	265
Other high-GWP gases	CFCs, HFCs, SF_6, etc.	up to 24,000

Source: IPCC 5th Assessment Report, 2014, 100-year values

What is 1 MT CO_2e?

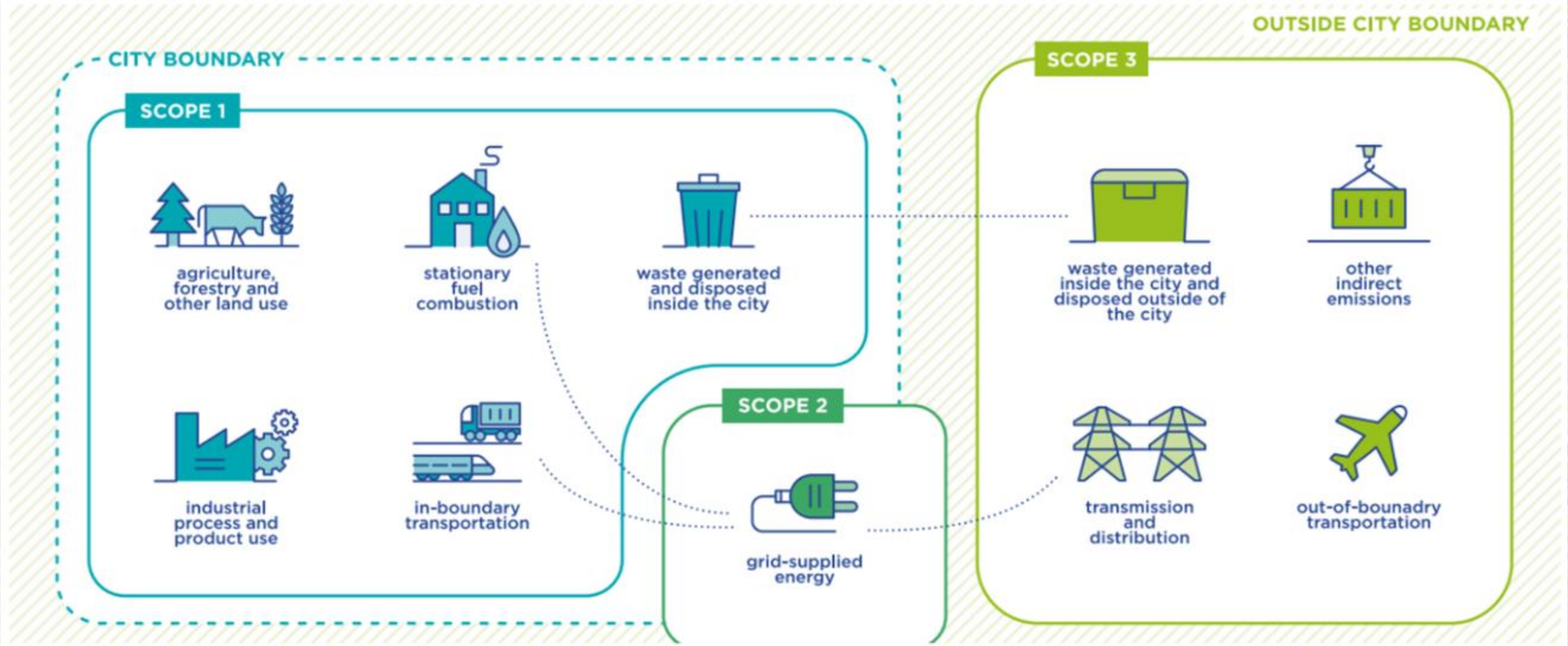
A Metric Ton of Carbon Dioxide Equivalent – a way to normalize GHG gases to CO_2.

One MT CO_2e is equal to any one of the following:*

- One passenger vehicle driven 2,500 miles
- 13% of one US home's energy use for a year
- 46 propane cylinders for home BBQs
- 1.2 acres of forest sequestration for 1 year

*Calculated using EPA's GHG Equivalencies Calculator

Inventory Boundaries



- Follows Washington State Department of Commerce requirements
- Calendar year 2022
- Camas geographic boundary

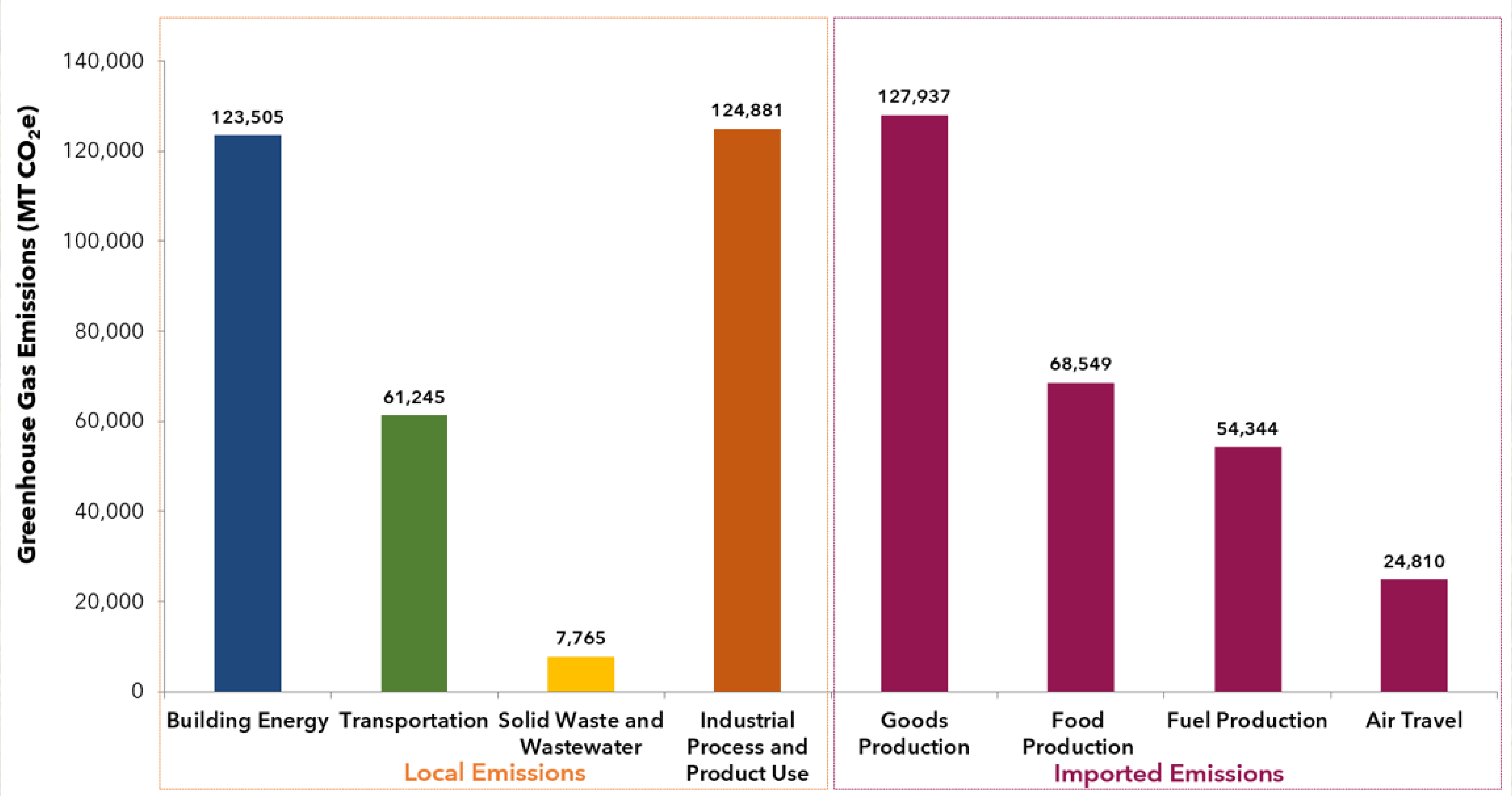
City of Camas 2022 GHG Inventory Results

Total Emissions

With a population of 27,000, all 2022 GHG emissions combined (local and imported) for Camas totaled
593,035 MT CO_2e

21.8
MT CO_2e
Per Capita

2022 Camas GHG Emissions Inventory Results



Local Emissions

2022 Camas GHG Emissions Inventory Results

Local 2022 Greenhouse Gas Emissions totaled
317,396 MT CO_2e

11.6
MT CO_2e
Per Capita

Building Energy	Transportation Energy	Industrial Process and Product Use	Solid Waste and Wastewater
39%	19%	39%	3%

- Largest sources of local emissions were
  - **Building energy**
  - **Industrial process and product use**
  - followed by **transportation**

