

Village of La Grange Park

2009 Government Operations

Greenhouse Gas Emissions Inventory



Narrative Report

Produced by: Cool Village Commission

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Executive Summary

The Purpose of Conducting an Inventory

Each day, local governments operate buildings, vehicle fleets, street lights, traffic signals, water systems, and wastewater plants; local government employees consume resources commuting to work and generate solid waste which is sent for disposal. All of these activities directly or indirectly cause the release of carbon dioxide and other greenhouse gases into the atmosphere. This report presents the findings and methodology of a local government operations (LGO) greenhouse gas emissions inventory for the Village of La Grange Park (VLP). The inventory measures the greenhouse gas emissions resulting specifically from VLP's government operations, arranged by sector to facilitate detailed analysis of emissions sources. The inventory addresses where and what quantity of emissions are generated through various local government activities. Through analysis of a local government's emissions profile, the Village of La Grange Park can tailor strategies to achieve the most effective greenhouse gas emission reductions.

Strategies that can significantly reduce emissions include increasing energy efficiency in facilities and vehicle fleets, utilizing renewable energy sources, reducing waste, and supporting alternative modes of transportation for employees. The benefits of these actions include lower energy bills, improved air quality, and more efficient government operations, in addition to the mitigation of local and global climate change impacts. By striving to save taxpayer money through efficient government operations, VLP is working to improve government services in a smart and targeted way that will benefit all of the Village's residents.

Regardless of one's views on climate change, VLP recognizes that communities like ours produce vast amounts of pollution, and it makes sense to produce less. Reduction of greenhouse gas emissions translates into a healthier environment, and in many cases, cost savings.

By conducting this inventory and joining ICLEI-Local Governments for Sustainability USA, a membership association of more than 600 U.S. local governments, VLP is acting now to limit future impacts that threaten the lives and property of VLP's residents and businesses, make government operations more efficient, and improve the level of service it offers to the residents of La Grange Park.

Inventory Results

The following figures summarize the results of the LGO greenhouse gas emissions inventory for VLP, by sector and source. VLP Government GHG emissions account for 1.7%¹ of community-wide GHG emissions.

2009 Government Operations CO₂e Emissions by Sector

TABLE 1

Sector	metric tons CO ₂ e
Buildings and Facilities	1,567
Vehicle Fleet	330
Street Lighting	284
Water Delivery Facilities	280
Totals	2,461

2009 Government Operations CO₂e Emissions by Source

TABLE 2

Source	metric tons CO ₂ e
Electricity	857
Natural Gas	1,273
Diesel – Off Road - Generator	4
Diesel – DPW & Fire	140
Biodiesel (≤5%) ²	0
Gasoline	186
Totals	2,461

¹ This is 0.1% less than the Community Wide Report.

² The Village of La Grange Park utilizes a biodiesel blend less than 5% for large vehicles.

Climate Change Mitigation Activities in VLP

In 2009, the VLP has responded to growing concerns over the effects of climate change by adopting a comprehensive approach to addressing emissions in the public and private sectors. This approach was officially initiated with adoption of the Charter to establish a Cool Village Commission to construct a sustainability plan for the VLP. The Sustainability Plan was developed to outline the VLP's commitment to sustainability and to identify strategies for the VLP's to reduce emissions in its VLP.

One of the tasks of the CVC was to evaluate whether the VLP should sign onto the U.S. Mayor's Climate Protection Agreement. By signing onto to the Climate Protection Agreement, the VLP would be committing itself to reduce carbon emissions that meet or exceed Kyoto Protocol targets, 7% reduction by 2012. The CVC was assigned with the task of taking an inventory of the GHG emissions for the VLP and evaluating whether the VLP could meet the 7% reduction target. The CVC is responsible for setting forth strategies to reduce carbon emissions by predetermined target. More discussion on establishing a GHG emissions reduction target is addressed later in this report. Below list strategies that could reduce GHG emissions for the VLP:

- Expand energy efficiency programs
- Seek to achieve reduction targets for transportation-related GHG emissions
- Expand the use of green building practices
- Increase waste diversion, composting, and commercial recycling
- Promote water efficiency programs
- Preserve forests that sequester carbon dioxide

The Sustainability Plan adopted by the Village of La Grange Park outlines the VLP's achievements in addressing climate change.

