

**District of West Vancouver  
Corporate Greenhouse Gas  
Inventory  
September 2008**





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- Carrie Miller (Streetlights)
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## Executive Summary

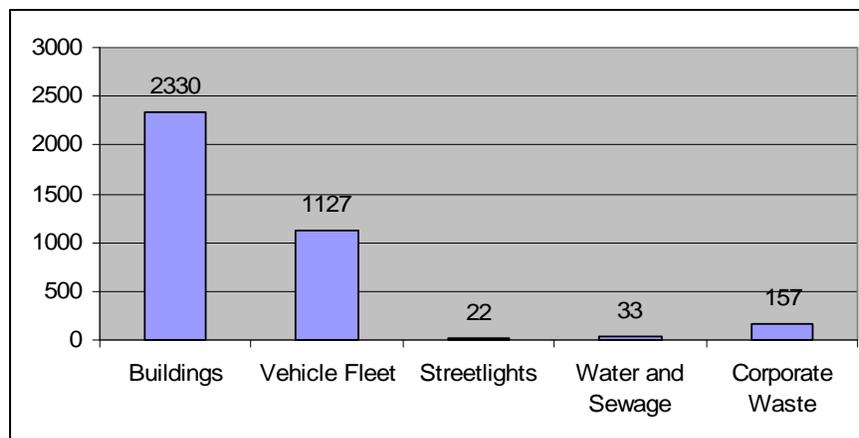
West Vancouver is serious about addressing climate change issues so, in January 2007, the District began an audit of the Carbon Dioxide (CO<sub>2</sub>e) emissions that result from the corporate activities of the 2007 calendar year for the District of West Vancouver (DWV). This report outlines the breakdown of 2007 greenhouse gas emissions from the corporate activities of the DWV. The corporate emissions profile was formed using the protocol created by the Partner for Climate Protection Program, which is a partnership between the Federation of Canadian Municipalities (FCM) and ICLEI- Local Governments for Sustainability.<sup>1</sup>

Each year, the corporate activities of the District of West Vancouver create 3,669 tonnes of CO<sub>2</sub>e. The majority of emissions produced by the DWV corporate activities are from the buildings and vehicle fleet.

The 2007 Corporate Carbon Emissions for the District of West Vancouver are as follows:

- Buildings account for 2,330 tonnes or 64% of the total corporate emissions
- Vehicle Fleet accounts for 1,127 tonnes or 31% of the total corporate emissions
- Streetlights account for 22 tonnes or 1% of the total corporate emissions
- Water/Sewage accounts for 33 tonnes or 1% of the total corporate emissions
- Waste accounts for 157 tonnes or 4% of the total corporate emissions

Figure 1- Corporate Emissions Breakdown by Source (CO<sub>2</sub>e)



<sup>1</sup> FCM Website. Available at: <http://www.sustainablecommunities.fcm.ca/Partners-for-Climate-Protection/>

## Impacts of Climate Change

The Greater Vancouver Region District has outlined that the potential impacts for the GVRC district are as follows:

**1. Rising Sea Levels** – Sea levels are expected to rise at a rate of 2 to 9 mm per year in the Greater Vancouver Regional District. This translates to a 10 to 45 centimetres rise by 2050 and 20 to 90 centimetres by 2100. Thermal expansion of the top ocean layer combined with subsidence in the Lower Mainland by a tectonic effect and/or compaction of the delta sediment pile will be the main cause of this sea level rise. Erosion of cliffs by wave action in areas such as Point Grey will be exacerbated by such a sea level rise. Drainage and sewerage systems could also be negatively impacted in the Lower Mainland. Recreation beaches will be more costly to maintain as a result of rising seas.

**2. Spring Flooding** – Increased winter and early spring precipitation in the Greater Vancouver Regional District and its watersheds may mean that existing flood protection works would no longer be adequate and flood damage could be more severe and frequent near rivers and streams. Increased precipitation would also increase the load on the Lower Mainland regional sewerage and drainage system.

**3. Summer Drought** - Summer soil moisture will diminish in the lower Fraser Valley as temperatures rise, leading to higher summer demand for agricultural and domestic water. Stream flow in late summer and fall will likely decrease in the GVRD and its watersheds, while stream temperatures will rise. This would reduce fish survivability.

**4. Landslides** - Landslides and debris torrents could become more common in steep and unstable terrain in northern areas of the Greater Vancouver Regional District as winter precipitation rises. Water quality in reservoirs, fish and wildlife habitat, as well as roads and other man-made structures could be at increased risk.

