



TOWN OF LODI

GREENHOUSE GAS INVENTORY REPORT

20

23

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Acknowledgements

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Introduction

Greenhouse Gas and the Effects on our Climate

Climate change alludes to a long-term change in temperature, precipitation, increasing ocean temperatures, melting of glaciers, the changes in extreme weather events, and shifts in ecosystem characteristics that effect the growing season, length of seasons, and the habitats of plants and animals (EPA/NYSDEC).

Humans have significantly changed the climate of the Earth in many ways. However, the main culprit is the increase in the releasing of greenhouse gases into the atmosphere. Greenhouse gas emissions are released from burning fossil fuels, deforestation, wetland loss, and other human activities which cause the greenhouse effect and global warming. The three main greenhouse gases prioritized in this inventory are carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). Global Warming Potential (GWP) refers directly to the impact of 1 unit of each gas in the atmosphere compared to 1 unit of CO₂ (see Table 1).

Greenhouse Gas (GHG)	Global Warming Potential (GWP)
Carbon Dioxide (CO ₂)	1
Methane (CH ₄)	85
Nitrous Oxide (N ₂ O)	264

Table 1: IPCC 5th Assessment 20-year Global Warming Potential Values

Why is a Greenhouse Gas (GHG) Emissions Inventory Important?

A greenhouse gas emissions inventory is one of the first steps a community can take to address climate change on a local level. A local government operations GHG inventory is “an accounting, analysis, and report of the GHG emissions resulting from the day-to-day operations of a village, town, city, or county” (CSC Website). An inventory breaks down GHG emissions for all operations within a day-to-day operation, from buildings, to fleets, to streetlights. An inventory therefore helps a municipality create goals based on emission reduction and sets a standard to track progress over the years.

A GHG inventory can help pinpoint the largest emissions producers and target them for efficiency improvements and emission reduction. This planning and implementation not only reduces emissions for a municipality but also saves taxpayers’ dollars on energy costs.

New York State’s Climate Goals

In 2019, New York State signed into law the Climate Leadership and Community Protection Act (CLCPA) with a goal of reducing emissions across the state. According to the CLCPA, the New York State's Climate Act is among the most ambitious climate laws in the nation and requires New York to reduce economy-wide greenhouse gas emissions 40 percent by 2030 and no less than 85 percent by 2050 from 1990 levels.

To bolster this effort, several departments under the state are working with climate action goals. The New York State Energy and Research and Development Authority (NYSERDA) enacted the [Clean Energy Communities \(CEC\)](#) program to incentivize energy reductions on a municipal level. The program is built on a series of high impact action items, including:

1. Unified Solar Permit
2. Energy Code Enforcement Training
3. PACE Financing

4. Clean Energy Upgrades
5. Clean Heating and Cooling Demo
6. 100% Renewables for Municipal Operations
7. Climate Smart Communities Certification
8. LED Streetlights
9. Clean Fleets
10. Benchmarking
11. Community Campaigns
12. County-Hosted Trainings
13. Community Choice Aggregation

As municipalities make progress in this program, they also earn points that can give them point based grants. These grant awards can then be used towards more energy-related projects.

The state also funded the [Climate Smart Communities \(CSC\) Program](#) that focuses on a wider range of climate action elements. This program is administered through the New York State Department of Environmental Conservation and supported by several other departments in the state. By participating in the CSC program, municipalities can work on a series of over 100 actions that fall under the following categories:

1. Build a Climate Smart Community
2. Inventory Emissions, Set Goals, and Plan for Climate Action
3. Decrease Energy Use
4. Shift to Clean, Renewable Energy
5. Use Climate-Smart Materials Management
6. Implement Climate Smart Land Use
7. Enhance Community Resilience to Climate Change
8. Support a Green Innovative Economy
9. Inform and Inspire the Public
10. Engage in an Evolving Process of Climate Action
11. Innovation
12. Performance

By pursuing actions in the CSC program, municipalities can pursue climate action in a holistic manner that fits with the dynamic of their individual community.