Introduction

General Methodology

Local Government Operations Protocol

A national standard called the Local Government Operations Protocol (LGO Protocol) has been developed and adopted by the California Air Resources Board (ARB) in conjunction with ICLEI. This standard provides quantification methods and procedures for reporting greenhouse gas emissions from local government operations. The LGO Protocol forms the basis of ICLEI's Clean Air & Climate Protection Software (CACP), which allows local governments to perform the emissions calculations using standardized methods. The CVC used the LGO Protocol to conduct the local government emissions inventory specifically. The State of Illinois does not currently offer tools nor require local governments to inventory and report their emissions, an emissions inventory is a critical first step for the Village to develop internal emissions reduction strategies and track future progress.

Greenhouse Gases and Carbon Dioxide Equivalent

Emissions summaries found throughout this report also use CACP's ability to combine emissions from the various greenhouse gases into carbon dioxide equivalent, CO₂e. Since equal quantities of each greenhouse gas have more or less influence on the greenhouse effect, converting all emissions to a standard metric, CO₂e, allows apples to apples comparisons amongst quantities of all six emissions types. Greenhouse gas emissions are reported in this inventory as metric tons of CO₂e (MTCO₂e).

Table 3 exhibits the greenhouse gases and their global warming potential (GWP), a measure of the amount of warming a greenhouse gas may cause compared to the amount of warming caused by carbon dioxide.

TABLE 3: GREENHOUSE GASES

Gas	Chemical Formula	Activity	Global Warming Potential (CO ₂ e)
Carbon Dioxide	CO ₂	Combustion	1
Methane	CH ₄	Combustion, Anaerobic Decomposition of Organic Waste (Landfills, Wastewater), Fuel Handling	21
Nitrous Oxide	N ₂ O	Combustion, Wastewater Treatment	310
Hydrofluorocarbons	Various	Leaked Refrigerants, Fire Suppressants	12–11,700
Perfluorocarbons	Various	Aluminum Production, Semiconductor Manufacturing, HVAC Equipment Manufacturing	6,500–9,200
Sulfur Hexafluoride	SF ₆	Transmission and Distribution of Power	23,900

Calculating Emissions

The CVC employed a calculation based methodology to assess emissions within the Village buildings tested. This approach is the most widely applied and provides a foundation from which cost effective and consistent comparisons may be developed and allows for standardized emissions metrics across a broad spectrum of municipalities throughout the United States. Table 4 provides examples of common emissions calculations.

TABLE 4: BASIC EMISSIONS CALCULATIONS

Activity Data	x	Emissions Factor	=	Emissions
Electricity Consumption (kilowatt hours)		CO ₂ emitted/kWh		CO ₂ emitted
Natural Gas Consumption (therms)		CO ₂ emitted/therm		CO ₂ emitted
Gasoline/Diesel Consumption (gallons)		CO ₂ emitted /gallon		CO ₂ emitted
Waste Generated by Government Operations (tons)		CH ₄ emitted/ton of waste		CH ₄ emitted

Organizational Boundaries

The organizational boundary for the inventory determines which aspects of operations are included in the emissions inventory, and which are not. Under the LGO Protocol, two control approaches are used for reporting emissions: operational control or financial control. A local government has operational control over an operation if it has full authority to introduce and implement policies that impact the operation. A local government has financial control if the operation is fully consolidated in financial accounts. If a local government has joint control over an operation, the contractual agreement will have to be examined to see who has authority over operating policies and implementation, and thus the responsibility to report emissions under operational control.

LGO Protocol strongly encourages local governments to utilize operational control as the organization boundary for a government operations emissions inventory. Operational control is believed to most accurately represent the emissions sources that local governments can most directly influence, and this boundary is consistent with other environmental and air quality reporting program requirements. The CVC adopted Operational Control in its assessment of emissions since it provides a means for the Village to assess and manage emissions from assets accountable to the Village. In this way operational changes instituted by the Village related to emissions reduction can be quantified.

