PIERCE COUNTY EMISSIONS DATA TRENDS

MEMO FOR THE CITY OF PUYALLUP

Introduction

This memo provides an overview of historic and forecasted greenhouse gas (GHG) emissions for Puyallup Pierce County, based on the inventory and forecast of Pierce County's emissions conducted for the Puget Sound Regional Emissions Analysis project (PSREA)[1], which provided an analysis of the County's communitywide geographic GHG emissions from 2015 to 2019 and emissions forecasts through 2050.[2]

Pierce County has committed to reducing its greenhouse gas (GHG) emissions 45% by 2030 and 95% 2050, compared to 2015 levels.[3] Insights from Pierce County's emissions and reduction targets will inform the development of Puyallup's Environmental and Sustainability Action Plan (ESAP) to ensure that the plan aligns with County targets.

The memo details emissions trends and how this information will inform key elements of the ESAP, namely the emissions reduction strategies and actions in the plan. To complete this analysis, Pierce County's current (2019) and historic GHG emission inventory (2015-2019)[4] were scaled to Puyallup based on population – as such, this report does not represent a community specific GHG profile but a scaled approximation only based on County wide information. Scaling was done based on Puyallup's population and land area relative to the entire County, with specific adjustments for timber harvesting, marine and agricultural operations removed due to the lack of these land uses within the city limits.

The first section of this memo highlights key findings about Puyallup's historic GHG emissions and is followed by an in-dept review of emissions trends by sector. The last section provides GHG emissions forecasts for Puyallup and Pierce County as a whole and identifies areas of opportunities for the County to meet its emission reduction targets..

GHG Emissions Inventory Summary

Puyallup's estimated current (2019) and historic GHG emission inventory (2015-2019)[4] provides insights into the primary drivers of community emissions. An analysis of the inventory revealed the following key trends:

[1] Pierce County Communitywide Geographic Greenhouse Gas Emissions (Puget Sound Regional Emissions Analysis)
[2] Some emissions totals may differ slightly between the PSREA report and this memo and its corresponding excel workbook. This difference is due to more refined Pierce County-specific data being added to the emissions analysis after the PSREA report was published, in addition to revising these inventory totals to remove emission source that are not applicable to Puyallup.
[3] Sustainability 2030: Pierce County's Greenhouse Gas Reduction Plan
[4] We are using 2019 to analyze current emissions rates to account for the temporary impact from the COVID-19 pandemic on 2020-2022 emissions. Trends are analyzed from 2015 (the County's last inventory year).

- The **top drivers of communitywide GHG emissions** in 2019 in Puyallup are estimated to be on-road transportation (35%), building electricity (21%), and building natural gas (20%). Other minor contributions to emissions included refrigerants, off-road equipment, solid waste disposal, and aviation (Figure 1).

