City of Tarpon Springs

First Annual Greenhouse Gas Emission Inventory - 2019

Final Technical Report

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Purpose

In 2020, at the direction of the City of Tarpon Springs Sustainability Committee, the City of Tarpon Springs Public Services Department began work on the first annual greenhouse gas inventory for the City of Tarpon Springs. The purpose of this effort is to quantify the estimated greenhouse gas emissions from the various activities and infrastructure of the City government. This information can be used by City management and policy makers to develop emissions goals, create policies and plans to manage greenhouse gas emissions over time, develop actionable practices to reduce energy consumption, and make smart financial investments in sustainability.

Scope

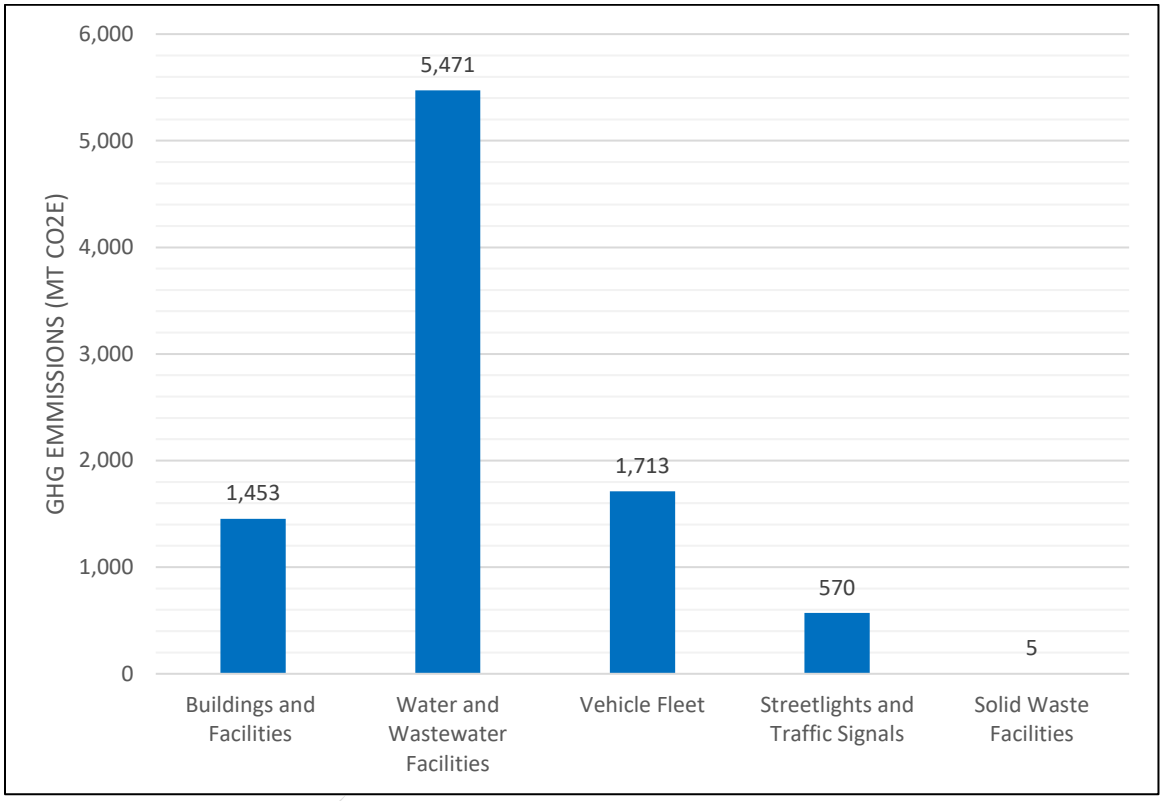
For this effort, the 2019 greenhouse gas emission inventory was created using the ICLEI (International Council for Local Environmental Initiatives) online inventory tool. This tool converts sources of energy consumption into CO2 equivalents to allow for a comparison of the relative emissions from different vehicles, fuels, and energy sources that might be used by a municipality. Since this was the first year the City elected to conduct an inventory, the 2019 inventory is based on the government operations track. This means that the 2019 inventory estimates the emissions from City government activities such as water and sewer utilities, public facilities, the City vehicle fleet, and City-owned infrastructure. In technical terms, only Scope 1 and Scope 2 emissions were considered in this effort. The EPA defines Scope 1 emissions as direct greenhouse (GHG) emissions that occur from sources that are controlled or owned by an organization (e.g., with fuel combustion in boilers, furnaces, vehicles. etc). Scope 2 emissions are indirect GHG emissions associated with the purchase of electricity from a third party. The City may consider examining broader community scale emissions in the future, but this effort was targeted to directly examine municipal government operations.

All values for greenhouse gas emission in this report are listed in metric tons (MT) of CO2 equivalents. This is an international standard for comparison and is the basis for emissions reporting in the ICLEI tool. For reference, one metric ton of CO2 is roughly equivalent to the emissions from driving an average passenger car 2500 miles, or the electrical use from 5.5 homes for one year.

1.1 Emissions Inventory Results and Discussion

Based on the results of this emissions inventory, the City of Tarpon Springs municipal government operations generated the equivalent of 9,212 tons of CO2 in 2019. These emissions were primarily created via purchased power from the local electric utility (Duke Energy), and consumption of fuels such as gasoline, diesel, and natural gas for various municipal activities.

Figure 1: City of Tarpon Springs Greenhouse Gas Emissions



The largest sector for municipal emissions was the operation of the water and wastewater treatment facilities at 5,471 tons of CO2e, or 59% of the City governments' emissions. These emissions were created via the energy consumption required to treat and convey water and wastewater within the public utilities. The energy requirements for water and wastewater treatment are unique to each City, and are based on a variety of local factors, such as source water quality, treatment techniques, and the layout of the City utility system itself.

The second largest emissions sector was the City vehicle fleet, which contributed 19% of City government emissions. The third largest emissions sector was municipal buildings and facilities, a category that includes power consumption at various general government buildings, such as City Hall, fire stations, recreation facilities, and the public works facility. These buildings and facilities contributed approximately 16% of municipal emissions. Finally, City owned streetlights, traffic signals, and the City yard waste facility contributed the remaining 6% of City government

emissions. A summary of Tarpon Springs' government track emissions inventory is provided below.

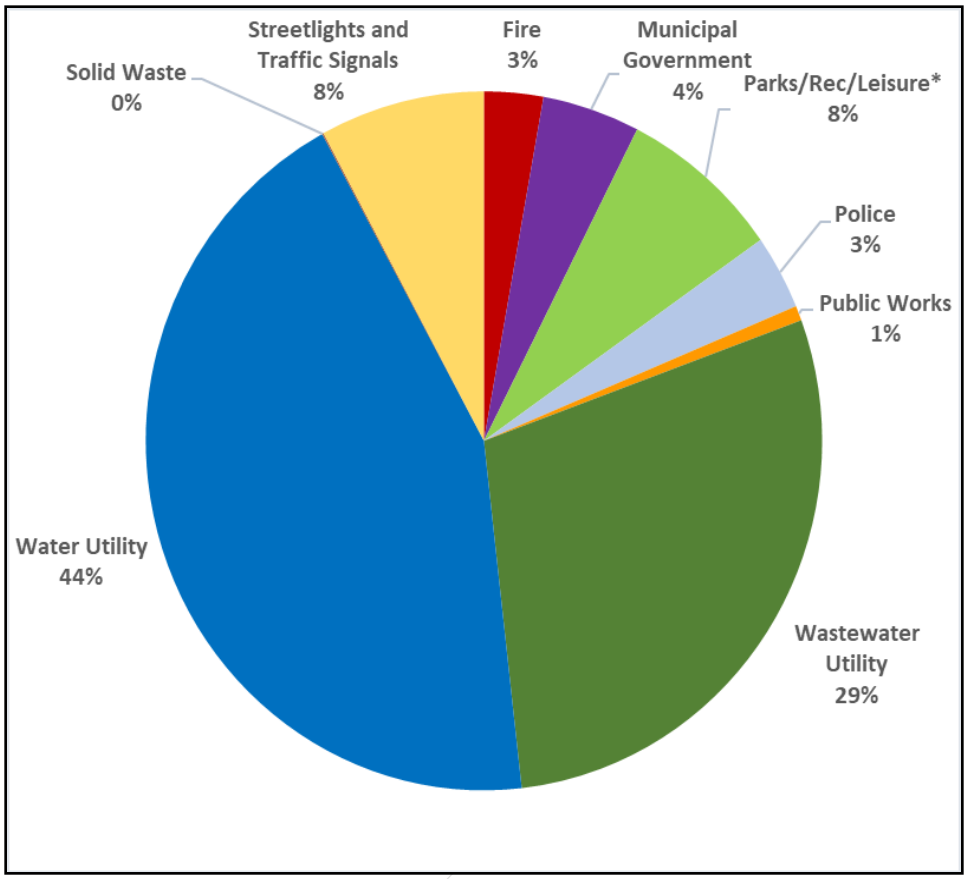
Electrical Power Consumption

When many people think of emissions, they immediately think of the tailpipe of a car or truck. However, remote emissions from power generation plants can easily outweigh the local emission from vehicles in local government operations. That is the case in Tarpon Springs. The four emissions sectors dominated by electrical power consumption (municipal buildings, the water and wastewater utilities, streetlights, and the solid waste facility) account for 82% of City government emissions. In 2019, these emissions were largely generated via electrical consumption from the City's local power provider, Duke Energy. Grid electricity emission from City operations are almost entirely dependent on the total kilowatt-hours of electricity consumed by the City, and the relative emissions from the power generation mix provided by the electrical utility. The City has limited ability to influence the power generation mix of the electric utility, so any effort to lower emissions from these source must come from reductions in electrical power use from the grid. A good first step toward this goal is examining power use in the various municipal services. Table 1 and Figure 2 below provide a breakdown of the relative electrical power consumption of various components of the City government in 2019.

