

# City of Palm Coast

2022

## Air Quality Assessment for Operations

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Produced by the City of Palm  
Coast Sustainability &  
Resiliency Initiative WITH  
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# Executive Summary

The City of Palm Coast is dedicated to fostering a thriving and healthy environment for all residents, exemplifying leadership through a proactive approach, the City of Palm Coast has partnered with ICLEI to provide an *Air Quality Assessment for Operations*. This collaborative effort offers as an examination of specific air-polluting gases, including nitrous oxide, methane, and carbon dioxide as it relates to City operations, serving as a baseline for measuring and enhancing future environmental initiatives.

Recognizing the significance of a thorough analysis of the City's operational pollution footprint, Palm Coast aims to make informed planning decisions, strategically develop policies, and champion initiatives that enhance air quality while mitigating pollution.

In embracing this collaborative endeavor with ICLEI, the City of Palm Coast reaffirms its dedication to resilient practices and responsible governance. Equipped with the insights from this Air Quality Assessment, the city is poised to enact meaningful changes, fostering a cleaner and healthier environment for current and future generations.

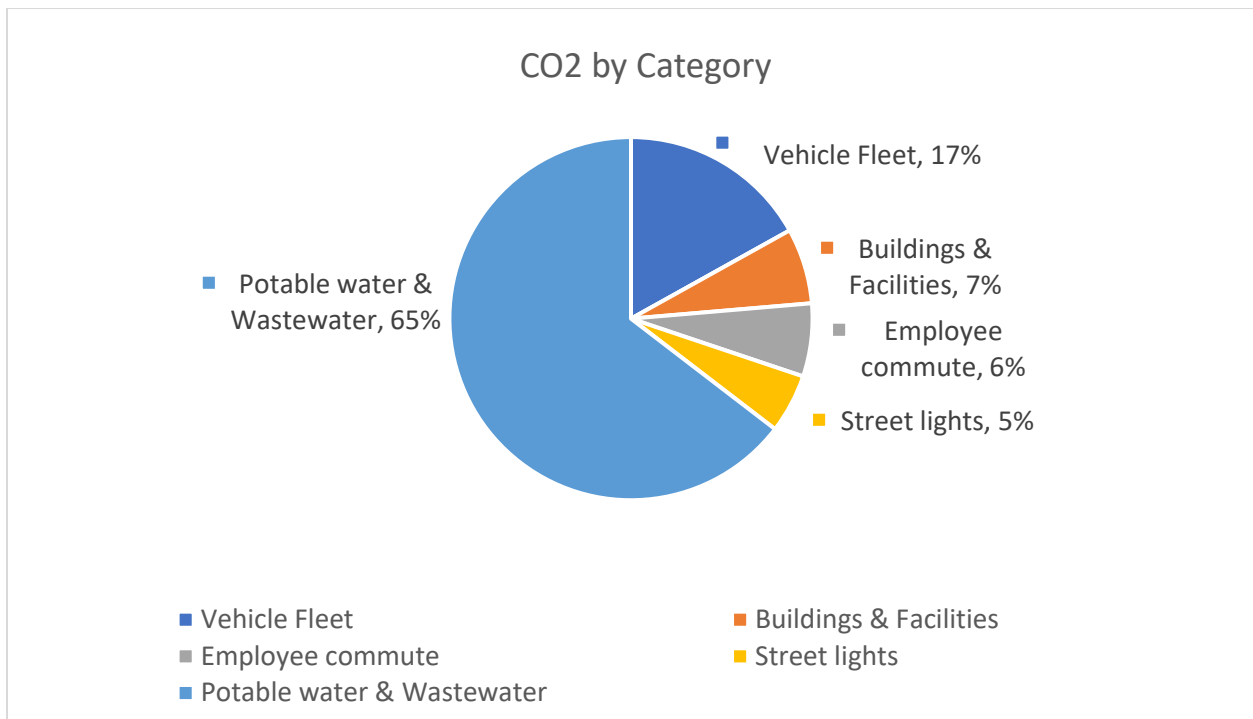
This report provides an overview of the City's air pollution footprint as it relates to the three gases identified above and focuses on the following areas of operations: Electricity, Transportation, Energy, Wastewater, & Potable Water.