Total = ~338,000 $MTCO_2e$

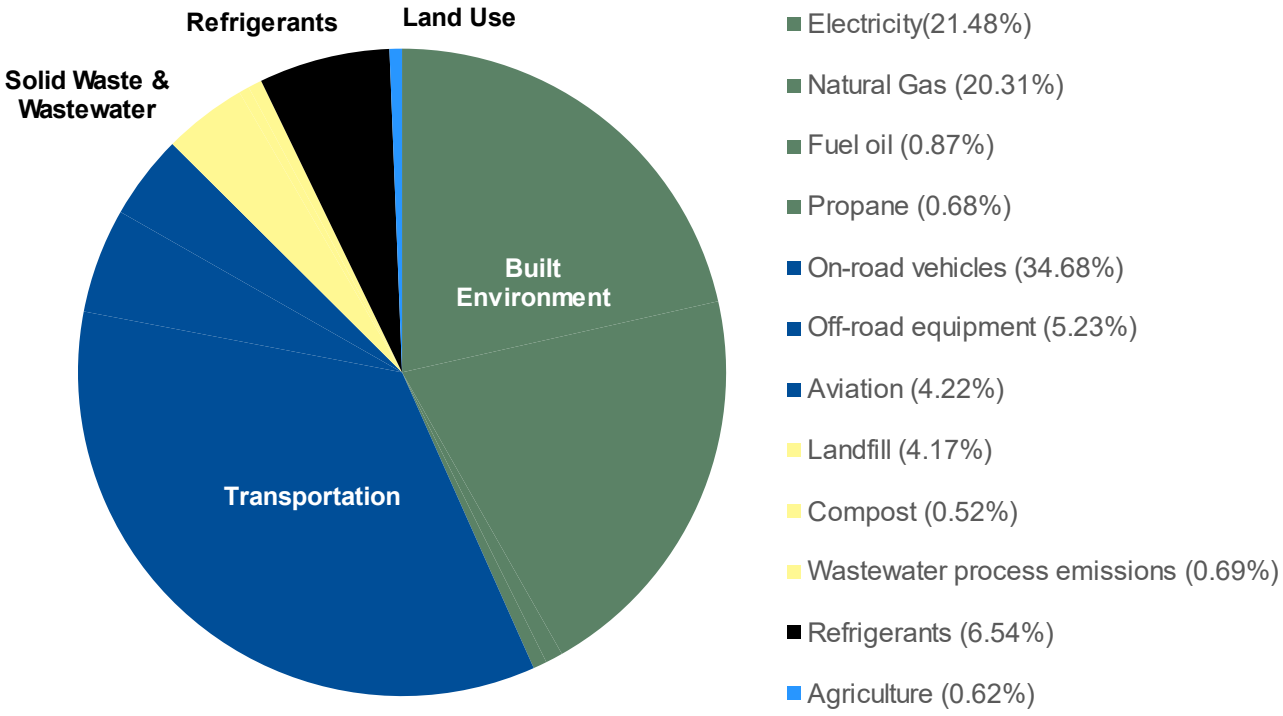


Figure 1. Sources of GHG emissions for Pierce County in 2019, by sector.

- From 2015 to 2019, **communitywide GHG emissions increased by 14%**, from ~296,000 to ~338,000 $MTCO_2e$ (Figure 2). Per capita emissions during this period increased 7%.

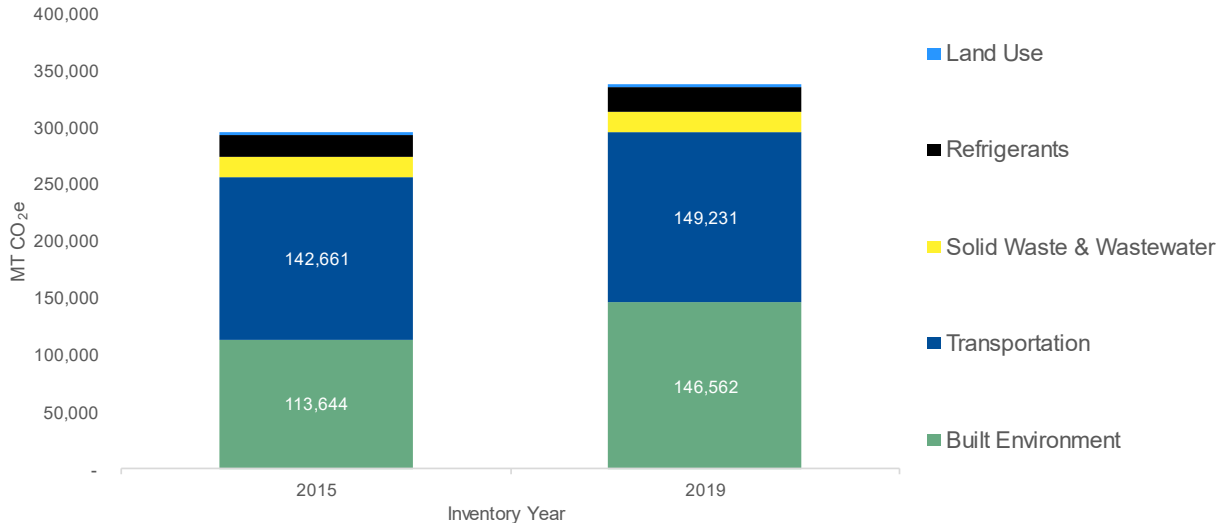


Figure 2. Total GHG emissions for Pierce County in 2015 and 2019, by sector.

Historic GHG Emissions by Sector

A breakdown of emissions trends by sector is provided below.

Built Environment

Built environment emissions come from energy used to power buildings.

- In 2019, built environment emissions accounted for an estimated **43%** of communitywide emissions.
- **Most emissions came from electricity and natural gas, which accounted for 50% and 47%, respectively,** of built environment emissions and 42% of total emissions.
  - In 2019, electricity emissions increased 36% from 2015 and accounted for an estimated 21% of Puyallup's total communitywide emissions (Figure 3).