Table 1: City of Tarpon Springs Electrical Consumption

Category	Electrical Consumption (kWh)
Fire	447,001
Municipal Government	737,770
Parks/Rec/Leisure	1,228,901
Police	546,436
Public Works	108,983
Wastewater Utility	4,560,780
Water Utility	6,938,879
Solid Waste	11,027
Streetlights and Traffic Signals	1,244,979
Grand Total	15,824,756

Figure 2: City of Tarpon Springs Relative Electrical Consumption



*Parks/Rec/Leisure includes the golf course, parks, rec center, cemetery, and similar facilities regardless of department.

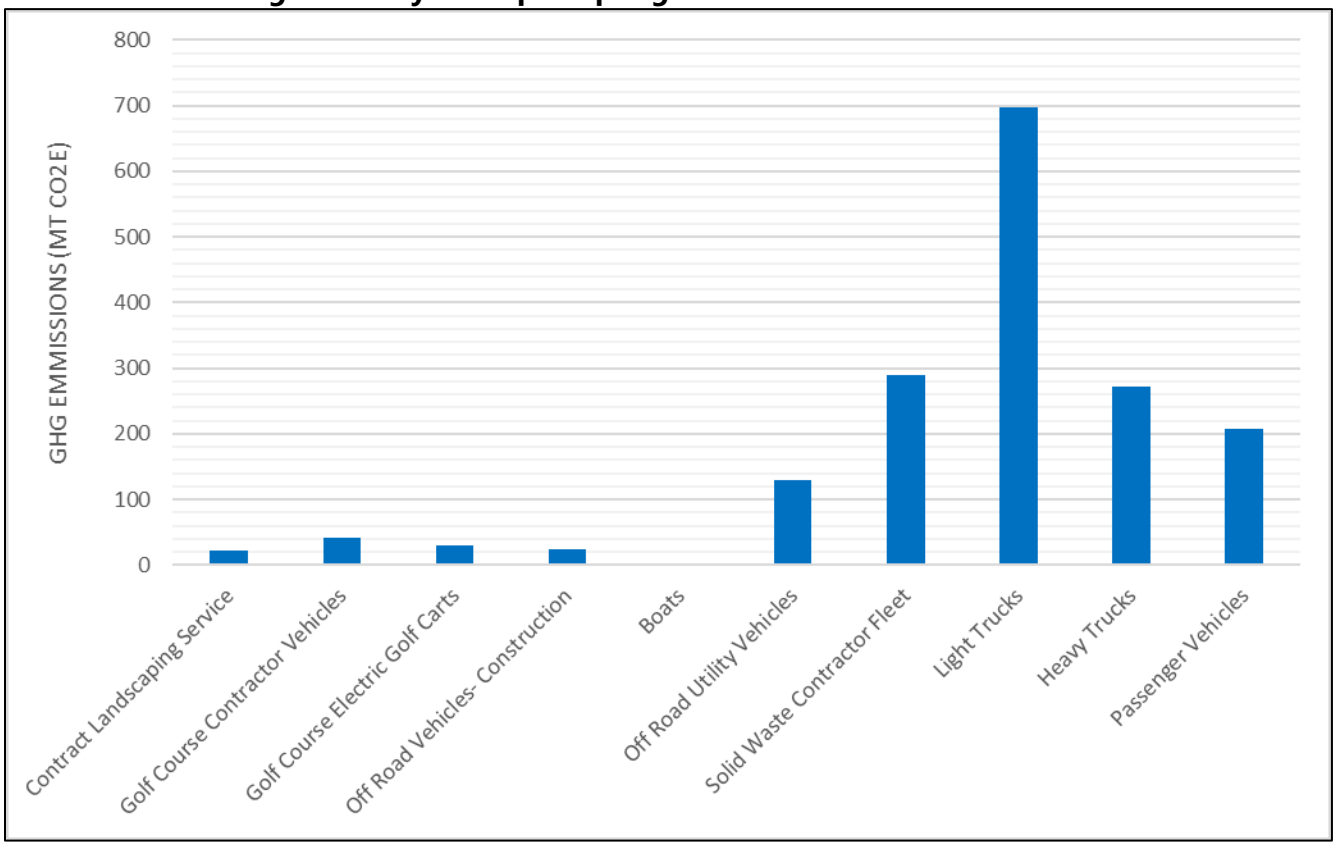
The water and wastewater utilities dominate the electrical demand in the City. The City operates a Reverse Osmosis Water Treatment Plant, which provides treated desalinated water from brackish groundwater sources. This is a relatively new facility, but RO treatment does typically have relatively high energy demands, which are largely dictated by the salinity of the source water. The City has already taken steps to provide renewable energy to this facility, with a large solar energy project coming online in 2020, and additional phases currently in design. In addition, the City wastewater utility also operates the City's Advanced Wastewater Treatment Plant (AWWTP). This is an older facility designed in the 1980s. It has been upgraded significantly, but there may be additional room for energy efficiency improvements as older equipment is replaced. Overall, tracking the energy use by the water and wastewater utilities over time will be important to any emissions reduction initiative at the City. It will also be important to normalize energy consumption at these facilities for the volumes of water treated, so that variation in rainfall or water demands from year to year can be accounted for.

Vehicle Fleet

After electrical consumption, direct emissions by the City vehicle fleet represents the second largest source of emissions in City government operations, accounting for over 1700 MT of

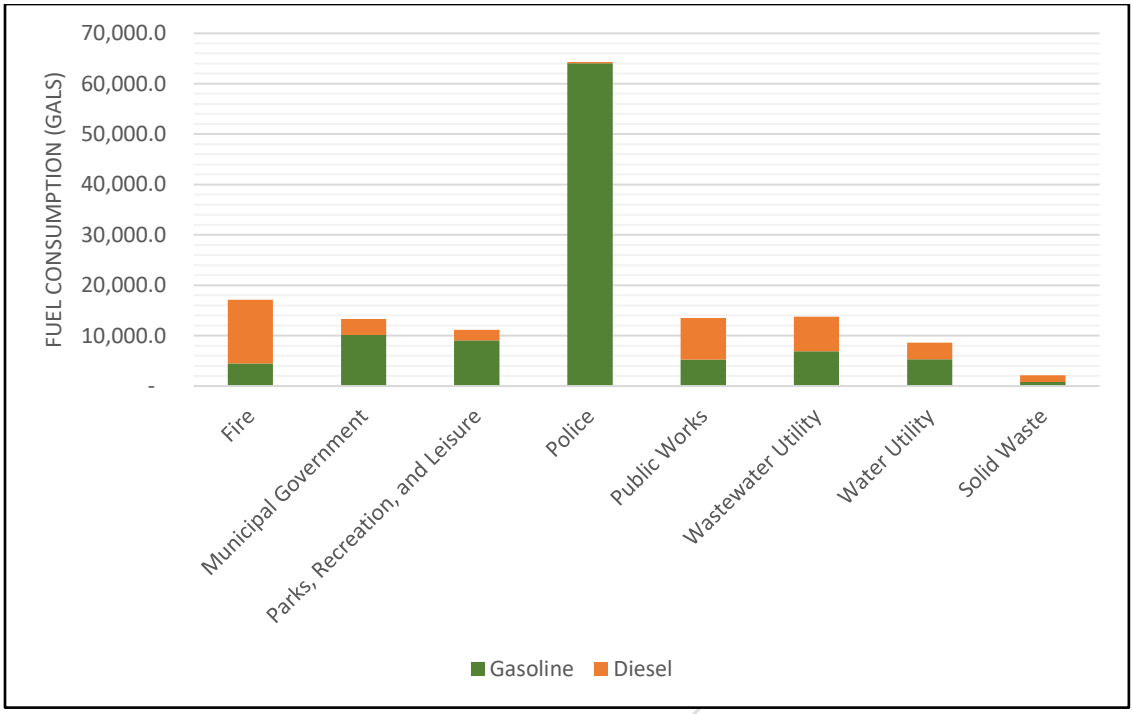
CO2e, or 19% of City emissions. Emissions from light trucks across all departments are the largest source of emissions within the City vehicle fleet, accounting for 41% of emissions. This category includes both traditional pickup trucks, but also light and heavy SUVs. Similarly, City-owned heavy trucks and passenger vehicles account for an additional 16% and 12% of fleet emissions respectively. Thus road-going City vehicles account for over 70% of fleet emissions, representing the largest potential area for emissions reductions.

Figure 3: City of Tarpon Springs Vehicle Fleet Emissions



The variety of roadgoing vehicles in the City is quite diverse, even within each vehicle category. For example, the light trucks category includes vehicles ranging from one-ton pickup trucks used for construction, to SUV police cruisers, to small SUVs that operate as passenger vehicles. Many of these vehicles serve specialized roles in the City, and potential for migration to higher-efficiency vehicles, hybrids, or electric vehicles will need to be examined within each department over time. Figure 4, below, provides a breakdown of vehicle fuel use within several government sectors in the City. The police department is the top fuel user in the City, with over 60,000 gallons of fuel use in 2019. The police department also operates the largest vehicle pool in the City, with 76 vehicles listed. Potential exists for fuel efficiency improvement over time, but hybrid and EV police vehicles are still an emerging technology, and any future police vehicle program would need to ensure there is no loss of function for critical public safety roles.

Figure 4: City of Tarpon Springs Vehicle Fleet Fuel Consumption



After the police department, the next largest sectors for fleet fuel consumption were the fire department, wastewater utility, public works (roads, streets, and stormwater only), and then general municipal government. It is noteworthy that with the exception of diesel consumption for the fire trucks (10,000 gal/yr), the vast majority of the fuel use in these activities is consumed by light trucks (over 14,000 gal/yr). Although some of these vehicles are specialized and have limited potential for higher efficiency alternatives (sewer vacuum truck, boom trucks for construction, etc), general use light trucks may represent an area of strong potential for improvement in efficiency over time. Light trucks are an emerging area for hybrid vehicle and EV development, and a long-term program to include EV trucks in the vehicle fleet could become feasible in the next several years as new EV truck options come to market and EV prices become more cost-competitive.