Town of Lodi Background Info

Founded in 1826, the Town of Lodi is located in the southwest corner of Seneca County in the Finger Lakes region of New York. The 2020 census shows a population of 1,469 citizens that is represented by a broad age range with 26.0% under the age of 20, 4.8% from 20 to 24, 22.2% from 25 to 44, 32.9% from 45 to 64, and 14.2% who were 65 years of age or older. Lodi is part of the South Seneca School district and has 633 households with a median income of \$53,036.

Located on the eastern shore of Seneca Lake, Lodi is home to a growing number of agricultural-related businesses. Although a large percentage of industry is driven by the town's award-winning wineries and accompanying vineyards, there is also a sizable amount of land devoted to organic vegetable farming, animal husbandry, and traditional row crop agriculture (corn, wheat, and soybeans).

In recent years, heavy precipitation has caused extensive flooding and destruction to homes, land, and Seneca Lake itself. In August 2018, eleven inches of rain fell in four hours which caused flooding so severe that areas had to be evacuated and warranted FEMA disaster relief of over 2 million dollars. Flooding hit hard again in October 2021 with 4 inches of rain falling in less than 2 hours. In the past two years, Lodi has worked with local, state and federal agencies to protect its community from the impact of climate change. Such work includes rebuilding and right-sizing bridges and culverts, adding green infrastructure to vulnerable areas, and engaging residents and businesses to learn more about and implement their own climate resilient actions.]

The Town of Lodi has already adopted the Climate Smart Communities pledge, completed at least two years' worth of benchmarking for municipal buildings, and tasked a project lead to help with the inventory.

Methods

Below are the steps the Town of Lodi took to complete a municipal level greenhouse gas inventory. The inventory addresses two scopes. The first is direct GHG emissions (known as Scope 1) - for example, from government-owned vehicles, onsite fuel combustion (e.g., natural gas, propane, or fuel oil), wastewater treatment facilities, landfills, and refrigerant leakage. The second is Indirect GHG emissions (known as Scope 2) – for example, from purchased electricity.

1. Collect Data

Before the inventory was completed, the Town of Lodi gathered a list of all owned/occupied municipal buildings and addresses, and a list of energy supplier account numbers. The information gathered was then broken down into two categories based on the GHG emitters that are owned and operated by the Town (vehicular fleet and administrative buildings).

2. Conduct the Greenhouse Gas Inventory (Year 2020-2022)

- a. Enter the collected data and calculate GHG emissions using the municipal GHG inventory tool created by the Climate Action Associates which is built off the Local Government Operations Protocol.
 - i. Create a Facility Master List
 - ii. List Energy Provider Accounts
 - iii. Collect Electricity and Natural Gas data
 - iv. Collect Tank Fuels (if applicable)
 - v. Collect Fleet Fuel Data
 - vi. Employee Commute (optional)
 - vii. Other Sources (Refrigerants, Landfill Methane, WWTP Methane)
- b. Identify key findings using the Climate Action Planning Scorecard

3. Create a GHG Inventory Report

4. Share the GHG Inventory Report with the Community

5. Plan Implementation of a Future GHG Inventory Analysis/Report Update (to be done every 5 years)

Emission Sectors

The unit used to measure carbon emissions in this report is MTCO₂e, or metric tons of carbon dioxide equivalent. “CO₂e” is a standard unit for measuring all greenhouse gases using global warming potential factors as compared to the effects of one unit of carbon dioxide, as explained above.

The Town does not own or operate any streetlights, so this sector is not included.

Vehicle Fleet

As a part of this GHG inventory report, the Town also conducted a fleet inventory which is another action item in the CSC program ([PE3: Fleet Inventory](#)). A fleet inventory includes information on:

- Model Year
- Year Purchased
- Make
- Model
- Fuel Type
- Miles Per Gallon (MPG)
- Odometer Reading
- Class (Light, Medium, Heavy)
- Wheel Drive (2WD, 4WD)
- Gross Vehicle Weight Rating (GVWR)
- Function

This information can help a municipality prioritize and plan to replace vehicles to make them more fuel efficient. This type of planning can not only reduce GHG emissions, but also save the Town and ultimately, the taxpayers money. The fleet inventory spreadsheet is listed in Appendix A. The Town owns 15 diesel powered vehicles, and information provided for this inventory is measured by gallons of diesel for all departments. In 2022, the total annual GHG emissions (MTCO₂e) from diesel fuel was 96.8 MTCO₂e.

