CITY OF PORT COQUITLAM

2010

Corporate & Community Climate Action Plan

Corporate Inventory Years: 2002 and 2007

Community Inventory Years: 2002 and 2007

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2010

Corporate Inventory Years: 2002 and 2007

Community Inventory Years: 2002 and 2007

Prepared for:

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About Hyla Environmental Services Ltd.

HES Ltd. specializes in developing corporate and community energy and emissions plans for local government and departments within senior levels of government (regional, provincial, and federal). With over 13 years of dedicated experience to emissions management, HES' work extends to corporate and community sustainability plans, including integrated community sustainability plans. HES has developed proprietary software, Energy and Emissions Reporting and Monitoring System™ (EEMRS™), used to calculate emissions, develop emissions forecasts, and integrate account-level management to produce accurate, cost effective emissions management strategies.

HES is a leader in this field having completed over 105 corporate energy and emissions inventories and 21 emissions management strategies. As well, HES produced community-wide energy and emissions inventories for the 2007 inventory year in 2009 for all local government (189) in British Columbia on behalf of the Province of British Columbia's Ministry of Environment.

HES Ltd. is proud to be a founding reporter of The Climate Registry.

HYLA ENVIRONMENTAL SERVICES LTD.

The Climate Registry

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Acronyms

CO_2 – Carbon Dioxide

CO_2e– Carbon Dioxide equivalent

EEMRS™ – Energy and Emissions Monitoring and Reporting System™

FCM – Federation of Canadian Municipalities

GHG – Greenhouse Gas

GMF – Green Municipal Funds

HES – Hyla Environmental Services Ltd.

PCP – Partners for Climate Protection

Note - Minor numerical discrepancies in tables are attributable to rounding.

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EXECUTIVE SUMMARY

Climate change is a global problem that requires local solutions. Canadian cities have adopted a coordinated response to mitigating and managing greenhouse gases (GHGs) by integrating energy and carbon management into the municipal planning process.

By developing this Corporate & Community Climate Action Plan the City of Port Coquitlam demonstrates continued good governance on issues of urban sustainability. By endorsing this plan, the city has made a commitment to integrate energy and emissions management into its day-to-day operations and community planning processes.

The City's plan has been developed as part of the commitment it made to the Partners for Climate Protection (PCP) program in 2002.

The portion of the plan relative to the City's corporate operations provides a detailed analysis of the processes for incorporating energy and carbon management into the municipal planning structure. This includes producing an energy and GHG emissions inventory, forecasting future energy consumption, GHG emissions and related costs, identifying potential reduction initiatives with city staff, and analyzing reduction initiatives and related costs by department.

The portion of the plan relative to the City's community provides a community energy and GHG emissions inventory, forecasting future energy consumption and GHG emissions, and, identifying potential reduction initiatives as well as who is responsible for each initiative.

The City has taken early action on GHG emission reductions through partnerships with BC Hydro, the City's alternative fuel vehicles program, sustainable development plans, and its sustainability checklist. In 2002, it reinforced its commitment to climate change action by making a voluntary commitment to participate in the PCP Program. Port Coquitlam's involvement in the PCP program and the results of this study will enable the city to more accurately measure and manage energy conservation and greenhouse gas reduction initiatives. Council's commitment to this program demonstrates its leadership among local government in British Columbia to improve the quality of life of its residents.

This report contains energy and GHG emissions information for the city's corporate operations and the community at large.

Upon adoption by Council and approval by the PCP Secretariat, the city will be recognized has having completed Milestone One, Two, and Three of the corporate and community streams of the PCP. Although the corporate sections of this plan fulfil the voluntary requirements of the Climate Action Charter, it should be noted that the scope of this project is not aligned with the requirements for Bill 27. Regardless, the community portion of the plan will assist the city to fulfil its mandatory obligations under Bill 27.

Corporate Plan Summary

Energy use, energy costs and GHG emissions were calculated for the base year (2007) and estimated for the forecast year (2017) to determine the city's total potential GHG emissions reduction. Inventory information was also developed for 2002 and provided valuable insights into changes in energy consumption between 2002 and 2007 and the city's progress with completed reduction initiatives.

Inventory Summary

In the 2007 base year, the city produced 2,777 tonnes of carbon dioxide equivalent (CO_2e) and consumed 69,305 gigajoules (GJ) at a total cost of $1,030,215 (see table below).

Parameter	2007
Energy Consumption	69,312 GJ
Energy Costs	$1,030,215
Emissions	2,777 tonnes CO2e

From 2002 to 2007, increases in energy consumption (six percent), costs for energy (31 percent), and resulting emissions (five percent), describes an upward trend that further emphasizes a need for implementation of reduction initiatives in the immediate future. A forecast for energy consumption, costs for energy, and greenhouse gas emissions was also developed which further illustrates the need for energy and emissions management.

By the forecast year of 2017 energy consumption is expected to rise by three percent, energy costs by 158 percent, GHG

emissions by one percent. Costs for energy are best estimates due to the highly speculative nature of gasoline and diesel fuel but indicate that increasing energy costs alone will provide a major incentive for the city to curb its energy consumption.

Table E1 – Summary of Corporate Forecasts

Forecasted Parameter	Corporate Comparison Year	Corporate Base Year	Percent Increase	Corporate Forecast Year	Corporate Percent Increase
	2002	2007	2002 - 2007	2017	2007-2017
Energy Consumption	65,537 GJ	69,312 GJ	6%	71,298 GJ	3%
Energy Costs	$786,528	$1,030,215	31%	$2,658,930	158%
Emissions	2,637 tonnes CO_2e	2,777 tonnes CO2e	5%	2,805 tonnes CO_2e	5%

Reduction Target Summary

The reduction target for the City of Port Coquitlam is based on a ten-year project period in accordance with the Federation of Canadian Municipalities' (FCM) Partners for Climate Protection Program. The base year is 2007 and the forecast year is 2017. The ten-year reduction targets for the city are presented in the table that follows (below). Section 5 summarizes the reduction amounts for city buildings and engineering assets along with summaries of reduction Initiatives for each sector.

Table E2 – Summary of Estimated Impact of Reduction Initiatives on Corporate Sectors

Sector	Base Year Emissions (tonnes CO_2e)	Reduction of GHG Emissions Complete	GHG Projection (tonnes CO_2e)	Potential Reduction of GHG Emissions after Projected Growth	GHG Emissions After Measures	Percent Reduction of Projected Emissions
	2007	2002-2007	2017			
Building	1,302	0	1,337	425	912	-30%
Lighting[1]	40	5	49	15	34	-15%
Water and Wastewater[2]	37	0	40	4	36	-3%
Fleet[3]	981	0	1,043	159	884	-10%
Solid Waste	417	0	375	20	355	-15%
TOTAL	2,777	5	2,844	623	2,221	-20%

[1]LEDs for ornamental and overhead lighting are currently too expensive to be cost effective, although this may change in the near future and should be monitored by staff.

[2]An estimate is provided in the water and wastewater sector, since the volume of potable water and wastewater was not available, and must be used as an indicator for specific measures.

[3]The reductions for the vehicle fleet are aggressive and assume biodiesel will replace conventional diesel fuel by 2017.

Corporate Reduction Target Statement:

The City of Port Coquitlam can reduce corporate GHG emissions by 20 percent from its 2007 base year emissions quantity by implementing reduction measures that will reduce corporate emissions by 623 tonnes CO_2e in the 2017 target year

Provincial Carbon Neutral Voluntary Commitment:

Table E3 summarizes the emissions inventory that will be included in carbon neutral accounting if the city chooses to become carbon neutral by 2012 and endorses the purchase of carbon credits

Table E4 – Carbon Neutral Government Accounting

Sector	2007 Base Year Emissions (tonnes CO_2e)	Included / Excluded in Carbon Neutral Accounting	Cost for Offsets with no Implementation ($25/tonne)	Emissions after Reductions (2017)	Cost for Offsets with implementation ($25/ tonne)
Buildings	1,302	included	$32,550	912	$22,800
Outdoor Lighting	40	included	$1,000	34	$850
Water and Wastewater	37	included	$925	36	$900
Vehicle Fleet	981	included	$24,525	884	$22,100
Corporate Solid Waste [3]	417	excluded			
Totals	2,777		$59,000	2,221	$55,525

[3] Solid waste from all City facilities counts in FCM PCP reports, but not in Provincial carbon neutral accounting

An expenditure of $59,000 for the purchase of carbon offsets at a price of $25/tonne would be required to meet the Provincial requirements for carbon neutrality.

In 2017, if the reduction initiatives described in this report were successfully implemented, and the 2017 greenhouse gas emissions forecast remained intact, it would cost the city $55,525 to become carbon neutral.

Community Plan Summary

Energy use and GHG emissions were calculated for the base year (2007) and estimated for the forecast year (2017) to determine the community's potential GHG emissions reductions. Community inventory information was also developed for 2002 and provided valuable insights into the trends of community energy consumption and GHG emissions between 2002 and 2007. Energy consumption and estimates of the resulting greenhouse gas emissions are provided.

Inventory Summary

In the base year, greenhouse gas emissions from the community totalled 310,025 tonnes CO_2e and the energy consumed totalled 6,198,574 GJ (see table below).

Parameter	2007
Energy Consumption	6,198,574 GJ
Emissions	310,025 tonnes CO2e

From 2002 to 2007, increases in energy consumption (21 percent) and resulting emissions (23 percent), describes an trend of rapidly increasing energy consumption and emissions that requires the implementation of reduction initiatives in the immediate future. A forecast for energy consumption and greenhouse gas emissions was also developed which further strengthens the importance of implementation. In the forecast year (2017) community energy consumption and GHG emissions are expected to rise by 10% each above 2007 levels.

Table E3 – Summary of Community Forecasts

Forecasted Parameter	Community Base Year	Community Year	Percent Increase	Community Forecast Year	Percent Increase
	2002	2007	2002 - 2007	2017	2007 - 2017
Energy Consumption	5,133,217 GJ	6,198,574 GJ	21%	6,808,955 GJ	10%
Emissions	252,708 tonnes CO_2e	310,025 tonnes CO_2e	23%	340,495 tonnes CO2e	10%

Reduction Target Summary

The reduction target for the city's community initiative is based on a ten-year period in accordance with the FCM' Partners for Climate Protection Program. Accordingly, the base year is 2007 and the forecast year is 2017. The ten-year reduction targets for the city are presented in the table that follows (next page). Section 6 summarizes the reduction amounts for community buildings, on-the-road transportation, and community solid waste.

Table E4 – Summary of Estimated Impact of Reduction Initiatives on Community Sectors

	Sector	2007 Base Year Emissions (tonnes CO_2e)	2017 GHG Projection (tonnes CO_2e)	Potential Reduction of GHG Emissions (2017)	GHG Emissions After Measures (2017)	Percent Reduction of Projected Emissions (2017)
Buildings	Residential	68,485	74,226	12,037	62,189	**-9%**
	Commercial	39,320	40,335	4,974	35,361	**-10%**
	Industrial	27,197	36,202	5,845	30,357	**12%**
On-the-road Transportation		165,076	179,784	30,657	149,127	**-10%**
Solid Waste		9,948	9,948	0	9,948	**0%**
	TOTAL	**312,033**	**342,512**	**53,513**	**286,982**	**-8%**

Community Reduction Target Statement:

It is recommended that the city adopts an emission reduction target of 53,513 tonnes CO_2e, an amount that will reduce greenhouse gas emissions by eight percent below 2007 levels by 2017



1. INTRODUCTION

The City of Port Coquitlam has taken a leadership role in incorporating sustainable growth principles into its municipal planning process. Its endorsement of the Federation of Canadian Municipalities' (FCM) Partners for Climate Protection (PCP) initiative in November 2002 is an integral part of these 'smart' growth initiatives.

Together with municipalities across the country, the City of Port Coquitlam recognizes the importance of including action on climate change in its overall sustainability program. The Corporate & Community Climate Action Plan (the plan) provides the analytical framework and information required to develop and implement a climate change policy based on an in-depth analysis of the municipality's energy use and greenhouse gas (GHG) emissions and reduction options.

In 2002, the City of Port Coquitlam made a commitment to address the issues of energy and emissions management by endorsing participation in the Federation of Canadian Municipalities' (FCM) Partners for Climate Protection (PCP) initiative. In 2008 Port Coquitlam signed the Climate Action Charter, pledging to become carbon neutral by 2010 and to create compact and complete communities.

In 2005, the city completed an inventory of energy and emissions for the base year 2002 and continued to develop this energy and emissions plan. In 2009 an inventory of 2007 emissions was conducted and has been used as a new base year in order to establish a realistic time frame for achieving project targets.

Communities around the world are taking steps to address climate change. A community energy and emission reduction plan (CEEP) is a community based framework that identifies energy and GHG emission reduction initiatives. By identifying reduction initiatives and setting benchmarks and goals around identified reduction initiatives, the CEEP challenges the community to take a leadership role in implementing sustainability within the context of energy and GHG emissions.

By creating a dialogue with the community from the initial planning stages, the CEEP will encourage stakeholders to reduce energy consumption and GHG emissions. The reduction initiatives that result from the planning stages are practical to achieve in the near future and do not rely on future technologies or long term targets set by senior levels of government.

1.1 Plan Development Process

Hyla Environmental Services Ltd. (HES) was hired to take staff through a planning process which culminated in the development of this document. Key staff from the city were interviewed and provided several critical components of plan development as follows:

- providing the detail required to complete the energy and emissions analysis and confirm the base year emissions quantity
- assisting with the forecast of energy consumption, costs for consumption, and emissions
- selecting the final reduction initiatives to be used to calculate the overall program goal (e.g., the reduction quantity)

1.2 Overall Program Goal: The Reduction Quantity

The overall program goal of the city's energy and emissions plan is to identify the potential for emission reductions, or the reduction quantity. This has been carefully developed through the planning process by combining the reductions that are possible in each sector into an overall reduction quantity for the city's operations. Since emissions are the result of the combustion of fuel and use of electrical energy, the plan incorporates various types of measures, or reduction initiatives, that reduce energy and emissions through:

- conservation through reduced use;
- technological change;
- switching to less carbon intensive fuel; and,
- offsetting conventional energy with renewable energy.

1.3 Climate Change Plan Structure

This plan presents the results of the planning process in five sections. Section 1 provides the introduction, context, and methodology. Section 2 presents the results of the corporate energy and emissions inventory while section 3 presents the results for the community inventory. Section 4 presents forecasts for corporate energy consumption, costs for consumption, and emissions for the year 2017. Section 5 presents forecasts for community energy consumption and emissions for 2017. Sections 5 and 6 presents a summary of the reduction initiatives for corporate and community plans that city staff wish to implement as well as the results of calculations that estimate the potential reductions for each reduction initiative. Section 7 summarizes the main findings and recommendations of the plan.

1.4 Energy, Greenhouse Gas Emissions, and Climate Change

Energy

Energy is part of our every day lives and taking it for granted is as easy as turning on a light switch. Nearly every activity we engage in and nearly every product we use on a daily basis either consumes energy directly or required energy in its production.

Energy is used in many ways — to light and heat our homes, to power our vehicles, and to partake in countless daily activities that make humans in the modern era the most productive society ever.

Residents and businesses within the City of Port Coquitlam use energy no differently than most other Canadian communities. They use electricity to light and heat homes and commercial and industrial establishments, natural gas to heat the majority of those same buildings, and gasoline and diesel fuel to power vehicles. The difference in energy use around the world is based mainly on climate and the most economically efficient energy type available. In British Columbia, hydroelectric power and natural gas prevail as the primary energy types for buildings and other infrastructure. Hydroelectric power has a low carbon footprint compared to electricity produced by burning fossil fuel and is relatively cheap in comparison to other forms of electric power, whereas natural gas is much more efficient than electricity when used for space heating. In British Columbia, natural gas is the choice for space heating as long as natural gas is available. Where it is not available, other fossil fuels such as fuel oil and propane are used for space heating.

In terms of climate change issues, natural gas has a much higher carbon emissions factor per GJ of energy compared to electricity. Therefore, low carbon emissions from hydroelectric power in BC tends to balance out with the higher carbon emissions from the use of natural gas, fuel oil, and propane when used for space heating.

Greenhouse Gas Emissions

Greenhouse gases (GHGs) are produced when we use energy. Most energy is derived from the combustion of fossil fuels, and when we burn fossil fuels, greenhouse gases are emitted (e.g., carbon dioxide, nitrous oxide, and methane gas). Since fossil fuels represent energy in one form or another, as we use this energy — we produce greenhouse gas emissions.

Climate Change

It's simple… greenhouse gases trap heat within the earth's atmosphere which unbalances the earths weather patterns causing our climate to change on a global scale.

Greenhouse gases make up part of the atmosphere and contribute to the greenhouse effect, which makes life on earth possible. Without greenhouse gases, the earth's mean temperature would be approximately –19 degrees Centigrade instead of approximately 15 degrees Centigrade.

1.5 Why Conserve Energy

Since the consumption of fossil fuels results in the production of greenhouse gases, successful climate change mitigation depends upon our ability to reduce energy consumption. Not only should we reduce energy consumption to lessen the effects of greenhouse gases on our planet, we must conserve for future generations.

Although our reasons to conserve energy have been to reduce the cost of energy consumed, this report places the primary emphasis on the affect on climate change. As supplies diminish or as electricity becomes more expensive, consumers will be forced to conserve due to cost escalations alone. Although extremely difficult to predict, it is reasonable to assume that energy conservation could be driven by price for consumption alone.

Energy conservation can be achieved by behavioral change of both consumers and producers, and through technological change. Simple behavioral changes include unplugging electronics and appliances when not in use, or setting the thermostat one or two degrees lower. In fact, lowering the temperature by one degree for just eight hours a day can conserve energy and reduce your heating costs by up to 2% (BC Hydro Power Smart). Investing in technological upgrades including renewable energy also has significant benefits for energy conservation and can save money.

Smart long range planning can also achieve energy conservation. Smart development strategies allow communities to grow to manageable limits that minimize overall energy consumption and greenhouse gas production through the spatial arrangement of communities and energy efficient construction. The addition of renewable energy technologies and configuration of shared heating systems reduces the pressures even further by efficiently sharing heating loads while reducing the reliance on fossil fuels.

Although there is no silver bullet to climate change mitigation, smart development strategies favour densification or compaction by implementing compact, safe and diverse design, promoting pedestrian, cycling and transit movement, and incorporating green building features, energy efficient construction and promoting alternative energy possibilities. All of these concepts need to come together if long-term reductions in greenhouse gas emissions are to be achieved.

1.6 International Climate Change Actions and Agreements

Climate change is a top issue of concern to Canadians. In 2007, the United Nations released its most aggressive call to action on climate change with it's Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Report - Climate Change 2007. The report, written by over 2,500 top scientists, concludes that there is "unequivocal" evidence that climate change is real and happening faster than expected. The report calls on the global community to increase their efforts in the areas of climate change adaptation, mitigation and technology.

The global trend toward stricter greenhouse gas emission reduction targets is placing pressure on all levels of government to take measurable steps toward offsetting the negative effects of climate change. Since the signing of the United Nations Framework Convention on Climate Change in 1992, countries have worked toward meeting the GHG emission reduction targets set at the first Earth Summit in Rio de Janeiro, Brazil. The Kyoto Protocol signed in 2002, sets out the suggested targets and options to be achieved on a national level. Canada's target is to reduce its GHG emissions to six percent below 1990 levels in the period 2008 to 2012.

Since 2007 there has been a global trend toward more aggressive greenhouse gas emission reduction targets. A key event was an international gathering of government representatives in Bali, Indonesia in 2007. The goal at this gathering was to determine the global climate change regime after 2012. Delegates called for stricter GHG reduction targets but also called for stricter enforcement measures. The tougher stance on emission reductions echoes recommendations from the G8 summit in Germany held in June 2007. Leaders of the G8 nations introduced more aggressive targets for greenhouse gas emission reductions, agreeing to halve current levels by 2050. At the 2008 summit in Tokyo, G8 leaders acknowledged emerging climate change frameworks must not only guide government bodies but must soon include all major emitters as well.