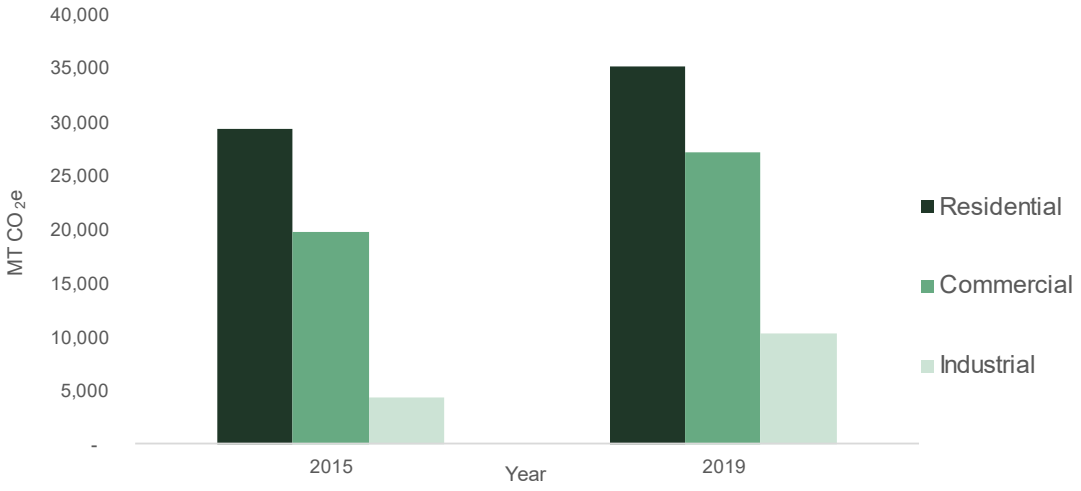


Figure 3. Electricity emissions trends, by sector.

- During the same period **electricity consumption increased 15%** (Figure 4). Emissions also increased in part from an increase in the carbon intensity of PSE's electricity fuel mix.

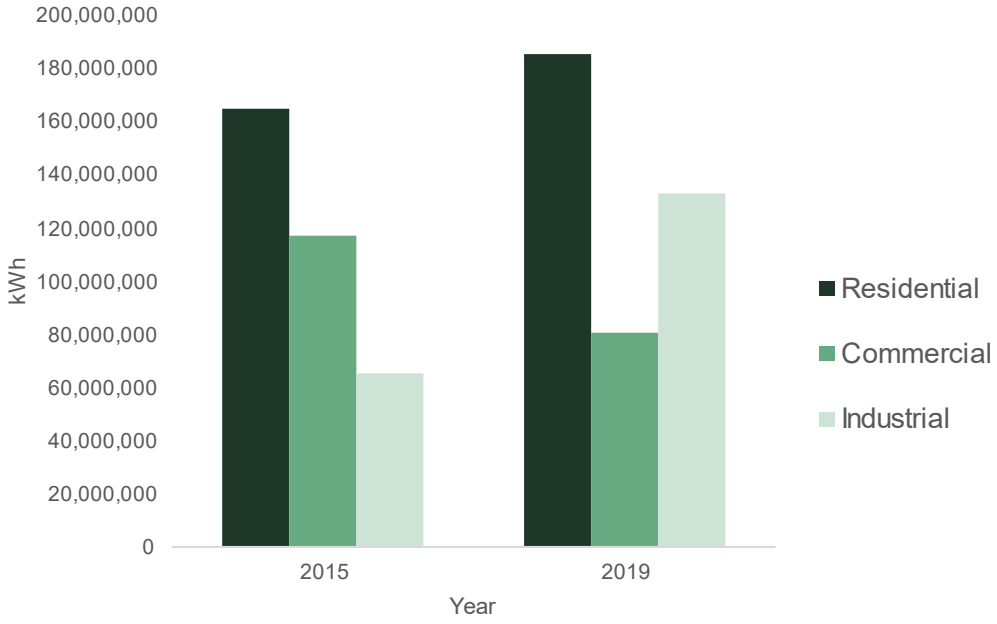


Figure 4. Electricity consumption trends, by sector.

- In 2019, natural gas (delivered by PSE) accounted for an estimated 20% of Puyallup's total communitywide emissions—a 26% increase from 2015 (Figure 5).

