City of Pompano Beach
Sustainability Baseline and Goals

RS&H

City of Pompano Beach
Sustainability Baseline and Goals

DRAFT
Date: April 13, 2021
Contract No.: 2021-05
RS&H No.: 301-0077-000

Prepared by RS&H, Inc. at the direction of the City of Pompano Beach, Florida

RS&H

TABLE OF CONTENTS

1. SUMMARY

Establishing a baseline for key areas of sustainability performance is crucial for identifying opportunities and measuring progress. The Sustainability Baseline and Goals document serves as a complement to the City's Sustainability Strategy, adopted by City Commission in September of 2020. The Sustainability Strategy evaluated qualitative aspects of the City's sustainability focus areas; this document evaluates quantitative aspects, including a Greenhouse Gas (GHG) inventory. It also includes preliminary sustainability goals for the City's consideration. The quantitative sustainability baseline evaluates performance in six focus areas:

- **Climate & Resilience:** The City's greenhouse gas (GHG) emissions are below the U.S. average of 17.5 metric tons of carbon dioxide equivalents (mtCO2e) per person at 12.3 mtCO2e, but swift and decisive action will be needed to reduce emissions in line with global agreements. The largest emissions sources for both local government operations and the community are those related to transportation. As transportation systems are projected to shift to electric and other more efficient vehicles, emissions will begin to fall, but significant additional effort will be needed to meet climate targets.
- **Resource Conservation:** City facilities consumed 2,648,253 kilowatt-hours (kWh) of electricity at a cost of $414,446, approximately 0.5% of total electricity use in the community. Five facilities that accounted for over 70% of this total represent the biggest opportunities for energy conservation. The City spent a significant amount on streetlights, although this end use is not among the biggest energy users. Water use in City facilities is falling, although costs continue to rise.
- **Materials Management:** Thirty-five City facilities generated an estimated 1,102 tons of municipal solid waste (MSW) in 2019. Based on dumpster capacity and pick-up frequency, the Broward County Sherriff's Office facility at 100 SW 3rd Street generated the most waste at 15% of the total. The City's waste diversion rate is estimated at about 15%, indicating significant room for improvement. In 2008, the Florida Legislature established a statewide recycling goal of 75% by 2020. In 2019 the stateside recycling rate was 49%.
- **Land Use & Transportation:** The City's fleet has 316 vehicles, which drove an estimated 2.6 million miles in 2019, consuming approximately160,000 gallons of unleaded gasoline and about the same amount of diesel fuel. The average gasoline vehicle in the fleet is 8 years old and the average diesel vehicle is 10 years old. Given these ages, there is significant opportunities to improve the efficiency of the City's fleet with newer vehicles. Community-wide, motor vehicles travelled 1.37 billion miles on City roads in 2019. Pollution from these vehicles is the most significant GHG emissions source in Pompano Beach.
- **Equity & Outreach:** RS&H recommends expanding data collection in this area to include metrics on homelessness, health, food security, workforce development and public engagement. The City currently tracks data related to affordable housing and health insurance costs. The City spends about $17 million each year on health insurance costs for its employees.
- **Policy & Economics:** The City's Budget has increased each year from 2016-2019. In 2019, the total Budget was over $363 million, a 37% increase over the previous year. The City has received over $2 million in recent grant funding for projects related to sustainability.

2. INTRODUCTION

This Sustainability Baseline and Goals document represents an important step in a sustainability planning process for the City of Pompano Beach. It establishes a quantitative sustainability baseline, including greenhouse gas emissions, and begins to identify opportunities for improvement. It also makes recommendations for managing key performance indicators and proposes climate action and focus area goals. This document represents the culmination of Phase 1 of the City's Sustainability Work Plan (see Figure 1), inclusive of a kick-off meeting with the City, data collection period, and data gap analysis. It also lays the groundwork to complete the next phases of the Work Plan especially Phase 3, "establish a Sustainability Project portfolio and Implementation Plan".

The document is intended as a basis for discussion and collaboration. Pompano Beach staff have the

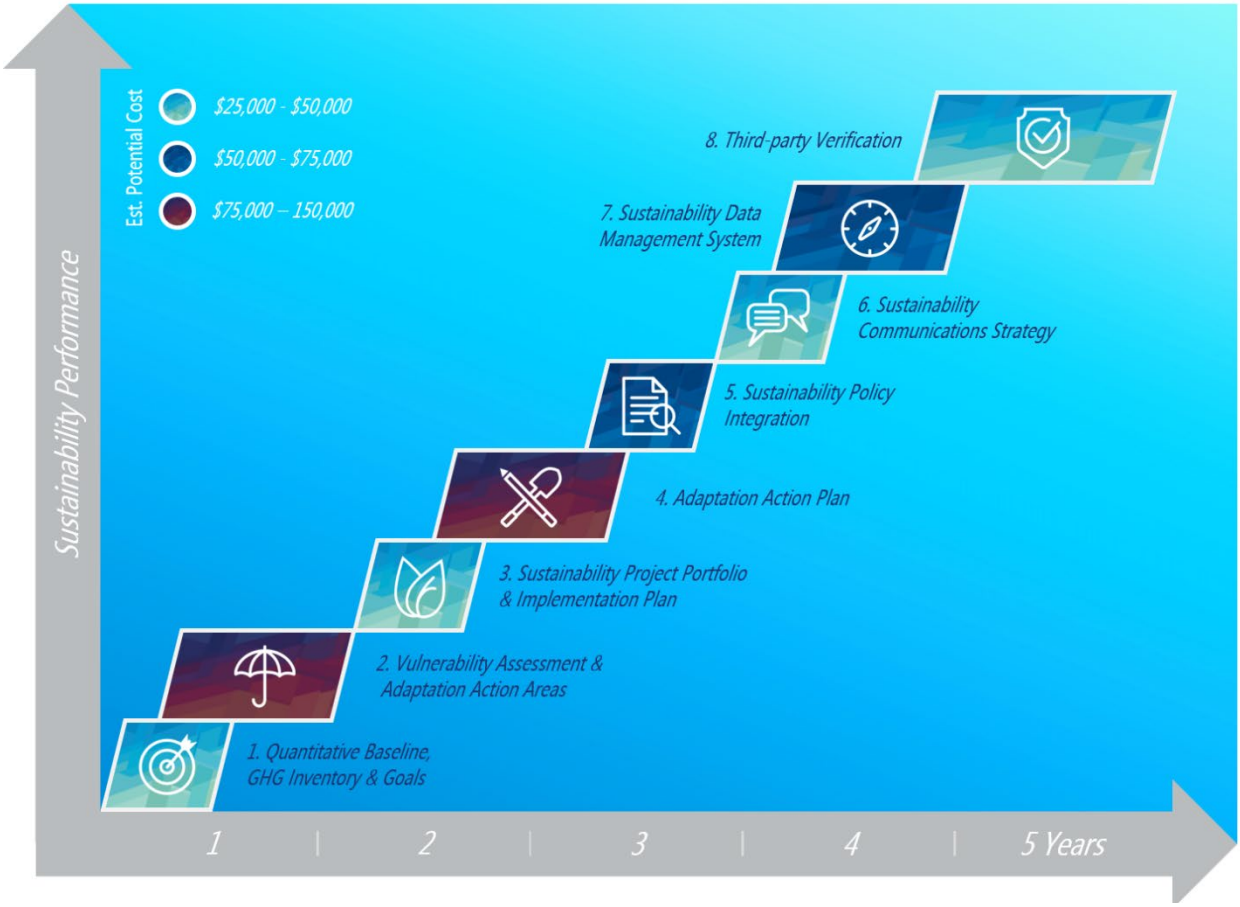

FIGURE 1: CITY OF POMPANO BEACH SUSTAINABILITY WORKPLAN

greatest knowledge of the City's operations. This document would not be possible without their extensive data collection effort. Staff input is essential for designing solutions based on this performance baseline, which lays the groundwork for subsequent phases of the City's Sustainability Work Plan, and acts as a reference for evaluating the performance of future initiatives.

The document is divided into three sections: 1) Summary and Goals, 2) Quantitative Baseline and 3) Greenhouse Gas Inventory

- The Goals and Recommendations section includes climate action goals, potential sustainability opportunities indicated by baseline results, and recommendations for sustainability data management and performance.
- The Quantitative Baseline summarizes the City's sustainability data for 2019 in the City's six focus areas, and analyzes trends over the period 2016-2019.
- The Greenhouse Gas Inventory quantifies emissions for local government operations and the community for calendar year 2019 and includes a business as usual forecast of future emissions. While technically part of the Quantitative Baseline, the GHG Inventory is provided as a separate section due to its scope and complexity. GHG emissions are an important sustainability indicator that allow a variety of emissions-producing activities to be compared using a common unit of measure. They can also be viewed as an indicator of waste, identifying opportunities to improve operational efficiency.

3. GOALS AND RECOMMENDATIONS

3.1 CLIMATE ACTION GOALS

Preliminary recommended climate action goals are shown in Table 1. Climate goals typically consist of three parts: a percent emissions reduction, a baseline year and a target year. Goals can apply to the community and / or government operations. RS&H recommends the City consider establishing a long-term goal of net zero emissions by 2050 for both City operations and the community, with an interim term goal of 45% reduction by 2030 compared to the 2019 baseline, and a mid-term goal of 75% by 2040 compared to the 2019 baseline.

These recommended goals represent a first step in the process of setting specific, measurable, achievable, relevant and time-bound (SMART) goals for climate action. They are informed by the City's GHG inventory and forecast, a survey of peer South Florida local governments, international political agreements and current climate science. The City should analyze the feasibility of a portfolio of specific emissions reductions strategies to calibrate and finalize these preliminary recommendations.

TABLE 1: RECOMMENDED GHG EMISSIONS REDUCTION TARGETS

Goal	Target					Sector
Short Term	45%	below	2019	by	2030	LGO & Community
Mid Term	75%	below	2019	by	2040	LGO & Community
Long Term	Net-zero			by	2050	LGO & Community

Table 2 includes several targets set by peer governments in South Florida.

TABLE 2: SELECTED GHG EMISSIONS REDUCTION TARGETS SET BY SOUTH FLORIDA GOVERNMENTS

City / County	Target					Sector
Boynton Beach	18%	below	2006	by	2035	LGO
Coral Gables	20%	Below	2013	by	2035	LGO
Fort Lauderdale	20%	below	2010	by	2020	LGO
Miami	25%	below	2007	by	2015	LGO
Sunrise	7%	below	2016	by	2030	LGO
Sunrise	43%	below	2016	by	2060	LGO
Broward County	80%	below	2007	by	2050	Community
City of Miami	Net-zero			by	2050	LGO
Miami-Dade County	20%	below	2008	by	2020	Community
Miami-Dade County	80%	below	2008	by	2050	Community
St. Petersburg	80%			by	2050	LGO
West Palm Beach	25%	below	2013	by	2025	Community
West Palm Beach	Net-zero			by	2050	Community
Sarasota County	Carbon-neutral			by	2030	Buildings/renovations
Orlando	Carbon-neutral & renewable			by	2030	LGO

In 2010, the United Nations Framework Convention on Climate Change (UNFCCC) met in Cancun, Mexico and agreed that future global warming should be limited below 2°C relative to pre-industrial levels. This equated to an emissions reduction of about 80% to 90% below 1990 levels by 2050 for industrialized areas. The Cancun Agreements influenced many local government GHG reduction targets, with many

adopting an 80% reduction and the 2050 target year (e.g., Broward and Miami-Dade County). Most local governments have found establishing a 1990 baseline year infeasible due to lack of data. Instead, they have established base years as practical. This has the effect of making it difficult to compare goals between local governments.

After 2010, many parties to UN climate talks expressed concern that limiting warming to below 2°C was insufficient. Limiting warming to 1.5˚ C would result in severe climate impacts, but at 2˚ C impacts would likely be catastrophic. The Paris Agreement, adopted in 2015, is a legally binding international accord with the goal of limiting global warming to well below 2°C and preferably to 1.5°C. The U.S. left the Paris Agreement in November 2020, but reentered the agreement in February 2021.

Meeting the Paris Agreement requires aggressive emissions cuts. In recent years, many local governments have adopted net-zero emissions goals, effectively meaning no emissions after considering sequestration or offsets. For instance, the Cities of Miami and West Palm Beach recently announced a goal to achieve net-zero emissions by 2050. In 2006, Sarasota County adopted the Architecture 2030 challenge, meaning all new buildings and major renovations have to be carbon-neutral by 2030. The City of Orlando has a goal for its local government operations to be carbon neutral and powered by renewable energy by 2030.

These goals reflect the substance of the Paris Agreement. The world has warmed by about 1.1˚ C to date. According to the United Nations, keeping warming below 1.5˚ C will require achieving zero emissions by 2050, only 29 years from now. Global emissions reductions over the next decade will be critical. By 2030, 45% emissions reductions from present levels will be necessary.

The GHG emissions reduction targets recommended for the City will require average emissions reduction of about 4.5% per year from 2021 to 2030. For comparison, global emissions dropped by about 7% in 2020 due to the COVID-19 pandemic. If the 2030 goal is met, a continuing annual reduction of only 3-3.5% might be sufficient. Annual emissions targets typically become harder to achieve as time goes on as the easiest and least costly mitigation measures are implemented. Meanwhile, policy and technology innovations will open new opportunities for decarbonization. Accordingly, these targets require significant effort and engagement.

3.2 FOCUS AREA GOALS

Goals to enhance performance in focus areas can support actions that reduce GHG emissions. Preliminary goals in these areas are recommended for the City's consideration. They are recommended based on targets set by peer local governments in the region as well as the contribution of each focus area to the overall climate action goal of net zero emissions by 2050.

Goals are designed to be SMART and are set for short-term, mid-term and long-term time frames. Unless otherwise specified these correspond to 2030, 2040 and 2050. Annual targets are the amount of increase or reduction needed each year to accomplish the goals. Metrics are the indicators the City would need to measure to determine if the goal had been achieved. Potential solutions are examples of possible initiatives, policies, or engagement strategies that could contribute to meeting the goals.

3.2.1 Resource Conservation

3.2.1.1 Electricity Consumption

- Short Term: Reduce electricity consumption for City operations by 15% by 2030

- Mid Term: Reduce electricity consumption for City operations by 30% by 2040
- Long Term: Reduce electricity consumption for City operations by 45% by 2050

Annual Target: 1.5% reduction beginning in 2021
Metric: Total annual electricity consumption for City operations
Potential Solutions: Recommissioning buildings, implementing energy conservation measures (ECMs) such as upgrades to lighting and mechanical systems, switching to ENERGY STAR and other certified efficient devices, and conducting employee engagement campaigns for energy conservation.

3.2.1.2 Renewable Energy

- **Short Term:** Achieve 33% renewable energy supply for City operations by 2040
- **Mid Term:** Achieve 66% renewable energy supply for City operations by 2040
- **Long Term:** Achieve 100% renewable energy supply for City operations by 2050

Annual Target: 3.3% increase beginning in 2021
Metric: Percentage of City's energy supply from renewable sources
Potential Solutions: Installing solar PV array or other renewable generation, entering into a lease agreement with a solar provider, working with the utility to procure more renewable energy, participating in a renewable energy tariff program such as FPL's "Solar Together", advocating for Florida legislative changes to renewable energy policy, purchasing renewable energy credits (RECs).

3.2.1.3 Water Use

- Short Term: Reduce potable water use by 13% from 2019 baseline by 2050
- Mid Term: Reduce potable water use by 27% from 2019 baseline by 2050
- Long Term: Reduce potable water use by 40% from 2019 baseline by 2050

Annual Target: 1.3% reduction
Metric: Total potable water use for City operations
Potential Solutions: Conducting water audits, installing high efficiency fixtures, improving irrigation systems, expanding the reuse water system, and conducting employee outreach on water conservation.

3.2.2 Materials Management

3.2.2.1 Sustainable Procurement

- **Short Term:** Develop and implement a Sustainable Procurement Policy by 2025
- **Mid Term:** 66% of all City purchases meet sustainable purchasing criteria under the City's Sustainable Procurement Policy by 2040
- **Long Term:** 100% of all City purchases meet sustainable purchasing criteria under the City's Sustainable Procurement Policy by 2050

Annual Target: 4% annual increase in Sustainable Procurement after 2025
Metric: Percent of all City purchases meeting sustainable purchasing criteria
Potential Solutions: Requiring City departments to comply with Sustainable Purchasing policy, and conducting employee outreach/training regarding the policy.

3.2.2.2 Waste Diversion

The City's existing LGO diversion rate is about 15%; the community-wide rate is unknown. Note that Florida has an existing statewide goal of achieving 75% waste diversion each year.[1]

- **Short Term:** Achieve a 20% LGO and community diversion rate
- **Mid Term:** Achieve 55% LGO and community diversion rate
- **Long Term:** Achieve a 75% LGO and community diversion rate

Annual Target: 2% increase in diversion rate
Metrics: LGO and Community diversion rates
Potential Solutions: Conducting public outreach campaigns on waste reduction and recycling, enacting single-use product bans, improving recycling systems, implementing composting solutions, requiring commercial and multifamily recycling, and supporting extended producer responsibility (EPR) initiatives.

3.2.2.3 Paperless Policy

- **Short Term**: Develop a policy to reduce the use of paper in City operation by substituting electronic alternatives by 2025
- **Mid Term:** 45% reduction in paper use realized under the terms of the Policy by 2040
- **Long Term:** 75% reduction in paper use realized under the terms of the Policy by 2050

Annual Target: 3% reduction in paper use each year after 2025
Metric: Percentage reduction in paper use for City operations
Potential Solutions: Developing and implementing a paperless policy, providing electronic software and hardware alternatives to paper use, and conducting employee engagement to drive behavior change.