These tougher international positions on GHG reduction targets and enforcement measures will inevitably affect the amount of detail included in climate change plans produced at the national, provincial and regional levels of government.

1.7 Federal Government Action

The Canadian government has committed to taking 'real action' in its most recent climate change plan, setting GHG emission reductions at 20 percent by 2012 while imposing mandatory reduction targets on industry. In support of efforts to reduce air pollution and greenhouse gas emissions, the Canada Eco Trust for Clean Air and Climate Change was introduced in February 2007. The purpose of the Trust is to co-fund, with the provinces, technology development, energy efficiency, and related projects.

1.8 Provincial Government Action

British Columbia will receive $199.2 million of the $1.5 billion in initial funding from the EcoTrust Fund to put towards its provincial GHG reduction initiatives. The government has legislated a goal of 33 percent reduction by 2020 and up to 80 percent reduction by 2050. These are some of the toughest emissions standards in North America. Notably, BC is the first Canadian province to adopt California's tough motor vehicle emissions reduction target of 30 percent reduction by 2016.

Climate Action Charter

The province is taking a national leadership role on climate change with the May 2008 introduction of the Climate Action Charter– a provincial initiative signed by the Province, the Union of BC Municipalities (UBCM), and local governments (inset). Upon signing, a voluntary commitment is made to measure and report community's greenhouse gas emissions and work to create compact, more energy efficient communities. In addition, a voluntary commitment is made to become carbon neutral in corporate operations by 2012 through conventional reductions (e.g., retrofits) supplemented by purchasing carbon offsets.

The City of Port Coquitlam is one of 155 BC municipalities to date to have signed the Charter and, as a result, has pledged to monitor community emissions while working towards carbon neutrality in their own operations. The Climate Action Charter recognizes the need to take action on climate change and reduce greenhouse gas emissions. It also recognizes the important role the Provincial Government and Local Governments can play in affecting change.

Green Communities Amendment Act Bill 27

The Green Communities Amendment Act (Bill 27) came into force on May 29, 2008. It requires official community plans by May 31, 2010 and regional growth strategies by May 31, 2011 to have targets for the reduction of greenhouse gas emissions in the area covered by the plan, and policies and actions of the local government proposed to achieve those targets. These policies and action include objectives to promote energy conservation, water conservation, and the reduction of greenhouse gas emissions.

Bill 27 also provided expanded development permit authority to promote energy and water conservation and the reduction of greenhouse gases, which can be applied to new development sites and the external components. Local governments may also create parking cash-in-lieu programs and use those funds to support alternate transportation. Parking standards may now also be determined by transportation need at the time of development approval. Development cost charges can be waived for small dwelling units and small lot 'green' subdivisions.

1.9 Partners for Climate Protection Milestones

The Partners for Climate Protection (PCP) grew out of the efforts made by the Federation of Canadian Municipalities' and the ICLEI - Local Governments for Sustainability. The PCP is an umbrella initiative that fosters municipal participation in greenhouse gas emission reduction initiatives and sustainability. Its goal is to assist municipalities with their greenhouse gas management initiatives by providing tools and logistical support. The PCP initiative not only focuses on reducing existing greenhouse gas emissions, but also encourages municipalities to influence future greenhouse gas emissions through a variety of sustainable mechanisms such as land use and transportation planning, building codes, and permitting. By participating in the PCP initiative, municipalities receive up-to-date information on global climate change and important information regarding strategies to reduce greenhouse gas emissions, including innovative financing strategies and sample action plans. Currently it includes 176 Canadian municipal and regional governments with BC the most active member of the network with 58 municipalities committed to reducing GHG emissions.

This report is a direct result of the efforts by the City to fulfill requirements as part of the PCP initiative, which consists of five milestones. These milestones are summarized as follows:

Milestone One

Creating a greenhouse gas emissions inventory and forecast

The CEEP analyzes energy use and emissions by sector (e.g., areas for GHG emissions reductions are identified by economic sector—industrial, commercial, residential, transportation and waste), and determines feasible strategies and the resulting reductions targets from each strategy. Before GHG reduction action strategies can be developed, it is necessary to determine

the current energy use and emissions of the community—the inventory—against which future GHG reduction progress can be measured.

Milestone Two

Setting an emissions reduction target

To set performance targets, a base year is first established against which all future emission reductions are measured. A percent reduction target is established over a given time frame. By developing an incremental time line, the plan's progress can be measured and monitored over time based on set benchmarks.

Although a major factor influencing the setting of emissions reduction targets are voluntary and mandated emissions reduction targets established at the federal, provincial and local government levels, local government must develop targets around what they believe they can achieve on their own. Therefore, a visionary target or top down target is not presented. The targets presented within this plan result from a summary of a series of estimated reductions that could be achieved in the sectors covered by the plan.

Milestone Three

Developing an action plan

By developing a list of existing actions and identifying what reductions will be borne by regional policy and senior government, if any, this plan will become the basis for public consultation– the later resulting in a document that has been developed by shared participation throughout the community. In developing the community reduction strategies, key positions and departments responsible for implementation of the proposed strategies will be identified. These activities may be distributed across a number of functions and departments, and community and corporate planning activities.

Actionable emission reduction activities are then identified. Many factors must be taken into consideration when developing viable strategies, including technology lifecycles, planned and retired assets, and government mandates, such as renewable energy standards and stricter emissions reductions. The new BC motor vehicle emissions standards are an example. See inset.

Milestone Four

Implementing the action plan and related activities

Important considerations in implementation of the CEEP are project timelines, costs, return on investment and funding sources for the targeted initiatives. Responsibility for each activity must be allocated to staff, consultants and/or other stakeholders.

Milestone Five

Monitoring progress and reporting results

Ongoing monitoring and performance measurement are critical to the plan's long-term success. Although the ultimate reward for success is the knowledge that local government have done their best to address climate change, a number of minor awards are available to local governments who have successfully implemented sustainability initiatives along the way.

1.10 Regional and Local Context

Located North of the Fraser River, the City of Port Coquitlam spans an area of 29 square kilometres (figure 1.10) and is home to approximately 55,000 residents. In 2001 and 2002, Port Coquitlam was one of the fastest growing communities in British Columbia and in 2004 experienced a boom of new construction.

Milestone One:

Complete GHG and energy use inventories and forecasts for both municipal operations and the community as a whole.

Milestone Two:

Set Reduction Targets. Suggested PCP targets are a 20 per cent reduction in GHG emissions from municipal operations, and a minimum six per cent reduction for the community, both within 10 years of making the commitment.

Milestone Three:

Develop a Local Action Plan. Develop a plan that sets out how emissions and energy use in municipal operations and the community will be reduced.

Milestone Four:

Implement the Plan. Create a strong collaboration between the municipal government and community partners to carry through on commitments, and maximize benefits from greenhouse gas reductions.

Milestone Five:

Measure Progress. Maintain support by monitoring, verifying, and reporting greenhouse gas reductions.

Figure 1.10 – The City of Port Coquitlam

1.11 Energy and Emissions Inventory and Forecast

By joining the PCP initiative, municipalities make a voluntary commitment to complete 5 milestones (see previous page). Methods for Milestone One are described herein and a brief description for Milestone Two is provided. Reporting protocols are referenced and reduction initiatives are briefly discussed. In order to implement an effective strategy to reduce greenhouse gas emissions it is necessary to develop an inventory of the emissions.

The emissions analysis is partitioned into a corporate emissions analysis and a community wide emissions analysis. Each analysis is further separated into sectors and sources.

A review of emissions by sector allows an analysis of the activity or operation responsible for various emissions. Corporate emissions by sector include those resulting from municipal buildings, fleet vehicles and other motorized equipment, traffic signals and street lighting, potable water, storm and sanitary sewers, and solid waste generated at municipal facilities. Community emissions by sector include those resulting from residential, commercial and industrial buildings and their operations, transportation within the community and solid waste generated within the community. Table 1.11 summarizes corporate and community sectors and typical fuel sources or direct emissions from each sector. A review of emissions by source allows an analysis of the origin of various emissions. The origin of the emission is attributed to the type of energy consumed and/or fuel burned while carrying out the activity or operation. Major sources of greenhouse gas emissions include electricity, natural gas, diesel fuel, and gasoline.

Greenhouse gases are emitted as these fuels are burned. Methane from the decomposition of waste in landfills is also a major source of greenhouse gas emissions, but is a indirect emission, as apposed to the emissions from burning fossil fuels.

Table 1.11 – Emissions Sources by Sector

Corporate Inventory (Municipal)		Community Inventory	
Sectors	**Emission Source**	**Sectors**	**Emission Source**
Buildings	Electricity, Natural Gas, Fuel oil (wood is excluded)	Residential Buildings	Electricity, Natural Gas, Fuel oil (wood is excluded)
Fleet Vehicles	Gasoline, Diesel Fuel, Natural Gas, Propane	Commercial Buildings	Electricity, Natural Gas, Fuel oil (wood is excluded)
Streetlights	Electricity	Industrial Buildings	Electricity, Natural Gas, Fuel oil (wood is excluded)
Water/Waste Water	Electricity	Transportation	Gasoline, Diesel Fuel, Natural Gas, Propane
Solid Waste	Methane Emission	Solid Waste	Methane Emission
Other	Direct sources from specific operations	Other	Direct sources from specific operations

Corporate Emissions Inventory

To gather corporate emissions data, an interdepartmental work team was established and consisted of city staff members with access to data for the base year of 2007 inventory year. For the corporate inventory, BC Hydro and Terasen Inc. provided consumption values and costs for electricity and natural gas for the inventory years of 2002 and 2007. Steve Brown, City of Port Coquitlam, assisted to identify electricity and natural gas accounts and provided gasoline and diesel fuel consumption data. Solid waste from municipal operations was derived from the volume of bins at municipal facilities and the frequency of pick-up of the bins.

Energy and emissions are calculated at the account level (e.g., an asset that consumes energy, such as a building or pumping facility, represents an account in the software).

All energy use and direct emissions data were entered into Hyla Environmental Services Ltd.'s Energy and Emissions Monitoring and Reporting System (EEMRS™) and the resulting emissions baseline calculated was established for 2007.

A detailed summary of the corporate energy and emissions inventory is presented in Appendix A.

Community Emissions Inventory

The community inventory consists of gross energy values for electricity and natural gas consumed by customers in the residential, commercial, and industrial sectors within the boundary of the city. BC Hydro and Terasen Inc. provided electricity and natural gas consumption data respectively.

Transportation sector emissions were approximated by estimating the fuel used by vehicles registered to City of Port Coquitlam residents. The alternate option– gross fuel sales within the municipal boundary– is less accurate in reflecting emissions attributed to the city since there is no way of determining the residency of those purchasing fuel within the city boundary or where the fuel was actually consumed.

The method employed to approximate transportation emissions by EEMRS™ uses vehicle registration data and average annual vehicle kilometres travelled (VKT) for specific vehicle classes. The origin of the vehicle registration data is the Insurance Corporation of British Columbia while VKT for vehicle classes is provided by Environment Canada for 2002 and the Province of BC for 2007[1]. Individual vehicles are matched with their corresponding fuel efficiencies[2] and a fuel consumption estimate is calculated.

1 Environment Canada; Province of BC

2 http://www.oee.nrcan.gc.ca

The calculations of CO_2e within EEMRS™ conforms with the methods described in the International Panel on Climate Change Greenhouse Gas Inventory Reference Manual (IPCC 2006), the principles provided in the International Standards Organization (ISO) Draft International Standard for Greenhouse Gases (ISO 2005), and the general guidance within the FCM's guidance document for the preparation of PCP inventories (FCM 2006). Emissions coefficients are found in the IPCC document and emissions factors for electricity are provided by BC Hydro[3].

A detailed summary of the community energy and emissions inventory is presented in Appendix B.

Emissions Baseline

The base year emissions number is the total greenhouse gas emissions from corporate operations and the community in the base year. This number can be either actual data or data that has been backcast from a year where actual data exists. The base year has been established as the year, 2007 – or the year that corresponds to the base year of the Province of British Columbia. Although the City of Port Coquitlam joined the PCP in 2002, a base year of 2002 is not practical because the city would only have two years to achieve their reduction target. The emissions baseline for the city's corporate operations is derived from actual data, which is presented in Section 3. Building emissions for the 2007 community base year is derived from actual consumption data, whereas community transportation emissions are derived from activity data and estimates of vehicle kilometres travelled.

Emissions Projection

An emissions projection is developed by forecasting emissions from a year in which real emissions data exists. This may be the base year or the year for which the base year was backcast. The projection must be derived from actual, not estimated, indicator data. The most common indicator data for developing the forecast is population growth estimates provided by a senior government agency. This forecast is also know as the 'business as usual' projection. Where possible, HES forecast emissions on a trend line using actual consumption data for the city for 2002 and 2007. The forecast is a business as usual projection to 2017.

Reporting Protocols and Guidelines

The Federation of Canadian Municipalities provides a protocol document, which guides the development of inventories for the Partners for Climate Protection Program (FCM 2006). By developing common conventions and a standardized approach, protocols make it easier for PCP members to fulfill their commitments to the PCP. As well, the FCM's guidance document for the preparation of PCP inventories (FCM 2006) expands on other protocols and provides more specific context for the preparation of community inventories.

Emissions Reduction Initiatives and Reduction Targets

Corporate reduction targets are calculated once staff selected reduction initiatives that could be achieved by the city. Community reduction targets are calculated once staff selected the reduction initiatives that they wish to propose for public consultation. The calculation of reductions is conducted on the energy types that are affected by the measure. For example, retrofits to residential buildings are calculated based on the potential reduction of the retrofit on the energy type that the retrofit affects. The total reductions that could be achieved by the city are the sum of the individual estimates of each reduction initiative, including growth, or the forecast, for each sector.

The Measures Module of EEMRS™ contains over 300 initiatives for local government operations and 90 initiatives for the community. Of the reduction initiatives presented to city staff, 53 initiatives were selected for inclusion in the final compilation of reduction initiatives for the corporate plan. Of the 37 reduction initiatives not selected, 32 were, 'not possible' in the city, while the remainder were not selected since they represented well established programs that began prior to the project period. The reduction initiatives selected are presented in section 5.

The overall reduction quantity is equal to the difference between the sum of the base year inventory plus the reductions, and the emissions forecast. The overall reduction quantity is expressed as a mass or as a simple percentage of the base year quantity. To achieve a reduction in emissions when the emissions inventory is forecast to 2017, the total reductions achieved during the project period must be greater than the growth in emissions. When expressed as a percentage, the literal translation is, 'the emissions inventory in 2017 will be X percent lower than the 2007 base year quantity'.

3 http://www.bchydro.com/rx_files/environment



2. CORPORATE ENERGY AND GHG INVENTORY

2.1 Corporate Inventory Summary

An overview of total energy consumed, costs, and emissions by sector is presented in table 2.1a and table 2.1.b. Two years of data are provided: 2002 and 2007. Data for the year 2002 was used to assist with the forecast and data for the year 2007 represents the base year.

The city's total energy consumed was 65,537 GJ in 2002 and 69,312 GJ in 2007. Total cost for energy was $786,528, and $1,030,215 in 2002 and 2007 respectively and total greenhouse gas emissions was 2,637 tonnes CO_2e for the 2002 inventory year and 2,776 tonnes in 2007. A detailed description of each sector is presented in Sections 2.2 to 2.6. A detailed inventory is presented in Appendix A.

Table 2.1a – Energy, Costs, and Emissions by Sector (2002)

Sector	Total Energy (GJ)	Total Cost	Total Emissions (CO_2e tonnes)	Percent Energy	Percent Costs	Percent Emissions
Buildings	44,127	$429,527	1,371	67%	55%	52%
Lighting	6,724	$109,086	45	10%	14%	2%
Water & Wastewater	3,488	$61,822	29	5%	8%	1%
Vehicle Fleet	11,197	$186,093	805	17%	24%	31%
Solid Waste			386			15%
Total	**65,537**	**$786,528**	**2,637**	**100%**	**100%**	**100%**

Table 2.1b – Energy, Costs, and Emissions by Sector (2007)

Sector	Total Energy (GJ)	Total Cost	Total Emissions (CO_2e tonnes)	Percent Energy	Percent Costs	Percent Emissions
Buildings	44,637	$487,092	1,302	64%	47%	47%
Lighting	6,256	$114,781	40	9%	11%	1%
Water & Wastewater	4,778	$87,733	37	7%	9%	1%
Vehicle Fleet	13,641	$340,609	981	20%	33%	35%
Solid Waste			417			15%
Total	**69,312**	**$1,030,215**	**2,776**	**100%**	**100%**	**100%**

Changes in the number of accounts are summarized in table 2.1c for both inventory years. There were no significant additions to the buildings stock from 2002 to 2007. Changes to the buildings stock included the replacement of the Old Parks and Rec Building with the Administration Annex, which resulted in a addition of ~80,000 kWh to the total electrical consumption in buildings. Once fully operational, The Outlet, a community gathering place, added ~120,000 kWh to the total electrical consumption in buildings. Changes to outdoor lighting include the addition of seven traffic signals and net increase of two ornamental lighting accounts. Water and wastewater accounts decreased by one account from 2002 to 2007 with the decommissioning of the Shaughnessy Street Underpass stormwater pump. Records of individual vehicles and their respective fuel consumptions were not available in 2002.

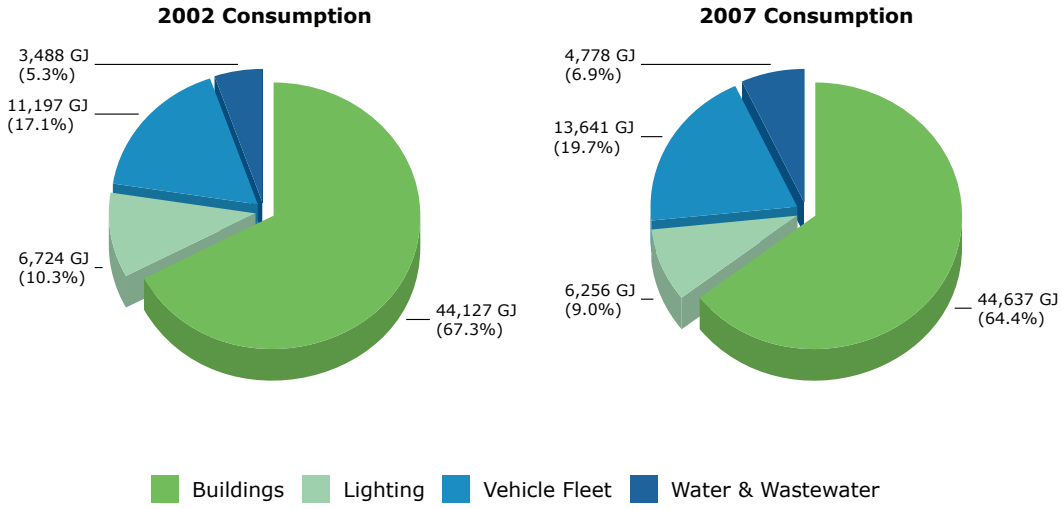
Table 2.1c – Account Summaries by Sector (2002, 2007)

Sector	Accounts in 2002	Accounts in 2007
Buildings	31	31
Outdoor Lighting	30	39
Water and Wastewater	34	33
Vehicle Fleet	Unavailable	128

2.1.1 Corporate Energy Consumption

As figure 2.1.1 illustrates, the majority of energy consumed in both inventory years occured in the buildings sector at 44,127 GJ and 44,637 GJ in 2002 and 2007 respectively. The vehicle fleet consumed 11,197 GJ of energy in 2002 and 13,641 GJ in 2007, lighting consumed 6,724 GJ in 2002 and 6,256 GJ in 2007, and water and wastewater consumed 3,488 GJ of energy in 2002 and 4,778 GJ in 2007 (table 2.1 and figure 2.1.1).