Conclusions and Recommendations

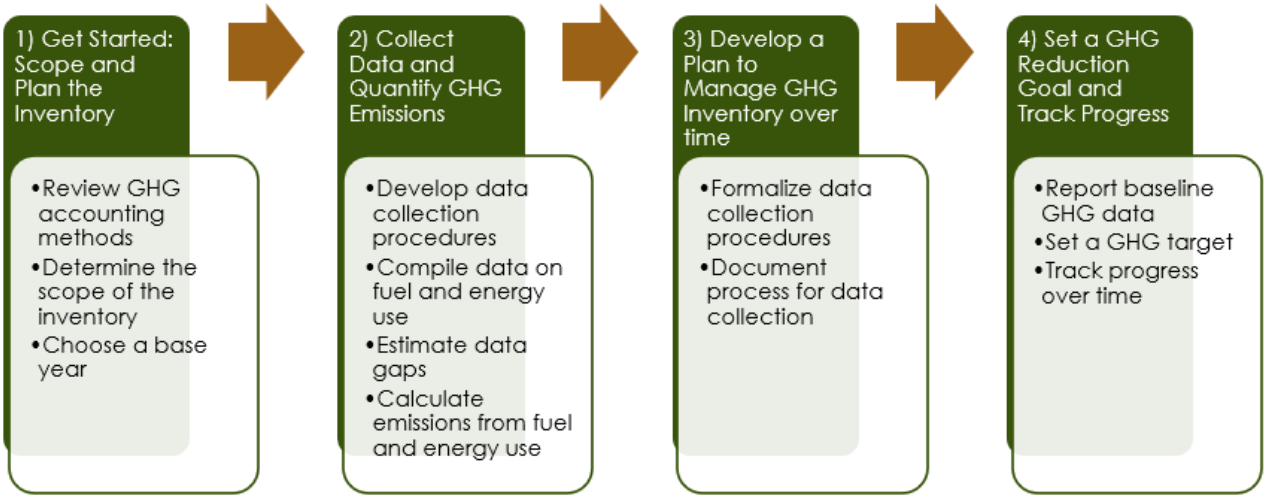
Based on the results of this baseline inventory, the water and wastewater utilities and the vehicle fleet represent the largest sources of City GHG emissions and thus have the largest potential for emission reduction over time. Other sectors of City government are also significant, and could provide opportunities for smaller scale changes that would reduce emissions as well. The following considerations and solutions are provided as a starting point for a potential GHG reduction program:

- **Evaluate potential for additional solar energy capacity at the RO Treatment Plant.** The Public Services Department has made considerable strides to reduce grid electricity consumption by installing a solar energy system onsite in 2020. This will be evaluated in the 2020 GHG inventory and a second phase of solar installation is in progress currently. To further reduce grid electricity consumption, additional solar energy capacity can be considered along with other renewable energy options.
- **Evaluate the potential for electrical efficiency improvements and offsite solar energy production for the AWWTF.** The AWWTF has been heavily upgraded with modern electrical drives and pumps over its lifetime, but due for upgrades to its electrical system in coming years, which may provide some energy savings. Additionally, the potential replacement of the original mechanical aeration system with a modern diffused air system could result in significant energy savings. Finally, offsite solar energy production could be considered to offset energy demand at this facility.
- **Consider a pilot program for testing and integrating EVs into the vehicle fleet.** Small trucks, SUVs, and passenger vehicles combine to account for the majority of fuel consumption in the City. Options for new commercial EVs are rapidly coming to market, and developing a program to pilot new EVs and slowly phase in EVs to the fleet over time could result in large fuel and monetary savings.
- **Create a staff work team to develop and implement projects and programs to reduce electrical power and fuel use over time.** There may be room for considerable improvements in areas of the City government with smaller GHG emissions footprints. The City is currently working to develop a staff level work team to develop ideas and projects for improvements in efficiency over time across the various departments.
- **Develop a system to evaluate projects and programs for emissions reduction.**
- **Consider implementing procurement practices that include emissions reducing practices.**
- **Consider expanding upon the 2019 inventory to conduct a more in-depth evaluation of vehicle fuel consumption by department.**

Policy Development and Next Steps

This greenhouse gas emissions inventory represents a first step in quantifying the City's greenhouse gas emissions in an actionable way and provides a baseline for measuring emissions over time. The following steps adapted from EPA guidance provide a logical roadmap for the creation and implementation of a greenhouse gas reduction program:

Figure 5: The GHG Inventory Development Process



The broader task for the City at this time is to create a City GHG reduction target as a matter of policy and create a plan to achieve that target. The City is currently developing a Sustainability Action Plan, and establishing a GHG emission reduction goal is being considered as a component of this plan. Should the City elect to proceed with a GHG reduction program, the following steps provide a reasonable path forward:

1. Provide the results of the 2019 GHG Inventory to City management and staff for consideration.
2. Create a 2020 GHG Emissions inventory and report findings.
3. Create a long term GHG emission projection over several years based on future growth.
4. Set a GHG emissions target as a matter of policy with a specific level of reduction and a target year.
5. Work with the new staff sustainability team to develop specific projects and actions to reduce energy and fuel use to achieve the target.
6. Develop key performance indicators for certain major emissions reduction program components.
7. Continue to track progress via annual GHG inventory reports.

Historically, the City of Tarpon Springs has made considerable effort in improving the sustainability of City government operations and implemented many environmentally beneficial programs. The City has built out a reclaimed water system and developed the RO Water Treatment Plant to conserve local water resources, implemented large scale solar energy projects, and is now leading area municipalities in developing a government-scale GHG inventory. This 2019 inventory represents the first step for the City to expand its environmental initiatives toward energy and climate sustainability. The City can build on this step by setting goals for emission reductions, using data-based decision-making to improve efficiency and reduce energy use, and making smart investments to help build a more sustainable City over time and provide climate leadership to its citizens and the surrounding communities.

2 Buildings and Facilities

The buildings and facilities category is the most diverse emissions sector in the Tarpon Springs emission inventory. This encompasses many core municipal services provided by the city, including the City Hall, Fire Department, Police Department, and various recreational facilities. This sector is focused heavily on electrical consumption in various city facilities and buildings. The vehicle fleet for various departments, as well as the water, sewer, and solid waste services are accounted in other sections of this report.

2.1 Key Emissions Sources

The key sources of emissions for the Building and Facilities categories are:

- **Electric Power Transmission and Distribution Losses –** Electricity consumed in the electrical grid to serve the connected buildings and facilities
- **Stationary Fuel Consumption-** Fuel consumed at emergency generators for municipal facilities

The primary source of data for the buildings and facilities category was City-wide electrical power use data compiled from account-level billing data. To ensure that the electrical and emission data would be useful and easy to assess, the various department accounts were rolled into summary categories. These categories are summarized below.

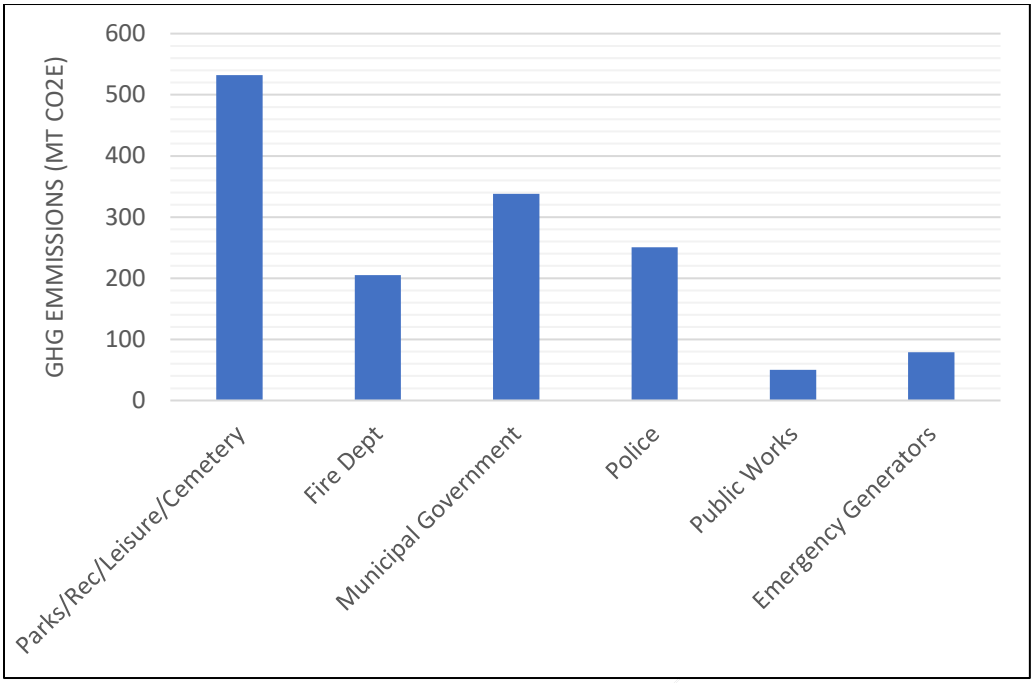
Table 2: Building and Facility Electrical Accounts

Category	Electrical Accounts	Notes
Fire	• Fire Department	Primarily fire stations
Municipal Government	• Information Technology • City Clerk • Non-Department facilities (City Hall, fleet maintenance, etc) • CRA • Utility Billing • Collection Center	
Parks, Recreation, and Leisure	• Recreation • Parks and Parkways • Cemetery • Library • Cultural Services • Heritage Center • Safford House • Train Depot • Golf Course	This category includes both Public Works and Public Services accounts.
Police	• Police Department	Includes the Public Safety Building
Public Works	• Marina • Storm Water	Roads and Streets accounts are summarized in the "Street Lights and Traffic Signals" category

2.2 Results

Overall, the various City buildings and facilities combine to represent the third largest source of greenhouse gas emissions in the City. These facilities combine to account for approximately 1,454 MT of CO2e emissions, or about 16% of the total emissions of the City government. Emissions from grid electricity were the largest source of emissions within this category at over 90% of emissions. Fuel use from emergency generators was relatively minor, representing less than ten percent of emissions for this category.