Building and Facilities

The Town has three municipal facilities that they own and operate, including the Town Hall, the Highway Barns, and the West Lodi Cemetery. The Town Hall and Highway Barns use both electricity and propane to operate, while the West Lodi Cemetery only uses electricity. In total, the three municipal facilities emitted 20.6 MTCO₂e in 2020, 55 MTCO₂e in 2021, and 18.0 MTCO₂e in 2022. These results can be seen in Figure 1: Annual GHG Emissions (MTCO₂e) from Administrative Facilities. By facility, the highway barns emit the most amount of GHG emissions, followed by the Town Hall, and then the West Lodi Cemetery. Results of this analysis can be seen in Figure 2: Facility GHG Emissions (MTCO₂e).

ANNUAL GHG EMISSIONS (MTCO2E) FROM ADMINISTRATIVE FACILITIES

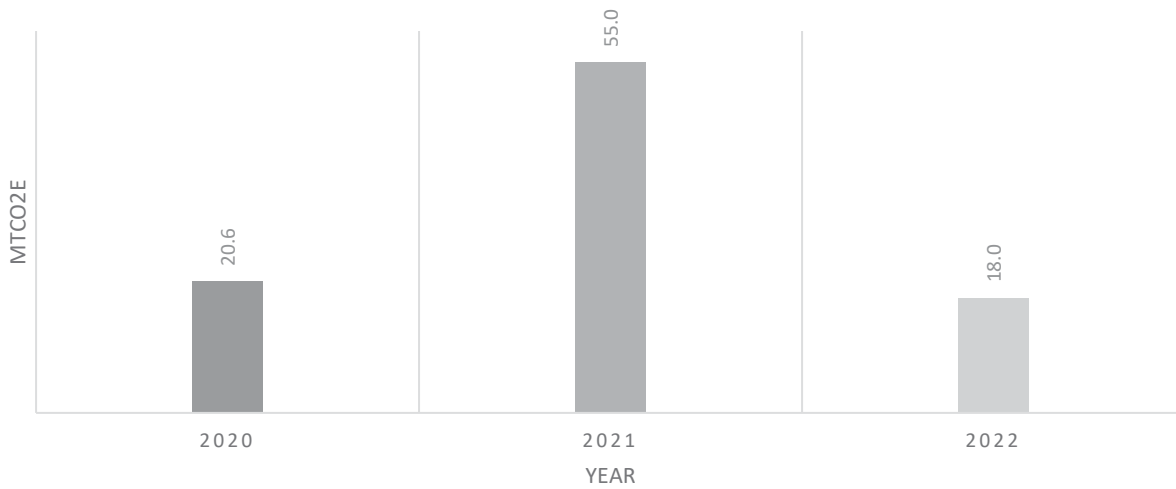


Figure 1: Annual GHG Emissions (MTCO2e) from Administrative Facilities

2020 FACILITY GHG EMISSIONS (MTCO2E)

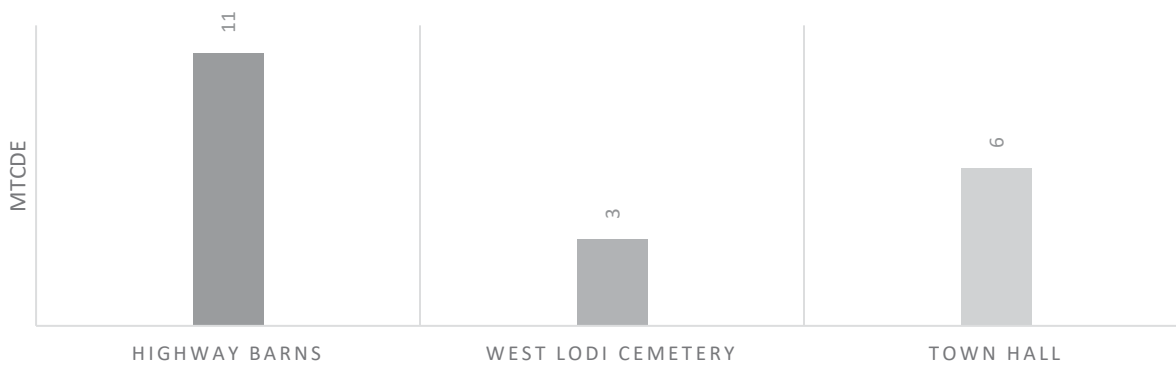


Figure 2: Facility GHG Emissions (MTCO2e)

Results

By Function:

Total emissions for 2022 equaled 114.97 MTCO₂e, with 16% (18.0 MTCO₂e) of emissions coming from the administrative facilities, and 84% (96.8 MTCO₂e) coming from the vehicle fleet. Figure 3: GHG Emissions by Function (MTCO₂e) show this data.