**5. Coastal ecosystems** - Increased organic material, increased sedimentation, coastal flooding and permanent inundation of natural ecosystems will occur in low gradient, intertidal areas of the Greater Vancouver Regional District as a result of increased precipitation in winter and rising seas. Some sensitive intertidal ecosystems may not be able to migrate inland as sea levels rise due to the presence of man-made dykes. Sea level rise will also cause salt water to penetrate further inland in the Fraser River and other estuaries, resulting in changes in natural estuarine communities.

**6. Forest fire and pests** – Drier summer conditions in forested areas of the Greater Vancouver Regional District would increase the risk of fire. Milder winters would allow more forest pests, such as mountain pine beetle to survive and multiply.

**7. Coastal infrastructure threats** - Low-lying homes, docks and port facilities may be frequently flooded at high tide in exposed areas of the Greater Vancouver Regional District during severe storms if the sea level rises significantly. Upgrading of existing dykes in low lying areas such as Richmond, Delta and Surrey could be necessary.

**8. Groundwater Impacts** - Sea level rise will raise groundwater levels in low-lying areas of the Fraser valley, forcing additional expenditures on water pumping. Salt water intrusion will affect some wells.

**9. Air Quality Degradation** - In conjunction with the rapid urbanization, air quality may become seriously degraded in the Lower Fraser Valley and the Okanagan Valley as stagnant summer conditions conducive to poor air quality become more common.

**11. Human Health Risks** - Some parasites, such as Giardia, thrive in a warmer climate. Also, fleas and mites that are now killed off completely each winter in the lower Fraser Valley will flourish in a warmer climate.

**12. Recreation** – Winter recreation in the north shore mountains will be affected if warmer temperatures reduce the length of the ski season.

## Methodology

The corporate inventory looks at municipal facilities and operations, including buildings, street lighting, water and wastewater treatment, municipal fleet, and corporate solid waste.

The greenhouse gas inventory was developed by collecting data on:

- Electricity and fossil fuel energy use (for buildings, facilities and streetlights);
- Transportation (such as vehicle kilometers traveled, fleet composition and fuel(s) consumed); and
- The quantity corporate waste.

The Corporate audit data was collected from the 2007 calendar year, from appropriate departments. Greenhouse gas (GHG) emissions are emissions of carbon dioxide

hydrofluorocarbons, methane, nitrous oxide, perfluorocarbons and sulphur hexafluoride. These emissions have varying greenhouse gas warming potential and are measured in tonnes of carbon dioxide equivalent units (eCO<sub>2</sub>).

The District of West Vancouver created an interdepartmental team to undertake and delegate the data collection tasks required to prepare the emissions inventory and forecast. The team included staff from all departments involved in the various sectors (buildings, vehicle fleet, streetlights, water/sewage and waste) contained in the inventory. Information was retrieved from BC Hydro and Teresan gas account records.

## Background/Objective

The District of West Vancouver, as part of our ongoing commitment to create a sustainable future, undertook the task of auditing the GHG emissions that result for the corporate activities of the DWV.

The District of West Vancouver's Official Community Plan "support(s) actions that will demonstrate the Municipality's capacity to be a leader in working towards environmental sustainability."<sup>2</sup> The District of West Vancouver undertook the audit of corporate emissions in order to be able to better understand the sources of emissions



from District activities. In 2007, the District was asked to sign the UBCM Climate Action Charter, which would result in a commitment to be carbon neutral for municipal operations by 2012. Staff and Council decided it would be best to audit emissions before committing the municipality to carbon neutrality.

To audit corporate emissions, a Climate Change Research Analyst (CCRA) was hired and worked with Vehicles Fleet, Facilities, Utilities, Finance and Purchasing departments. The CCRA researched various auditing methods and chose the Partners for Climate

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<sup>2</sup> District of West Vancouver Official Community Plan, pg 85

Protection (PCP) model, FCM/ICLEI, as it appeared to be the most widely accepted across Canada. The PCP program is based on:

“A five milestone framework used to guide municipalities to reduce greenhouse gas emissions. The five milestone process is a performance-based model which remains flexible; milestones do not need to be completed in sequential order.

Each milestone provides an opportunity for municipal capacity building.

The five milestones are:

- Creating a greenhouse gas emissions inventory and forecast
- Setting an emissions reductions target;
- Developing a local action plan;
- Implementing the local action plan or a set of activities; and
- Monitoring progress and reporting results.”<sup>3</sup>

The PCP model was used by the District to audit the corporate emissions. In 2008, the Provincial government of B.C. has announced legislation, Bill 27, which will require municipalities to audit their corporate greenhouse gas emissions<sup>4</sup>. The provincial government of B.C is expected to be releasing a framework for carbon modeling that will be complimentary to the FCM model.

