Climate control

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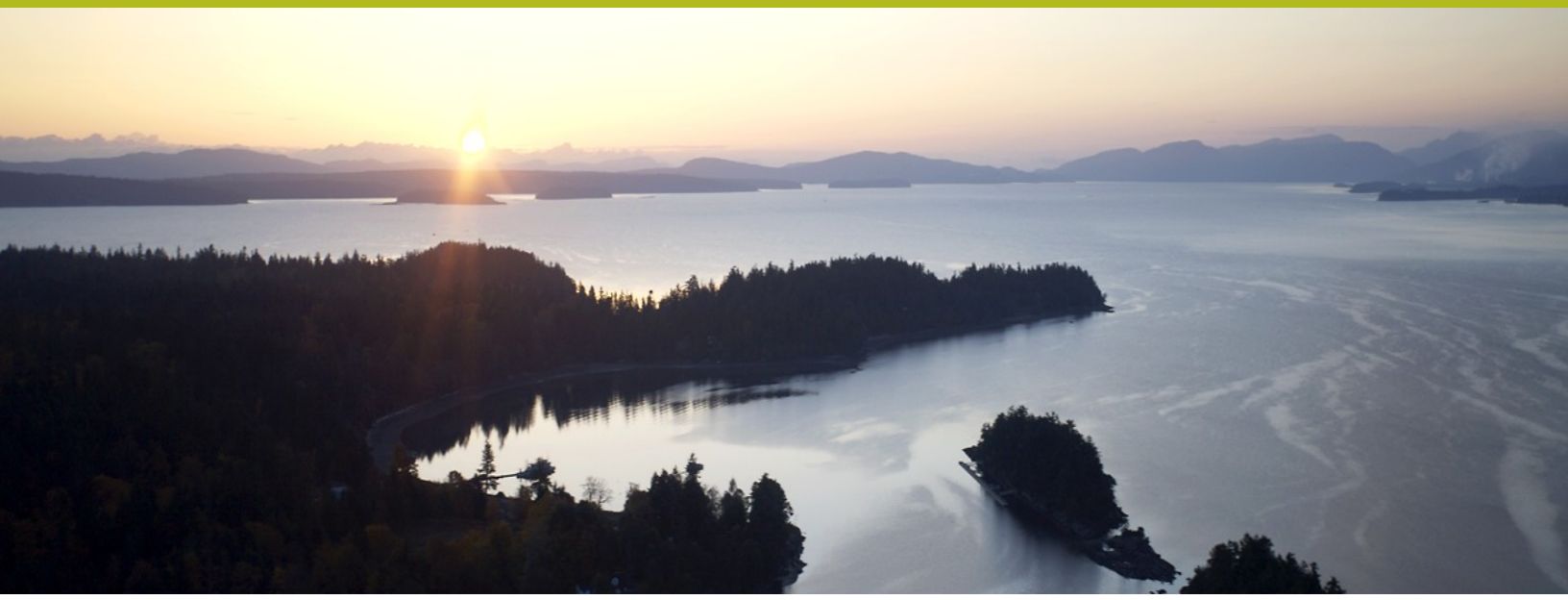

C·V·R·D

Cowichan Valley Regional District

Corporate Greenhouse Gas Inventory & Emissions Reduction Plan 2012

The CVRD's Environmental Policy Division offers information and advice that can help citizens, local government staff and elected officials make better decisions about the regional's environment. Our goal is to ensure our region has clean air, enough water, productive/healthy soil, sustainable resources, and a resilient ecosystem for generations to come. We offer simple cost effective tools and solutions to manage complex environmental challenges such as climate change, pollution, habitat loss and the food and energy needs of a growing population.

CVRD Environmental Policy Division

Executive Summary

The Cowichan Valley Regional District (CVRD) has developed this Corporate GHG Emissions Inventory and Reduction Plan to provide a preliminary road map to reduce energy consumption and GHGs in its corporate operations. This plan is consistent with the Regional District's voluntary commitment to the Climate Action Charter. As a signatory to the Charter, the CVRD is committed to becoming carbon neutral by 2012. In addition this plan seeks to meet the commitments the CVRD has made to the Federation of Canadian Municipalities (FCM) Partners for Climate Protection (PCP) program. This plan establishes a framework for meeting these two commitments by:

- Defining the baseline inventory of all energy consumption and GHG emissions that result from the Regional District's corporate operations
- Identifying measures already initiated by the CVRD that will increase energy efficiency or reduce corporate emissions
- Developing policies and actions to reduce energy consumption and greenhouse gas emissions in four focus areas: buildings, fleet, infrastructure, and purchasing and corporate leadership;
- Outlining a structure for implementation

Corporate Energy and GHG Emissions Profile

In 2011, the CVRD emitted 1857 tonnes of CO_2e in its delivery of its services to the community. The majority of energy consumption occurred in buildings at 72%, with the 3 large recreation centres producing the majority of the GHG emissions. The CVRD Fleet vehicles accounted for 19% of the GHG emissions and infrastructure comprising the remaining 9%.

From 2007 to 2011, the GHG emissions from the CVRD rose by 36%. In the same period, population grew by 4.5%. The current business as usual practices of the CVRD are not sufficient to address the level of energy management required to reduce GHG emissions. Strategic action must be taken above and beyond the business as usual practices in order the reverse this upward trend.

GHG Emissions Reduction Plan

There is a direct relationship between GHG emissions, energy consumption and operational costs. By making operations energy efficient, GHG emissions are reduced as well as operating budgets. Reducing the carbon footprint is best operating practice and allows the CVRD to offer its services with the best possible benefits to all of the community; present and future.

This action plan outlines the climate action commitments the CVRD has made, details the obligations it must meet, provides a snap shot of the current GHG emissions profile, and lays the foundation for a long term strategic energy management plan.

The plan provides eighteen corporate actions across the four areas of the CVRD's operations which will enable the CVRD to make progress in its goal to reduce its corporate GHG emissions. The actions described here have been identified and developed through the strategic energy management practices of successful organizations around the world.

Initiative One - Corporate Leadership

Corporate Action 1	Establish an energy conservation policy that defines specific long term goals/timelines, medium term objectives and measurable annual targets.
Corporate Action 2	Require each CVRD Division to develop an emission reduction plan for their operational activities to assist the CVRD in meeting its commitments.
Corporate Action 3	Create a formal incentive program where an executive sponsor recognizes employees for direct participation in the energy conservation program.
Corporate Action 4	Create a Climate Action Reserve Fund to support Energy Efficiency projects.
Corporate Action 5	Direct Environmental Policy Division staff to undertake detailed analysis of certified offset providers.
Corporate Action 6	Incorporate life cycle costing into operational decision making.
Corporate Action 7	Encourage green procurement.
Corporate Action 8	Incorporate emissions tracking requirements into agreements with CVRD contracted services.
Corporate Action 9	Direct Environmental Policy Division staff to pursue Milestones Two and Three of the PCP framework.

Initiative Two: Building Operations and Construction

Corporate Action 10	Commit to building the most energy efficient and environmentally friendly facilities using a certified standard.
Corporate Action 11	Require an evaluation of alternative energy sources for new construction and major renovations.
Corporate Action 12	Require commissioning on all new construction and major renovations.
Corporate Action 13	Require monitoring, targeting and reporting procedures on all major CVRD buildings.
Corporate Action 14	Eliminate #2 heating oil as a fuel source for heating in CVRD facilities.

Initiative Three: Fleet Operations

Corporate Action 15	Develop a CVRD vehicle purchasing policy.
Corporate Action 16	Implement an efficient vehicle use initiative.

Initiative Four: Infrastructure

Corporate Action 17	Conduct energy efficiency focused operational reviews of infrastructure annually.
Corporate Action 18	Evaluate energy recovery opportunities and carbon offset potential for facilities, and waste management programs.

Over time, some of the actions in this plan may be superseded by more relevant ones but the higher level principles set out here will continue to assist the CVRD to maintain its commitment to reducing energy consumption and GHG emissions. These principles can serve as the guide to future decision making on energy management and GHG emissions reductions.

Implementation

Five implementation activities are outlined that staff are currently involved in or are in planning stages.

Activity 1: Complete Top Level Energy Assessments of all Corporate Assets

Activity 2: Propose a Strategic Energy Policy for Review and Approval

Activity 3: Continue to Refine Corporate GHG emission data

Activity 4: Develop an Accurate Tool for Tracking Fleet Emissions

Activity 5: Report on Progress

These implementation activities provide the forward momentum and groundwork required to further the energy management strategy. They will establish the basis for targeted energy policies, strategic upgrade plans, and foster the necessary communication channels required to embed energy management into ongoing operations.

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1 Introduction

1.1 Climate Change

There is consensus among the international science community that the climate is changing due to human related greenhouse gas (GHG) emissions. The Intergovernmental Panel on Climate Change (IPCC) is the leading international body for assessment of climate change, and through its extensive research has presented substantive evidence of the human effects on the ecology of the planet. In addition, climate change is expected to have serious negative effects on global economic markets and national gross domestic products.

In BC, climate change is expected to bring more extreme and unseasonal weather which could result in seasonal water shortages, potential flooding, impacts on agriculture, and further unpredictable effects on ecological systems. For local governments, this may impact demands on infrastructure, and affect energy and utility loads associated with operating facilities in increasingly variable temperatures.

The BC Climate Action Toolkit[1] estimates that local governments have control or influence over approximately 45% of provincial emissions. Local governments are unique in that they not only have control over their corporate emissions but because of their intimate relationship with the communities they serve, can influence entire community emission trends.

In 2007, the Cowichan Valley Regional District demonstrated its commitment to reducing GHG emissions by signing the BC Climate Action Charter and adopting the Federation of Canadian Municipalities (FCM) Partners for Climate Protection (PCP) program.

1.2 The BC Climate Action Charter

The BC Climate Action Charter is a provincial initiative introduced in September 2007 to encourage local governments to reduce energy and emissions from their operations. As of 2011, 180 of the 184 local governments in BC had signed onto the charter.