Imported Emissions

2022 Camas GHG Emissions Inventory Results

Imported 2022 Greenhouse Gas Emissions totaled
275,639 MT CO_2e

10.1
MT CO_2e
Per Capita

46% **Goods Production**

9% **Air Travel**

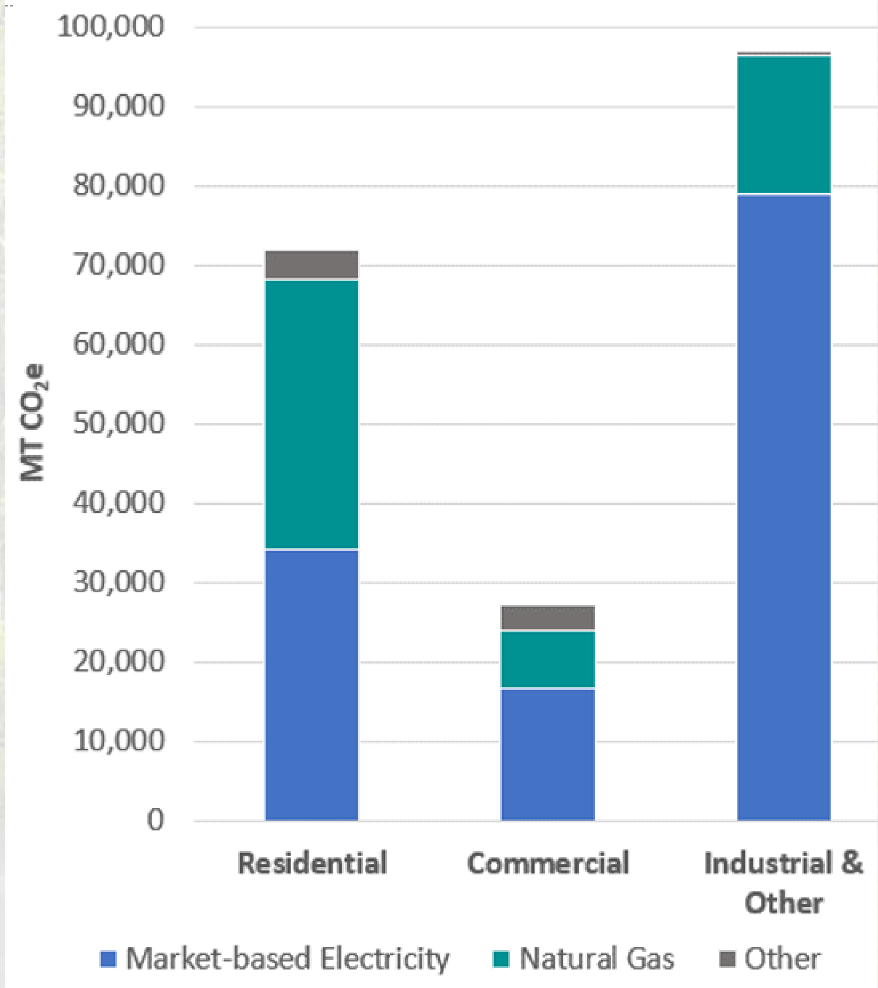
25% **Food Production**

20% **Fuel Production**

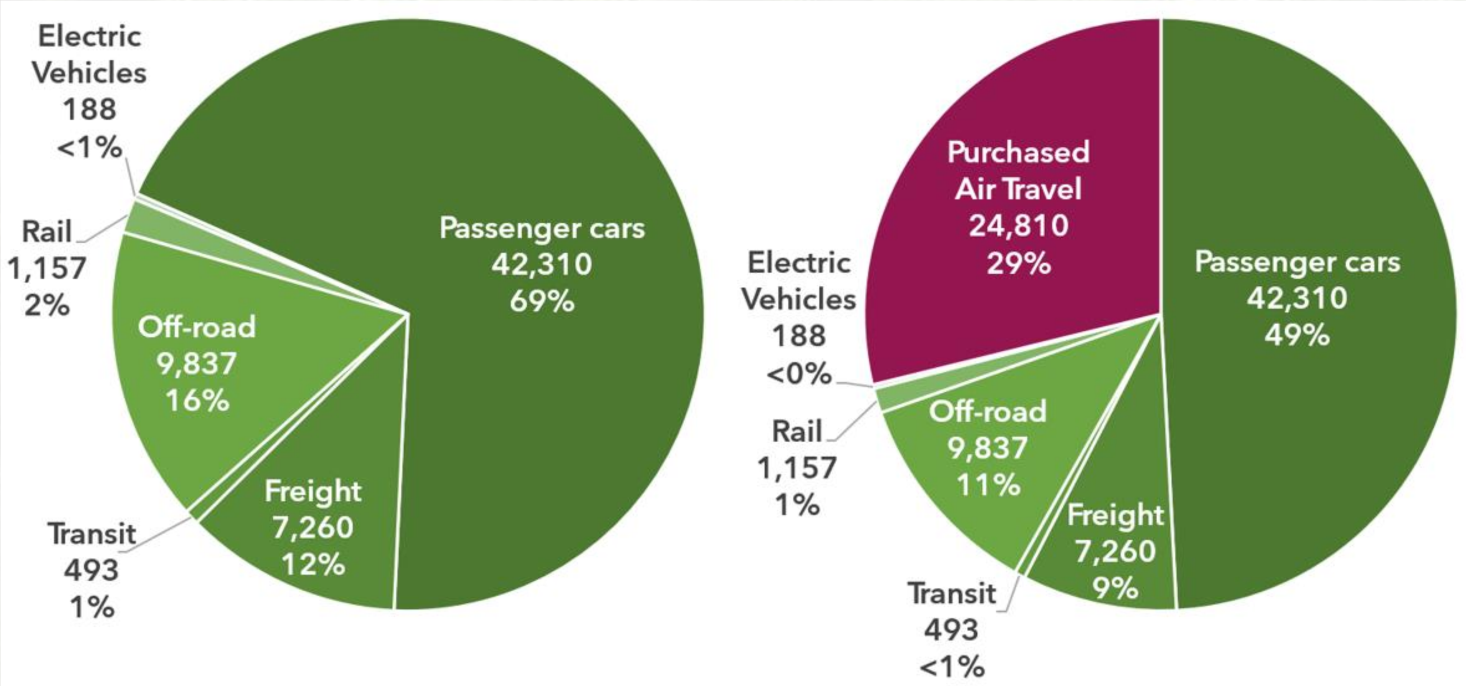
- Consumption of **goods** is largest source of imported emissions
- Followed by **food production** and **food production**

GHG Emissions by Sector – Building Energy

- **Electricity** is largest source of building energy emissions
- **Natural gas** is the second largest
- **Other fuels** include propane and fuel oil



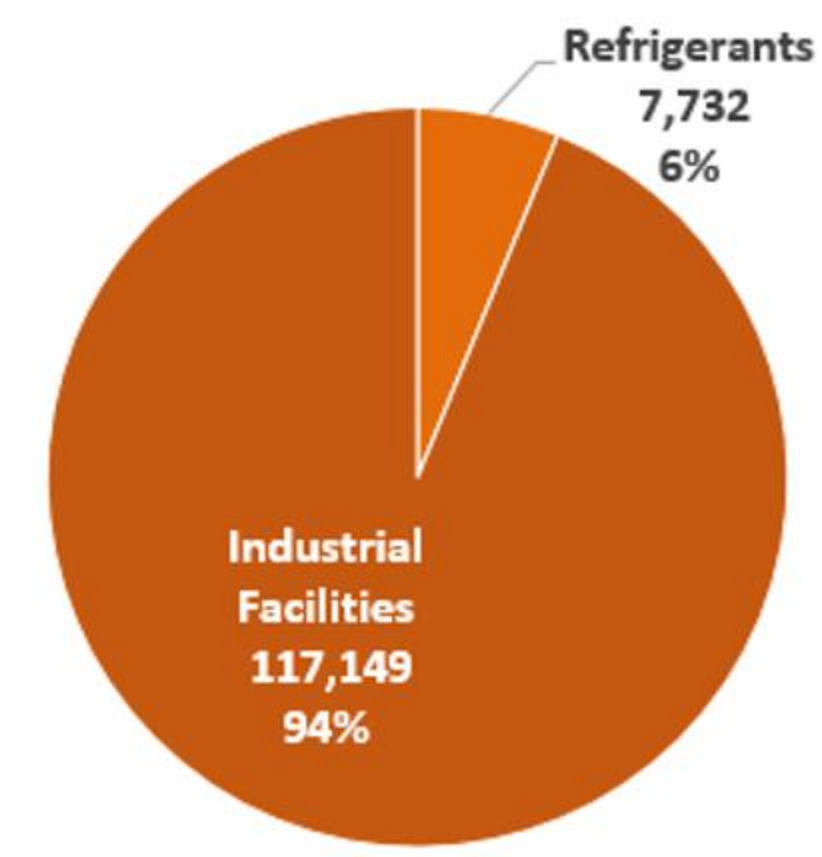
GHG Emissions by Sector – Transportation



- The largest contributor to transportation emissions is **gasoline**, followed by **purchased air travel** and **diesel**

GHG Emissions by Sector – IPPU

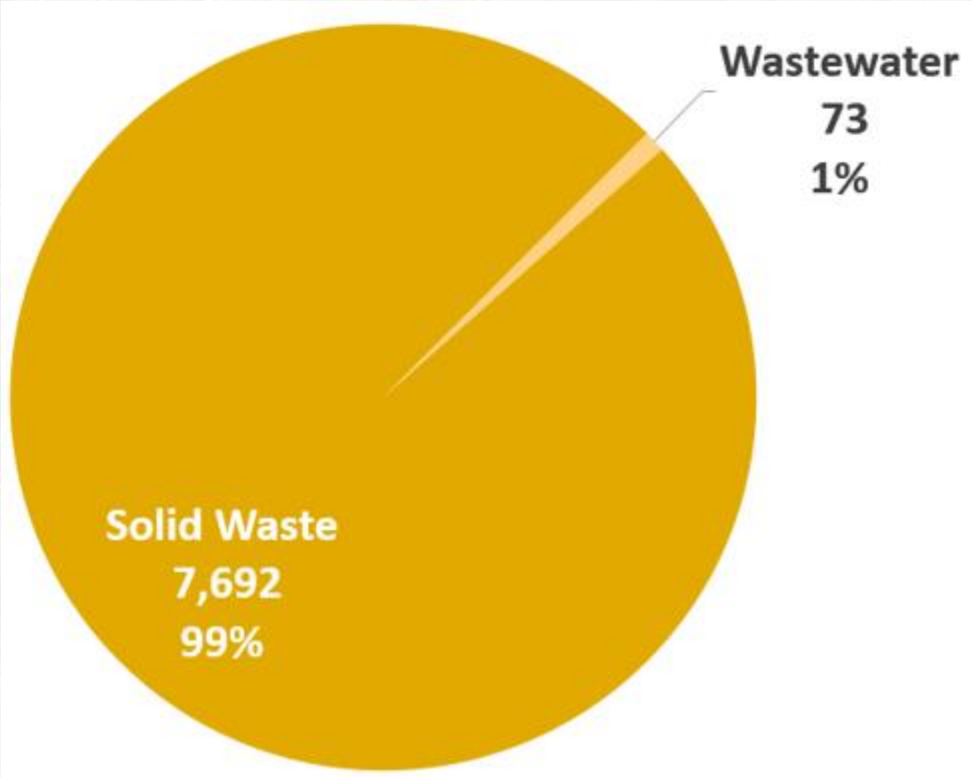
Industrial Process & Product Use (IPPU) Emissions



- **IPPU** are non-energy sources of emissions, and are a large source of emissions for Camas
- Specialized fugitive gases from **industrial facilities** contributed the largest share of emissions
- These gases are potent GHGs, up to 23,500 times that of CO_2

GHG Emissions by Sector – Waste & Wastewater

Solid Waste & Wastewater Emissions



- **Waste and wastewater** is a small source of emissions
- **Solid waste** is the largest portion
- **Central wastewater** is a small source of emissions in this category

Questions

Claudia Denton, GHG Lead

Parametrix

Climate Hazards in Camas

Probability: The likelihood a hazard will occur in the future.

Magnitude: The degree of impact or loss expected (informed by vulnerability).

- Cost of damage, response or recovery
- Number of people, structures or other assets impacted
- Severity of disruption (i.e., availability of alternatives)

Item 2.

Hazard Ranking: **High**

Extreme Heat

Annual days with a humidex** over 90°F

+ 42 days by 2050 | + 63 days by 2080

More hot days in summer will increase the risk of heat-related illness and may disrupt daily activities. Heat is expected to increase demand for water and electricity (air conditioning).

***Humidex is how hot it feels based on temperature and humidity*

Hazard Ranking: **Low**

Drought

Late summer precipitation (Jul 15 - Sept 15)

– 14% by 2050 | – 28% by 2080

Less rain in summer means less water will be available for human use when demand is high. This will also impact wildlife by reducing the amount of water in lakes and streams.

Hazard Ranking: **Medium**

Wildfires & Smoke

Annual days with high fire danger

+ 9 days by 2050 | Not Available by 2080

Hotter, drier conditions increase the potential for wildfires, which may burn near populated areas, causing evacuations and property damage. Wildfire smoke can damage human health and disrupt daily activities.

Hazard Ranking: **High**

Extreme Precipitation

Total annual precipitation

+ 12% by 2050 | + 17% by 2080

Heavy rains can overwhelm drainage systems, collapse roadways, make driving unsafe, and lead to landslides and floods. Rainstorms may bring strong winds that down trees or powerlines. Though less rain is expected in summer, more is expected in other seasons.

Hazard Ranking: **Medium**

Flooding

Peak streamflow in the Washougal River

+ 17% by 2050 | + 19% by 2080

Heavy rains cause flooding that may inundate homes, businesses, roads, and agricultural areas, leading to costly property damage and health impacts. Stream/river flooding can harm salmon and other aquatic species, create streambank erosion, and damage the quality of wildlife habitat.

Hazard Ranking: **Medium**

Landslides

Intensity of heavy precipitation events

+ 13% by 2050 | + 24% by 2080

Heavy precipitation increases the risk of landslides by saturating the ground and loosening soil. Landslides damage natural areas, buildings, and infrastructure in their path. Debris may block roads, poll waterways, and displace people living

Vulnerability & Risk Assessment

- Consider the vulnerability (sensitivity and adaptive capacity) of local assets to assess risk.
  - Sensitivity concerns the potential degree of impact to an asset.
  - Adaptive capacity concerns the ability of an asset to adapt to a hazard.
  - Risk includes the future probability and magnitude of a hazard.
- Identify which assets are more vulnerable to certain climate hazards and policies that will improve resiliency.

Identifying Assets in Camas

- Camas must develop at least one climate resilience goal and supportive policy for each of the 11 climate sectors:
  - Agriculture & Food Systems
  - Buildings & Energy
  - Cultural Resources & Practices
  - Economic Development
  - Ecosystems
  - Emergency Management
  - Health & Well-being
  - Transportation
  - Waste Management
  - Water Resources
  - Zoning & Development

Vulnerable Assets in Camas

Discussion: Which assets in Camas should be prioritized in the resiliency sub-element of the comprehensive plan?

Identify your **top 1-2** asset/hazard pairings and share with the group.

- *Example: Drought will affect Camas' tree canopy.*

Are there policies that could improve the resiliency of the asset to the hazard?