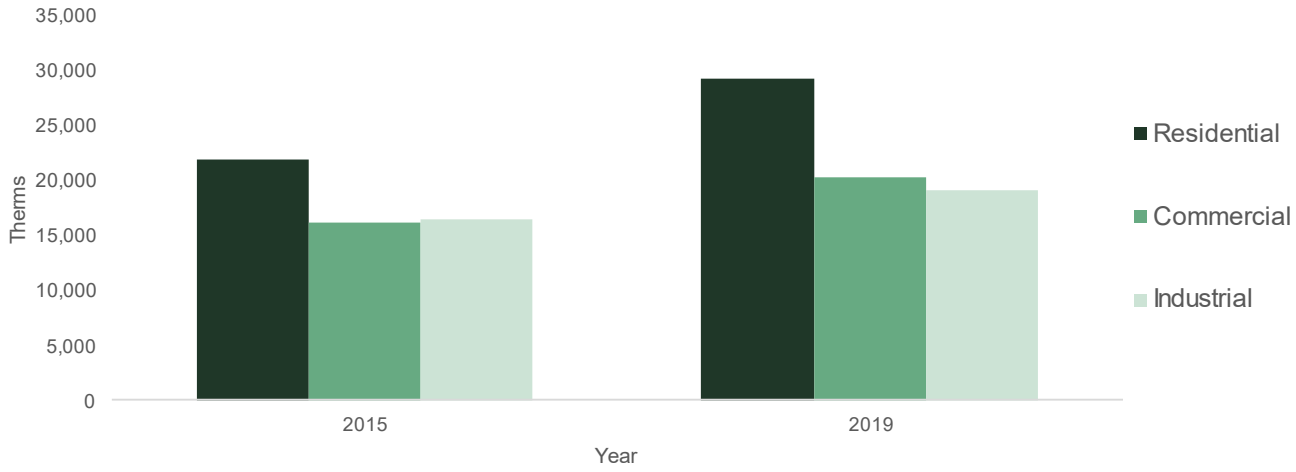


Figure 5. Natural gas emissions trends, by sector.

Transportation

Transportation emissions come from on-road transportation—which includes passenger vehicles, freight trucks, and transit vehicles within the county boundary—as well as aviation, offroad vehicles and equipment, and marine and rail.

- In 2019, transportation accounted for 44% of communitywide emissions.
  - On-road transportation activities accounted for most of the total transportation emissions (79%) and an estimated 34% of Puyallup's communitywide emissions in 2019. Passenger vehicles accounted for the majority (83%) of 2019 on-road vehicle emissions. Total on-road transportation emissions increased 2% between 2015 and 2019.
  - The remaining 2019 transportation emissions come from aviation (10%) and off-road vehicles and equipment (12%)—see Figure 6. Aviation emissions have increased 28% since 2015.

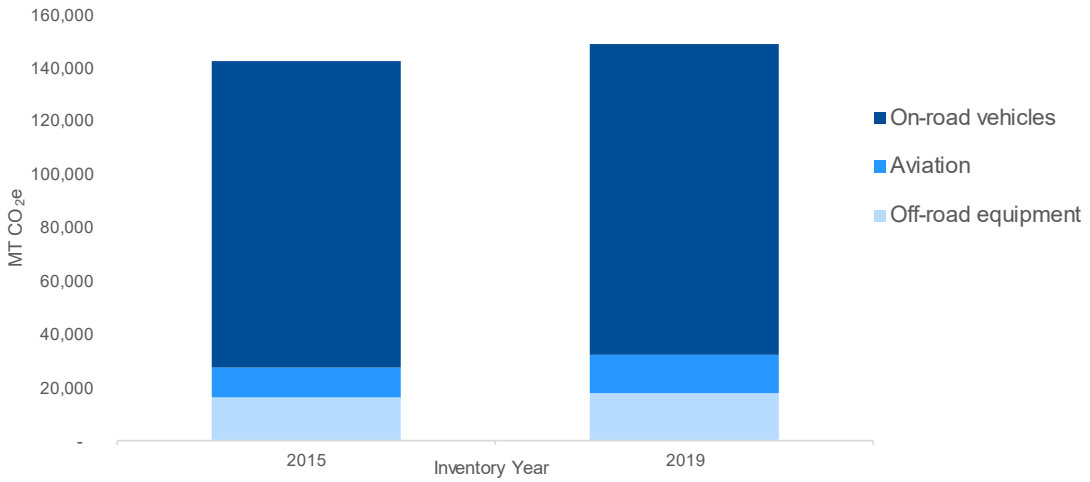


Figure 6. Transportation emissions trends, by sector.

  - From 2015 to 2019, on-road passenger vehicle transportation emissions decreased approximately 1% which may be attributed to the transition to cleaner passenger vehicles, while emissions from freight and service vehicle transportation increased 15% (Figure 7).