Types of Emissions

As described in the LGO Protocol, emissions from each of the greenhouse gases can come in a number of forms:

Stationary or mobile combustion: These are emissions resulting from on-site combustion of fuels (natural gas, diesel, gasoline, etc.) to generate heat, electricity, or to power vehicles and mobile equipment.

Purchased electricity: These are emissions produced by the generation of power from utilities outside of the VLP.

Fugitive emissions: Emissions that result from the unintentional release of greenhouse gases into the atmosphere (e.g., leaked refrigerants, methane from waste decomposition, etc.).

Process emissions: Emissions from physical or chemical processing of a material (e.g., wastewater treatment).

Exclusions

The less significant emissions sources (up to 5 percent of total emissions) were not used in this inventory.

A common emission that is categorized as an information item is carbon dioxide emitted in the combustion of biogenic fuels. Local governments will often burn fuels that are of biogenic origin (wood, landfill gas, organic solid waste, biofuels, etc.) to generate power. Common sources of biogenic emissions are the combustion of landfill gas from landfills or biogas from wastewater treatment plants, as well as the incineration of organic municipal solid waste at incinerators.

Each inventoried sector may have additional emissions sources associated with them that were unaccounted for, such as solid waste generated by government operations and fuels consumed by vehicles during employee commuting that could not be estimated.

Also, local governments provide different services to their citizens, and the scale of the services (and thus the emissions) is highly dependent upon the size and purview of the local government. For these reasons, comparisons between local government totals should not be made without keen analysis of the basis for figures and the services provided.

Inventory Results

Emissions Total

In 2009, VLP's greenhouse gas emissions from government operations totaled 2461 metric tons of CO₂e. This number represents an approximation of emissions, and is not intended to represent a complete picture of emissions from VLP's operations. This approximate number was calculated specifically to avoid double counting.

Buildings and Other Facilities

Facility operations contribute to greenhouse gas emissions in two major ways. First, facilities consume electricity and fuels such as natural gas. This consumption is associated with the majority of greenhouse gas emissions from facilities. In addition, fire suppression, air conditioning, and refrigeration equipment in buildings can emit hydrofluorocarbons (HFCs) and other greenhouse gases when these systems leak refrigerants or fire suppressants. Refrigerants and fire suppressants are very potent greenhouse gases, and have Global Warming Potential (GWP) of up to many thousand times that of CO₂. For example, HFC-134a, a very common refrigerant, has a GWP of 1300, or 1300 times that of CO₂. Therefore, even small amounts of leaked refrigerants can have a significant effect on greenhouse gas emissions.

Six facilities operated by VLP are included in this reporting category:

- 1) 447 N Catherine (Village Hall, Fire Station, and Police Department)
- 2) 1010 E. 31st Street (Fire Station)
- 3) 3147 Prairie Avenue (Underground Vault for Water Distribution)
- 4) 1600 Barnsdale (Lift Station for the sewer[well])
- 5) 1400 Scotdale (Lift Station for the sewer [well])
- 6) Police Surveillance Unit

VLP also operates 937-939 Barnsdale (Public Works Facility/Office/Garage/ Water Tank Intake Buildings [a/k/a Pump House/Reservoir, Lift Stations]). This building is categorized as a water delivery facility and is included in the Water Delivery Facilities section.

TABLE 5: SOURCES OF GHG FROM FACILITIES

Facility	CO ₂ e Emissions from Natural Gas	% of Sector Emissions from Natural Gas	CO ₂ e Emissions from Electricity	% of Sector Emissions from Electricity	Total CO ₂ e Emissions	Total % Sector Emissions
447 N. Catherine	973	62%	268	17%	1241	79%
1010 E. 31 st Street	300	19%	11	.7%	311	20%
1400 Scotdale	0	0%	5	.3%	5	.3%
1600 Barnsdale	0	0%	5	.3%	5	.3%
3147 Prairie	0	0%	2	.2%	2	.2%
Surveillance Unit	0	0%	3	.2%	3	.2%
Totals	1273	81%	294	19%	1567	100%

