



# CITY OF LAKE FOREST PARK CLIMATE POLICY ADVISORY TEAM (CPAT) MEETING

**Tuesday, April 15, 2025 at 7:00 PM**

Meeting Location: In Person and Virtual / Zoom  
17425 Ballinger Way NE Lake Forest Park, WA 98155

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## **INSTRUCTIONS FOR ATTENDING THIS MEETING VIRTUALLY:**

Join Zoom Webinar: <https://us06web.zoom.us/j/84378794422>  
Call into Webinar: 253-215-8782 | Webinar ID: 843 7879 4422

The Climate Action Committee is providing opportunities for public comment by attending in person to provide oral public comment.

### **HOW TO PARTICIPATE WITH ORAL COMMENTS:**

If you are attending in person, there is a sign-in sheet located near the entrance to the room. Fill out the form and the presiding officer will call your name at the appropriate time. Oral comments are limited to 3:00 minutes per speaker. Oral comments are not being accepted via Zoom.

The meeting is being recorded.

For up-to-date information on agendas, please visit the City's website at [www.cityofflp.gov](http://www.cityofflp.gov).

## **AGENDA**

1. **CALL TO ORDER: 7:00 P.M.**
2. **WELCOME AND INTRODUCTIONS**
  - A. Discussion question: What's come up for you since our last meeting?
3. **ADOPTION OF AGENDA**
4. **REVIEW/APPROVE MEETING MINUTES**
  - A. March 12 meeting minutes
5. **PUBLIC COMMENTS**

***The Team is not accepting online public comments. This portion of the agenda is set aside for the public to address the Committee on agenda items. Comments are limited to a three (3) minute time limit.***

**6. NEW BUSINESS**

**7. OLD BUSINESS**

- A.** Brief overview of the GHG inventory results and launch GHG summary memo review, and discuss updated VMT reduction strategies and target setting (~45 mins)
- B.** Policy development process update (~10 mins)
- C.** Vulnerability Assessment initial findings on exposure and sensitivity (~30 mins)
- D.** Engagement updates and discussion items: Preliminary survey results, group interviews process update, upcoming May 1 open house discussion (~25 mins)
- E.** Review action items from the March meeting and identify action items from April meeting (~5-10 mins)

**8. NEXT MEETING**

Wednesday, May 14, 2025

**9. ADJOURN**

*Any person requiring a disability accommodation should contact city hall at 206-368-5440 by 4:00 p.m. on the day of the meeting for more information.*

1 City of Lake Forest Park – Climate Policy Advisory Team  
2 Regular Meeting Minutes: March 12, 2025; 7:00-9:00pm  
3 Hybrid Meeting Held in the Forest Room at City Hall and Virtually via Zoom  
4

5 **CPAT members present:** Chair David Kleweno, Miriam Bertram, Sarah Phillips, Janne Kaje (via  
6 Zoom), Stacey Spain, and Victoria Kutasz  
7

8 **Staff and others present:** Mark Hofman, Community Development Director; Alexandra Doty,  
9 Cascadia (via Zoom); Jenna Decker, Cascadia (via Zoom); Marissa Milam, Cascadia (via Zoom)  
10

11 **Members of the Public present:** none  
12

13 **CPAT members absent:** Vice Chair Anne Udaloy, Jessica Côté (alternate)  
14

15 **Call to order:** Chair Kleweno called the meeting to order at 7:00 PM  
16

17 **Welcome and Introductions:**

18 **Discussion question: What’s come up for you since our last meeting?**

19 CAC members Bertram and Phillips gave an update on CAC events and the remodeling of the  
20 Climate Hub at Third Place Commons.

21 Tree Board member Kutasz gave an update on Tree Board events.

22 Chair Kleweno gave an update on Planning Commission middle housing updates.  
23

24 **Adoption of Agenda:** CPAT member Kutasz motioned for the agenda to be approved, CPAT  
25 member Spain seconded. The agenda was approved unanimously.  
26

27 **Approval of Meeting Minutes:** CPAT member Phillips made a motion to approve the February  
28 12, 2025, Meeting Minutes. CPAT member Kaje seconded and the motion to approve the minutes  
29 was carried unanimously.  
30

31 **Public Comment:** No public comments.  
32

33 **New Business:**

34 **Share out the GHG community inventory results and update on municipal inventory process**

35 Ms. Decker gave a presentation on the GHG community inventory results. Ms. Decker went over  
36 the survey results from GHG emissions by sector for the years 2019, 2022, and 2023. The travel  
37 market assessment is a study conducted to understand the travel behavior of all people traveling  
38 to/from/within Lake Forest Park.  
39  
40

41 **Introduction to the travel market summary and vehicle miles traveled study**

42 Ms. Milam gave a presentation on the travel market summary. Ms. Milam went over the trends on  
43 public transportation and the effects of less bus routes and work commutes. Since Covid, there has  
44 been a decrease in bus routes which has led to a decrease in bus commutes. Ms. Milam also  
45 discussed the VMT reduction strategies that can build and support existing CAP policies.  
46  
47

1 **Old Business:**

2 **Engagement updates and discussion items**

3 Ms. Doty discussed the survey launch. Ms. Doty reviewed the postcard and factsheet for the Climate  
4 Element.

5  
6 **Review action items from the February meeting and identify action items from March**  
7 **meeting**

8 Ms. Doty reviewed the action items from the Cascadia team including follow-ups to the factsheet,  
9 group interviews, and VMT strategies.