3.2.3 Land Use and Transportation

3.2.3.1 Fleet

- **Short Term:** Transition 33% of City's fleet vehicles to non-fossil fuel sources or electricity by 2030
- **Mid Term:** Transition 66% of City's fleet vehicles to non-fossil fuel sources or electricity by 2040
- **Long Term**: Transition 100% of City's fleet vehicles to non-fossil fuel sources or electricity by 2050

Annual Target: Transition 3.3% of the City's fleet each year
Metric: Percentage of the City's fleet that is not fossil-fueled

[1] Florida House Bill 7135 (2008) created Florida Statutes Section 403.7032, and established a statewide recycling goal of 75% to be achieved by the year 2020.

Potential Solutions: Developing annual procurement targets for EVs, hybrids, and/or alternative-fueled vehicles, providing EV charging and/or alternative fuel infrastructure, and seeking grant funding to accelerate EV transition.

3.2.3.2 Green Building

» **Short Term:** Update the City's Green Building Program (Chapter 152.51) to include City-owned renovations, existing buildings and infrastructure. Require certification at specified levels, and /or include minimum performance requirements by 2025.
  - **Mid Term:** 30% of new construction and major renovations shall meet updated Green Building Program standards by 2040
  - **Long Term:** 50% of new construction and major renovations shall meet updated Green Building Program standards by 2040

Annual Target: N/A
Metric: Percentage of new construction and major renovations meeting updated Green Building Program standards
Potential Solutions: Updating Green Building Program and requiring qualifying building/renovation projects to meet Green Building criteria, and conducting outreach to employees, designers, contractors and other stakeholders to support the program.

3.2.3.3 Multi-modal transportation

- Short Term: To reduce employee commuting emissions, develop and implement an incentive program to encourage City employees to telecommute, use public transportation, walk or bicycle to work by 2025. Also establish criteria for incentivizing and evaluating multi-modal trips by 2025.
- Mid Term: Achieve a balanced transportation system with no single mode accounting for more than 20% of trips by 2040
- Long Term: Achieve a balanced transportation system with no single mode accounting for more than 30% of trips by 2050

Annual Target: 1.25% annual increase in the number of multi-modal trips meeting criteria
Metric: Percentage of trips using each mode
Potential Solutions: Developing incentives for employees that allow alternatives to single-occupancy commuting, developing and implementing a Multimodal Transportation Plan (referenced in the City's Complete Street Design Manual), developing and implementing a comprehensive bicycle and pedestrian plan., and establishing criteria to measure and evaluate multi-modal trips within the City to track and evaluate performance towards the multi-modal transportation goals.

3.2.4 Equity and Outreach

3.2.4.1 Outreach and Communications

- Short Term: Develop an outreach and communications plan for the City's sustainability program by 2025 that addresses both City employees and community members
- Mid Term: Conduct surveys showing at least 45% of community members are aware of and engaged with the City's sustainability programs by 2040

- Long Term: Conduct surveys showing at least 75% of community members are aware of and engaged with the City's sustainability programs by 2050

Annual Target: 3% increase in awareness and engagement after 2025

Metric: Percentage of community members who report being aware of and engaged with the City's sustainability programs

Potential Solutions: Developing and implementing an outreach and communications plan and conducting follow-up surveys to assess the plan's effectiveness.

3.2.5 Policy and Economics

3.2.5.1 Sustainability Funding

- Short Term: Establish a sustainability revolving fund (SRF) by 2025 and fund selected sustainability initiatives to be developed in Phase 3 of the Work Plan (Sustainability Project Portfolio & Implementation Plan). Note that resilience projects developed in Phase 2 of the Work Plan will require separate funding through grants, public-private partnership (P3) or other means.
- Mid Term: None.
- Long Term: Achieve a self-funding sustainability program in which cost savings realized by efficiency and resource conservation initiatives fund at least 50% of new initiatives by 2050

Annual Target: N/A

Metric: Percentage of planned sustainability initiatives that receive funding

Potential Solutions: Setting up an SRF with initial funding for selected sustainability initiatives. The fund should have a mechanism to recover money saved through the initiatives in terms of reduced expenses or recovered costs, and allow that money to be redirected to other initiatives that meet sustainability criteria. Over time the SRF can grow and help increase the number of initiatives the City is able to implement, including those that are less cost-effective but have important social, environmental or resilience benefits.

3.3 OPPORTUNITIES

A review of Pompano Beach's baseline points towards a number of high-level opportunities to improve sustainability performance and reduce emissions:

» **Decarbonize the Transportation Sector**

Transportation is the most significant emissions source for both LGO and the community. It is also the most promising opportunity for emissions reductions. Vehicle emissions are projected to decline as vehicle fuel economy increases and electric vehicle technology continues to improve and gain mass acceptance. Accelerating this trend through aggressive measures within the City's fleet would establish Pompano Beach as a leader and exemplar in this area. On the community side, providing charging infrastructure and other incentives to the community could result in substantial emissions reductions even as the City's population continues to grow. Smart growth planning techniques and promotion of alternative transportation modes also have a role to play in decarbonizing the transportation sector.

- **Improve Energy Efficiency**
  Just five City facilities use 70% of electricity for government operations. Energy audits and commissioning can help identify energy conservation measures and improve efficiency. To meet its climate mitigation goals, the City should also aggressively pursue policies to promote energy efficiency in the community for commercial, residential and industrial uses.
- **Promote Renewable Energy**
  Renewable energy is disadvantaged in Florida by state-level energy policies that can make it difficult to achieve reasonable payback periods for investment. Still, renewable energy is needed to reduce carbon emissions. The City should advocate for better energy policy and for FPL to increase the percentage of renewables in its generation portfolio. The City should evaluate FPL's SolarTogether program, which offers to offset up to 100% energy use with solar as part of a long-term power purchase agreement. The City should also pursue its own renewable installations where they are cost effective, have significant environmental benefits or when grant funding can be obtained. Alternative project delivery methods may also facilitate solar installations on City property. For example, some cities have entered into agreements with solar providers who own, manage and maintain photovoltaic systems installed on city property, while charging the city a fixed price under a long-term lease agreement.
- **Reduce Water Use Intensity**
  While total water use has decreased, potable water use intensity and costs for City facilities continues to trend higher. Water efficiency measures in City facilities could reverse this trend, saving money and resources. Conducting water audits in facilities, installing low flow / flush fixtures, and using smart irrigation controls are potential ways to further reduce water use. Expansion reuse water should be continued, while exploring additional sources of alternative water supply, including HVAC condensate, non-potable well water, etc. The City currently conducts public outreach on water conservation to all ratepayers of the water-system, both inside and outside its jurisdiction, and should continue and expand those efforts. The water utility's existing conservation outreach measures are discussed in Section 4.2.2.
- **Increase Waste Diversion**
  The waste diversion rate for City facilities is low at an estimated 15.2%. The City is not tracking community-wide waste diversion or recycling rates. Consider conducting waste audits for LGO and the community and implement strategies to increase the diversion rate. Also reduce source materials through developing and implementing a sustainable purchasing policy. The City should coordinate with Waste Management (WM) to obtain annual waste and recycling data and engage with WM, the Monarch Hill disposal facility, Broward county and jurisdictions served by the Monarch Hill to increase waste diversion rates and reduce landfill/incineration emissions.

3.3.1 Baseline Recommendations

Based on results of the Quantitative Baseline, RS&H has provided a series of recommendations aimed at improving data management, conserving energy and resources, managing materials and fleets, improving equity and funding sustainability initiatives. These are preliminary recommendations; many could potentially be developed into sustainability initiatives with further study and evaluation. They are designed to support the focus area goals and take advantage of the high level opportunities presented in

Section 3.3. Note that additional and complementary sustainability recommendations are included in the City's Sustainability Strategy (Appendix A).

- **General Recommendations:**
  - Definitively associate utility billing accounts with operationally meaningful categories, such as processes, buildings, facilities, utilities, departments, etc. All utility accounts should be linked to a common facility ID. Utilities should be required to report data to the City in an electronic format that facilitates importing the data into the City's data management systems.
  - Consider purchasing or developing an integrated database solution to automate sustainability data collection, normalize metrics, and regularly report on progress. Such a system will allow managers to evaluate past and on-going efforts and plan new initiatives necessary to reach City goals.
- **Climate & Resilience:**
  - Establish a schedule for regular updates of the GHG Inventory. Most communities update their inventories every two to five years.
  - Establish a framework for reporting on LGO emissions in an operationally meaningful manner (e.g., by department, service, etc.)
  - Track fugitive emissions from stationary and mobile HVAC systems, including establishing a database of system specifications and maintenance records.
  - Complete an employee commuting survey to improve the quality of estimates of emissions from employee commuting and gather information that could be used to influence travel choices.
- **Resource Conservation:**
  - Install submeters at locations with multiple electricity end uses.
  - Submeter major process-related energy end uses, such as data centers or water utilities.
  - Track natural gas use in City facilities such as Fire Stations.
  - Develop an inventory of stationary power generators and track associated fuel use.
  - Consider performing energy audits at top energy-consuming facilities. Such audits systematically investigate an existing facility's energy end-uses, developing cost-benefit analyses for retrofits that save energy.
  - Consider recommissioning larger, more complex buildings with interactive systems and sophisticated controls. Commissioning corrects facility problems that develop over time as equipment ages and usage patterns change. Often it resolves problems that have persisted since design or construction. Examples include equipment or lighting that is on when it may not need to be; systems that do not adequately dehumidify, cool too much or simultaneously heat and cool when they should not; setpoints, sensors and thermostats that are out of calibration; air balancing systems that are not optimal; controls sequences that are functioning incorrectly, etc. Many operations and control improvements cost little or nothing to implement, making commissioning particularly cost effective.
  - Continue expanding the Reuse water system

- Conduct water audits at selected facilities to verify meter attribution, determine the source of rising costs, and investigate high water use intensity values

» **Materials Management:**
- Track municipal solid waste and recycling by volume or mass.
- Obtain annual waste and recycling totals from the City's waste disposal contractor (WM).
- Conduct waste audits at one or more City facilities to better understand recyclable commodities present in the waste stream and uncover opportunities to increase recycling and reduce disposal costs.
- Conduct a waste audit of the community waste stream to better understand its composition and discover recycling opportunities that could increase the community diversion rate.
- Develop a protocol for comprehensive sustainable procurement, including design and construction standards, and track performance of qualifying purchases and services.
- Track the quantity of hazardous waste collected and cost savings to the City from participating in the regional hazardous waste cooperative agreement.

» **Land Use & Transportation:**
- Maintain an annual (i.e., 12 month period) record of fleet usage.
- Configure or obtain fleet management software that can generate fuel usage reports for individual vehicles.
- Develop a sustainability strategy to replace older, less efficient vehicles with electric, hybrid and/or more efficient models.
- Develop a fleet optimization initiative that would identify and eliminate under-used vehicles and optimize the fleet to fit the needs of each department.
- Conduct a comprehensive inventory of fleet vehicles and operations at the Airpark and consider joining the Airport Carbon Accreditation program.
- Consider developing a multimodal transportation plan and/or a bicycle and pedestrian plan and adopting level of service (LOS) standards for bicycle and pedestrian access.

» **Equity & Outreach:**
- Collect data on data on homelessness within the City's jurisdiction
- Investigate the potential to reduce City staff health insurance costs through participation in employee wellness programs. Track data relating to City employee wellness programs and premium reductions, and community wellness information such as rates of substance abuse and obesity, and mental health metrics.
- Consider requiring sustainability training for all City employees as part of the onboarding process with updates at recurring intervals, and track workforce development data.
- Establish and track data related to public outreach related to sustainability.
- Conduct a formal stakeholder mapping exercise to identify stakeholder groups who should be engaged when planning sustainability and resilience initiatives.
- Evaluate potential benefits of third-party certification programs for sustainability and consider incorporating metrics used by such programs.

- **Policy & Economics:**
  - Implement Phase 3 of the City's Sustainability Work Plan, which will involve developing sustainability initiatives consistent with the recommendations in this section that will save the City money by increasing efficiency and reducing waste in City operations.
  - Consider establishing a Sustainability Revolving Fund to support the implementation of green initiatives and recapture/redistribute their benefits

4. QUANTITATIVE BASELINE

The Quantitative Baseline is a continuation of previous sustainability planning work at the City of Pompano Beach. The City of Pompano Beach Sustainability Strategy (Appendix A) establishes a qualitative baseline for the City which reviewed sustainability performance relative to the six focus areas shown in Table 3 below. It also establishes a workplan to further develop the City's sustainability program over a five year period.

The Quantitative Baseline summarizes key sustainability metrics for both the City's operations and the community. It includes numerical data evaluating the City's sustainability performance in the City's focus areas. It establishes 2019 as a baseline year for the City's resource conservation, materials management, land use and transportation, equity and outreach, and policy and economics metrics. It also looks backwards in time to 2016, where data was available, to establish trends that indicate the direction and magnitude of the City's progress. Where possible, data are normalized to facilitate comparisons between and within operational boundaries. This information will give the City's Sustainability Coordinator a reference point against which to measure progress, and will be useful for illuminating opportunities and planning future sustainability initiatives.

The Quantitative Baseline should be viewed as a complement to the Sustainability Strategy as it focuses on numerical data relative to the City's six sustainability focus areas. For that reason, not all the elements of each focus area shown in Table 3 are addressed. Those that are more qualitative in nature are discussed in the Sustainability Strategy document, provided as Appendix A.

TABLE 3: CITY OF POMPANO BEACH SUSTAINABILITY FOCUS AREAS

Focus Area	Quantitative Elements	
Climate and Resilience	» GHG Inventory	
Resource Conservation	» City Facilities and Infrastructure » Electricity Use » Stationary Fuels » Electronics and Equipment	» Water Use » Irrigation & Reuse Water » Wastewater » Renewable Energy
Materials Management	» Waste Generation & Pickup Services » Recycling » Composting	» Disposal » Universal & Hazardous Wastes
Land Use and Transportation	» City Fleet » Airpark » Transit	» Parking » Community-wide Transportation
Equity and Outreach	» Health Insurance » Health and Wellness	» Sustainability Training » Workforce Development
Policy and Economics	» City Budget » Revenues » Sustainability Incentives	» Sustainability Funding Sources » IT assets

4.1 CLIMATE AND RESILIENCE

The Climate and Resilience focus area includes elements related to quantifying and mitigating GHG emissions that contribute to climate change, as well as those related to adapting to its impacts (i.e., resilience). To quantify the City's contribution to climate change, RS&H completed a GHG Inventory that quantifies emissions for the 2019 baseline year. Refer to Section 5, "Greenhouse Gas Inventory" in this document for the full results and methodology of the GHG Inventory. The Inventory addresses both community-wide emissions and those related to local government operations (LGO).

In 2019, LGO GHG emissions in Pompano Beach amounted to 6,423 metric tons of carbon dioxide equivalents. Community-wide emissions amounted to 1,376,874 mtCO2e. Per capita emissions are below the U.S. average and compare favorably to selected local governments in the region, at 12.3 mtCO2e per person.

4.2 RESOURCE CONSERVATION

The Resource Conservation focus area includes elements related to energy use, electronics and equipment, renewable energy and water use.

4.2.1 Energy

4.2.1.1 Electricity

4.2.1.1.1 Local Government Operations

In 2019 Pompano Beach facilities consumed 2,648,253 kWh of electricity at a cost of $414,446. However, the top five facilities accounted for over 70% of this total. Table 4 shows the top twenty locations by electricity usage for 2019 and the percentage each contributed to total electricity use for all facilities. Together, these locations contributed 85% of facility electricity usage out of a total of 51 accounts with billing records.

TABLE 4: TOP 12 FACILITIES BY ELECTRICITY CONSUMPTION, 2019

FPL Account No.	Address	Location	kWh	% of Total
6471692324	50 W Atlantic Blvd	Library/Cultural Center	758,040	28.62%
3979077488	190 N Ocean Blvd	Lift Station	494,580	18.68%
8524551036	100 W Atlantic Blvd	City Hall Offices	334,740	12.64%
9111951274	275 Sea Breeze Way	Pompano Beach Pier	167,640	6.33%
8449956427	703 N Federal Hwy	Tennis Clubhouse	110,544	4.17%
2189890482	3066 N Course Dr	Palm Air Golf	76,742	2.90%
1125422145	1401 N Federal Hwy	Pompano Beach Golf Course	71,584	2.70%
5005724033	3250 NE 2nd St	Beach Library	67,538	2.55%
3157281522	2901 NE 14th St	Alsdorf Park Boat Ramp	46,930	1.77%
7419148379	18 N Pompano Beach Blvd	Aquatics Beach Lifeguard Bldg	45,838	1.73%
9815935284	1190 NE 3rd Ave	Water Treatment Plant and Public Works	34,017	1.28%
966341273	3440 NE 3rd St	Parking Garage	31,541	1.19%
All Facilities			**2,648,253**	**100%**

The data shows that the Library/Cultural Center, a Lift Station located at 190 N Ocean Boulevard and City Hall Offices made up approximately 29%, 19% and 13% of the City's total electricity consumption in 2019. Other significant electricity users include the Pompano Beach Pier and the Tennis Clubhouse.

Figure 2 shows 2019 energy use and cost for the various types of facilities in the City. Expenditures generally are proportional to energy use for most facilities types, with exceptions for Parks, Golf, Streetlights, and Right of Way (ROW). For these facility types, expenditures seem to be higher than expected for energy use. This could indicate billing at a different rate, which is common for lighting. Other potential explanations could be higher base service fees due to a large number of accounts with little usage (possible for parks), or billing errors. The discrepancy may indicate opportunities to reduce costs for these account types.