- *Example: Encourage the use of tree species that are drought resistant.*

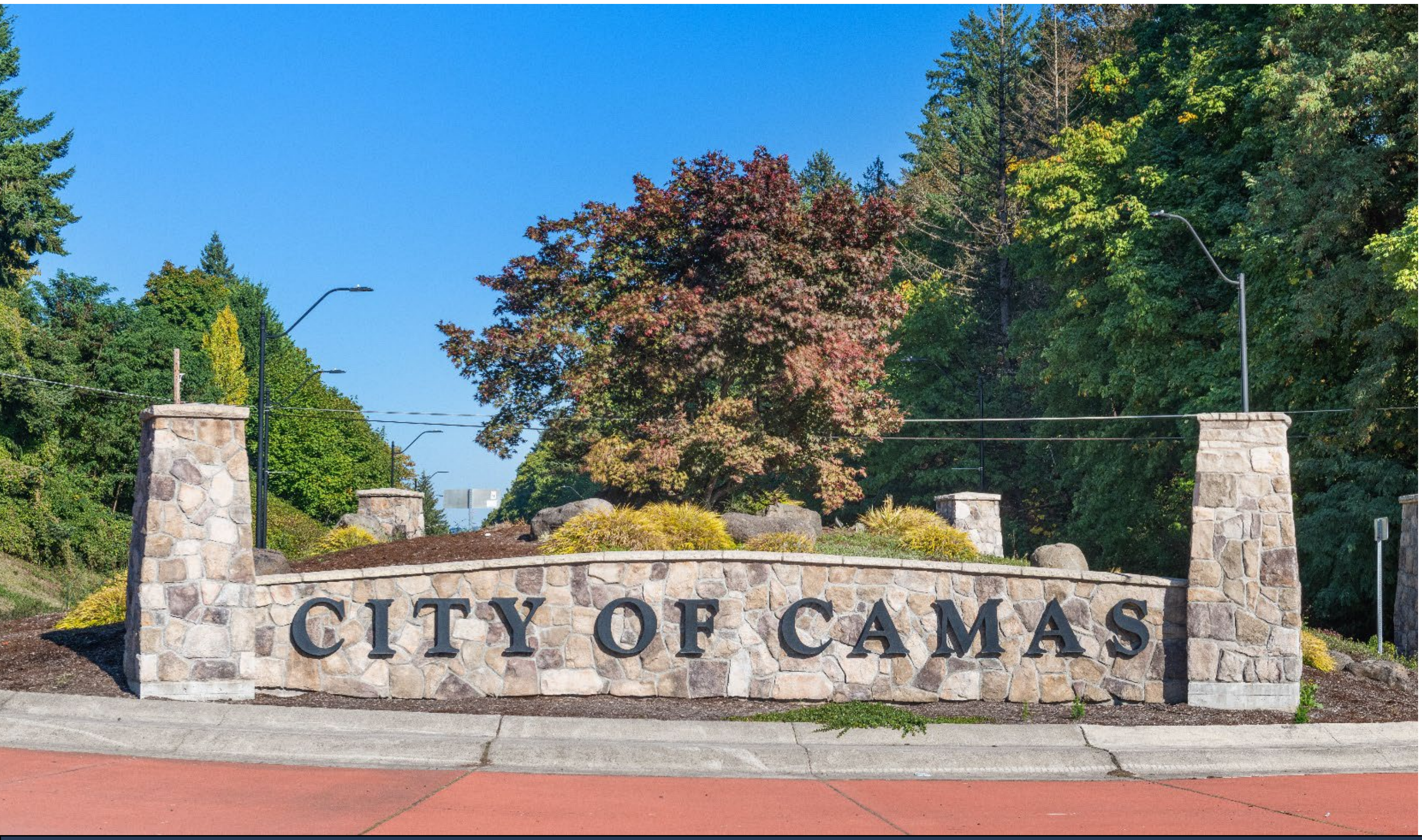
Next Steps

- Community Summit #2 to review land use alternatives
  - Tuesday, October 22nd from 4:30-6:30 PM
  - Fire Station 42 (4321 NW Parker St)
- Complete focused Vulnerability and Risk Assessment (Oct. 31, 2024)

Visit us online!

www.engagecamas.com/ourcamas2045

City of Camas
WASHINGTON



Camas, Washington

Community Greenhouse Gas Inventory

for Calendar Year 2022

July, 2024

Parametrix | good COMPANY

Acknowledgments

City of Camas Team

Alan Peters, Community Development Director

Robert Maul, Planning Manager

Clark County Team

Jenna Kay, Community Planning

Amy Koski, Public Health

Harrison Husting, Transportation

Special thank you to the Cities of Battle Ground, Camas, Ridgefield, Washougal and Vancouver; Waste Connections of Washington; Clark Regional Wastewater District; Clark County Public Utility District (PUD) and Northwest Natural Gas for providing necessary data for this inventory.

Consulting Team

Good Company, a division of Parametrix is the sustainability consulting team that conducted this greenhouse gas analysis on behalf of Clark County. Tracy Lunsford served as project manager. Claudia Denton, Beth Miller, and Suzy Godber provided data-gathering assistance and analysis. They are the primary authors of this report.

FUNDED BY WASHINGTON'S CLIMATE COMMITMENT ACT

The Washington Department of Commerce climate planning grant is supported with funding from Washington's Climate Commitment Act (CCA). The CCA supports Washington's climate action efforts by putting cap-and-invest dollars to work reducing climate pollution, creating jobs, and improving public health. Information about the CCA is available at www.climate.wa.gov.

Table of Contents

Figures

Tables

Executive Summary

In 2023, Washington enacted House Bill 1181, amending the Growth Management Act to include a climate goal and mandating the inclusion of a "climate element" in local comprehensive plans. As part of this, the entirety of Clark County conducted a community greenhouse gas (GHG) inventory for their 2025 Comprehensive Plan Update. This inventory for Camas is part of this larger effort and will help set targets and strategies to reduce GHG emissions and decrease per capita vehicle miles traveled (VMT).

This inventory follows internationally recognized Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories (GCP) and accounts for all significant sources of GHG emissions driven by activities taking place within the City of Camas's geographic boundary (local emissions). Beyond protocol requirements, the inventory also measures consumption-based emissions from imported goods and food, fuel, air travel, and the purchase of carbon offsets (imported emissions). Cama's total 2022 emissions are summarized below in Figure 1.

Summary of Findings

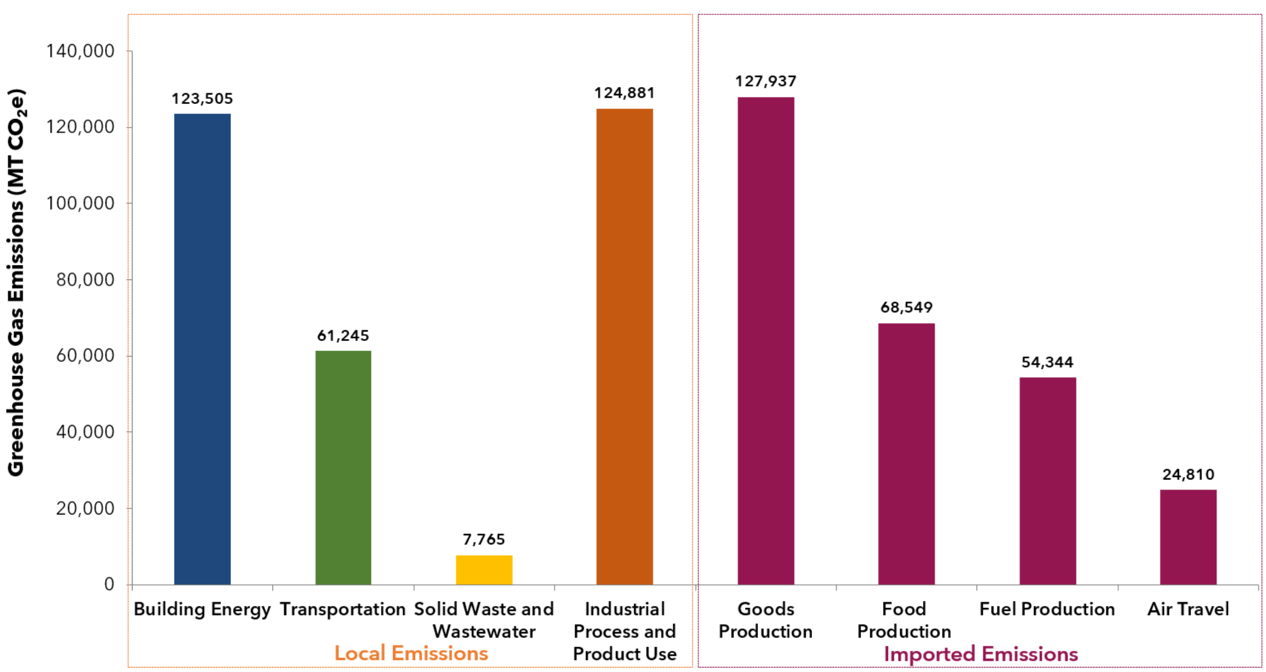
City of Camas GHG Emissions

With a population of 27,250, all 2022 GHG emissions combined (local and imported) for City of Camas totaled

593,035 MT CO_2e

21.8
MT CO_2e
Per Capita

Figure 1: Camas's 2022 Emissions



Local Emissions

Local emissions include emissions from activities occurring within Camas's geographic boundary and include the sectors listed below.

Local 2022 Greenhouse Gas Emissions totaled

317,396 MT CO_2e

11.6
MT CO_2e
Per Capita

Building Energy
39%

Transportation Energy
19%

Industrial Process and Product Use
39%

Solid Waste and Wastewater
3%

Imported Emissions

Imported emissions include emissions generated outside of the community during the production of goods, food, fuel, and service products consumed by Camas and include the activities listed below.

Imported 2022 Greenhouse Gas Emissions totaled

275,639 MT CO_2e

10.1
MT CO_2e
Per Capita

46% Goods Production

9% Air Travel

25% Food Production

20% Fuel Production

Introduction

Camas's community GHG inventory estimates the GHG emissions associated with the geographic boundaries of Camas. This report represents Camas's carbon footprint, and it provides a baseline for future GHG emissions tracking for the GHG reduction sub-element for the climate element of the comprehensive plan. This inventory can be used to better understand how different sectors impact emissions. The inventory will help provide context to evaluate future mitigation strategies and to inform further investment in community-level climate mitigation work and regional efforts with public agencies, utilities, nonprofit partners, and the business community.

Camas's community GHG inventory includes the following emissions sources:

Building Energy: Energy usage (primarily electricity and natural gas) by residential, commercial, and industrial buildings and facilities represents a major source of GHG emissions for most communities. These emissions come from the combustion of natural gas and from electricity generated from fossil fuels to heat water and power buildings. Small quantities of other combusted fuels are also included. Additionally, a fraction of natural gas is lost during local distribution, releasing methane, a potent greenhouse gas pollutant.

Transportation: Gasoline for passenger vehicles and diesel consumption for freight and bus transit are included in this category. Electricity use by electric vehicles is also included here where applicable.

Solid Waste and Wastewater: Landfilling organic matter (such as food scraps and paper) produces methane, another potent greenhouse gas. Most of this methane is collected and flared or burned for energy production, but some of it leaks. The treatment of wastewater also produces GHG emissions from nitrous oxide and methane.

Industrial Process and Product Use: Refrigerant emissions come from transportation and building cooling systems. Refrigerants are powerful global warming gases. Therefore, relatively small losses have a large climate impact. Known significant industrial process emissions are also included here. These emissions are not from the energy used in a factory, for example, but from the other processes involved in manufacturing. In inventory protocol, this is referred to as Industrial Process and Product Use.

Imported Emissions: These emissions are generated outside of the community during the production of goods, food, fuels, and service products consumed by residents. Imported emissions are also known as consumption-based emissions.

Inventory Results

The following section details the results of the GHG inventory for the Camas community for 2022. These emissions include both **local** and **imported** emissions. Further details on emissions by each sector are also provided.

All emissions are reported in metric tons carbon dioxide equivalent (MT CO_2e) defined to the right.

A full detailed methodology, list of data used, and details on reporting accuracy are provided in Appendix B, Appendix C, and Appendix D.

Definition: MT CO_2e

Metric tons of carbon dioxide equivalent is a unit of measure. Most greenhouse gases are more potent than carbon dioxide in warming the atmosphere. To calculate and compare emissions easily, all gases are calculated and combined into a carbon dioxide equivalent, typically measured in metric tons.

Local Emissions

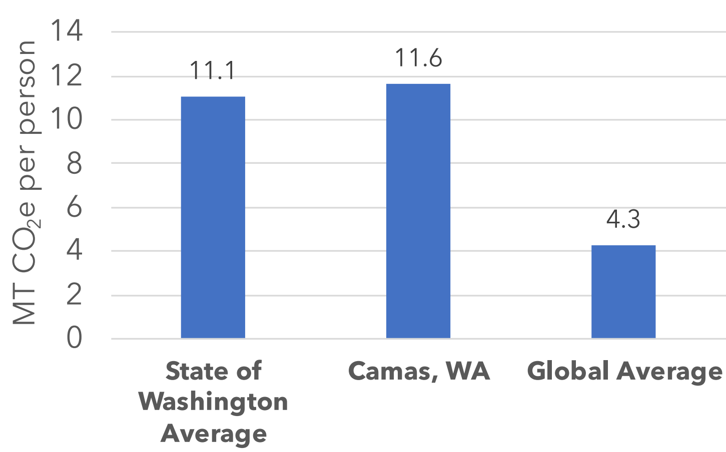
Protocols refer to **local emissions** as sector-based emissions that are generated from local sources within the community, such as vehicles and buildings. These emissions are generated close to home and are most often under the community's **direct control**. The Camas community generated **317,396 MT CO_2e** of local emissions which averages about **11.6 MT CO_2e** per resident.