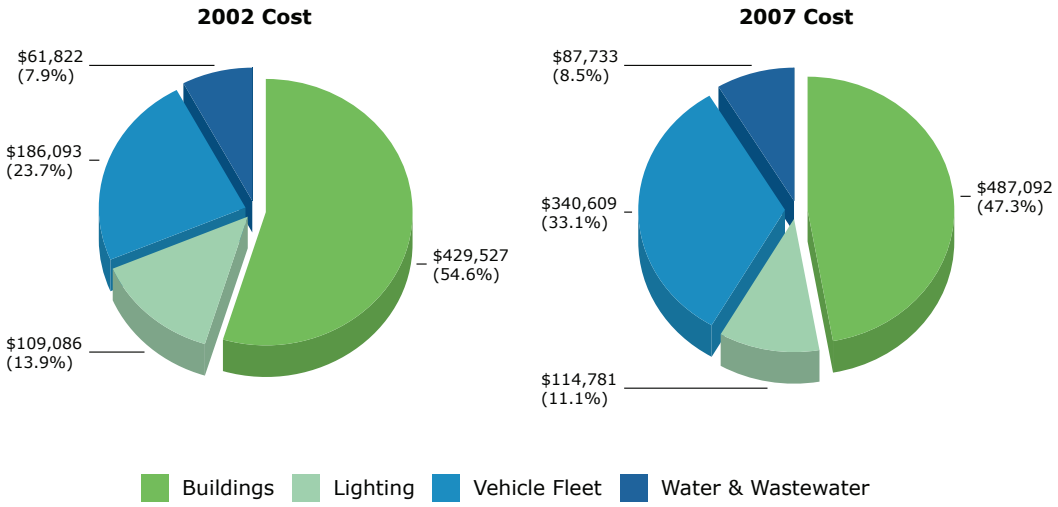
Figure 2.1.1 – Energy Consumption by Sector



2.1.2 Corporate Costs

In 2002, the majority of the city's total energy costs were incurred by buildings at $429,527. Vehicle fleet costs were $186,093, lighting costs were $109,086, and water and wastewater costs were $61,822 (table 2.1 and figure 2.1.2). In 2007, building costs were $487,092, vehicle fleet costs were $340,609, lighting costs were $114,781 and water and wastewater costs were $87,733.

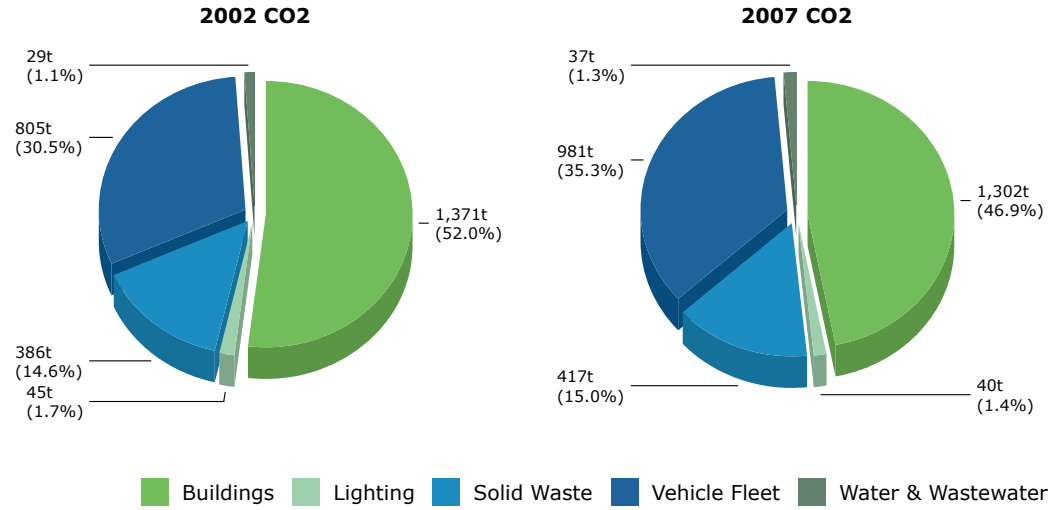
Figure 2.1.2 – Energy Costs by Sector



2.1.3 Corporate Emissions

In 2002, the city's buildings produced the majority of emissions at 1,371 tonnes CO_2e or 52 percent of the total. The vehicle fleet followed at 805 tonnes or 31 percent, solid waste at 386 tonnes or 15 percent, lighting at 40 tonnes or 2 percent, and, water and wastewater at 29 tonnes or one percent of total emissions (table 2.1 and figure 2.1.3). In 2007, buildings continued to produce the most emissions at 1,302 tonnes or 47 percent of the total. The vehicles fleet increased emissions to 980 tonnes or 35 percent while solid waste produced 417 tonnes or 15 percent of corporate emissions. Water and wastewater and lighting produced 38 tonnes and 56 tonnes respectively or approximately two percent each.

Figure 2.1.3 – Energy Emissions by Sector



2.1.4 Sources of Corporate Energy and Costs

The city consumes only four types of energy: electricity; natural gas, gasoline, and; diesel fuel. A very small amount (10's of litres) of propane is consumed, for the sake of simplicity propane consumption is not reported. In terms of energy content, electricity accounts for nearly half of the total energy consumed by the city in 2002 (46 percent) and 2007 (47 percent; see table 2.1.4a and table 2.1.4b). Natural gas (37 percent in 2002 and 33 percent in 2007), diesel fuel (10 percent in 2002 and 14 percent in 2007), and gasoline (7 percent and 6 percent respectively) follow in rank. Figure 2.1.4a illustrates the mix of energy by source and figure 2.1.4b illustrates costs for energy types.

Table 2.1.4a – Sources of Corporate Energy & Costs (2002)

Energy Type	Units	Total Use	Total Energy (GJ)	Total Cost	Percent Total Energy by Source	Percent Total Costs by Source
Electricity	kWh	8,333,214	30,000	$393,148	46%	50%
Natural Gas	GJ	24,340	24,340	$207,287	37%	26%
Gasoline	litres	126,072	4,370	$81,947	7%	10%
Diesel Fuel	litres	176,520	6,828	$104,146	10%	13%
Total			65,537	$786,528		

Table 2.1.4b – Sources of Corporate Energy & Costs (2007)

Energy Type	Units	Total Use	Total Energy (GJ)	Total Cost	Percent Total Energy by Source	Percent Total Costs by Source
Electricity	kWh	9,115,175	32,815	$466,222	47%	45%
Natural Gas	GJ	22,856	22,856	$223,384	33%	22%
Gasoline	litres	114,463	3,967	$101,178	6%	10%
Diesel Fuel	litres	250,101	9,674	$239,431	14%	23%
Total			69,312	$1,030,215		

Figure 2.1.4a – Consumption by Energy Type

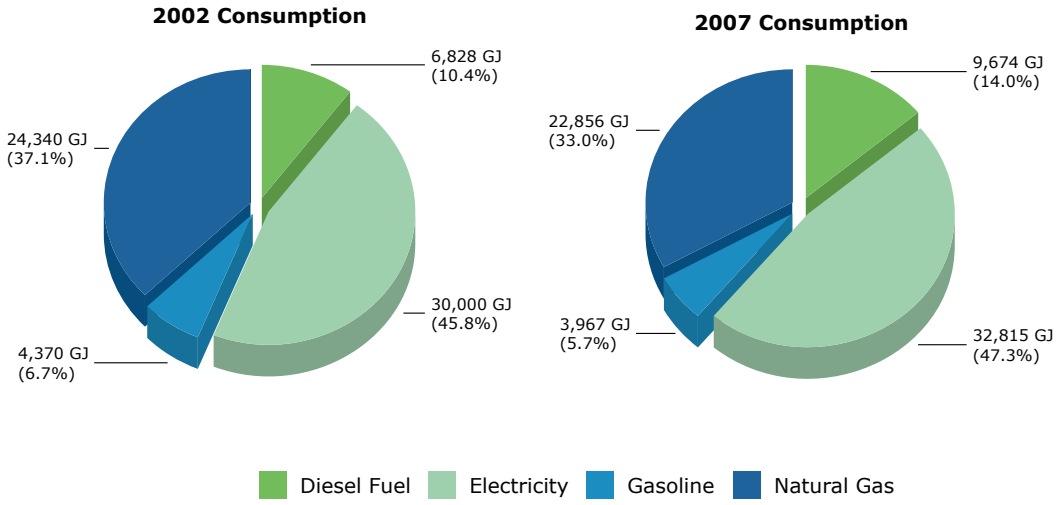
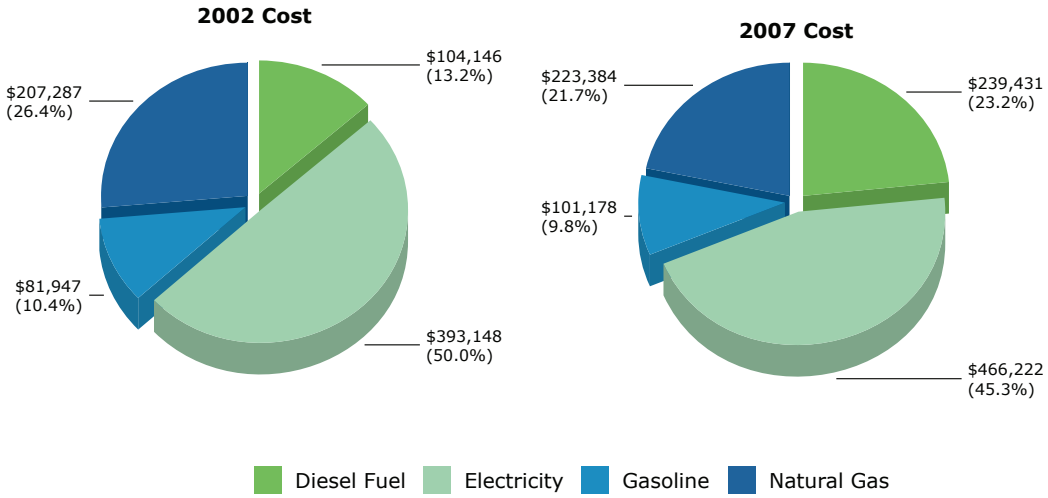


Figure 2.1.4b – Costs by Energy Type



As shown in figure 2.1.4a and 2.1.4b, electricity is the primary energy type consumed by the city followed by natural gas.

2.1.5 Sources of Corporate Emissions

The greatest source of emissions is from the combustion of natural gas (47 percent of total emissions in 2002 and 42 percent in 2007), followed by diesel fuel (19 percent of total emissions in 2002 and 25 percent in 2007). Figure 2.1.5 illustrates the contribution of energy sources to total emissions.

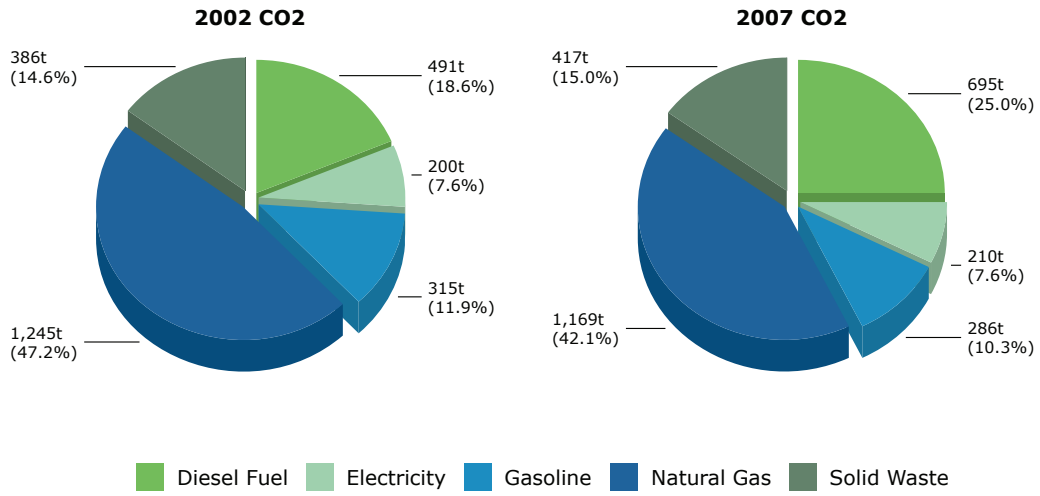
Table 2.1.5a – Sources of Corporate Emissions (2002)

Energy Type	Units	Total Use	Total Emissions (CO_2e tonnes)	Percent by Source
Electricity	kWh	8,333,214	200.0	8%
Natural Gas	GJ	24,340	1,245.0	47%
Gasoline	litres	126,072	314.8	12%
Diesel Fuel	litres	176,520	490.6	19%
Solid Waste			386.1	15%
Total			**2,636.6**	**100%**

Table 2.1.5b – Sources of Corporate Emissions (2007)

Energy Type	Units	Total Use	Total Emissions (CO_2e tonnes)	Percent by Source
Electricity	kWh	9,115,175	209.6	8%
Natural Gas	GJ	22,856	1,169.1	42%
Gasoline	litres	114,463	285.9	10%
Diesel Fuel	litres	250,101	695.1	25%
Solid Waste			416.5	15%
Total			**2,776.2**	**100%**

Figure 2.1.5 – Sources of Emissions by Energy Type



2.2 Buildings

The city owns approximately 30 buildings that have electrical connections. The total energy consumed in all buildings was 44,127 GJ in 2002 and 44,637 in 2007, which is shared by two energy types: electricity and, natural gas. The total emissions for the building sector was 1,371 tonnes CO_2e in 2002 and 1,302 tonnes in 2007 (table 2.2.1). This is due in part to reduction of natural gas consumption in corporate buildings. Table 2.2.1 ranks the top 10 energy consumers in the buildings sector. For a complete list of building accounts, see Appendix A.

Table 2.2a – Summary of Buildings Sector Emissions

2002 Energy Type	Units	Total Use	Total Energy (GJ)	Total Cost	Total CO_2e (t)
Electricity	kWh	5,530,952	19,911	$223,084	132.7
Natural Gas	GJ	24,215	24,215	$206,443	1,238.6
Total			**44,127**	**$429,527**	**1,371.3**

2007 Energy Type	Units	Total Use	Total Energy (GJ)	Total Cost	Total CO_2e (t)
Electricity	kWh	6,090,327	21,925	$265,820	140.1
Natural Gas	GJ	22,711	22,711	$221,272	1,161.7
Total			**44,637**	**$487,092**	**1,301.8**

The Hyde Creek Recreation Centre and the Port Coquitlam Recreation Complex are the top two energy consumers since both consume a large amount of natural gas to heat pool water (Hyde Creek) and maintain the ice rink (Port Coquitlam Recreation Complex). The works yard and city hall are ranked number three and four respectively due to the amount of natural gas consumed for space heating. These accounts also ranked highest in consumption in 2002 and represent accounts of highest priority.Energy retrofits were undertaken in 2004 at Hyde Creek Recreation Centre (see Section 3).

Table 2.2b – Summary of Buildings Sector Emissions (2007)

	Buildings : Top Sources of GHG Emissions	Energy	Costs	CO_2e
1	**Hyde Creek Recreation Centre** - 1379 Laurier Ave	13,485 GJ	$148,704	413.4 t
2	**Poco Rec Complex & Wilsons Seniors Centre** - 2150 Wilson Ave	13,159 GJ	$84,297	359.9 t
3	**Operation Centre** - 1737 Broadway St	5,379 GJ	$66,608	168.4 t
4	**City Hall** - 2580 Shaughnessy St	3,252 GJ	$45,113	88.0 t
5	**Fire Hall No. 1** - 1725 Broadway St	1,568 GJ	$22,232	52.9 t
6	**Fire Hall No. 2** - 3196 Toronto St	1,241 GJ	$16,928	46.9 t
7	**Terry Fox Library** - 2470 Mary Hill Rd	1,059 GJ	$16,737	31.7 t
8	**Admin Annex** - 2253 Leigh Sq	868 GJ	$13,180	26.0 t
9	**The Outlet** - 2250 Mcallister Ave	830 GJ	$12,373	20.8 t
10	**Robert Hope Pool** - 2159 Lamprey Dr	441 GJ	$6,125	20.5 t

2.3 Outdoor Lighting

The city's outdoor lighting consumed 6,724 GJ of electricity (1,867,894 kWh) in 2002, and 8,821 GJ (1,737,869 kWh) in 2007 resulting in the production of 45 tonnes and 40 tonnes of CO_2e respectively (table 2.3.1). Outdoor lighting accounted for approximately 2% of corporate greenhouse gas emissions in each inventory year (table 2.1). Table 2.3.2 shows the top ten lighting accounts ranked by energy consumption. For a complete list of outdoor lighting accounts, see Appendix A.

Table 2.3a – Summary of Lighting Sector Emissions

2002	Energy Type	Units	Total Use	Total Energy (GJ)	Total Cost	Total CO_2e (t)
	Electricity	kWh	1,867,894	6,724	$109,086	44.8
	Total			**6,724**	**$109,086**	**44.8**
2007	**Energy Type**	**Units**	**Total Use**	**Total Energy (GJ)**	**Total Cost**	**Total CO_2e (t)**
	Electricity	kWh	1,737,869	6,256	$114,781	40.0
	Total			**6,256**	**$114,781**	**40.0**

Table 2.3b – Lighting Ranked by Energy Consumption (2007)

	Lighting : Top Sources of GHG Emissions	Energy	Costs	CO_2e
1	**Ornamental Streetlighting** - Ornamental Street Ltg	5,705 GJ	$104,608	36.4 t
2	**Mary Hill T S** - 1210 Mary Hill Rd	85 GJ	$1,685	0.5 t
3	**Prairie|Cedar T S** - Prairie|Cedar	34 GJ	$589	0.2 t
4	**Argue Street Streetlights** - 2381 Argue St|Ifo	30 GJ	$628	0.2 t
5	**Lougheed Hwy|Shaughnessy St T S** - Lougheed Hwy|Shaughnessy St	20 GJ	$347	0.1 t
6	**Rte 7|Cst Meridian Rd T S** - Rte 7|Cst Meridian Rd	16 GJ	$269	0.1 t
7	**Shaughnessy/Wilson T S** - Shaughnessy St	16 GJ	$265	0.1 t
8	**Coast Meridian|Lincoln Ave T S** - Coast Meridian|Lincoln Ave	15 GJ	$262	0.1 t
9	**Coast Meridian/Prairie T S** - Coast Meridian Rd At	15 GJ	$260	0.1 t
10	**Westwood/Kitchener T S** - Westwood St	15 GJ	$259	0.1 t

Ornamental streetlights consume the majority of energy in the city's lighting sector. Since 2002, the city has retrofitted its traffic signals from incandescent to LED technology.

2.4 Water & Wastewater

The city does not operate any sewage treatment plants or potable water treatment plants, and therefore, energy consumed in the water and wastewater sector is for motors that drive sanitary sewer, potable water, and storm sewer pumps. Overall, 934,368 kWh of electricity and 125 GJ of natural gas (space heating in pump stations) was consumed in 2002 which resulted in the release of 29 tonnes of emissions at a cost of $61,822 (table 2.4.1). In 2007, consumption increased to 1,286,979 kWh of electricity and 144 GJ of natural gas resulting in 37 tonnes of CO_2e at a cost of $87,733. Table 2.4.2 shows the top ten water and wastewater accounts ranked by energy consumption. For a complete list of accounts, see Appendix A.