Figure 6: City of Tarpon Springs Building and Facility Emissions



Emissions from the parks, recreation, and leisure sector contributed significantly to this category, at over 500 MT of CO2e emissions. This largely reflects the large and diverse number of recreational buildings featured in the City. Among the remaining categories, emissions were largely related to the size of City facilities, with larger buildings such as the public safety building, library, and community center using more energy than smaller facilities like the golf course clubhouse. This is likely due to the increased energy consumption needed for climate control and lighting. In general, this category is quite diverse, and a general emphasis on energy efficiency, HVAC, and lighting will likely be a key strategy to reduce emissions in this sector.

3 Water and Wastewater Treatment Facilities

The water and wastewater treatment facilities category is the largest energy and emissions sector in the City of Tarpon Springs, and also the most unique. This sector includes the recently constructed Reverse Osmosis Water Treatment Plant and the Tarpon Springs Advanced Wastewater Treatment Facility, as well as the related infrastructure for raw water production (wells), water distribution, the wastewater collection system, and the reclaimed water system. Electrical consumption in these facilities is higher than in other areas of the city government due to the large pumps and electrical motors needed to move and treat large volumes of water. This sector also has additional fuel needs for emergency pumps and generators and some unique emissions sources in the wastewater treatment process.

The energy consumption of water and wastewater facilities is unique to each city and is influenced by local factors such as water quality, the types of customers and population served, the level of treatment required for environmental compliance, and even the geographic layout of the City. As the largest energy use sector of the City government, the water and wastewater utilities represent a unique opportunity for efficient operation.

3.1 Key Emissions Sources

The key sources of emissions for the Building and Facilities categories are:

- **Electric Power Transmission and Distribution Losses –** Electricity consumed in the electrical grid to serve the connected buildings and facilities
- **Stationary Fuel Consumption-** Fuel consumed at emergency generators and pumps for municipal facilities
- **Wastewater Treatment N2O Emissions** - emissions of nitrogen released to the atmosphere from wastewater treatment
- **Wastewater Treatment Plant Effluent Discharge N2O Emissions** – downstream emissions of N2O from treated reclaimed water returned to the environment

The primary source of data for water and wastewater treatment facilities category was electrical power use data compiled from account-level billing data. To ensure that the electrical and emission data would be useful and easy to assess, the various accounts were compiled as follows:

Table 3: Water and Wastewater Facility Electrical Accounts

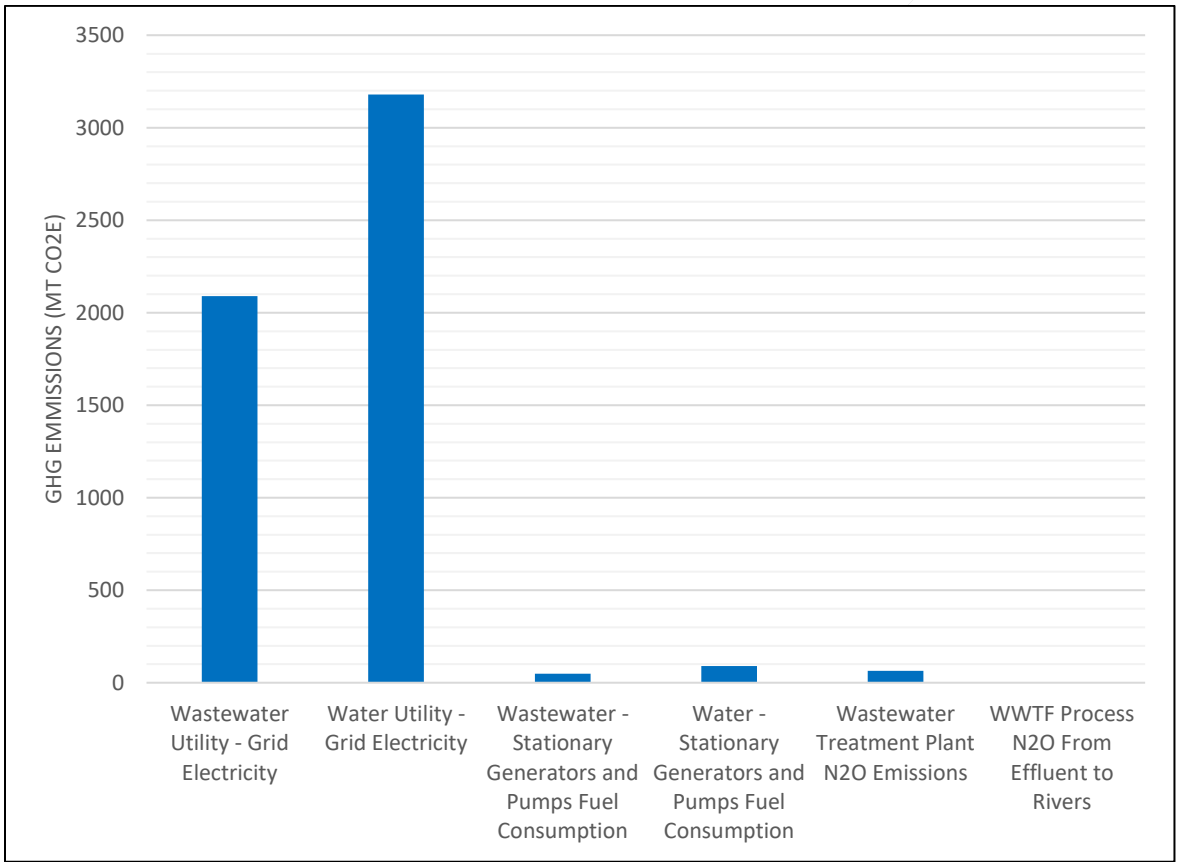
Category	Electrical Accounts
Wastewater Utility	• Wastewater Treatment Facility • Sewage Collections • Sewage Lift Stations
Water Utility	• Water Treatment Plant • Water Wells/Supply

Finally, it is noteworthy that the water and wastewater utilities each maintain their own vehicle fleets for maintenance and field activities. Due to the structure of the ICLEI tool, the utility vehicles emissions were included in the overall City vehicle fleet in Chapter 4 of this report.

3.2 Results

The water and wastewater utilities are the largest source of emissions from City operations, at a total of 5472 MT of CO2e emissions, or about 59% of the total emissions. Emissions in this area are dominated by the electrical consumption at the RO Water Treatment Plant and Advanced Wastewater Treatment Plant, which combined total 5269 MT of CO2e emissions. Other minor sources of emissions include fuel use for emergency generators and pumps, and the unique N2O emissions from wastewater treatment. The smaller emissions sources represent only 208 MT of CO2e emissions total, which is minor in relation to the emissions from grid electricity.

Figure 7: City of Tarpon Springs Water and Wastewater Facility Emissions



Reverse Osmosis Water Treatment Plant

The City's Reverse Osmosis Water Treatment Plant is the largest user of electricity in the City, and produces up to 2.8 million gallons per day of fresh potable water to meet City water needs. Individually, the water utility accounted for about one third of total City GHG emissions. The

electrical consumption at the RO plant is driven by total City water demands, and the level of treatment required to produce potable quality water. In general, energy demands for reverse osmosis treatment are closely linked to the salinity of the source water for the plant, and in this case, the City of Tarpon Spring's locally available source water is predominantly brackish groundwater due to the City's proximity to the coast. As such, energy needs for water treatment will be higher for the City in relation to other utilities with fresher water sources that require less treatment.

In comparison to other desalination facilities, the RO Water Treatment Plant was constructed relatively recently in 2016, and took advantage of recent advances in energy efficient RO membranes, pumps, and electrical components. The RO Water Treatment plant also employs an energy recovery system within the facility to further increase energy efficiency. As the facility is still relatively new and was designed to maximize energy efficiency in the treatment and electrical systems, options for large improvements in efficiency at this facility may be limited. Any significant reductions in emissions would likely require substituting a lower emissions energy source such as solar power in place of existing grid electricity. The City has already completed the first phase of a solar energy project at the RO plant in 2020, and is currently implementing a second phase of solar power development. Future inventories will be able to document reductions in emissions from this new renewable energy resource.

Advanced Wastewater Treatment Facility

The City's Advanced Wastewater Treatment Facility is the second largest consumer of electricity in the City, and provides treatment for approximately two million gallons per day of wastewater from the City's service area. Similarly to the water plant, the energy requirements for the wastewater facility are closely related to the wastewater flows produced by the customers, as well as the treatment requirements to meet FDEP water quality standards. The main sources of energy consumption in the wastewater facility are pumps and mixers to convey water within the facility, and electric aerators to provide oxygen to the wastewater for the treatment process.

The wastewater facility is an older facility from the late 1980s that has been heavily upgraded with modern electrical drives and pumps. The facility is due for considerable upgrades to its electrical system over the next several years, which may provide some energy savings and emissions reductions. An additional update that could be considered in the future is the replacement of the original mechanical aeration system with a modern diffused air system, which can result in significant energy savings. At present, the wastewater facility has relatively little available space for solar energy development, but offsite solar energy production could be considered to offset energy demand at this facility.

4 Vehicle Fleet

The third largest, and one of the most visible and intuitive emissions sectors in the City of Tarpon Springs, is the municipal vehicle fleet. The Tarpon Springs vehicle fleet is quite diverse, and ranges from police cruisers and fire engines to heavy construction equipment to the golf cart fleet at the municipal golf course. The majority of road-going vehicles in the City are still conventional gas or diesel powered vehicles that produce direct Scope 1 emission from burning fuel during operation. The vehicle fleet in the ICLEI inventory system also includes small engines and off-road vehicles such as lawn mowers, gas-powered lawn tools, and utility vehicles. Additionally, City staff elected to include the City's solid waste contractor, Waste Management in this inventory.