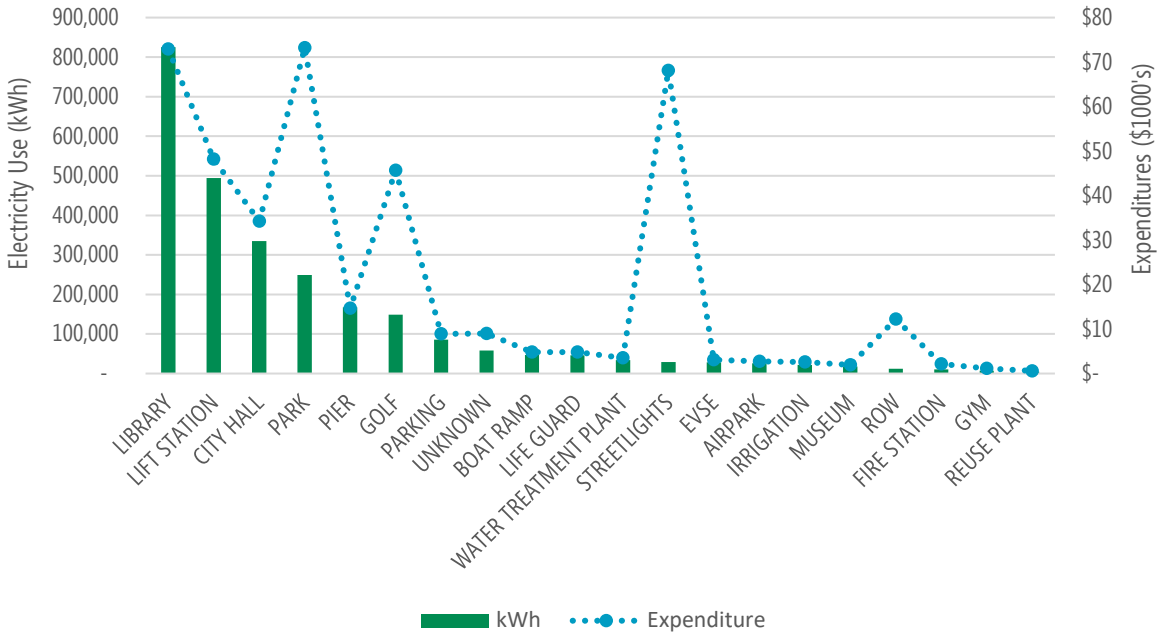

FIGURE 2: 2019 ENERGY USE & EXPENDITURES FOR FACILITIES BY TYPE

The City obtained a full calendar year data on electricity consumption for 2019 and partial year consumption for 2020 from its account representative with FPL. FPL provided utility billing records in PDF format which required conversion to a spreadsheet format for analysis.

The FPL billing data contains addresses and FPL account numbers, but does not have a common ID field linking accounts to the City's internal facility list. RS&H attempted to match FPL accounts to the City's facility list by address matching and by using Geographical Information Systems (GIS) to map FPL account addresses and determine if they are in proximity to City facilities. This is a challenging process since in some cases a single account or meter may serve multiple facilities. In addition, some addresses are erroneous in either the FPL or City database or both. For this reason, attribution of electricity consumption to City facilities should be regarded as an approximation which could contain errors. A detailed survey

linking utility accounts to City facilities through site visits and conducting an inventory of meters would be necessary to attribute energy use to City facilities with a high degree of confidence.

4.2.1.1.2 Energy Use Intensity

Energy Use Intensity (EUI) is a commonly used metric to compare energy use between buildings with similar use types. It is typically expressed as million BTUs of energy used per square foot of heated building area. EUI should include all forms of energy use including thermal fuels (e.g., natural gas) and electricity. RS&H attempted to calculate EUI for City buildings, however results were highly variable and not within expected ranges. This is another indication that there are likely data quality issues related to the matching of FPL accounts to City facilities.

4.2.1.1.3 Community Electricity Use

The City's Sustainability Coordinator provided community-wide electricity data sourced from the City's FPL account representative. It indicates the community consumed 1,500,808 MWh of electricity in 2019, as shown in Table 5.

TABLE 5: COMMUNITY-WIDE ELECTRICTY CONSUMPTION, 2019

Account Type	2019 Electricity Consumption (MWh)	2019 Electricity Consumption (MMBtu)
Commercial	716,208	2,443,703
Commercial Public Authority	85,135	290,479
Industrial	4,444	15,163
Industrial Public Authority	70,248	239,687
Other Public Authority	91	311
Public Streets	7,116	24,279
Residential	617,340	2,106,363
Residential Public Authority	227	774
TOTAL	**1,500,808**	**5,120,759**

4.2.1.1.4 Streetlights and Traffic Lights

The City did not provide an inventory of streetlights. FPL data provided by the City includes several accounts with "Lights" or "Streetlights" in the account description. These include accounts at 2859 Hammondville Road, 316 NE 1st Street, 414 NE 1st Avenue and 601 NW 19th Avenue (Hunter's Park Manor). Together these accounts amount to 1.6% of the City's electricity consumption in 2019. However, on a cost basis, the City spent $75,616 for lighting accounts, which is over 18% of total costs for all facilities. The discrepancy between cost and usage suggests the City is billed at a higher rate for lighting accounts, possibly indicating they are maintained by the utility. The City provided a list of 115 traffic signals located in Pompano Beach. The list includes 92 signalized intersection, eight pedestrian, 11 post beacons, one proposed signalized intersection, and one ITS signal. It does not include information about the lighting fixtures, lamp types or power consumption. It was not possible to link Traffic Signals to FPL account data provided by the City as the Traffic Signal data includes only partial address information.

Many local governments have reduced energy consumption and associated costs and avoided greenhouse gas emissions by improving the efficiency of streetlighting and traffic lighting. Although streetlighting does not make up a large portion of the City's electricity consumption it is significant in

terms of cost. A detailed inventory including lamp and fixture types, as well as details of the City's arrangement with FPL for streetlights and signals should be investigated to uncover opportunities.

4.2.1.2 Stationary Fuel Combustion

Stationary fuels include natural gas and propane which are delivered through utility pipelines or by truck and burned in facilities for heating.

4.2.1.2.1 Local Government Operations (LGO)

Information on natural gas usage in City facilities was not available. The City indicated that some of its fire stations may use natural gas for water heating, but did not provide billing records. RS&H recommends the City verify whether natural gas is used in its facilities and if so, track usage and expenditures. Natural gas usage should be considered along with electricity usage when calculating Energy Use Intensity (EUI) for City facilities.

4.2.1.2.2 Community

RS&H estimated community-wide natural gas and propane usage for the City by using EIA estimates of per household usage in the southeast region hot/humid climate, and applying it to the estimated number of households using these fuels in Pompano Beach. This method could not be applied to the commercial and industrial sectors due to the variability of end uses. Results indicate an estimated 822 households used 29,663 MMBtu of natural gas in 2019, and 123 households used 1,664 MMBtu of propane. Compared to the energy used for community-wide electricity, this is only 0.58% and 0.03% of that amount, respectively. Combustion of stationary fuels in Pompano Beach is relatively insignificant in comparison to electricity consumption. The City should obtain natural gas data from People Gas in the future for baseline and GHG inventory updates.

4.2.1.3 Electronics and Equipment

RS&H requested but did not receive an inventory of the City's information technology (IT) and electronic assets, including those that are ENERGY STAR certified or have an equivalent certification for energy efficiency. The quantitative baseline established in the Sustainability Strategy (Appendix A) found the IT department has enacted some energy savings measures but has not quantified their benefits. There is currently no strategy for requiring equipment to be certified to third party standards for energy efficiency and sustainability.

4.2.1.4 Renewable Energy

The City does not have any renewable energy generating facilities/installations at this time.

4.2.2 Water and Wastewater

The City operates a water utility which serves the community as well as some surrounding communities. Water treatment infrastructure in the City includes the Water Treatment Plant (WTP), located at 1190 NE 3RD Avenue and the Oasis Reuse Plant, located at 901 NE 18th Street. The City's WTP supplies treated water to portions of unincorporated Broward county, Lauderdale-by-the-sea, Lighthouse Point and Margate as well as to Pompano Beach. The City only provides water to Margate, Broward County and Ft. Lauderdale in times of emergency. Pompano Beach usage accounted for 92.6% of the total treated by the WTP in 2019.

Significant water end uses include potable use and irrigation. The City has been expanding the use of reuse (e.g., "purple pipe") water for irrigation. The reclaimed water utility avoids 2.6 – 3 million gallons per day (MGD) of potable water use.

The City's water utility promotes water conservation to all of its ratepayers, and has expanded reuse projects (see "Water Utility Policy and initiatives".). The City has restricted watering days, advanced irrigation controls, and an AMI system that can show utility customer's water use hour by hour.

4.2.2.1 Water Usage (Potable, Irrigation, and Reuse)

The City provided account data for water usage at City facilities. In 2019 there were 222 potable water accounts, 94 irrigation accounts and 9 reuse accounts. City facilities used approximately 135.14 million gallons (MG) of potable water, 95.67 MG of irrigation water and 10.75 MG of Reuse water. The total expenditure for water supplied to City facilities was $2.56 million.

Figure 3 shows potable, irrigation and reuse water usage and total cost for all City facilities from 2016-2019. Potable use has decreased from 157.33 MG in 2016 to 135.14 MG in 2019. Irrigation usage and Reuse water usage both decreased by about 10 MG over the same period. Costs increased by about $195,000 in 2019 compared to 2016. Costs were lowest in 2017 although total usage was comparable to other years. This cost anomaly should be investigated. It could be related to billing errors, a change in pricing structure, or some other reason.

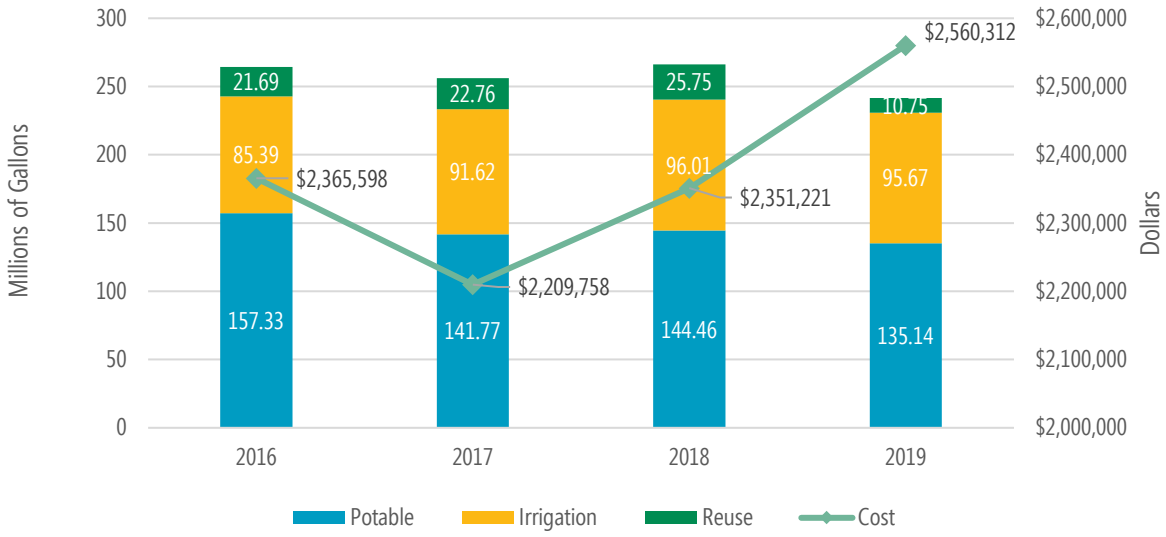

FIGURE 3: POTABLE AND IRRIGATION WATER USE AND COST - ALL ACCOUNTS 2016-2019

RS&H identified the 20 accounts that used the most potable water in 2019 for further analysis. These 20 accounts together used 66.59 MG of potable water in 2019, or 49% of the 2019 total for all 222 accounts. Figure 4 shows the top 20 accounts from greatest to least usage. Accounts are shown by address or name (if known) with the water utility account number in parentheses.

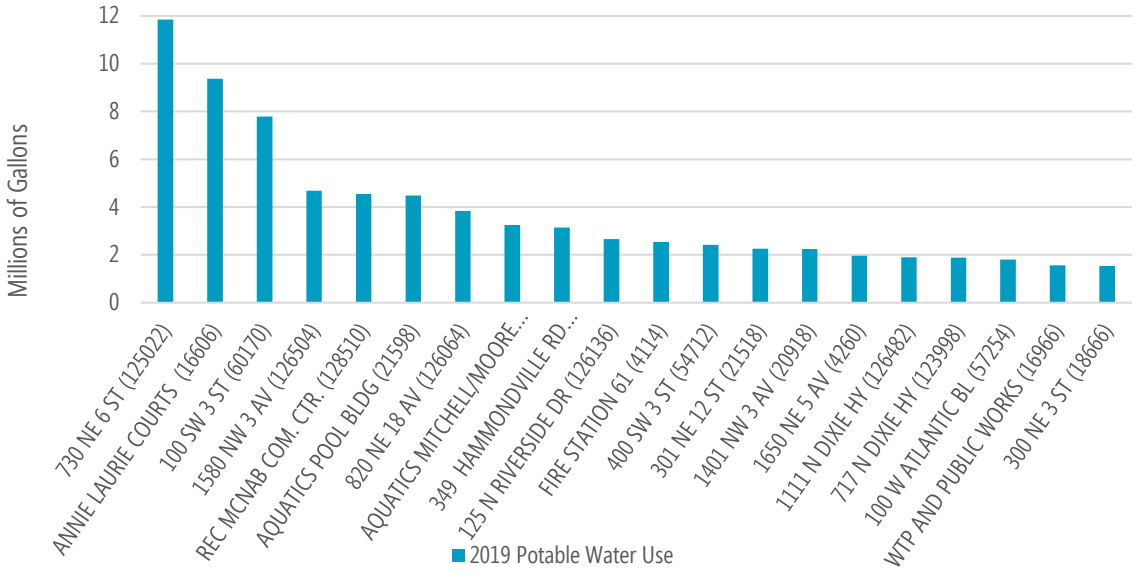

FIGURE 4: POTABLE WATER USE IN 2019, TOP 20 SELECTED ACCOUNTS

Water use intensity (WUI), expressed in gallons of water consumed per square foot, is a common metric to compare water use between buildings. Figure 5 shows potable WUI and cost intensity from 2016 – 2019 for the 20 facilities with the highest WUI in 2019. The data shows increasing water usage and cost in City facilities on a square foot basis over the four year period. This suggests that sustainability opportunities exist to reduce water usage and associated costs in City facilities. WUI appears to be considerably higher than expected in City buildings; for comparison, the Energy Information Agency's 2012 Commercial Buildings Energy Consumption Survey found that large commercial building used only 20 gallons per square foot annually on average. This may indicate a data quality problem or abnormally high water usage. Water audits should be conducted at targeted facilities to verify these results. Note that cost intensity shown in this chart includes all water usage types and sewer charges. Since sewer (wastewater) is not metered, it is billed based on potable water usage (up to 10,000 gallons).

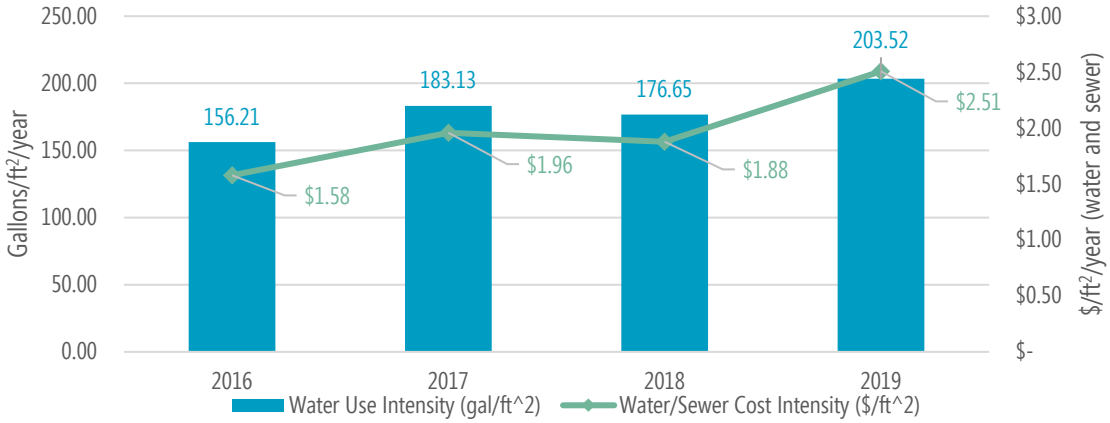

FIGURE 5: POTABLE WATER USE & COST INTENSITY, SELECTED FACILITIES

4.2.2.2 Wastewater

The City's wastewater is treated at the North Regional Wastewater Treatment Plant (NRWWTP), which has provided contract wholesale wastewater services to Large Users plus the County since 1974. The facility is located within the City of Pompano Beach's jurisdiction but is owned and operated by Broward County. In addition to the City of Pompano Beach, the current Large Users served by the facility include the Cities of Coconut Creek, Coral Springs, Deerfield Beach, Lauderhill, North Lauderdale, Oakland Park, Tamarac; and North Springs Improvement District (NSID), Parkland Utilities, and Royal Utilities. Service is also provided to WWS Districts 1 and 2 retail wastewater systems.

Wastewater is not metered separately, but is billed based on potable water usage at subject properties. Annual wastewater totals for City facilities are equal to the potable water totals shown in Figure 3 above. Wastewater is included in the total cost billed for City facilities; data provided does not allow wastewater charges to be disaggregated.