This quantity of GHGs is equivalent to the carbon sequestered by over 370,000 acres of average U.S. forest land area, about 37 times the size of Camas.[1]

Average Per Capita Comparison

Compared to global and state of Washington per capita emissions averages, the **11.6 MT CO_2e** per person is slightly higher than the Washington state average of **11.1 MT CO_2e** per person (Figure 2) and is considerably higher than the global average of **4.3 MT CO_2e** per person.[2]

Figure 2: Comparison of Per Capita Emissions



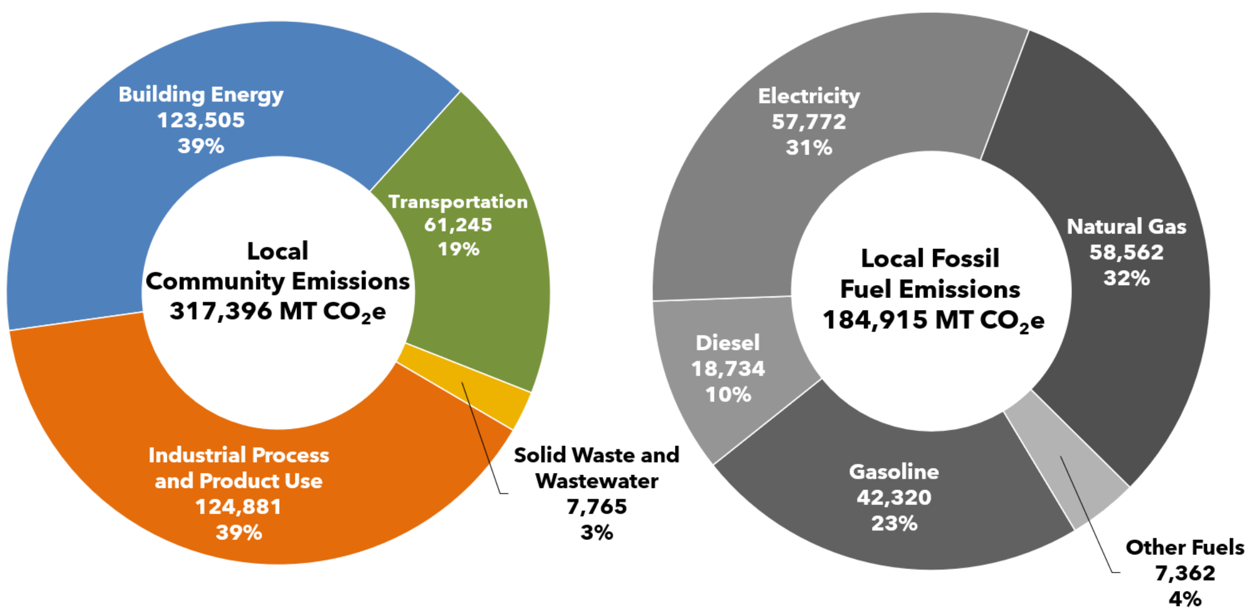
[1] U.S. EPA GHG Equivalencies Calculator: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.
[2] Data from World Bank. For details, visit https://data.worldbank.org/indicator/EN.ATM.CO2E.PC.

Local Emissions by Sector and Fossil Fuel Type

Camas's local emissions are shown on the left side of Figure 3 (below) and primarily come from **building energy**, **industrial process and product use**, and **transportation**. The right side of Figure 3 details fossil fuel use. Note that almost all emissions from **buildings** and **transportation** are from **fossil fuels** (**58% of local emissions**). All building energy emissions from fossil fuels are included here. However, not all building or transportation energy sources contribute to emissions. Electricity generated from zero-carbon sources, such as hydropower, does not contribute to the city's emissions; biofuels, such as R-99 and biodiesel, contribute minimal emissions.

Industrial process and product use and **solid waste and wastewater** emit non-fossil fuel emissions. These emissions include, but are not limited to, greenhouse gases from waste processing and water treatment, as well as high-global warming potential (GWP) gases – such as refrigerants. The emissions from these non-fossil sources are further discussed in the corresponding sector sections.

Figure 3: 2022 Local Community Emissions and Fossil Fuels Details



Imported Emissions

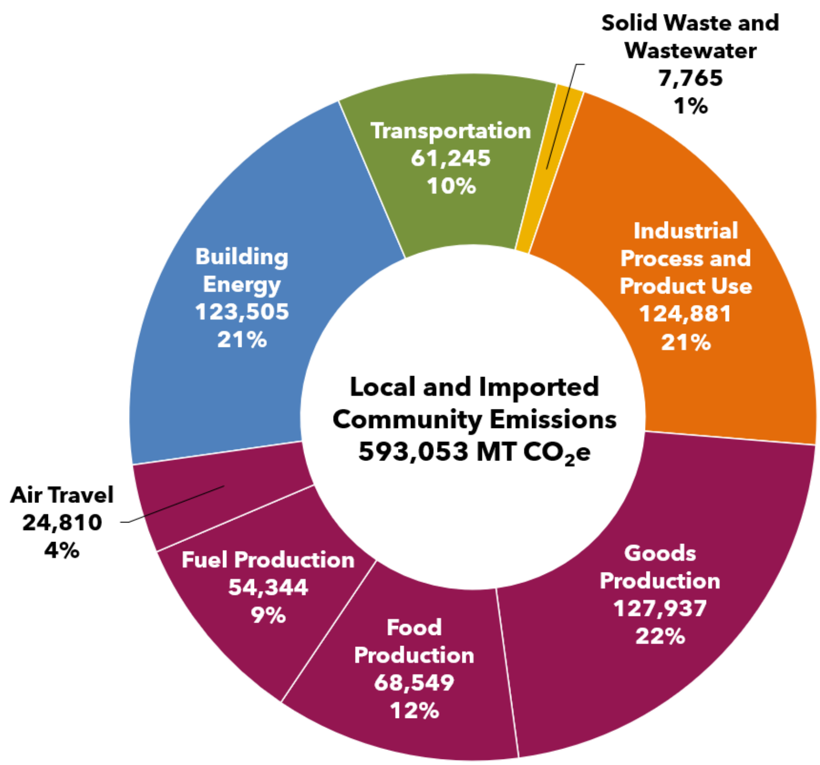
In addition to accounting for local emissions, the inventory also estimates **imported (consumption-based) emissions**, which are generated outside of Camas to produce and provide the imported **goods, food, air travel,** and **production and transport of fuels** consumed by local households. Imported emissions total **275,639 MT CO_2e** in addition to sources of local emissions.

This quantity of GHGs is equivalent to the carbon sequestered by over 320,000 acres of average U.S. forest,[3] an area 1.4 times the size of Mount Rainier National Park.

Figure 4 compares the scale of local, sector-based emissions to imported emissions from household consumption. Within **goods**, the largest purchasing categories include **furniture, clothing, construction materials,** and **electronics.** Within **food**, the largest emissions are from the **production of meats**, particularly **beef** products.

Upstream emissions from **fuel production** (gasoline, diesel, electricity, and natural gas) and **air travel** from flights taken by residents (regardless of airport location) are also significant sources of imported emissions.

Figure 4: Local and Imported Emissions



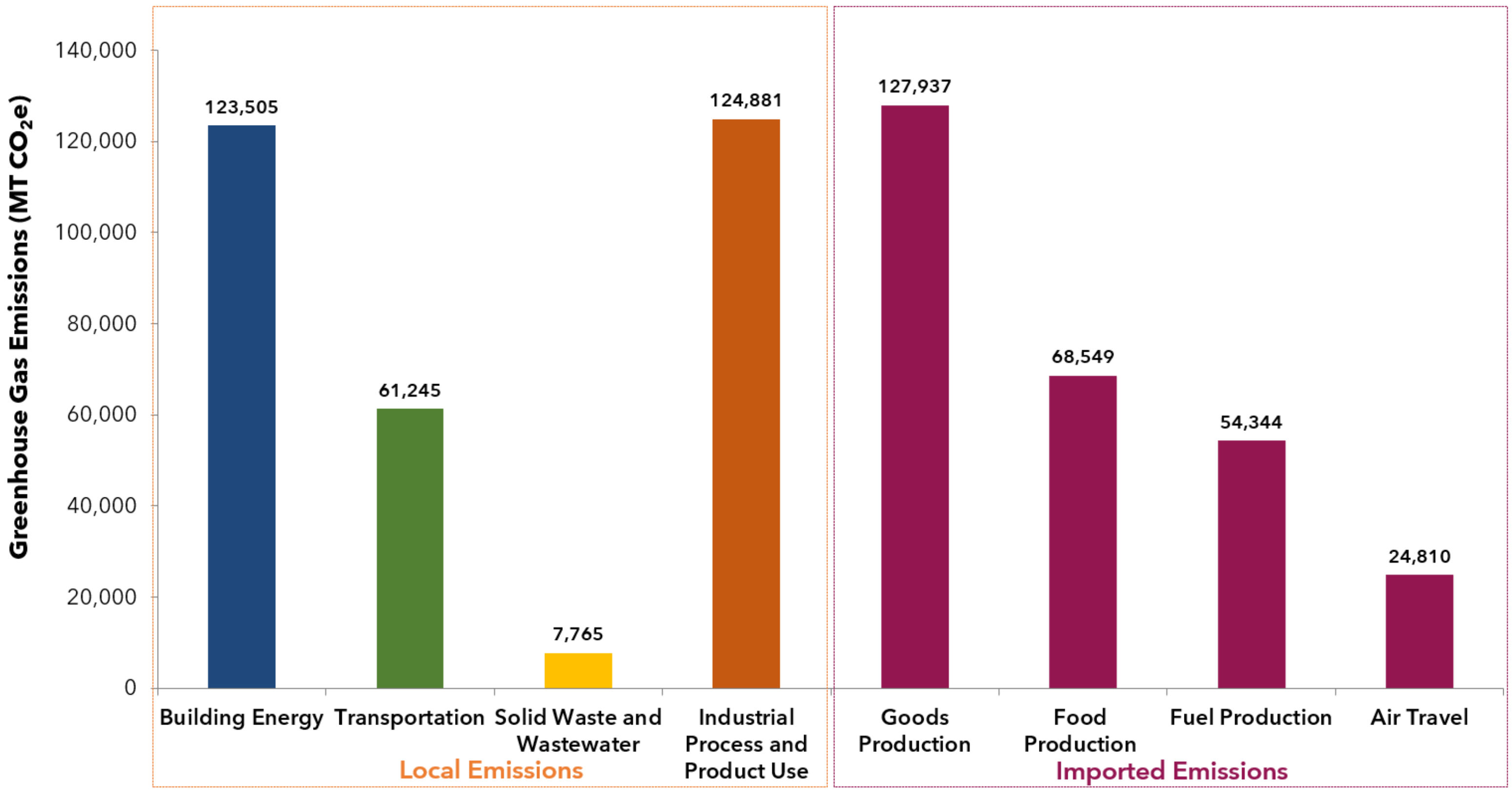
[3] U.S. EPA GHG Equivalencies Calculator: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

Total Emissions

Local and imported emissions combine for a total of **593,053 MT CO_2e** (shown below in Figure 5), or **21.8 MT CO_2e per resident.** There are **negative emissions** from voluntary purchase of **carbon offsets** from Northwest Natural Gas customers, which are outlined in the Building Energy section (**956 MT CO_2e**). Note that the net benefit from Clark County Public Utility District customers' purchase of renewable electricity in the form of Renewable Energy Certificates (RECs) is accounted for in the building energy sector (market-based accounting) and reduced emissions by approximately **250 MT CO_2e.**

593,053 MT CO_2e of GHGs is roughly equivalent to the carbon sequestered by about 700,000 acres of average U.S. forest, an area roughly 165% of the size of Clark County

Figure 5: Camas's 2022 Emissions Sources

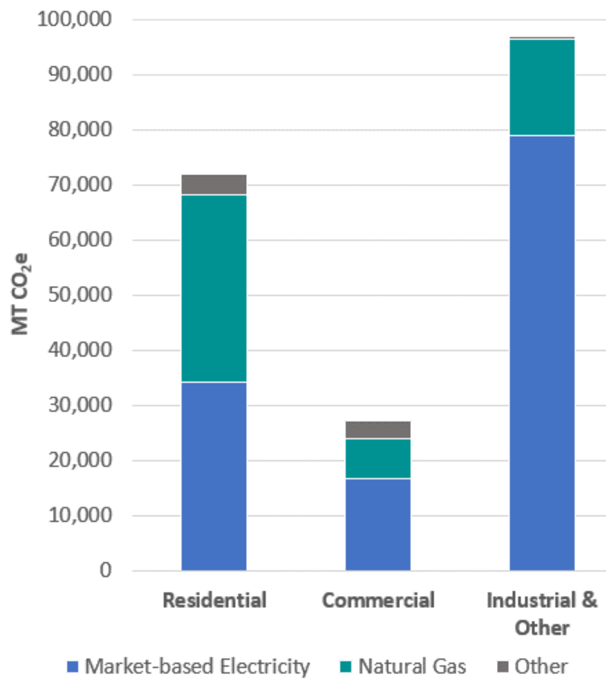


Inventory Highlights

Building Energy

Energy used in buildings is Camas's second largest source of local GHG emissions, accounting for **39%** of local emissions. These emissions come from a mix of electricity, natural gas use, and other stationary combusted fuels, and they result in **123,505 MT CO_2e**.[4] By energy type, natural gas had the largest impact (47% of total building emissions); closely followed by electricity (47%); and other fuels (6%). Figure 6 shows emissions by subsector and energy type. Fugitive natural gas escaping from local distribution systems was reported by Northwest Natural Gas and accounts for 0.5% of total building emissions.