TABLE 6: EMISSIONS FROM FACILITIES BY SOURCE

Facility	% of VLP Emissions Natural Gas	% of VLP Emissions Electricity	Total % VLP Emissions
447 N. Catherine	39.6%	10.9%	50.5%
1010 E. 31 st Street	12.2%	.5%	12.7%
1400 Scotdale	0%	.2%	.2%
1600 Barnsdale	0%	.2%	.2%
3147 Prairie	0%	.1%	.1%
Surveillance Unit	0%	.1%	.1%
Totals	51.8%	12%	63.8%

Streetlights, Traffic Signals, and Other Public Lighting

Like most local governments, VLP operates a range of public lighting. VLP has 270 unmetered highway lights and 4 metered street lights. The majority of emissions associated with the operation of this infrastructure are due to electricity consumption. Data relating to electricity consumption for public lighting was obtained from ComEd.

TABLE 7: EMISSIONS FROM PUBLIC LIGHTING

Highway Lights Subsector	Electricity Use (kWh)	metric tons CO ₂ e	% of VLP Emissions
Streetlights - Metered	66,695	47	1.9%
Streetlights - Unmetered	337,719	237	9.6%
Totals	404,414	284	11.5%

Water Delivery Facilities

This sector includes emissions from equipment used for the distribution or transport of water, including drinking water, sprinkler systems and irrigation. VLP operates a range of water transport equipment, including 937-939 Barnsdale (Public Works Facility/Office/Garage/Water Tank Intake Buildings [a/k/a Pump House/ Reservoir, Lift Stations]).

TABLE 8: EMISSIONS GENERATED BY WATER DELIVERY FACILITIES

Facility	metric tons CO ₂ e	% of VLP Emissions	Electricity Use (kWh)	Cost (\$)
937-939 Barnsdale	280	11.4%	399,232.77	\$ 41,457
Totals	280	11.4%	399,232.77	\$ 41,457

Vehicle Fleet and Mobile Equipment

The vehicles and mobile equipment used in VLP's daily operations, burn gasoline, diesel, and other fuels, which results in greenhouse gas emissions. In addition, vehicles with air conditioning or refrigeration equipment use refrigerants that can leak from the vehicle.

In 2009, VLP operated a vehicle fleet with:

#	Type	#	Type
15	Passenger Cars	1	Fire Ladder Truck
4	SUVs	1	Pumper Truck
1	Van	2	Ambulances
7	Light Duty Trucks	1	Fire Truck (Pumper)
8	Heavy Trucks	1	Pumper
1	Street Sweeper		

VLP's vehicle fleet performed a number of essential services, from emergency responses, police patrol, street maintenance and tree trimming.

TABLE 9: LGO PROTOCOL REPORT - VEHICLE FLEET EMISSIONS BY EMISSION TYPE

Department	Gasoline Consumption (gal)	Off Road Diesel Consumption (gal)	Biodiesel Consumption (gal)	Diesel Consumption (gal)	metric tons CO2e (combined)	% of VLP Emissions	Cost (combined)
Police	16,092				145	5.9%	\$ 39,680
Fire	1,505		84.498	4140.402	56	2.2%	\$ 15,793
Public Works	2,852		197.162	9660.938	125	5.1%	\$ 35,370
Building	82				1	0%	\$ 210
Administration	51				0	0%	\$ 132
Misc: 447 Catherine		357			4	.1%	\$ 1002.51
Totals	20,582	357	281.66	13801.34	330	13.4%	\$92,187.39

Next Steps

ICLEI's Five Milestone Process

While VLP has already begun to reduce greenhouse gas emissions through its actions, this inventory represents the first step in a systematic approach to reducing VLP's emissions. This system, developed by ICLEI, is called the Five Milestones for Climate Mitigation. This Five Milestone process involves the following steps:

- Milestone One:** Conduct a baseline emissions inventory and forecast
- Milestone Two:** Adopt an emissions reduction target for the forecast year
- Milestone Three:** Develop a local climate action plan
- Milestone Four:** Implement the climate action plan
- Milestone Five:** Monitor progress and report results

ICLEI's Five Milestones for Climate Mitigation



ICLEI staff is available to local governments who are members and should be contacted to discuss the full range of resources available at each stage of the Milestone process. The following sections provide a glimpse at next steps and help capture the lessons learned in conducting this inventory.