4.3 MATERIALS MANAGEMENT

The City's operations generate a variety of waste streams. These include garbage, which is also known as municipal solid waste (MSW) and may include some recyclable commodities. Additionally, the City's operations generate universal wastes, such as electronic devices, batteries, and fluorescent lamps. Waste is generated through most aspects of day-to-day operations, including office work, vehicle operation and maintenance, operation of facilities, construction, and services provided to residents. The U.S. Environmental Protection Agency (EPA) recommends managing non-hazardous solid waste according to a waste management hierarchy that prioritizes source reduction & beneficial reuse, followed by recycling & composting, energy recovery, and lastly disposal.

4.3.1 Waste Generation, Collection, and Disposal

Detailed waste generation data for City facilities was not available. RS&H estimated waste generation at 53 City owned facilities based on dumpster volumes in cubic yards (CY) and pickup frequency. Based on an interview with the City's recycling coordinator, dumpsters were assumed to be 87.5% full at the time of pickup. This is the median of the range of the 75-100% range suggested by the recycling coordinator.

In 2019, 35 City facilities generated an estimated 1,102 tons of MSW. A facility located on 100 SW 3rd Street, generated 15% of the total estimated tons of MSW, which is three-times higher than the next highest facility. Figure 6 shows the top 20 facilities by estimated MSW waste generation for 2019.

Waste from City facilities is picked up by a combination of City staff and Waste Management (WM), the City's waste contractor. City staff pick up public containers such as garbage cans from the beach and on sidewalks, as well as trash from parks and from events. Larger containers such as dumpsters are picked up by WM.

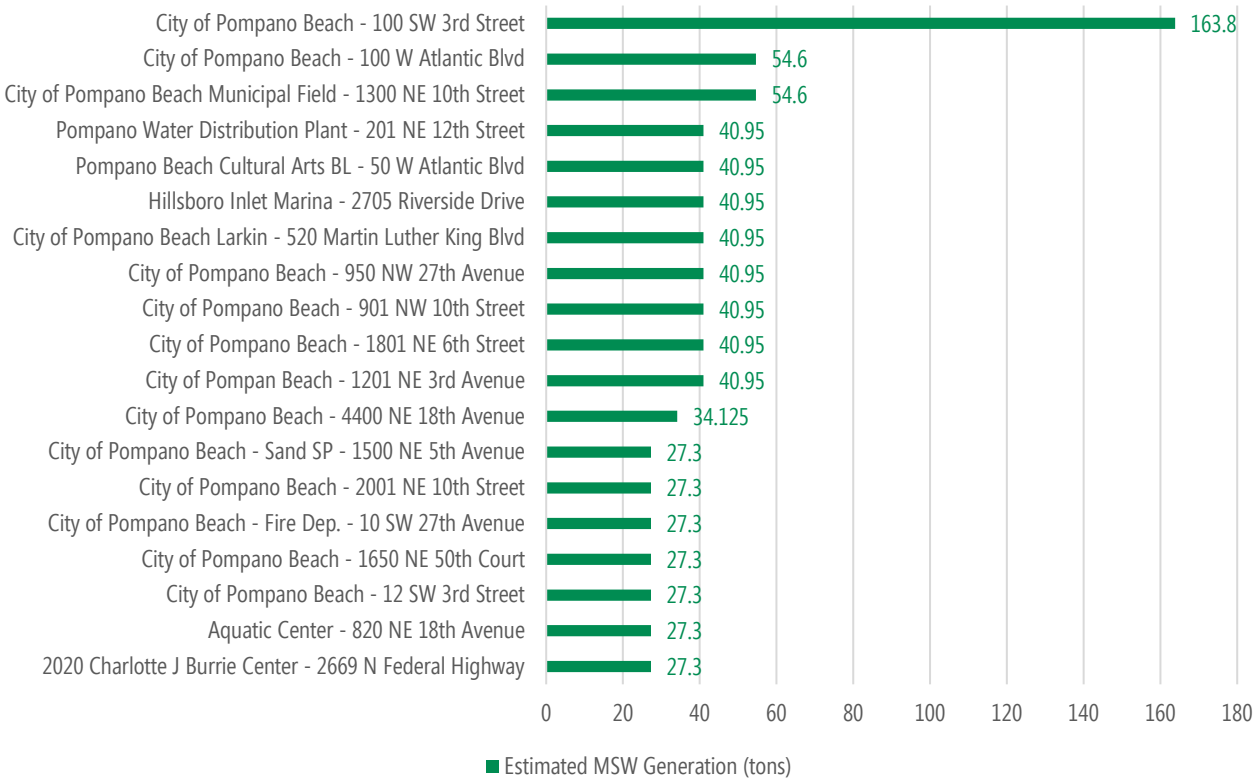

FIGURE 6: 2019 ESTIMATED MSW GENERATION BY FACILITY

The numbers provided in the figure above are best available approximations and may not fully reflect the actual amount of MSW generated by each facility. RS&H recommends that the City conduct a detailed waste audit or waste characterization study. Such a study can help the City determine its actual waste footprint for facilities with significant generation and identify opportunities to divert recyclable wastes that may be present in waste streams. Additionally, a municipal waste audit would improve the quality of future GHG emissions estimates for government operations waste generation.

The City has a contract with Waste Management to collect solid waste, program recyclables, and bulk waste from residential customers. The Monarch Hill Landfill receives waste from the community of Pompano Beach and is landfilled on site. The Monarch Hill Landfill has incineration capabilities, but currently incineration is not tracked. There is no way to disaggregate quantities of Pompano Beach incinerated versus landfilled at the facility.

Waste Management provided RS&H with monthly waste mass totals from Pompano Beach entering the Monarch Hill Landfill for the years 2006 through 2019. Figure 7 summarizes the waste generation for the community in 2019.

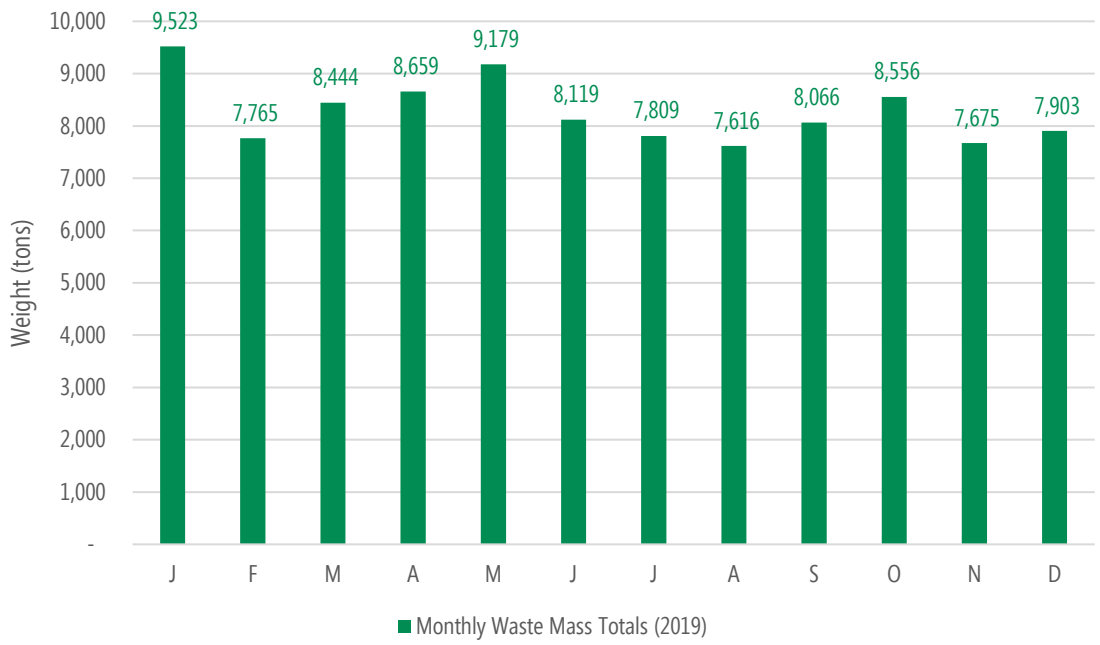

FIGURE 7: MONTHLY COMMUNITY WASTE GENERATION, 2019

Annually, community waste generation shows variability. Beginning with 105,791 tons in 2016, waste generation for the community increased 11% to 116,159 tons in 2017. It then fell to 109,325 in 2018 and fell again to 99,314 in 2019, 19% less than the 2016 value. Although waste generation is variable due to factors such as economic activity, hurricanes and other events, the recent trend has been declining.

The data provided did not include a characterization of waste type within the waste stream. This information can be obtained from a comprehensive waste audit for the community. RS&H recommends that the City consider completing an audit or assessment of this scale to determine the effectiveness of waste operations and set targets and benchmarks for waste diversion.

4.3.2 Recycling

Detailed recycling data for City facilities for 2019 was not available. Similar to waste generation, recycled waste in 2019 was estimated based on container capacity in CY and pickup frequency.

In 2019, 28 City facilities recycled an estimated 167.31 tons of waste. The City Hall facility, located at 100 W Atlantic Boulevard, comprised 25% of the total estimated recycled waste. Figure 8 shows the estimated recycling quantities for the top 20 City facilities in 2019.

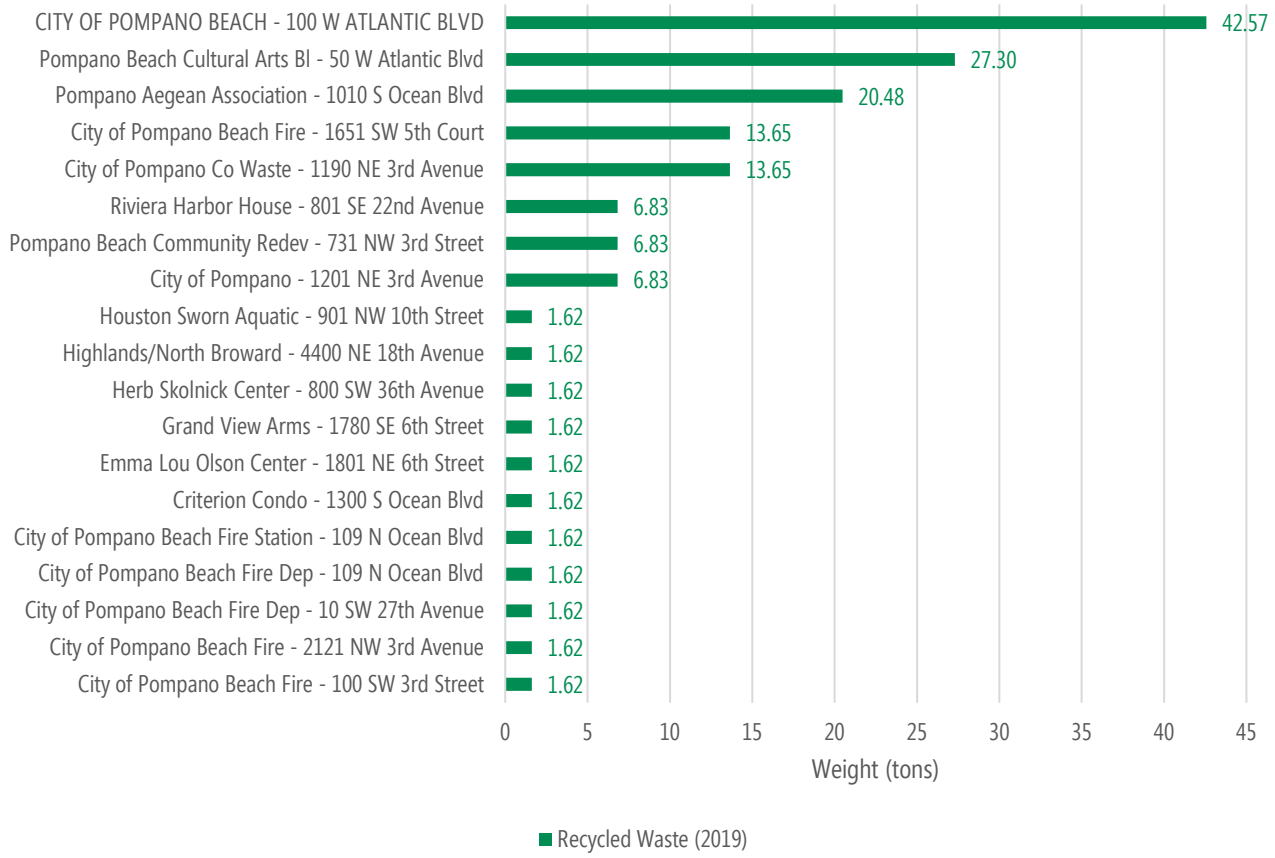

FIGURE 8: ESTIMATED RECYCLING QUANTITIES FOR TOP 20 FACILITIES IN 2019

The numbers provided in the figure above are best available approximations and may not fully reflect the actual recycling quantities picked up at each of these facilities in 2019. As discussed in earlier sections, RS&H recommends that the City conduct a detailed waste audit or waste characterization study.

Using both the estimated MSW waste generation and the estimated recycling quantities for 2019, the City of Pompano Beach currently has an estimated diversion rate of 15.2%. This diversion rate is an approximation based on the estimating methods for both MSW waste generation and recycling quantities. A detailed waste audit or characterization study could help confirm the accuracy of this diversion rate.

Annual community-wide recycling amounts by commodity were requested but could not be provided. Based on conversations with the City's Recycling Coordinator, there are no recycling-related revenues generated from the community's recycling efforts. Additionally, recycling expenditures are built into the City's existing contract with Waste Management.

4.3.3 Composting

Information relating to composting for local operations and the community was not available. The City indicated that there are currently no incentive programs for residential composting programs, but the City's Recycling Coordinator provides education for composting options.

4.3.4 Universal Wastes

The City recycles universal waste at its facilities. The City provided invoices relating to universal e-waste recycling for November 2019 and August 2020 and indicated that each invoice corresponded to approximately six months' worth of collected materials. Based on the City's direction, RS&H estimated that the November 2019 invoice covered the months of May through November. Figure 9 shows the recycled e-waste by weight during the six-month period between May and November.

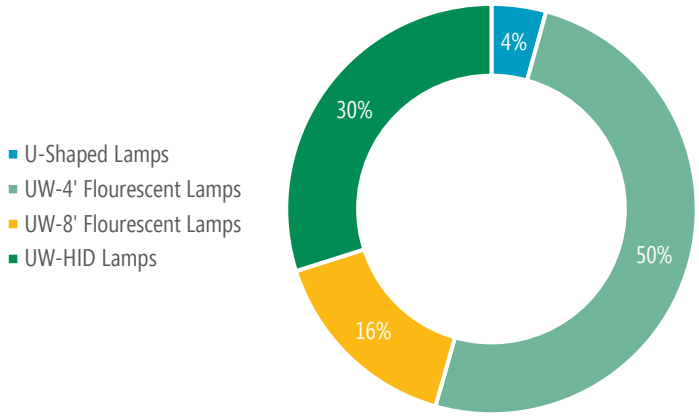

FIGURE 9: RECYCLED UNIVERSAL WASTE, MAY – NOVEMBER 2019

4.3.5 Hazardous Wastes

The City has partnered with several other Broward County cities to provide the collection and disposal of household hazardous waste and electronic scrap recycling. The collection of materials takes place 15 times per year at various collection locations in the County. With proof of residency, City residents can go to other participating cities for their collection events at no cost. The program tracks the quantity of hazardous waste dropped off by participants, but there is currently no way to determine how much of the waste comes from Pompano Beach.

4.4 LAND USE AND TRANSPORTATION

4.4.1 City Fleet

The City provided fleet data for each department for five months from September 6, 2018 to January 16, 2019. Estimates of annual performance were extrapolated from this limited data set. The data contained the make, model, year, serial number, purchase date and odometer readings for each vehicle. The data did not include the vehicle type (on-road or off-road), fuel type (gasoline or diesel), vehicle class, annual fuel consumption or vehicle miles traveled (VMT) for 2019.

4.4.1.1 Methodology

RS&H was able to determine the vehicle type, fuel type, and estimated fuel economy via independent research for each vehicle. RS&H assigned each vehicle four classes, as described in Table 6.

TABLE 6: VEHICLE CLASS ASSIGNMENTS

Vehicle Class	Description	Weight
1	Passenger Cars	<6,000 lbs.
2	SUV's / Light Duty Trucks	6,001 – 10,000 lbs.
3	Medium Duty Trucks / Vans	10,001 – 16,000 lbs.
4	Heavy Duty Trucks	16,000 + lbs.

Because VMT was not available from the data set provided, RS&H took the odometer readings from the January 2019 data and found the difference from the September 2018 data to provide approximately four months' worth of mileage for each vehicle. These values were then multiplied by 2.77 to determine an estimated annual VMT.

The City provided annual fuel consumption and expenditures by department, but this data was not broken out by individual vehicle. Therefore, RS&H estimated the annual fuel consumption for each vehicle. Using an estimate of fuel economy and the estimated annual VMT for each vehicle, RS&H was able to estimate an annual fuel consumption for each vehicle. This methodology produced the best available annual fuel consumption estimate for the City's fleet, however, it may not fully reflect the actual fuel usage for the year 2019. RS&H recommends that the City keeps detailed fleet information, including annual fuel consumption and mileage for each of its fleet vehicles.

4.4.1.2 Fleet Composition

The data provided for January 2019 indicated that the City has 316 on road vehicles in their fleet. An analysis of the 2018 data showed that there were numerous off-road vehicles present (e.g., lawn mowers, generators, boats, etc.), however, all but two of these vehicles were omitted from the January 2019 data set. It is recommended that the City evaluate this omission and include off road vehicles in future fleet evaluations.

