

2023 Municipal Greenhouse Gas Inventory: Town of Chesapeake Beach

What is a Greenhouse Gas Inventory?

A Greenhouse Gas (GHG) Inventory is an accounting of greenhouse gas emissions resulting from activities within a given boundary. These inventories help decision-makers identify the greatest sources of GHG emissions, establish goals, and track progress towards reduction targets.

Emissions are broken down into three categories, or scopes, by the [Greenhouse Gas Protocol](#) to better understand the source of emissions. Inventory results are typically expressed in Metric Tons of Carbon Dioxide Equivalent, or MT CO₂e, for ease in comparison. This measure converts all greenhouse gases emitted into the equivalent amount of CO₂ by weighing its relative global warming potential.

A municipal GHG Inventory, otherwise known as a Municipal Carbon Footprint, specifically focuses on the emissions associated with municipal government operations. It usually includes emissions from activities under the municipality's operational or financial control such as energy used by government-owned buildings, streetlights, and vehicles, plus emissions associated with other municipal operations such as solid waste, wastewater treatment, landscaping, etc.

Municipal GHG Inventories allow a local government to understand the major sources of its emissions, provide a basis for developing an action plan, and track changes in its carbon footprint over time. Inventories can also be compared to other municipalities; however, it is important to keep in mind that the scope of operations varies widely across different municipal governments. Thus, comparisons are most useful with municipalities of a similar size and between those that provide similar services.

A GHG Inventory is divided into three categories:

Scope 1

- Direct emissions from sources released within the inventory boundaries
- For example: natural gas combustion or the application of fertilizer for lawn care

Scope 2

- Indirect emissions from sources that are controlled by the organization
- For example: electricity, heat, or steam purchased and used by the organization

Scope 3*

- Other indirect emissions that are a consequence of an institution's activities, but are from sources neither owned nor controlled by the institution
- For example: emissions from waste generated within a specific geography that is sent to a landfill elsewhere or emissions from staff commuting

**Scope 3 and some Scope 1 emissions are omitted from this inventory*

The Town of Chesapeake Beach

Chesapeake Beach is a town in Calvert County, Maryland, with a population of about 6,436 people. This municipal Greenhouse Gas Inventory considers the emissions from the following:

- Energy used by the municipally-owned buildings (Town Hall, Treatment Plant, Water Park, and Kellam's Field)
- 167 Streetlights paid for by the municipality
- 6 gasoline-powered vehicles

Emissions from other sources such as solid waste disposal, employee commutes, refrigerants and chemicals were not considered in this inventory.

Chesapeake Beach Carbon Footprint: By the Numbers

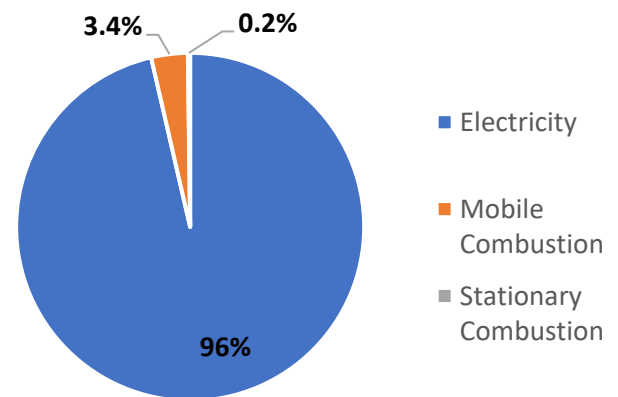
Most GHG emissions from Chesapeake Beach are from Scope 2, which accounts for 84% of the town's total emissions, then followed by Scope 1 at 15%. Since Scope 3 is considered de minimis or negligible it was not included in the following analysis and greenhouse gas inventory.

2023 Total Chesapeake Beach Emissions (MTCO ₂ e)					
	CO ₂	CH ₄	N ₂ O	Total MT CO ₂ e	Percent of Total
Scope 1	107.82	0.04	0.09	107.95	15%
Scope 2	580.05	1.00	1.59	582.64	84%
Scope 3	-	-	-	-	0%
Total Gross Emissions	687.87	1.04	1.68	690.59	100%

Energy Use by Source

96% of the energy consumed by the Chesapeake Beach government is from purchased electricity, followed by 3.4% from gasoline-powered vehicles, with the remaining 0.2% from heating fuel and diesel oil.

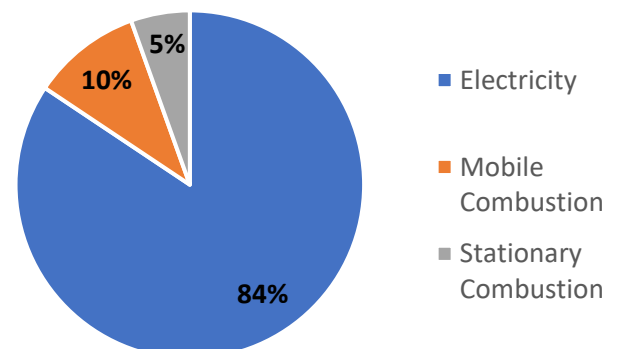
2023 Energy Consumption by Source			
	Usage	BTU equivalent	Percent of Total
Electricity (kWh)	1,959,957	235,614,270,798	96%
Mobile Combustion Gasoline (gallons)	7,240	8,301,741,953	3.4%
Stationary Combustion Heating Oil and Diesel (MMBtu)	509	509,040,000	0.2%
Total		244,425,052,751	100%



Emissions by Source

Electricity use accounts for 84% of total greenhouse gas emissions, mobile combustion for 10%, and the remaining emissions comes from stationary combustion, accounting for 5% of total GHG generation.