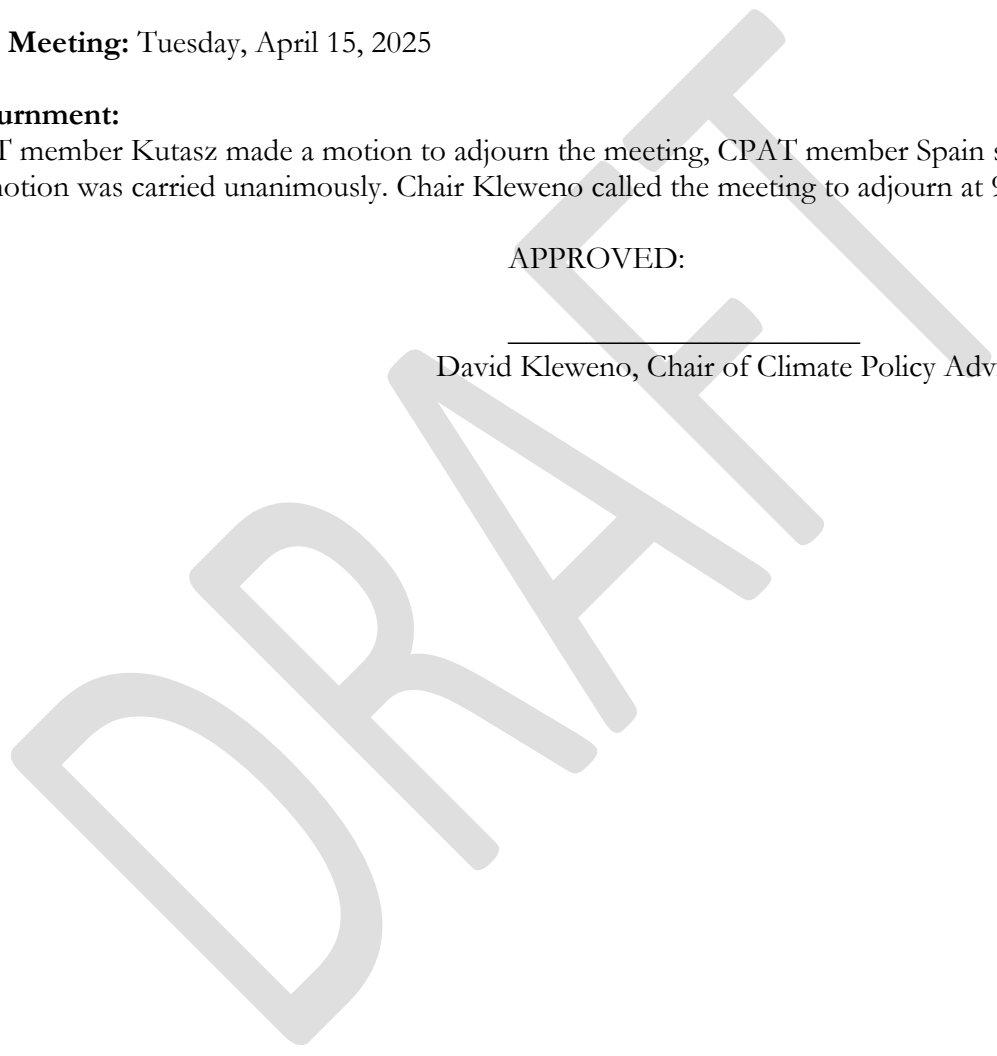
10  
11 **Next Meeting:** Tuesday, April 15, 2025

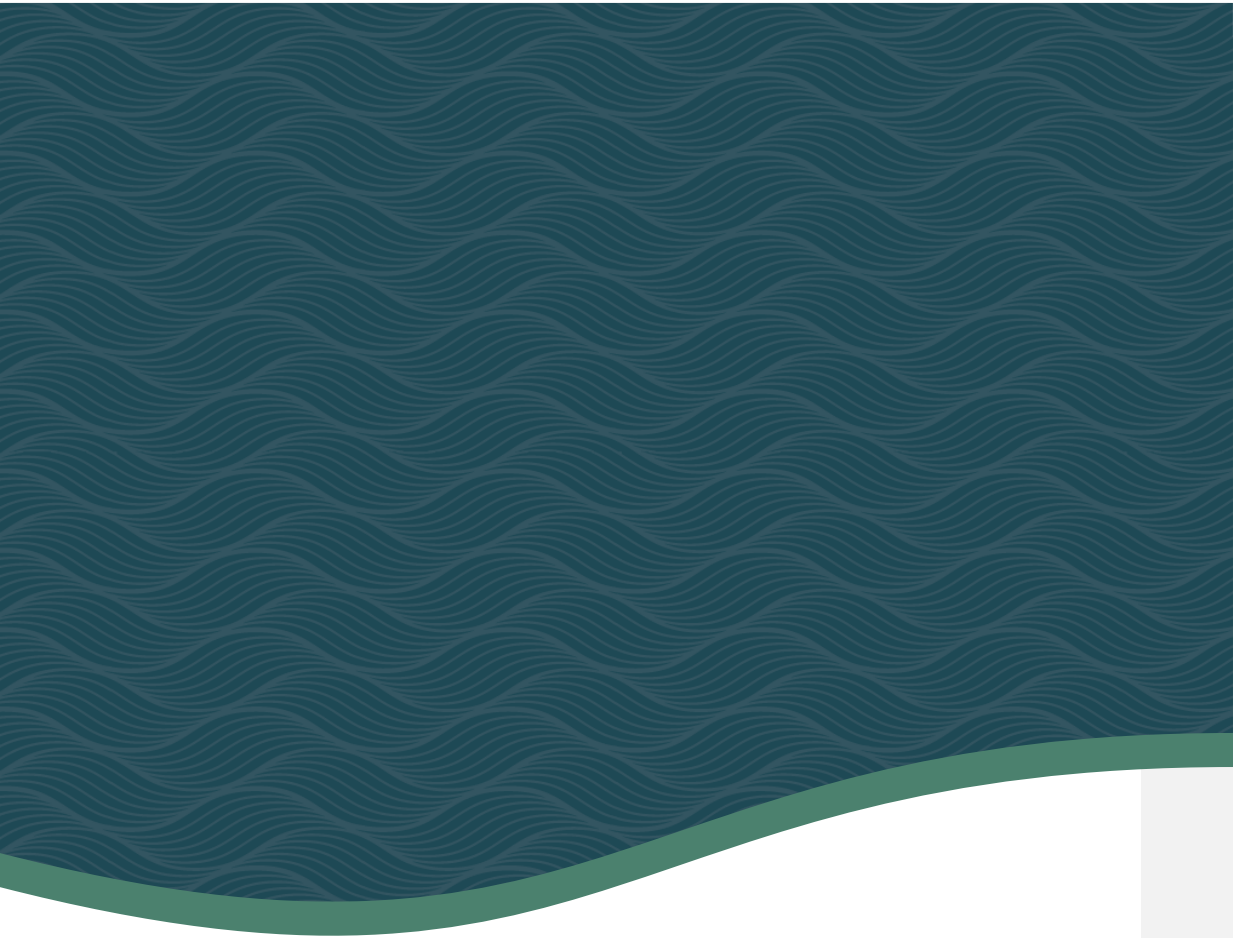
12  
13 **Adjournment:**

14 CPAT member Kutasz made a motion to adjourn the meeting, CPAT member Spain seconded, and  
15 the motion was carried unanimously. Chair Kleweno called the meeting to adjourn at 9:00 PM.