The City's fleet is comprised of 200 gasoline vehicles and 116 diesel vehicles that are distributed throughout 32 City departments. The distribution of vehicles by department is shown in Figure 10. A majority (24%) of the City's fleet is comprised of Class 3, medium duty vehicles, mostly belonging to the Grounds (26 Class 3 Vehicles) and Building Maintenance (18 Class 3 Vehicles) departments.

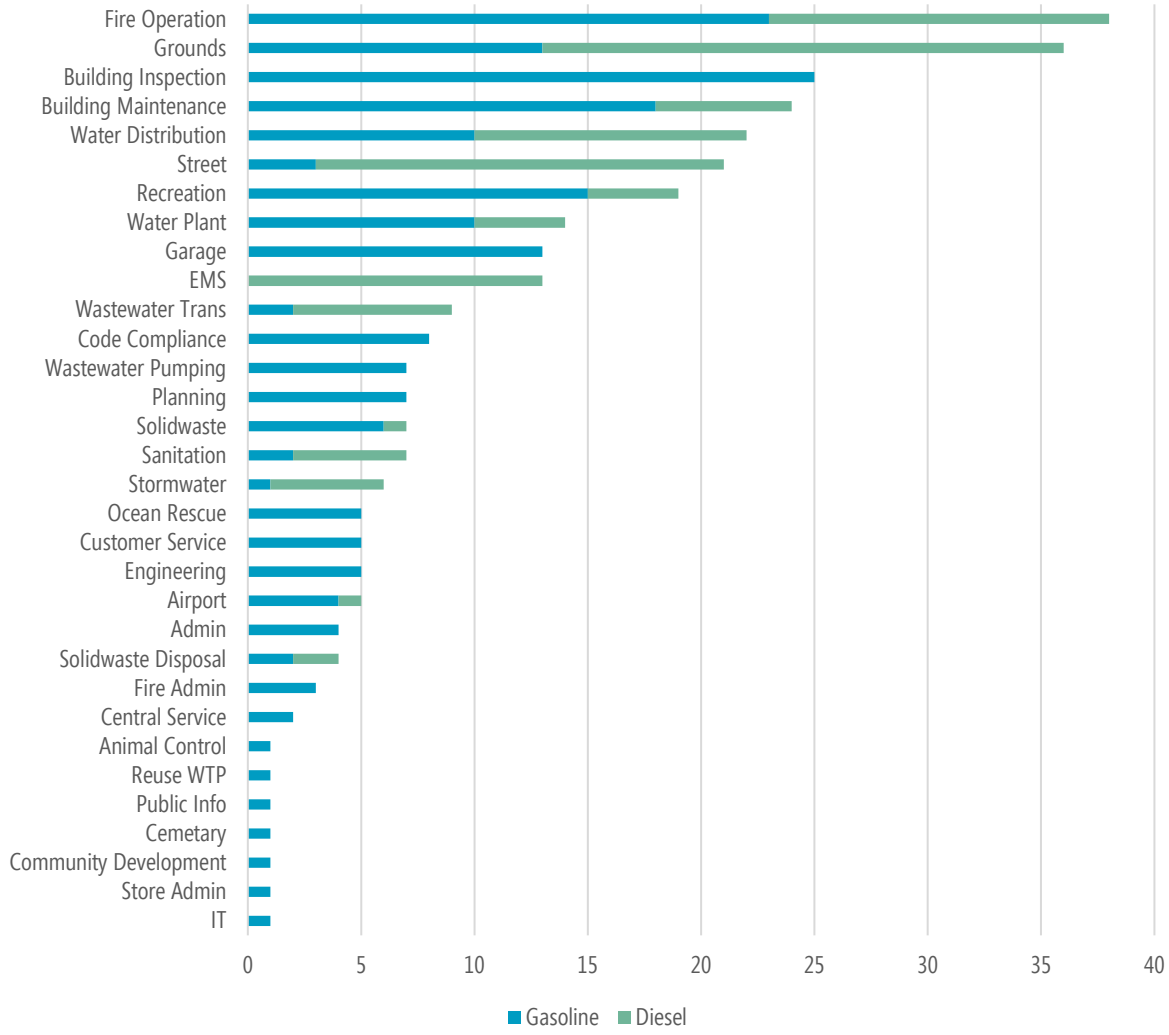

FIGURE 10: CITY FLEET VEHICLES BY DEPARTMENT

4.4.1.3 Expenditures

The City spent approximately $1.75 million in maintenance and fuel costs for its fleet in 2019. The majority of its expenditures was spent on maintenance ($1 million) and the remainder ($750,000) spent on fuel. This amounts to an average of approximately $5,539 spent on maintenance and fuel for each vehicle in 2019.

The Grounds department had the highest maintenance and fuel costs in 2019 at approximately $346,000. Following the grounds department is Fire Operations ($242,000) and EMS ($196,418).

4.4.1.4 Estimated VMT

Average estimated VMT by vehicle is presented in Figure 11. According to the Bureau of Transportation Statistics, the Average Annual VMT per vehicle is approximately 11,000 miles. Of the City's existing fleet, 84% of them were estimated to have VMTs less than 11,000. 47% of the City's fleet had an estimated

annual VMT less than 5,000. A majority of these vehicles (60%) that were estimated to have traveled less than 5,000 miles in 2019 are approaching ten years of age.

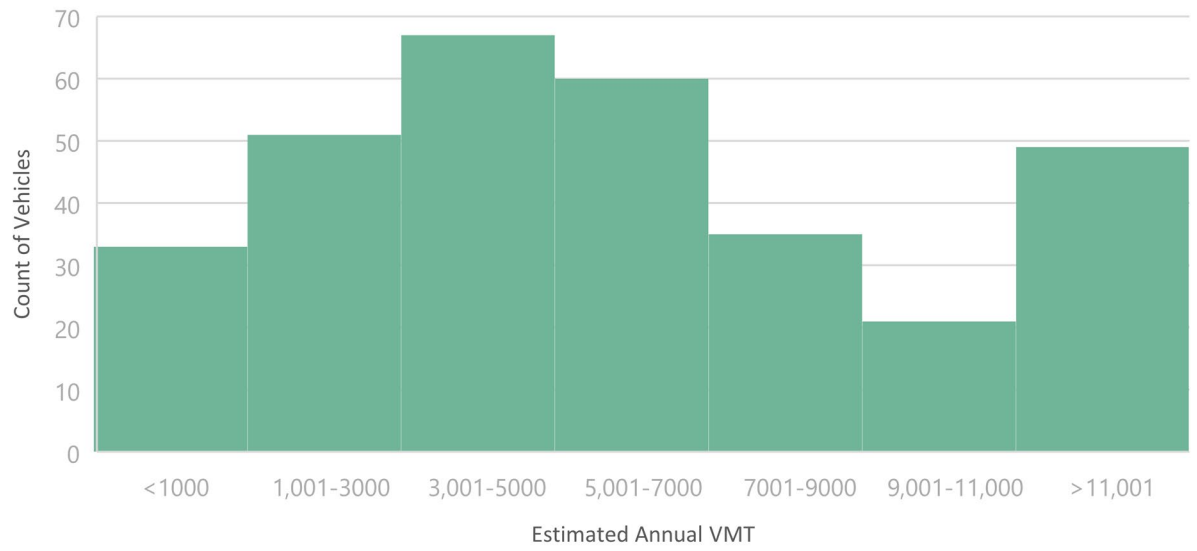

FIGURE 11: AVERAGE ANNUAL ESTIMATED VMT BY VEHICLE

The estimated VMT for all 316 City fleet vehicles combined was 2,687,238 miles in 2019. Based on estimates of annual VMT and vehicle classes, Class 4 Diesel vehicles traveled the most distance in 2019 (24% of the total miles traveled). These vehicles are mostly utilized in the Fire Operations, Emergency Management Services (EMS), and Street departments at the City. A summary of the estimated distribution of VMT by class and fuel type is provided in Figure 12.

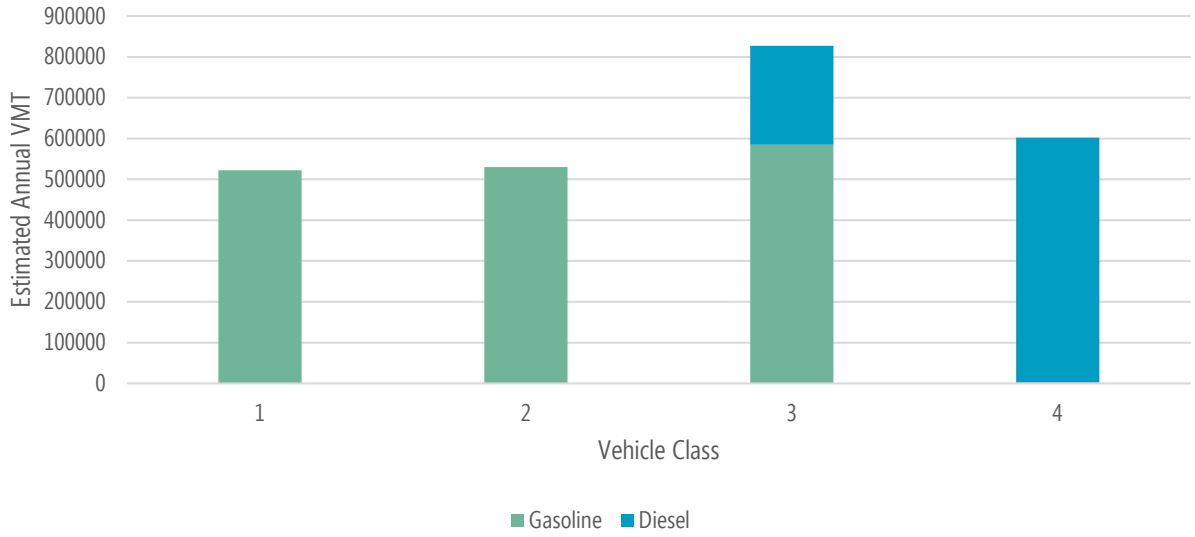

FIGURE 12: ESTIMATED ANNUAL VMT BY VEHICLE CLASS

The average age of the fleet is approaching 10 years old, with an average fleet vehicle vintage of 2012. Gasoline vehicles tended to be newer and diesel vehicles older.

Staff expressed interest in using fleet right-sizing principles to limit the number of vehicles in the fleet and require use of the most fuel-efficient models. There are currently no polices establishing standards for fleet performance (e.g.. fuel economy, vehicles miles travelled, idling, greenhouse gas management, etc.) The City's current agreement with Enterprise Leasing may limit options for using alternative fuel and/or fuel-efficient vehicles as well as their potential benefits.

4.4.2 Airpark

The Pompano Beach Airpark fleet contains a small number of vehicles and equipment running on gasoline and diesel fuels, shown in Table 7.

TABLE 7: AIRPARK EQUIPMENT AND VEHICLES

Vehicle	Quantity
Ford-F250	2
Ford Explorer	1
Zero Turn Mower	3
John Deere Diesel 444 Front End Loader	1
Bat Wing Diesel Mowers	2
Miscellaneous Weed Trimmers and Equipment	Not Specified

Data for fuel usage for City-owned vehicles and equipment at the Airpark was available on a departmental basis, but not broken down for specific vehicles/equipment.

The City does not own any aviation ground equipment such as tugs or fuel trucks. Also, they do not dispense any fuel to any aircraft on the airfield. This is handled by the Airport's fixed base operators.

For both baseline purposes and greenhouse gas inventory purposes, the City should develop a comprehensive inventory of fleet vehicles and operations at the Airpark. While not all of these emissions are directly under the City's operational control, doing so can help the City understand its footprint from airport operations. If this is completed, the Airpark can apply for the Airport Carbon Accreditation program, which is an institutionally endorsed carbon management certification program for Airports. Numerous airports of all sizes have adopted the ACA program as a framework for carbon management, using airport specific management and reduction strategies. Several general aviation airports have utilized the ACA program for carbon management, such as Peter O' Knight Airport (FL), Tampa Executive Airport (FL), Hillsboro Airport (OR), and Teterboro Airport (NY).

4.4.3 Transit

The City and Broward County Transit provides a community shuttle service with four shuttle stops to residents of the City. The service is designed to work in conjunction with connections to several Broward County Transit (BCT) Routes. Table 8 summarizes the number of stops associated with the City's shuttle service.

TABLE 8: CITY OF POMPANO BEACH SHUTTLE ROUTES AND STOPS

Route	Number of Stops
Red	10
Orange	8
Green	10
Blue	7

The City does not charge fares for using community shuttle services within its jurisdiction; however, riders are expected to pay when making connections to BCT routes. The City is required by BCT to maintain a minimum performance of 7.1 Passengers Per Revenue Service Hour per route to remain in the program.

The BCT publishes a ridership report at the end of each month detailing the ridership for each shuttle route. The 2019 ridership for each shuttle route is shown in Figure 13.

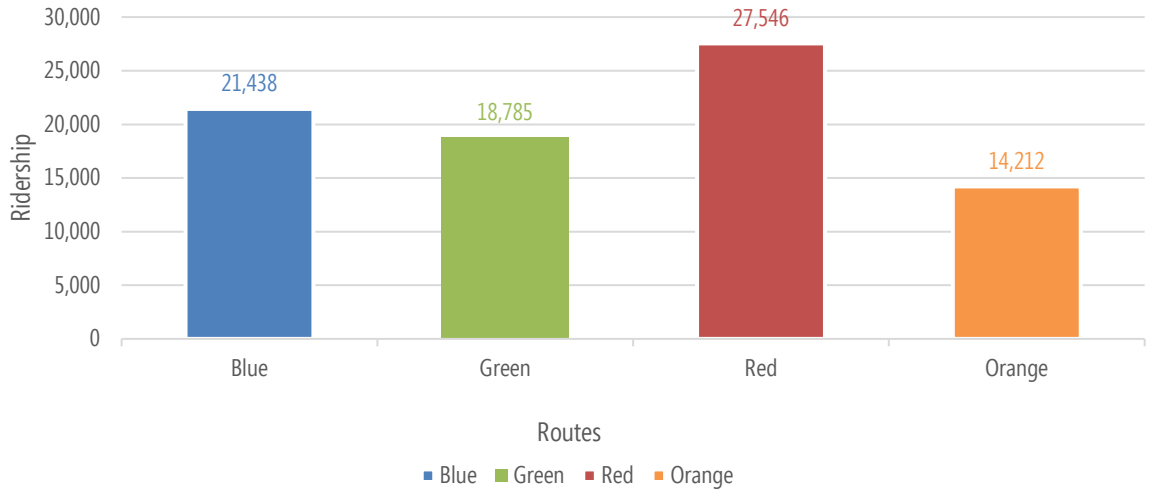

FIGURE 13: CITY OF POMPANO BEACH SHUTTLE SERVICE RIDERSHIP, 2019

In previous assessments of the City's sustainability efforts, staff and commissioners revealed strong interest in developing additional transit options for the City. The yearly ridership for these shuttle routes indicate that transit is a utilized resource for the community.

4.4.4 Parking

The City has 1,375 total parking spaces; 663 of them are located in the in the Pompano Pier Garage and 772 are located throughout the City. The City provided an aggregate parking revenue report from January 1st, 2016 through December 31st, 2019. This report combined all parking revenue for the reporting years into one single report. Table 9 summarizes the aggregated parking revenue from 2016 to 2019.

TABLE 9: AGGREGATED PARKING REVENUES, 2016-2019

Revenue Type	Pompano Pier Garage	Other City-Owned Spaces
Ticket Revenue	$943,284.40	$35,363.00
Non-Ticket Revenue	$127,130.02	$8,824,971.58
Total	**$1,070,414.42**	**$8,860,334.58**

RS&H estimated that the City generates approximately $29,733 in annual revenue from the Pompano Pier Garage and $246,120 from other City spaces. This was determined by taking the total aggregated parking revenue for both facilities and dividing by the number of months in the aggregate period (36). The estimated average annual revenue generated per space was $44.85 for the Pompano Pier Garage and $345.67 for other City-owned spaces.

Offering free parking may be counterproductive to the sustainability goals of encouraging multi-modal transportation and reducing transportation-related GHG emissions. Charging for parking should be seen as a disincentive to single-occupant driving as well as a way to raise revenue. Providing EV parking with charging facilities could be a way to incentivize transition to more sustainable vehicles in the community.

4.4.5 Community-wide Transportation

Vehicles in the community travelled 1.37 billion miles on roads within Pompano Beach's jurisdiction in 2019. Of that total, 44% were on urban arterials, 28% on urban interstate, 22% on urban freeway, and 4% on minor arterials and collector roads.

4.4.6 Green Buildings

The City's Strategic Plan, Goal 4 includes an objective to encourage new buildings meet United State Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) standards or other sustainability building standards. According to USGBC's database there are currently 24 LEED certified projects in the City (Figure 14). There are 14 additional projects with certification in process, but only two with registration dates after 2018. Five City facilities have received LEED certification.

FIGURE 14: LEED CERTIFIED FACILITIES IN POMPANO BEACH

The City provides incentives for developers to participate in its Green Building Program. Incentives include expedited permitting, reduced permitting fees, rebates and marketing incentives. Interviews with staff indicated that the program is not widely used by developers. The City should consider engaging in public outreach to potential users of the program to encourage greater participation.

4.5 EQUITY AND OUTREACH

The Equity and Outreach focus area addresses social equity and the need to engage and listen to City employees, residents and other stakeholders, including low income, minority, elderly and other disadvantaged populations. This focus area includes categories such as affordable housing, health and wellness, food security, workforce development, public outreach, employee engagement, stakeholder engagement and third-party verification. Information related these categories is also included in Appendix A: Sustainability Strategy. Currently the City tracks limited quantitative data related to these categories.