4.1 Key Emissions Sources

The key sources of emissions for the Building and Facilities categories are:

- **Fleet Vehicle Emissions (Fuel)-** Direct emissions from fuel consumption from City vehicles (cars, trucks, SUVs)
- **Emissions from Offroad Vehicles (Fuel) –** Direct emissions from fuel consumption from City construction equipment, off-road UTVs, landscaping equipment, and other small engine equipement
- **Fleet Vehicle Emissions (Electric)-** Emissions from grid electricity used to power city electric vehicles

Fuel consumption from the City-owned fuel station at the public works yard was the primary source of data for the vehicle fleet emissions sector. Fuel use is tracked for each vehicle, and fuel use data was categorized for various vehicle types and according to fuel type (diesel vs gasoline). Additionally, in 2019, the City golf cart fleet was the largest user of electric vehicles in the City, so electrical use at the golf course for cart charging was included in this category. Finally, the City included fuel use information provided by its solid waste and landscaping contractors.

The city vehicle fleet in 2019 included 289 individual gas and diesel vehicles and fuel use cards for small engine equipment. Light trucks, including small SUVs, were the most common vehicle in the City, with small utility vehicles (UTVs, landscape equipment, etc) being the second most common. Light trucks also used the most total fuel in the vehicle fleet at over 78,000 gallons of combined gasoline (E89 ethanol) and diesel use. Heavy trucks were the second largest fuel use sector at over 27,000 gallons of combined gasoline and diesel use. The following tables provides a breakdown of the various vehicles included in the 2019 emissions inventory, as well as fuel use by vehicle class.

Table 4: City of Tarpon Springs Vehicle Fleet

	Boat	Construction	Heavy Truck	Large Utility	Light Truck	Passenger	Small Utility	Total
Fire	1	0	5	1	9	1	4	**21**
Municipal Government	0	0	0	0	24	2	4	**30**
Parks, Recreation, and Leisure	0	0	4	0	19	0	40	**63**
Police	0	0	1	1	41	33	0	**76**
Public Works	0	10	11	0	7	0	4	**32**
Wastewater Utility	0	4	7	0	14	0	9	**34**
Water Utility	1	2	2	0	16	0	7	**28**
Solid Waste	0	1	0	0	2	0	2	**5**
Total	**2**	**17**	**30**	**2**	**132**	**36**	**70**	**289**

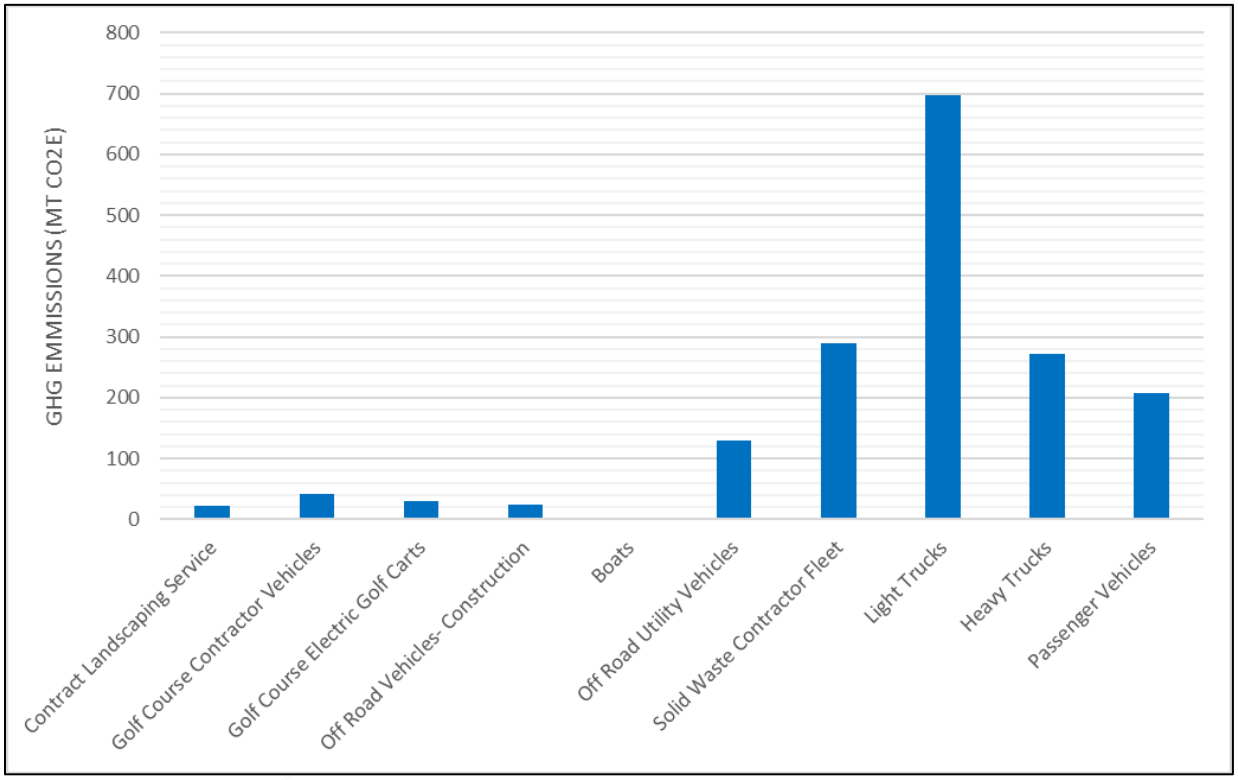
Table 5: Vehicle Fleet Fuel Consumption by Vehicle Class

Equipment Type	E-89 Ethanol (gals)	Dyed Diesel (gals)
Boat	31	-
Construction	82	2,343
Heavy Truck	3,115	24,003
Large Utility	-	2,023
Light Truck	76,296	2,125
Passenger	23,393	-
Small Utility	3,189	7,418
Total	**106,106**	**37,912**

4.2 Results

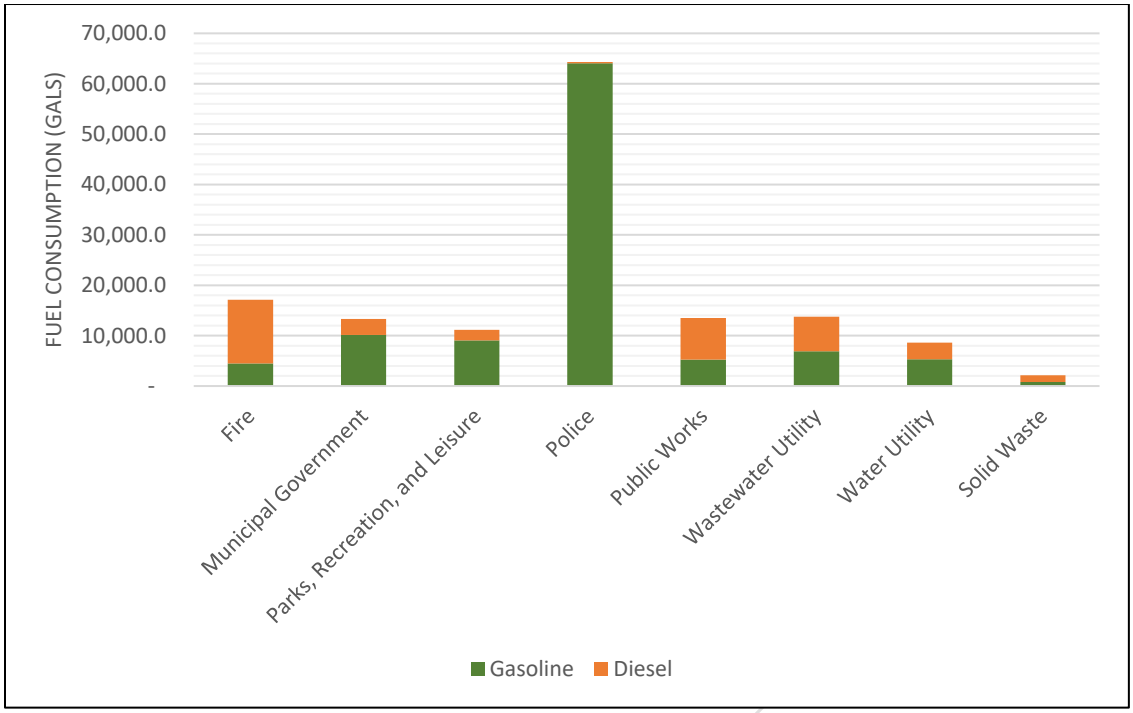
Direct emissions by the City vehicle fleet represents the second largest source of emissions in City government operations, accounting for over 1700 MT of CO2e, or 19% of City emissions. Emissions from light trucks (including SUVs) across all departments are the largest source of emissions within the vehicle fleet, accounting for 41% of vehicle emissions. When light trucks, heavy trucks, and passenger vehicles are considered together, these road-going City vehicles account for over 70% of fleet emissions, representing the largest potential area for emissions reductions.

Figure 8: City of Tarpon Springs Vehicle Fleet Emissions



The City maintains a diverse vehicle fleet, even within each vehicle category. For example, the light trucks category includes vehicles ranging from one-ton pickup trucks used for construction, to SUV police cruisers, to small SUVs that operate as passenger vehicles. Many of these vehicles serve specialized roles in the City, and potential for migration to higher-efficiency vehicles, hybrids, or electric vehicles will need to be examined within each department over time. Figure 9, below, provides a breakdown of vehicle fuel use within several government sectors in the City. The police department is the top fuel user in the City, with over 60,000 gallons of fuel use in 2019. The police department also operates the largest vehicle pool in the City, with 76 vehicles listed. Potential exists for fuel efficiency improvement over time, but hybrid and EV police vehicles are still an emerging technology, and any future police vehicle program would need to ensure there is no loss of function for critical public safety roles.