Setting Emissions Reduction Targets

This inventory provides an emissions baseline that can be used to inform Milestone Two of ICLEI's Five-Milestone process—setting emissions reduction targets for VLP's municipal operations. The greenhouse gas emissions reduction target is a goal to reduce emissions to a certain percentage below base year levels by a chosen planning horizon year. A target provides an objective toward which to strive and against which to measure progress.

In selecting a target, it is important to strike a balance between scientific necessity, ambition, and what is realistically achievable. VLP should give itself enough time to implement chosen emissions reduction measures—noting that the farther out the target year is, the more VLP should pledge to reduce. ICLEI recommends that regardless of the chosen long-term emissions reduction target (e.g., 15-year, 40-year), VLP should establish linear interim targets for every two- to three-year period. Near-term targets facilitate additional support and accountability, and linear goals help to ensure continued momentum around local climate protection efforts. To monitor the effectiveness of its programs, VLP should plan to re-inventory its emissions on a regular basis; many municipalities are electing to perform annual inventories. ICLEI recommends conducting an emissions inventory every three to five years.

The Long-Term Goal

ICLEI recommends that near-term climate work should be guided by the long-term goal of reducing its emissions by 80 percent to 95 percent from the 2005 baseline level by the year 2050. By referencing a long-term goal that is in accordance with current scientific understanding, VLP can demonstrate that it intends to do its part towards addressing greenhouse gas emissions from its internal operations.

It is important to keep in mind that it will be next to impossible for local governments to reduce emissions by 80 to 95 percent without the assistance of state and federal policy changes that create new incentives and new sources of funding for emissions reduction projects and programs. However, in the next 15 years, there is much that local governments can do to reduce emissions independently. Additionally, cost saving projects can be undertaken now. There is no need to delay increasing the quality of local government service and operations, while reducing taxpayer costs.

Village of La Grange Park Targets and Guidance

An integral component of the Village of La Grange Park climate protection approach should be the creation of three core emissions reduction targets at the community level: near-, mid- and long term. While these targets are specific to the community-scale, they can be used to inform emissions targets for government operations as well.

Departmental Targets

If possible, ICLEI recommends that VLP consider department-specific targets for each of the departments that generate emissions within its operations. This allows VLP staff to do a more in-depth analysis of what is achievable in each sector in the near, mid and long-term, and also provides encourages department leaders to consider their department's impact on the climate and institute a climate-conscious culture within their operations.

Creating an Emissions Reduction Strategy

This inventory identifies the major sources of emissions from VLP's operations and, therefore, where policymakers will need to target emissions reductions activities if they are to make significant progress toward adopted targets. For example, since Buildings and Facilities was a major source of emissions from VLP's operations, it is possible that VLP

could meet near-term targets by implementing a few major actions within the Buildings and Facilities sector of emissions. VLP's facility at 447 N. Catherine Avenue makes up approximately 80% of emissions from the Buildings and facilities, narrowing the focus of where to implement strategies to reduce emissions. Medium-term targets could be met by focusing emissions reduction actions on the other sectors, and the long term (2040) target will not be achievable without major reductions in all of these sectors.

Please note that, whenever possible, reduction strategies should include cost-saving projects that both reduce costs (such as energy bills) while reducing greenhouse gas emissions. These "low hanging fruit" are important because they frequently represent win-win situations in which there is no downside to implementation. Selecting these projects in the order of largest to smallest benefit ensures that solid, predictable returns can be realized locally. These projects lower recurring expenditures, save taxpayer dollars, create local jobs, and benefit the community environmentally.

Given the results of the inventory, ICLEI recommends that VLP focus on the following tasks in order to significantly reduce emissions from its government operations:

- Comprehensive municipal retrofit of existing buildings
- Switch traffic signals from incandescent bulbs to Light Emitting Diodes (LEDs)
- Change procurement policy to specify high fuel efficiency for each vehicle class.
- Increase office recycling, e.g. paper, cardboard, cans, toner cartridges

Using these strategies as a basis for a more detailed overall emissions reductions strategy, or climate action plan, VLP should be able to reduce its impact on global warming. In the process, it may also be able to improve the quality of its services, reduce costs, stimulate local economic development, and inspire local residents and businesses to redouble their own efforts to combat climate change.