Figure 6: Building Energy Emissions by Source



The market-based electricity accounting method uses utility-specific factors and accounts for voluntary community participation in utility-sponsored green power programs.

Renewable Electricity Purchase

In 2022, Clark County Public Utility District's customers in Camas purchased renewable energy in the form of RECs equal to less than 1% of demand, which decreased market-based electricity accounting emissions by nearly **250 MT CO_2e**. Purchasing these RECs actively reduces Camas's building energy emissions.

Natural Gas Offsets

Additional negative emissions are from carbon offsets purchased by natural gas consumers. Less than 1% of the natural gas used in Camas is offset by community members who participate in Northwest Natural's Smart Energy Offsets program (**956 MT CO_2e**). This program allows customers to purchase carbon offsets from The Climate Trust on their bill to offset emissions from their natural gas use. Purchasing these offsets does not reduce Camas's emissions, but they are accounted for separately as negative emissions.

[4] All emissions estimates use market-based accounting for electricity unless otherwise noted. Market-based electric accounting totals **123,505 MT CO_2e**, while location-based accounting totals **195,817 MT CO_2e**. See Appendix C: Electricity for information about market-based versus location-based accounting.

Transportation

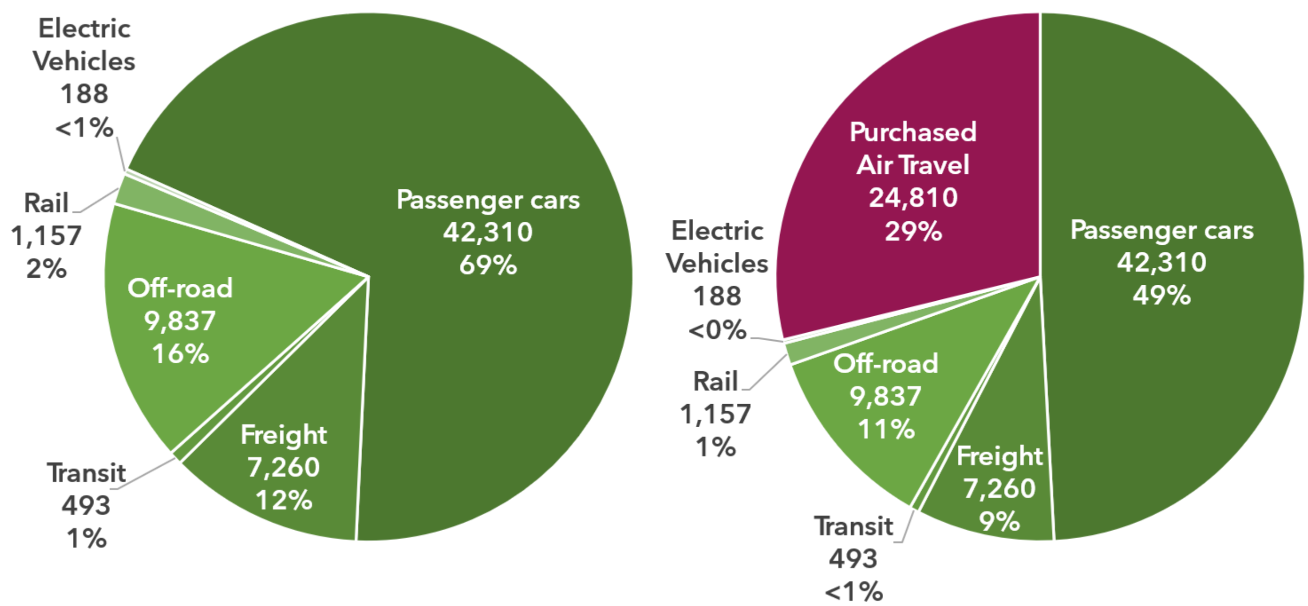
Transportation emissions are the third-largest source of local emissions for Camas, totaling **61,245 MT CO_2e**. On-road passenger vehicles were the leading source of local transportation emissions and are responsible for **69%** of local transportation emissions. These emissions originate from fossil gasoline sales, primarily used by private-use cars and trucks but also include a small percentage of non-road uses. This category also includes the small amount of electricity used by electric vehicles (**<1%**). The next-largest category is off-road fuel sales, which included the purchase of propane and diesel and accounted for **16%** of total emissions. Fossil diesel sales, primarily used by freight and commercial vehicles, comes as next-highest at **12%**; most of these emissions are expected to be from on-road vehicles but may also include non-road equipment. Rail accounted for **2%** of local transportation emissions and transit accounted for the remaining **1%**. Fuel emissions were calculated based on VMT data, further discussed in Appendix D: Summary of Data and Emissions Factors.

Many residents travel by airplane, whether within the Camas boundary or not (for example, those traveling by air from Portland Airport), and air travel is part of the community's **imported emissions**. As is shown in Figure 7, emissions from air travel (**magenta**) are a significant source of emissions in addition to local transportation emissions (**green**). Imported air travel emissions are estimated at about **24,810 MT CO_2e**.

Figure 7: Transportation Emissions Breakdown

Left: Camas's transportation emissions, excluding air travel.

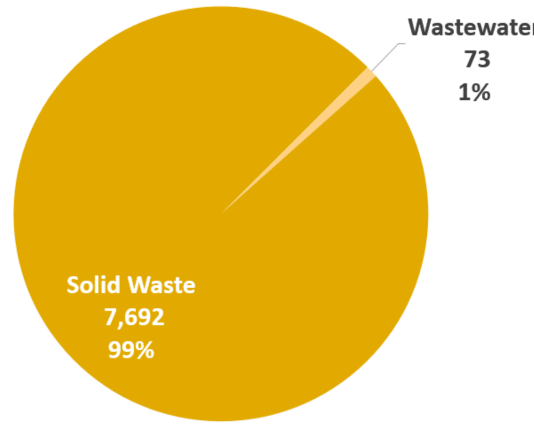
Right: Camas's transportation emissions, including imported emissions from air travel.



Solid Waste and Wastewater

Solid waste and wastewater emissions total approximately **7,765 MT CO_2e**, **3%** of local emissions. Figure 8 illustrates the breakdown of emissions from both solid waste and wastewater.

Figure 8: Solid Waste and Wastewater Emissions



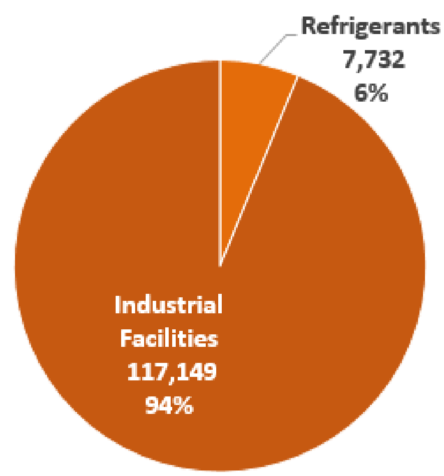
Camas's solid waste emissions are estimated to total **7,692 MT CO_2e**. Clark County has no landfills that handle municipal waste within its geographic boundaries. Waste was landfilled at Finley Butte or Wasco County landfills. This includes emissions from the Georgia Pacific industrial landfill within Camas's boundary.

Wastewater is processed by Clark County Regional Wastewater District and is included in the analysis. Total wastewater process emissions are estimated to total **about 73 MT CO_2e**.

Industrial Process and Product Use

Industrial Process and Product Use (IPPU) emissions are the second largest source of local emissions. IPPU emissions are non-energy sources of emissions from unintentional leaks or discharges of gases from equipment or facilities. They come from refrigeration systems (air conditioning, refrigerators, freezers) or specialized industrial processes – chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), nitrogen trifluoride (NF_3) – and have a large climate impact, up to 23,500 times the global warming potential of an equivalent weight of CO_2 depending on the gas. Figure 9 illustrates the breakdown of IPPU emissions.

Figure 9: Industrial Process and Product Use Emissions



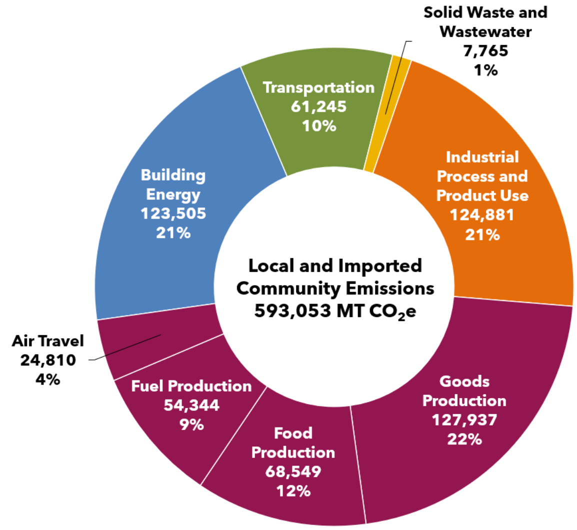
Fugitive loss of refrigerants from residential and commercial buildings and vehicle air conditioning and refrigeration equipment are a smaller proportion of Camas's IPPU emissions. These sources are estimated to be **7,732 MT CO_2e**.

Industrial process emissions (excluding energy use) were identified for three different industrial manufacturing facilities within Camas. These emissions total **117,149 MT CO_2e** for 2022. *All industrial emissions visible in state and federal reporting are limited to building energy emissions and are included in the Building Energy section.*

Imported Emissions: Consumption of Goods, Food, Fuel, and Air Travel

Camas's inventory goes beyond GPC requirements to highlight the known large sources of **imported emissions** from consumption activities. These emissions are considered Other Scope 3 in GPC protocol. These imported emissions will be in another community's local accounting. This means that the community has less control over these emissions compared with sources of local emissions. That said, these emissions are included in the inventory because they are large, they are caused by local demand, and opportunities exist to reduce these emissions locally by reducing consumption. These emissions were estimated at **275,639 MT CO_2e** and make up **47% of total emissions** (Figure 10).

Figure 10: Imported Emissions Detail



Consumption of imported **goods** is the largest source for Camas's imported emissions. The largest contributors to this category include **furniture, clothing, construction materials, and electronics.** The next-largest category is **food** and beverage, where the largest emissions are from **meat**, especially **beef**. Upstream **fuel production**, specifically gasoline production, is another large source, which goes hand in hand with passenger transportation. **Air travel** is also a significant source of Camas's imported emissions. Note that these air travel emissions are from air travel trips taken by residents regardless of airport location.