Table 2.4a – Summary of Water and Wastewater Sector Emissions

2002	Energy Type	Units	Total Use	Total Energy (GJ)	Total Cost	Total CO_2e (t)
	Electricity	kWh	934,368	3,364	$60,978	22.4
	Natural Gas	GJ	125	125	$844	6.4
	Total			**3,488**	**$61,822**	**28.8**
2007	**Energy Type**	**Units**	**Total Use**	**Total Energy (GJ)**	**Total Cost**	**Total CO_2e (t)**
	Electricity	kWh	1,286,979	4,633	$85,621	29.6
	Natural Gas	GJ	144	144	$2,112	7.4
	Total			**4,778**	**$87,733**	**37.0**

Table 2.4b – Water and Wastewater Ranked by Energy Consumption (2007)

	Water & Wastewater : Top Sources of GHG Emissions	Energy	Costs	CO_2e
1	**Citadel P W P S -** 1241 Ricard Pl	156 GJ	$2,456	7.5 t
2	**Dominion S T M -** Dominion Ave E End	862 GJ	$12,964	5.5 t
3	**Harbour S T M -** Harbour Rd E/End Argu	659 GJ	$11,205	4.2 t
4	**Shaughnessy/Citadel S S P S -** Shaughnessy/Citadel	412 GJ	$7,978	2.6 t
5	**Hyde Creek Well -** 3636 Coast Meridian	282 GJ	$5,483	1.8 t
6	**Handley S S P S -** Handley Cresc	207 GJ	$4,034	1.3 t
7	**Harbour Old S T M -** Ft Of Argue St	189 GJ	$3,682	1.2 t
8	**Penny Place P W P S -** Penny Place	174 GJ	$3,396	1.1 t
9	**Freemont S S P S -** 702 Prairie Ave	167 GJ	$3,248	1.1 t
10	**Pitt River S S P S -** 2400 Pitt River Rd	164 GJ	$3,202	1.0 t

2.5 Vehicle Fleet

The vehicle fleet includes all motorized vehicles and equipment operated by the city. In 2002, this sector produced 805 tonnes of CO_2e and fuel costs were $186,093. Vehicle fleet emissions increased to 980 tonnes of CO_2e in 2007 with fuel costs totalling $340,609 Table 2.5.1 provides a summary of emissions by fuel type. Table 2.5.2 shows the top five vehicle categories in 2002 ranked by energy consumption. Table 2.5.3 lists the top ten vehicles categories in 2007 ranked by energy consumption. For a complete list of vehicle fleet accounts, see Appendix A.

Table 2.5a – Summary of Vehicle Fleet Sector Emissions

2002	Energy Type	Units	Total Use	Total Energy (GJ)	Total Cost	Total CO_2e (t)
	Gasoline	litres	126,072	4,370	$81,947	314.8
	Diesel Fuel	litres	176,520	6,828	$104,146	490.6
	Total			**11,197**	**$186,093**	**805.5**

2007	Energy Type	Units	Total Use	Total Energy (GJ)	Total Cost	Total CO_2e (t)
	Gasoline	litres	114,463	3,967	$101,178	285.9
	Diesel Fuel	litres	250,101	9,674	$239,431	695.1
	Total			**13,641**	**$340,609**	**981.0**

Table 2.5b – Summary of Vehicle Fleet Sector Emissions (2002)

Vehicle Fleet : Top Sources of GHG Emissions	Energy	Costs	CO_2e
Light Vehicles -	133 GJ	$2,487	9.6 t
Tractors, Graders, Backhoes, Loaders -	733 GJ	$11,174	52.6 t
Heavy Fire Dept. Truck -	917 GJ	$13,992	65.9 t
Light Truck, Van, Suv -	2,848 GJ	$53,415	205.2 t
Heavy Truck Or Van -	6,567 GJ	$105,025	472.1 t

Table 2.5c – Vehicle Fleet Ranked by Energy Consumption (2007)

	Vehicle Fleet : Top Sources of GHG Emissions	Energy	Costs	CO_2e
1	**Freight/Labrie Condor/Sterling -** Eq1516	913 GJ	$23,141	65.6 t
2	**Freight/Labrie Condor/Sterling -** Eq1517	904 GJ	$22,904	65.0 t
3	**Freight/Labrie Condor/Sterling -** Eq1514	861 GJ	$22,029	61.8 t
4	**Freight/Labrie Condor/Sterling -** Eq1515	795 GJ	$20,133	57.1 t
5	**Safe-Jet-Vac -** Eq1702	771 GJ	$19,536	55.4 t
6	**Freight/Labrie Condor/Sterling -** Eq1518	756 GJ	$19,145	54.3 t
7	**Smeal/Spartan 75' -** Eq0091	570 GJ	$14,437	40.9 t
8	**Ihc/Del T/A -** Eq1323	356 GJ	$9,016	25.6 t
9	**Smeal/Spartan 75' -** Eq0088	355 GJ	$8,987	25.5 t
10	**Ihc/Del T/A -** Eq1322	318 GJ	$8,059	22.9 t

Heavy trucks and vans consumed the majority of fuel in the vehicle fleet in 2002 followed by light trucks, vans, and sport utility vehicles, fire department trucks, off-road vehicles, and light passenger vehicles. In 2007 five diesel fuelled packers were among the highest energy consumers, along with other utility vehicles such as sweepers and flushers, and fire department trucks. *Note: for the 2002 inventory, consumption for individual garbage packers was not available and therefore the consumption for garbage packers has been included in the total consumption for, 'Heavy Truck and Van'.*

2.6 Corporate Solid Waste

Solid waste generated in municipal facilities accounts for approximately 15 percent of total corporate emissions in both 2002 and 2007 inventory years. In 2002, the city's waste from its corporate operations resulted in 386 tonnes of CO_2e and increased to 417 tonnes CO_2e in 2007.

2.7 Corporate Inventory Summary and Comparison 2002 and 2007

In terms of energy consumed, costs for energy, and total emissions by sector, buildings are ranked number one in all categories. The majority of the city's energy is consumed by buildings and specifically by two recreation complexes (e.g., 38 percent of all corporate energy is consumed in the Hyde Creek Recreation Centre and the Port Coquitlam Recreation Complex). Other than buildings, a significant amount of energy is consumed by the vehicle fleet (20 percent of total energy).

2.7.1 Consumption Comparison

The following table illustrates energy consumption from 2002 and 2007. Energy consumption in the city increased from 2002 and 2007 and indicates an increase of six percent (table 2.7.1). The largest increase occurred in the water and wastewater sector at 37 percent. Outdoor lighting energy consumption increased 31 percent from 2002 to 2007.

Table 2.7.1a – Energy Consumption by Sector (2002-2007)

Sector	Energy Type / Unit	Consumption	Energy (GJ)	Total Energy (GJ)	Consumption	Energy (GJ)	Total Energy (GJ)	Percent Change
		2002			2007			02-07
Buildings	Electricity (kWh)	5,530,952	19,911	44,127	6,090,327	21,925	44,636	1%
	Natural Gas (GJ)	24,215	24,215		22,711	22,711		
Outdoor Lighting	Electricity (kWh)	1,867,894	6,724	6,724	1,737,869	6,256	6,256	-7%
Water & Wastewater	Electricity (kWh)	934,368	3,364	3,488	1,286,979	4,633	4,777	37%
		125	125		144	144		
Vehicle Fleet	Diesel Fuel (L)	176,520	6,828	11,197	250,101	9,674	13,641	22%
	Gasoline (L)	126,072	4,370		114,463	3,967		
Total		65,537 GJ			69,312 GJ			6%

2.7.2 Costs Comparison

As energy consumption increases over time, so does the costs per unit of energy. In 2002 and 2007 the cost of electricity ranged from $0.04 to $0.07 per kWh. The price for vehicle fuel has increased from $0.59/L in 2002 to $0.96/L in 2007 for diesel fuel and $0.65/L to $0.88/L for gasoline.

Table 2.7.2a – Energy Costs by Sector (2002-2007)

Sector	Energy Type / Unit	Consumption	Costs	Total Cost	Consumption	Costs	Total Cost	Percent Change
		2002			2007			02-07
Buildings	Electricity (kWh)	5,530,952	$223,084	$429,527	6,090,327	$265,820	$487,092	13%
	Natural Gas (GJ)	24,215	$206,443		22,711	$221,272		
Outdoor Lighting	Electricity (kWh)	1,867,894	$109,086	$109,086	1,737,869	$114,781	$114,781	5%
Water & Wastewater	Electricity (kWh)	934,368	$60,978	$61,822	1,286,979	$85,621	$87,733	42%
	Natural Gas (GJ)	125	$844		144	$2,112		
Vehicle Fleet	Diesel Fuel (L)	176,520	$104,146	$186,093	250,101	$239,431	$340,609	83%
	Gasoline (L)	126,072	$81,947		114,463	$101,178		
Total		$786,528			$1,030,215			31%

2.7.3 Emissions Comparison

The emissions produced in each sector and the corresponding increase of CO_2e released into the atmosphere is presented in table 2.7.3. From 2002 to 2007, overall emissions increased by five percent. Of note is the increase in the water and wastewater and vehicle fleet sectors of 28 percent and 22 percent respectively, an increase of 24 percent in the outdoor lighting sector anda decrease of five percent in the buildings sector.

Table 2.7.3a – Emissions by Sector (2002-2007)

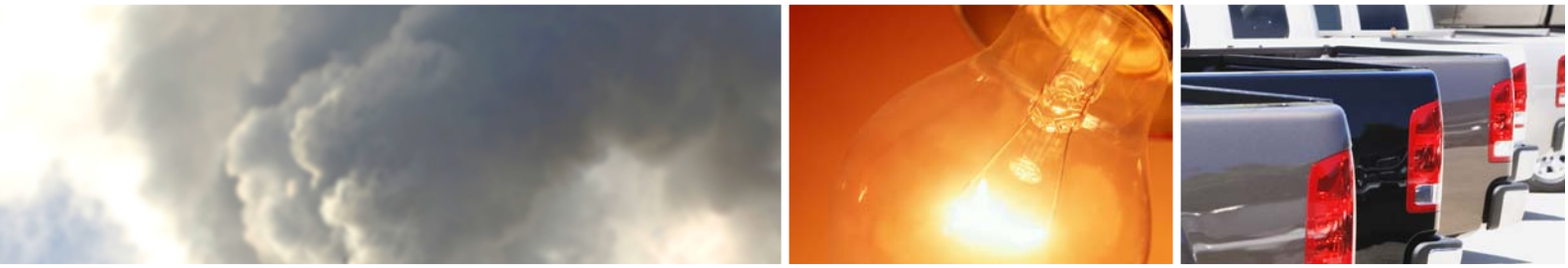
Sector	Energy Type	Emissions CO_2e (t)	Total CO_2e (t)	Emissions CO_2e (t)	Total CO_2e (t)	Percent Change
		2002		2007		02-07
Buildings	Electricity	133	1,371	140	1,302	-5%
	Natural Gas	1,239		1,162		
Outdoor Lighting	Electricity	45	45	40	40	-11%
Water & Wastewater	Electricity	22	29	30	37	28%
	Natural Gas	6		7		
Vehicle Fleet	Diesel Fuel	491	805	695	981	22%
	Gasoline	315		286		
Corporate Waste		386	386	417	417	8%
Total		**2,637 tonnes CO_2e**		**2,777 tonnes CO_2e**		**5%**

2.7.3 Emissions Comparison

Energy consumption increased by ten percent from 2002 to 2007 and energy costs and CO2e increased by 58 percent and six percent respectively (table 2.7.4). Increases in energy consumption are due to the addition and/or expansion of city-owned buildings and engineering assets. Increases for costs for consumption are also due to additions and/or expansions, as well as increases in the cost of energy.

Table 2.7.4 – Inventory Summaries (2002-2007)

Parameter	2002	2007	Percent Change 2002-2007
Energy Consumption	65,537 GJ	69,312 GJ	6%
Energy Costs	$786,528	$1,030,215	31%
Emissions	2,637 tonnes CO_2e	2,777 tonnes CO_2e	5%



3. COMMUNITY ENERGY AND GHG INVENTORY

3.1 Community Inventory Summary

An overview of total energy consumed and emissions by sector is presented herein. For community buildings and on-the-road transportation, energy and emissions data are presented in the sections that follow. Two years of data are provided: 2002 and 2007. Data for the year 2002 was used to assist with the 2017 forecast and data for the year 2007 represents the base year, against which reduction targets are developed.

The community's total greenhouse gas emissions was 252,708 tonnes CO_2e for the 2002 inventory year. In 2007, the total greenhouse gas emissions was 310,025 tonnes CO_2e. See Appendix A3 and A4 for detailed community inventories for 2002 and 2007 respectively.

Figure 3.1a illustrates percent GHG emissions by sector for 2002 and 2007 and table 3.1a provides a tabulation of GHG emissions and energy consumption by sector for 2002 and 2007.

Figure 3.1a – Community GHG Emissions by Sector (2002 and 2007)

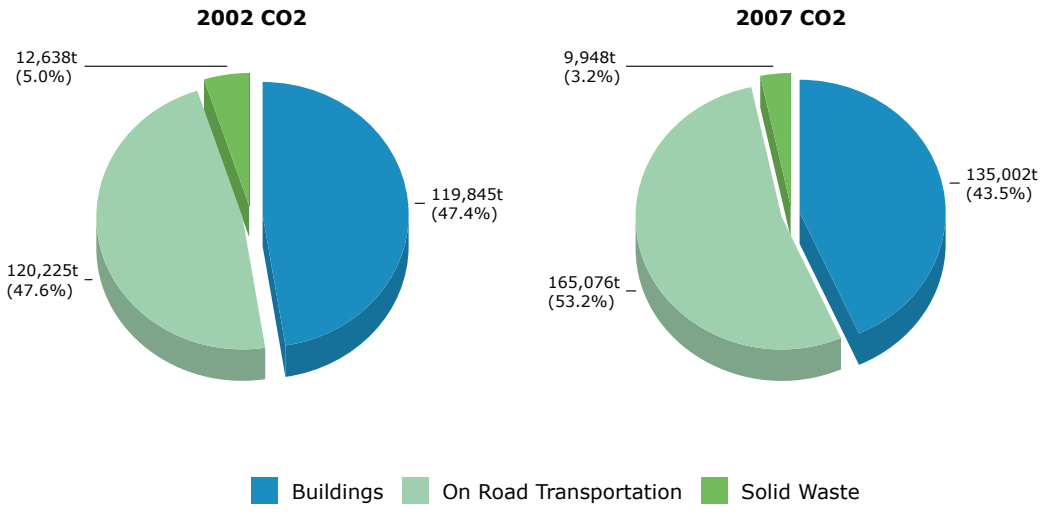


Table 3.1a – Community Energy and Emissions by Sector (2002 and 2007)

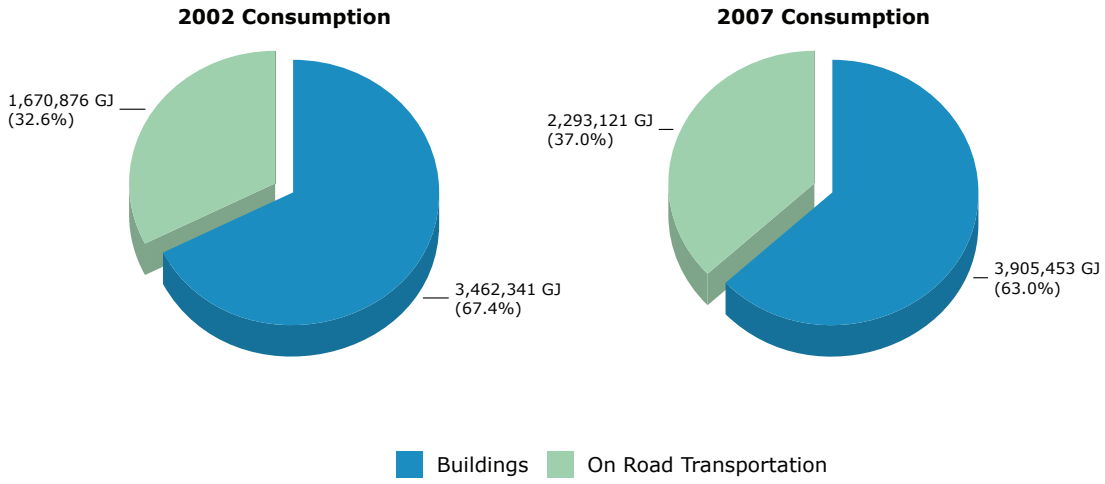
Sector 2002	Total Energy (GJ)	Total Emissions (CO_2e tonnes)	Percent Energy	Percent Emissions
Buildings	3,462,341	119,845	67%	47%
On Road Transportation	1,670,876	120,225	33%	48%
Solid Waste		12,638	0%	5%
Total	**5,133,217**	**252,708.4**	**100%**	**100%**

Sector 2007	Total Energy (GJ)	Total Emissions (CO_2e tonnes)	Percent Energy	Percent Emissions
Buildings	3,905,453	135,002	63%	44%
On Road Transportation	2,293,121	165,076	37%	53%
Solid Waste		9,948	0%	3%
Total	**6,198,574**	**310,025.4**	**100%**	**100%**

Community transportation produced the majority of emissions at 120,225 tonnes CO_2e in 2002 (48 percent) and 165,076 tonnes CO_2e (53 percent) in 2007. Community buildings generated 119,845 tonnes (47 percent) in 2002 and 135,002 tonnes CO_2e (44 percent) in 2007. Solid waste generated 12,638 tonnes CO_2e (5 percent) in 2002 and 9,948 tonnes CO_2e (3 percent) in 2007 (figure 3.1 and table 3.1a).

In 2002, the majority of energy was consumed in the buildings sector at 3,462,341 GJ (67 percent), whereas community transportation consumed 1,670,876 GJ (33 percent; figure 3.1b and table 3.1a). In 2007, community buildings consumed 3,905,453 GJ (63 percent) while transportation consumed 2,293,121 GJ of energy (37 percent; figure 3.1b and table 3.1a).

Figure 3.1b – Community Energy Consumption by Sector (2002 and 2007)



Sources of Community Energy

Although the community consumes several types of energy, only four types of energy are significant: electricity; natural gas, gasoline, and; diesel fuel. Energy consumption increased steadily between 2002 and 2007. While a significant source of energy, in both 2002 and 2007, electricity accounted for approximately only 3 percent of the total community emissions (table 3.1c). Natural gas and Gasoline were the community's energy sources that had the highest associated GHG emissions, together accounting for 86 percent of emissions in 2002 and 84 percent in 2007. Diesel fuel consumption doubled between 2002 and 2007, rising from 5% of total emissions to 10%. Mobile propane produced an insignificant amount of emissions in both inventory years.

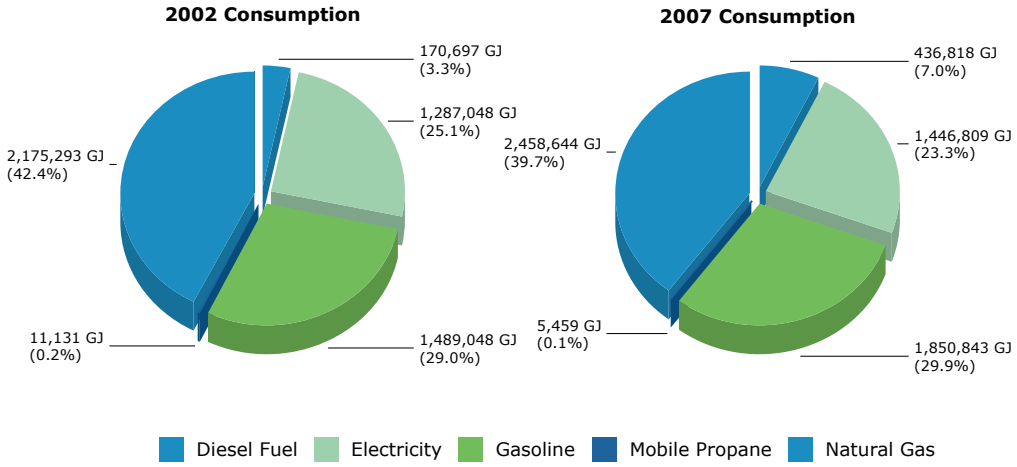
Table 3.1c – Sources of Community Energy for 2002 (top) and 2007 (bottom)

Energy Type	Units	Total Use	Total Emissions (CO_2e tonnes)	Percent by Source
Electricity	kWh	357,513,316	8,580	3%
Natural Gas	GJ	2,175,293	111,265	44%
Gasoline	litres	42,961,571	107,291	42%
Diesel Fuel	litres	4,413,061	12,266	5%
Mbl Propane	litres	439,793	669	0%
Solid Waste			12,638	5%
Total			**252,708**	**100%**

Energy Type	Units	Total Use	Total Emissions (CO_2e tonnes)	Percent by Source
Electricity	kWh	401,891,268	9,243	3%
Natural Gas	GJ	2,458,644	125,758	41%
Gasoline	litres	53,399,986	133,360	43%
Diesel Fuel	litres	11,293,133	31,388	10%
Mbl Propane	litres	215,690	328	0%
Solid Waste			9,948	3%
Total			**310,025**	**100%**

Figure 3.1c illustrates the percent energy use by source. Although propane for barbecues and heaters is consumed in the community, data for residential propane purchased at fuel service stations and other retail outlets is not available from suppliers and is otherwise insignificant relative to buildings and transportation (e.g., estimates are less than one tenth of a percent of total community energy).