This report outlines the emissions released from the corporate activities for the District of West Vancouver. The emissions audit looked at emissions in five categories; buildings, vehicle fleet; streetlights; water/sewage and waste. The Emissions profile was completed using methodology created and provided by the FCM and ICLEI as part of the Partners for Climate Protection Program.<sup>5</sup> The emissions coefficients were based on the National Pollutant Inventory. This audit will serve as a baseline to track future progress towards reducing greenhouse gas emissions that result from the operations of the DWV. The baseline will also be used to set emission reduction targets, outline cost effective emission reductions and create an action plan for the DWV.

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<sup>3</sup> FCM Website. Available at: <http://www.sustainablecommunities.fcm.ca/Partners-for-Climate-Protection/>

<sup>4</sup> Ministry of Community Services. Available at: [http://www2.news.gov.bc.ca/news\\_releases\\_2005-2009/2008CS0061-000539-Attachment1.htm](http://www2.news.gov.bc.ca/news_releases_2005-2009/2008CS0061-000539-Attachment1.htm)

<sup>5</sup> FCM Website. Available at: <http://www.sustainablecommunities.fcm.ca/Partners-for-Climate-Protection/>

## **Actions to Date**

The DWV is been committed to environmental protection both in the workplace and throughout the community. Efforts have been made to reduce the environmental footprint from many DWV activities and the District staff is continually working to progress forward. Some of the achievements of the DWV are outlined below.

### ***Gleneagles Community Centre***

This District of West Vancouver facility houses a gym, fitness centre, art centre, child care facility, and a customer service and support area that were designed to be universally accessible.

Green features include:

- Building is heated and cooled using a highly efficient ground source heat pump that is connected to radiant heating
- Low-flow showers and toilets, timed showers, and motion-detection urinals were used to reduce water consumption
- Created a wetland on the adjacent golf course and lengthened the salmon bearing stream, Larson Creek. The wetland is fed from two bio-swales that improve the health of the stream and improves storm water management.



### ***Gleneagles Public Safety Building***

This multi-purpose community facility located near Horseshoe Bay houses a regional firehall, community police station, and maintenance facility for the adjacent golf course.

Green features include:

- Siting to maximise daylight
- Pervious pavement to reduce storm water runoff
- Zero-irrigation plants
- Low-flow fixtures and toilets to reduce water consumption
- Low emission products were used through out design

## ***Eagle Lake Green Energy Project***

This project is an award-winning independent energy project. A micro power generation system generates hydroelectricity through a micro-turbine installed in a service reservoir 150m below Eagle Lake. Before the water enters the municipality's water distribution system it flows through the turbine which captures energy that would otherwise be lost. The system produces approx.



1.1 gigawatt-hours per year, equal to 20% of the energy consumed by the District of West Vancouver's operations, or about 90 single family homes.



## ***Aquatic Centre and Arena***

This District of West Vancouver project was undertaken to expand and renovate the 26 year old well used Aquatic Centre and create a building that was more sustainable. Many new technologies were employed including a geothermal heat exchanger and ozone treatment. The Arena has also been outfitted with a new edger and zamboni, which drastically reduces fuel use by the facility.

## ***Supporting Sustainable Transportation***

Sustainable transportation is a cornerstone of the DWV's plan to reach a sustainable environment. Many initiatives have been undertaken to support the District's commitment to sustainable transportation including the introduction of an anti-idling policy throughout the District and the introduction of bio-diesel municipal fleet and hybrid vehicles.

These are just a few of the sustainability initiatives that have been undertaken by the DWV in the last few years. Additionally, an internal Climate Change Steering

Committee, with representatives from: Planning, Lands and Permits; Engineering and Transportation; Parks and Community Services, has been created to guide the Carbon Audit project.

