VILLAGE OF SARANAC LAKE
INC. 1892
CLIMATE SMART COMMUNITIES

Local Government Operations Green House Gas Inventory

Executive Summary

The Village of Saranac Lake (VSL) Climate Smart Communities Group conducted an inventory and analysis of Green House Gases (GHG) produced from Local Government Operations. This included the following elements:

- Collected records of energy use in 2017 & 2018
  - Diesel Fuel
  - Gasoline
  - Fuel Oil #2
  - Electricity
- Calculated Climate Impact - Quantity of each fuel type was converted to metric tons of carbon dioxide equivalent (CO2e) using EPA standard methodology and specific regional factors
- Recorded the cost of each fuel type to enable cost benefit analysis of climate strategies
- Analyzed how energy is used for different functions
- Developed strategies for reducing climate impact and cost

Through careful improvements in efficiency, the Village of Saranac Lake reduced the GHG impact by five percent from 2017 to 2018. We used 2018 as a baseline for determining further potential improvements.

Green House Gas (GHG) Baseline Calculations for Local Government Operations							
	2017			2018			
Fuel Source	Quantity	Units	CO2e	Quantity	Units	CO2e	Notes
Diesel Fuel	24332	gallons	248	21426	gallons	219	Scope 1
Gasoline	17110	gallons	152	20080	gallons	178	Scope 1
Fuel Oil #2	41092	gallons	418	36165	gallons	368	Scope 1
Electricity	2237293	kwh	300	2233198	kwh	299	Scope 2
GHG Emissions:		**Total 2017 =**	**1119**		**Total 2018 =**	**1065**	
	CO2e =	**Carbon Dioxide equivalent in metric tons**					

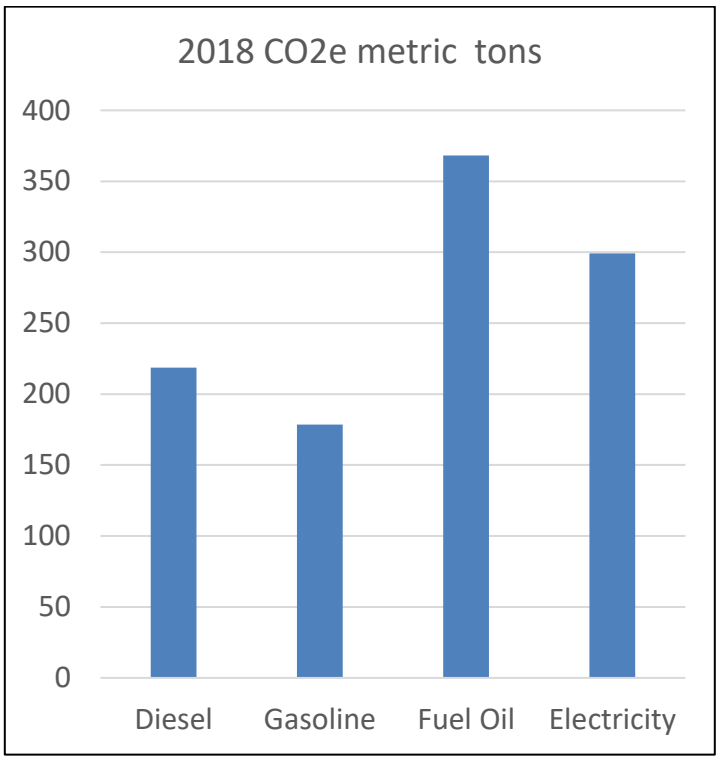
Analysis of GHG and Energy Cost

Principal Sources of Carbon Dioxide

Scope 1 Carbon Dioxide equivalent (CO_2e) emissions from fossil fuels used in transportation and buildings constitute 72 percent of the total from Local Government Operations. Scope 2 emissions from electricity generation constitute 28 percent of the total CO_2e.

Most local government buildings are heated with Fuel Oil, although some buildings have been upgraded to use more efficient, less polluting HVAC systems.

Electricity in this region is produced primarily from non-combustion sources (68%), such as nuclear and hydro power, reducing climate impacts.