Figure 3.1c – Community Energy Consumption by Sector (2002 and 2007)



3.2 Community Buildings

The community buildings sector can be subcategorized into residential, commercial, and industrial buildings. Figures 3.2a and 3.2b illustrate the percent energy and emissions respectively in each subcategory in 2002 and 2007. Table 1.2c illustrates the amount of energy and emissions in residential, commercial, and industrial buildings in 2002 and 2007.

Figure 3.2a – Percent Energy in Community Buildings (2002 and 2007)

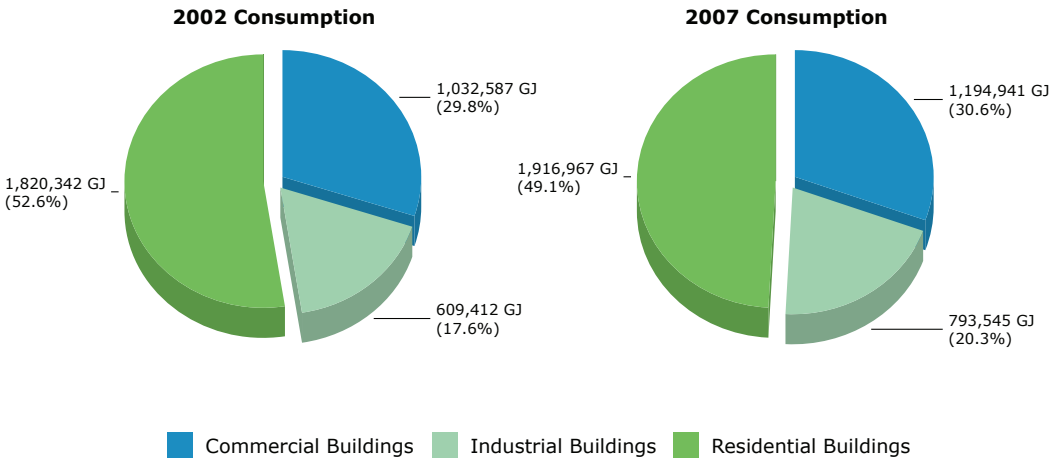
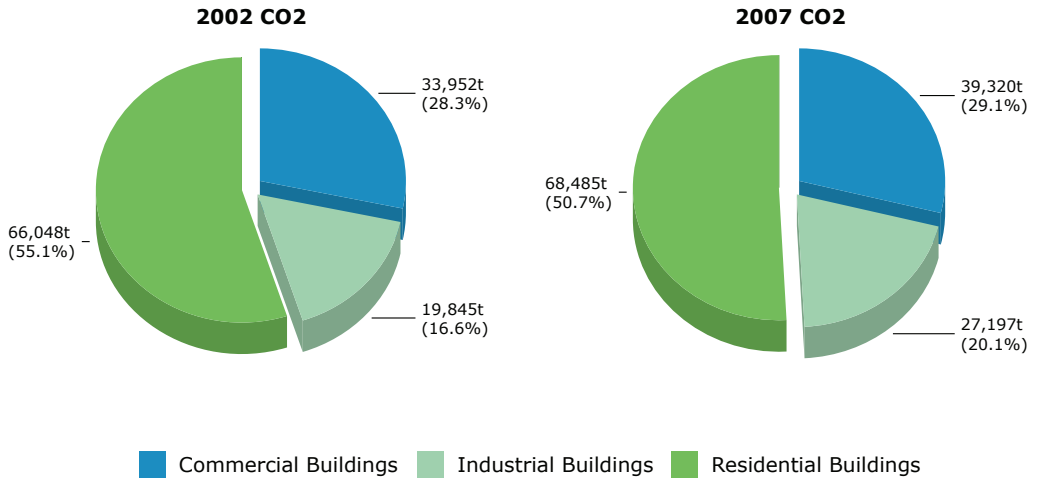


Figure 3.2b – Percent GHG Emissions in Community Buildings (2002-2007)



The total energy consumed in all buildings in 2002 was 3,462,341 GJ, which is shared by two energy types: electricity (1,287,048 GJ); and, natural gas (2,175,293 GJ). The total emissions for all community building categories was 119,845 tonnes CO_2e (table 3.2a). In 2007 community buildings consumed 3,905,453 GJ of energy, and used two energy types: electricity (1,446,809 GJ); and, natural gas (2,458,644 GJ). The total emissions for all community building categories was 134,600 tonnes CO_2e in 2007 (table 3.2a and table 3.2b).

Fuel oil used for space heating is unavailable due to confidentiality issues and there are no reliable indicators in the available datasets to estimate fuel oil consumption.

3.2.1 Residential Buildings

The residential sector consists of single unit dwellings, multi-unit dwellings, and mobile homes in the City of Port Coquitlam. There were an estimated 19,689 households (www.statcan.gc.ca) in the City representing 52 percent and 49 percent of building energy consumption an ~55 percent and 51 percent of GHG emissions in 2002 and 2007 respectively.

3.2.2 Commercial Buildings

The commercial sector consists of buildings used for offices, retail space, health care, education, lodging and food, and places of public assembly and religious worship. In total, the commercial sector represents 30 and 31 percent of energy use in the City in 2002 and 2007 respectively and 28 percent and 29 percent of GHG emissions in 2002 and 2007 respectively.

3.2.3 Industrial Buildings

In total, the industrial sector represents 18 percent of energy use in the City for 2002 and 20 percent of GHG emissions in 2007. The industrial sector represents 17 percent and 20 percent of GHG emissions in 2002 and 2007 respectively.

Table 3.2a – Summary of Community Buildings (2002)

Buildings	Consumption By Type						Emissions Total
	Type	Connections	Consumption	Energy/Connection	Energy (GJ)	CO_2e (t)	CO_2e (t)
Residential Buildings	Electricity	17,231	168,984,997 kWh	9,807 kWh/C	608,346	4,056	**66,048**
	Natural Gas	13,149	1,211,996 GJ	92 GJ/C	1,211,996	61,993	
Commercial Buildings	Electricity	1,787	117,802,156 kWh	65,922 kWh/C	424,088	2,827	**33,952**
	Natural Gas	1,395	608,499 GJ	436 GJ/C	608,499	31,124	
Industrial Buildings	Electricity	479	70,726,164 kWh	147,654 kWh/C	254,614	1,697	**19,845**
	Natural Gas	28	354,798 GJ	12,671 GJ/C	354,798	18,148	
Subtotal	Electricity	19,497	357,513,316 kWh		1,287,048	8,580	**119,845**
	Natural Gas	14,572	2,175,293 GJ		2,175,293	111,265	

Table 3.2b – Summary of Community Buildings (2007)

Buildings	Consumption By Type						Emissions Total
	Type	Connections	Consumption	Energy/Connection	Energy (GJ)	CO_2e (t)	CO_2e (t)
Residential Buildings	Electricity	18,337	183,486,201 kWh	10,006 kWh/C	660,550	4,220	**68,485**
	Natural Gas	13,356	1,256,417 GJ	94 GJ/C	1,256,417	64,265	
Commercial Buildings	Electricity	2,022	135,291,859 kWh	66,910 kWh/C	487,051	3,112	**39,320**
	Natural Gas	1,532	707,890 GJ	462 GJ/C	707,890	36,208	
Industrial Buildings	Electricity	525	83,113,208 kWh	158,311 kWh/C	299,208	1,912	**27,197**
	Natural Gas	13	494,338 GJ	38,026 GJ/C	494,338	25,285	
Subtotal	Electricity	20,884	401,891,268 kWh		1,446,809	9,243	**135,002**
	Natural Gas	14,901	2,458,644 GJ		2,458,644	125,758	

Of note is the increase in energy per connection in all buildings subsectors between 2002 and 2007. Although it is difficult to determine the reasons for increases in consumption per connection in the commercial and industrial subsectors, there are many possible explanations why energy consumption per connection is increasing in the residential sector. Some of the factors that may result in increased consumption include: size of homes; number of secondary suites; number of occupants per dwelling; rate of occupancy of dwellings; the use of more household appliances and the energy consumption of appliances (e.g. large screen televisions may have a significant effect).

3.3 Community On-the-Road Transportation

A summary of fuel use and GHG emissions for vehicles on the road in the City of Port Coquitlam is presented in tables 3.3a and 3.3b for 2002 and 2007 respectively.

A weighted average fuel consumption rate in L/100km is also provided in tables 3.3a and 3.3b. Fuel consumption rates decreased from 2002 to 2007 in most vehicle classes reflecting the automotive industry's advancements in fuel efficiency technology. Tonnes of GHG emissions per unit for each vehicle class is also provided in these tables.

Table 3.3a – Summary of Community Transportation (2002)

On Road Transportation	Consumption By Type						Weighted Average Fuel Consumption Rate (L/100 km)	CO_2e per Unit (t)	Emissions Total
	Type	Units	Consumption		Litres/Unit	CO_2e (t)			CO_2e (t)
Small Passenger Cars	Gasoline	12,541	11,654,874	litres	929 L/U	29,107	9.2	2.3	**29,530**
	Diesel Fuel	65	152,478	litres	2,346 L/U	424	5.9	6.5	
Large Passenger Cars	Gasoline	11,122	13,254,374	litres	1,192 L/U	33,101	12.1	3.0	**33,450**
	Diesel Fuel	77	125,458	litres	1,629 L/U	349	7.9	4.5	
Light Trucks, Vans, And Suvs	Gasoline	3,181	6,589,122	litres	2,071 L/U	16,455	14.1	5.2	**17,218**
	Diesel Fuel	98	196,690	litres	2,007 L/U	547	12.1	5.6	
	Mobile Propane	74	142,278	litres	1,923 L/U	216	17.5	2.9	
Commercial Vehicles	Gasoline	558	7,880,798	litres	14,123 L/U	19,681	16.2	35.3	**31,080**
	Diesel Fuel	560	3,938,434	litres	7,033 L/U	10,947	16.9	19.5	
	Mobile Propane	73	297,515	litres	4,076 L/U	452	18.0	6.2	
Motorhomes	Gasoline	312	1,271,570	litres	4,076 L/U	3,176	22.1	10.2	**3,176**
Motorcycles And Mopeds	Gasoline	557	2,270,078	litres	4,076 L/U	5,669	6.5	10.2	**5,669**
Bus	Gasoline	10	40,755	litres	4,076 L/U	102	13.2	10.2	**102**
Subtotal	Gasoline	28,281	42,961,571	litres		107,291			**120,225**
	Diesel Fuel	800	4,413,061	litres		12,266			
	Mbl Propane	147	439,793	litres		669			

Table 3.3b – Summary of Community Transportation (2007)

On Road Transportation	Consumption By Type						Weighted Average Fuel Consumption Rate (L/100 km)	CO_2e per Unit (t)	Emissions Total
	Type	Units	Consumption		Litres/Unit	CO_2e (t)			CO_2e (t)
Small Passenger Cars	Gasoline	16,559	13,769,970	litres	832 L/U	34,389	8.4	2.1	**34,659**
	Diesel Fuel	156	97,294	litres	624 L/U	270	5.8	1.7	
Large Passenger Cars	Gasoline	6,316	6,890,396	litres	1,091 L/U	17,208	10.6	2.7	**17,373**
	Diesel Fuel	66	59,404	litres	900 L/U	165	8.5	2.5	
Light Trucks, Vans, And Suvs	Gasoline	15,408	27,596,274	litres	1,791 L/U	68,918	12.3	4.5	**69,547**
	Diesel Fuel	116	177,069	litres	1,526 L/U	492	12.1	4.2	
	Mobile Propane	52	89,781	litres	1,727 L/U	136	15.8	2.6	
Commercial Vehicles	Gasoline	2,286	4,080,873	litres	1,785 L/U	10,191	15.6	4.5	**28,308**
	Diesel Fuel	1,210	6,449,381	litres	5,330 L/U	17,926	17.9	14.8	
	Mobile Propane	90	125,909	litres	1,399 L/U	191	17.7	2.1	
Tractor Trailer Trucks	Diesel Fuel	243	4,467,864	litres	18,386 L/U	12,418	24.0	51.1	**12,418**
Motorhomes	Gasoline	255	486,093	litres	1,906 L/U	1,214	18.4	4.8	**1,331**
	Diesel Fuel	20	42,121	litres	2,106 L/U	117	18.0	5.9	
Motorcycles And Mopeds	Gasoline	1,055	392,460	litres	372 L/U	980	6.6	0.9	**980**
Bus	Gasoline	22	183,920	litres	8,360 L/U	459	18.2	20.9	**459**
Subtotal	Gasoline	41,901	53,399,986	litres		133,360			**165,076**
	Diesel Fuel	1,811	11,293,133	litres		31,388			
	Mbl Propane	142	215,690	litres		328			

Table 3.3c presents the percent breakdown of the number of vehicles in each vehicle class for 2002 and 2007 and the overall percent change in the number of vehicles in each vehicle class between 2002 and 2007.

Table 3.3c – Summary of Vehicle Registration Data (2002-2007)

Vehicle Type	Units	Percent of Total	Units	Percent of Total	Overall Percent Change
	2002		2007		02-07
Small Passenger Cars[1]	12,606	43%	16,715	38%	33%
Large Passenger Cars[2]	11,199	38%	6,382	15%	-43%
Light Trucks, Vans, and SUVs[3]	3,353	11%	15,576	36%	365%
Commercial Vehicles[4]	1,191	4%	3,586	8%	201%
Tractor Trailer Trucks[5]	-	-	243	1%	-
Motorhomes	312	1%	275	1%	-12%
Motorcycles and Mopeds	557	2%	1,055	2%	89%
Bus[6]	10	0%	22	0%	120%
TOTAL	**29,228**		**43,854**		**50%**

[1] Small passenger cars are cars <1,400 kg Gross Vehicular Weight

[2] Large passenger cars are cars >1,400 kg Gross Vehicular Weight

[3] Light trucks, vans, and SUVs are defined as gasoline and diesel fuel vehicles driven for personal use

[4] Commercial vehicles are trucks driven for commercial use

[5] Tractor trailer trucks are large engine displacement trucks that haul various multi-axle trailers

[6] Buses include public transit buses and commercial buses

Vehicle classes have been grouped using gross vehicle weight ratings for individual vehicles. Heavy duty diesel vehicles are defined as multi-axle, multi-tire vehicles that would generally travel the majority of distances outside of the city of Port Coquitlam municipal boundary.

In 2002, Small Passenger Cars made up the largest group of vehicles (43 percent) followed by Large Passenger Cars (38 percent). Light Trucks, Vans, and SUVs made up the third largest group (11 percent) with commercial viehicles making up the fourth largest group (four percent).

In 2007, small passenger cars decreased from 43 percent of total registered vehicles to 38 percent. Vehicle choice shifted dramatically towards light trucks, vans, and SUVs, which increased from 11 percent of registered vehicles to 36 percent. Large passenger cars decreased from 38 percent to 15 percent of the total number of vehicles in the region. Commercial vehicles made up the fourth largest vehicle class (eight percent).

Overall percent change in the total number of vehicles increased by 50% between 2002 and 2007 with the most significant change occurring in the light truck, van and SUV vehicle class.

3.4 Community Solid Waste

Solid waste generated by residents, and commercial and industrial facilities in the City of Port Coquitlam accounted for two percent of total community emissions in 2002 and two percent in 2007. In 2002, solid waste from all community sources resulted in 12,638 tonnes of CO_2e in 2002 and 9,948 tonnes CO_2e in 2007. The decrease in emissions is the direct result of source bans imposed by Metro Vancouver and increased diversion of waste by the City.

Table 3.4 – Summary of Solid Waste Data

Sector	CO_2e (t)	CO_2e (t)	Overall Percent Change
	2002	2007	
Solid Waste	12,638	9,948	-21%

3.5 Community Inventory Summary and Comparison 2002 to 2007

A summary of GHG emissions for each sector in 2002 and 2007 is presented in table 3.5. Buildings and On The Road Transportation increased by 12 and 37 percent respectively while solid waste decreased by 21 percent. The overall percent change between 2002 and 2007 was an increase of 23 percent.

The largest increase in GHG emissions was in the On Road Transportation sector at 37 percent which is mainly due to a 50 percent increase in vehicles registered in the region between 2002 and 2007 (table 1.3c). This increase is also partially due to a shift in vehicle choice from large passenger vehicles to light trucks, vans, and SUVs between 2002 and 2007 (see table 1.3c) and the corresponding higher fuel consumption rates of vehicles in this class.

Greenhouse Gas Emissions for buildings increased by 12 percent from 2002 to 2007 and is mainly due to the increase in the total number of connections in the region (e.g., ~19,000 connections in 2002 to ~20,000 connections in 2007; table 1.2c).

Table 3.5 – Comparison of GHG Emissions by Sector (2002-2007)

Sector	Energy Type/Unit	Consumption	CO_2e (t)	Total CO2e (t)	Consumption	CO_2e (t)	Total CO_2e (t)	Overall Percent Change
		2002			2007			02-07
Buildings	Elect (kWh)	357,513,316	8,580	119,845	401,891,268	8,243	135,002	+12%
	Nat Gas (GJ)	2,175,293	111,265		2,458,644	125,758		
On Road Transportation	Gasoline (L)	42,961,571	12,226	120,225	53,399,986	133,360	165,076	+37%
	Diesel (L)	4,413,061	107,291		11,293,133	31,388		
	Propane (L)	439,793	669		215,690	328		
Solid Waste	Tonnes	-	12,638	12,638	-	9,948	9,948	-21%
TOTAL		252,708			310,025			**+23%**

Overall greenhouse gas emissions increased by 23 percent in a five year period (2002 to 2007) from 252,708 tonnes to 309,624 tonnes CO_2e

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4. FORECASTS OF ENERGY CONSUMPTION AND GHG EMISSIONS

The energy and emissions inventory presented in Section 2 provides a starting point from which to construct a forecast of energy consumption and emissions for corporate operations and the community.

Forecasts are only as good as one's ability to predict future growth. When developing reduction targets (Section 5), it is important that the forecast of emissions is estimated as accurately as possible since it forms part of the calculation of the overall reduction quantity.

4.1 Predicted Growth in the Corporate Inventory

The forecast of corporate emissions is based on the assumption that the city will provide services with the same level of efficiency as it has in the past, but will also make additions and upgrade core services such as recreation facilities and other public buildings, thereby adding to energy consumed, costs for consumption, and overall emissions. Additions to the inventory were only incorporated into the forecast if a capital project had been identified or if it was certain that aging buildings and/or infrastructure, if any, would be demolished during the project period.