## Corporate Emissions- Breakdown and Discussion

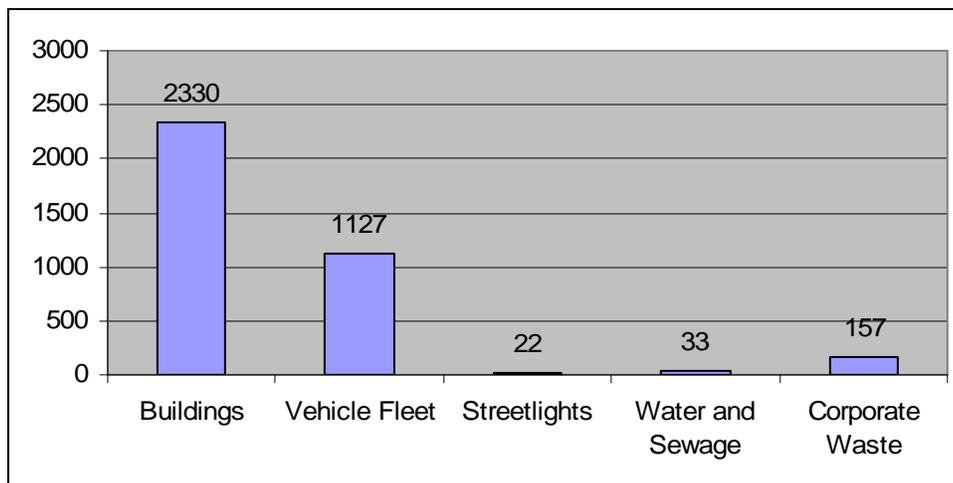
The audit looked the sources that are responsible for the release of greenhouse gases from the day to day activities of the corporation of West Vancouver. Each year, the corporate activities of the District of West Vancouver create 3,669 tonnes of CO<sub>2</sub>e. The majority of emissions produced by the DWV corporate activities are from the buildings and vehicle fleet.

The 2007 Corporate Carbon Emissions for the District of West Vancouver are as follows:

- Buildings account for 2330 tonnes or 64% of the total corporate emissions
- Vehicle Fleet account for 1127 tonnes or 31% of the total corporate emissions
- Streetlights account for 22 tonnes or 1% of the total corporate emissions
- Water/Sewage account for 33 tonnes or 1% of the total corporate emissions
- Waste account for 157 tonnes or 4% of the total corporate emissions

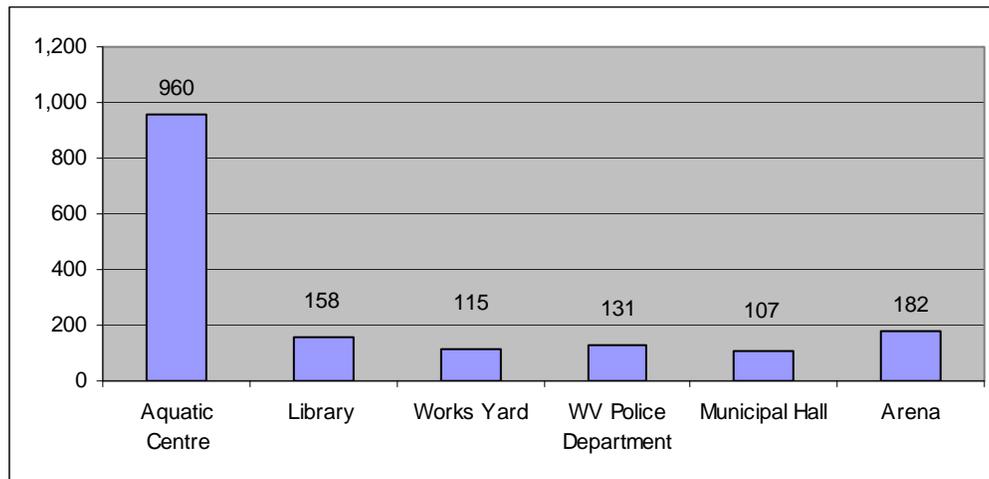
The Corporate Greenhouse Gas Emissions Audit looked at emissions from buildings; vehicles; streetlights; water/sewage; and waste.

**Figure 2- Corporate Emissions Breakdown by Source (CO<sub>2</sub>e)**



The building stock included all building for which the DWV is responsible. There are forty-six municipal buildings; six emit over 100 tonnes of CO<sub>2</sub>e each. The primary fuel for the buildings is electricity but the use of natural gas is a larger contributor to the emissions from buildings. This includes the Municipal Hall, the Works Yard, 4 Fire Halls, 2 Community Centres, the Library and many others. There are 6 buildings that emit over 100 tonnes each are listed in Figure 3

**Figure 3- Top Six Emitting Municipal Buildings**



All vehicles that are owned and operated by the DWV were included in the audit. The vehicle fleet is comprised of 149 vehicles. The DWV uses vehicles in many departments including Parks and Planning, Police and Bylaw enforcement. Staff commuting and personal vehicle use for DWV business were not included. Additionally, some vehicles that were rented through short term rentals were not included. In 2007, the DWV used approx. 11% biodiesel in their diesel fuel and had 2 hybrid vehicles. The amount of biodiesel is limited by weather constraints. Overall, the emissions that resulted from the vehicle fleet in DWV were 1,127 tonnes.