16  
17 APPROVED:

18  
19 \_\_\_\_\_  
20 David Kleweno, Chair of Climate Policy Advisory Team





# Lake Forest Park Greenhouse Gas Inventory Report – Draft

INVENTORY YEARS 2019, 2022, 2023

PUBLISHED 2025



# Contents

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<b>Executive Summary</b> .....	<b>1</b>
<b>Introduction</b> .....	<b>3</b>
Methodology.....	3
Emissions Sources.....	3
<b>Communitywide GHG Emissions Results</b> .....	<b>4</b>
Buildings.....	4
Transportation.....	8
Solid Waste.....	10
Refrigerants.....	11
Land Use.....	11
<b>Municipal Operations GHG Emissions Results</b> .....	<b>12</b>
Buildings.....	12
Transportation.....	12
Solid Waste.....	13
Refrigerants.....	13
<b>Policy Recommendations</b> .....	<b>14</b>
<b>Appendix A: Methodology</b> .....	<b>15</b>

## Executive Summary

The City of Lake Forest Park Greenhouse Gas (GHG) Inventory Report summarizes the findings from two inventories: 1) the 2019, 2022, and 2023 communitywide GHG inventories and 2) the 2023 municipal operations GHG inventory. These inventories were completed by leveraging existing GHG analysis work performed by King County and funding from Washington State Department of Commerce (Commerce). The results from this inventory report will support the development of the Lake Forest Park Climate Element, specifically the GHG Reduction Sub-Element.

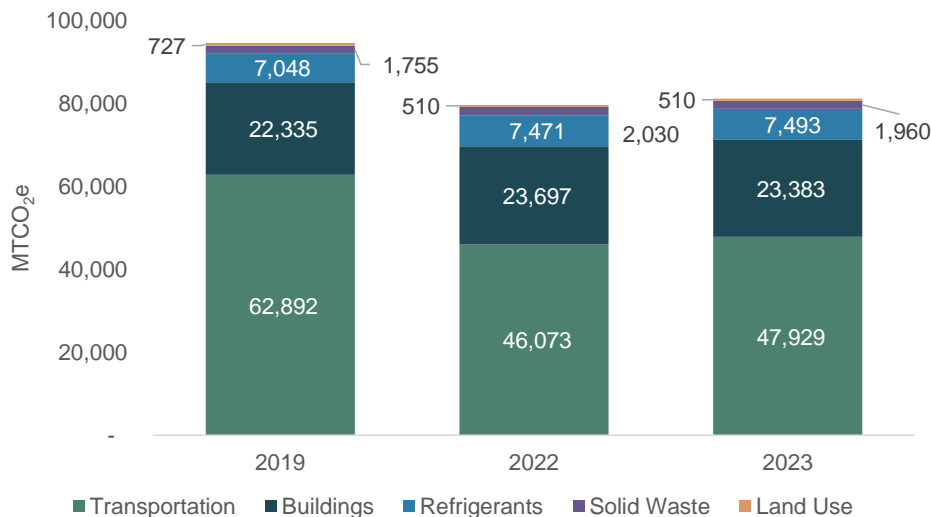
Table 1 below shows the estimated metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>e) and the average per-capita emissions for each year included in the communitywide GHG inventories.

Table 1. Communitywide MTCO<sub>2</sub>e and per-capita emissions, by inventory year.

	2019	2022	2023
<b>MTCO<sub>2</sub>e</b>	94,757	79,780	81,274
<b>Per-capita emissions</b>	7.2	5.9	5.9

**Transportation** and **buildings** have consistently been the highest contributors to **communitywide** GHG emissions across inventory years. Emissions have seen a downward trend since 2019, with the largest reductions from the transportation sector. Figure 1 below shows communitywide emissions, by emissions source and inventory year.

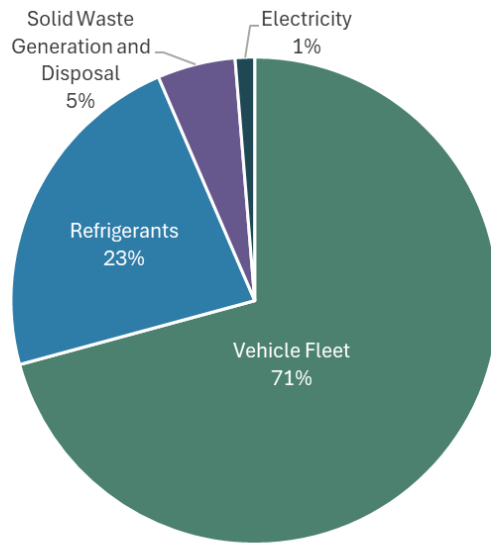
Figure 1. 2019, 2022, and 2023 communitywide GHG emissions, by source (MTCO<sub>2</sub>e).



Lake Forest Park Greenhouse Gas Inventory Report – Draft  
Executive Summary

The City of Lake Forest Park also completed a **municipal operations** GHG inventory for 2023, supported by Commerce through the Climate Commitment Act. Of the emission sources included in the inventory, the municipal **vehicle fleet** was the greatest contributor to GHG emissions from municipal operations. Figure 2 below shows proportions of emissions by source.

Figure 2. 2023 municipal operations GHG emissions, by source (percentage of total municipal operations emissions).





# Introduction

## Methodology

Lake Forest Park’s 2019, 2022, and 2023 communitywide inventories were performed in alignment with both ICLEI’s **U.S. Community Protocol for Accounting and Reporting of GHG Emissions (USCP)** and **The Greenhouse Gas Protocol’s Global Protocol for Community-Scale Greenhouse Gas Inventories (GPC)**.<sup>1,2</sup> Lake Forest Park’s 2023 municipal operations inventory was performed in alignment with the **Local Government Operations Protocol (LGOP)**.<sup>3</sup> These protocols are the industry standard for quantifying emissions from communities and local governments. Following these protocols helps to ensure the inventories are replicable, consistent, and accurate. Additional documentation on the methodologies for both inventories is provided in *Appendix A: Methodology*.

## Emissions Sources

The GHG emissions sources analyzed in the GHG inventories are detailed below in Table 2.

Table 2. Emissions sources analyzed in Lake Forest Park’s 2019, 2022, and 2023 GHG inventories.

Sector	Emissions Source
<b>Communitywide GHG Inventories (2019, 2022, and 2023)</b>	
Buildings	Electricity Natural gas Propane Fuel oil
Transportation	On-road Off-road Air travel
Solid Waste	Landfilled waste generation and disposal Compost generation and disposal
Refrigerants	Refrigerants
Land Use	Tree loss
<b>Municipal Operations GHG Inventory (2023)</b>	
Buildings	Electricity
Transportation	Vehicle fleet
Solid Waste	Landfilled waste generation and disposal Compost generation and disposal
Refrigerants	Stationary and mobile refrigerants

<sup>1</sup> [US Community Protocol | ICLEI USA](#)

<sup>2</sup> [Global Protocol for Community-Scale GHG Inventories \(GPC\) | GHG Protocol](#)

<sup>3</sup> [Local Government Operations \(LGO\) Protocol | ICLEI USA](#)

## Communitywide GHG Emissions Results

Lake Forest Park’s community emitted an estimated 94,757, 79,780, and 81,274 MTCO<sub>2</sub>e in 2019, 2022, and 2023, respectively. **Transportation** was the highest emitter across all three inventory years, with emissions from **buildings** being the second largest emitter across all three years. Emissions have seen a downward trend since 2019 with the largest reductions occurring from air travel and on-road vehicles. Lake Forest Park’s communitywide GHG emissions for 2019, 2022, and 2023 are detailed below in Table 3, by emissions source.