Signatory local governments, including the CVRD, have voluntarily committed to the charter and have agreed to develop strategies and take actions to achieve the following goals:

- being carbon neutral[2] in respect of their operations by 2012
- measuring and reporting on their community's GHG emissions profile
- creating complete, compact, more energy efficient rural and urban communities

In order to support and assist local governments in this endeavor, the Province in partnership with the Union of British Columbia Municipalities (UBCM) created the Green Communities Committee (GCC). The GCC works with local governments to develop guidance materials and provide tools and resources to attain their carbon neutral goals.

Signatories to the Climate Action Charter are currently eligible for an annual grant from the Province called the Climate Action Revenue Incentive Program (CARIP)[3]. The grant value is currently equal to the amount of

[1] http://www.toolkit.bc.ca/

[2] achieving carbon neutrality involves reducing GHG emissions where possible, and then purchasing carbon offsets for the remainder

[3] http://www.cscd.gov.bc.ca/lgd/greencommunities/carip.htm

carbon tax paid by the local government and is available to those signatories that complete the annual CARIP report. This funding supports local governments in their effort to reduce GHG emissions and move forward on achieving their Charter commitments.

1.3 Partners for Climate Protection (PCP) Program

In addition to the CVRD's commitment to the BC Climate Action Charter, in 2007 it joined the Federation of Canadian Municipalities (FCM) program: Partners for Climate Protection (PCP). The PCP is the Canadian component of a larger international local government network, which involves more than 900 communities worldwide.

Along with its other 237 partner governments across Canada, the CVRD has resolved to achieve the milestones set in the PCP 5-milestone framework[4]. The five milestone process is a performance-based model designed to guide municipalities to reduce GHG emissions, each milestone providing an opportunity for municipal capacity building.

The five milestones are:

Milestone 1 - Creating a greenhouse gas emissions inventory and forecast

Milestone 2 - Setting an emissions reductions target

Milestone 3 - Developing a location action plan

Milestone 4 - Implementing the location action plan or a set of activities

Milestone 5 - Monitoring progress and reporting results

Through this report and the Community Energy and Emissions Inventory (CEEI) report[5] provided by the provincial government, the CVRD has completed the requirements of Milestone 1. It is strongly suggested that the CVRD continue with the next milestones with Milestones 2 and 3 to be completed by 2014. The FCM's Green Municipal Fund currently provides grants for up to 50% of costs for completion of PCP Milestones 2 and 3.

1.4 The Business Case

While there is already justification for climate action based on the ecological damage caused by human GHG emissions, investing in emission reductions also generates a wide range of far-reaching benefits. These benefits can be both quantitative such as direct energy savings and qualitative like improved employee morale, public health, and public influence.

Historically, there has been a misconception that being environmentally and socially responsible is inherently more expensive. By utilizing modern accounting practices that go beyond traditional corporate methods, there is a compelling business case that justifies climate protection and allows local governments to realize new advantages for its communities. Increasingly, both public and private organizations including governments around the world are using both "life cycle costing" (LCC) and "triple bottom line"[6] accounting,

[4] http://www.fcm.ca/home/programs/partners-for-climate-protection/milestone-framework.htm
[5] http://www.env.gov.bc.ca/cas/mitigation/ceei/reports.html
[6] International Council for Local Environmental Initiatives. The Business Case for Local Government & Triple Bottom Line. http://www.iclei.org/anz/tbl/toolkitcontents.htm

frameworks that informs and reviews environmental, economic, and social performance. (see Appendix A for further information on these topics)

These are the tools that allow the governments to create a road map and point its community in the right direction. Each local government business case for cutting GHG emissions is unique and reflects a community's values, principles, and needs. It clearly spells out the investment required to reduce emissions and costs, how long it takes to achieve savings, and the direct and indirect benefits to the community.

For the CVRD, it is essential to create this broad vision demonstrating the positive economic, social, and environmental benefits in developing a GHG reduction and sustainability plan. Through its corporate actions, the CVRD can lead by example, showing how GHG emissions reduction and management can foster the local green economy, advance technological innovation and save money through reduced energy costs.

2 Background and Context

2.1 Carbon Neutrality

The Cowichan Valley Regional District has committed to become carbon neutral in its corporate operations beginning in 2012, as outlined in the Climate Action Charter. Achieving carbon neutrality in local government operations entails the following:

- Measure - Establish a baseline of annual GHG emissions
- Reduce - Reduce emissions as much as possible through annual reduction measures
- Balance - Balance/offset emissions to net the remaining emissions to zero
- Report - Publicly report on its GHG Emissions profile and actions annually

For most government agencies including the CVRD, carbon neutrality will be accomplished through a combination of reduction measures and offsets since it is extremely difficult to completely reduce emissions given the dynamic nature of governance and the continued growth of the community it serves. The process is cyclical, occurring each calendar year, offering the benefit of reviewing the effect of previous actions and allowing the CVRD to target those areas that offer the greatest benefit.

Measurement

Through the GCC and Province, a consistent standardized approach to GHG measurement has been developed outlining emission factors for various fuel types, including energy conversion factors and global warming potentials (GWP) for a B.C. specific context. (See Appendix B for details)

Emission Boundaries

GHG emissions are a direct product of energy use in corporate operations. The Climate Action Secretariat clearly outlines the measurement boundaries in order to maintain a consistent approach for carbon reporting across the province.

The boundaries are defined as 'Traditional Municipal Services' and are listed below:

- Administration and Governance
- Drinking, Storm and Waste Water
- Solid Waste Collection, Transportation and Diversion
- Roads and Traffic Operations
- Arts, Recreation and Cultural Services
- Fire Protection

Local governments are required to report on emissions that are directly related to these services *if* they provide them. In addition, they are required to include GHG emissions from contracted services ("contracted emissions") as part of their carbon neutral commitment. (see Appendix E for details)

Balance and Offsetting Corporate GHG Emissions

To achieve carbon neutrality under the Climate Action Charter, governments must find ways to balance their GHG emissions each year. The GCC Carbon Neutral framework sets out 3 distinct options to achieve this:

Option 1 - Invest in GCC Supported Projects - allows local governments to invest locally (*outside* the corporate emission boundary) while also ensuring that projects are credible and result in measurable GHG reductions. The GCC currently provides four types of projects:

- energy efficient building retrofits/fuel switching
- solar hot water
- household organic waste composting
- low emissions vehicles

Option 2 - Invest in Alternate Community GHG Reduction Projects - allows for project ideas beyond option 1 that could be undertaken *outside* their corporate emissions boundary

Option 3 - Purchase Offsets from a Credible Provider - a simple and cost effective way for most local governments to offset their corporate emissions. Although this is a relatively inexpensive and simple option, its disadvantage is that offsets will likely not occur within the community.

Local governments can pick any combination of the 3 options to balance/offset their annual GHG emissions.

Carbon Costs and Rebates

Local governments in BC currently have 2 carbon liabilities - first is the BC "carbon tax" associated with fossil fuel purchase, and the second is the voluntary purchase of carbon offsets to become carbon neutral (currently priced at $25/tonne in BC). At its 2011 GHG emission rate, the CVRD would have to invest approximately $49,000 to meet its carbon neutral commitment.

At the current time, both of these carbon costs have been waived for governments working toward carbon neutrality. The carbon tax is currently being refunded as a grant under the CARIP program.

With the recognition that achieving carbon neutrality is a challenging endeavor, In June 2011 the GCC developed a proposal to local governments called *"Making Progress toward Carbon Neutrality"*. The intent is to provide some flexibility for signatories who may not be able to achieve the 2012 target date.

This approach allows, in the short term, governments to demonstrate their commitment to GHG reductions by completing some of the requirements (eg. measure, reduce, report) to be designated "making progress towards" but not claim "carbon neutral" in their public reporting.

It is important to note that these are both the CARIP and "Making Progress Towards" are assistance measures enacted to enable local governments in their transition to carbon neutral in the short term with the savings intended to be used to help in the transition.

Climate Action Reserve Fund

One concept that is being adopted by some local governments that are "making progress towards carbon neutrality," is to set aside the dollars that they would otherwise use to purchase offsets in the Carbon Neutral framework. These funds are put into a climate action reserve fund to budget for future emission reduction projects, support local climate actions, and purchase future carbon credits.

2.2 Unique Considerations for the Cowichan Valley Regional District

Like many Regional Districts, the CVRD has unique considerations which may provide some challenges when managing energy and GHG emissions.

Large and Geographically Diverse Service Areas

The CVRD service area spans four municipalities and nice electoral areas, spreading over 349,446 hectares (3,494 kilometers). Facilities, vehicles, and services are dispersed accordingly.

In addition, the distribution of the population throughout the municipalities and regional electoral areas offers unique funding and service challenges.

Regional District Structure

Because regional districts are required to match the benefits and costs of its services to the people that benefit from the service, it can be challenging to allocate resources for broader projects that benefit the greater population.

The distributed management of assets, particularly in facilities also offers challenges in developing common best practices and advancement in energy management.

A Climate Action Reserve Fund may assist in bridging these difficulties by using funds from its own reserve pool solely for the purpose of achieving climate action goals and objectives.

Fleet

The CVRD operates a relatively small number of fleet vehicles, with many performing multiple tasks in varied locations across a large geographic area. Additionally, the CVRD operates specialty vehicles (e.g. fire trucks and ice resurfacing machines), some without alternatives and others only available at considerable investment.

In addition, the CVRD currently contracts its curbside collection to a third party collector on its behalf. Controlling third party emissions is an additional challenge and must be communicated in policies for RFPs and contracts. This is currently not accounted for in the CVRD's GHG emissions profile but will be added as per the GCC requirements.

Fuel Types

The CVRD has 119 BC Hydro electrical accounts, 7 Fortis BC natural gas accounts, as well as several propane and multiple heating oil accounts. Because of the diversity of the region, certain fuels are unavailable in certain areas making fuel switching choices limited and on a case-by-case situation.

The CVRD currently consumes electricity, natural gas, propane, #2 heating oil, and biodiesel in its buildings and gasoline, diesel, biodiesel, and electricity in its fleet.

Regionally Shared Facilities and Services

In the CVRD a range of municipalities and electoral areas contribute funding for the operation and maintenance of regional recreation facilities. Under the recommendations of the GCC it is appropriate to allocate GHG emissions from these shared functions according to the funding model. This needs to be confirmed and adopted by all parties so GHG emissions are accounted for accurately.

Staff Resources

Buildings, infrastructure and fleet are managed by regional district staff who are limited in time, resources, and knowledge to pro-actively manage energy use and implement energy efficient policies and upgrades on their own.