4.5.1 Affordable Housing

Affordable housing is a complex issue and one the City has worked on for many years. A full analysis of affordable housing is outside the scope of this study. The City quantified housing availability and needs in its 2015-2020 Consolidated Plan and in the 2017 Pompano Beach Affordable Housing study. The latter states that in 2012 there were approximately 2,600 affordable housing units in Pompano Beach under three rental housing programs: Low-income Housing Tax Credit (LIHTC), traditionally funded public housing, and Section 8 housing.

Homelessness is a social equity concern related to affordable housing as well as to economic, mental health and social services issues. The 2015-2020 Consolidated Plan states that data on homelessness in the City of Pompano Beach is not available, so the City relies on Broward County data. In the future, the City should consider collecting data on homelessness within the City's jurisdiction as part of the sustainability program.

4.5.2 Health and Wellness

The City provides insurance coverage for City Employees. According to the City, average annual costs to the City for Employee Health Coverage amount to $17,000,000. The City did not provide information related to employee participation in health and wellness programs. Going forward, the City could seek to enroll employees in such programs and track their participation. This could lead to benefits such as insurance discounts and reductions in employee sick days.

For the community, the City should consider tracking health and wellness data such as rates of substance abuse, mental health metrics, and rates of obesity. County-level data on life expectancy, alcohol use, obesity, physical activity, and diabetes is available from http://www.healthdata.org/us-health/data-download.

4.5.3 Food Security

This City does not currently track data related to food security, but City Commissioners identified it as an important issue in interviews conducted for the City's Sustainability Strategy (Appendix A). The U.S. Department of Agriculture (USDA) Food Access Research Atlas[2] shows that three census tracts in the City, (12011030801, 12011030903 and 12011030903) meet criteria for low income and low food access, meaning a significant number of residents live more than one mile from the nearest supermarket. The City

[2] The USDA Food Access Research Atlas can be accessed at https://www.ers.usda.gov/data-products/food-access-research-atlas/go-to-the-atlas/

should consider establishing metrics to measure food security and food deserts in the community and incorporate local data into its sustainability program.

4.5.4 Workforce Development

The City develops its own workforce through training programs that provide opportunities for employees to learn and advance their skills and careers. The City also has the opportunity to support workforce development in the community by providing training opportunities, and through its procurement process. The City did not provide quantitative data related to employee training or its Revolving Loan Fund (RLF) Program. Pompano Beach should consider tracking workforce development data to better manage and take credit for its accomplishments in this area.

4.5.5 Public Outreach

Education and outreach are key components of any sustainability program. Moving towards sustainability requires effective engagement of stakeholders to accomplish behavior changes and a shift in organizational culture. Education and outreach to employees, residents, visitors, businesses and other stakeholders is key to accomplishing change and driving the sustainability program forward by communicating its benefits. Although the City conducts outreach on issues related to sustainability, it does not track these efforts in a systematic way. Establishing and tracking metrics for outreach would help the City manage these activities going forward.

4.5.6 Employee and Stakeholder Engagement

Understanding the influence of stakeholders and how the sustainability program will affect their interests allows communications to be tailored to meet their needs, helping to avoid roadblocks and misunderstandings. The City should consider conducting a formal stakeholder mapping exercise for its sustainability program. The four phases of stakeholder mapping include: identifying relevant organizations and groups, analyzing their interests and influence, visually mapping their relationship to the project and other stakeholders, and prioritizing strategies to effectively manage stakeholder engagement.

4.5.7 Third-Party Verification.

The City has not yet pursued third-party verification for its sustainability program under a certification program such as LEED for Cities and Communities. If the City pursues such a certification in the future, data collected as part of this baseline will be useful for documenting achievements and achieving credit. The City may wish to evaluate the potential benefits of such programs, and if it decides to pursue one, incorporate metrics relevant to the certification into its internal data tracking.

4.6 POLICY AND ECONOMICS

The City's budgeting process is an annual process that runs from November to October of each year. The City's annual budget for fiscal years 2016 through 2019 are shown in Figure 15. The City encourages residents and local businesses to serve in approximately 28 different advisory boards listed on the City's website. Several of the boards relate to some aspect of sustainability (e.g., Community Development Advisory Committee, Employee Health Insurance Committee, Marine Advisory Board, Recycling and Solid Waste Committee, etc.).

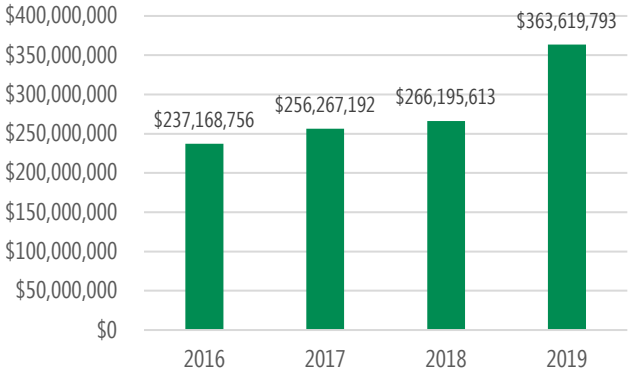

FIGURE 15: CITY OF POMPANO BEACH OPERATING BUDGET, 2016-2019

Between 2016 and 2019, the City's annual operating budget increased by approximately 53%. Sustainability initiatives often result in return-on-investments that could help the City save money over a certain time period. For example, LED lights produce significant energy and maintenance cost savings that could save the City money in its annual budget.

The City's sustainability and adaptation projects to date appear to have been funded primarily through the City's operating budget or G.O bond. However, the City has been awarded several grants for sustainability related projects from the South Florida Water Management District (SFWMD), the Florida Departments of Health and Economic Opportunity, State Appropriations, and Broward County, shown in Table 10.

TABLE 10: SUSTAINABILITY GRANTS AWARDED TO POMPANO BEACH

Grant Name	Requested	Awarded	Source
City of Pompano Beach Sustainability Baseline and Goals	$35,000	$35,000	Florida Department of Economic Opportunity
City of Pompano Beach Reuse Expansion	$600,000	$500,000	SFWMD
Fluoride System Replacement	$107,000	$107,000	Florida Department of Health, Dental Program
Broward County IWRP Reuse Grant	$700,000	$200,000	Broward County
Water Interconnects Rehabilitation	$287,500	$287,500	State Appropriations
Reuse in NE and LHP	$500,000	$400,000	SFWMD
Avondale Stormwater	$2,694,067	$300,000	FDEP 319 Grant
Reuse NE Expansion Grant	$1,350,000	$300,000	Florida State

The City is also pursuing grant funding from the Florida Department of Environmental Protection to complete a comprehensive vulnerability assessment for City facilities.

Although the City has found ways to fund sustainability projects, it is recommended that a Sustainability Revolving Fund or other means of returning resource efficiency cost savings to the sustainability program

be established for future funding. Other sources of funding may include special fees, public private partnerships, and grants.

Data relating to City sources of revenue, inventory of IT assets and electronics currently in use, and sustainability incentives currently provided by the City was requested but could not be provided. RS&H is aware that the City has some sustainability incentives, including the Green Building Program. The City's water utility also has conservation incentives, including increasing block rates for water usage designed to incentivize customers to use less. These are discussed in the City's Sustainability Strategy (Appendix A). RS&H recommends that sources of revenue, incentives and IT assets be tracked in the future, potentially utilizing technology and data management systems.

5. GREENHOUSE GAS INVENTORY

RS&H has prepared the first Greenhouse Gas (GHG) emissions inventory and forecast for the City of Pompano Beach. The inventory includes emissions from local government operations (LGO) and the community as a whole ("the Community"). Since government operations are among the sources and activities that make up community emissions, the LGO inventory is a subset of the community inventory. It is provided to give the government a detailed picture of emissions it directly controls.

This inventory establishes 2019 as the baseline for emissions. It also includes a business-as-usual (BAU) emissions forecast for the Community and LGO from the present to 2040. There is great uncertainty in projecting future emissions. This forecast should be viewed as a tool for planning GHG reduction activities.

Together, the Community and LGO inventories and forecast facilitate understanding of present and future emissions trends. They also provide information needed by staff, policy-makers and stakeholders as they design and implement strategic measures to reduce GHG emissions.

Local government operations (i.e., facilities, vehicles, and infrastructure directly owned and/or controlled by the city) were responsible for emitting 6,423 mtCO2e, with the city's Vehicle Fleet operation contributing 47%. Employee Commuting and Buildings & Facilities also contributed significantly to the total LGO emissions, at 18% and 12%, respectively.

In 2019, the Community's total estimated emissions were 1,376,874 metric tons of Carbon Dioxide equivalent (mtCO2e), the standard measure of GHG emissions. The transportation sector contributed the largest single source (46%). Commercial energy use and waste disposal emissions also contributed significantly — 18% and 17%, respectively.

If no actions are taken, Local government operations emissions could decrease by 6% to 6,496 mtCO2e by 2040. Community-wide emissions could decrease slightly by 0.49% to 1,365,213 mtCO2e by 2040. This "Business-as-Usual" (BAU) forecast is based on growth factors for energy use, transportation fuel consumption, population growth, and water supply. The decrease is due to projected transition of vehicles in the Southeast to electric and other lower-emitting models. The result is consistent with the Energy Information Agency's (EIA) national "Energy-related carbon dioxide emissions by end-use" forecast, which also shows declining emissions through 2040. However, projected declines are not enough to meet global climate targets to keep warming under 1.5 degrees Celsius. The City will still need to take aggressive action to reduce its emissions. See discussion in Section 3.1: Climate Action Goals.

5.1 INTRODUCTION

Pompano Beach endorsed the Mayor's Climate Action Pledge and joined the Southeast Florida Regional Climate Change Compact (SEFLCC) in 2013 with Resolution 2013-134. These commitments require the City to understand its greenhouse gas emissions, set emissions reduction targets, and implement climate

actions. This greenhouse gas (GHG) inventory establishes a baseline for the City's GHG emissions that will enable the City to accomplish these objectives.

The first step toward achieving GHG emission reductions requires identifying baseline levels and sources of emissions in the community. The next step is to monitor emissions over time. A standardized approach is necessary to achieve these objectives. The LGO portion of this inventory was completed under ICLEI Local Government Operations Protocol, Version 1.1, published May 2010. The Community portion of the inventory was completed using Local Government for Sustainability (ICLEI) U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Version 1.1, published July 2013.

LGO GHG emissions fall into one of three categories, or "scopes". Scope 1 emissions are those from sources directly owned or controlled by an organization and typically located within its geographical jurisdiction. They include emissions associated with fuel combustion; HVAC, fire suppression and electrical equipment; and landfills, incinerators and wastewater treatment facilities located in-boundary. Scope 2 emissions come from purchased energy such as electricity generated outside the jurisdiction and include energy transmission and distribution (T&D) losses. Scope 3 includes sources not directly under the organization's control such as employee commuting. Although the organization may not directly own the vehicles generating Scope 3 emissions, it still can influence the quantity of emissions released through policy changes, for example b incentivizing the use of public transportation.

For Community inventories, ICLEI does not use scopes because they do not "translate to the community scale in a manner that is clear and consistently applicable as an accounting framework." Instead, ICLEI categorizes Community emissions in terms of "Sources" and "Activities". Sources are "any physical process inside the jurisdictional boundary that releases GHG emissions into the atmosphere (e.g., combustion of gasoline in transportation; combustion of natural gas in electricity generation; methane emissions from a landfill). Activities are "the use of energy, materials, and/or services by members of the community that result in the creation of GHG emissions either directly (e.g., use of household furnaces and vehicles with internal combustion engines) or indirectly (e.g., use of electricity created through combustion of fossil fuels at a power plant, consumption of goods and services whose production, transport and/or disposal resulted in GHG emissions)".

This report presents estimates of GHG emissions in Pompano Beach for the calendar year 2019 for each emissions-producing source or activity that takes place within the city limits. In Pompano Beach, as in most places, GHG emissions are not measured at the source. Instead, they are calculated based on activity data and emission factors. The basic equation used is: *Activity Data X Emission Factor = Emissions*. Activity data collected and provided by the City measure energy use, fuel consumption or other indicators of processes that generate emissions. Emissions factors that compare GHG emissions to units of activity data (e.g., metric tons CO2e per kWh of electricity) are used to convert activity data into emissions quantities. Calculations involve several assumptions that are limited by the quality and availability of related data. Accordingly, emission estimates are indicators, rather than exact values.

Emissions estimates in this inventory are presented in units of metric tons of carbon dioxide equivalent (mtCO2e). Because various greenhouse gases have differing global warming potentials, they are

standardized to equivalent units of CO2 to allow comparison of their global warming effects. Global warming potential (GWP) values from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment were used to convert various greenhouse gases to carbon dioxide equivalents.

RS&H prepared separate forecasts for community-wide and local government emissions over a 21-year time horizon from 2019 through 2040. These "Business as Usual" forecasts assume no further actions taken to control emissions. Growth factors drawn from federal, state and local government sources were used to develop the forecasts. The BAU forecasts are useful for comparing planned emissions reductions to a base case and measuring progress over time.

5.2 LOCAL GOVERNMENT OPERATIONS

The local government operations inventory allows the City to effectively plan to reduce emissions over which it has significant influence or direct control. It represents the total amount of greenhouse gas (GHG) emissions associated with local government operations for calendar year 2019.

5.2.1 LGO Inventory Overview

In 2019, LGO emissions from Pompano Beach totaled **6,423** mtCO2e. Table 11 shows local government sectors, activities, emissions scope and estimated GHG emissions included in this total. Figure 16 shows the percentage of the total contributed by each sector. Items marked "Included Elsewhere" (IE) are not added to the inventory total because they are already included in another source or activity; they are shown for informational purposes. Items marked "Not Estimated" (NE) were not included due to a lack of supporting data, but would typically be part of an LGO inventory. If possible, they should be included in future LGO GHG Inventory updates.

TABLE 11: LOCAL GOVERNMENT OPERATION GHG EMISSIONS BY SECTOR, 2019

Sector	Source	Scope	Emissions ($mtCO_2e$)
Vehicle Fleet	Fleet emissions for on and off-road vehicles and equipment	1	3,022
Employee Commute	Emissions associated with City employee commuting	3	1,126
Buildings / Facilities	Electricity consumption & transmission and distribution (T&D) losses	2	797
Process & Fugitive Emissions	Fugitive emissions related to HVAC systems	1	748
Solid Waste	Waste generation at city facilities	3	711
Airpark (IE)	IE - included elsewhere (Vehicle Fleet)	1	*IE (46)*
Water Treatment	Energy use for Water Treatment	1	11
Streetlights	Streetlight electricity consumption & T&D losses	2	9
Generators (NE)	*NE - not estimated, no information available*	1	*NE*
Stationary Fuels (NE)	*NE - not estimated, no information available*	1	*NE*
Total			***6,423***

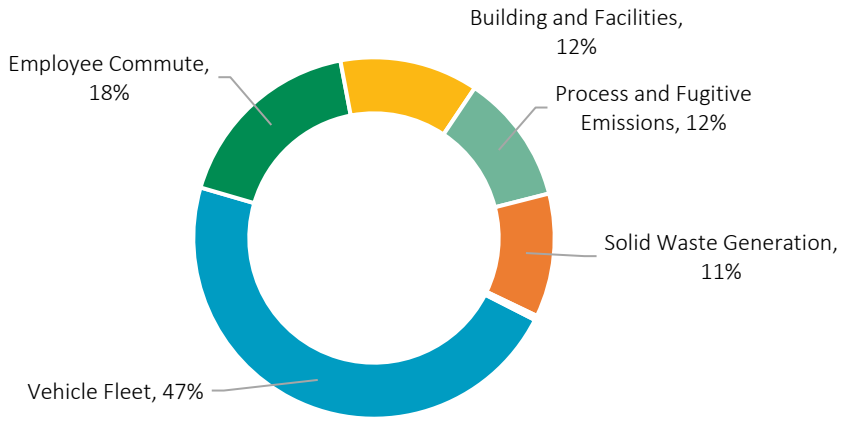

FIGURE 16: 2019 LOCAL GOVERNMENT OPERATION GHG EMISSIONS

5.2.2 LGO Inventory Data Sources and Methods

This section details data sources, methods and calculations used to complete the emissions estimates for each sector.

5.2.2.1 Vehicle Fleet

The City operates fleets of on-road vehicles. It also operates a fleet of off-road vehicles and equipment. These vehicles and equipment contribute to Scope 1 GHG emissions through combustion of gasoline or diesel fuel.

The City provided fleet fuel use information in several different Excel Spreadsheets. "Monthly Fuel Cost" worksheets, provided for fiscal years 2016 - 2019, show fuel usage quantities and expenditures by department. The City also provided a "Fuel Comparison" worksheet which contains fiscal year fuel purchase quantities and expenditures from 2011 - 2020. This worksheet is citywide and not broken down by department. For each year, it contains unleaded gasoline and diesel purchases and an additional category of "hurricane fuel" gasoline and diesel purchases. The hurricane fuel is pre-purchased in advance of hurricane season and then later incorporated back into the regular fuel supply if not used for emergency purposes.