Figure 9: City of Tarpon Springs Vehicle Fleet Fuel Consumption



After the police department, the next largest sectors for fleet fuel consumption were the fire department, wastewater utility, public works (roads, streets, and stormwater only), and then general municipal government. It is noteworthy that with the exception of diesel consumption for the fire trucks (10,000 gal/yr), the vast majority of the fuel use in these activities is consumed by light trucks (over 14,000 gal/yr). Although some of these vehicles are specialized and have limited potential for higher efficiency alternatives (sewer vacuum truck, boom trucks for construction, etc), general use light trucks may represent an area of strong potential for improvement in efficiency over time. Light trucks are an emerging area for hybrid vehicle and EV development, and a long-term program to include EV trucks in the vehicle fleet could become feasible in the next several years as new EV truck options come to market and EV prices become more cost-competitive.

Golf Course Electric Vehicles

The City-owned municipal golf course is currently the largest operator of electric vehicles in the city, with an all-electric fleet of 75 golf carts. Indirect emissions from these golf carts was only 31 MT of CO_2e, or 2% of total vehicle emissions. The electric golf cart fleet demonstrates the high efficiency and potential for lower emissions with small electric utility vehicles. An effort to replace older gas UTVs with electric carts and UTVs could help to save money on fuel use and reduce emissions over time in other departments.

Contractor Fleet and Fuel Consumption

In addition to the City-owned vehicle fleet, the City also utilizes contractors for certain municipal activities. Although this would typically be a Scope 3 item (an source of emissions outside of the scope of a local government operations scale emissions inventory), the City elected to include fuel use by its solid waste contractor as well as smaller landscape and maintenance contractors for the golf course and public facilities.

Solid waste service is offered by the City and administered through a direct city contractor, in this case Waste Management. Waste Management tracks fuel use on its various routes, and provided the City with a summary of fuel use for Tarpon Springs routes for 2019. Emissions from the solid waste fleet accounted for about 17% of fleet emissions. It should be noted that Waste Management has been proactive in developing a lower-emissions fleet, and over 70% of the routes served in Tarpon Springs were served by garbage trucks that run on compressed natural gas. Compressed natural gas is a lower-emissions fuel than diesel and helps reduce the City's overall vehicle emissions. This demonstrates that in the future, the City can also utilize its procurement process for contracted services to hire contractors that use lower emissions technologies to improve the City's GHG emissions over time.

Public Transit

Public Transit can be a large component of municipal government fleet operations, as well as a key method to help reduce vehicle emissions within a community. The City of Tarpon Springs is served by the Pinellas Suncoast Transit Authority, and does not operate a public transit fleet at this time. For the 2019 inventory, public transit was not included, as this inventory was focused on City of Tarpon Springs government operations. Public transit may be revisited in future assessments with expanded scopes.

5 Streetlights and Traffic Signals

Streetlights and traffic signals are small consumers of electricity individually but can collectively contribute significantly to overall municipal electrical consumption due to their prevalence throughout city roads and intersections. The City has 77 electrical meters assigned to various lights, traffic signals and remote public works locations throughout the City. Lighting is one area of significant improvement in energy efficiency over the last decade, with energy-efficient LED lights coming to market for many uses. As such, street lighting and traffic signals may represent an opportunity for future energy savings.

5.1 Key Emissions Sources

The key sources of emissions for the Building and Facilities categories are:

- **Electric Power Transmission and Distribution Losses –** Electricity consumed in the electrical grid to serve the connected facilities

The primary source of data for the solid waste category was electrical power use data for the various electrical meters for streetlights and traffic signals. 78 electrical accounts in the Public Works Department were included in this assessment.

5.2 Results

Streetlights and traffic signals were a relatively small category for emissions within City operations. Total emissions were 570 MT of CO2e emissions in 2019, or about six percent of total emissions. Due to the relative simplicity of electrical consumption in this category, street lights may represent one area for potential improvement. Additional investigation into the age and types of lights employed by the City may reveal an opportunity for improved efficiency as lights and infrastructure are replaced over time.

6 Solid Waste Facilities

Solid waste facilities can be a significant source of greenhouse gas emissions in municipal government operations. Typical sources of emissions from solid waste facilities can include methane emissions from landfill gas, CO2 emissions from flaring of landfill gas, and CO2 emissions from composting operations. The City currently outsources solid waste disposal to its contractor, Waste Management, so active landfill operations were outside the scope of this study. The City does maintain a closed landfill, but this facility has been closed for many years, and annual monitoring indicates that ongoing emissions are minimal. The City still operates a small yard waste transfer station at the landfill location that was assessed in this inventory.

6.1 Key Emissions Sources

The key sources of emissions for the Building and Facilities categories are:

- **Emissions from Grid Electricity-** Electric power consumption in the City yard waste facility

The primary source of data for the solid waste category was electrical power use data for the yard waste facility. Additionally, fleet emissions from the contracted Waste Management solid waste fleet were included in the Vehicle Fleet category (Section 4 of this report).

6.2 Results

The City yard waste facility generated only 5 MT of CO2e emissions in 2019, which is the smallest emissions category in the City. Emissions from solid waste disposal likely represent a significant source of emissions, but are currently outside of City operations. Emissions from solid waste disposal could be included in future inventories if the City elects to conduct a community scale inventory.

7 Conclusions and Recommendations

Based on the results of this baseline inventory, the water and wastewater utilities and the vehicle fleet represent the largest sources of City GHG emissions and thus have the largest potential for emissions reduction over time. Other sectors of City government are also significant, and could provide opportunities for smaller scale changes that would reduce emissions as well. The following considerations and solutions are provided as a starting point for potential GHG reduction program:

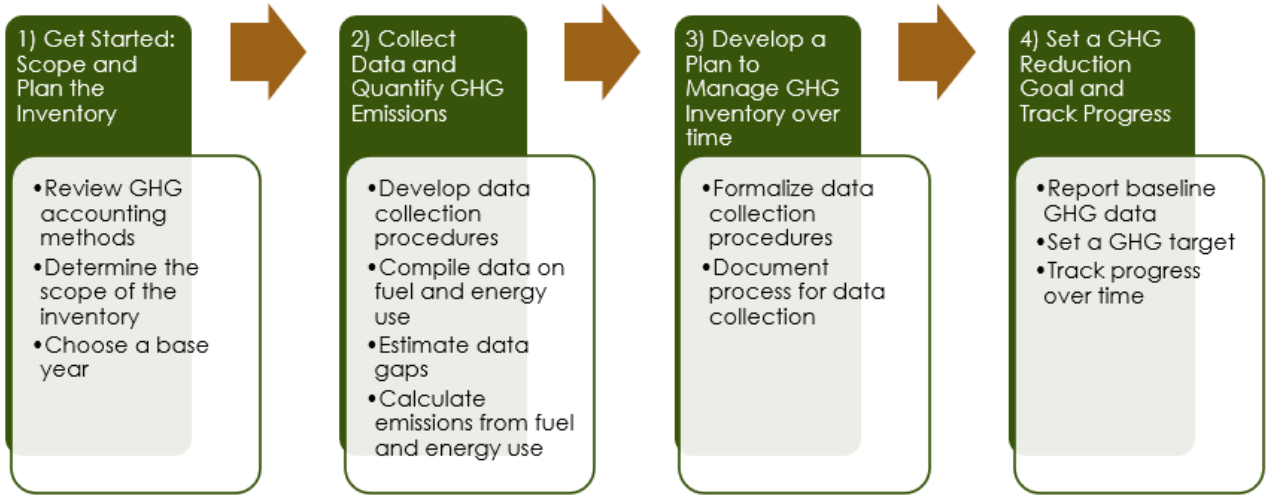
- **Evaluate potential for additional solar energy capacity at the RO Treatment Plant.** The RO Treatment plant is the largest consumer of electricity of City facilities. This is inherent to the reverse osmosis treatment method, which is a relatively energy-intensive treatment technique, which is necessary to treat the brackish groundwater which is the City water supply. The Public Services Department has made considerable strides to reduce grid electricity consumption by installing a solar energy system onsite in 2020. This will be evaluated in the 2020 GHG inventory and a second phase of solar installation is in progress currently. The facility was constructed in 2016, and should be relatively energy efficient from a treatment perspective. To further reduce energy consumption, additional solar energy capacity can be considered, although rooftop or offsite siting may be required.
- **Evaluate the potential for electrical efficiency improvements and offsite solar energy production for the AWWTF.** The wastewater utility is the second largest consumer of electricity in the City. This is an older facility from the late 1980s that has been heavily upgraded with modern electrical drives and pumps. The facility is due for considerable upgrades to its electrical system over the next several years, which may provide some savings. An additional update that could be considered in the future is the replacement of the original mechanical aeration system with a modern diffused air system, which can result in significant energy savings. Additionally, offsite solar energy production could be considered to offset energy demand at this facility.
- **Consider a pilot program for testing and integrating EVs into the vehicle fleet.** The vehicle fleet is the largest source of fuel-based emissions in the City. Small trucks, SUVs, and passenger vehicles combine to account for the majority of fuel consumption. This is an area of emerging options for the implementation of EVs and hybrid vehicles, and developing a program to pilot new EVs and slowly phase in EVs to the fleet over time could result in large fuel and monetary savings. Police vehicles and general use SUVs and trucks have large potential for emissions reductions as new EVs and specialized hybrids mature in the vehicle market.
- **Create a staff work team to develop and implement projects and programs to reduce electrical power and fuel use over time.** There may be room for considerable improvements in areas of the City government with smaller GHG emissions footprints. Many of the different operational areas of the City government have specialized equipment and operations that can best be evaluated within those departments. The City is currently working to develop a staff level work team to develop ideas and projects for improvements in efficiency over time.