2.3 GHG Emissions Inventory Methodology

The CVRD's initial GHG inventory and analysis for 2007 was built on an analysis of the CVRD financial records and systems for each year since 2007. This required systematically retrieving financial records for purchases of energy related to building and utility use and calculating GHG emissions based on volume or unit of energy consumed. Totaling these for the entire year determined the overall CVRD emission picture. The financial records system was not designed to extract data of this sort and in this manner. For example, while records of gasoline purchase costs were available through the financial records, volume of fuel used was unavailable. In addition, it was difficult to allocate the fuel use to a particular division or vehicle. As such, a number of proxies where required in the beginning to provide general or adjusted estimates of fuel use or user groups.

Working with the finance department during the 2008 period provided an opportunity to track energy purchases for cost, volume and ownership being a component of the primary procedures within the accounting department. This reduced the need to have additional staff retrieve records to duplicate input and analysis.

In 2008, the initiative focused on working with the provincial government and the provincial Green Communities Committee to explore how local governments could develop a standardized methodology for systematically developing meaningful inventories of emissions.

In 2010, the Environmental Policy Division in partnership with the CVRD Finance Department developed an approach and shared mechanism to more strategically align existing billing and financial tracking of energy and GHG based data across the organization. Working with the province, the CVRD was chosen as a regional district case study to trial the provincial online software "SMARTTool". This resulted in the CVRD having increased capacity and the support of the Provincial Government to fast track collection and communication of their emissions data. The CVRD was also able to contribute recommendations to the Union of BC Municipalities (UBCM) working group, which advised that all local governments utilize the provincial software as a cost effective and user friendly reporting tool.

In 2011, increased staff capacity in the Environmental Policy Division in the last quarter of 2010 and first quarter of 2011 resulted in an ability to produce a corporate inventory that is meaningfully derived from refined data relevant to specific corporate business lines and activities. With the introduction of the Senior Environmental Analyst – Energy position in 2012, further refinements of the system and data has been possible. This increased capacity to review and analyze data on a more frequent basis will allow the development of highly accurate accounting of GHG emissions, the fuel sources it's derived from, and strategies to reduce them.

The CVRD has continued to work with the GCC, further refining the "SMARTTool" software by requesting data capabilities to include the ability to report fuel consumption and GHG emissions on a per vehicle basis. This is possible for the CVRD because of the use of individual fuel cards for each fleet vehicle. This level of view combined with annual mileage data will offer great insight into fleet vehicle use and allow for strategic targeting of GHG emissions reductions for division managers and fleet purchasers.

Future Inventory Inclusions

In order to meet the GCC guidelines for GHG emissions reporting, the CVRD must include fossil fuels from contracted services as outlined in the requirements in Emissions Boundaries section of this report. In addition, the CVRD will also include the proportional energy use of the Economic Development Division who lease office space in the Community Futures building on 135 Third Street.

3 CVRD Energy and GHG Inventory

3.1 2011 Energy Consumptions and GHG Emissions Profile

In 2011, GHG emissions from the Cowichan Valley Regional District corporate operations resulted in 1857 tonnes of CO_2e. A summary of GHG emissions by sector is provided in Table 1.

Table 1: Corporate GHG Emissions by Sector (2011)

Sector	GHG Emissions (tonnes of CO_2e)
Buildings	1,417
Vehicle Fleet	342
Water and Sewage	80
Solid Waste	12
Streetlights	6
Total	**1,857**

Buildings within the CVRD have the majority of GHG emissions producing 72% of the total emissions. This is not surprising since the CVRD operates 3 major recreation centres with highly energy intensive ice skating arenas. A summary of energy consumption and GHG emissions by energy source is showed in Table 2 for buildings and infrastructure.

Table 2: Building and Infrastructure GHG Emissions by Energy Source (2011)

Source	Energy Consumption (GJ)	GHG Emissions (tonnes of CO_2e)
Electricity	35,699	246
Natural Gas	17,940	895
#2 Heating Oil[7]	2,796	200
Propane	2,661	162
Diesel[8]	94	6.8
Total	**59,188**	**1510**

CVRD buildings are consuming the greatest proportion of energy and emitting the largest amounts of GHG emissions. Within these buildings, heating and cooling systems can account for up to 60% of energy use in the building and offer the greatest opportunities for GHG emission reductions. System re-commissioning, fuel switching and accelerated upgrades of heating systems to high efficiency units with better controls can potentially provide a 10-20% reduction in GHG emissions.

[7] #2 heating oil used by the CVRD is BioHeat from Columbia Fuels which has 5% Biodiesel, a carbon neutral component

[8] Used for backup generators

Table 2 also clearly shows the difference in GHG emissions between hydro electrical sources compared to its fossil fuel counter parts. While the energy consumption of electricity was almost 13 times greater that of #2 heating oil, the GHG emissions are only 1.23 times larger. A retrofit of building heating systems to replace heating oil furnaces and boilers with high efficiency electric heat pumps would reduce the CVRD's overall GHG emissions by almost 10%.

More detailed reporting into the building energy systems of the CVRD will be provided in the upcoming energy management first quarterly report from the CVRD Energy Analyst in December 2012.

Table 3: Fleet GHG Emissions by Energy Source (2011)

Source	Energy Consumption (L)	GHG Emissions (tonnes of CO_2e)
Gasoline	52,247	125
Diesel	83,171	222
Propane	2,012	3
Marine Gasoline	400	0.92
Total		**351**

Table 3 displays emissions by fleet fuel source. Within the CVRD fleet, diesel fuel has the highest volume consumption and has the highest overall GHG emissions. There is potential to reduce diesel fuel consumption through the use of carbon neutral biodiesel produced locally by the Cowichan Biodiesel Co-Operative. An initiative has already started in this direction and should be supported and continued. A 25% use of biodiesel in the CVRD fleet will reduce GHG emissions from diesel by the same amount.

Propane is consumed for the ice resurfacing machines operated at the 3 arenas. There are now options for electric machines that will eliminate this propane consumption. Although, initial investment is high for these machines there are additional benefits for the ice arenas including better air quality and reduced heating load for the cooling system.

Gasoline consumption can be targeted by examining fleet vehicles and use by departments and examining the viability of alternative options such as hybrids and high efficiency vehicles.

Emissions by Division

For the CVRD it is useful to examine GHG emissions from a division standpoint. It offers a useful view for understanding the balance of emissions and a starting point for the strategic targeting of emission reductions.

Table 4: Stationary GHG Emissions by CVRD Division (2011)

CVRD Divisions	GHG Emissions (tonnes of CO_2e)	Carbon Offsets Required (@$25/tonne)
Administration and Governance	13.71	$343
Drinking, Storm and Waste Water	194.39	$4,860
Parks, Recreation, Culture	1346.66	$33,667
Public Safety	57.06	$1,425
Recycling and Waste Management	11.49	$287

Street Lighting	6.29	$157
Total	**1629.6**	**$40,740**

From Table 4, it is clear that the majority of stationary GHG emissions arise from the large recreation centres and arenas operated by the Parks, Recreation and Culture division. The second largest producer of GHG emissions is the Drinking, Storm and Waste Water division infrastructure.

Included in the table is the carbon offset value required to meet the Climate Action Charter commitments. This is an important area for discussion by the CVRD as it decides how to allocate funds to meet its carbon neutral commitments and where these funds should originate from.

Table 5: Fleet GHG Emissions by CVRD Division (2011)

CVRD Division	GHG Emissions (tonnes of CO_2e)	Carbon Offsets Req'd (@$25/tonne)
Administration and Governance	19	$482
Drinking, Storm and Waste Water	0.55	$14
Parks, Recreation, Culture	50	$1250
Public Safety	31	$786
Recycling and Waste Management	240	$6000
Total	**342**	**$8550**

Table 5 displays the GHG emissions from fleet vehicles for 2011. Further investigation is required into the value derived for the Drinking, Storm and Waste Water division as this value is much lower than previous years.

In future reviews of fleet there will be available detailed data on a per vehicle basis, including annual mileage. This will provide insight into the way vehicles are used by each department allowing for "right-sizing" and development of a fleet GHG emissions reduction strategy.

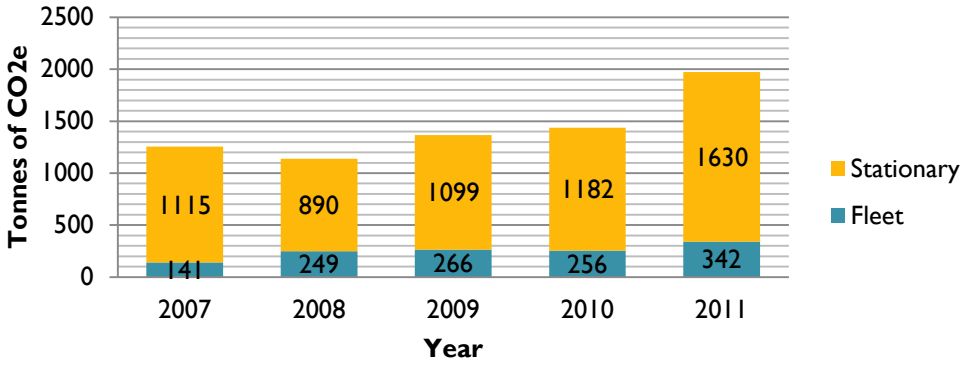
GHG Emissions 2007-2011

As the corporate operations of the CVRD are a dynamic and evolving system, it is useful to examine the change in the GHG Emissions profile over time.

Figure 1 shows that over the 5 years since the CVRD signed the Climate Action Charter, GHG emissions from corporate operations has grown overall by 36%. Fleet emissions have increases by 141% while stationary emissions from buildings and infrastructure have gone up by 46%.

Increase in emissions over this period can be attributed to growth in population; increase in number of CVRD managed infrastructure and services; an increase use of recreation facilities; climatic changes and the aging of equipment and infrastructure. It is clear however, that there is significant work to be done to manage emissions and reverse this upward trend.