Table 3. 2019, 2022, and 2023 communitywide GHG emissions and percent change, by emissions source.

Emissions Source	2019	2022	2023	% Change (2019-2023)
<b>Buildings</b>	<b>22,335</b>	<b>23,697</b>	<b>23,383</b>	<b>5%</b>
Electricity	497	403	464	-7%
Natural Gas	19,007	21,352	21,021	11%
Other Fuels	2,831	1,942	1,898	-33%
<b>Transportation</b>	<b>62,892</b>	<b>46,073</b>	<b>47,929</b>	<b>-24%</b>
On-road	24,929	23,600	23,511	-6%
Air travel	31,916	16,161	18,041	-43%
Off-road	6,047	6,313	6,377	5%
<b>Solid Waste</b>	<b>1,755</b>	<b>2,030</b>	<b>1,960</b>	<b>12%</b>
Landfill	1,318	1,568	1,512	15%
Compost	437	462	448	2%
Refrigerants	7,048	7,471	7,493	6%
Land Use (Tree Loss)	727	510	510	-30%
<b>Total Emissions</b>	<b>94,757</b>	<b>79,780</b>	<b>81,274</b>	<b>-14%</b>

### Buildings

The **buildings** sector emitted an estimated 22,335, 23,697, and 23,383 MTCO<sub>2</sub>e in 2019, 2022, and 2023, respectively, representing **29%** of total 2023 emissions. Emissions from buildings stem from electricity, natural gas, and other fuels (propane and fuel oil) used to heat, cool, and power homes and buildings in the community.

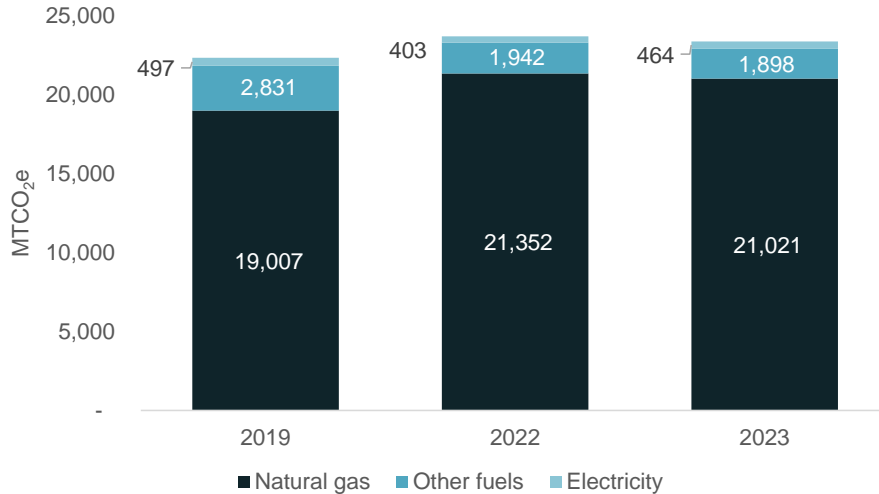
- **Electricity** contributed 497, 403, and 464 MTCO<sub>2</sub>e to building emissions in 2019, 2022, and 2023, respectively. Electricity accounted for **less than 1%** of total 2023 emissions.
- **Natural gas** contributed the most to 2019, 2022, and 2023 building emissions, emitting 19,007, 21,352, and 21,021 MTCO<sub>2</sub>e, respectively. Natural gas accounted for **26%** of total 2023 emissions.
- **Other fuels**, including propane and fuel oil, contributed 2,831, 1,942, and 1,898 MTCO<sub>2</sub>e to building emissions in 2019, 2022, and 2023, respectively. Other fuels accounted for **2%** of total 2023 emissions.

Commented [AF1]: Note: This section, along with summary graphics and tables, will likely need to be updated once we hear back from Seattle City Light on missing inventory data. We are currently waiting on Seattle City Light to provide 2019 electricity consumption data.

### Lake Forest Park Greenhouse Gas Inventory Report – Draft Communitywide GHG Emissions Results

Emissions from buildings have seen an upward trend since 2019, mostly driven by increases in natural gas consumption. Figure 3 below shows the breakdown of building emissions, by energy source, in each inventory year.

Figure 3. Building emissions, by source, in 2019, 2022, and 2023 (MTCO<sub>2</sub>e).



#### ELECTRICITY

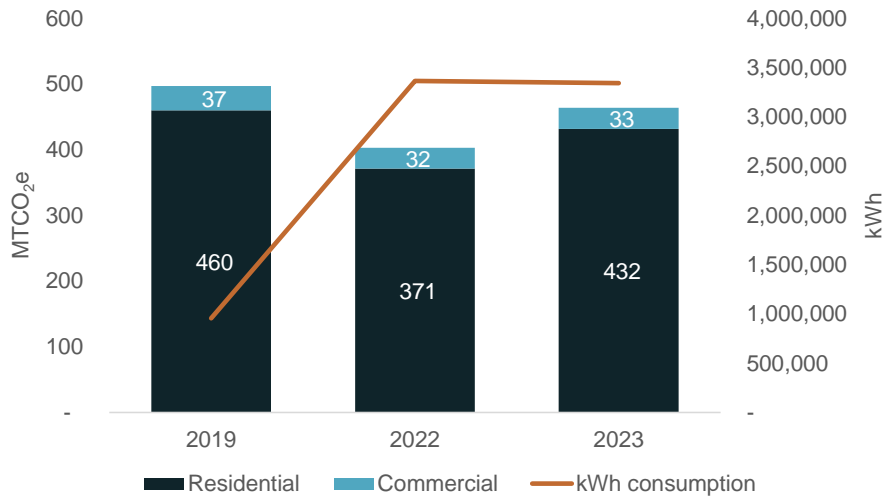
**Electricity** contributed <1% to communitywide emissions in each inventory year. Electricity data was provided by Puget Sound Energy and Seattle City Light for these studies. Since 2019, emissions from electricity have seen a downward trend, as shown in Figure 4, primarily driven by an increase in customer participation in Puget Sound Energy’s green power programs. In 2023, Puget Sound Energy and Seattle City Light powered the grid with about 50% and 95% renewables, respectively; both are committed to 100% clean electricity by 2030.

**Commented [AF2]: Note:** We will update this section once we receive data from Seattle City Light. We'll report on trends in consumption and emission factors, as relevant.