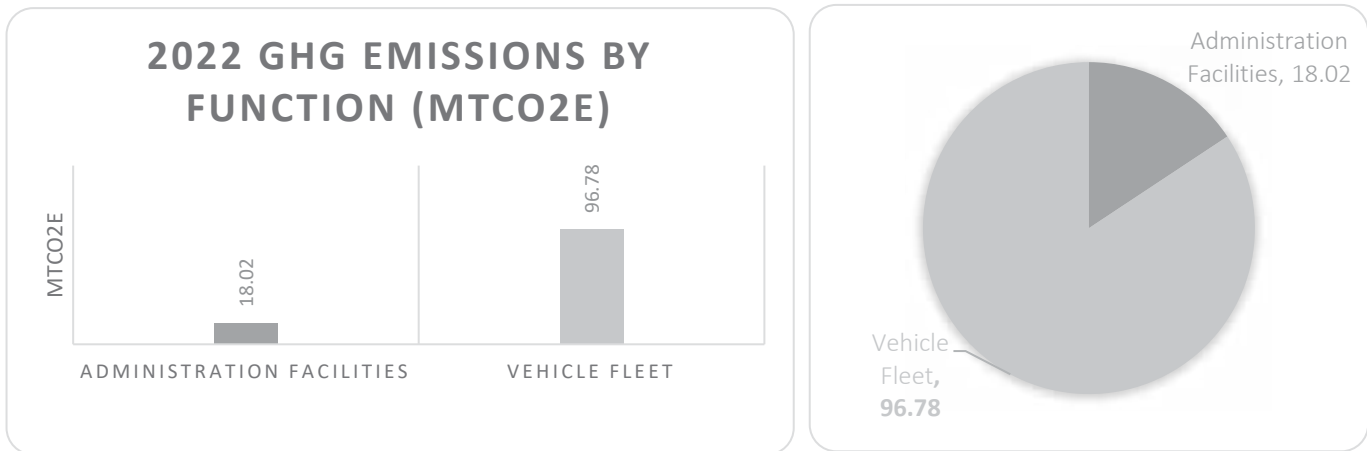


Figure 3: 2022 GHG Emissions by Function (MTCO₂e)

By Energy Source:

By energy source, diesel fuel was by far the largest emitter of GHG with 96.8 MTCO₂e (84.3%), followed by propane with 13.5 MTCO₂e (11.7%), and lastly electricity with 4.6 MTCO₂e (4.0%). Figure 4: 2022 GHG Emissions by Energy Source (MTCO₂e) shows this data.