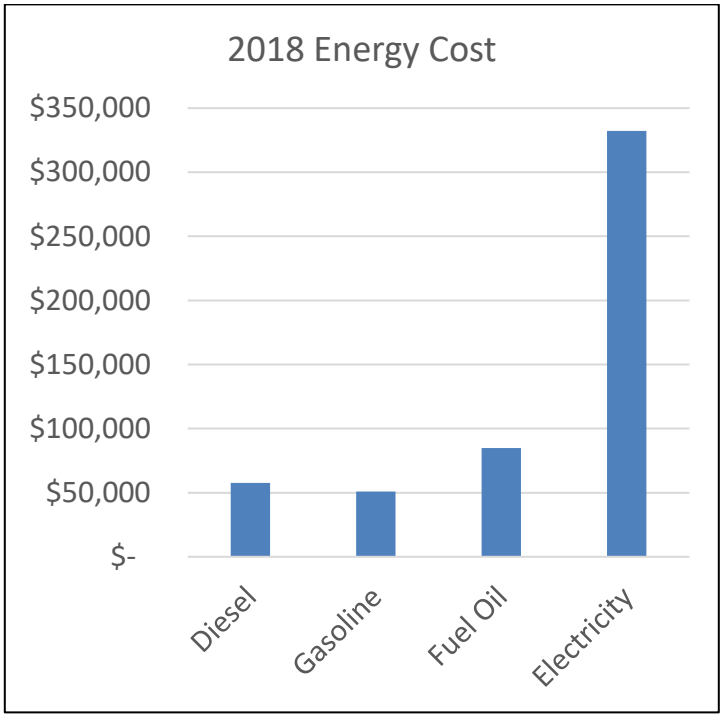
Energy Cost of Fuels and Electricity

While fossil fuels produce most of the CO_2e emissions, electricity constitutes 63 percent of the total energy cost of local government operations.

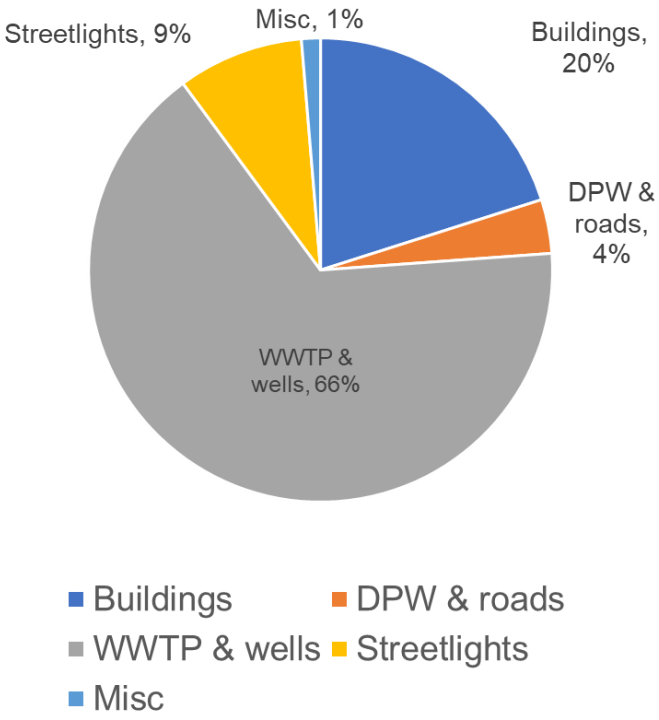
The strategies for reducing CO_2e emissions may not be the same strategies for reducing the energy cost, particularly when assessing life cycle cost of improvements.

Since both CO_2e emissions and energy cost are important, we developed an analysis process:

1. Analyze how each energy type is used by sector
2. Combine energy types to get a total cost and climate impact for each sector
3. Develop strategies that have the greatest benefits



Step 1 – Analyze how each energy type is used by each sector of Local Government Operations.