2023 Emissions by Source (MT CO ₂ e)					
	CO ₂	CH ₄	N ₂ O	Total	Percent of Total
Electricity	580.05	1.00	1.59	582.64	84%
Mobile Combustion	70.15	-	-	70.15	10%
Stationary Combustion	37.67	0.04	0.09	37.80	5%
Total Gross Emissions	687.87	1.04	1.68	690.59	100%



Emissions by Use

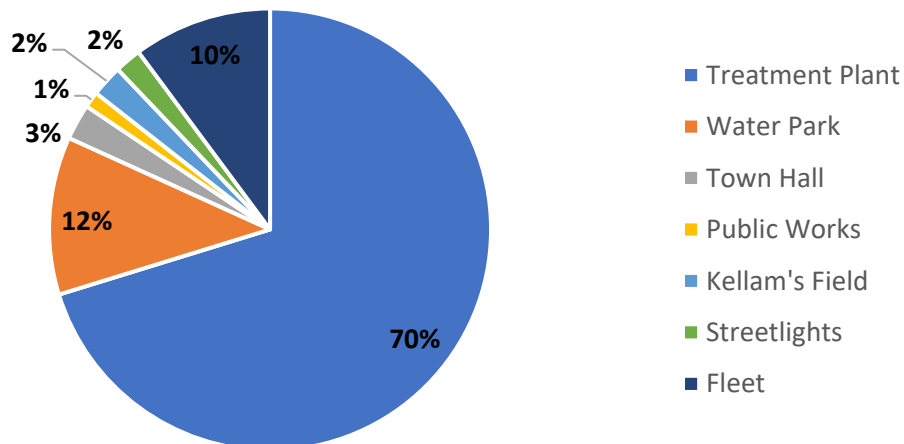
When looking at emissions by use, the town’s buildings is the largest contributor, accounting for 88% of Chesapeake Beach’s total greenhouse gas emissions, which comes from emissions associated with electricity and heating fuel usage in the Treatment Plant (70%), as well as electricity from the water park (12%), Town Hall (3%), Kellam’s Field (2%), and Public Works (1%). To reduce emissions from this use category, Chesapeake Beach could consider strategies to generally improve energy efficiency, such as installing heating and cooling upgrades and/or transition to renewable energy sources. Specifically, the town may want to explore best practices for reducing emissions associated with water parks and treatment plants as these two facilities make the up the largest percent of the town’s total greenhouse gas emissions. The Town has begun a project to power the Treatment Plant using solar energy.

The second largest emissions by use is 10% for gasoline consumption for the town’s fleet vehicles. To reduce emissions from this use category, the town could consider transitioning to the use of an electric vehicle and adopting best practices to track fuel usage more systematically by vehicle and vehicle miles traveled to help the town identify further opportunities for energy savings.

Lastly, the town’s streetlights are responsible for 2% of total emissions. To reduce emissions from this use category, Chesapeake Beach could consider converting all town owned streetlights to LEDs, advocating for more precise metering from utilities, and/or switching to renewable energy sources. Thus far, the Town has made the following upgrades to lights:

1. 187 decorative streetlights changed from 100-watt metal halide to 14-watt LED
2. 35 overhead parking lot changed from 400-watt metal halide to 110-watt LED
3. 11 Town sign lights changed from 250- watt metal halide to 21-watt LED
4. At Kellam’s Field the Town changed five 1500-watt lights to 400-watt LED. The Town will change 123 more 1500-watt lights to 400-watt LED lights at Kellam’s Field.

2023 Total Emissions by Department and Source (MT CO2e)					
Department	Electricity	Stationary	Mobile	Total	Percent of Total
Treatment Plant	447.27	37.80		485.07	70%
Water Park	79.78			79.78	12%
Town Hall	18.09			18.09	3%
Public Works	8.08			8.08	1%
Kellam's Field	16.00			16.00	2%
Streetlights	13.43			13.43	2%
Fleet			70.15	70.15	10%
Total	582.65	37.80	70.15	690.60	100%



Sources & Assumptions

This inventory was completed using the Environmental Protection Agency's (EPA) Local Greenhouse Gas Inventory Tool: Government Operations Module. Other emissions factors are from the EIA's State Electricity Profiles database. All other assumptions and calculation methodologies are from the inventory tool.

Input Data: All data on energy and fuel usage was provided by the Chesapeake Beach municipal government. Building electricity and stationary fuel data corresponds approximately to calendar year 2023 (November 2022 – October 2023).

Street lighting electricity usage is for the calendar year 2022 (January 2022 – December 2022) and thus does not correspond to the 12-month period from which the remaining data is drawn. However, this inventory assumes usage would have been similar in 2023.