Table 4.1 – Predicted Growth in Corporate Inventory (2012)

Sector	Energy Type/Unit	Comparison Year Consumption	Base Year Consumption	Percent Change Energy	Predictions	Consumption Forecast
		2002	2007	2002-2007	2007-2017	2017
Buildings	Elect (kWh)	5,530,952	6,090,327	10%	Increase between 2002-2007 due to addition of Administration Annex and Gathering Place. Nominal change expected at 0.5% every two years up to 2017.	2.50%
	Nat Gas (GJ)	24,215	22,711	-6%	Decrease between 2002-2007 due to efficiencies in replaced roof top units at Hyde Creek Pool. Nominal decreases expected from 2007 to 2017 with upgrade to small roof top units.	0%
Lighting	Elect (kWh)	1,867,894	1,737,869	-7%	Decrease in consumption between 2002-2007 the result of upgrades to LED lighting. Nominal change expected for outdoor lighting at Dominion Triangle.	1%
Water & Wastewater	Elect (kWh)	934,368	1,286,979	38%	Overall growth from 2007 to 2017 estimated at 11% due to one new pump station (Trenton), larger motors at existing pump stations (1 per year for six years), an additional two PRVs, and addition of lighting at four existing PRVs .	11%
	Nat Gas (GJ)	125	144	15%	No change expected.	0%
Vehicle Fleet	Diesel (L)	176,520	250,101	42%	Increase between 2002-2007 due to addition of garbage packers. From 2007-2017, growth for garbage packers is expected. Growth in other vehicle numbers is not expected, although as service delivery increases, fuel consumption amounts will increase slightly over time.	7%
	Gas (L)	126,072	114,463	-9%	Decrease between 2002-2007 due to some vehicle conversions to diesel fuel. From 2007-2017, growth in other vehicle numbers is not expected, although as service delivery increases, fuel consumption amounts will increase slightly.	5%
Total*		**65,537 GJ**	**69,312 GJ**	**10%**	**71,298 GJ**	**3%**

4.1.1 Forecast of Corporate Energy Consumption, Costs, and Emissions

The project team has developed the growth forecasts based on additions and deletions to corporate buildings and engineering assets during the project period.

Energy consumption and associated costs to purchase energy are forecast together although forecasts of each energy type in each sector is weighted according to the mix of energy type in the base year. Although all forecasted parameters are equally important, local governments are paying particular attention to forecasts of energy costs to better prepare for future budgets. Although it is difficult to predict future energy costs, in all certainty, energy costs will increase in the forecast period. Conservative estimates of energy cost increases are provided.

Table 4.1.1a – Forecast of Corporate Energy Consumption by Sector (2002 - 2017)

Sector	Energy Type/Unit	Comparison Year Consumption	Base Year Consumption	Consumption Forecast Percent	Forecasted Consumption	Forecasted Energy (GJ)	
		2002	2007	2017			
Buildings	Elect (kWh)	5,530,952	6,090,327	2.50%	6,242,585	22,473	45,184
	Nat Gas (GJ)	24,215	22,711	0%	22,711	22,711	
Lighting	Elect (kWh)	1,867,894	1,737,869	1%	1,755,248	6,319	6,319
Water & Wastewater	Elect (kWh)	934,368	1,286,979	11%	1,428,547	5,143	5,287
	Nat Gas (GJ)	125	144	0%	144	144	
Vehicle Fleet	Diesel (L)	176,520	249,920	7%	267,414	10,344	14,509
	Gas (L)	126,072	114,463	5%	120,186	4,165	
Total		65,537 GJ	i69,312 GJ				71,298 GJ

The forecast of energy consumption (table 4.1.1a) is aligned with the predicted growth by sector in table 4.1, whereas the forecast of energy costs (table 4.1.1b) is highly dependent upon our prediction of costs per unit of energy in the future. The most difficult cost prediction for energy types is gasoline and diesel fuel. The prediction of $2.50/litre of gasoline and $2.25/litre of diesel fuel is considered conservative and based on a reputable source (Nesbitt Burns Oil & Gas Research - Oil & Gas Weekly). However, predictions from Federal US oil and gas analysts (US Energy Agency) are as high as $4.50/litre and $4.00/litre for gasoline and diesel fuel, respectively.

Table 4.1.1b - Forecast of Corporate Costs by Sector (2002 - 2017)

Sector	Energy Type/Unit	Comparison Year Consumption	Base Year Consumption	Consumption Forecast Percent	Forecasted Consumption	Forecasted Cost	
		2002	2007	2017			
Buildings	Elect (kWh)	5,530,952	6,090,327	2.50%	6,242,585	$936,388	$1,277,053
	Nat Gas (GJ)	24,215	22,711	0%	22,711	$340,665	
Lighting	Elect (kWh)	1,867,894	1,737,869	1%	1,755,248	$263,287	$263,287
Water & Wastewater	Elect (kWh)	934,368	1,286,979	11%	1,428,547	$214,282	$216,442
	Nat Gas (GJ)	125	144	0%	144	$2,160	
Vehicle Fleet	Diesel (L)	176,520	249,920	7%	267,414	$601,682	$902,148
	Gas (L)	126,072	114,463	5%	120,186	$300,465	
Total		65,537 GJ	69,312 GJ				$2,658,930

The emissions forecast (table 4.1.1c) is also based on the percentages provided in the initial forecast for each sector (table 4.1). For the sake of simplicity, the emissions forecast does not include any predicted changes to electricity emissions factors, either positive

or negative (e.g., the emissions factor increases and decreases according to the mix of power generation by hydroelectricity vs. power generation by burning fossil fuels). Instead, the forecast assumes that electricity factors will remain constant over time. The electricity emissions factor is used to convert the amount of electricity consumed to CO_2e and is important in the calculation. Although it is highly unlikely that emissions coefficients will remain constant over the forecast period, the trend in emissions coefficients in British Columbia is not straight forward since they are based on the origin of electricity provided to BC Hydro customers, which in turn is dependent upon overall demand for electrical energy– parameters that are not easily predicted.

Due to aggressive city policies towards reducing corporate and community wide solid waste there will likely be a decrease of one percent a year in total solid waste emissions.

Table 4.1.1c – Forecast of Corporate Emissions (CO_2e tonnes) by Sector (2002 - 2017)

Sector	Energy Type/Unit	Comparison Year Emissions	Base Year Emissions	Emissions Forecast Percent	Forecasted Consumption	Forecasted Emissions*
		2002	2007	2017		
Buildings	Elect (kWh)	133	140	2.50%	6,242,585	175
	Nat Gas (GJ)	1,239	1,162	0%	22,711	1,162
Lighting	Elect (kWh)	45	40	1%	1,755,248	49
Water & Wastewater	Elect (kWh)	22	30	11%	1,428,547	40
	Nat Gas (GJ)	6	7	0%	144	7
Vehicle Fleet	Diesel (L)	491	695	7%	267,414	743
	Gas (L)	315	286	5%	120,186	300
Solid Waste[1]	Tonnes	386	417	-10%	NA	375
Total		2,637 tonnes	2,777 tonnes			2,914

4.1.2 Summary of Corporate Forecasts

Overall corporate energy consumption is forecast to increase by three percent from 2007 to 2017 which is a small increase and consistent with the absence of new building stock in the capital plan. Overall costs for corporate energy are forecast to increase by 158 percent due to the forecasted increase in the unit cost for electricity, natural gas, and automotive fuel. Overall emissions are forecast to increase by one percent, lower than the forecast for energy due to the difference in energy types in each of the sectors. Likely this is due to the expected increase in electricity consumption and stagnant natural gas consumption rates. The forecasts for corporate energy consumption, costs, and emissions are summarized in table 4.1.2.

Table 4.1.2 – Summary of Corporate Forecasts

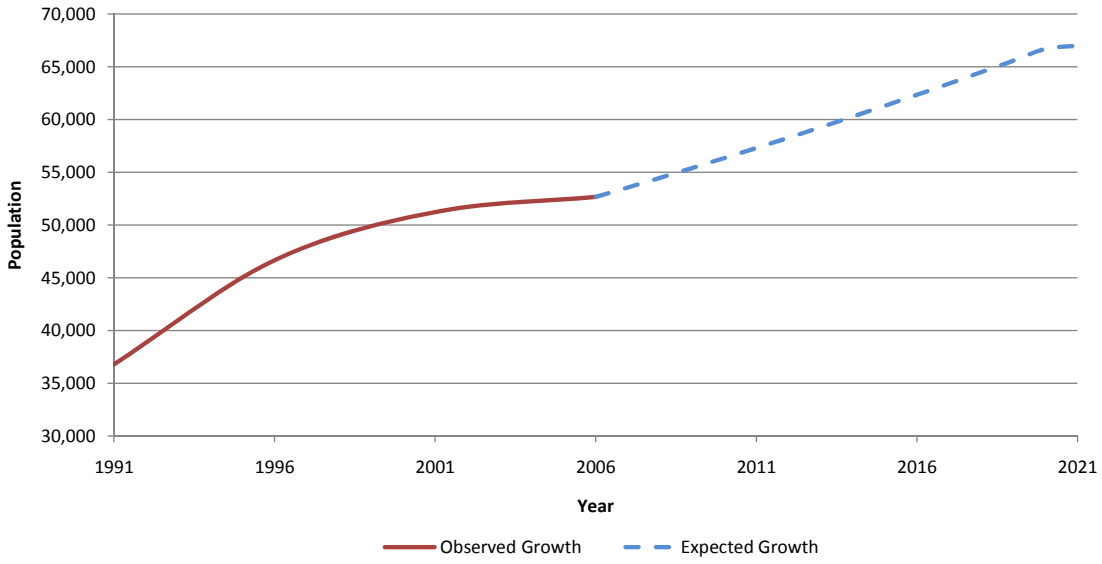
Forecasted Parameter	Corporate Comparison Year	Corporate Base Year	Corporate Forecast Year	Corporate Percent Increase
	2002	2007	2017	2007-2017
Energy Consumption	65,537 GJ	69,312 GJ	71,298 GJ	3%
Energy Costs	$786,528	$1,030,215	$2,658,930	158%
Emissions	2,637 tonnes CO2e	2,777	2914	5%

4.2 Predicted Growth in the Community Inventory

The forecast of community emissions is based on observations of trends in the community buildings and transportation sectors. In general, energy and emissions at the community level will increase in accordance with population growth, but growth is slightly different for each sector and difficult to predict in changing economic times. The City of Port Coquitlam has experienced significant population growth over the past two decades. The city grew by 44 percent between 1991 and 2006 from 36,800 residents to nearly 53,000 residents in 2006. The city expects population growth to continue over the next decade and estimates that i will have a population of 67,000 by 2021 (figure 4.2a)[1]. Regardless of the trend in population growth, energy and emissions will not necessarily increase in a similar manner.

A summary of the energy and emissions forecast and assumptions for each community sector is presented in section 4.2.4 (table 4.2i). The data that supports these assumptions is presented in table 4.2a to table 4.2g.

Figure 4.2a – Population Growth (1991–2021)



4.2.1 Community Buildings Forecast

Many factors contribute to the forecast of GHG emissions for community buildings. These factors include the number of units projected, the energy types used for space heating in the projected units (e.g., electric or natural gas space heating), the size and therefore the energy intensity of projected units by energy type, and the emissions factor for electricity that will be used to calculate GHG emissions from electricity in 2017.

To simplify, the calculation for the emissions forecast for community buildings is:

Growth in Emissions by Energy Type = Projected Number of Units × Projected Energy Intensity by Energy Type × Projected Emissions Factor

Each of the three operands have been considered in the forecast for community buildings, with the exception of energy intensity, which can only be used for the residential sector due to inconsistencies in energy intensity for commercial and industrial buildings. Note that the projected emissions factor only changes for electricity and is otherwise constant for natural gas. A framework and number of assumptions has been provided to support the forecast for each subsector.

Table 4.2a presents the prediction of the number of community building units that is used in the GHG emissions forecast.

[1] City of Port Coquitlam (http://www.portcoquitlam.ca/Discover_Port_Coquitlam/About_Port_Coquitlam/Stats_and_Facts/Socio-Economic_Profile.htm)

Framework and Assumptions

Framework and Assumptions for Forecasts in the Community Buildings Sector:

- The GHG emissions factor for electricity in 2007 is used to calculate GHG emissions for the 2017 forecast. An emissions reduction due to less carbon intensive electricity is included in Section 4 under reduction initiatives that senior government is responsible for;
- Consumption data for natural gas is not normalized for weather for 2017, nor is it normalized for any other inventory year presented (e.g., GHG emissions are absolute and normalization would be undertaken for detailed comparisons of specific consumption accounts);
- Growth is significantly different for each of the community buildings subsectors;
- Growth is predicted for the forecast year 2017; and,
- Energy and GHG emissions Inventories for the years 2002 and 2007 were available to provide guidance for the forecast although the data was not necessarily used to develop the forecast.

Assumptions for Forecasts in the Residential Buildings Subsector:

- A business as usual (BAU) scenario is presented. This scenario reflects the city's best estimate of buildings could be developed under existing land use bylaws up to 2017;
- A projection of units is provided from the observed trend from 2005 to 2007, but this projection is used to compare to the median of the expected growth and high growth scenarios;
- The ratio of residential units that are heated by electricity to those heated by natural gas has been adjusted from 2007 data. Assume that the predicted number of high rise apartments will use electricity for space heating instead of natural gas. Assume natural gas will be consumed in high rise buildings for common area heating. Once a more detailed dataset is obtained from BC Hydro and Terasen Gas Inc., the existing ratios for low rise and high rise apartments will be used for the forecast; and,
- The calculation of the forecasted energy and resulting GHG emissions is based on a projection of the number of units added to the inventory between the base year (2007) and the forecast year (2017).

Assumptions for Forecasts in the Commercial Buildings Subsector:

- The ratio of commercial units that are heated by electricity to those heated by natural gas in 2007 is used to develop the 2017 forecast;
- Trends in consumption in the commercial sector have been used as guidance for the forecast;
- A commercial component has been factored into the forecast for commercial buildings, although these new commercial establishments are not necessarily new to the community and may be relocated businesses from within the city;
- Large commercial establishments indicate that growth is difficult to predict through turbulent economic times;
- Forecasts have been developed by estimates of new commercial floor space developed by city staff..

Assumptions for Forecasts in the Industrial Buildings Subsector:

- Industrial facilities indicate that growth is difficult to predict through turbulent economic times;
- Forecasts are based on discussions with staff of the size and character of expected new industrial developments (see Appendices);

Projections

The observed trend in the number of building units between 2002 and 2007 along with the projected trend is provided in table 4.2a. While the historical trend in new buildings is useful as a means of comparison it is not used to create a projection of new units. Forecasts of new buildings are rather based on city by-laws and proposed and expected new developments within the project period.

Table 4.2a – Projection of Community Building Types (2007 - 2017)

Sector	Number of Units	Number of Units	Percent Change	Projected Units[1]	Percent Change
	2002	2007	2002-2007	2017	2007-2017
Residential Buildings	17,231	18,337	6%	21,015	16%
Commercial Buildings	1,787	2,022	13%	–	–
Industrial Buildings	479	525	10%	–	–

[1] Note that forecast for growth in commercial and industrial buildings were based on city estimates of additional square footage rather than new connections.

Due to the wide variety of energy intensities between residential building types table 4.2b provides a breakdown of projected units while table 4.2c provides an estimate of expected energy consumption and GHG emissions in the buildings sector.

Table 4.2b – Expected Growth for Residential Building Types (2017)

Residential Building Type	Projected Units
	2017
Apartments – High Rise	200
Apartment – Low Rise	i5,866
Row Housing	3,786
Single Units	11,163
Total Units	**21,015**

Table 4.2c – Forecast of Community Energy and GHG Emissions for Residential Buildings (2017)

Sector	Energy Type/ Unit	Energy Consumption	GHG Emissions (CO_2e tonnes)
		Expected 2017	
Apartments	Elect (kWh)	31,723,087	888
	Nat Gas (GJ)	262,717	13,438
Row Housing	Elect (kWh)	33,261,872	931
	Nat Gas (GJ)	195,272	9,988
Single Units	Elect (kWh)	128,116,845	3,587
	Nat Gas (GJ)	887,462	45,393
Subtotal	**Elect (kWh)**	**193,101,804**	**5,407**
	Nat Gas (GJ)	**1,345,451**	**68,819**
TOTAL			**74,226**

City staff have identified moderate potential growth in commercial units and substantial potential growth in the industrial units within the project period. New commercial developments are expected to be split between lower level units in residential developments and large format retail stores. New industrial growth is expected to be almost entirely limited to light industrial activity such as warehouses, research and development facilities and business offices.

Table 4.2d presents the forecasted energy consumption and related GHG emissions for all community building subsectors (e.g., residential, commercial, and industrial). Under a business as usual scenario, buildings emissions will increase by ~16,000 tonnes CO_2e to 150,763. Table 4.2e presents the base year (2007) GHG emissions, the GHG emission increments, and the total GHG emissions forecast for the forecast year (2017).

Table 4.2d – Energy and GHG Emissions Forecast for Community Buildings (2017)

Sector	Energy Type/ Unit	Forecast Energy Consumption	Forecast GHG Emissions (CO_2e)
		2017	2017
Residential Buildings	Elect (kWh)	193,101,804	5,407
	Nat Gas (GJ)	1,345,451	68,819
Commercial Buildings	Elect (kWh)	136,630,925	3,826
	Nat Gas (GJ)	713,763	36,509
Industrial Buildings	Elect (kWh)	117,154,745	3,280
	Nat Gas (GJ)	643,637	32,922
Subtotal	**Elect (kWh)**	**446,887,474**	**12,513**
	Nat Gas (GJ)	**2,702,851**	**138,250**
TOTAL			**150,763**

Table 4.2e – Forecast of GHG Emission Increments for Buildings (2017)

Sector	Energy Type/ Unit	Base Year Emissions	Expected Growth (CO_2e tonnes)	Forecast Year Emissions (CO_2e tonnes)	Percent Increase
		2007	2017	2017	2007-2017
Residential Buildings	Elect	4,220	1,187	5,407	28%
	Nat Gas	64,265	4,554	68,819	7%
Commercial Buildings	Elect	3,112	714	3,826	23%
	Nat Gas	36,208	301	36,509	1%
Industrial Buildings	Elect	1,912	1,368	3,280	72%
	Nat Gas	25,285	7,637	32,922	30%
Subtotal	**Elect**	**9,244**	**3,269**	**12,513**	**35%**
	Nat Gas	**125,758**	**12,492**	**138,250**	**10%**
TOTAL		**135,002**	**15,761**	**150,763**	**12%**

4.2.2 Community Transportation Forecast

Many factors contribute to the forecast of on-the-road transportation GHG emissions. These factors include the number of vehicles on-the-road, the fuel consumption rate of vehicles, and the number of kilometres driven. Community transportation forecasts are therefore difficult to develop since it is difficult to predict the type of vehicles that residents will purchase in the coming years. Further, the fuel consumption rate of vehicles and the number of kilometres driven is also difficult to predict.

To simplify, the calculation for the forecast of community on-the-road transportation is:

Growth in Emissions = Projected Number of Vehicles per Vehicle Class × Projected Fuel Consumption Rate by Fuel Type × Projected Vehicle Kilometres Driven by Vehicle Class × GHG Emissions Factor.