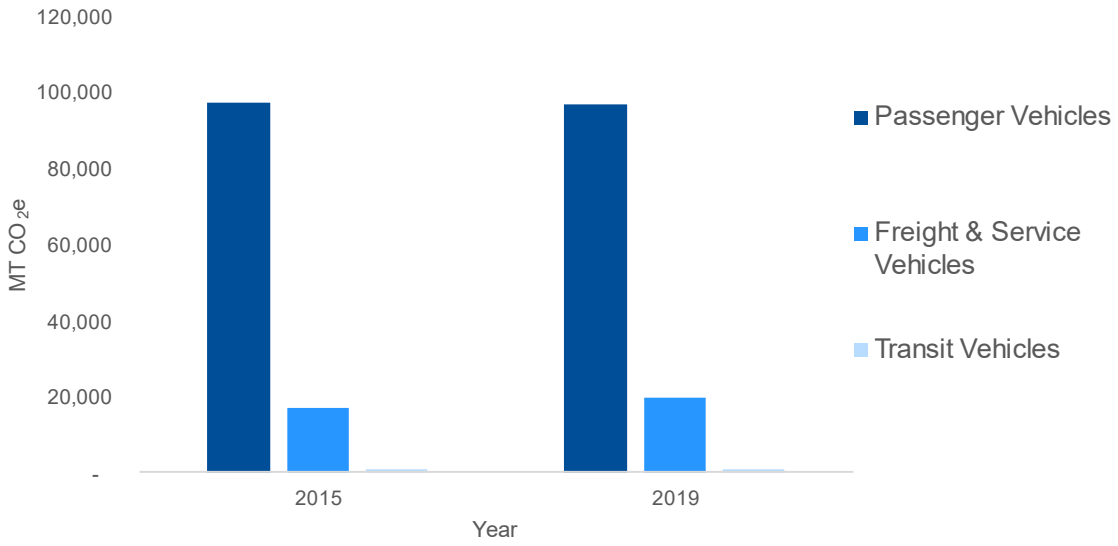


Figure 7. On-road transportation trends.

Solid Waste

Solid waste emissions are released during waste transportation to landfills and commericial composting facilities. When organic waste breaks down in conditions devoid of oxygen in landfills, methane is released into the atmostphere. Although many landfills capture most of the methane, some methane still reaches the atmostphere. Commercial composting also releases greenhouse gases as organic material decomposes.

- Solid waste accounted for an estimated 5% of Puyallup's total communitywide GHG emissions in 2019. Overall, **solid waste emissions decreased 4% from 2015 to 2019** (Figure 8), driven by reductions in the amount of waste sent to landfills and increased diversion of organic waste.
  - Landfill emissions accounted for most of 2019 solid waste emissions (89%) and 4% of communitywide emissions.

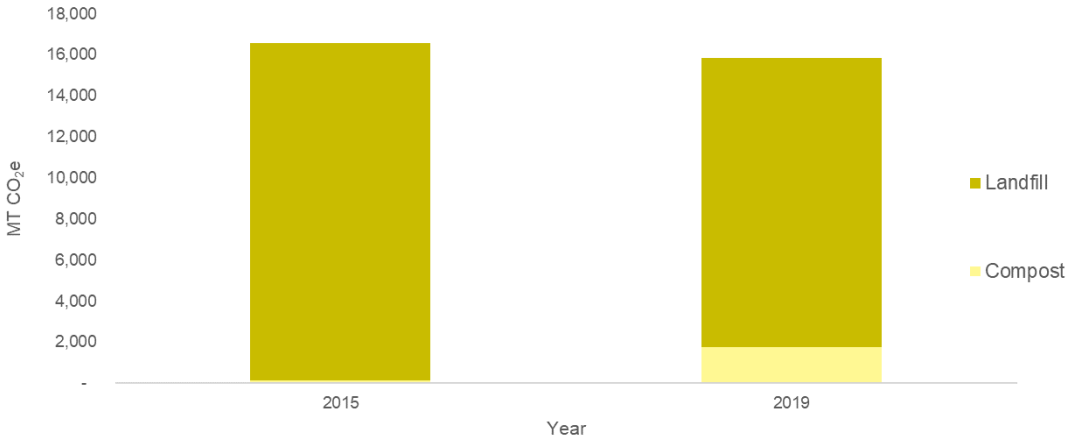


Figure 8. Solid waste emissions trends, by sector.

Wastewater

Wastewater emissions are produced during the wastewater treatment process.

- **Estimated wastewater emissions in Puyallup have increased 18% since 2015**, in large part due to a growing population (Figure 9).
    - Both in 2015 and 2019 Pierce County's wastewater emissions (and as a result Puyallup's estimated wastewater emissions) were relatively high compared to its population. These trends are primarily driven by the high number of septic systems in the county.