Figure 1: CVRD GHG Emissions 2007-2011[9]



GHG Emissions Forecast

As per the requirements of the PCP Milestone One, a ten year forecast of GHG emissions was developed for the period of 2011 to 2023. The Business as Usual (BAU) forecast is driven by an 11% population growth for the period[10], and future plans for construction and infrastructure. It also considers both natural efficiency improvements in technologies and efficiency improvements expected as a result of senior government policy. The BAU is a guideline of where things could go if no action is taken by the CVRD.

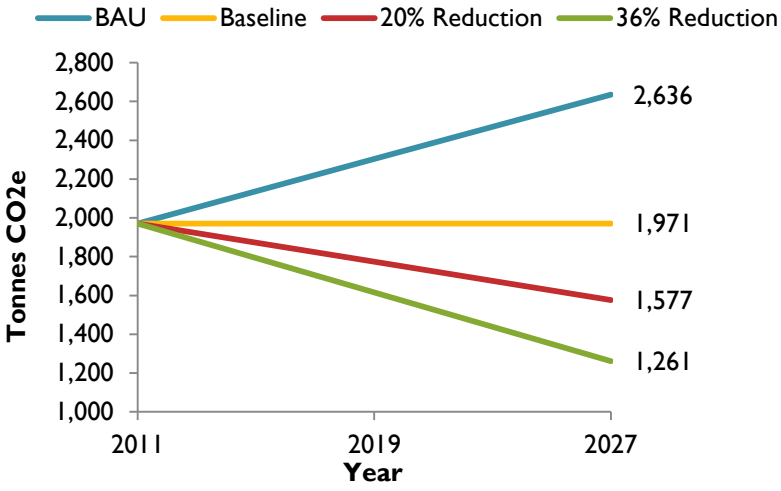


Figure 2: CVRD GHG Emissions Forecast 2011-2023

The 20% reduction forecast shows the suggested target for PCP Milestone 2 and the 36% reduction is to illustrate the required reduction to achieve 2007 emissions levels.

A strategic GHG emissions management program can help to reverse the upward trend of GHG emissions. By intimately understanding the cause and effect relationship between energy use and emissions in each of its operations, it is possible for the CVRD to gain control over its energy use and significantly reduce its corporate GHG emissions.

[9] Figure 1 displays gross emissions

[10] BCStats – Population Estimates
http://www.bcstats.gov.bc.ca/StatisticsBySubject/Demography/PopulationEstimates.aspx

4 Developing a Strategic Plan

4.1 Current Emissions Initiatives

In developing a plan for GHG emissions reductions it is useful to examine current energy management practices for facilities and fleets. Since energy use is directly linked to GHG emissions, this initial examination can provide important insight into the current practices for energy management, existing fuel sources, building use, age of equipment and fleet operation and management. In addition, this overview allows for an understanding of the culture of the organization and attitude towards energy conservation. Further discussion on the findings of the facility operations will be provided by the Energy Analyst in an energy management report in December 2012.

Provided here is an overview of some of the major energy conservation and GHG emission reduction projects being undertaken by the CVRD in the last few years.

Facilities and Infrastructure:

Facility and infrastructure operations are constantly maintaining and upgrading their equipment to maintain reliability and to keep their services operational for the public. In addition, facility managers and infrastructure operators are looking for cost savings by implementing energy reduction initiatives.

Some examples of recent upgrades include major lighting retrofits at all of the recreations centres, heating system upgrades, motion sensor controls, motor control upgrades for water systems, and various heat recovery projects.

Fleet:

A number of departments at the CVRD are purchasing biodiesel for use in their associated fleet vehicles. The emissions from biodiesel are considered carbon neutral, and are exempt from offsetting. In association with the Cowichan Biodiesel Co-Operative, there is a biodiesel/diesel blending pump being installed at the Bing's Creek Solid Waste Management Complex that will allow diesel CVRD fleet vehicles to select the appropriate blend for their equipment and time of the year.

Many of the departments are also selecting gas/electric hybrid vehicles for their fleet, improving the gas mileage of their vehicles and significantly reducing the resulting emissions from gasoline usage. In addition, the Engineering and Environment department purchased a Nissan Leaf, plug-in electric vehicle that is 100% electric and emission free.

The transit department has received a grant and is also in the process of installing 3 electric vehicle charging stations – one at each of the recreation centres to be completed in 2012.

Corporate Leadership:

In the summer of 2011, CVRD management participated in a BC Hydro energy management assessment (EMA) workshop with the goal of depicting the current overall business practices of the CVRD and provide a road map for the development and implementation of a Strategic Energy Management Plan.

With support funding from BC Hydro, the CVRD was able to hire an Energy Analyst in September 2012 dedicated to the management of the energy conservation program, execution of technical projects, and to provide a comprehensive assessment of energy efficiency opportunities.

The CVRD energy analyst has been taking the first steps towards developing the strategic energy management plan. Review of the corporate assets, energy accounts, division operations, and personnel as

well as current energy management practices will be available in the first quarterly Energy Management report, December 2012. Additionally, the first quarterly report will provide guidance on setting energy reduction targets, policy to be adopted, and key areas that require further analysis.

4.2 Action Plan Development

The strong upward trend in GHG emissions at the CVRD juxtaposed against the current GHG emission initiatives clearly shows that a more strategic approach is required to manage energy use and reduce GHG emissions. The CVRD is not alone in facing these challenges as globally, governments and private organizations seek ways to cut energy use and GHG emissions.

Out of this global effort towards sustainable operations, a common thread has appeared in those organizations that have been successful. For all of them, the most important factor has been the development of an Energy Management System, including annual Strategic Energy Management Plans with short term targets chosen to meet the organizations longer term environmental goals.

In North America, the biggest leader in this field in the private sector has been the company 3M, who have had an energy management program since 1973. 3M's energy management program is at the heart of its operations, integrated into the corporate strategic planning process and sets oversight and guidance for division level planning. The program has resulted in an 80% improvement in its energy efficiency since its inception and continues to deliver energy efficiency and environmental benefits year after year.

The City of North Vancouver has had an energy management plan in place since 2005 and has been using strategic energy management practices to identify and set targets for reducing their corporate GHG emissions. In 2005, the city of North Vancouver council adopted policy to reduce corporate GHG emissions by 20% below their 1995 baseline by 2010. In 2011, through a complete review of their energy management plan the city set new goals for a 25% reduction of GHG emissions by 2020 below their 2007 baseline with interim targets of 5% by 2013 and 15% by 2016. In addition, the city of North Vancouver completed the 5th milestone of the Partners for Climate Change program in 2010, the third municipality nation-wide to do so.

In July 2011, the International Organization for Standardization (ISO) released ISO 50001, a specification created for "for establishing, implementing, maintaining and improving an energy management system, whose purpose is to enable an organization to follow a systematic approach in achieving continual improvement of energy performance, including energy efficiency, energy security, energy use and consumption."[11]

As the CVRD moves forward with its plans for GHG Emissions reduction it is imperative that the organization works through such a framework in order to deliver continual progress on its commitments to carbon neutrality. This plan provides actions that will begin to create this necessary structure for energy management.

[11] http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=51297

5 Foundations of a Strategic Energy Management Plan

5.1 Energy and GHG Emissions Policy Statement

This GHG reduction plan suggests a number of actions for the CVRD to pursue based on the best available information at this time. There will always be new ideas and opportunities that present themselves in the future, to better address our energy use and resulting emissions. As such, it is important to capture the key principles of the plan and use them to guide and evaluate those future initiatives.

Policy Statement:

The CVRD will conduct its operations with continual attention paid to reducing energy use and associated greenhouse gas (GHG) emissions, as it strives to lead by example in moving towards a resilient community.

This will be achieved by:

- Explicitly defining energy efficiency and GHG emission considerations in capital spending and operational activities;
- Building strong business cases to demonstrate that GHG reduction, energy savings and operational improvements are cost effective;
- Instilling a culture of energy conservation in its organization and staff; and
- Reporting to its community the activities it is pursuing and the benefits achieved.

5.2 Action Plan Areas

This reduction plan recommends a range of initiatives and actions in four areas of the CVRD's operations: Building/Facility Operations, Fleet Operations, Infrastructure, and Corporate Leadership. The suggested corporate actions fall within the following categories depending on how they impact consumption and emissions:

(i) *Direct* – actions by which the CVRD identifies and implements specific activities which will conserve energy in their operation. These include building audits and retrofits, vehicle downsizing, etc. and often have an immediate cost associated with them.

(ii) *Strategic/Policy* – initiatives whereby the CVRD outlines key principles and activities for guiding actions. These initiatives may not achieve immediate impacts, but through board and staff endorsement they guide future activities. These policies can better inform future decision making and instill energy conservation within the corporate structure.

(iii) *'Lead by Example'* - Behavioral actions which improve the culture of conservation, waste reduction and sustainability. These measures are broader than exclusively energy management or GHG emissions and while some of these actions may have smaller emissions savings they have a substantial demonstration value. Leading by example may reduce emissions amongst staff or in the community that aren't formally included in the CVRD's corporate inventory.

5.3 Action Plan Summary

Initiative One - Corporate Leadership

Corporate Action 1 Establish an energy conservation policy that defines specific long term goals/timelines, medium term objectives and measurable annual targets.

Corporate Action 2 Require each CVRD Division to develop an emission reduction plan for their operational activities to assist the CVRD in meeting its commitments.

Corporate Action 3 Create a formal incentive program where an executive sponsor recognizes employees for direct participation in the energy conservation program.

Corporate Action 4 Create a Climate Action Reserve Fund to support Energy Efficiency projects.

Corporate Action 5 Direct Environmental Policy Division staff to undertake detailed analysis of certified offset providers.

Corporate Action 6 Incorporate life cycle costing into operational decision making.

Corporate Action 7 Encourage green procurement.

Corporate Action 8 Incorporate emissions tracking requirements into agreements with CVRD contracted services.

Corporate Action 9 Direct Environmental Policy Division staff to pursue Milestones Two and Three of the PCP framework.

Initiative Two: Building Operations and Construction

Corporate Action 10 Commit to building the most energy efficient and environmentally friendly facilities using a certified standard.

Corporate Action 11 Require an evaluation of alternative energy sources for new construction and major renovations.

Corporate Action 12 Require commissioning on all new construction and major renovations.

Corporate Action 13 Require monitoring, targeting and reporting procedures on all major CVRD buildings.

Corporate Action 14 Eliminate #2 heating oil as a fuel source for heating in CVRD facilities.