- The residential sector is the largest contributor to electricity emissions, as shown in Figure 4.
- Consumption of electricity has seen about a X% increase or decrease since 2019, as shown in Figure 4. This increase in consumption is likely due to an increase in population.

Lake Forest Park Greenhouse Gas Inventory Report – Draft  
Communitywide GHG Emissions Results

Figure 4. Communitywide electricity emissions, by sector, along with trends in consumption in 2019, 2022, and 2023 (MTCO<sub>2e</sub> and kWh).



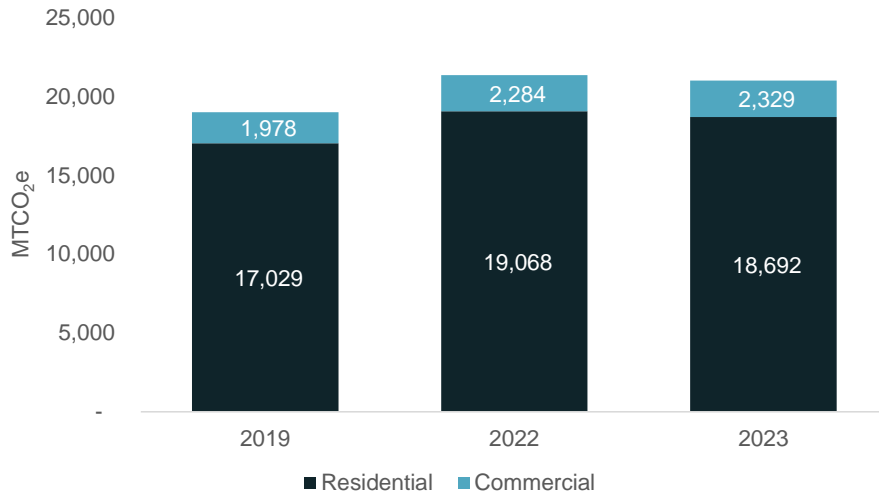
**NATURAL GAS**

Natural gas accounted for 20%, 27%, and 26% of Lake Forest Park’s communitywide emissions in 2019, 2022, and 2023, respectively. Natural gas data was provided by Puget Sound Energy for these studies. Since 2019, emissions from natural gas have seen an upward trend, as shown in Figure 5, primarily driven by changes to natural gas consumption, increased fugitive emissions occurring as natural gas is transported through the pipeline to consumers, and a dirtier carbon intensity of the natural gas provided by Puget Sound Energy.

- The residential sector has contributed the most to 2019, 2022, and 2023 natural gas emissions, contributing 17,029, 19,068, and 18,692 MTCO<sub>2e</sub>, respectively, as shown in Figure 5.
- Consumption of natural gas has decreased by about 2% despite an increase in emissions, as shown in Figure 5. Despite this decrease, the increase in emissions from 2019 to 2023 can be attributed to multiple factors including changing carbon intensity of natural gas and increased fugitive emissions as stated above.

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Communitywide GHG Emissions Results

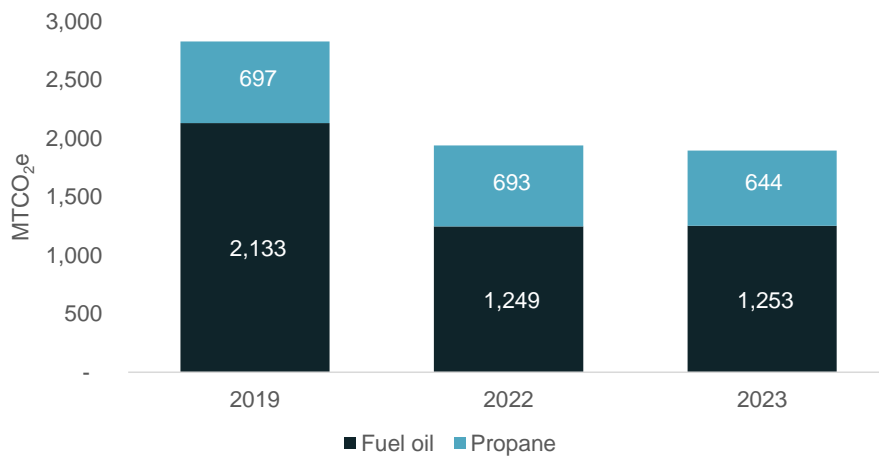
Figure 5. Communitywide natural gas emissions, by sector, in 2019, 2022, and 2023 (MTCO<sub>2</sub>e).



OTHER FUELS

Other fuels, including propane and fuel oil, accounted for 3%, 2%, and 2% of communitywide emissions in 2019, 2022, and 2023, respectively. The residential sector was the largest contributor to emissions from propane and fuel oil. Since 2019, emissions from propane and fuel oil have seen a downward trend, as shown in Figure 6, primarily driven by a decrease in consumption. Propane and fuel oil data was estimated from annual U.S. Energy Information Administration (EIA) reports for these studies.

Figure 6. Communitywide other fuels emissions, by fuel type, in 2019, 2022, and 2023 (MTCO<sub>2</sub>e).



Lake Forest Park Greenhouse Gas Inventory Report – Draft  
Communitywide GHG Emissions Results

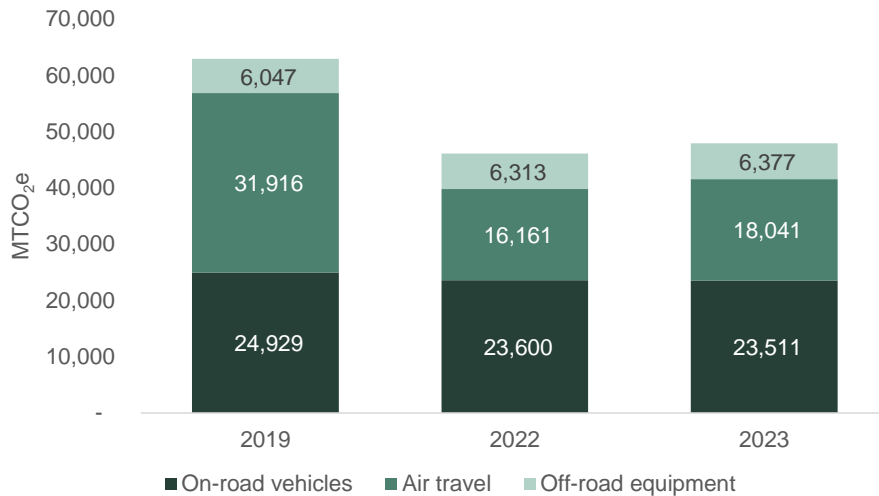
## Transportation

The **transportation** sector emitted an estimated 62,892, 46,073, and 47,929 MTCO<sub>2</sub>e in 2019, 2022, and 2023, respectively, representing **59%** of total 2023 emissions. Emissions from transportation stem from on-road and off-road vehicles and equipment use within the community and air travel attributed to Lake Forest Park’s residents.