There is a greater than 10% difference in fuel purchase quantities and expenditures between the data from the "Monthly Fuel Cost" and "Fuel Comparison" worksheets, whether or not the hurricane fuel is included. For the purposes of the inventory, the data from the "Fuel Comparison" worksheets was used, converted to calendar year 2019 and with the hurricane fuel included. This represents the highest annual total for fuel usage and avoids undercounting GHG emissions associated with operation of the City's fleet. Because the City does not track on-road versus off-road fuel usage, all of the 2019 usage was assigned to the on-road category. 2019 fuel consumption in gallons for unleaded gasoline and diesel were multiplied by the appropriate emissions factor for each fuel to calculate GHG emissions in CO_2 equivalents.

5.2.2.2 Employee Commute

Employee commuting emissions represent 18% of the City's LGO total. These are considered Scope 3 emissions for the City since it does not directly produce them, but still has substantial control over them.

Emissions from this source could be reduced through strategies such as telework and incentives for carpooling, transit use, bicycling, electric vehicles, etc.

The GHG emissions produced by employee commuting were calculated in three steps. First, annual miles traveled by full time and part time employees were estimated. Second, annual gasoline use by full time and part time employees was estimated. Finally, GHG emissions were calculated based on fuel use.

Anonymized 2019 employee home addresses and work locations provided by the City were used to calculate commuting distances. This method required some assumptions. Addresses were converted to latitude/longitude coordinates using a batch geocoding application. Some addresses had to be manually corrected in cases where errors prevented geocoding. A few addresses were unable to be resolved, for instance if a PO box were entered instead of a physical address. The average commuting distance was assigned to the addresses that could not be resolved. The coordinate data was converted to an ESRI shapefile using ArcMap. The ArcGIS Online "Connect Origins to Destinations" Tool was used to calculate shortest-route distances in miles over the roadway network from home to work location for each employee. Because the exact work locations of each employee were not available, City Hall was used as a proxy location for all employees.

The City of Pompano Beach supplied the number of City holidays in 2019 (12). Holidays and weekend days (104) were deducted from the number of days in a year. Then the product of the average number of vacation days for state and local government workers (12) and percentage of local government workers with access to paid time off (61%) was deducted, leaving 242 working days for the year. RS&H assumed 2 trips per employee per day (to and from work). Part-time employees, who made up 29% of the work force, were assumed to work 2 days per week, after holidays and vacation were deducted, or 99 days per year.

The average age of a passenger vehicle in the U.S. in 2019 was 11.8 years, making the average vehicle a 2007 model. The average combined fuel economy of 2007 short-wheelbase passenger vehicles (cars, light trucks and SUVs) was 22.9 mpg. This fuel economy number was used to estimate the gallons of gasoline consumed to travel the total estimated commuting mileage. For the purposes of the analysis, all vehicles were assumed to be gasoline fueled.

5.2.2.3 Building and Facilities

Buildings and Facilities generate Scope 2 GHG emissions through electricity consumption and Scope 1 emissions through stationary combustion of fuels for heating and water heating.

5.2.2.3.1 Electricity Consumption

Emissions estimates for purchased electricity were calculated based on the City's utility billing records, obtained from Pompano Beach's Florida Power and Light (FPL) account manager by the City's Sustainability Coordinator. RS&H attempted to match FPL accounts to the City's facility list through a variety of means, but attribution of accounts to facilities should be regarded as an approximation. See Section 3.2.1.1 for more information.

Once the matching process was complete, RS&H aggregated facility energy use data into common categories. Table 12 shows the categories of City facilities with the 2019 emissions for each in mtCO2e.

TABLE 12: GHG EMISSIONS BY FACILITY TYPE, 2019

Facility	2019 GHG Emissions in mtCO2e
Airpark	7.71
Boat Ramp	13.80
City Hall	98.42
EVSE	8.23
Fire Station	3.03
Golf	43.68
Gym	2.20
Irrigation	6.34
Library	242.73
Lifeguard	13.48
Lift Station	145.41
Museum	5.12
Park	73.25
Parking	25.17
Pier	49.29
Reuse Plant	1.34
Right of Way	3.65
Unknown	17.22
Streetlights	8.53
Water Treatment Plant	10.00

The estimate also includes grid loss emissions related to energy lost in transmission, calculated using ICLEI Equation BE 4.1.1. Total grid loss emissions amounted to 38 mtCO2e.

5.2.2.3.2 Stationary Combustion

Information on natural gas usage in City facilities was not available. The City indicated that some of its fire stations use natural gas for water heating, but billing records for natural gas were not available. RS&H recommends that the City track natural gas usage going forward and include this emissions source in future GHG Inventory updates. While indications are that use of natural gas in City facilities is minimal, it is still part of the City's energy use and represents a potential area for GHG emissions reduction (e.g., by installing solar water heating systems).

5.2.2.4 Process & Fugitive Emissions

Pressurized chemicals, such as the refrigerants used in heating, ventilation and air conditioning (HVAC) systems, leak or are released via maintenance activities. These substances are very potent greenhouse gases, so small releases have a significant climate impact. Emissions can be reduced by replacing the strongest greenhouse gases with less potent alternatives, as well as enhanced maintenance processes. No direct data on HVAC system capacity, leakage or recharge was available. Note that under Section 608 of the Clean Air Act (40 CFR Part 82, Subpart F), owners and operators of refrigeration and HVAC equipment are required to document dates, refrigerant charge amounts, and information related to service of this equipment. Fugitive emissions were estimated by RS&H using the World Resources Institute (WRI) screening method. The City supplied lists of facilities that either included or were matched to square footages that were used to develop the estimate. In the future, tracking HVAC system specifications, maintenance and refrigerant usage would result in a more accurate estimate and ensure compliance with Federal regulations.

5.2.2.5 Solid Waste Generation

Waste generation at City-owned facilities was estimated based on dumpster volumes in cubic yards (CY) and pickup frequency. Based on an interview with City recycling coordinator, dumpsters were assumed to be 87.5% full at pickup. The mass of mixed municipal solid waste (MSW) was estimated at 150 pounds per cubic yard following EPA guidance.

Pompano Beach waste is transported to the Monarch Hill landfill/waste to energy facility for disposal. This landfill is not owned/operated by the City. Because it is located within Pompano Beach's boundaries, its emissions count as Scope 1 for waste generated in the course of City operations.

Waste and recycling services are provided by Waste Management (WM) under contract to the City. For City facilities, a combination of City staff and WM pick up waste and recycling. City staff are responsible for picking up all public containers such as garbage cans around city on sidewalks, recycling/garbage cans at the beach, and waste from City parks and events. Waste picked up by City staff is taken to a local transfer station where it is then picked up by WM. Per the contract, WM disposes of all waste at the Monarch Hill Landfill located at 3000 Wiles Road, Pompano Beach, FL. Monarch Hill Landfill is a regional facility serving Broward County and surrounding counties and cities, and is equipped with a landfill gas control system. WM takes recycling to its Recycle America facility at 20701 Pembroke Road, Pembroke Pines, Florida. A municipal waste audit would improve the quality of the estimated Scope 3 emissions related to LGO waste generation..

Note that the Monarch Hill landfill site also includes a waste-to-energy incineration facility. The City stated there is currently no way to determine the percentage of the City's waste that is incinerated rather than landfilled. For the purposes of this inventory, it is assumed that 100% is landfilled. This results in a higher emissions estimate than if waste were assumed to be incinerated. Transportation emissions were not calculated since the disposal facility is located within the community.

5.2.2.6 Airpark

Airpark emissions related to electricity use in buildings are included elsewhere (IE) in the Buildings and Facilities section of the LGO inventory; see Table 2 above. Airpark buildings were responsible for 7.71 mtCO2-e in 2019.

Airpark LGO fuel usage emissions included elsewhere (IE) in the Vehicle Fleet category. City-owned vehicles and equipment at the Airpark were responsible for 46.15 mtCO2e in 2019.

The City does not own/operate any ground support equipment (GSE) and does not dispense aviation fuel to aircraft. The Pompano Beach Airpark fleet contains a small number of vehicles and equipment running on gasoline and diesel fuels. The combustion of fossil fuels in mobile sources emits CO2, CH4 and N2O. Data for fuel usage for City-owned vehicles and equipment at the Airpark was available on a departmental basis, but not broken down for specific vehicles/equipment. As a result, all fuel usage was assigned to the "on-road" category.

5.2.2.7 Water Treatment

Water treatment emissions are included elsewhere (IE) in the Buildings and Facilities section of the LGO inventory; see Table 12 above. In 2019, the Reuse plant and Water Treatment Plant (WTP) were responsible for 1.34 and 10.04 mtCO2e, respectively.

Data for this record was obtained from FPL along with the rest of the City's electricity utility bills. The City of Pompano Beach's water is treated at the City's Water Treatment Plant (WTP) located at 1190 NE 3rd Avenue and at the Oasis Reuse Plant located at 901 NE 18th street. These facilities do not report emissions to EPA's Facility Level Information on GreenHouse Gases Tool (FLIGHT). Water treatment emissions are estimated based on electricity use at the facilities and are considered Scope 2. The City did not provide any data related to natural gas consumption for City facilities, and indicated there was little or no natural gas consumption. The City confirmed there is no natural gas use at the WTP.

Note that the City's WTP supplies treated water to portions of unincorporated Broward county, Lauderdale-by-the-sea, Lighthouse Point and Margate as well as to Pompano Beach. Water is only provided to Margate, Broward County and Ft. Lauderdale during emergencies. Pompano Beach usage accounted for 92.6% of the total treated by the WTP in 2019. Because the Reuse and WTP facilities are located in-boundary and owned/operated by the City, 100% of their emissions belong to Pompano Beach even though they serve other communities as well.

5.2.2.8 Streetlights

Streetlight electricity usage produces Scope 2 emissions. Data for this record was obtained from FPL along with the rest of the City's electricity utility bills. Streetlights are broken out as a separate emissions source because there are often opportunities to reduce streetlight energy consumption/emissions by upgrading them to more efficient fixtures or lamps.

5.2.2.9 Generators

An inventory of stationary generators owned by the City and associated fuel usage records was not available. As a result, this record is marked "NE" or not estimated. Since generators only use fuel during emergencies and infrequent testing, this emissions source is likely *de minimus* in the context of the overall LGO total. However, the City should track generator fuel usage going forward and add this source to future GHG inventory updates.

5.3 COMMUNITY

The community-scale inventory represents the total amount of greenhouse gas (GHG) emissions within Pompano Beach's jurisdictional boundary. This total includes emissions from municipal government operations and activities. As result, the LGO inventory is a subset of the community inventory.

5.3.1 Community Inventory Overview

In 2019, community-wide emissions from Pompano Beach totaled 1,376,874 mtCO2e. Table 13 shows community sectors, activities, scope and estimated emissions included in this total. Figure 17 shows the percentage of the total contributed by each sector. Items marked "Not Estimated" (NE) were not included due to a lack of supporting data, but would typically be part of a community inventory. If possible, they should be included in future community GHG Inventory updates.

TABLE 13: COMMUNITY GHG EMISSIONS BY SECTOR, 2019

Sector	Activities	Category	Emissions ($mtCO_2e$)
Transportation	Community-wide Transportation Emissions	Source	638,930
Commercial Energy	Electricity used in commercial establishments (coded Commercial and Commercial Public Authority)	Activity	247,099
Waste Disposal	Monarch Hill Landfill / Waste to Energy Facility	Source	231,530
Residential Energy	Electricity (coded Residential and Residential PA), Distributed Fuels used in Residences	Activity, Source	192,106
Wastewater	Utility Wastewater Treatment, Septic Systems	Activity, Source	41,955
Industrial Energy	Electricity used in Industrial Sector (coded Industrial, Industrial Public Authority, Public Authority, Public Streets)	Activity	25,245
Community Waste Generation (IE)	Waste generation from the community – included elsewhere (in Waste Disposal total)	Activity	*IE (13,740)*
Water (IE)	Water treatment and reuse plant emissions (Included Elsewhere, not added to inventory total)	Source	*IE (17)*
Total			***1,376,805***

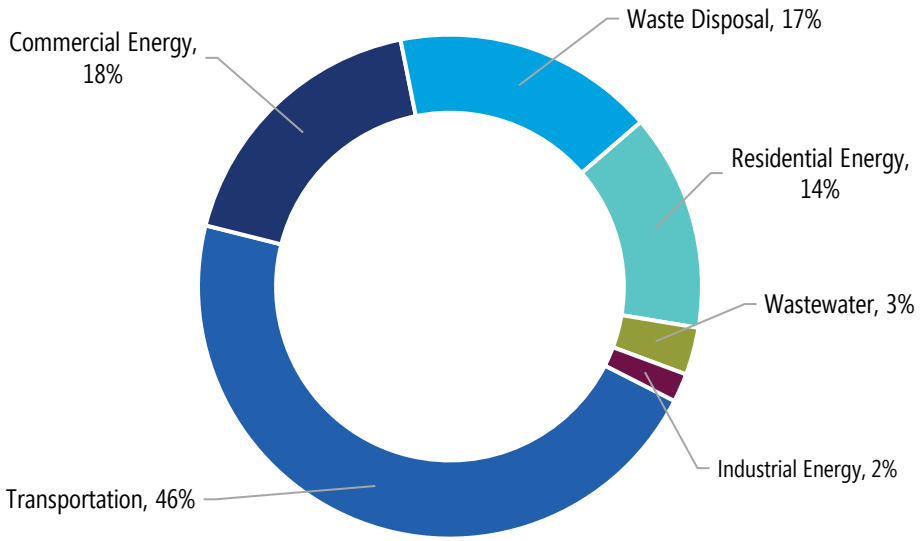

FIGURE 17: 2019 COMMUNITY GHG EMISSIONS

5.3.2 Community Inventory Data Sources and Methods

This section details data sources and methods used to complete the emissions estimates for each sector. Unless otherwise noted, data was collected and provided by the City of Pompano Beach.

5.3.2.1 Transportation

RS&H estimated community on-road transportation emissions using Vehicle Miles Traveled (VMT) data from FDOT's regional transportation planning model and emission rates from the Motor Vehicle Emissions Simulator (MOVES) developed and maintained by the US Environmental Protection Agency. The regional

transportation planning model was run for an annual average weekday condition in 2019. Greenhouse gases emitted by motor vehicles include carbon dioxide (CO2), Methane (CH4) and Nitrous Oxide (N2O).

The MOVES model output estimates by road functional class (Table 14.). Daily emissions were converted from grams to metric tons of CO2 equivalents. To arrive at annual emissions, they were multiplied by 365.25.

TABLE 14: 2019 SUMMARY OF DAILY COMMUNITY TRANSPORTATION GHG EMISSIONS FOR POMPANO BEACH

Road Functional Classes (HPMS)	VMT (Miles)	mtCO2e
Urban Interstate	1,057,050	506.57
Urban Freeway	809,288	390.12
Urban Arterial	1,718,675	776.01
Urban Minor Arterial and Collector	163,950	76.60
Total	*3,748,963*	*1,749*

Note that the transportation sector emissions estimate does not include aviation at the Airpark. Data was not available to calculate GHG emissions related to air traffic from the airpark, however, this could represent a significant Scope 3 emissions source for the City. Although the City does not directly own or control the aircraft producing these emissions, the Airport can work with its tenants to identify and encourage opportunities to reduce emissions in their facilities such as energy efficiency projects, implementation of infrastructure to support electrification of GSE, or providing support in favor of alternative aviation fuels. RS&H recommends the City conduct a separate GHG emissions study for the Airpark facility and enroll the Airpark in the Airport Carbon Accreditation (ACA) program. ACA is an institutionally endorsed carbon management certification program for airports.

5.3.2.2 Commercial Energy

Annual community-wide 2019 electricity consumption data was obtained from the City's account representative at FPL by May Wemyss, COPB's Sustainability Coordinator.

ICLEI U.S. Community Protocol equation BE 2.2 was used to calculate emissions from purchased electricity. Equation BE 4.1.1 was used to calculate electric transmission system grid losses from the same dataset.

FPL categorized community-wide electricity usage into eight categories: Commercial, Commercial Public Authority, Industrial, Industrial Public Authority, Other Public Authority, Public Streets, Residential and Residential Public Authority. RS&H summarized these into Residential, Commercial and Industrial uses.

For the purposes of this inventory, "Commercial" and "Commercial Public Authority" were considered commercial use types.

5.3.2.3 Waste Disposal

The Monarch Hill Landfill receives waste generated in the community as well as from surrounding communities. The City of Pompano Beach's Community Inventory includes the total GHG emissions of this facility, which are reported to the EPA on an annual basis. This data was retrieved from the EPA's FLIGHT tool. Because Monarch Hill is located within Pompano Beach's boundaries, its total annual emissions

count as Scope 1 for the City. The 500-acre facility which opened in 1965 is owned and operated by Waste Management (WM) and serves communities in Broward County.

In addition, the portion of the Monarch Hill Facility's GHG emissions attributable to the waste generated within the City (13,740 mtCO2e) was calculated using a ratio approach (i.e., City's percentage of waste disposed compared to total emissions for the facility). This is provided as an information only item since this portion is included elsewhere (in the total emissions for the facility). Following ICLEI Community Protocol guidance, waste transportation emissions were not calculated since the disposal facility is located within the community. Figure 18: GHG emissions from Community Waste Disposal, 2019 shows the total 2019 GHG emissions from the Monarch Hill facility with the portion attributable to waste generated in the City of Pompano Beach.