- **Develop a system to evaluate projects and programs for emission reduction.**
- **Consider implementing procurement practices that include emissions reducing practices.** Including emissions, fuel efficiency, or energy efficiency in procurement standards could help the City to identify contractors using alternative fuels such as natural gas, or provide a incentive for City contractors to implement EVs or other emissions reducing practices over time.
- **Consider expanding upon the inventory to conduct a more in-depth evaluation of emissions rates from vehicle usage by each department.** Include a detailed report on city vehicles and their fuel consumption separated by department in order to evaluate which types of vehicles are contributing the most emission rates in an effort for the City to reduce these rates.

Policy Development and Next Steps

This greenhouse gas emissions inventory represents a first step in quantifying the City's greenhouse gas emissions in an actionable way. The 2019 emissions inventory provides a baseline for measuring emissions over time and provides valuable quantifiable information on fuel and energy consumption to determine the areas of municipal government operations with the most potential for future greenhouse gas emissions reductions. The next logical steps as part of a sustainability program relating to greenhouse gas emissions would be to develop City policies and goals for how to reduce emissions over time. The following steps adapted from EPA guidance provide a logical roadmap for the creation and implementation of a greenhouse gas reduction program:

Figure 10: The GHG Inventory Development Process



The City has already completed the first two steps of this process. The next step will involve documenting and formalizing the technical steps to create the City GHG inventory. This step is largely accomplished by this technical memo, and the process for managing the City GHG inventory can be accomplished via knowledge management and SOP creation with the implementation of the City's new internal Sustainability Coordinator position.

The broader task for the City at this time is to create a City GHG reduction target as a matter of policy and create a plan to achieve that target. The City is currently developing a Sustainability Action Plan, and establishing a GHG emission reduction goal is being considered as a component of this plan. Should the City elect to proceed with a GHG reduction program, the following steps provide a reasonable path forward:

1. Provide the results of the 2019 GHG Inventory to City management and staff for consideration
2. Create a 2020 GHG Emissions inventory and report findings.
3. Create a long term GHG emission projection over several years based on future growth.
4. Set a GHG emissions target as a matter of policy with a specific level of reduction and a target year.
5. Work with the new staff sustainability team to develop specific projects and actions to reduce energy and fuel use to achieve the target.
6. Develop key performance indicators (KPIs) for certain major emissions reduction program components. Some KPIs could be kWh/MGD of electrical use for water or wastewater utilities, or tracking the percentage of EVs and hybrid vehicles in the City fleet.
7. Continue to track progress via annual GHG inventory reports.

Over the last several years, the City of Tarpon Springs has made considerable effort in improving the sustainability of City government operations and implemented many environmentally beneficial programs. The City has built out a reclaimed water system and developed the RO Water Treatment Plant to conserve local water resources, implemented several small and large scale solar energy projects, and is now leading area municipalities in developing a government-scale GHG inventory. This 2019 inventory represents the first step for the City to expand its environmental initiatives toward energy and climate sustainability. The City can build on this step by setting goals for emission reductions, using data-based decision-making to improve efficiency and reduce energy use, and making smart investments in new technology to help build a more sustainable City over time and provide climate leadership to its citizens and the surrounding communities.

City of Tarpon Springs

First Annual Greenhouse Gas Emission Inventory – 2019

Appendix A: Methods and Data Sources

1. General Methods

For this effort, the 2019 greenhouse gas emission inventory was created using the ICLEI (International Council for Local Environmental Initiatives) online inventory tool. This tool converts sources of energy consumption into CO2 equivalents to allow for a comparison of the relative emissions from different vehicles, fuels, and energy sources that might be used by a municipality. Since this was the first year the City elected to conduct an inventory, the 2019 inventory is based on the government operations track. This means that the 2019 inventory estimates the emissions from City government activities such as water and sewer utilities, public facilities, the City vehicle fleet, and City-owned infrastructure. In technical terms, only Scope 1 and Scope 2 emissions were considered in this effort. The EPA defines Scope 1 emissions as direct greenhouse (GHG) emissions that occur from sources that are controlled or owned by an organization (e.g., with fuel combustion in boilers, furnaces, vehicles. etc). Scope 2 emissions are indirect GHG emissions associated with the purchase of electricity from a third party. The City may consider examining broader community scale emissions in the future, but this effort was targeted to directly examine municipal government operations.

All values for greenhouse gas emission in this report are listed in metric tons (MT) of CO2 equivalents. This is an international standard for comparison and is the basis for emissions reporting in the ICLEI tool. For reference, one metric ton of CO2 is roughly equivalent to the emissions from driving an average passenger car 2500 miles, or the electrical use from 5.5 homes for one year.

2. Buildings and Facilities

Electrical Power Consumption

The primary source of data for the buildings and facilities category was City-wide electrical power use data compiled from account-level billing data. This data was compiled into a twelve-month summary spreadsheet by the Finance Department, with each electric meter assigned to a department account for billing. Account-level included twelve months of electrical power use in kiloWatt-hours (kWh), based on electric bill statements. Based on data availability, the 2019 electric data contains information from July 2019 to June 2020. In the future, this information will be based on one fiscal year of electric power use.

To ensure that the electrical and emission data would be useful and easy to assess, the various department accounts were rolled into summary categories. These categories are summarized below.

Table A-1: Building and Facility Electrical Accounts

Category	Electrical Accounts	Notes
Fire	• Fire Department	Primarily fire stations
Municipal Government	• Information Technology • City Clerk • Non-Department facilities (City Hall, vehicle maintenance facility, etc) • CRA • Utility Billing • Collection Center	
Parks, Recreation, and Leisure	• Recreation • Parks and Parkways • Cemetery • Library • Cultural Services • Heritage Center • Safford House • Train Depot • Golf Course	This category includes both Public Works and Public Services accounts.
Police	• Police Department	Includes Public Safety Building
Public Works	• Marina • Storm Water	*Roads and Streets accounts are summarized in the "Street Lights and Traffic Signals" category
Wastewater Utility	• Wastewater Treatment Facility • Sewage Collections • Sewage Lift Stations	*Electrical power accounted in Section 3: Water and Wastewater Treatment Facilities
Water Utility	• Water Treatment Plant • Water Wells/Supply	*Electrical power accounted in Section 3: Water and Wastewater Treatment Facilities
Solid Waste	• Yard Waste Recycling Facility	*Contract operations by Waste Management included in the "Vehicle Fleet" category

To convert the kWh electrical data into CO2 emissions, information on the emissions of the local electrical utility is required. In the ICLEI tool, this is handled by developing a "factor set" of data about the amounts of emissions per unit of electricity produced by the utility. City staff obtained the grid electricity factor set data from Duke Energy, the local electric service provider and used this information in the ICLEI tool. This is summarized below:

Table A-2: Duke Energy Electrical Emissions Factors

CO2 (lbs/MWh)	CH4 (lbs/GWh)	N2O (lbs/GWh)
1007.5	37.5	2.7

Emergency Generators

The final source of emissions in this category is Emergency Generators. The City maintains emergency generators to ensure continuity of operations in disasters such as hurricanes and other disruptions to power. These generators are operated occasionally throughout the year during power outages and for maintenance. City staff used procurement invoice records to tally the amounts of diesel fuel delivered to these generators in 2019. The total volume of fuel delivered was then input into the ICLEI stationary fuel consumption calculator and converted into emissions. Approximately 7683 gallons of diesel were consumed in 2019 by generators for general government use. Generators for the water and wastewater utilities were included in that category.

3. Water and Wastewater Facilities

Electrical Power Consumption

Electrical power consumption is the primary source of energy and emissions within the water and wastewater utilities for the City. As in other categories, the primary source of data these facilities was electrical power use data compiled from account-level billing data. This data was compiled into a twelve-month summary spreadsheet by the Finance Department, with each electric meter assigned to a department account for billing. Account-level included twelve months of electrical power use in kiloWatt-hours (kWh), based on electric bill statements. Based on data availability, the 2019 electric data contains information from July 2019 to June 2020. In the future, this information will be based on one fiscal year of electric power use.

To ensure that the electrical and emission data would be useful and easy to assess, the various department accounts were rolled into summary categories. These categories are summarized below.

Table A-3: Water and Wastewater Facility Electrical Accounts

Category	Electrical Accounts	Notes
Wastewater Utility	• Wastewater Treatment Facility • Sewage Collections • Sewage Lift Stations	Electrical power accounted in Section 3: Water and Wastewater Treatment Facilities
Water Utility	• Water Treatment Plant • Water Wells/Supply	Electrical power accounted in Section 3: Water and Wastewater Treatment Facilities

Water and Wastewater Stationary Fuel Consumption

An additional source of emissions in the water and wastewater utility is emergency generators and mobile pumps. These are used to maintain power to critical infrastructure, and also for temporary wastewater conveyance during construction or emergencies. These generators and pumps are operated periodically throughout the year during power outages and various construction or repair projects. Additionally, all emergency generators are run for maintenance purposes on an exercising schedule. City staff used procurement invoice records to tally the amounts of fuels delivered to these generators and pumps in 2019. Some generators are filled with fuel from secondary containers by staff, and these fuel quantities were collected from the Fleet department fuel consumption reports for 2019. Propane use was based on 2020 invoice records. The total volume of fuels delivered from various sources was then input into the ICLEI stationary fuel consumption calculator and converted into emissions. Each fuel type was entered into the ICLEI tool as a separate line item. The entries for various fuel types and their end uses are summarized below.

Table A-4: Water and Wastewater Facility Stationary Fuel Consumption

Category	Data Source	Use	Total Gallons
Wastewater Stationary Generators- Propane	2020 Propane Invoices	Emergency generators	133.5 gals
Wastewater Stationary Generators- Diesel	2019 Direct Delivery Invoices; 2019 Fleet Fuel Island Records	Emergency Generators and Pumps	4906 gals
Water Stationary Generators- Diesel	2019 Direct Delivery Invoices; 2019 Fleet Fuel Island Records	Emergency Generators	9171 gals

Wastewater Treatment Plant - N2O Emissions

One source of emissions in the City that is unique to the wastewater utility is N2O (nitrous oxide) emissions. These emissions are based on nitrogen released to the atmosphere from wastewater treatment due to the total nitrogen content of the raw wastewater treated by the treatment facility. ICLEI has developed a calculator tool to assess the N2O emissions from wastewater treatment based on the population served by the facility and whether or not the facility provides advanced wastewater treatment for nutrient removal (nitrification/denitrification). The City of Tarpon Springs Advanced Wastewater Treatment Facility is an advanced wastewater treatment facility designed to remove nitrogen from finished effluent, so the ICLEI "Process Emissions from WWTP with Nitrification/Denitrification" calculator was used.