- **On-road vehicles** contributed 24,929, 23,600, and 23,511 MTCO<sub>2</sub>e to transportation emissions in 2019, 2022, and 2023, respectively, and accounted for **29%** of total 2023 emissions.
- **Air travel** contributed 31,916, 16,161, and 18,041 MTCO<sub>2</sub>e to transportation emissions in 2019, 2022, and 2023, respectively, and accounted for **22%** of total 2023 emissions.
- **Off-road equipment** contributed 6,047, 6,313, and 6,377 MTCO<sub>2</sub>e to transportation emissions in 2019, 2022, and 2023, respectively, and accounted for **8%** of total 2023 emissions.

Emissions from transportation have seen a downward trend since 2019, mostly driven by a reduction in air travel and on-road vehicle activity. Figure 7 below shows the breakdown of transportation emissions, by source, in each inventory year.

Figure 7. Transportation emissions, by source, in 2019, 2022, and 2023 (MTCO<sub>2</sub>e).



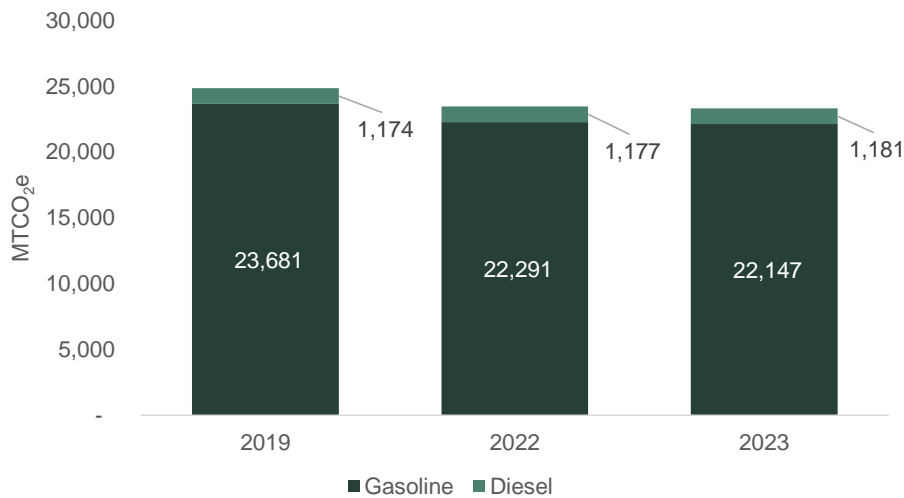
### ON-ROAD VEHICLES

**On-road** vehicle miles traveled (VMT) accounted for 26%, 30%, and 29% of Lake Forest Park’s communitywide emissions in 2019, 2022, and 2023, respectively. On-road VMT activity data was estimated from the Puget Sound Regional Council (PSRC) travel demand model for all three years, and a post-pandemic adjustment factor was applied to the 2022 and 2023 VMT

### Lake Forest Park Greenhouse Gas Inventory Report – Draft Communitywide GHG Emissions Results

activity data based on StreetLight Big Data estimates for Lake Forest Park. Since 2019, emissions from on-road vehicles have seen a downward trend, as shown in Figure 8, primarily driven by a 4% decrease in VMT from 2019 to 2023 and an increased uptake of electric vehicles. While VMT has decreased since 2019, StreetLight Data indicates that this reduction is largely due to shorter vehicle trip lengths, not a reduction in vehicle trips.

**Figure 8. Communitywide on-road vehicle emissions, by fuel type, in 2019, 2022, and 2023 (MTCO<sub>2</sub>e).**



#### AIR TRAVEL

**Air travel** accounted for 34%, 20%, and 22% of Lake Forest Park’s communitywide emissions in 2019, 2022, and 2023, respectively. Air travel emissions were estimated using a combination of SeaTac fuel consumption data, passenger survey data, and U.S. Census median household income data. Emissions from SeaTac’s origin passengers who report living in King County are allocated to cities based on median household income from the U.S. Census under the assumption that communities with a higher median household income are more likely to travel by plane.

The 43% decrease in emissions from air travel can be attributed to a reduction in SeaTac fuel use from 2019 to 2023 along with a reduction in origin passengers who reported coming from King County in SeaTac’s passenger survey. In 2019, 82% of origin passengers reported coming from King County, while in 2022, only 52% of origin passengers reported coming from King County.

#### OFF-ROAD EQUIPMENT

**Off-road equipment** accounted for 6%, 8%, and 8% of Lake Forest Park’s communitywide emissions in 2019, 2022, and 2023, respectively. Off-road emissions were estimated by running

## Lake Forest Park Greenhouse Gas Inventory Report – Draft Communitywide GHG Emissions Results

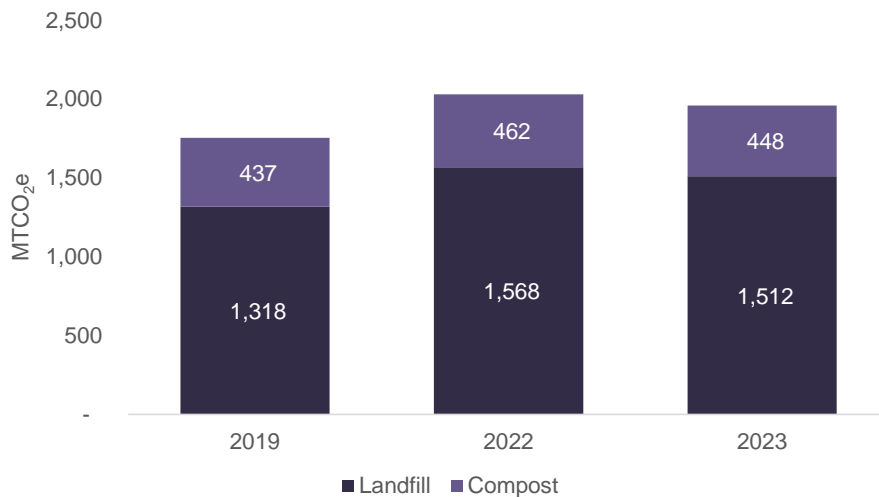
the EPA MOVES model at a county level and scaling by city population.<sup>4</sup> Off-road emissions include the following equipment types: recreational, construction, industrial, lawn/garden, agriculture, commercial, logging, airport support, oil field, pleasure craft, and railroad. Across all three inventory years, **construction, industrial, and lawn/garden equipment** produced the most emissions.