Initiative Three: Fleet Operations

Corporate Action 15 Develop a CVRD vehicle purchasing policy.

Corporate Action 16 Implement an efficient vehicle use initiative.

Initiative Four: Infrastructure

Corporate Action 17 Conduct energy efficiency focused operational reviews of infrastructure annually.

Corporate Action 18 Evaluate energy recovery opportunities and carbon offset potential for facilities, and waste management programs.

5.4 Initiative One: Corporate Leadership

The CVRD will assume a leadership role in developing policies that contribute to the reduction of energy and GHG emissions in its current and future building and fleet operations. It will also lead by example and develop awareness among the community. Initiatives pursued as part of this plan should be highlighted in public documents such as Annual Reports and through existing CVRD communication strategies such as the website, newsletters and press releases.

Corporate Action1: Establish an energy conservation policy that defines specific long term goals/timelines, medium term objectives and measureable annual targets

Action Type: *Policy*

This will establish the necessary infrastructure to integrate the energy management /emissions reduction program into the overall operating systems for the CVRD. Quantified goals and timelines are of critical importance for framing the vision of this initiative to the whole organization.

The lack of quantitative goals and timelines makes it difficult to understand what will be considered success with regards to energy conservation, measure progress towards successful completion, allocate resources accordingly to obtain the desired result, and keep stakeholders motivated as they have no milestones against which to determine progress.

Therefore, any effective energy policy statement must include quantitative goals and timelines that clarify expectations and will enable the CVRD to establish concrete plans for projects, initiatives, and the resources required for delivery.

Corporate Action 2: Require each CVRD Division to develop an emission reduction plan for their operational activities to assist the CVRD in meeting its commitments

Action Type: *Policy*

As part of the energy management program, this will allow each department to directly engage in the GHG emission reduction plan by better tracking the energy use and GHG emissions resulting from day to day operations, decision-making, and capital purchases. As many departments are making positive choices concerning energy, this will be a tool to account for the various improvements made and track their effectiveness after implementation.

Corporate Action 3: Create a formal incentive program where an executive sponsor recognizes employees for direct participation in the energy conservation program.

Action Type: *Policy*

In order to further the GHG reduction initiative, the CVRD should consider a formal incentive program where employees are recognized by an executive sponsor for direct participation in the energy conservation program as a way of adding additional motivation to energy efficiency.

Staff are at the core of the organization and on the front lines with dealing with energy systems. They often have unique and innovative ideas that can only be born out of day-to-day interaction with their processes.

An incentive program can successfully use positive motivation as a way to increase employee engagement, drive innovation, maintain a culture across divisions, and open communication between employees and senior management.

Corporate Action 4: Create a Climate Action Reserve fund to support energy efficiency projects

Action Type: *Policy Direct*

The CVRD will explore opportunities to create a dedicated fund for energy management and GHG reduction activities.

Within a regional district, the clearly delineated functions and related funding can create disadvantages for incorporating longer term and broader reaching energy efficiency projects. This is an issue that has been a consideration from all levels of the organization.

Currently, CARIP grant money is set aside each year in the general funds with expenditure handled by the Environmental Policy Division. This is an excellent start to the program and a dedicated fund with additional resources would strengthen this initiative.

There are several models for funding available and careful consideration should be given so as to provide an independent financial means for moving this initiative forward. It is possible to combine these models as appropriate.

One model is to create a "revolving" fund that collects the savings from energy efficiency projects to provide a dedicated funding source for future energy management initiatives. Combining energy savings across departments into a single fund would provide a larger pool of resources that can fund future

initiatives. It also provides the opportunity for the CVRD to assess which initiatives will provide the greatest GHG emissions reductions from a holistic point of view.

Because there has been an addition to the Carbon Neutral requirements allowing local governments to apply for "Working towards Carbon Neutral", no carbon offsetting is required for those years. It would be prudent to recognize the GHG emissions offset required at the current rate of $25/tonne and set that money aside in a reserve fund. In 2011 the required offsets would have been $49,270.

Corporate Action 5: Direct Environmental Policy Division staff to undertake a detailed analysis of certified offset providers

Action Type: *Policy Lead by Example*

There are currently 3 levels of offsets eligible to meet the carbon neutral mandate as outlined in the Balancing and Offsetting section of this document. These are unique investment opportunities that balance or offset corporate emissions by investing in community projects outside of the CVRD's corporate boundaries. In addition there is development of a local Cowichan Valley carbon market currently underway.

It will be important for the CVRD staff and board to be aware of the options for purchasing offsets and to create policies around balancing and offsetting GHG emissions in the future.

Corporate Action 6: Incorporate life cycle costing into operational decision making

Action Type: *Policy Lead by Example*

To ensure the full cost of a product or project is considered, include Life Cycle Cost (LCC) in purchasing and other operational decision making procedures. LCC refers to the total cost of ownership over the life of an asset. LCC is being adopted across many sectors as it is a more accurate way of judging the cost and benefit of a decision.

It is recognized that the CVRD has already informally incorporated this approach into its activities. Examples include the purchase of Ford Escape hybrids, and lighting upgrades at the Island Savings Centre. In these purchases, a higher up front capital cost was justified on the basis of long term operational savings.

A formalized policy in this area will allow for the development of tools that consider the life cycle cost in a formalized and systematic manner, allowing a consistent approach across all departments.

Corporate Action 7: Encourage Green Procurement

Action Type: *Policy Lead by Example*

The CVRD will encourage purchasing energy efficient products. This may require the development of a green purchasing policy that includes criteria for energy conservation and GHG reduction. A green purchasing policy considers the life cycle cost of each product, and gives preference to environmentally superior products where quality, function, and cost are equivalent.

A green procurement policy can include a range of criteria, such as:

- Guidelines for selecting appropriate vehicles ('rightsizing');
- Guidelines for fuel selection;

- Preference for products with specific environmental labeling /rating (Energy Star, Environmental Choice, EcoLogo);
- Requiring a certain recycled content in paper purchases; and
- Local food for board and committee meetings.

Corporate Action 8: Incorporate emissions tracking requirements into agreements with CVRD service providers

Action Type: *Policy*

To enable staff to capture and monitor the emissions associated with private delivery of CVRD services (e.g. waste hauling, parks maintenance etc); the CVRD will include emission tracking requirements in all contracts with private sector service providers renewed after January 1, 2013.

Corporate Action 9: Direct Environmental Policy Division staff to pursue Milestones Two and Three of the PCP framework

Action Type: *Direct*

Milestone Two of the PCP framework involves setting GHG emission reduction targets for both corporate operations and community. CVRD corporate reduction targets will be developed through internal processes but the community reduction target will require the input from citizens, community stakeholders, non-governmental organizations and the private sector. Targets may also need to be revised with the development of Milestone Three.

Milestone Three involves developing a local action plan (LAP) that outlines how the district will achieve its GHG reduction target. Links must also be established between the LAP and the official community plans. There generally is two documents, one for the CVRDs corporate operations and a second for the community as a whole. The community wide LAP will be more complex to develop and implement, again requiring many stakeholder inputs.

Recognizing the complexity of these two milestones, the FCM's Green Municipal Fund provides grants of up to 50 percent of costs to a maximum of $350,000 toward the completion of these next steps.

5.5 Initiative Two: Building Operations and Construction

The CVRD stationary assets are primarily comprised of recreation facilities, community halls, fire departments, and administrative offices. These buildings are the largest energy users and GHG emitters for the CVRD. Most of the existing infrastructure was built decades ago in times where building design and engineering had different priorities.

Over time, building use and occupancy has also changed as the needs and priorities of the community have changed. With aging mechanical systems, equipment upgrades are ongoing commitments. As these requirements arise, they can be seen as opportunities to review building use, energy requirements and opportunities to reduce energy consumption. By proactively monitoring and reviewing building energy use, long-term strategies can develop to meet energy demands in the most efficient manner.

New construction and major rehabilitation projects provide building owners with an opportunity to make use of new technologies and materials that can result in more efficient building systems, reduced operational costs, and lower GHG emissions.

Planning work is underway for a new community center in South Cowichan, a waste transfer site, and ongoing development of utilities building. In addition a number of significant renovation projects are in the planning stages, including a major retrofit of the Kerry Park recreation facility. The development of this Plan provides the CVRD with an opportunity to develop a policy to guide these and all future projects.

Corporate Action 10: Commit to building the most energy efficient facilities using a certified standard

Action Type: *Policy / Lead by Example*

Given that more than 80% of the total cost associated with a facility occurs post-construction, business case development for new projects should include a demonstration of the life cycle cost benefits into its decision making regarding major renovation and construction projects.

To support this commitment, the CVRD can choose to utilize third party rating and certification systems (such as LEED for green buildings, ASHRAE 90.1/Energy Star for energy efficiency, EnerGuide for equipment ratings).

Corporate Action 11: Require an evaluation of alternative energy sources for new construction and major renovations

Action Type: *Policy Lead by Example*

The CVRD will:

"Include within all new construction, major equipment replacement, and major renovations, an evaluation of the opportunities to utilize alternative energy sources."

New construction, the replacement of equipment (at the end of its service use), and major renovations are key opportunities to incorporate alternative energy systems at the lowest possible cost. This is particularly important in large facilities that will inherently require energy, and where the CVRD supports the increased use of facilities to achieve other important benefits (ie. the use of recreation facilities). This action can include a focus on alternative energy systems such as:

- Solar hot water
- Heat recovery from refrigeration and other waste heat sources (e.g. ice chillers)
- Geo-Exchange – using ground source heat pumps to drive heating or cooling systems
- District energy opportunities

This would include a technical and financial evaluation of potential alternative energy sources for space and hot water heating. The assessment should account for both the capital and operational costs over an extended period (life cycle costing) as alternative energy systems may require higher upfront capital costs, but reduce operating costs (including fuel costs) over the lifetime of the building.

Corporate Action 12: Require commissioning on all new construction and major renovations

Action Type: *Direct*

The CVRD will:

"Require commissioning reports on all major renovations, equipment replacements and new construction."

Commissioning is the process of verifying that all subsystems of HVAC, plumbing, electrical, fire/life safety, building envelopes, lighting, controls and other mechanical systems achieve the owner's project requirements as intended and designed by the building architects and engineers.