# Key Findings

Figure 1 shows local government operations as it relates to nitrous oxide, methane and carbon dioxide. The water and wastewater sector accounts for a vast majority (65%) of these emissions. The next largest contributor is vehicle fleet (17%), followed by buildings and facilities (7%). Actions to reduce these pollutions from these sectors will be a key part of any future resiliency plan developed by the City of Palm Coast. Streetlights and employee commute were responsible for the remainder (approximately 11%).

The Inventory Results section of this report provides a detailed profile of sources within the City of Palm Coast; information that is key to guiding local reduction efforts.



**Figure 1: Government Operations Emissions by Sector**

# Introduction

Air pollution is complex, and dynamic based on the uniqueness of the regional area and industry. The Earth's atmosphere has a various composition of different gases, and all play different roles. For instance, carbon dioxide can linger in the atmosphere for 300-1,000 years<sup>1</sup>. As a result, what we add today will live for many lifetimes. While gases such as carbon dioxide are naturally reoccurring, humans impact this cycle and play a role into what happens within these systems as we add pollution.

Cities, towns, and counties are well placed to define coherent and inclusive plans that address integrated action — through adaptation, resilience, and mitigation. Existing targets and plans need to be reviewed to bring in the necessary level of ambition and policies to address pollution. Air pollution reduction is an opportunity for our community to experience a wide range of co-benefits, such as creating socio economic opportunities, reducing poverty and inequality, and improving the health of people and nature.

According to the 2022 [National Climate Assessment](#), Southeast Florida, including City of Palm Coast, is at particular risk for coastal hazards, such as flooding, erosion, and hurricanes that will continue to intensify with sea-level rise. In addition, fluctuations in our weather will continue to produce warmer seasons and extreme temperatures that threaten many sectors within City of Palm Coast and the greater region, most notably tourism and public health<sup>2</sup>.

Reducing air pollution in the community can have many benefits. More efficient use of energy decreases utility and transportation costs for residents, governmental operations, and businesses. Retrofitting homes and businesses to be more efficient creates local jobs.

Take for example energy use. More efficient use of energy decreases utility costs while reducing air pollution-both on the government side but also residential. Retrofitting homes and businesses to be more efficient creates local jobs and boosts the workforce. The energy workforce added close to 300,000 jobs in 2022<sup>3</sup>. In addition, when residents save on energy costs, they are more likely to spend their money elsewhere and could add to the local economy.



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<sup>1</sup>NASA, 2019: Sizing Up Humanity's Impacts on Earth's Changing Atmosphere, A. Buis. NASA's Jet Propulsion Laboratory.

<sup>2</sup> U.S. Global Change Research Program. 2022. National Climate Assessment – Ch 19: Southeast. Retrieved from <https://nca2023.globalchange.gov/chapter/22/>

<sup>3</sup> U.S. Department of Energy. 2023. U.S. Energy & Employment Jobs Report. Retrieved from <https://www.energy.gov/policy/us-energy-employment-jobs-report-useer>.

# Inventory Methodology

The first step toward achieving reductions requires identifying baseline levels, sources, and activities generating nitrous oxide, methane, and carbon dioxide in the community. The government operations inventory is one piece of a much larger puzzle. Think of it as a subset of a community inventory, as shown in Figure 2.

This inventory uses the approach and methods provided by the U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions (Community Protocol) and the Local Government Operations Protocol for Accounting and Reporting Greenhouse Gas Emissions (LGO Protocol), both of which are described below.

Many of the charts in this report represent emissions in “carbon dioxide equivalent” (CO<sub>2</sub>e) values, calculated using the Global Warming Potentials (GWP) for methane and nitrous oxide from the IPCC 5th Assessment Report.

The inventory process requires the selection of a base year with which to compare current emissions. City of Palm Coast utilizes 2022 as its baseline year, for which the necessary data are available.

The following activities are included in the LGO inventory:

- Energy and natural gas consumption from buildings & facilities
- Wastewater treatment processes
- On-road transportation from employee commute and vehicle fleet



**Figure 2: Relationship of Community and Government Operations Inventories**



# Government Operations Emissions Inventory Results

Government operations emissions for 2022 are shown in Table 3 and Figure 6.