### Solid Waste

The **solid waste** sector emitted an estimated 1,755, 2,030, and 1,960 MTCO<sub>2</sub>e in 2019, 2022, and 2023, respectively, representing **2%** of total 2023 emissions. Emissions from solid waste are generated by the transportation and disposal of landfilled and composted waste produced by Lake Forest Park’s residents, employees, and visitors. **Landfilled waste** accounted for 77% of 2023 solid waste emissions, while **composted waste** accounted for 23%.

Emissions from solid waste have seen an upward trend since 2019, primarily driven by increases in both landfilled and composted waste generated. Figure 9 below shows the breakdown of solid waste emissions, by source, in each inventory year.

Figure 9. Solid waste emissions, by source, in 2019, 2022, and 2023 (MTCO<sub>2</sub>e).



<sup>4</sup> [MOVES and Mobile Source Emissions Research | U.S. EPA](#)



Lake Forest Park Greenhouse Gas Inventory Report – Draft  
Communitywide GHG Emissions Results

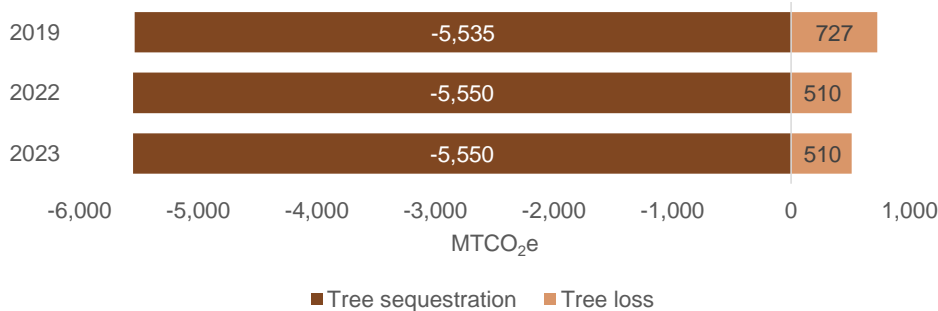
## Refrigerants

**Refrigerants** emitted 7,048, 7,471, and 7,493 MTCO<sub>2</sub>e in 2019, 2022, and 2023, respectively, representing **9%** of total 2023 emissions. Refrigerants are used for cooling equipment such as air conditioners and refrigerators. Emissions from refrigerants stem from refrigeration equipment leakage and occur most often from hydrofluorocarbons (HFCs) which have a high global warming potential (amount of global warming units that results from one unit of gas). Emissions from refrigerants have seen an upward trend since 2019. Refrigerant consumption is not tracked locally, so refrigerant emissions were estimated using a national EPA dataset for refrigerants and scaled to Lake Forest Park based on population.<sup>5</sup>

## Land Use

**Land use** emitted an estimated 727, 510, and 510 MTCO<sub>2</sub>e in 2019, 2022, and 2023, respectively, representing **less than 1%** of total 2023 emissions. These emissions occur from tree loss and occur when tree canopy is lost or when forests are converted to alternate land use. Land use also has the additional benefit of carbon sequestration from tree canopy gain and undisturbed tree canopy. Lake Forest Park’s tree canopy sequestered an estimated 5,535, 5,550, and 5,550 MTCO<sub>2</sub>e in 2019, 2022, and 2023, respectively. To ensure proper accounting of emissions, tree canopy sequestration benefits are reported separately from emissions. Land use emissions were calculated using the ICLEI’s Land Emissions and Removals Navigator (LEARN) tool using a GIS shapefile of Lake Forest Park’s geographic boundaries.<sup>6</sup> The tool provides multi-year estimates (in this case, 2016-2019 for 2019 and 2019-2021 for 2022 and 2023) that are then averaged for a per-year estimate. Figure 10 below illustrates emissions from tree loss along with the annual sequestration values for 2019, 2022, and 2023.

Figure 10. Tree canopy GHG emissions and sequestration (MTCO<sub>2</sub>e).



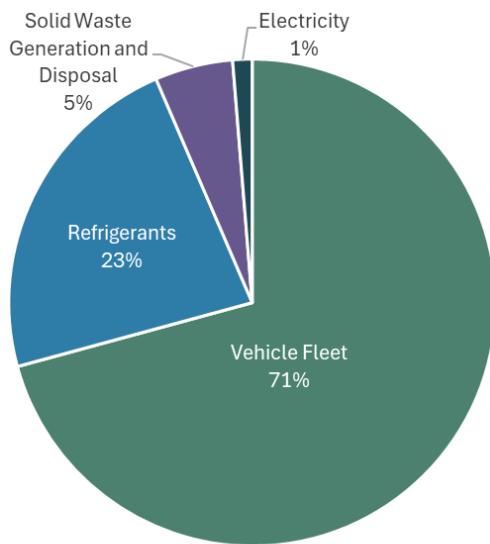
<sup>5</sup> [Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2022 | U.S. EPA](#)

<sup>6</sup> [Land Emissions and Removals Navigator \(LEARN\) | ICLEI USA](#)

# Municipal Operations GHG Emissions Results

Lake Forest Park’s municipal operations produced 247 MTCO<sub>2</sub>e in 2023. **Transportation** was the highest emitting sector, with the City’s **vehicle fleet** responsible for **71%** of total municipal operations emissions. Lake Forest Park’s municipal operations GHG emissions for 2023 are shown below in Figure 11, by emissions source.

Figure 11. 2023 municipal operations GHG emissions, by source (percentage of total municipal operations emissions).



## Buildings

The **buildings** sector emitted an estimated 3 MTCO<sub>2</sub>e in 2023, accounting for **1%** of total municipal operations emissions. Emissions from buildings stem from **electricity** used to power, heat, and cool City-owned facilities. The City does not use natural gas in its facilities.

## Transportation

The **transportation** sector emitted an estimated 175 MTCO<sub>2</sub>e in 2023, accounting for **71%** of total municipal operations emissions. Emissions from transportation stem from **on-road**

Lake Forest Park Greenhouse Gas Inventory Report – Draft  
Municipal Operations GHG Emissions Results

**vehicles and off-road vehicles and equipment** (on-road vehicles comprised over 99% of municipal fleet emissions).

Note: the City did not have data available to estimate emissions from employee commuting or employee business travel. If the City is interested in a more comprehensive municipal operations inventory in the future, City staff can administer employee commute surveys and collect data on employee business travel to estimate emissions associated with these activities.

## Solid Waste

The **solid waste** sector emitted an estimated 13 MTCO<sub>2</sub>e in 2023, accounting for **5%** of total municipal operations emissions. Emissions from solid waste stem from the transportation and disposal of landfilled and composted waste generated at City-owned or -operated facilities. **Landfilled waste** contributed the most to 2023 municipal solid waste emissions, emitting close to 12 MTCO<sub>2</sub>e. **Composted waste** contributed 1 MTCO<sub>2</sub>e to solid waste emissions in 2023.