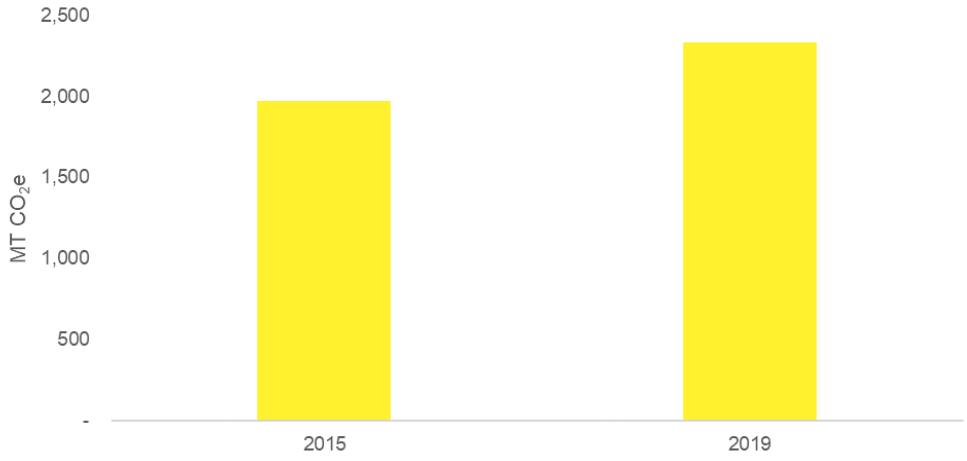


Figure 9. Wastewater emission trends.

Refrigerants

Refrigerant emissions stem primarily from the release of hydrofluorocarbons (HFCs), which are a substitution for ozone depleting substances (ODSs). HFCs, which are greenhouse gases, are mainly used for air conditioning and refrigeration equipment (USEPA, 2014).

- In 2019, refrigerants accounted for 7% of communitywide emissions.
- **Refrigerant emissions increased 14% between 2015 and 2019**

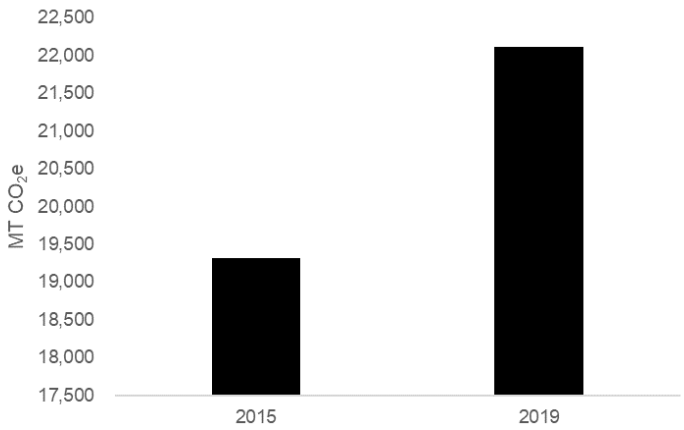


Figure 10. Refrigerant emission trends.

- Refrigerant emissions are estimated by downscaling national-level refrigerant emission data to the local level based on population. Therefore, trends in this source are a product of both national-level refrigerant trends and local population growth.

Land Use

Land use emissions come from agriculture activities.

- In 2019, land use accounted for 1% of estimated communitywide emissions in Puyallup.
- Agriculture emissions come primarily from the release of methane and nitrous oxide emissions associated with livestock digestion (enteric fermentation) and manure management.
- **Agricultural emissions decreased 7% from 2015 to 2019**, likely due in part to a 65% decrease in the number of dairy cows in Pierce County, which release more methane than other farm animals; the number of beef cows stayed about the same between the two years. (Figure 11).

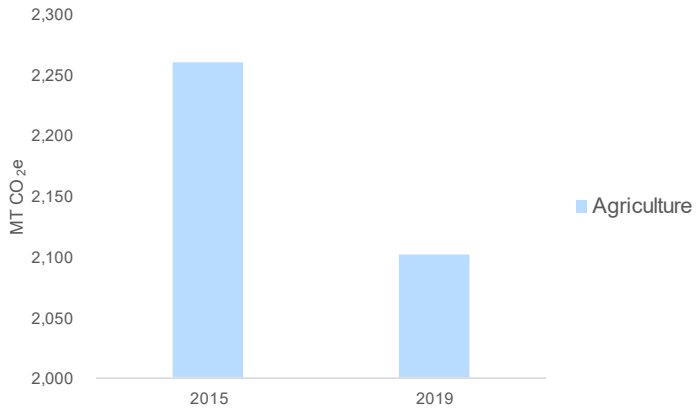


Figure 11. Land use trends.

Forecasted Future Emissions

Future emissions were forecasted through 2050 to understand how emissions in Pierce County are expected to change in the coming decades.