Streetlights include all ornamental and traffic streetlights in the District of West Vancouver. Streetlights in the DWV are responsible for 22 tonnes of CO<sub>2</sub>e yearly. These emissions from streetlights are relatively low in comparison to other municipalities in the

Lower Mainland. This is likely a result of the aggressive replacement/phase out of inefficient streetlights with more efficient streetlights.

Water/sewage emissions are primarily from the energy use required to operate the DWV water/sewer utilities. All utilities and pumping stations that are controlled by the DWV combined release 33 tonnes of CO<sub>2</sub>e. This does not include emissions from the waste produced by the septage in the system. The emissions from the septage emissions are accounted for in the DWV Community Profile, not the Corporate Profile. The emissions from the DWV Water/Sewage system are relatively low. This can likely be attributed to the participation of the DWV in the BC Hydro Powersmart program, which have resulted in upgrades to the pumping system for the community of West Vancouver.

Waste emissions are calculated based on the tonnage of waste sent to landfill. In 2007, the corporate facilities of the District of West Vancouver created 325 tonnes of waste. This waste accounts for 157 tonnes of CO<sub>2</sub>e emissions. This waste includes all waste that is sent to landfill from the facilities that are operated by the DWV.

The emissions from buildings and vehicle fleet account for the majority of emissions for the DWV Corporate emissions. This is typical for corporate municipal operations. This information gathered by this audit is very valuable to the District of West Vancouver. This baseline year will serve as a basis for setting an emissions reduction target and act as a point of comparison for the future. We will soon be releasing a Climate Change Action Plan, which will detail future plans to reduce our emissions.

## **Recommendations and Next Steps:**

- Identify reduction targets for Corporate emissions
- Create an Action Plan to reach targets
- Implementation strategy, including budget implications

Targets form a basis of a municipality program objective and provide a starting point to track progress. For Corporate emissions, the FCM recommends – a 20% reduction below

baseline year GHG emissions within 10 years. Plan to monitor progress towards the emissions reduction target. Outline costs and responsibility for GHG emissions reductions strategy

## References

Federation of Canadian Municipalities

<http://www.sustainablecommunities.fcm.ca/Partners-for-Climate-Protection/>

Facts and Stats, West Vancouver Population Projections. Sources: BC Stats & Statistics Canada

Province of BC- backgrounder, legislation enhances “green’ communities.

[http://www2.news.gov.bc.ca/news\\_releases\\_2005-2009/2008CS0061-000539-Attachment1.htm](http://www2.news.gov.bc.ca/news_releases_2005-2009/2008CS0061-000539-Attachment1.htm)

## Appendix

Common Terms

Examples of actions from other Municipalities

Backgrounder: Civic Centre Site

Backgrounder:

## Common Terms

**Carbon footprint** (CF) is a measure of the impact human activities have on the environment in terms of the amount of green house gases produced, measured in units of carbon dioxide equivalent.

**Carbon dioxide Equivalent** (CO<sub>2</sub>e) is used to measure the global warming potential of greenhouse gas emissions relative to the global warming potential of carbon dioxide. It is used as a baseline because greenhouse gases have different global warming potential.

**Greenhouse Gas** (GHG) is a term referring to the 6 chemicals that have the potential to trap heat in the atmosphere, as defined by the United Nations International Panel on Climate Change.

**Federation of Canadian Municipalities** (FCM) is The Partners for Climate Protection (PCP) - network of 151 Canadian municipal governments who have committed to reducing greenhouse gases and acting on climate change, the Canadian component of ICLEI's Cities for Climate Protection(CCP) network that comprises more than 600 communities world wide making the same efforts. PCP is a partnership between the Federation of Canadian Municipalities (FCM) and ICLEI - Local Governments for

Sustainability. PCP receives financial support from the Green Municipal Fund as part of the Capacity Building Program.

**IPCC Guidelines for National Greenhouse Gas Inventories**, which are used by the Parties for calculating and reporting national greenhouse gas emissions and removals under the Protocol; were first released in 1994 and a revised set was released in 1996. In 2005, however, an IPCC special report suggested that they were insufficient to address certain issues.<sup>27</sup> In April 2006 the IPCC adopted the IPCC 2006 guidelines for National Greenhouse Gas Inventories (hereafter the 2006 Guidelines), which contained for the first time, a complete methodology for the treatment of CCS activities.

(p.9)[http://www.un.org/esa/sustdev/sdissues/energy/op/ccs\\_egm/presentations\\_papers/havercroft\\_paper\\_legal.pdf](http://www.un.org/esa/sustdev/sdissues/energy/op/ccs_egm/presentations_papers/havercroft_paper_legal.pdf)