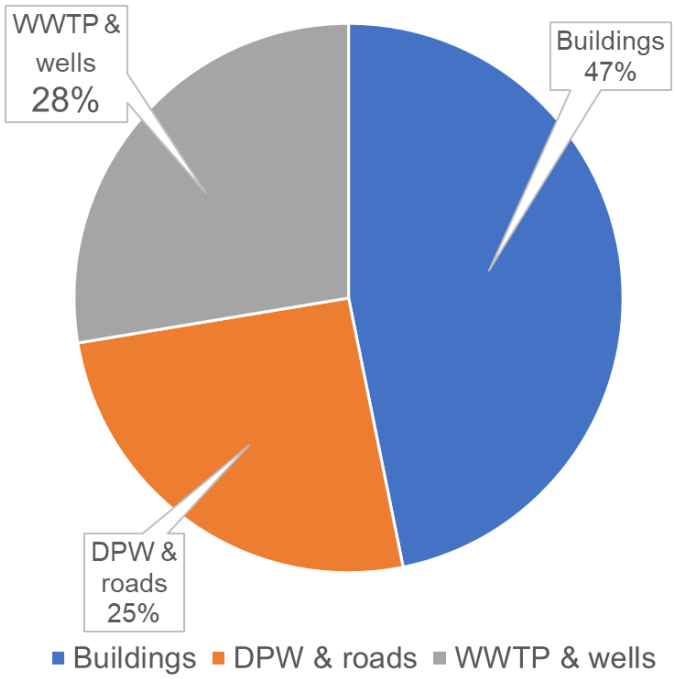
Electricity Use by Sector

Waste water treatment and wells for potable water supply use 66 percent of total electricity KWh.

Buildings use 20 percent of total electricity.

Street lights use 9 percent of total electricity.

DPW and Road Maintenance use 4 percent of total electricity



Fuel Oil and Propane Use by Sector

Buildings use 47 percent of total fuel oil, primarily for winter heating.

WWTP and Wells use 28 percent of total fuel oil, propane & kerosene. Most of the heat required to maintain the anaerobic digestion process of waste water treatment is produced by burning methane that is captured as a byproduct of the process. This approach uses methane as a replacement for fuel oil, reducing both environmental impact and energy cost.

Department of Public Works and roads service buildings use 25 percent of total fuel oil.

A similar analysis was completed for diesel fuel and gasoline that are used for transportation.

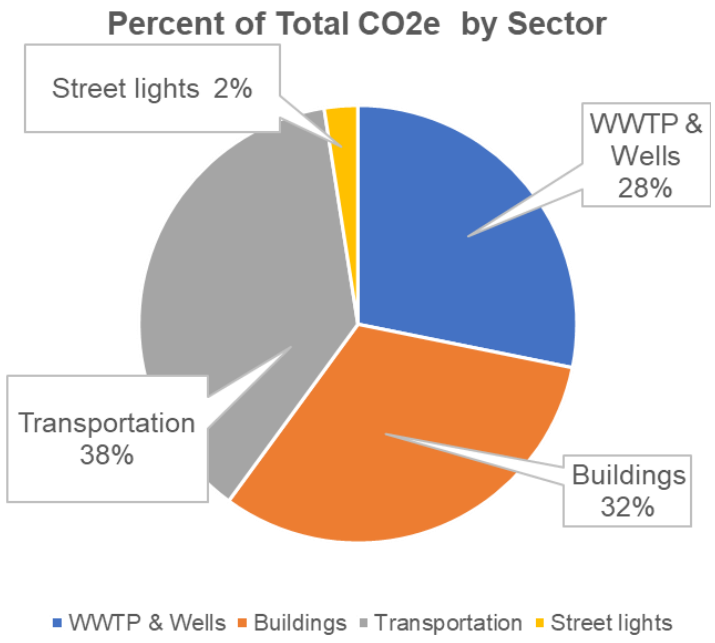
Step 2 - Combine energy types to get a total cost and climate impact for each sector of Local Government Operations

Climate Impact by Sector

In 2018, the total climate impact from Local Government Operations was 1,065 metric tons CO2e.