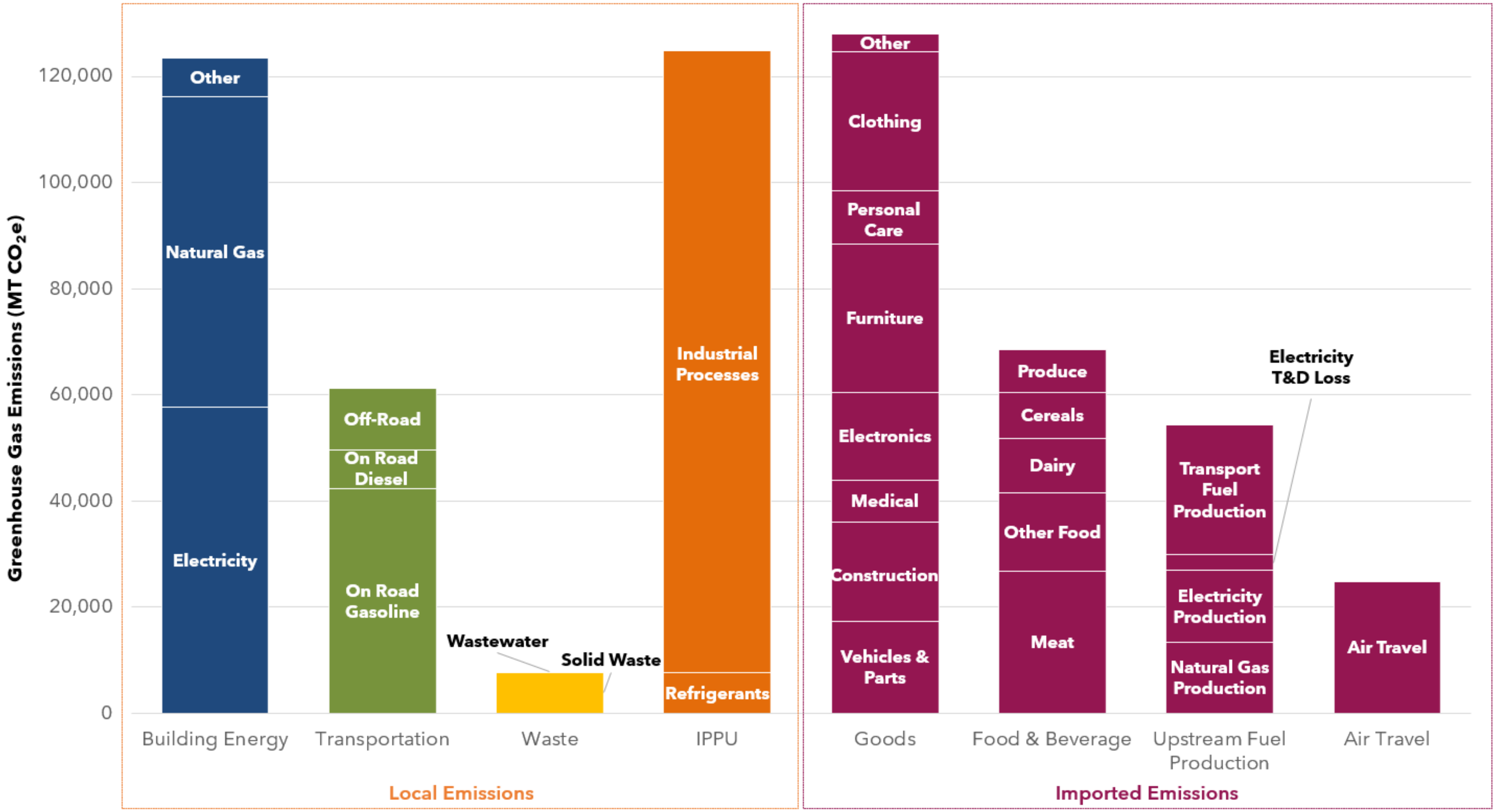
Category Descriptions

- **Goods:** These emissions are from extracting, manufacturing, and transporting raw materials into final products such as building materials, automobile, furniture, clothing, and other goods.
- **Food & Beverage:** These emissions are from agriculture (energy for irrigation, production of fertilizers, methane emissions from livestock, etc.) and transportation of raw materials and finished products. Categories include produce, cereals, dairy, meat, and others.
- **Upstream Fuel Production:** Process and energy emissions from the extraction and production of fuel products (electricity from household outlets, gasoline pumped into cars, natural gas combusted by furnaces, etc.). These upstream emissions are considered at the community scale for electricity, natural gas, gasoline, and diesel (not available for propane and fuel oil). These emissions are separate from those that are generated when the fuel is used in your car or house.
- **Air Travel:** Emissions associated with air travel by the community (regardless of the airport's location).

Full Breakdown of Emissions Categories

Figure 11 below provides a full breakdown of Camas's 2022 GHG emissions.

Figure 11: Full Breakdown of Emissions Categories



Appendix A: Glossary of Terms

Carbon (or Greenhouse Gas) Footprint

These are the total emissions of greenhouse gases that are directly and indirectly released into the atmosphere each year by a given activity, which can be of an individual, a community, an organization, a process, a product or service, or an event, among other things. It is usually measured in tons of carbon dioxide equivalent.

Climate Action Plan

A comprehensive response to climate change tailored to local circumstances that includes a greenhouse gas inventory, goals for emissions reduction, and feasible strategies for action. It is a road map for making informed decisions and understanding how to achieve the most impactful and cost-effective greenhouse gas reductions in alignment with the organizational mission.

Climate Change

A change in global or regional climate patterns. A change apparent from the mid- to late-20th century onward and attributed largely to the increased levels of atmospheric carbon dioxide produced using fossil fuels.

Carbon Dioxide

Carbon dioxide (CO_2) is the most common and abundant greenhouse gas, and it is produced in large amounts when fossil fuels are burned.

Fugitive Emissions

Unintentional emission, leakage, or discharge of gases from pressure-containing equipment or facilities and components, such as valves, piping flanges, pumps, storage tanks, etc.

Fossil Fuels

Combustible material obtained from below ground and formed during a geological event. Fossil fuels of importance to climate change are coal, oil, and natural gas.

Greenhouse Gases

Emission of greenhouse gases are the cause of current climate change. An inventory of GHGs measures gases in units of carbon dioxide equivalents (CO_2e). A GHG inventory is also known as a carbon footprint.

Global Protocol for Community-Scale Greenhouse Gas Emission Inventories

This type of inventory follows a set protocol, the Greenhouse Gas Protocol (GHGP) standard for cities and communities, known as Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC). This protocol determines what is included within a set boundary and categorizes emissions by sector. See Local Emissions (Sector-Based) Greenhouse Gas Inventory for more information.

Global Warming Potential

Global warming potential (GWP) refers to the potency of emissions to trap heat in the atmosphere. Carbon dioxide has a GWP of 1, and other greenhouse gases are more potent and expressed as a multiple of carbon dioxide. For example, methane has a GWP of 28, meaning one molecule of methane has 28 times the effect of one molecule of carbon dioxide (United Nations Intergovernmental Panel on Climate Change Fifth Assessment Report values [IPCC AR5]).

Imported Emissions (also known as Consumption-Based Emissions or Other Scope 3)

Emissions from consumption of imported goods and services, also known as Other Scope 3 Emissions per GPC protocol, include emissions from upstream fuel production and household consumption, such as food, household goods, and air travel.

United Nations Intergovernmental Panel on Climate Change Assessment Reports

The United Nations Intergovernmental Panel on Climate Change (IPCC) releases assessment reports every few years providing an overview of the state of knowledge concerning climate change science. The Fifth Assessment Report (AR5) was released in 2014. The Sixth Assessment Report (AR6) was released in 2023, but the new values have not yet been widely adopted.

Kilowatt Hour

Kilowatt hours (kWh) are a standard unit for electricity consumption and a measure of electrical energy equivalent to a power consumption of 1,000 watts for 1 hour. For example, a 50-inch LED TV uses about 0.016 kWh per hour. It would take roughly 62.5 hours for this TV to use 1 kWh of energy.[5]

Local Emissions (Sector-Based) Greenhouse Gas Inventory

This refers to an inventory that is broken down by various sectors of the community that have common greenhouse gas characteristics. This type of inventory follows the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GCP), determining what is included in each sector. It is referred to as sector-based emissions in protocol but called "local emissions" here for clarity. Sector-based emissions include emissions from building energy and vehicles, along with local sources of greenhouse gases from waste, uncontrolled loss of industrial and refrigerant gases, and agriculture. Note that emissions from household consumption of goods and services are not included in sector-based inventories. Standard emissions included in a sector-based inventory include:

- **Building Energy:** Emissions from energy used or produced in a fixed location (e.g., electricity, natural gas, propane, and fuel oil). The GPC term is stationary energy.
- **Transportation:** Emissions from vehicles and mobile equipment.
- **Waste:** Landfilled waste emissions and wastewater treatment emissions.

[5] Electricity Plans: https://electricityplans.com/kwh-kilowatt-hour-can-power/#:~:text=Here%20are%20some%20of%20the,around%202.3%20kWh%20per%20hour.

- **Industrial Process and Product Use (IPPU):** Refrigerants and other fugitive gases from industrial processes.
- **Agriculture, Forestry and Land Use (AFLU):** emissions from agriculture (e.g., animal waste and agricultural inputs) and community land use change (e.g., development of forest or grasslands).

Location-Based Electricity Emissions Accounting

Refers to the greenhouse gas intensity of the regional electricity grid, representing the average impacts of electricity use and efficiency efforts across the region. Contrast with market-based electricity emissions accounting as defined in the Electricity Accounting section in Appendix B.

Market-Based Electricity Emissions Accounting

Refers to the greenhouse gas intensity of electricity contracts with local utilities and direct purchases, including renewables. Contrast with location-based electricity emissions accounting as defined in the Electricity Accounting section in Appendix B.

Metric Ton

A metric ton (MT) is about 2,200 lbs. This is a common unit by international standards.

Metric tons of carbon dioxide equivalent

Greenhouse gases are often measured in metric tons of carbon dioxide equivalent (MT CO_2e). Most greenhouse gases are more potent than carbon dioxide in warming the atmosphere. To calculate and compare emissions easily, all gases are calculated and combined into a carbon dioxide equivalent, typically measured in metric tons.

Scopes

Scopes (as in Scope 1, Scope 2, and Scope 3) are one method to define the source of emissions. Scope categories distinguish between emissions that occur within a geographic boundary (Scope 1) from electricity generation serving the community (Scope 2) and emissions that occur outside the boundary but that are driven by activity within the boundary (Scope 3).

Therm

Common reporting unit of natural gas that represents 100,000 British thermal units. A therm is roughly equivalent to 100 cubic feet of natural gas.

Appendix B: Detailed Emissions Breakdown

Table 1: Detailed Emissions Breakdown–Market-Based Accounting

Camas Emissions by Sector / Sub-Sector *Using market-based accounting for electricity*	**2022 Emissions**	**Per capita**
Building Energy	**123,505**	**4.5**
Residential Buildings		
Electricity	17,527	0.6
Natural Gas	33,856	1.2
Other Fuels & Emissions	3,774	0.1
Commercial Buildings		
Electricity	8,539	0.3
Natural Gas	7,216	0.3
Other Fuels & Emissions	3,248	0.1
Industrial and Other Facilities		
Electricity	31,518	1.2
Natural Gas	17,490	0.6
Other Fuels & Emissions	338	0.0
Transportation	**61,245**	**2.2**
Passenger cars	42,310	1.6
Freight	7,260	0.3
Transit	493	0.0
Off-road	9,837	0.4
Rail	1,157	0.0
Electric Vehicles	188	0.0
Solid Waste and Wastewater	**7,765**	**0.3**
Solid Waste Landfill	7,692	0.3
Wastewater Treatment & Septic Systems	73	0.0
Industrial Process and Product Use	**124,881**	**4.6**
Refrigerants	7,732	0.3
Industrial Facilities	117,149	4.3
Imported Emissions	**275,639**	**10.1**
Household Consumption		
Goods	127,937	4.7
Food	68,549	2.5
Upstream Energy Production	54,344	2.0
Air Travel	24,810	0.9
Negative Emissions	**-956**	
Purchased Offsets	-956	
Local Emissions	317,396	11.6
Local + Imported	593,035	21.8

Table 2: Detailed Emissions Breakdown–Location-Based Accounting

Camas Emissions by Sector / Sub-Sector *Using location-based accounting for electricity*	2022 Emissions	Per capita
Building Energy	**195,817**	**7.2**
Residential Buildings		
Electricity	34,221	1.3
Natural Gas	33,856	1.2
Other Fuels	3,774	0.1
Commercial Buildings		
Electricity	16,672	0.6
Natural Gas	7,216	0.3
Other Fuels	3,248	0.1
Industrial and Other Facilities		
Electricity	79,003	2.9
Natural Gas	17,490	0.6
Other Fuels	338	0.0
Transportation	**61,422**	**2.3**
Passenger cars	42,310	1.6
Freight	7,260	0.3
Transit	493	0.0
Off-road	9,837	0.4
Rail	1,157	0.0
Electric Vehicles	365	0.0
Solid Waste and Wastewater	**7,765**	**0.3**
Solid Waste Landfill	7,692	0.3
Wastewater Treatment & Septic Systems	73	0.0
Industrial Process and Product Use	**124,881**	**4.6**
Refrigerants	7,732	0.3
Industrial Facilities	117,149	4.3
Imported Emissions	**296,342**	**10.9**
Household Consumption		
Goods	127,937	4.7
Food	68,549	2.5
Upstream Energy Production	75,046	2.8
Air Travel	24,810	0.9
Negative Emissions	**-956**	
Purchased Offsets	-956	
Local Carbon Storage	0	
Local Emissions	389,885	14.3
Local + Imported	686,227	25.2

*For an explanation of market versus location-based accounting see Appendix C: Electricity Accounting section.