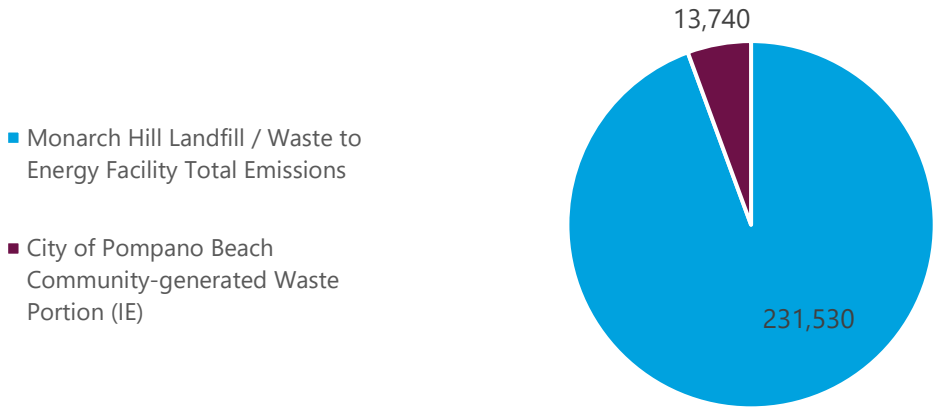

FIGURE 18: GHG EMISSIONS FROM COMMUNITY WASTE DISPOSAL, 2019

5.3.2.4 Residential Energy

The residential energy GHG emissions estimate includes purchased electricity and stationary fuel combustion (natural gas and propane).

5.3.2.4.1 Residential Electricity Consumption

See section 5.5.2 for electricity consumption data sources and calculation methods.

For the purposes of this inventory, "Residential" and "Residential Public Authority" were considered residential use types.

5.3.2.4.2 Stationary Fuel Combustion

Residential Natural Gas and Propane consumption totals for the City were not available, so GHG emissions from these activities were estimated using state and county level data.

Statewide natural gas consumption data from the Energy Information Agency (EIA) and household data from the American Community Survey (ACS) were used to estimate community-wide natural gas consumption for 2019. ACS data on home heating fuel use for the City of Pompano Beach was not available, so data for Broward County was used. According to ACS data, in 2019 2.0% of households in

Broward used Natural Gas, and 0.3% used Propane. These percentages were applied to the Florida statewide average energy use per household for natural gas and propane to estimate energy use for these fuels in Pompano Beach. Figure 19 shows GHG emissions totals for these sources in 2019.

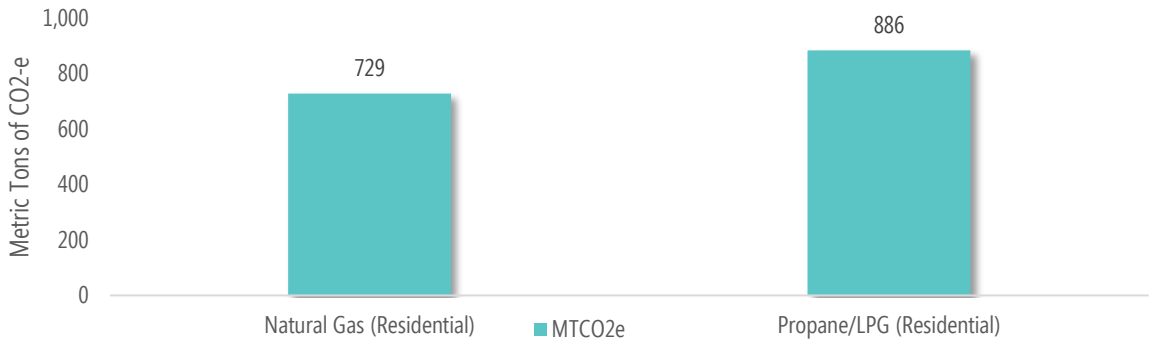

FIGURE 19: COMMUNITY EMISSIONS FROM STATIONARY FUEL COMBUSTION, 2019

Data was not available to estimate commercial and industrial natural gas consumption for the community. In contrast to residences, different types of commercial and industrial properties can have very different natural gas and propane usage. Downscaling statewide data is not likely to result in accurate estimates for these sectors. Because they are omitted, total community-wide natural gas and propane consumption are likely underestimated, however in Florida these fuels are only a small percentage of total energy use. The City should track community-wide stationary fuel consumption from utilities and add data-driven estimates for residential, commercial and industrial use to future community GHG inventory updates.

5.3.2.5 Wastewater

There are two forms of wastewater treatment in the City. The overwhelming majority of residences and other buildings are connected to utility sewage systems, while a small number of households have individual septic systems. Table 15 shows the estimated GHG emissions and population served by utility wastewater treatment and septic systems.

TABLE 15: WASTEWATER TREATMENT IN POMPANO BEACH (ESTIMATED)

Treatment Type	Population Served	MTCO2e
Utility Wastewater	111,726	41,908
Community Septic Systems	392	48
TOTAL	**112,118**	**41,955**

5.3.2.5.1 Utility Wastewater Treatment

Broward County Water and Wastewater Services (WWS) owns and operates the North Regional Wastewater Treatment Plant (NRWWTP), which has provided contract wholesale wastewater services to Large Users and the County since 1974. The facility is located within the City of Pompano Beach's jurisdiction but is owned and operated by Broward County. In addition to the City of Pompano Beach, the current Large Users served by the facility include the Cities of Coconut Creek, Coral Springs, Deerfield Beach, Lauderhill, North Lauderdale, Oakland Park, Tamarac; and North Springs Improvement District (NSID), Parkland Utilities, and Royal Utilities. Service is also provided to WWS Districts 1 and 2 retail

wastewater systems. The NRWWTP utilizes an activated sludge treatment process for liquid treatment and an anaerobic digestion system for handling the biosolids produced from the liquid treatment process. After digestion, the sludge is dewatered and disposed of by landfilling and land spreading.

Because the NRWWTP is owned and operated by Broward county, Pompano Beach is only responsible for the portion of its GHG emissions related to wastewater generated within the community. ICLEI's population-based calculations were used to estimate the process CH4 emissions from wastewater treatment and N2O process emissions from wastewater treatment lagoons. Emissions related to wastewater generated in the City are considered an activity. The population estimated to use septic systems was deducted from the total City population to arrive at the populations using centralized wastewater services.

5.3.2.5.2 Septic Systems

The number of septic systems in Pompano Beach in 2019 was estimated using data from the Florida Water Management Inventory (FLWMI), which provides an up-to-date centralized geographic data map linking each built property in the state with a drinking water source (public water or private domestic well) and wastewater treatment method (central sewer or onsite septic). Geographic parcel data for Broward County was downloaded from the FLWMI and parcels located in Pompano Beach were extracted to determine the number of parcels known to use septic systems or likely to use septic systems. This amounts to only a small number of parcels in the City, about 0.35% of the total. This percentage was applied to the City's 2019 population to estimate the number using septic systems. ICLEI equation WW.11(alt) "Alternative Method for Methane Emissions from Septic Systems if Only the Population is Known" was used to develop the GHG emissions estimate.

5.3.2.6 Industrial Energy

See section **5.5.2.** for electricity consumption data sources and calculation methods.

For the purposes of this inventory, “Industrial”, “Industrial Public Authority”, “Other Public Authority” and “Public Streets” were considered industrial use types.

5.3.2.7 Water

This record is marked included elsewhere (IE) to avoid double counting, since the WTP's electricity emissions are already included in the Industrial sector community electricity emissions total.

The City of Pompano Beach's Water is treated at the City's Water Treatment Plant (WTP) located at 1190 NE 3rd avenue, the Membrane plant at 1205 NE 5th avenue and at the Oasis Reuse Plant located at 901 NE 18th street. These facilities do not report emissions to EPA's FLIGHT tool. Emissions are estimated based on electricity use at the facilities. Note that the City's WTP supplies treated water to portions of unincorporated Broward county, Lauderdale-by-the-sea, Lighthouse Point and Margate as well as to Pompano Beach. Water is only provided to Margate, Broward County and Ft. Lauderdale during emergencies. Pompano Beach usage accounted for 92.6% of the total treated by the WTP in 2019. Because the facilities are located in-boundary and owned/operated by the City, 100% of their emissions are included in the community inventory.

The City did not provide any data related to natural gas consumption for City facilities, and indicated there was little or no natural gas consumption. Calculation assumes no natural gas use at the WTP.

5.4 GHG EMISSIONS COMPARISON WITH PEER LOCAL GOVERNMENTS

Pompano Beach's GHG emissions can be compared to those of other communities. However, every community is different, with varying infrastructure, services, housing stock, transportation networks, waste disposal and commerce. These differences translate into varying rates of GHG emissions, even when values are presented on a per capita basis. For example, Pompano Beach operates a water utility that serves surrounding communities, but the utilities emissions are part of the City's GHG Inventory. Similarly, the total emissions of the Monarch Hill Landfill and Waste to Energy facility are included in Pompano Beach's community inventory because it is located in the City's jurisdiction, even though it serves many other cities. In addition, communities complete inventories on varying schedules and at varying intervals. Comparisons between different inventory years are less valid than those between the same year, and validity decreases as the time difference increases. Inventory methodologies may vary between communities as well. Comparisons of community GHG emissions should be used with caution.

Table 16 Pompano Beach and selected other Southeast Florida communities' communitywide and per capita GHG emissions and the percentage of the total attributable to electricity and stationary energy consumption, transportation sources, and other sources. Pompano Beach's per capita emissions are below the median (13.7) for the cities listed. The "Other' category includes sources such as fugitive emissions, waste disposal and wastewater treatment. This category is higher in Pompano Beach than other communities listed because of GHG emissions from the Monarch Hill waste disposal facility.

TABLE 16: PER CAPITA GHG EMISSIONS, SOUTHEAST FLORIDA COMMUNITIES

Base Year	Local Government	Community Emissions (mtCO2e)	Per Capita Emissions (mtCO2e)	Electricity & Stationary Energy (%)	Transportation (%)	Other (%)
2019	Pompano Beach*	1,376,805	12.3	34%	46%	20%
2014	Village of Pinecrest*	220,309	11.6	47%	52%	1%
2016	Hallandale Beach*	460,733	11.7	49%	49%	2%
2006	Miami^	4,800,000	12.5	58%	39%	3%
2005	Miami-Dade County^	30,700,000	12.8	53%	43%	4%
2014	Miami Beach^	1,223,848	13.3	76%	18%	6%
2016	Sunrise*	1,318,300	14.1	36%	59%	5%
2017	Delray Beach*	998,446	14.5	39%	60%	1%
2005	Key West^	399,593	16.8	66%	28%	6%
2010	Fort Lauderdale^	2,827,747	17.1	NA	NA	NA
2017	Coral Gables*	914,473	17.9	49%	48%	3%
2008	West Palm Beach^	5,513,890	30.1	33%	27%	40%

* Inventory completed by RS&H, Inc.

^ Data from City of Miami Beach presentation "Greenhouse Gas inventory: 2015 Community Wide and Government Operations"
NA: Information Not Available

5.5 GHG EMISSIONS FORECAST

5.5.1 Methodology

While establishing an emissions baseline lays the groundwork for measuring and reporting emissions, it is also useful to forecast how emissions might change in the absence of actions to reduce them (i.e., a business-as-usual (BAU) scenario). RS&H prepared BAU forecasts for both local government operations and the community over a 21-year time horizon from 2019 through 2040.

Due to the high number of variables and unforeseen events that could affect future emissions, the forecast is best viewed as a planning tool. Elaborate forecast methods are not likely more accurate predictions of future emissions than methods based on trends in energy and population growth.

Publicly available information from government sources that can be referenced for future updates is used as the basis of the forecast. These include three sources for growth rate indicators. Population growth projections from the Broward County Population Forecast and Allocation Model (PFAM) were used to estimate population growth through 2040.

For categories related to energy use (e.g., transportation and facilities energy consumption) the U.S. Energy Information Agency (EIA) Annual Energy Outlook 2020 total energy projection for the southeast region was used. For water and wastewater demand, the 2018 South Florida Water Management District (SFWMD) Lower East Coast Water Supply Plan projection for increase in water demand was used.

5.5.2 Local Government Inventory Forecast Results

The local government GHG Emissions forecast indicates GHG emissions will begin to decrease slightly each year beginning in 2021, reaching 6,083 mtCO2e in 2040, as shown in Figure 20. This decline is driven by the EIA's projected transition of the transportation sector from fossil fuels to electricity and cleaner fuels, driving 16% emissions declines in gasoline emissions sources and 11% declines in diesel sources. This results in decreasing Vehicle Fleet and Employee Commuting emissions and causes the LGO forecast total to drop 5.3% by 2040. To realize this projected decline, the City would need to transition its fleet to cleaner vehicles.

Other categories continue to show increasing emissions by 2040, including Building and Facility energy use (9%), Streetlights (21%), Process and Fugitive Emissions (11%), Solid Waste Generation (11%) and Water Treatment (12%).

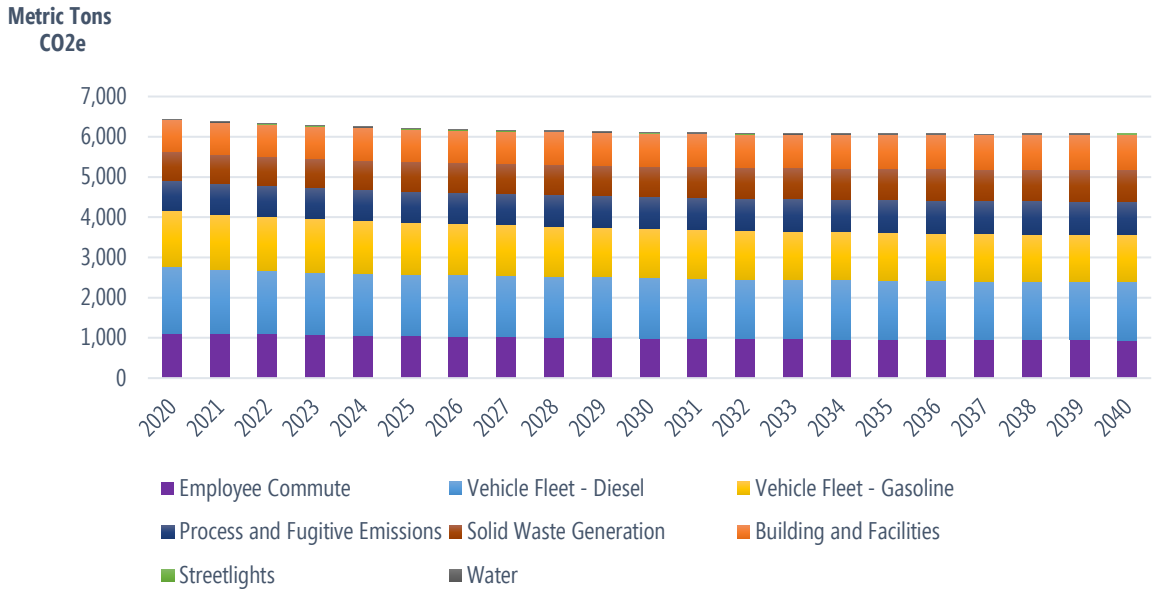

FIGURE 20: LGO GHG EMISSIONS FORECAST, 2020-2040

5.5.3 Community Inventory Forecast Results

The community GHG Emissions forecast indicates that after 2021, total community GHG emissions will begin to decrease slightly each year, reaching 1,365,213 mtCO2e in 2040, as shown in Figure 21. This decline is driven by the EIA's projected transition of the transportation sector from fossil fuels to electricity and cleaner fuels, driving 16% emissions declines in gasoline emissions sources and 11% declines in diesel sources. This results in decreasing communitywide transportation emissions and causes the community forecast total to drop 0.5% by 2040. Other categories continue to show increasing emissions by 2040, including Industrial Energy (24%), Commercial Energy (16%), Water (11%), Wastewater (11%), Solid Waste Generation (11%) and Residential Energy (9%).

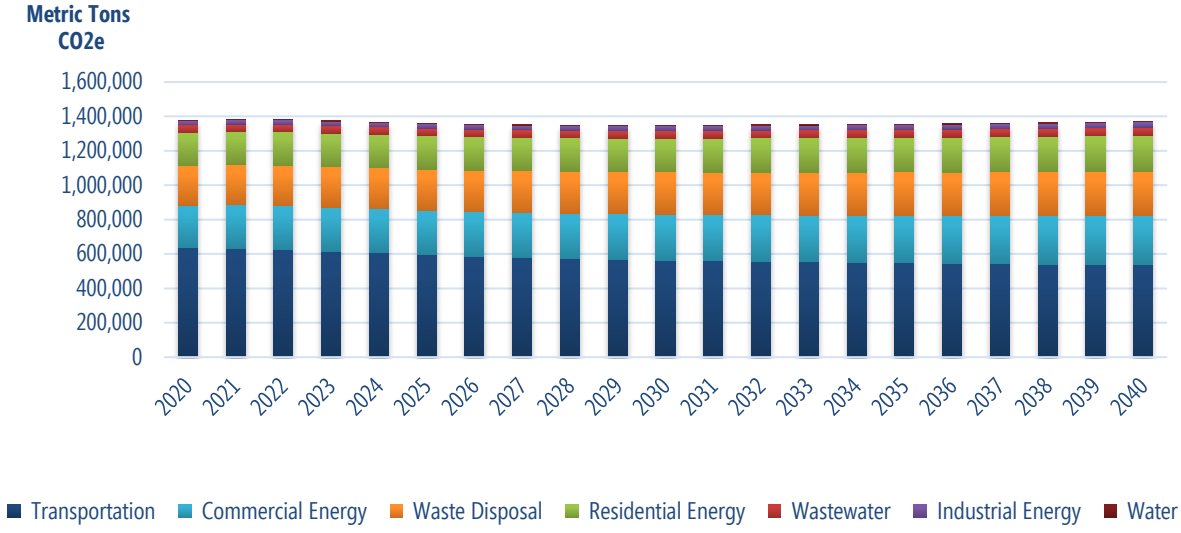

FIGURE 21: COMMUNITY GHG EMISSIONS FORECAST, 2020-2040