The forecast for on-the-road transportation is further complicated by many other external influences that affect each of the factors listed above. The majority of these external influences cannot be predicted but are listed for information as follows:

Number of Vehicles On-the-road

- insurance costs - high insurance costs can be cost prohibitive and prevent licensed drivers from owning a vehicle. Also, insurance costs may result in existing vehicles taken off the road by an owner
- vehicle price - the price of new vehicles may affect the number of vehicles on the road
- availability of capital leases - leasing is a less expensive alternative to purchasing a vehicle and fewer newer vehicles may be purchased in the absence of leasing options
- lease and finance rates for new vehicles - most people cannot afford to pay cash for a vehicle and must rely on lease and financing options

Fuel Consumption Rate

- regulations introducing fuel consumption standards
- fuel type - consumption rates differ for gasoline and diesel fuel combustion engines
- technological change - switch from fuel combustion to electric-gas hybrid to electric
- temperature - combustion engines operate less efficiently in extreme weather conditions and temperature can alter the shape and inflation of tires which can increase fuel consumption rates
- fuel price - the price of fuel can affect driver behaviour. High fuel prices may result in slower driving speeds and decreased rates of acceleration, whereas low fuel prices may have the opposite effect
- economy - the financial well-being of a driver may result in behaviours that reduce fuel consumption in order to reduce costs for fuel

Vehicle Kilometres Travelled

- shifts from auto to non-auto modes of transportation
- shifts to public transportation
- changes in the availability, accessibility, and convenience of public transportation
- economy - the financial well-being of a driver may result in more or less kilometres driven
- insurance rates - drivers may choose to insure their vehicles under rate classes that limit the number of kilometres driven or limit where the vehicle is driven (e.g., work vs. pleasure only or combinations thereof)

Framework and Assumptions for Forecasts in the On-the-road Transportation Sector

- The Insurance Corporation of British Columbia (ICBC) provides HES with data specific to the City of Port Coquitlam. A condition of the provision of data is that we represent the vehicles in each vehicle class as a 'unit';
- Although VKT estimates play an important role in predicting GHG emission in the on-the-road transportation sector, we assume that VKT will not change significantly in the forecast year, the focus for the forecast is a prediction of the count of vehicle types;
- Trends from 2002 to 2007 are not taken into account because these trends are not necessarily representative of the number of vehicles that will be on the road in 2017. Rather, the number of vehicles per dwelling for 2007 has been used for personal vehicles and projected against the number of residential units predicted in section 3.1;
- It is assumed that personal vehicles per capita does not significantly fluctuate between 2007 and 2017.
- A current year dataset would further assist with our assumptions for the on-the-road transportation forecast;
- Knowledge of the per capita rate of vehicles in apartments, row houses, and single units would greatly assist with the forecast; and,
- Commercial vehicles, tractor trailer trucks, and motorhomes are not forecast because there are no reliable indicators, including trends, from which to base the forecast.

Projections

Unlike the methods used to forecast GHG emissions in community buildings, the forecast for personal vehicles in the on-the-road transportation sector uses the number of vehicles per dwelling (2.06 units/dwelling) in 2007 and the projected number of dwellings from the 'business as usual' scenario to predict the number of vehicles in 2017. Expected vehicle growth is entirely limited to private passenger vehicles, hence the expected 16 percent increase in residential units reflects the approximately 11 percent increase in vehicles.

Once the number of vehicles is predicted from the number of units per dwelling for personal vehicles and the predicted number of residential building types, the fuel used per unit in 2007 is used to calculate the fuel used for 2017. Table 3.2a presents the data for 2007 that has been used to calculate the number of additional units in 2017 and the forecast of units and fuel consumption.

Table 4.2f provides a count of vehicles by vehicle type for 2007, the fuel consumed by each vehicle class, the additional units projected for 2017, and the forecast of fuel consumption for 2017. It is projected that in 2017 there will be nearly 49,000 vehicles on the road in Port Coquitlam and they will consume nearly 71 million litres of fuel.

Table 4.2f – Forecast of Number of Units and Fuel Consumption for On-the-road Transportation (2017)

Vehicle Class	Fuel Type	Units	Fuel (Litres)	Litres / Unit	Additional Units	Forecast Units	Forecast Consumption (Litres)
		2007			2017		
Small Passenger Cars	Gasoline	16,559	13,769,970	832	1,977	18,536	15,414,227
	Diesel Fuel	156	97,294	624	19	175	108,912
Large Passenger Cars	Gasoline	6,316	6,890,396	1,091	754	7,070	7,713,171
	Diesel Fuel	66	59,404	900	8	74	66,497
Light Trucks, Vans, and SUVs	Gasoline	15,408	27,596,274	1,791	1,840	17,248	30,891,514
	Diesel Fuel	116	177,069	1,526	14	130	198,213
	Mbl Propane	5i2	89,781	1,727	6	58	100,502
Commercial Vehicles	Gasoline	2,286	4,080,873	1,785	0	2,286	4,080,873
	Diesel Fuel	1,210	6,449,381	5,330	0	1,210	6,449,381
	Mbl Propane	90	125,909	1,399	0	90	125,909
Tractor Trailer Trucks	Diesel Fuel	243	4,467,864	18,386	0	243	4,467,864
Motorhomes	Gasoline	255	486,093	1,906	0	255	486,093
	Diesel Fuel	20	42,121	2,106	0	20	42,121
Motorcycles and Mopeds	Gasoline	1,055	392,460	372	206	1,261	469,055
Bus	Gasoline	22	183,920	8,360	0	22	183,920
TOTAL		43,854	64,908,809		4,824	48,678	70,798,251

Community transportation forecasts are difficult to develop since it is difficult to predict the type of vehicles that residents will purchase in the coming years. Further, the fuel consumption rate of vehicles and the number of kilometres driven is also difficult to estimate.

Table 4.2g provides the total units, fuel consumption, and GHG emissions for the target calculation. The GHG emissions have been calculated from the forecast amount of fuel consumed.

Table 4.2g – Forecast of GHG Emissions for On-the-road Transportation (2017)

Vehicle Class	Fuel Type	Forecast of Units	Forecast of Consumption (litres)	Forecast of GHG Emissions (tonnes CO_2e)
		2017		
Small Passenger Cars1	Gasoline	18,536	15,414,227	38,495
	Diesel Fuel	175	108,912	303
Large Passenger Cars2	Gasoline	7,070	7,713,171	19,263
	Diesel Fuel	74	66,497	185
Light Trucks, Vans, and SUVs3	Gasoline	17,248	30,891,514	77,148
	Diesel Fuel	130	198,213	551
	Mbl Propane	58	100,502	153
Commercial Vehicles4	Gasoline	2,286	4,080,873	10,191
	Diesel Fuel	1,210	6,449,381	17,926
	Mbl Propane	90	125,909	191
Tractor Trailer Trucks5	Diesel Fuel	243	4,467,864	12,418
Motorhomes	Gasoline	255	256,299	12,418
	Diesel Fuel	20	42,121	117
Motorcycles and Mopeds	Gasoline	1,261	469,055	1,171
Bus	Gasoline	22	183,920	6,375
TOTAL		**48,678**	**70,568,457**	**196,905**

4.2.3 Solid Waste Forecast

The forecast for community solid waste is pending receipt and review of solid waste data that has been collected since the introduction of new waste diversion strategies in the city. For the development of the overall reduction target solid waste emissions are assumed to remain constant over the project period.

4.2.4 Summary of Community forecast

Table 4.2i presents the percent change and resulting forecast of emissions. The forecast of emissions derived directly from the observed trend is a 10 percent increase from the 2007 base year emissions quantity. For solid waste, further diversion efforts and bans at the landfill will result in GHG reductions as the trend indicates. Therefore, the forecast for solid waste is based on the observed trend from 2002 to 2007.

Overall energy consumption is forecast to increase by 10 percent and overall greenhouse gas emissions are forecast to increase by 10 percent. The estimate developed for the on-the-road transportation sector may be conservative given the ever decreasing fuel consumption rates of vehicles. The forecasts for community energy consumption and emissions are summarized in table 4.3.

Table 4.2i – Forecast of Community Emissions (CO_2e tonnes) by Sector and Energy Type (2002 - 2012)ii

Sector	Energy Type / Unit	Emissions CO_2e (t)	Emissions CO_2e (t)	Forecast of Emissions (CO_2e tonnes)	Percent Change
		2002	2007	2017	2007-2017
Residential Buildings	Elect	4,056	4,220	5,407	28%
	Nat Gas	61,993	64,265	68,819	7%
Commercial Buildings	Elect	2,827	3,112	3,826	23%
	Nat Gas	31,124	36,208	36,509	1%
Industrial Buildings	Elect	1,697	1,912	3,280	72%
	Nat Gas	18,148	25,285	32,922	30%
Community Transportation	Gas	107,291	133,360	147,941	11%
	Diesel	12,266	31,388	31,499	0%
	Propane	669	328	344	5%
Community Solid Waste	N/A	12,638	9,948	9,948	0%
Total		**252,708**	**310,025**	**340,495**	**10%**

Table 4.2j – Summary of Community Forecasts

Forecasted Parameter	Community Base Year	Community Year	Community Forecast Year	Percent Increase
	2002	2007	2017	2002 - 2017
Energy Consumption	5,133,217 GJ	6,198,574 GJ	6,808,955 GJ	10%
Emissions	252,708 tonnes CO_2e	310,025 tonnes CO_2e	340,495 tonnes CO2e	10%

4.3 Forecasts and Their Contribution to Reduction Targets

Forecasts allow us to understand future energy consumption, costs of consumption, and emissions. They should be considered a work in progress as new information can change the forecast and therefore the reduction targets.

As stated earlier, the forecast is an essential component of the calculation of the reduction target. Since all the parameters used to calculate the reduction targets are subject to change, targets are essentially, 'moving' as new information is gathered.

The reduction target is equal to the percent difference between the base year inventory and the forecast year inventory. Since reduction targets are absolute and not based on per capita emissions, to achieve an actual reduction, **the total reductions achieved during the project period must be greater than the growth in emissions.** Regardless of any overall increase in emissions during the project period, implementing reduction initiatives will, at a minimum, decrease the amount of growth in emissions if the 'business as usual' scenario is allowed to continue.

The reduction initiatives that the city selected for implementation over the project period are summarized in section 5.

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5. CORPORATE REDUCTION INITIATIVES

5.1 Corporate Reduction Initiatives

Reduction initiatives have been selected that will reduce energy consumption and the production of GHG emissions from existing infrastructure and infrastructure that will be added in the future.

Detailed audits of infrastructure were not undertaken, although walkthrough audits were completed on major buildings to develop the list of possible reduction initiaitives for each building and groups engineering assets. Tables for each sector (buildings, lighting, water and wastewater, vehicle fleet, waste, etc.) are provided that summarize estimates of typical reductions for the potential reduction initiatives selected. A preliminary end-use breakdown of energy loads for buildings and infrastructure that was gathered from our walkthrough audits has been used in the estimates. Although walkthrough audits were conducted, the estimates do not replace detailed audits.

Although we have described the reduction amounts as ***estimates***, the calculations are based on reductions of the energy type that the measure affects. Careful consideration has been given to the effect that each measure will have on energy consumption. Measures are applied to end-use breakdowns of the types of energy consumed in all city infrastructure.

Administrative Considerations

For the city's corporate operations, the city should begin monitoring and reporting energy consumption and emissions and coordinating corporate energy and emissions efficiency. To accomplish this task, it is recommended that staff report to Council with several options and corresponding budget. Staff should create an interdepartmental workteam, made up of representatives from appropriate departments, that would be responsible for implementation of this plan. The workteam would be responsible for reviewing any new infrastructure plans for the city to ensure that the specifications meet the LEED performance criteria under the recommended Green Buildings Policy. It is imperative that buildings be designed to the highest energy efficiency standard possible. A review of new buildings and infrastructure would be undertaken before new infrastructure projects are forwarded by Departments for inclusion in budgets.

5.2 Buildings

Proposed Initiatives Affecting Base Year Energy and Emissions

It is estimated that ~10,000 GJ of energy can be saved by implementing building retrofits. Energy savings would result in approximately ~$126,000, calculated at current day costs for energy consumption. The estimated energy reductions would result in a reduction of ~425 tonnes CO_2e.

Table 5.2a – Summary of Proposed Reduction Initiatives for the Buildings Sector (2010-2012)

Buildings		Annual Savings		
		Consumption	Costs	CO_2e (t)
SUBTOTALS	Electricity	646,356 kWh	$27,261	15 t
	Natural Gas	8,022 GJ	$98,432	410 t
TOTAL THIS SECTOR:		**10,349 GJ**	**$125,693**	**425 t**

The tables that follow describe the reduction initiatives that were selected for each building.

City Hall

City Hall consumed ~1,000,000 kWh of electricity and ~1,500 GJ of natural gas in 2007. Energy is used for lighting, air conditioning, space heating, domestic hot water, and appliances (e.g., computers, photocopiers, mobile device chargers, etc.).

There are many reduction initiatives that could be applied to City Hall, but most will not result in appreciable changes to GHG emissions (see table at right). Regardless, energy savings are possible and should remain a priority for the City in order to reduce costs for energy. The major source of GHG emissions from City Hall is natural gas used for space heating. A temperature setback in winter months will reduce natural gas consumption and associated GHG emissions. All computers and computer screens and any other appliances, photocopiers, and printers used in the building should be replaced with Energy Star rated equipment at the appropriate time. The total CO_2e reductions estimated for this building is ~ six tonnes (see table 5.2a). Solar hot water, photovoltaics, and geoexchange systems are not economically feasible at this facility due to the extremely long payback periods (e.g., 20-30 years).

City Hall - 2580 Shaughnessy St

2007 Natural Gas Consumption and Estimates of Reductions

2007 Inventory			Summary: Proposed Measures		
Consumption	Energy Costs	CO_2e (t)	Consumption	Costs	CO_2e (t)
1,501 GJ	$23,089	77	75 GJ	$1,564	4

1. Reduce temp unoccupied areas	75 GJ	$1,564	4 t
NATURAL GAS SUBTOTAL	75 GJ	$1,564	3.8 t
	75 GJ	**$1,564**	**4 t**

2007 Electricity Consumption and Estimates of Reductions

2007 Inventory			Summary: Proposed Measures		
Consumption	Energy Costs	CO_2e (t)	Consumption	Costs	CO_2e (t)
1,020,697 kWh	$46,177	23	100,204 kWh	$4,539	2

2. Upgrade fridge	1,167 kWh	$53	0 t
3. Redesign T8s	50,349 kWh	$2,281	1 t
4. Disconnect parasitic	6,692 kWh	$303	0 t
5. Convert to LEDs	3,772 kWh	$171	0 t
6. Temperature reduction (WT)	10,038 kWh	$455	0 t
7. Auto computer shutdown	1,881 kWh	$85	0 t
8. CO2 sensors	17,942 kWh	$813	0 t
9. EnergyStar	5,019 kWh	$227	0 t
10. Setback controls for fans	3,346 kWh	$152	0 t
ELECTRICITY SUBTOTAL	100,204 kWh	$4,539	2.3 t
	361 GJ	**$4,539**	**2 t**

ACCOUNT SUBTOTAL	Electricity	100,204 kWh	$4,539	2.3 t
	Natural Gas	75 GJ	$1,564	3.8 t
		436 GJ	**$6,103**	**6 t**

Note: a brief walkthrough of this building was undertaken in 2006. The information above does not represent an audit of the building and was completed to identify simple measures that the City could undertake to improve energy efficiency in the short term. A more detailed audit may have been conducted for this facility since the walkthrough was completed.

Terry Fox Library

Terry Fox Library consumed ~280,000 kWh of electricity and ~560 GJ of natural gas in 2007. Energy is used for lighting, air conditioning, space heating, domestic hot water, and appliances.

Reduction initiatives that were applied to City Hall could also be applied to Terry fox Library with the exception of computer shutdown software (see table to the right). The major source of GHG emissions from the library is natural gas used for space heating. A temperature setback in winter months will reduce natural gas consumption and associated GHG emissions. The total CO_2e reductions estimated for this building is ~ two tonnes (see table 5.2b). As with City Hall, solar hot water, photovoltaics, and geoexchange systems are not economically feasible at this facility due to the extremely long payback periods (e.g., 20-30 years).

The total CO_2e reductions estimated for this building is ~2 tonnes.

Terry Fox Library - 2470 Mary Hill Rd

2007 Natural Gas Consumption and Estimates of Reductions

2007 Inventory			Summary: Proposed Measures		
Consumption	Energy Costs	CO_2e (t)	Consumption	Costs	CO_2e (t)
557 GJ	$7,021	28	28 GJ	$1,034	1

11. Reduce temp unoccupied areas	28 GJ	$1,034	1 t
NATURAL GAS SUBTOTAL	28 GJ	$1,034	1.4 t
	28 GJ	**$1,034**	**1 t**

2007 Electricity Consumption and Estimates of Reductions

2007 Inventory			Summary: Proposed Measures		
Consumption	Energy Costs	CO_2e (t)	Consumption	Costs	CO_2e (t)
281,837 kWh	$19,616	6	28,373 kWh	$1,974	1

12. Redesign T8s	14,455 kWh	$1,006	0 t
13. Disconnect parasitic	1,921 kWh	$134	0 t
14. Convert to LEDs	1,083 kWh	$75	0 t
15. Temperature reduction (WT)	2,882 kWh	$200	0 t
16. CO2 sensors	5,151 kWh	$358	0 t
17. EnergyStar	1,441 kWh	$100	0 t
18. Landscaping - increase shading	1,441 kWh	$100	0 t
ELECTRICITY SUBTOTAL	28,373 kWh	$1,974	0.7 t
	102 GJ	**$1,974**	**1 t**

ACCOUNT SUBTOTAL	Electricity	28,373 kWh	$1,974	0.7 t
	Natural Gas	28 GJ	$1,034	1.4 t
		130 GJ	**$3,008**	**2 t**

Note: a brief walkthrough of this building was undertaken in 2006. The information above does not represent an audit of the building and was completed to identify simple measures that the City could undertake to improve energy efficiency in the short term. A more detailed audit may have been conducted for this facility since the walkthrough was completed..

Fire Hall No. 1

Fire Hall No. 1 consumed ~345,000 kWh of electricity and ~1,000 GJ of natural gas in 2007. Energy is used for lighting, air conditioning, space heating, domestic hot water, and appliances.

There are few reduction initiatives that could be applied to this building with the exception of door interlocks and redesigning T8 lighting in overlit areas (see table to the right). A 'turn it off' program is recommended to reduce electrical consumption for indoor lighting.

The total CO_2e reductions estimated for this building is ~20 tonnes.

Fire Hall No. 1 - 1725 Broadway St

2007 Natural Gas Consumption and Estimates of Reductions

2007 Inventory			Summary: Proposed Measures		
Consumption	Energy Costs	CO_2e (t)	Consumption	Costs	CO_2e (t)
957 GJ	$10,547	49	383 GJ	$4,962	20

19. Temperature reduction (WT)	96 GJ	$1,241	5 t
20. Reduce temp unoccupied areas	48 GJ	$620	2 t
21. Interlock with doors	96 GJ	$1,241	5 t
22. CO2 sensors	144 GJ	$1,861	7 t
NATURAL GAS SUBTOTAL	383 GJ	$4,962	19.6 t
	383 GJ	**$4,962**	**20 t**

2007 Electricity Consumption and Estimates of Reductions

2007 Inventory			Summary: Proposed Measures		
Consumption	Energy Costs	CO_2e (t)	Consumption	Costs	CO_2e (t)
345,241 kWh	$23,718	8	22,991 kWh	$1,583	1

23. Redesign T8s	17,584 kWh	$1,211	0 t
24. Disconnect parasitic	2,337 kWh	$161	0 t
25. Convert to LEDs	1,317 kWh	$91	0 t
26. EnergyStar	1,753 kWh	$121	0 t
ELECTRICITY SUBTOTAL	22,991 kWh	$1,583	0.5 t
	83 GJ	**$1,583**	**1 t**

ACCOUNT SUBTOTAL	Electricity	22,991 kWh	$1,583	0.5 t
	Natural Gas	383 GJ	$4,962	19.6 t
		466 GJ	**$6,545**	**20 t**

Note: a brief walkthrough of this building was undertaken in 2006. The information above does not represent an audit of the building and was completed to identify simple measures that the City could undertake to improve energy efficiency in the short term. A more detailed audit may have been conducted for this facility since the walkthrough was completed.

Fire Hall No. 2

Fire Hall No. 2 consumed ~200,000 kWh of electricity and ~900 GJ of natural gas in 2007. Energy is used for lighting, space heating, domestic hot water, and appliances.