The inputs to this tool included population served and an Industrial-Commercial Discharge Multiplier factor. The population was based on the 2019 permanent population calculated in the City's 2019 Public Supply Annual Report, provided to the Southwest Florida Water Management District. The permanent population was 27,665. This includes all homes in the Tarpon Springs service area, and will include some septic tank users, but is a reasonable starting estimate that

can be refined in future years. The tool also includes the Industrial-Commercial Discharge Multiplier factor, which was left at a default value of 1.25 per ICLEI guidance.

Wastewater Treatment Plant Effluent Discharge - N2O Emissions

Another source of emissions in the City unique to the wastewater utility is N2O (nitrous oxide) emissions from discharges to rivers. These emissions are based on the total nitrogen content of the finished wastewater effluent returned to the natural environment after treatment. ICLEI has developed a calculator tool to assess the N2O emissions from wastewater effluent based on the daily nitrogen load of the finished water in kg/d of total nitrogen. The WWTF monitors total nitrogen on a weekly basis, and the annual average total nitrogen concentration from 2019 was used to calculate a nitrogen load of 7.42 kg/day of total nitrogen.

4. Vehicle Fleet

City Vehicle Fuel Consumption

Fuel consumption from the City-owned fuel station at the public works yard was the primary source of data for the vehicle fleet emissions sector. Data on the type and volume of fuel dispensed at the fueling station is collected automatically for each fleet vehicle each time the vehicle is fueled at the City facility. Public Services staff worked with fleet management to develop a report on 2019 fuel consumption for each vehicle. The fuel consumption data was then linked in a spreadsheet to the vehicle inventory for each department. Each vehicle was classified by type (construction, heavy truck, passenger vehicles, etc), and total diesel and gasoline usage was tallied for each vehicle category. The ICLEI tool has unique emissions calculation for vehicles based on both vehicle and fuel type, so multiple vehicle fleet emissions entries were input to the inventory to cover fuel consumption for the various types of vehicles in service. The tables below provide a breakdown of the various types of internal combustion vehicles in the City, as well as relative fuel consumption for each vehicle type.

It should be noted that some light trucks in the City carry auxiliary fuel tanks. These tanks are used to fuel up remote generators, pumps, and other small engines in the field. As it is difficult to determine the end use of this fuel, fuel from auxiliary tanks was included in the "Small Utility" category. Additionally, fuel use from four fuel cards was designated for generators and listed the stationary fuel use category.

Table A-5: Vehicle and Stationary Fuel Card Inventory

	Boat	Construction	Heavy Truck	Large Utility	Light Truck	Passenger	Small Utility	Stationary Fuel	Total
Fire	1	0	5	1	9	1	4	0	**21**
Municipal Government	0	0	0	0	24	2	4	0	**30**
Parks, Recreation, and Leisure	0	0	4	0	19	0	40	0	**63**
Police	0	0	1	1	41	33	0	0	**76**
Public Works	0	10	11	0	7	0	4	1	**33**
Wastewater Utility	0	4	7	0	14	0	9	2	**36**
Water Utility	1	2	2	0	16	0	7	1	**29**
Solid Waste	0	1	0	0	2	0	2	0	**5**
Total	**2**	**17**	**30**	**2**	**132**	**36**	**70**	**4**	**293**

Table A-6: Vehicle Fleet Fuel Consumption by Vehicle Class

Equipment Type	E-89 Ethanol (gals)	Dyed Diesel (gals)
Boat	31	-
Construction	82	2,343
Heavy Truck	3,115	24,003
Large Utility	-	2,023
Light Truck	76,296	2,125
Passenger	23,393	-
Small Utility	3,189	7,418
Total	**106,106**	**37,912**

Golf Course Electric Vehicles

The City-owned municipal golf course is currently the largest operator of electric vehicles in the city, with an all-electric fleet of golf carts. Indirect emissions from these golf carts was included in the vehicle fleet component of the emissions inventory. The golf carts are currently maintained in a cart barn at the golf course that is on a separate electric meter. Electric power

consumption from this meter was used to estimate the emissions from the golf cart fleet via the ICLEI tool.

Contractor Fleet and Fuel Consumption

In addition to the City-owned vehicle fleet, the City also utilizes contractors for certain municipal activities. Although this would typically be a Scope 3 item (an action outside of the scope of a local government track inventory), the City elected to include fuel use by its solid waste contractor as well as smaller landscape and maintenance contractors for the golf course and public facilities.

Solid waste service is offered by the City and administered through a direct city contractor, in this case Waste Management. Waste Management tracks fuel use on its various routes, and provided the City with a summary of fuel use for Tarpon Springs routes for 2019. The City included fuel use by Waste Management in the 2019 inventory as the solid waste service is a service administered by the City via a City contract as part of municipal government operations. It should be noted that Waste Management has been proactive in developing a lower-emissions fleet, and over 70% of the routes served in Tarpon Springs were served by garbage trucks that run on compressed natural gas. Compressed natural gas is a lower-emissions fuel than diesel and helps reduce the City's overall vehicle emissions.

The City also employs contractors for landscape and maintenance service for the municipal golf course and City parks and easements. City staff surveyed these two contractors about onsite fuel consumption for landscaping equipment and off-road vehicles. No records of fuel use were available for 2019, but City staff worked with the contractors to estimate their fuel use based on 2020 typical operations. The fuel use for these contractors is relatively small within the current City operations, and estimating these fuel quantities will not have a large effect on the overall inventory.

Public Transit

Public Transit can be a large component of municipal government fleet operations, as well as a key method to help reduce vehicle emissions within a community. The City of Tarpon Springs is served by the Pinellas Suncoast Transit Authority, and does not operate a public transit fleet at this time. For the 2019 inventory, public transit was not included, as this inventory was focused on City of Tarpon Springs government operations. Public transit may be revisited in future assessments with expanded scopes.

5. Streetlights and Traffic Signals

Streetlights and traffic signals are small consumers of electricity individually but can collectively contribute significantly to overall municipal electrical consumption due to their prevalence throughout city roads and intersections. The City has 77 electrical meters assigned to various lights, traffic signals and remote public works locations throughout the City. City staff compiled electrical usage data from each of these meters to evaluate the total electrical use from streetlights and traffic signals for 2019. This data was used to estimate total emissions on the same basis as grid electrical consumption in other municipal buildings and facilities.

6. Solid Waste Facilities

The City currently owns one solid waste facility, a former Class-III landfill, which was closed in 1983. This site no longer accepts solid waste, and is under long-term monitoring for site closure. Although the site is closed as a landfill, the City currently utilizes a portion of the space as a local transfer station for yard waste. No composting takes place on-site, and the facility primarily acts as a local drop-off point for yard waste to be transferred to Waste Management, the City's solid waste contractor.

Electrical Power Consumption

For the 2019 inventory, the primary source of emissions at this facility was electrical consumption. There are two electrical services at this location, and total electrical consumption was included in the 2019 inventory on the same basis as grid electrical consumption in other municipal buildings and facilities.

Landfill Emissions

The ICLEI tool includes several options for calculating the emissions for the ultimate disposal method for solid waste in City operations. The largest potential source of emissions from the City landfill is methane emissions from landfill gas. The City maintains ongoing monitoring of the landfill gas venting system, and in recent years the vast majority of the monitoring locations have shown no methane content, with a handful of locations occasionally showing minimal methane or CO2 content. This indicates that the landfill venting system has worked properly, and it appears that any lingering methane emissions are minimal and would be difficult to quantify. For these reasons, the emissions from the closed City landfill were assumed to be minimal for the 2019 inventory. Additionally, as the City's solid waste is currently disposed by a third-party in a common landfill, the ultimate disposal of current solid waste was not examined for emissions potential at this time. Solid waste emissions may be revisited in future inventories if a community scale inventory is developed.

7. Grid Losses

In addition to the electricity consumed directly by City facilities, energy consumption occurs during the transmission of the electricity to the end user. This is known as electrical grid loss. The electrical grid loss is the energy lost when power is sent from the electrical power plant to end users throughout the service area. In practice, the US Energy Information Administration estimates that grid electricity and distribution losses account for about 5% of US electrical production. This means that electric utilities must produce slightly more electricity for the grid than is required by the end users.

The ICLEI tool includes a method to calculate the energy lost to the grid when electricity is consumed by a customer. This is based on a grid loss factor that is unique to each electrical distribution system. In this case, the grid loss factor was provided by Duke Energy, and the local grid loss factor is 4.3%. The ICLEI tool applies this factor to electric use data to determine the amount of energy lost in serving the City, which is then converted to emissions equivalents. This is considered a Scope 3 emission. ICLEI has recently advised municipalities not to account for these emissions directly in the government track inventory since these are indirect emissions, and out of the municipality's control. In the initial drafts of the 2019 inventory, the City included electrical system grid losses within each emission sector. Per ICLEI guidance, staff removed this information from the final draft for consistency with other municipalities in the area.

Electrical system grid losses were assessed using the ICLEI tool for each emissions sector that utilizes electrical grid power consumption. This included electrical consumption from buildings and facilities, water and wastewater facilities, etc. As previously stated, the grid loss factor was provided by Duke Energy, and the local grid loss factor is 4.3%. Overall emissions from grid losses were estimated to be 283 MT of CO2e.

Figure A-1: City of Tarpon Springs Electrical Grid Loss Emissions