Appendix C: Methodology & Protocols

Protocol and Inventory Boundaries

This inventory follows Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) by Greenhouse Gas Protocol (GHGP). This inventory also follows GHGP's Scope 2 Guidance for location-based and market-based electricity accounting emissions and ICLEI's U.S. Community Protocol for guidance on calculation of consumption-based emissions (i.e., Other Scope 3 as defined by GPC).

Good Company's carbon calculator tool G3C – Community was used for greenhouse gas (GHG) emissions calculations. Emissions are documented in the Inventory Audit Trail. G3C – Community is an Excel-based calculator that documents all activity data, emissions factors, and emissions calculations used in the inventory. The audit trail catalogs all data, calculation, and resource files used to complete the inventory. These resources are highly detailed and will allow for those conducting future inventories to fully understand and replicate the methods used in this inventory.

GHG emissions presented in this report are represented in metric tons of carbon dioxide equivalent (MT CO_2e). The gases considered in the analysis are consistent with protocol and include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), chlorofluorocarbons (CFCs), sulfur hexafluoride (SF_6), and perfluorocarbons (PFCs) per the Kyoto Protocol. All GHG calculations use 100-year global warming potentials as defined in the International Panel on Climate Change's Fifth Assessment Report (IPCC AR5).

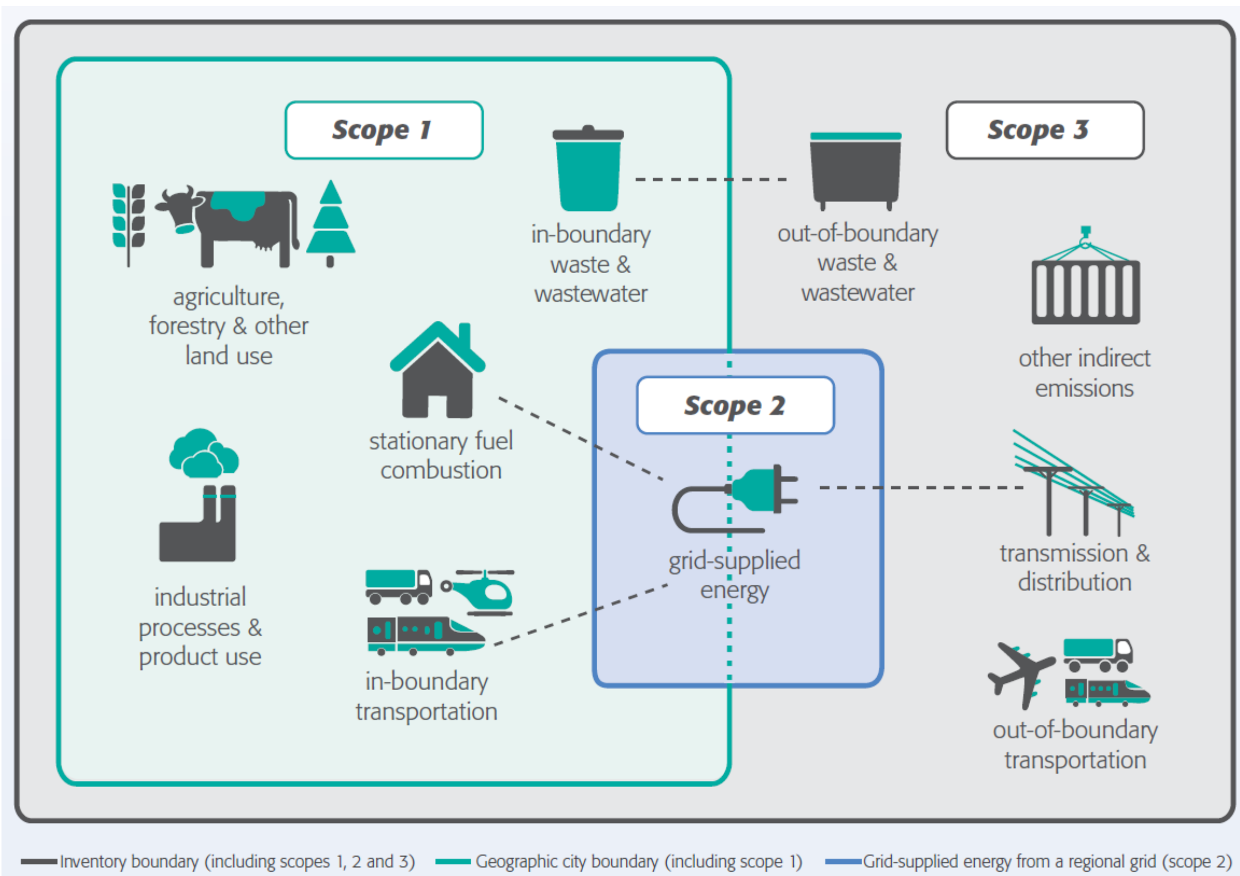
Scopes

As described above, GHG emissions are often organized by sector (buildings, transportation, waste, etc.). Another way to organize them is by their origin location, either within a community or outside; these are referred to as "scopes." Scope categories, as outlined in Table 3 and Figure 12 (next page) distinguish those emissions that occur within the geographic boundaries (Scope 1) from those that occur outside the boundaries but are driven by activity from within the geographic boundary (Scope 2 and Scope 3). Emissions sectors and subsectors included in the GPC are shown in Table 4 (page C-3). These are compared with emissions included in the 2022 community inventory by scope category.

Table 3: Scope Descriptions

Scope 1	GHG emissions from sources located within the geographic boundary.	Example: Burning fossil fuels to heat homes or power cars
Scope 2	GHG emissions occurring as a consequence of the use of grid-supplied electricity within the geographic boundary.	Example: Emissions from coal and natural gas power plants
Scope 3	All other GHG emissions that occur outside the boundary as a result of activities taking place within the boundary.	Example: Production of fuels, goods, and food

Figure 12: Graphical Illustration of Scopes[6]



[6] Global Protocol for Community-Scale Greenhouse Gas Inventories.

Table 4: Crosswalk of Emissions and Scopes

Emissions Sector / Sub-Sector	Scope 1	Scope 2	Scope 3
Building Energy			
Residential Buildings	✓	✓	
Commercial Buildings	✓	✓	
Industrial Facilities	✓	✓	
Potable Water Treatment Energy	✓	✓	
Wastewater Treatment Energy	✓	✓	
Fugitive Emissions from Natural Gas Systems	✓		
Fugitive Sulfur Hexafluoride	✓		
Transportation			
On-Road Passenger Vehicles	✓	✓	
On-Road Heavy-Duty and Freight	✓	✓	
Transit Vehicles	✓		
Off-Road Vehicles and Equipment	✓		
Rail	✓		
Local Aviation	✓		
Solid Waste and Wastewater			
Landfill Waste	✓		✓
Central Wastewater Treatment	✓		
Industrial Process and Product Use			
Refrigerants	✓		
Industrial Process Emissions	✓		
Imported Emissions			
Household Consumption			✓
Air Travel			✓
Upstream Energy Production			✓
Negative Emissions			
Purchased carbon offsets	✓		

Other emissions activities not listed above do not occur within the boundary - see list of exclusions.
NE = Emissions occur but are not reported or estimated.
IE = Included elsewhere as part of another data set where a split is not available.

Inventory Exclusions

Table 5: Summary of Inventory Exclusions

Inventory Emissions Sources by Sector/Sub-Sector			
GPC Terminology	**Report Terminology**	**Notation Key**	**Explanation**
Stationary Energy	**Building Energy**		
Residential buildings	Residential buildings	Included	
Commercial and institutional buildings and facilities	Commercial buildings	Included	
Manufacturing industries and construction	Industrial facilities	Included	
Energy industries		NO	No emissions are associated with solar energy production. There is no other substantial generation of electricity, such as a power plant.
Agriculture, forestry, and fishing activities		NE/IE	Electricity and natural gas use emissions are included elsewhere, likely in industrial energy use with no additional splits available. Other sources, such as propane and fuel oil, are downscaled from state data on a per capita basis and may be included in commercial uses or in off-road diesel estimates. This data is likely included elsewhere, but if not, is not additionally estimated due to lack of data sources.
Fugitive emissions from mining, processing, storage, and transportation of coal		NO	No activity identified within the geographic boundary.
Fugitive emissions from oil and natural gas systems	Fugitive emissions from natural gas systems	IE	In Other Emissions by subsector.
Non-specified sources	Fugitive sulfur hexafluoride	IE	In Other Emissions by subsector.
Transportation			
On-road	On-road passenger vehicles	Included	
	On-Road heavy-duty and freight	Included	
	Transit vehicles	Included	
Railways	Rail	Included	
Waterborne navigation		NO	No significant activity within the geographic boundary. Any emissions associated with small, private craft on

			the Columbia River launched from locations inside the boundary are not captured but are not significant. Commercial transport emissions from Columbia River are not considered part of the geographic boundary.
Aviation	Local aviation	NO	There are no airports within the city boundaries. Emissions from air travel are included in the consumption emissions and estimated from economic data.
Off-road	Off-road vehicles and equipment	Included	
Waste	**Solid Waste and Wastewater**		
Solid waste disposal	Landfill waste	Included	
Biological treatment of waste		NO	No waste collection processed as composting.
Incineration and open burning		NO	No waste collection processed as incineration or open burning.
Wastewater treatment and discharge	Central wastewater treatment	Included	
	Septic systems	NO	No septic systems are reported within the geographic boundary.
Industrial Process and Product Use (IPPU)			
Industrial Processes	Industrial process emissions	Included	
Agriculture, Forestry, & Other Land Use	**Agriculture, Forestry, & Land Use**		
Livestock		NO	No activity identified within the geographic boundary.
Land	Land use emissions	NO	
	Land use sequestration (annual growth)	NO	
Aggregate sources and non-CO_2 emission sources on land	Agricultural soil amendments	NO	
Other Scope	**Imported Emissions**		
	Household consumption	Included	
	Air travel	Included	
	Upstream energy production	Included	

Included=Emissions occur and are estimated and included within the results.

NE = Emissions occur but are not reported or estimated.
IE = Included elsewhere as part of another data set where a split may not be available.
NO = Activity or process does not occur within boundary.

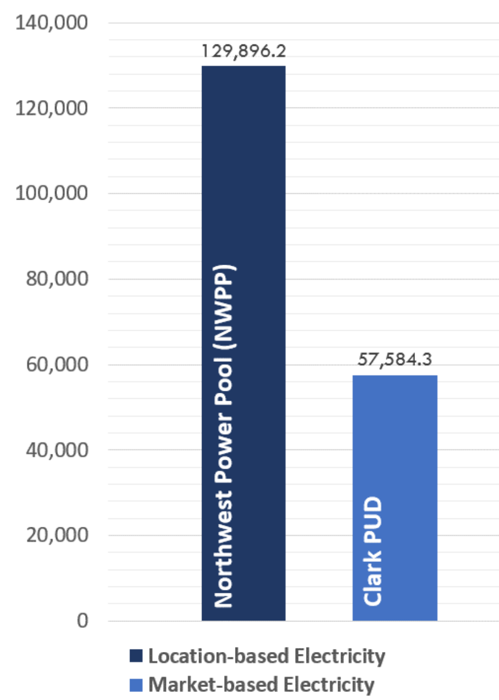
Electricity Accounting

Activity data was collected from Clark Public Utility District. Data was collected directly from the utility, including volume of renewable energy certificates purchased. Data provided was split by residential, commercial, and industrial.

The GPC and Scope 2 guidance requires that communities report electricity emissions using two accounting methods: market-based and location-based.[7] **Market-based accounting** is based on the GHG intensity of electricity contracts with local utilities and is used in most of the figures presented in this report as the GPC protocols recommended methodology to track progress toward goals over time. **Location-based accounting** is calculated using the regional electricity grid's (Northwest Power Pool) GHG intensity and represents the average impacts of electricity use and efficiency efforts for the region. Figure 13 displays electricity emissions using both accounting methods.