## Refrigerants

Municipal **refrigerant use** emitted 56 MTCO<sub>2</sub>e in 2023, accounting for **23%** of total municipal operations emissions. Refrigerants are used for cooling equipment such as air conditioners and refrigerators in both stationary and mobile equipment. Of the 56 MTCO<sub>2</sub>e produced by refrigeration equipment used by the City, 98% was produced by stationary equipment such as HVAC systems, while 2% was produced by air conditioning units in the City's fleet vehicles. Emissions from refrigerants stem from refrigeration equipment leakage and occur most often from hydrofluorocarbons (HFCs) which have a high global warming potential (amount of global warming units that results from one unit of gas).

## Policy Recommendations

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The 2019, 2022, and 2023 communitywide GHG emissions inventory results were used to inform GHG emissions reduction policy for Lake Forest Park’s Climate Element. To adhere with Washington’s HB 1181, which was passed in 2023, Lake Forest Park must incorporate policy in its Comprehensive Plan aimed at reducing GHG emissions. These policies at minimum must result in overall GHG emissions reductions and reductions in VMT per-capita and prioritize reductions that benefit overburdened communities.<sup>7</sup> Based on the Commerce guidance and the results of this GHG analysis, it is recommended that Lake Forest Park pursue the development of Climate Element policies that:

- **Reduce VMT per-capita**, such as through measures that promote multi-modal transportation, improve public transit infrastructure and access, or manage parking
- **Expand electric vehicle infrastructure**
- **Increase building efficiency** in new and existing buildings
- **Promote building electrification** in new and existing buildings
- **Reduce landfilled waste**

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<sup>7</sup> [Climate Element Planning Guidance | WA State Department of Commerce](#)

## Appendix A: Methodology

This appendix provides a detailed description of the calculation methodology used to complete Lake Forest Park’s communitywide and municipal operations GHG inventories.

Calculating Lake Forest Park’s GHG inventories involved identifying and applying emissions factors to activity data, summarized in Table 4 below.

- **Activity data** quantifies the amount of activity that ultimately generates emissions. Examples of activity data include kilowatt hour of electricity consumed, vehicle miles traveled (VMT), and tons of waste generated.
- **Emissions factors** are values that are used to determine the amount of a specific GHG emitted based on one unit of activity data. Examples of emission factors include metric tons of carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>), or CO<sub>2</sub> equivalence emitted per kilowatt hour of electricity consumed, per ton of waste generated, or per VMT.

Table 4. Calculation methodology, including activity data and emissions factor sources.

Sector	Activity Data	Emissions Factors (EFs)
<b>Buildings</b>		
<b>Natural gas</b>	City-specific consumption provided by utilities	Utility-provided emission factors provided by Puget Sound Energy
<b>Electricity</b>	City- and municipal-specific consumption provided by utilities	1) Utility-specific emission factors (from Department of Ecology Clean Fuel Standard program utility-specific electricity calculations) 2) Emissions & Generation Resource Integrated Database (eGRID) EFs (for informational purposes only)
<b>Fuel oil</b>	WA fuel oil consumption by sector from U.S. Energy Information Administration (EIA)	U.S. Environmental Protection Agency (EPA) Emission Factors (EF) Hub <sup>8</sup> average EFs
<b>Propane</b>	WA propane consumption by sector from U.S. EIA	U.S. EPA EF Hub average EFs
<b>Transportation</b>		
<b>On-road vehicles (communitywide)</b>	Vehicle miles traveled data and estimated emissions from Puget Sound Regional Council (PSRC) travel demand model outputs. StreetLight Data was used to create a VMT adjustment factor that accounts for pandemic-related travel changes from 2019 conditions.	U.S. EPA EF Hub vehicle EFs (by vehicle & fuel type)

<sup>8</sup> [GHG Emission Factors Hub | U.S. EPA](#)

Lake Forest Park Greenhouse Gas Inventory Report – Draft  
Appendix A: Methodology

Sector	Activity Data	Emissions Factors (EFs)
	This adjustment factor was applied to the PSRC VMT data for 2022 and 2023	
<b>On-road vehicles</b> <i>(municipal operations)</i>	City-provided vehicle type, fuel type, fuel use, and miles traveled for municipal fleet vehicles	U.S. EPA EF Hub vehicle EFs (by vehicle & fuel type)
<b>Off-road equipment</b> <i>(communitywide)</i>	EPA Motor Vehicle Emission Simulator (MOVES) <sup>9</sup> model outputs, by county then scaled by city population	N/A - reported in terms of emissions
<b>Off-road equipment</b> <i>(municipal operations)</i>	City-provided vehicle/equipment type, fuel type, fuel use, and miles traveled for municipal fleet off-road vehicles/equipment	U.S. EPA EF Hub vehicle EFs (by vehicle & fuel type)
<b>Aviation</b>	<p>Two approaches, depending on data availability:</p> <p>1) Volume of fuel (jet-A and aviation gasoline) loaded onto all planes departing from airports within county; volume of all fuel used in helicopters, light aircraft operating within county boundaries (e.g., police, sightseeing, training)</p> <p>2) Number of landing and takeoff cycles that could be used to estimate fuel based on similar airports</p> <p>Emissions from Seattle-Tacoma International Airport (SEA) were attributed to individual cities using Approach 1 (described above), in combination with passenger survey data, population, and household income data from the U.S. Census.</p>	U.S. EPA EF Hub average EFs, by fuel type
<b>Solid Waste</b>		
<b>Landfill</b>	City- and municipal-specific tonnage and King County waste characterization data	EPA Waste Reduction Model (WARM) <sup>10</sup> EFs, customized for landfill attributes
<b>Compost</b>	City- and municipal-specific tonnage and King County waste characterization data	EPA WARM EFs
<b>Refrigerants</b>		
<b>Refrigerants</b> <i>(communitywide)</i>	EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks	N/A - reported in terms of emissions

<sup>9</sup> [MOVES and Mobile Source Emissions Research | U.S. EPA](#)

<sup>10</sup> [Waste Reduction Model | U.S. EPA](#)

Lake Forest Park Greenhouse Gas Inventory Report – Draft  
Appendix A: Methodology

Sector	Activity Data	Emissions Factors (EFs)
<b>Refrigerants</b> <i>(municipal operations)</i>	City-reported refrigerant use in municipal facilities and fleet vehicles	Global warming potential (GWP) values from California Air Resources Board (AR5 values) <sup>11</sup>
<b>Land Use</b>		
<b>Tree loss</b>	ICLEI's LEARN tool <sup>12</sup> with a city-specific GIS shapefile of geographic boundaries	ICLEI's LEARN tool

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<sup>11</sup> [High-GWP Refrigerants | CA Air Resources Board](#)

<sup>12</sup> [Land Emissions and Removals Navigator \(LEARN\) | ICLEI USA](#)