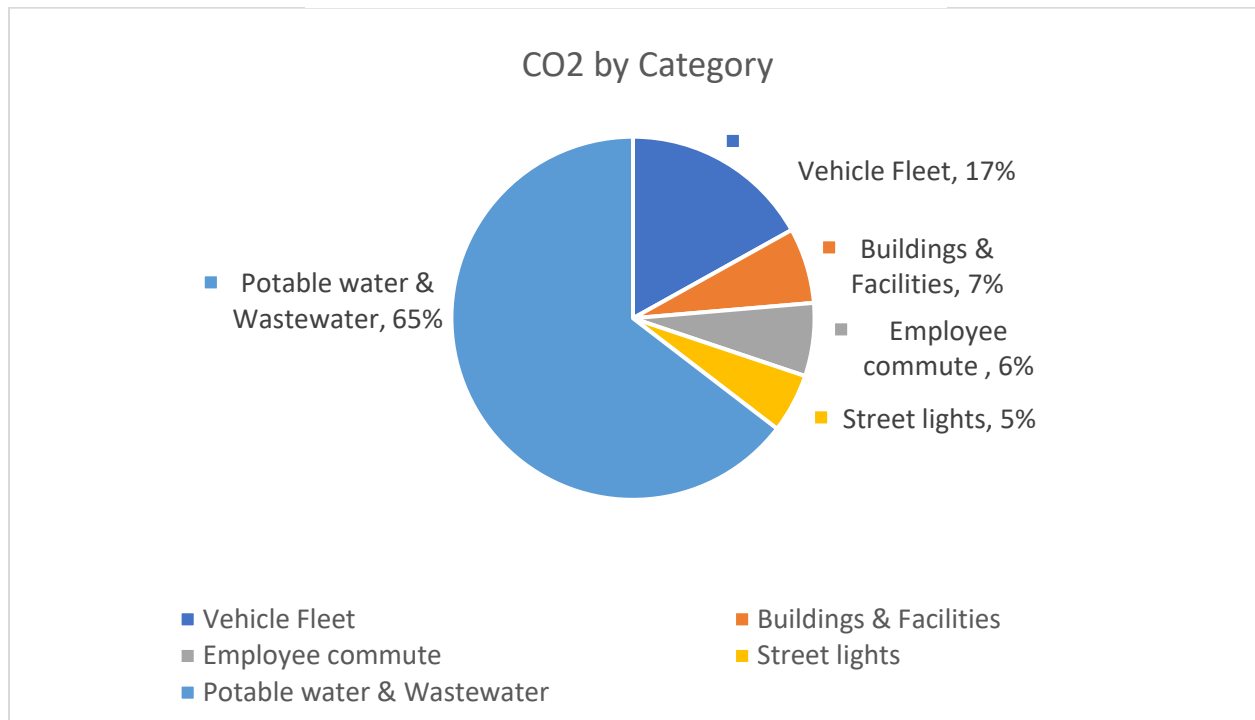
**Table 1: Local Government Operations Inventory**

Sector	Fuel or source	2022 Usage	Usage unit	2022 Emissions (MTCO <sub>2</sub> e)
Buildings & Facilities	Electricity	2645403	kWh	1003
<b>Buildings &amp; Facilities total</b>				<b>1003</b>
Street Lights & Traffic Signals	Electricity	2066745	kWh	784
<b>Street Lights &amp; Traffic Signals total</b>				<b>784</b>
Vehicle Fleet	Diesel (off-road)	22525	gallons	230
	Gasoline (on-road)	157539	gallons	1383
	Diesel (on-road)	89070	gallons	909
<b>Vehicle Fleet total</b>				<b>2522</b>
Employee Commute	Gasoline	109787	gallons	970
<b>Employee Commute Total</b>				<b>970</b>
Water and wastewater	Nitrogen Discharge Treatment Plant 1&2	100000	people	232
<b>Water and wastewater total</b>				<b>232</b>
<b>Total government emissions</b>				<b>5511</b>



Figure 3 shows the distribution among the four sectors included in the inventory. Potable water and wastewater represent the majority of emissions, followed by buildings and facilities and employee commute. Streetlights and wastewater treatment facilities account for a small portion of emissions.