For each major sector of Local Government Operations, we combined the climate impact of the four primary energy types – diesel fuel, gasoline, fuel oil #2, and electricity. From this analysis we can conclude that:

- Transportation Sector accounts for 38 percent of total CO2e
- Buildings account for 32 percent
- Waste water treatment and wells account for 28 percent
- Street lights account for 2 percent

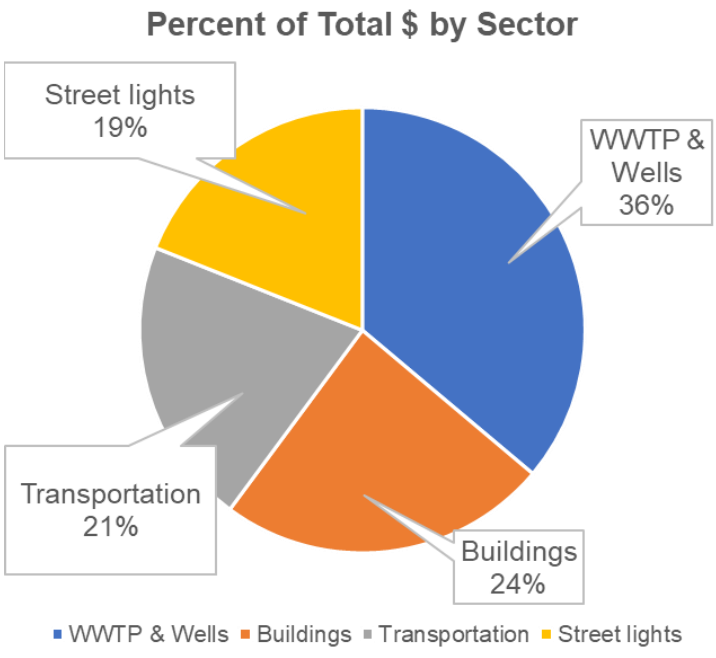


Energy Cost by Sector

In 2018, the total energy cost of all sources for Local Government Operations was about $525,713.

For each major sector of Local Government Operations, we combined the energy cost of the four primary energy types – diesel fuel, gasoline, fuel oil #2, and electricity. From this analysis we can conclude that:

- Waste water treatment plant and wells account for 36 percent of total energy cost
- Buildings account for 24 percent
- Transportation accounts for 21 percent
- Street lights account for 19 percent



Step 3 – For each sector, develop strategies that have the greatest benefits of reducing climate impact and operations cost

Buildings comprise 24% of total energy cost and produce 32% of total climate impact	• Most buildings had lighting upgrades in 2017 - this cut lighting electricity cost by almost 50%
	• Additional strategies:
	  • Improve building envelope insulation and windows
	  • Commission existing mechanical equipment
	  • Upgrade efficiency of replacement mechanical equipment
	  • Consider solar electric (PV) installations

Waste Water Treatment (WWT) and Wells comprise 36% of total energy cost and produce 28% of total climate impact	• WWT is currently burning captured methane from the treatment process instead of fuel oil – this saves energy cost and reduces climate impacts • Additional strategy: Investigate the potential of Cogeneration to burn methane, producing both electricity and heat. A preliminary analysis indicates that this process can provide almost 50% of the electricity required for WWT operations and all of the heat required for anaerobic digestion.
Transportation comprises 21% of total energy cost and produces 38% of total climate impact	• Continue the current practice of purchasing very fuel-efficient vehicles • Additional strategy: Purchase electric or hybrid vehicles where feasible
Street Lighting comprises 19% of total energy cost and produces 2% of total climate impact	• Street lighting energy cost includes both purchased electricity and maintenance of the lighting by the utility. • Additional strategy: The Village of Saranac Lake is investigating the potential to convert to LED street lighting, which would reduce energy cost and climate impact
Conclusions	1. By careful attention to local government operations, the VSL cut CO2e emissions by five percent from 2017 to 2018. 2. Assessing both climate impact and operational cost for each sector identifies the best strategies for additional improvements. 3. This analysis can be used to develop a future Climate Action Plan.