Commissioning ensures building quality using peer review and in-field or on-site verification. Commissioning also accomplishes higher energy efficiency, environmental health, and occupant safety and improves indoor air quality by making sure the building components are working correctly and that the plans are implemented with the greatest efficiency. Commissioning is a quality assurance-based process that delivers preventive and predictive maintenance plans, tailored operating manuals and training procedures for all users to follow.

Corporate Action 13: Require energy monitoring, targeting and reporting on all major energy using CVRD buildings

Action Type: *Direct*

The CVRD will:

"Require all major CVRD facilities to have energy monitoring systems in place to be used for targeting energy efficiency measures."

Monitoring and targeting (M&T) energy use is a critical component of an effective energy management program. M&T techniques provide the CVRD with feedback on operating practices, results of energy management projects and guidance on the level of energy use that is expected in a certain period. It is a useful tool to track and control energy use and can lead to significant energy savings.

For example, The Cowichan Lake Recreation Centre has recently undergone a major renovation with numerous energy efficient upgrades. M&T can help to answer questions such as: *"How successful was the renovation and are the systems performing as expected?, should these practices be carried to the other facilities?"* Without the tools to collect and analyze these buildings there is no way of quantifying energy reductions.

Many of the buildings in the CVRD have had significant energy efficiency upgrades performed in the last 5 years and there are many more upgrades to consider in the future. A formalized approach to monitoring, targeting and reporting on building upgrades will assist the CVRD in controlling energy use and reducing GHG emissions.

Most of the larger CVRD buildings already have Direct Digital Controls (DDC) installed that could be used to extract data to a monitoring system.

Corporate Action 14: Eliminate #2 heating oil as a fuel source for heating in CVRD facilities

Action Type: *Direct Lead by Example*

The CVRD will:

"Replace all heating oil systems with low emission, high efficiency alternatives by 2015."

The use of #2 heating oil is an outdated and highly polluting method for heating buildings. The burning of oil produces 67kg of CO2e for every gigajoule of energy provided. Simple retrofit options are available to replace these heating systems with high efficiency electric heat pumps. Buildings using heating oil in the CVRD are mainly fire department halls and community halls.

The elimination of heating oil from the CVRD buildings will reduce its GHG emissions footprint by almost 200 tonnes of CO2e with only a small increase in electrical energy GHG emissions.

This can be an important initiative to lead by example as heating with fuel oil in the Cowichan Valley has a major impact on its community GHG emissions profile. From the 2010 Community Energy and Emission Inventory (CEEI), residential heating oil consumption represents 28% of total building emissions in the CVRD.

5.6 Initiative Three: Fleet Operations

The CVRD currently has a fleet of over 70 vehicles, including passenger cars and trucks, as well as specialty vehicles such as fire trucks, tractors, dump trucks and ice resurfacing machines.

A common barrier to reducing fleet fuel consumption is the travel distances required for staff and the range or service functions that may be required from a single vehicle. However, CVRD staff has already deployed Ford Escape hybrid SUVs – indicating that fuel efficiency and performance requirements can both be achieved.

Fleet consumption is driven by two factors, the types of vehicles driven and the manner in which they are driven. Two actions are defined to target these factors.

Corporate Action 15: Develop a CVRD Vehicle Purchasing Policy

Action Type: *Policy Direct*

In this action the CVRD will **formalize** a vehicle purchasing policy to ensure that vehicles purchased are evaluated based on:

- Anticipated usage of vehicles (e.g. engine size, vehicle weight, average load capacity, average passenger capacity, average operational terrain); and
- Life cycle considerations (e.g. residual costs / values of vehicle being replaced, capital costs, maintenance costs, fuel costs, resale values).

The objective is to ensure that all vehicles are the most energy efficient, while still meeting the required activity requirements. The CVRD may choose to adopt this policy as part of a larger green procurement policy (Action 7).

As an example, the CVRD has purchased hybrid Ford Escapes, which have up to 50% better gas mileage than non-hybrid versions. The incremental purchase cost has been justified by the long term savings in fuel costs.

Corporate Action 16: Implement an efficient vehicle use initiative

Action Type: *Direct*

The CVRD will:

"Implement a program of staff education to reduce fleet fuel consumption."

It is estimated that up to 10% fuel savings are readily possible through regular maintenance and fuel efficient driving behavior. This will include a corporate anti-idling policy.

Specific activities include:

- Routine checks of vehicle systems (e.g. tire pressure, engine tuning)
- Driver training
- Anti-idling policy
- Accelerated retirement of inefficient vehicles
- Reducing travel needs through teleconferencing and other potential IT solutions

Programs such as the E3 fleet (a fleet certification system developed by the Fraser Basin Council) and FleetSmart (a Natural Resources Canada toolkit) provide excellent resources for actions to implement. However at present it is not likely that the CVRD fleet is large enough to justify pursuing certification through E3, and it may be an action to take in the future.

5.7 Initiative Four: Infrastructure

Infrastructure currently represents the largest portion of CVRD functions and also the most energy using accounts. These accounts are mainly electrical, therefore having a lower GHG emission footprint. However, this does not preclude the need for energy management as there are many opportunities to reduce energy use, increase reliability, create best practices and reduce the cost of providing these services.

Additionally, infrastructure often lends itself to opportunities for generating or harnessing energy. These unique opportunities are worth considering as they can often provide significant long-term savings and excellent examples for community awareness and education.

Corporate Action 17: Conduct energy efficiency focused operational reviews of infrastructure

Action Type: *Direct*

The CVRD currently operates infrastructure, and occasionally acquires new services. These facilities are reviewed (on a periodic, or as needed basis) to define maintenance requirements for financial planning purposes. In particular, newly acquired services may have engineering and technical reviews conducted.

Energy efficiency reviews should be conducted on both the macro and micro level, examining systems as a whole as well as reviewing individual components for efficiency. On a macro level, reviewing system use and strategically planning schedules can reduce energy use.

On the micro level, it is well known in the industry that the initial equipment cost is on average only 9% of the life cycle cost of the component. The majority of the cost is in maintenance and energy expenditure. Periodic reviewing of infrastructure systems can identify components that can be made more efficient.

As with buildings, monitoring and targeting of systems provides the necessary feedback of upgrades and help to identify best practices. This is beneficial in a division where there are a significant number of operations each with unique circumstances.

This action commits the CVRD to include within these reviews an assessment of the energy conservation potential and resulting GHG emissions reductions.

Corporate Action 18: Evaluate energy recovery opportunities and carbon offset potential for facilities and waste management programs

Action Type: *Policy Lead by Example*

This action commits the CVRD to evaluate energy capture and recovery opportunities within the planning for new and existing services. This may include sewage waste heat recovery, biogas generation, and innovative energy recovery systems within the plants as well as potential electricity generation from water systems.

While some of these opportunities have potentially high initial capital cost, the life cycle cost of these implementations can prove them viable for the long term development of the regional district. The ability to demonstrate alternative energy processes will also provide unique educational and community engagement opportunities.

6 Next Steps for Implementation

6.1 Summary of Implementation Activities

A number of activities are being executed by CVRD staff to implement this plan. These include:

Activity 1: Complete Top Level Energy Assessments of all Corporate Assets

Activity 2: Propose a Strategic Energy Policy for Review and Approval

Activity 3: Continue to Refine Corporate GHG emission data

Activity 4: Develop an Accurate Tool for Tracking Fleet Emissions

Activity 5: Report on Progress

6.2 Implementation Actions

Activity 1: Complete Top Level Energy Assessments of all Corporate Assets

The first steps in an energy management plan is to first identify all the energy consuming assets, and develop a broad understanding of the systems, their functional use, the current management strategies and potentials for energy efficiency.

The CVRD energy analyst will complete the exploratory site audits of the CVRD corporate asset inventory and identify the greatest energy users and largest GHG emissions. In addition, a work scope will be developed for key areas where further energy audit and analysis is required.

This exploratory work will serve as the basis for defining potential opportunities for GHG emissions reductions and provide the body of evidence for achievable energy reduction targets.

Activity 2: Propose a Strategic Energy Policy for Review and Approval

Through the work in Implementation Activity 1, the CVRD Environmental Policy division will develop a formal energy policy that will be put forward to the board for approval. This policy will define specific long term goals/timelines, medium term objectives and measureable annual targets.

This proposal will be completed by December, 2012.

Activity 3: Continue to Refine Corporate GHG Emission Data

The CVRD Environmental Policy Division will continue to work with the Finance Department and the Provincial SMARTTool team to develop the GHG emissions tracking and monitoring system. Staff will continue to review the data for tracking GHG emissions and work with the Finance Department to ensure accuracy of emissions and correct allocation of energy use to divisions.

Activity 4: Develop an Accurate Tool for Tracking Fleet Emissions

Staff are working with the SMARTTool team to incorporate detailed information about fleet emissions. Tracking fuel consumption, emissions, and mileage are required to obtain the necessary information to make informed decisions for vehicle purchases and developing fleet policies.

A prototype version of the system will be available at the end of 2012, with testing and further refinements occurring in 2013.

Activity 5: Report on Progress

The tracking of energy consumption and GHG emissions data from fuel and utility bills is accomplished through the CVRD's finance department records. This data is valuable for departmental energy-related decision making and should be provided to facility managers and operators to enable better energy management.

The energy analyst will work to identify suitable reporting intervals for division managers, facility coordinators, and infrastructure operators. Energy consumption data is useful as a feedback tool in identifying components of operations that are not operating as expected as well as developing best practices. Further development of more sophisticated monitoring and reporting systems may be required for high energy use facilities.

Staff will work to develop methodology for reporting to various levels of the organization with standardized reporting at appropriate intervals, empowering divisions with the information necessary to understand their energy consumption and GHG emissions profile.

Staff will also provide an annual emissions management report to the senior management and the Board, including a review of all utility accounts to identify areas of concern, comparisons of current energy use to records from previous years, and documentation of energy reduction initiatives completed each year.

Appendix A – Life Cycle Costing and Triple Bottom Accounting

Life Cycle Cost Analysis (LCCA)

Life-cycle cost analysis (LCCA) is an economic method of project evaluation in which all costs arising from owning, operating, maintaining, and disposing of a project are considered important to the decision. LCCA is well suited to the economic evaluation of design alternatives that satisfy a required performance level but may have differing investment, operating, maintenance, or repair costs, and possibly different life spans. It is particularly relevant to the evaluation of investments where high initial costs are traded for reduced future cost obligations.