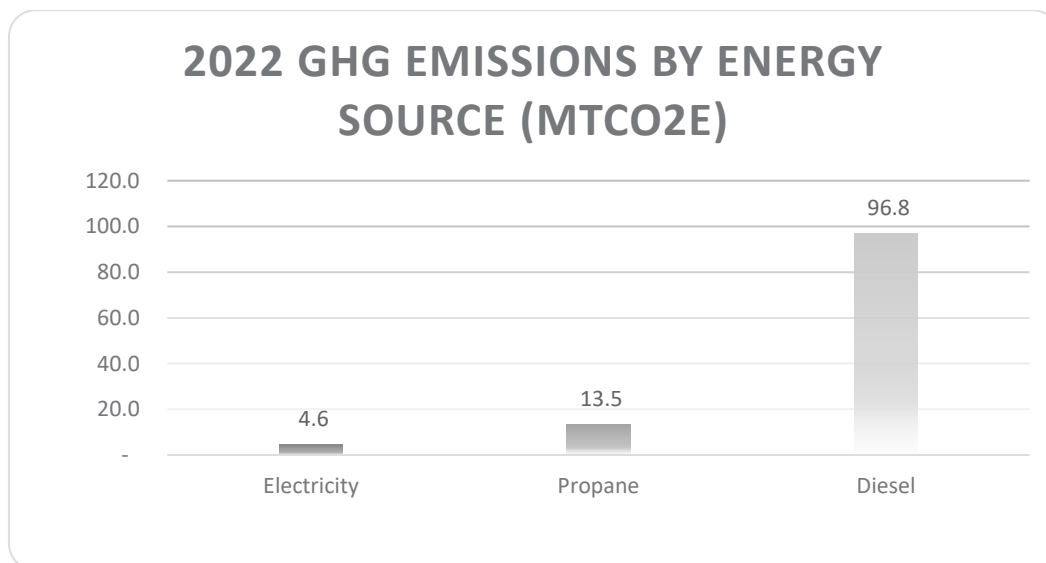


Figure 4: 2022 GHG Emissions by Energy Type (MTCO₂e)

Recommendations

Vehicle Fleet

Since the sector that produces the most emissions by a significant margin is the vehicular fleet, the priority of the recommendations focuses on this section.

1. [Fleet Inventory](#)- It is recommended that the Town keeps their vehicle inventory up to date for the purpose of prioritizing the replacement of the vehicles which use the largest portion of the energy.
2. [Fleet Efficiency Policy](#)- A vehicle fleet policy sets a fuel efficiency standard for whenever it is available and economical for the Town to do so. This policy aims to reduce GHG emissions and fuel costs over time.
3. [Fleet Rightsizing](#)- A fleet rightsizing initiative encourages local governments to monitor their vehicle fleet to make sure that the Town is maximizing their fleet efficiency by making sure they are matching the right vehicle with the right tasks, and/or reducing the fleet size if necessary.
4. [Advanced Vehicles](#)- In addition, the Town can look to purchasing electric vehicles (EV) when available. The DEC's Zero-Emission Vehicle (ZEV) rebate program ([Grants for Climate Action - NYS Dept. of Environmental Conservation](#)) can help a municipality purchase or lease a zero-emission vehicle. In the coming years, there is expected to be a wider availability of EV options for municipalities for light, medium and heavy class vehicles. Investment in this type of vehicle can lower GHG emissions and save the Town money.

Administration Facilities

The Town of Lodi is currently building a new Town Hall that is more energy efficient. Once this upgrade is complete, the Town should apply to the CEC program for a [Clean Energy Upgrade](#), which can take them one step closer towards a certification and/or points-based grant.

Since the Highway Barns are currently the biggest emitters of GHG in the Town, the Town can look to make energy upgrades. Energy upgrade options are as follows:

1. Lighting Upgrades
 - a. Interior
 - b. Exterior
2. Building HVAC
 - a. Controls/Building Management Systems
 - b. Motors and VSDs
 - c. Boiler and Chiller Plant Upgrades
3. Building Envelope
 - a. Doors and Windows
 - b. Insulation
4. Domestic Water Heating Systems
5. Renewable Energy Project
 - a. Solar Photovoltaic (PV)
 - b. Geothermal Heat Pumps
 - c. Wind Turbines

Conclusions

The Town of Lodi has made great strides over the years to be more sustainable, understanding that the more they can offset GHG emissions, the better they can preserve the climate of the place they call home. This GHG inventory report highlights the places where the Town can continue to make steps toward reducing GHG emissions, as well as saving taxpayer dollars over time. If the Town continues to prioritize their vehicular fleet and building upgrades, they will be able to lower their emissions.

References

1. EPA <https://www.epa.gov/climatechange-science/basics-climate-change#greenhouse>
2. NYS DEC <https://www.dec.ny.gov/energy/50399.html>
3. CSC GHG Inventory Action Item <https://climatesmart.ny.gov/actions-certification/actions/#open/action/6>
4. IPCC Assessment <https://www.ipcc.ch/assessment-report/ar5/>
5. CEC Website- <https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Communities>
6. CSC Website- <https://climatesmart.ny.gov/>
7. EPA Pollution Prevention GHG Calculator Guidance - <https://www.epa.gov/sites/default/files/2014-12/documents/ghgcalculatorhelp.pdf>