- **Market-based method** (or utility-specific) represents emissions specific to the utility and considers community purchase of Renewable Energy Certificates. Market-based electricity accounting is commonly used for target and goal tracking and is useful to assess and manage GHGs associated with electricity generation and supply. It also highlights benefits for energy-efficiency actions, particularly in communities served by utilities with very low GHG electricity. That is, the less electricity used in the community, the more low-GHG electricity there is available for export to communities with more GHG-intensive electricity sources.
- **Location-based method** (or regional grid) multiplies an organization's electricity use by the average emissions intensity of a specific regional electricity grid that is published by the Environmental Protection Agency (eGRID 2022).[8] Note that over time, there may be differences in emissions results for inventory years due to the use of an updated eGRID emissions factor (typically released every 1 to 2 years). Location-based electricity

Figure 13: Electricity Emissions Using Both Accounting Methods



[7] For details, visit http://www.ghgprotocol.org/scope_2_guidance.
[8] https://www.epa.gov/system/files/documents/2024-01/egrid2022_summary_tables.pdf

accounting offers a means of assessing the average impacts of electricity use on the regional electricity grid.

Appendix D: Summary of Data and Emissions Factors

Data Collection

Project staff worked with City and Clark County staff to collect the data required to calculate emissions. City and Clark County staff, along with other local and regional government staff and private entities that serve the community, graciously provided time, data, and expertise. Data and emissions factors are described in detail below.

Emissions Category	Category Description
Building Energy (Stationary Energy in GPC Protocol)	
Residential Energy	*These categories include direct emissions from natural gas, fuel oil, and propane combustion by the residential, commercial, and industrial sub-sectors within the geographic boundary. They also include the emissions from providing grid electricity used by the same sub-sectors for the same geographic boundary.*
Commercial Energy	
Industrial Energy	
Electricity and natural gas data provided by Clark Public Utility District, Northwest Natural and private users with other energy supply contracts. Electricity and natural gas data included information on retail sales, transported gas and electricity, and participation in renewable electricity and carbon offset programs. Residential and commercial fuel oil and propane use was estimated using state-level per capita 2021 fuel usage data downscaled by the city's population. Emissions factors for natural gas, fuel oil, and propane are from U.S. EPA's emissions factors hub and The Climate Registry's 2018 default emissions factors and are considered highly accurate. Location-based electricity emissions factors are taken from EPA eGRID 2022 data for the Northwest Power Pool (NWPP) sub-region. Market-based electricity accounting emissions factors for Clark Public Utility District was provided by the utility along with its usage data and SF_6 emissions. Emissions factors for Clatskanie Public Utility Department in Oregon were taken from Oregon Department of Environmental Quality's report titled, *2010–2022 Greenhouse Gas Emissions from Electricity Use*, available online via the Department of Environmental Quality (DEQ). Utility data is considered highly accurate; non-utility data (e.g., fuel oil and propane) is considered to have medium accuracy.	
Fugitive Natural Gas System Emissions	*Fugitive loss of natural gas from the local product distribution system.*
Northwest Natural Gas (NWN) reported a system leakage quantity. This data is considered highly accurate.	

Transportation	
On-Road Energy	*Direct emissions from gasoline and diesel for passenger and freight transportation.*

Emissions from on-road energy were calculated using a combination of vehicle miles traveled (VMT) modeling approaches. First, the city's boundary was uploaded to Replica software, which uses cell phone GPS data to estimate typical weekday and weekend VMT, and it updates the data by season and by year. This inventory used typical VMT data for a Thursday and a Saturday in fall 2022. The software also provides an estimated breakdown of "passenger," "freight," and "transit" trip types. Using the Thursday data as a typical workday and the Saturday as a typical non-workday, annual passenger, freight, and transit VMT were estimates for each geography. All passenger miles were assumed to be in gas or electric vehicles and all freight miles were assumed to be in diesel vehicles.

The annual VMT values were then adjusted to match the total county VMT estimates provided by the Washington State Department of Transportation (WSDOT), pro-rated by population in the city. Overall, WSDOT estimates were larger by about 20% but are assumed to be more accurate and the preferred data source.

To convert VMT into emissions, the population of cars was estimated using the county's registration records for 2022, which includes whether the car was electric or internal combustion. The electric car population was assumed to be consistent across the county. Fuel efficiencies for diesel, gasoline, and electric vehicles were taken from the AFLEET model's Washington data. All diesel usage was assumed to be B5 (5% biodiesel, 95% fossil diesel), and all gasoline was assumed to be E10 (10% ethanol, 90% fossil gasoline). All electric usage was assumed to have Clark Public Utility District's emissions factor (and subtracted from the overall residential electricity usage).

Note that C-TRAN fuel use was subtracted from freight diesel outside of the model.

Transit	*Direct emissions from gasoline and diesel (on-road) and electricity (light rail) for passenger transit transportation.*

Emissions data was collected from C-TRAN. C-TRAN staff provided fuel use, fuel blend, and VMT for all vehicles. Emissions were then downscaled by population and subtracted from on-road vehicle emissions to avoid double counting.

Off-Road including Rail	*Direct emissions from gasoline and diesel for off-road vehicles, such as construction equipment, etc.*

Emissions from off-road vehicles were estimated based on the state of Washington's GHG inventory (2019, used as proxy) and were downscaled by population. Off-road transportation data was available split into air transport, marine transport, locomotives, and "other"; air and marine transport were excluded since no significant sources, such as ferries and airports, exist in the community. Data was given in carbon dioxide equivalent (CO_2e).

Solid Waste and Wastewater	
Landfilled Solid Waste	*Fugitive methane emissions from mixed solid waste generated in the community regardless of disposal location.*
Clark County has no landfills that handle municipal waste within its geographic boundaries. Waste was landfilled at Finley Butte or Wasco County landfills, and the total tonnage sent to each landfill from the entire region was available, but the proportion attributable to each geography was not available. Total 2022 EPA-reported emissions from Finley Butte and Wasco were downscaled based on reported short tons from Clark County customers. Then, the total emissions were downscaled for the city by population. This activity data is moderately accurate.	
Wastewater Treatment Process Emissions	*Wastewater treatment plant biogas combustion, denitrification process, and fugitive nitrous oxide emissions from discharge of treated effluent (wastewater).*
Emissions calculations for nitrification/denitrification are based on service population. Applicable wastewater treatment plant process emissions were provided by the wastewater utility. This activity data is considered highly accurate.	
Septic Systems	*Direct emissions from the decomposition of biosolids (wastewater).*
Septic fugitive emissions were estimated based on service population data from wastewater treatment providers compared to the city population. This activity data is considered moderately accurate.	
Industrial Process and Product Use	
Product Use (Refrigerants)	*Fugitive loss of refrigerants and other high global warming potential (GWP) gases from building and vehicle air conditioning systems.*
Fugitive refrigerant loss and other non-industrial high-GWP gas emissions are estimated using EPA estimates for Washington state and downscaled on a per capita basis. Activity data for state-level fugitive emissions from refrigerants, aerosols, and fire suppression systems is reported in the EPA's state-level emissions inventory as Substitute Ozone Depleting Substances. Emissions are considered as having moderate accuracy.	
Industrial Processes	*Fugitive loss of industrial high-GWP gases from industrial processes. Stationary building emissions (fuel combustion, etc.) are not included and are part of Building Emissions.*
Two applicable facilities inside the city boundary were identified by the EPA Facility Level Information on GreenHouse Gases Tool (FLIGHT) tool. These industrial facilities are required to report significant air quality and/or climate emissions. Emissions were reported using AR4 GWP values as not all gases were listed and could therefore not be recalculated using AR5	

values. Therefore, a decision was made to leave the results in AR4 to match the state results. This data is considered highly accurate.	
Imported Emissions	
Goods	*Upstream energy and process emissions raw material extraction, manufacturing, and out-of-state transportation of goods.*
Food	*Upstream energy and process emissions from the growing, processing and transportation of foods.*
Services	*Upstream energy emissions from air travel by community members from all airports regardless of location.*
Accurate data on quantities and suppliers for the goods and food consumed by community households are not readily available. Therefore, the Berkeley Cool Climate Calculator was used to estimate emissions based on the city's household income distribution. Income data was acquired from the U.S. Census Bureau. Because the data is estimated from a large and complicated economic model, this activity data is considered as having low accuracy.	
Upstream Fuel Production	*Upstream energy and process emission from the production and distribution of natural gas, gasoline, diesel, and electricity consumed either directly or indirectly by the community.*
Data for gasoline, diesel, natural gas, and electricity use is the same as previously described. Life-cycle emissions factors for the various fuel types are provided by Oregon Department of Environmental Quality's Clean Fuels program carbon intensity scores. These results are expected to be the same for Washington communities because the fuel products are generally the same. Upstream fuel and energy emissions are calculated as the difference between direct tailpipe emissions (reported under Transportation) and total life-cycle emissions. Activity data for electricity and natural gas is considered highly accurate, while transportation fuel use is considered moderately accurate because the precise feedstocks for biofuels sold within the community are not readily available. Upstream emissions can vary significantly for biofuels depending on feedstocks; therefore, calculated emissions are considered moderately accurate.	
Negative Emissions	
Purchased Carbon Offsets	*Community purchase of verified carbon offsets.*
Carbon offsets purchased by NWN account holders' participation in NWN's Clean Energy program were provided by the utility as therm-equivalents and metric ton CO_2e. This activity data is considered highly accurate.	

Camas will need to develop at least one climate resilience goal and supportive policy for each of the 11 sectors (below) in the climate element of our comprehensive plan. The general types of assets found in each sector are listed. Identifying specific assets, and determining which assets we should prioritize, will help the City focus our resiliency policies on issues of importance to the community.

Climate Sector	Asset Theme	Assets
Agriculture & Food Systems	*Food Production & Distribution*	Small farms; Community gardens; Food distribution systems
	Ecosystem Services	Healthy soil (carbon capture, filtration, nutrients); Corridors for wildlife
Buildings & Energy	*Government facilities*	Municipal/public buildings
	Schools	Schools
	Energy Infrastructure	Power lines/Natural gas pipelines; Power plants; Charging stations; Solar panels/infrastructure; Hydropower infrastructure (Dams appear in Water Resources)
	Commercial & Residential Buildings	Commercial & residential buildings (energy)
Cultural Resources & Practices	*Historic Sites*	Historic buildings and sites
	Cultural Foods	Salmon; First Foods such as huckleberry (foods important to Indigenous peoples)
	Community Resources	Libraries; Community centers; Faith-based institutions; Parks/outdoor recreation/campgrounds; Open space
	Social Networks	Social networks/connectivity
Economic Development	*Job Security*	Income
	Local Businesses	Grocery stores; Banks; Restaurants; Hotels; Commercial recreational facilities; Water sports; Outfitters (fishing, hunting, foraging)
	Industrial/Manufacturing & Resource Extraction	Industrial/manufacturing operations; Mines & quarries
Ecosystems	*Natural Areas*	Preserves/refuges; Forests; Riparian areas (includes Floodplains & Wetlands); Streambanks/beaches
	Natural Resources	Tree canopy (urban and suburban); Surface water (rivers, lakes, streams); Clean air
	Plant & Animal Species	Native species; Threatened/endangered species; Pollinators
Emergency Management	*Emergency Response/Services*	Emergency services (police, fire, ambulance); Emergency access routes
Health & Well-being	*Medical Facilities*	Clinics; Nursing homes/elder care facilities
	Social Services	Health/mental health services; Childcare facilities; Drug treatment facilities; Food pantries
	Human Health & Well-Being	Healthy & safe populations
Transportation	*Major Transportation*	Roadways; Railroads; Bridges; Ports/marine transportation routes; Grove Field
	Local/Public Transportation	Bus lines; Trails/walkways/sidewalks; Boat launches/docks; Bike lanes
Waste Management	*Waste Management*	Waste hauling/garbage pickup; Septic systems; Wastewater/sewage treatment facilities
Water Resources	*Water Resources*	Groundwater supplies/aquifers/wells; Streamflow; Reservoirs; Snowpack
	Water Infrastructure	Pipes; Pumping stations; Culverts; Stormwater infrastructure/drains; Dams
Zoning & Development	*Communication Infrastructure*	Communication infrastructure (mail, radio, cellular, internet)
	Development & Conservation Potential	Available land for development; Available land for conservation/open space
	High-Traffic Areas	Downtown/Central business district
	Residential Structures	Single and multi-family residences (structures); Mobile/temporary homes (vehicles, tents, trailers, campers)

	Commercial Buildings	Businesses (structures)