The LCC method takes into account first costs, including capital investment costs, purchase, and installation costs; future costs, including energy costs, operating costs, maintenance costs, capital replacement costs, financing costs; and any resale, salvage, or disposal cost, over the life-time of the project, product, or measure.

LCC method is being adopted broadly around the world by both private and public organizations. Of particular note is the broad adoption by the US Federal Government in 2005.

Section 401 of Executive Order 13123 requires that "Agencies shall use life-cycle cost analysis in making decisions about investments in products, services, construction, and other projects to lower the Federal Government's costs and to reduce energy and water consumption…"[12]

Triple Bottom Accounting

The TBL is an accounting framework that incorporates three dimensions of performance: social, environmental and financial. This differs from traditional reporting frameworks as it includes ecological (or environmental) and social measures that can be difficult to assign appropriate means of measurement.

From the BC Climate Action Toolkit Website[13]:

Many organizations, including local governments and businesses, that are successfully reducing their emissions are increasingly using a "triple bottom line" approach that captures the diversity of social, economic and environmental costs and benefits. Using a triple bottom line is particularly appropriate in light of the world's most comprehensive review of climate change economics commissioned by the UK Government. "Climate change is the greatest market failure the world has seen" according to Sir Nicholas Stern, author and former World Bank Chief Economist [2].

Indeed, the cost of fossil fuel combustion on the atmosphere has not been integrated into the price of the coal, oil and gas we consume. Our communities are now paying for this with ecosystem impacts like the pine beetle infestation that has devastated $43 billion worth of lumber in BC, and more frequent and intense weather episodes such as floods, droughts and windstorms [3].

[12] http://www1.eere.energy.gov/femp/pdfs/lcc_guide_05.pdf

[13] http://www.toolkit.bc.ca/business-case-climate-action

This triple bottom line business case is based on six elements. Because taking action involves doing things differently, transcending every one of these elements is ***LEADERSHIP***.

The six elements of triple bottom line accounting are:

Leadership Advantage - by driving innovation in their own operations, local governments can strengthen employee performance and morale, building capacity that extends to the broader community, and prepare residents and local professionals who construct and use the built environment.

Economic Performance - energy efficiency improvements are investments beyond their initial expenditures. Investing in energy efficiency in local government operations can improve economic performance over the life of the equipment and systems it serves.

Asset Management - whether infrastructure is viewed through the economic or environmental scope, the result is an integrated sustainability vision. Asset management includes maintaining and increasing equipment efficiency and reducing leaks with sophisticated approaches now extracting energy from these streams.

Defense against Climate Change - deep emission reductions today and adaption minimizes exposure and risk to current and future climate change. Local governments are on the front line dealing with clean-ups, restoration, and increasingly more costly and complicated climate change issues.

Economic and Social Development - complete, compact communities and sustainable energy are central to economic development across BC. These developments promote active lifestyles, improve human health, and strengthen community.

Resilience - with such great global economic, social, and environmental uncertainty on the horizon, developing adaptive capacity for communities is central to the resilience of its social and ecological systems.

Appendix B – GHG Emissions Measurement

The following information is based on the report "Methodology for Reporting 2011 B.C. Local Government Greenhouse Gas Emissions (V2.), February 2012."[14]

To simplify measurement and reporting, GHG emissions are normalized and reported as metric tonnes of carbon dioxide equivalents (tonnes of CO_2e). CO_2e represents the sum of individual GHGs weighted to represent the atmospheric effects of CO_2 – the most abundant greenhouse gas. Table 1 displays the global warming potential of the GHGs being tracked by the B.C. public sector.

Table 1: Global Warming Potentials

Greenhouse Gas	Chemical Formula	100-Year Global Warming Potential
Carbon dioxide	CO_2	1
Methane	CH_4	21
Nitrous Oxide	N_2O	310

Emissions from energy consumption are calculated using emission factors, which specify the amount of CO_2e produced per energy unit. The emission factor is then multiplied by the total energy consumed to determine the amount of CO_2e produced. Table 2 shows the emissions factors for energy used by the CVRD in stationary and mobile sources.

Table 2: Emissions Factors used for CVRD GHG Inventory

Source	Emission Factor CO_2e (kg/GJ)
Electricity (BC Hydro)	6.9
Natural Gas	50.16
Propane	61.01
Light Fuel Oil - #2 heating oil	67.68
Diesel Fuel	70.05
Marine Diesel Fuel	75.73
Gasoline	64.18

The emissions factors are of great importance when considering fuel shifting and developing strategic plans for reducing GHG emissions. Of particular note is the emission factor of hydroelectric based power systems from BC Hydro compared to the other available fossil fuel sources.

14 http://www.env.gov.bc.ca/cas/mitigation/pdfs/Methodology_for_Reporting_BC_Public_Sector_GHG_Emissions.pdf

Appendix C – CVRD GHG Inventory: Departmental Data

The following information is extracted from SMARTTool and has not been reviewed for accuracy at this time.

Figure 3 - Administration and Governance 2007-2011

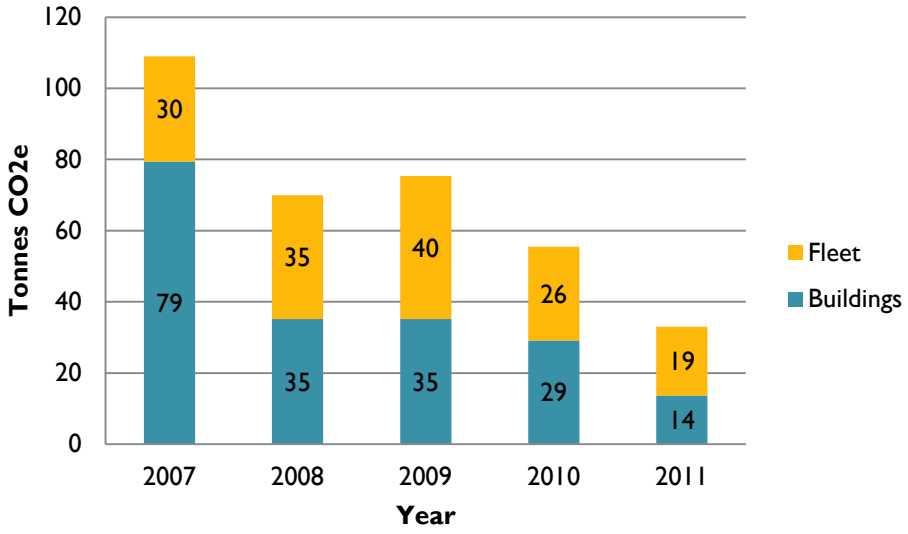
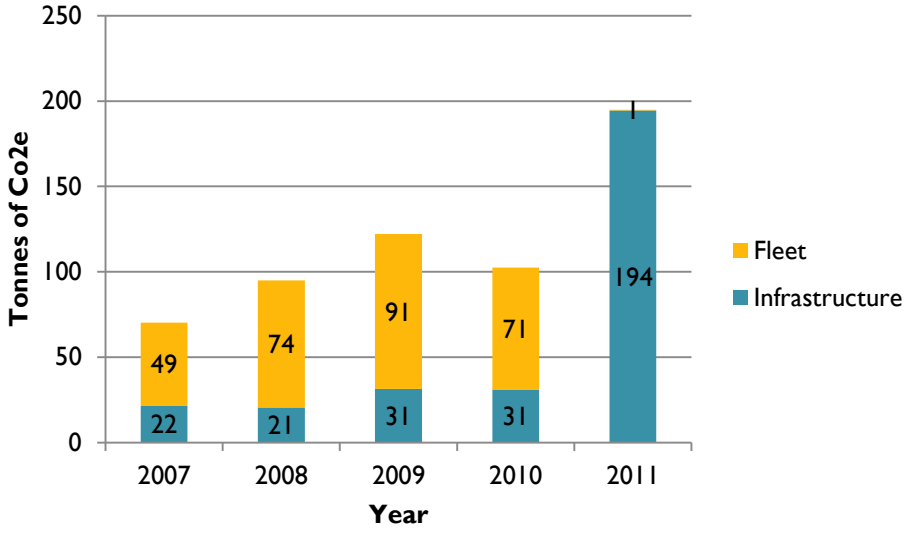


Figure 4 - Drinking, Storm and Waste Water 2007-2011[15]