**Figure 3: Local Government Operations Emissions by Sector**



# Conclusion

The results from the Air Quality Assessment at the municipal operations level for the City of Palm Coast provides valuable insights into the environmental impact of the City's activities and operations. A comprehensive and proactive approach is recommended to address and mitigate these emissions effectively. Currently, the City of Palm Coast is working towards prioritizing and implementing resiliency practices and technologies within its operations that will assist in reduction activities.

Engaging with the community and stakeholders is equally as important, fostering a sense of shared responsibility for environmental stewardship as the City cannot do it alone. Furthermore, the City of Palm Coast will explore partnerships with regional and national environmental organizations, as well as collaborate with neighboring municipalities to share best practices and leverage collective resources. Initiating joint efforts can lead to more impactful and cost-effective solutions, contributing to a broader regional resilient strategy.

Continuous data monitoring and periodic updates to the inventory will be essential to track progress and adapt strategies as needed. This iterative process will enable the City of Palm Coast to stay responsive to emerging technologies, evolving environmental policies, and changing community needs.

In conclusion, by taking a proactive and collaborative approach, Palm Coast has the opportunity to not only reduce its air pollution but also enhance the overall quality of life for its residents. Embracing environmental initiatives at the municipal level not only contributes to a healthier environment but also positions the city as a leader in responsible governance and a model for others to follow.

This inventory shows that vehicle fleet, employee commute and buildings as well as communitywide transportation patterns will be particularly important to focus on. Through these efforts and others, the City of Palm Coast can achieve environmental, economic, and social benefits beyond reducing emissions.

# Appendix:

## Methodology Details

### Energy

The following tables show each activity, related data sources, and notes on data gaps.

**Table 2: Energy Data Sources**

Activity	Data Source	Data Gaps/Assumptions
<b>Local Government Operations</b>		
Electricity consumption	FPL	N/A

**Table 3: Emissions Factors for Electricity Consumption**

Year	CO <sub>2</sub> (lbs./MWh)	CH <sub>4</sub> (lbs./GWh)	N <sub>2</sub> O (lbs./GWh)
2022	832.9	53	7

### Transportation

**Table 4: Transportation Data Sources**

Activity	Data Source	Data Gaps/Assumptions
<b>Local Government Operations</b>		
Government vehicle fleet	City of Palm Coast Public Works	N/A
Employee commute	HR survey	23 of 523 employees completed the HR survey, results may not be an accurate representation. To compensate for this shortfall, cumulative data findings were extrapolated using national averages for 523 employees. The reliance on a small subset of responses may impact the accuracy and representativeness of the overall commute-related insights.

For vehicle transportation, it is necessary to apply average miles per gallon and emissions factors for CH<sub>4</sub> and N<sub>2</sub>O to each vehicle type. The factors used are shown in Table 6.

**Table 5: MPG and Emissions Factors by Vehicle Type**

Fuel	Vehicle type	MPG	CH <sub>4</sub> g/mile	N <sub>2</sub> O g/mile
Gasoline	Passenger car	25.3	0.0084	0.0069
Gasoline	Light truck	18.2	0.0117	0.0087
Gasoline	Heavy truck	5.38	0.0719	0.0611
Gasoline	Motorcycle	44	0.0084	0.0069
Diesel	Passenger car	25.3	0.0005	0.001
Diesel	Light truck	18.2	0.001	0.0015
Diesel	Heavy truck	6.56	0.0051	0.0048

## Wastewater

**Table 7: Wastewater Data Sources**

Activity	Data Source	Data Gaps/Assumptions
<b>Local Government Operations</b>		
Nitrogen Discharge	Utilities Department	N/A
Digester Gas Combustion/Flaring		
Energy used in wastewater facilities	FPL	N/A

## Potable Water

**Table 8: Potable Water Data Sources**

Activity	Data Source	Data Gaps/Assumptions
<b>Local Government Operations</b>		
Emissions from grid electricity	FPL	N/A

## Inventory Calculations

The 2022 inventory was calculated following the US Community Protocol and ICLEI's ClearPath software. As discussed in Inventory Methodology, the IPCC 5th Assessment was used for global warming potential (GWP) values to convert methane and nitrous oxide to CO<sub>2</sub> equivalent units. ClearPath's inventory calculators allow for input of the sector activity (i.e. kWh or VMT) and emission factor to calculate the final CO<sub>2</sub>e emissions.





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