- **If no action is taken to reduce emissions**, Pierce County's communitywide emissions are projected to increase 112% by 2050 compared to a 2015 baseline (black dotted line in Figure 12).
- **Existing federal, state, and regional climate policies** are estimated to reduce emissions 36% by 2050 compared to a 2015 baseline (pink line in Figure 12), with the greatest impact coming from Washington's Clean Energy Transformation Act (CETA) and Washington's Internal Combustion Engine Ban (SB 5974).[5]

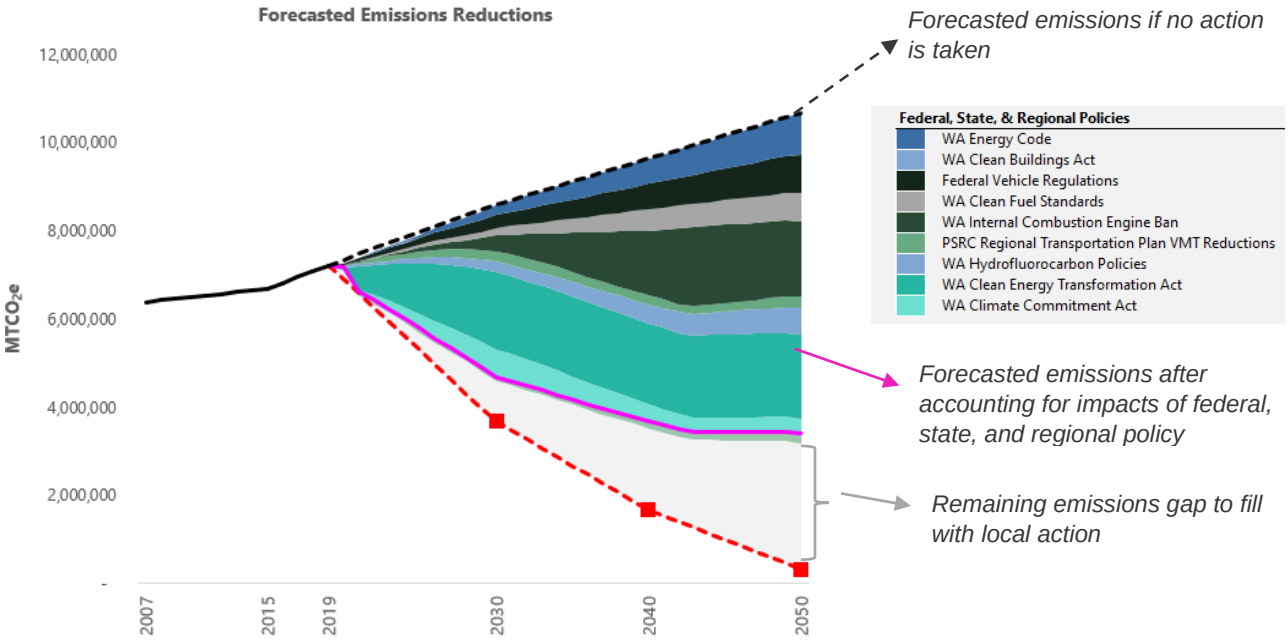
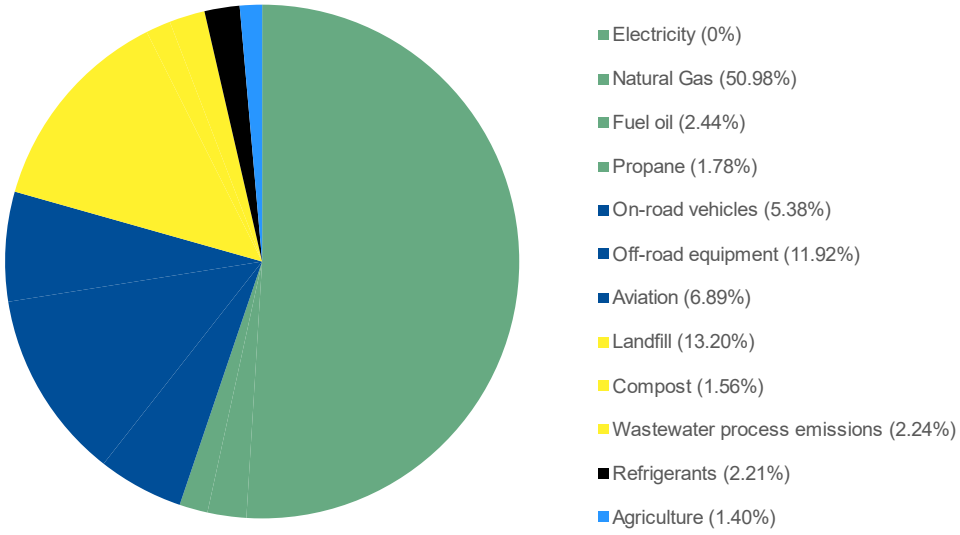


Figure 12. Forecasted emissions reduction under three scenarios for Pierce County.[6] The gray section of the graph indicates the emissions gap that needs to be closed for Pierce County to achieve 95% reduction compared to 2015 emissions levels by 2050.

After accounting for existing policies, ~188,400 $MTCO_2e$ for Puyallup, with the largest sources of emissions projected to be natural gas[7] (51%), landfilled waste (13%), and off-road equipment (12%) (Figure 13).