[15] Data needs verification for this department

Figure 5 - Parks, Recreation and Culture 2007-2011

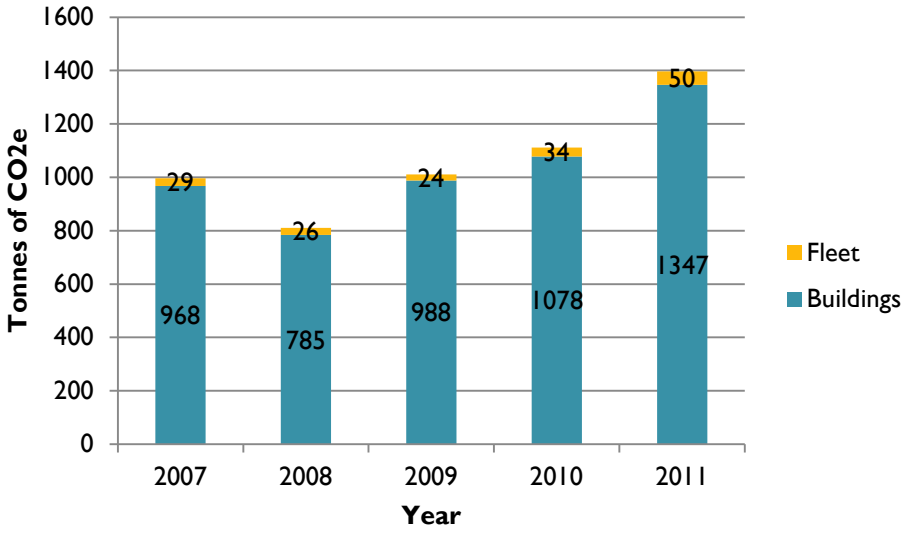


Figure 6 - Public Safety 2007-2011

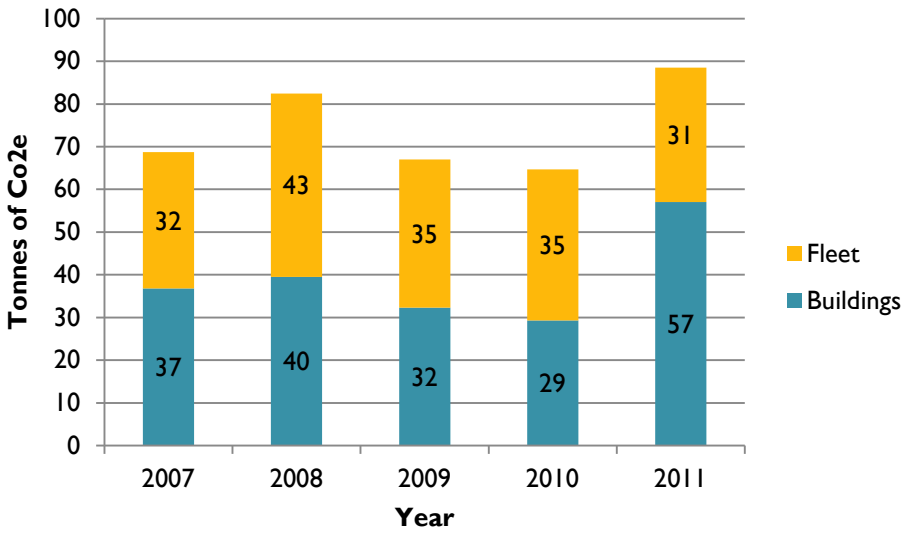


Figure 7 - Recycling and Waste Management 2007-2011[16]

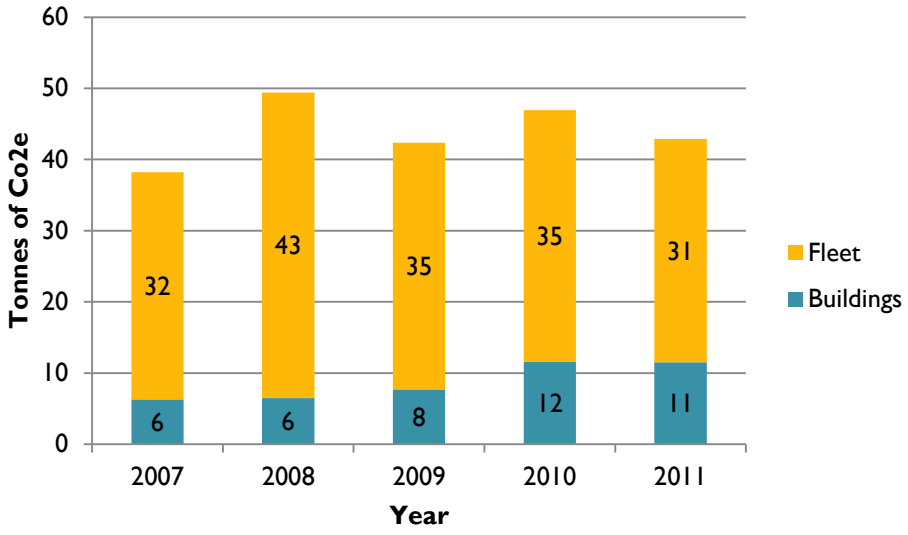
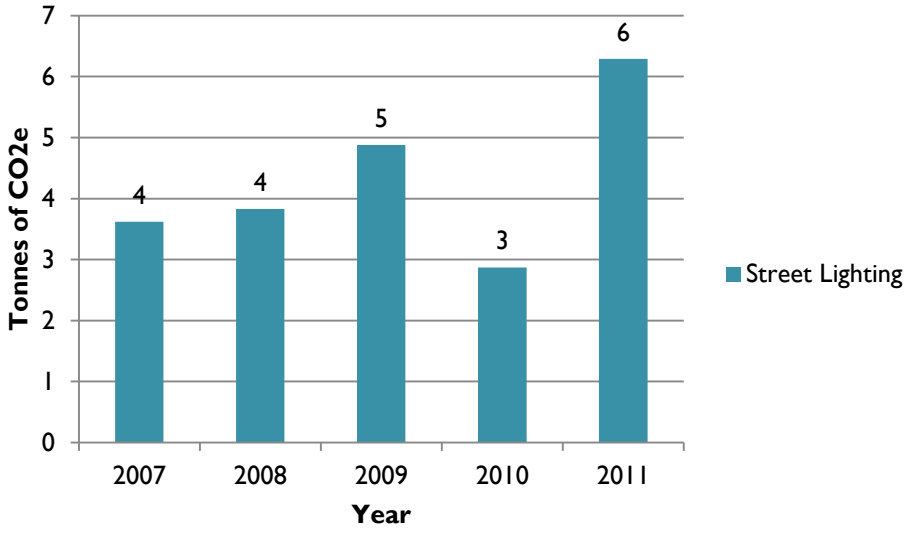


Figure 8 - Street Lighting 2007-2011



[16] Does not currently include contracted services

Appendix D – PCP 5 Milestone Framework

These are extracts from the Five Milestone Framework Overview[17]:

Milestone One – Create a GHG emissions inventory and forecast

What is a GHG emissions inventory and forecast?

A GHG emissions inventory is a collection of data that quantifies the amount of energy consumed and solid waste generated by your community and municipal operations. The community inventory records data from the institutional, commercial, industrial (ICI), transportation, and residential waste sectors. The corporate inventory records data from your municipal government facilities and operations, including buildings, street lighting, water and wastewater treatment, the municipal fleet, and corporate solid waste.

Why develop an inventory?

You can use your inventory as a management tool to:

Save money. The inventory helps you track dollars spent on energy and can reveal opportunities for investment in energy efficiency improvements — what can be measured can be managed.

Get a reference point. Selecting a baseline year, and completing an emissions inventory for that year, is essential for tracking reductions in GHG emissions.

Take action. Identifying significant sources of GHG emissions is the first step toward developing an effective local action plan (Milestone Three) and implementing appropriate emissions reduction measures (Milestone Four).

Participate in carbon trading. A verifiable GHG emissions inventory will help you to participate in the voluntary carbon trading market, and may be required in a regulated market.

Milestone Two – Set an Emissions Reduction Target

What is an emissions reduction target?

An emissions reduction target is the quantity of emissions your municipal government aims to reduce through various emissions reduction measures outlined in a local action plan. It is usually expressed as a percentage reduction below the quantity of emissions released in the baseline year.

Why set a target?

The emissions reduction target is the basis of your municipality's program objectives and provides a goal against which to track progress. Some communities have been able to adopt aggressive targets. For instance, the City of Calgary has adopted a target to reduce corporate emissions by 50 per cent below 1990 levels by 2012.

What is a good reduction target to strive for?

PCP recommends the following targets:

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17 Http://www.fcm.ca/Documents/reports/PCP/Five_Milestone_Framework_for_Reducing_Greenhouse_Gas_Emissions_EN.pdf

- A **20 per cent reduction** in GHG emissions below baseline levels for **municipal operations** within 10 years.
- A **six per cent reduction** in GHG emissions below baseline levels for the **community** within 10 years.

You may revise the targets as you develop your local action plan (Milestone Three). Select a base year or which the most complete and reliable data are available.

Milestone Three – Develop a location action plan

What is a local action plan?

A local action plan (LAP) is a strategic document that outlines how your municipality will achieve its GHG emissions reduction target. Links must also be established between the LAP and the municipal government's official plan and other planning documents.

Many communities develop two separate LAPs — one for municipal operations and one for the community as a whole. Although the reduction potential from the community is significantly greater than that from municipal operations, PCP encourages municipal governments to develop and implement a plan for municipal operations first. By going first, your municipality can demonstrate leadership and provide a positive example for the community to follow. Also, the experience gained in making the smaller municipal LAP can then be applied to the community-wide LAP, which is typically more complex to develop and implement, requiring input and coordination from many stakeholders, such as citizens' groups, non-governmental organizations and the private sector.

Milestone Four – Implement the local action plan or a set of activities

Who implements the local action plan?

While municipal staff are responsible for putting the plan in motion and maintaining momentum, non-governmental organizations and private-sector contractors can contribute to the implementation of specific projects. The approval and support of council, municipal staff, stakeholders and the community are essential to the plan's success.

What funding is available to implement the plan?

You have several options for financing the implementation of your local action plan. You can use internal funds, obtain third-party financing through performance contracting and borrowing, and apply for grants and loans for environmental initiatives. For example, FCM's Green Municipal Fund offers grants and loans for leading studies and projects (see **www.fcm.ca/gmf**).

Milestone Five - Monitor progress and report results

Why monitor progress?

Monitoring the results of the actions planned for in Milestone Three and implemented in Milestone Four helps you to determine:

- whether reduction measures are producing the anticipated results; and
- whether your emissions reduction target will be met.

If your actions are not producing the anticipated results or your target will not be met, the data collected can provide you with the information you need to evaluate and adjust your activities.

Realizing your goals

Reaching Milestone Five is a significant achievement, but it does not signal the end of your community's emissions reduction efforts. A local action plan is a living document that is revised as information, ideas and circumstances evolve.

Appendix E – Including Contracted Emissions

The following is an extract from the GCC guide "Becoming Carbon Neutral – Guidance on Includigin Contracted Emissions in Local Government Corporate Inventories, April 2012"[18]:

What Contracts are Included?

When reporting on contracted emissions they must include contracts that are:

- new or renewals after June 1, 2012; AND
- over $25,000 in value in any calendar year; AND
- "in scope" based on the traditional services boundaries described in the Workbook EXCEPT FOR administration and governance services.

These are "included contracts". Note: once a contract has been established as part of the corporate inventory it should be included every year, for the entire term of the contract.

What Needs to be Tracked and Reported?

For included contracts, local governments are only required to track and report on contracted emissions that are derived from fossil fuel consumption used to operate vehicles, equipment and machinery. These included (but are not limited to) gasoline, diesel, natural gas, propane, and bio-fossil fuel blends.

[18] http://www.toolkit.bc.ca/sites/default/files/CNLG_Contracted%20Emissions_April%202012%20_FINAL.pdf