[5] CETA will require all utilities to be carbon neutral by 2030 (i.e., phase out natural gas) and to provide clean renewable energy by 2045.
[6] This scenario only includes the emissions sources included in Puyallup's emissions totals, however, emissions from tree cover loss, marine and rail transportation, and industrial process emissions may apply to Pierce County.
[7] Electricity emissions are anticipated to zero out due to the impact from CETA.



Total = ~188,400 $MTCO_2e$

Figure 13. Remaining 2050 emissions after accounting for federal, state, and regional policies.

Opportunities for Reducing Emissions

To achieve the remaining emissions reduction needed to meet the county's goals, **industries, governments, businesses, and individuals in Pierce County will need to take additional action beyond existing policies to achieve a 45% reduction by 2030** and hypothetical targets in line with Washington State goals of 70% reduction by 2040, and 95% reduction by 2050[8] (dotted red line in Figure 12). These additional actions will be developed as part of the ESAP planning effort.

Cascadia recommends the City of Puyallup to adopt emissions reduction targets consistent with either Pierce County targets or Puget Sound Regional Council targets. Table 1 includes details on these targets as well as targets from the state and county levels. Pierce County's emissions targets are set from a 2015 baseline (the latest inventory year).

Table 1. GHG Emissions Reduction Targets at the State, County, and Regional Levels

Jurisdiction	Plan GHG reduction target	Jurisdiction commitment to carbon neutrality?
WA State RCW 70A.45.020	2030: 45% reduction below 1990; 2040: 70% reduction below 1990; 2050: 95% reduction	No
Pierce County	2030: Reduce GHG by 45%, 2040: 70%	Yes, by 2050
Lakewood	2030: 50%, 2050: 80%	Yes, by 2050.

[8] Note that Pierce County has not yet committed to reduction targets for 2040 or 2050; targets presented here are hypothetical.

Tacoma	2030: Reduce GHG emissions 33%	Yes, by 2050
King County	2030: Reduce by 50%, 2050: 80%	80 percent reduction by 2030
Issaquah	2030: Reduce by 50%, 2040: 75%	Yes, by 2050
Edmonds	2025: Reduce by 25%, 2050: 50%	Yes, by 2050
Burien	2030: Reduce by 50%	Yes, by 2050
Redmond	2030: Reduce by 50%, 2050: 80%	Yes, by 2030
Thurston County Climate Action Plan **County, Lacey, Olympia, and Tumwater*	2030: Reduce by 45%, 2050: 85%	Yes, by 2050

In 2007, the Washington State Legislature passed RCW 47.01.440 which adopted statewide goals to reduce annual per capita vehicle miles traveled (VMT), shown in Table 2. **Cascadia recommends the City of Puyallup also adopt the Washington State targets for VMT reduction.** The City may also consider aligning with the targets adopted by the King County-Cities Climate Collaboration (K4C)—a partnership of 22 King County cities focused on advancing regional climate action. K4C targets are outlined in Table 2 as well.

However, regional transportation models, which conservatively predict a -20% reduction in VMT by 2050, indicate that these targets may be aspirational; the City should consider revisiting the VMT target in the next 5-10 years.

Table 2. Washington State Annual VMT per Capita Reduction Targets

	2035	2050
Washington State	30% reduction from 2007 levels	50% reduction from 2007 levels
King County-Cities Climate Collaboration (K4C)	20% reduction from 2017 levels	50% reduction from 2017 levels

Based on based on inventory and emission forecast findings, we anticipate addressing emissions from buildings, transportation, solid waste, and land use in the development of the ESAP, as these are the largest emissions sources and greatest contributors to the increase in GHG emissions at the communitywide level. **The ESAP will include strategies and actions to reduce GHG emissions** that align with actions, strategies, and targets adopted by regional partners, including Pierce County and PSRC. Examples of widely adopted and impactful GHG reduction actions include:

- Retrofit or construct buildings following green building standards to increase energy efficiency, and source products and materials that are less carbon intensive.
- Incentivize energy-efficient practices (e.g., installing LED lights, weatherproofing doors and windows) in homes and buildings.
- Increase land use density and incentivize mixed-use development with affordable housing near public transit lines and stations.
- Facilitate electric vehicle (EV) adoption by outlining a plan for increasing EV charging stations at strategic locations throughout the city.
- Develop programs for food waste prevention and diversion to keep food out of landfills.

- Encourage and provide incentives for homeowners and private landowners to preserve and plant trees on their property.
- Plant and maintain right-of-way trees to reduce heat and increase carbon sequestration.
- Encourage employers and community members reduce drive-alone trips through the Pierce Trips program.
- Develop transportation projects that reduce vehicle miles traveled.