There are few reduction initiatives that could be applied to this building with the exception of door interlocks and redesigning T8 lighting in overlit areas (see table to the right). A 'turn it off' program is recommended to reduce electrical consumption for indoor lighting. Recently, the boiler at Fire Hall No. 2 was decommissioned and replaced with two unit heaters in the truck bay. A temperature set back of 16 degrees Centigrade was applied to the unit heaters.

The total CO_2e reductions estimated for this building is ~18 tonnes.

Fire Hall No. 2 - 3196 Toronto St

2007 Natural Gas Consumption and Estimates of Reductions

2007 Inventory			Summary: Proposed Measures		
Consumption	Energy Costs	CO_2e (t)	Consumption	Costs	CO_2e (t)
872 GJ	$9,795	45	349 GJ	$4,759	18

27. Temperature reduction (WT)	87 GJ	$1,190	4 t
28. Reduce temp unoccupied areas	44 GJ	$595	2 t
29. Interlock with doors	87 GJ	$1,190	4 t
30. CO2 sensors	131 GJ	$1,785	7 t
NATURAL GAS SUBTOTAL	349 GJ	$4,759	17.8 t
	349 GJ	**$4,759**	**18 t**

2007 Electricity Consumption and Estimates of Reductions

2007 Inventory			Summary: Proposed Measures		
Consumption	Energy Costs	CO_2e (t)	Consumption	Costs	CO_2e (t)
204,967 kWh	$14,267	5	13,875 kWh	$966	0

31. Redesign T8s	10,612 kWh	$739	0 t
32. Disconnect parasitic	1,410 kWh	$98	0 t
33. Convert to LEDs	795 kWh	$55	0 t
34. EnergyStar	1,058 kWh	$74	0 t
ELECTRICITY SUBTOTAL	13,875 kWh	$966	0.3 t
	50 GJ	**$966**	**0 t**

ACCOUNT SUBTOTAL	Electricity	13,875 kWh	$966	0.3 t
	Natural Gas	349 GJ	$4,759	17.8 t
		399 GJ	**$5,725**	**18 t**

Note: a brief walkthrough of this building was undertaken in 2007. The information above does not represent an audit of the building and was completed to identify simple measures that the City could undertake to improve energy efficiency in the short term. A more detailed audit may have been conducted for this facility since the walkthrough was completed.

Hyde Creek Recreation Centre

Hyde Creek Recreation Centre consumed ~3,500,000 kWh of electricity and ~17,000 GJ of natural gas in 2007. Energy is used for lighting, space heating, domestic hot water, pool process water, and appliances. The majority of the natural gas consumption is for pool process water.

A solar hot water system and heat reclamation system have been installed for pool process water. Also, occupancy sensors have been installed in the racquet courts.

The city should investigate a dehumidification system and incorpoate the existing heat recovery system along with fully integrated control technology.

The total CO_2e reductions estimated for this building is ~190 tonnes.

Hyde Creek Recreation Centre - 1379 Laurier Ave

2007 Natural Gas Consumption and Estimates of Reductions

2007 Inventory			Summary: Proposed Measures		
Consumption	Energy Costs	CO_2e (t)	Consumption	Costs	CO_2e (t)
16,613 GJ	$187,536	850	3,656 GJ	$45,015	187

42. Dehumidifier and Heat Recovery	3,656 GJ	$45,015	187 t
Natural Gas Subtotal	3,656 GJ	$45,015	187.0 t
	3,656 GJ	**$45,015**	**187 t**

2007 Electricity Consumption and Estimates of Reductions

2007 Inventory			Summary: Proposed Measures		
Consumption	Energy Costs	CO_2e (t)	Consumption	Costs	CO_2e (t)
3,445,101 kWh	$127,527	90	123,409 kWh	$4,569	3

43. Disconnect parasitic	23,604 kWh	$874	1 t
44. Redesign HID and T12 (WT)	51,452 kWh	$1,905	1 t
45. EnergyStar	17,703 kWh	$655	0 t
46. Upgrade motors	30,650 kWh	$1,135	1 t
Electricity Subtotal	123,409 kWh	$4,569	3.2 t
	444 GJ	**$4,569**	**3 t**

Account Subtotal	Electricity	123,409 kWh	$4,569	3.2 t
	Natural Gas	3,656 GJ	$45,015	187.0 t
		4,100 GJ	**$49,584**	**190 t**

Note: a brief walkthrough of this building was undertaken in 2007. The information above does not represent an audit of the building and was completed to identify simple measures that the City could undertake to improve energy efficiency in the short term. A more detailed audit may have been conducted for this facility since the walkthrough was completed.

Poco Recreation Complex

The PoCo Recreation Complex consumed ~4,000,000 kWh of electricity and ~12,000 GJ of natural gas in 2007. Energy is used for the ice plant, lighting, space heating, domestic hot water, and appliances.

Timers on bleacher heaters would save approximately 300 GJ of natural gas. HID lighting in the foyer should be on photocells and T12 lighting in office areas can be redesigned to reduce lighting levels in overlit areas.

The total CO_2e reductions estimated for this building is ~22 tonnes.

Poco Rec Complex & Wilsons Seniors Centre - 2150 Wilson Ave

2007 Natural Gas Consumption and Estimates of Reductions

2007 Inventory		
Consumption	Energy Costs	CO_2e (t)
11,767 GJ	$53,737	602

	Summary: Proposed Measures		
	Consumption	Costs	CO_2e (t)
	308 GJ	$926	16
35. Timers on bleacher heaters	308 GJ	$926	16 t
Natural Gas Subtotal	308 GJ	$926	15.8 t
	308 GJ	**$926**	**16 t**

2007 Electricity Consumption and Estimates of Reductions

2007 Inventory		
Consumption	Energy Costs	CO_2e (t)
3,933,961 kWh	$138,621	90

	Summary: Proposed Measures		
	Consumption	Costs	CO_2e (t)
	250,190 kWh	$8,951	6
36. Redesign HID and T12 (WT)	163,264 kWh	$5,841	4 t
37. Disconnect parasitic	26,749 kWh	$957	1 t
38. Convert to LEDs	15,076 kWh	$539	0 t
39. Reduce temp unoccupied areas	20,062 kWh	$718	0 t
40. EnergyStar	20,062 kWh	$718	0 t
41. Vending misers (WT)	4,976 kWh	$178	0 t
Electricity Subtotal	250,190 kWh	$8,951	5.8 t
	901 GJ	**$8,951**	**6 t**
Account Subtotal — Electricity	250,190 kWh	$8,951	5.8 t
Account Subtotal — Natural Gas	308 GJ	$926	15.8 t
	1,209 GJ	**$9,877**	**22 t**

Note: a brief walkthrough of this building was undertaken in 2007. The information above does not represent an audit of the building and was completed to identify simple measures that the City could undertake to improve energy efficiency in the short term. A more detailed audit may have been conducted for this facility since the walkthrough was completed.

Operations Centre

The Operations Centre consumed ~1,400,000 kWh of electricity and ~3,000 GJ of natural gas in 2007. Energy is used for lighting, air conditioning, space heating, domestic hot water, and appliances. Radiant tube heaters are used in the office area.

A temperature reduction for radiant tube heaters in the main office area would save ~300 GJ of natural gas.

The total CO_2e reductions estimated for this building is about 18 tonnes.

Operation Centre - 1737 Broadway St

2007 Natural Gas Consumption and Estimates of Reductions

2007 Inventory			Summary: Proposed Measures		
Consumption	Energy Costs	CO_2e (t)	Consumption	Costs	CO_2e (t)
2,994 GJ	$38,274	153	299 GJ	$4,160	15

47. Temperature reduction (WT)	299 GJ	$4,160	15 t
NATURAL GAS SUBTOTAL	299 GJ	$4,160	15.3 t
	299 GJ	**$4,160**	**15 t**

2007 Electricity Consumption and Estimates of Reductions

2007 Inventory			Summary: Proposed Measures		
Consumption	Energy Costs	CO_2e (t)	Consumption	Costs	CO_2e (t)
1,351,985 kWh	$57,722	31	107,314 kWh	$4,679	2

48. Redesign T8s	68,610 kWh	$2,992	2 t
49. Disconnect parasitic	9,119 kWh	$398	0 t
50. Convert to LEDs	5,139 kWh	$224	0 t
51. Reduce temp unoccupied areas	6,839 kWh	$298	0 t
52. Interlock with doors	10,767 kWh	$469	0 t
53. EnergyStar	6,839 kWh	$298	0 t
ELECTRICITY SUBTOTAL	107,314 kWh	$4,679	2.5 t
	386 GJ	**$4,679**	**2 t**

ACCOUNT SUBTOTAL	Electricity	107,314 kWh	$4,679	2.5 t
	Natural Gas	299 GJ	$4,160	15.3 t
		686 GJ	**$8,839**	**18 t**

Note: a brief walkthrough of this building was undertaken in 2007. The information above does not represent an audit of the building and was completed to identify simple measures that the City could undertake to improve energy efficiency in the short term. A more detailed audit may have been conducted for this facility since the walkthrough was completed.

5.3 Outdoor Lighting

Completed Initiatives

In the mid 1990's, the majority of the city's mercury vapour streetlights were converted to high pressure sodium. More recently, all traffic signals have been converted to LED technology for a total savings of approximately $18,000. Energy savings of 315,000 kWh during this period have resulted in emissions reductions totalling 8 tonnes CO_2e.

Proposed Initiatives Affecting Base Year Energy and Emissions

Although not yet available as a cost effective measure, approximately 2,300 GJ of energy can be saved by retrofitting streetlighting owned by the city to LED technology (e.g., all streetlights not owned by BC Hydro). Energy savings would result in approximately $44,000, calculated at current day costs for energy consumption. The estimated energy reductions would result in savings of 15 tonnes CO_2e. Table 5.3a represents a summary of the proposed measure for ornamental streetlights.

Table 5.3a – Summary of Proposed Reduction Initiatives for the Lighting Sector (2010-2017)

Lighting		Annual Savings		
		Consumption	Costs	CO_2e (t)
SUBTOTALS	Electricity	632,612 kWh	$44,130	15 t
TOTAL THIS SECTOR:		**2,277 GJ**	**$44,130**	**15 t**

5.4 Water and Wastewater

Proposed Initiatives Affecting Base Year Energy and Emissions

Approximately 550 GJ of energy can be saved by undertaking water and wastewater measures in the future. Energy savings would result in approximately $10,000, calculated at current day costs for energy consumption. The estimated energy reductions would result in a reduction of four tonnes CO_2e.

Table 5.4a summarizes the estimated reductions in energy use, energy costs and GHG emissions for the proposed reduction initiatives for liquid waste pump stations. Reductions for other water and wastewater sectors were not provided as the consumption amounts are insignificant.

Table 5.4a – Summary of Proposed Reduction Initiatives for the Water and Wastewater Sector (2010-2017)

Water & Wastewater		Annual Savings		
		Consumption	Costs	CO_2e (t)
SUBTOTALS	Electricity	152,775 kWh	$9,727	4 t
TOTAL THIS SECTOR:		**550 GJ**	**$9,727**	**4 t**

It is difficult to estimate the impact of these energy reduction initiatives on the water and wastewater sector. A reduction quantity of approximately four tonnes CO_2e is currently estimated. Note that growth in the community may overshadow any savings outlined herein. The city would need to track volume of water and wastewater to be able to monitor the effects of any reduction initiatives, although, because the consumption amounts are insignificant in this sector, resources for monitoring is not recommended.

Potable Water Pump Stations

The city's total consumption for potable water pump stations in 2007 was approximately 50,000 kWh. Replacing and/or rewinding motors, if necessary, on the two potable water pumps will result in an insignificant savings and therefore, no reductions are listed for potable water pump stations. These motors will be replaced and/or rewound as required, but not necessarily with the current project period.

Liquid Waste Pump Stations

This subsector includes 17 liquid waste pump stations in 2007. Electrical consumption at liquid waste stations ranged from ~1,500 kWh to ~114,000 kWh in 2007, although most consume between 20,000 kWh and 45,000 kWh. Only one pump consumed more than 100,000 kWh (i.e., Shaughnessy/Citadel SSPS). Reduction initiatives are not proposed for liquid waste pumps beyond normal replacement and rewinding of motors.

Drainage Pump Stations

This subsector includes nine drainage pump stations ranging in consumption from 20,000 kWh to 240,000 kWh. There are only two drainage pump stations with consumptions greater than 200,000 kWh; Dominion PS and Harbour PS. Table 5.4b lists the estimates of savings at each drainage pump station if these motors were replaced and/or rewound.

Table 5.4b – Summary of Proposed Reduction Initiatives for Liquid Waste Pump Stations (2010-2017)

		Annual Savings		
Harbour Old S T M		Consumption	Costs	CO_2e (t)
	Electricity	7,880 kWh	$554	0.2 t
		28 GJ	$554	0.2 t
Barberry S T M		Annual Savings		
		Consumption	Costs	CO_2e (t)
	Electricity	5,585 kWh	$395	0.1 t
		20 GJ	$395	0.1 t
Cedar S T M		Annual Savings		
		Consumption	Costs	CO_2e (t)
	Electricity	4,073 kWh	$293	0.1 t
		15 GJ	$293	0.1 t
Dominion S T M		Annual Savings		
		Consumption	Costs	CO_2e (t)
	Electricity	71,870 kWh	$4,338	1.7 t
		259 GJ	$4,338	1.7 t
Maple S T M		Annual Savings		
		Consumption	Costs	CO_2e (t)
	Electricity	2,880 kWh	$209	0.1 t
		10 GJ	$209	0.1 t
Laurier S T M		Annual Savings		
		Consumption	Costs	CO_2e (t)
	Electricity	5,540 kWh	$395	0.1 t
		20 GJ	$395	0.1 t
Ellis S T M		Annual Savings		
		Consumption	Costs	CO_2e (t)
	Electricity	24 kWh	$2	0.0 t
		0 GJ	$2	0.0 t
Harbour S T M		Annual Savings		
		Consumption	Costs	CO_2e (t)
	Electricity	54,921 kWh	$3,542	1.3 t
		198 GJ	$3,542	1.3 t

A number of considerations are listed that will reduce the demand on potable water and reduce the amount of liquid waste from residents and businesses in the city as follows:

The following reduction initiatives are proposed:

i. Encourage and/or subsidize the Installation of low-flow toilets, dual flush toilets, waterless urinals, tankless urinals, tap sensors and other water-saving de-vices in community buildings;

ii. Continue with lawn-watering restrictions;

iii. Increase water conservation awareness (e.g. through school campaigns and public awareness programs);

iv. Conduct industrial/commercial water audits and implement residential water audits to reduce demand on potable water pumps and to conserve water.. Costs vary and must be further explored; and,

v. Discourage garburators in new development and encourage residents to remove or not use existing garburators to reduce demand on the wastewater treatment plants and to reduce demand on sanitary pump stations.

5.5 Vehicle Fleet Sector

Completed Initiatives

Reduction measures in the vehicle fleet sector are difficult to track from year to year since vehicle use is dependent upon factors which are not tracked (e.g., number of projects undertaken by city staff, location of projects within the municipal boundary and proximity of projects to vehicle home base, etc.).

Proposed Initiatives Affecting Base Year Energy and Emissions

The most significant reductions proposed in the vehicle fleet sector are through idle free campaigns, energy aware driver training, and switching at least 90% of the total diesel fuel consumed with biodiesel 20 by 2012. The biodiesel initiative is more aggressive than the BC Provincial *Renewable and Low Carbon Fuel Requirements Regulation* which only requires a five percent blend of renewable content. Other reductions are possible, such as switching to ethanol blended gasoline, although we have not included ethanol blends as an option since high-blend ethanol gasoline is not easily available to the City of Port Coquitlam at this time.

Approximately 2,300 GJ of energy could be saved in the vehicle fleet sector which would result in an approximate cost savings of $55,000, calculated at current day costs for gasoline and diesel fuel. The estimated energy reductions would result in an emissions reduction of 159 tonnes CO_2e (table 5.5a).

Table 5.5a – Summary of Proposed Reduction Initiatives for the Vehicle Fleet Sector (2010-2017)

Vehicle Fleet		Annual Savings		
		Consumption	Costs	CO_2e (t)
SUBTOTALS	Diesel Fuel	32,273 L	$27,934	90 t
	Gasoline	27,683 L	$27,042	69 t
TOTAL THIS SECTOR:		2,319 GJ	$54,976	159 t

A number of administrative recommendations are suggested as follows:

- The fleet manager requires more flexibility in procurement to ensure vehicle purchases are not based on price point alone. Weighting must be adjusted accordingly by the fleet manager so that vehicle's equipment and fuel efficiency are carefully balanced according to specific vehicle use (equipment, number of crew, ancillary equipment, towing capabilities, etc.);
- The responsibility for driver training for new and existing staff must be a shared responsibility between the fleet manager and the Human Resources Department. The fleet manager must develop a driver training module for fuel efficiency and deliver workshops for staff across all departments. Pamphlets on fuel efficiency and the current annual status of fuel consumption by the city should be provided to staff in on a quarterly basis with payroll slips.

A number of Council Policies are suggested as follows:

- Full adoption of an Idle Free Policy across all departments including personal vehicle use;
- Implement technology that controls vehicle idling. Costs for this initiative need to be explored further. There is no appreciable payback for this initiative;
- As much as possible, all new light trucks and utility vehicles that do not have heavy load requirements, to be as fuel efficient as possible.

Table 5.5b provides a summary of proposed measures, summarized for both gasoline and diesel fuel vehicles. Note that the largest reduction is from Diesel Fuel Heavy Trucks or Vans.

Table 5.5b – Summary of Proposed Reduction Initiatives for Vehicle Fleet Subsectors (2010-2017)

Heavy Truck Or Van		Annual Savings		
		Consumption	Costs	CO_2e (t)
	Diesel	26,359 L	$25,390	73.3 t
		1,020 GJ	$25,390	73.3 t
Heavy Fire Dept. Truck		**Annual Savings**		
		Consumption	Costs	CO_2e (t)
	Diesel	3,361 L	$184	9.3 t
		130 GJ	$184	9.3 t
Tractors, Graders, Backhoes, Loaders		**Annual Savings**		
		Consumption	Costs	CO_2e (t)
	Diesel	2,553 L	$2,361	7.1 t
		99 GJ	$2,361	7.1 t
Light Truck, Van, Suv		**Annual Savings**		
		Consumption	Costs	CO_2e (t)
	Gas	25,074 L	$24,572	62.8 t
		970 GJ	$24,572	62.8 t
Heavy Truck Or Van		**Annual Savings**		
		Consumption	Costs	CO_2e (t)
	Gas	2,610 L	$2,470	6.5 t
		101 GJ	$2,470	6.5 t

5.6 Solid Waste Sector

Reduction Initiatives for the Corporate Solid Waste Sector

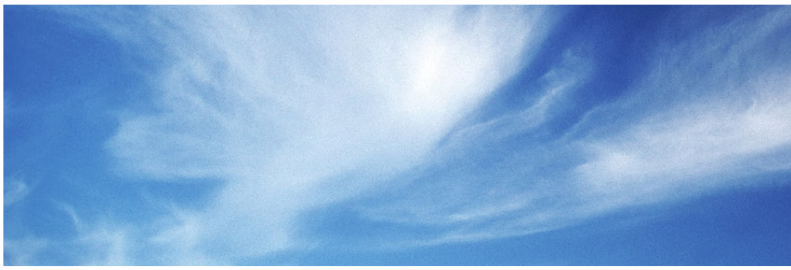
There are two significant reduction measures that city staff can implement to reduce corporate solid waste in the city's buildings as follows:

1. Expand recycling and composting facilities for staff and the public in city-owned buildings; and,
2. Conversion to a paperless system (as much as possible and practical).

By reducing the amount of solid waste produced and landfilled, the city could reduce its corporate emissions in this sector by approximately 19 tonnes CO_2e.

Further initiatives to manage corporate waste include a waste composition study to determine the percent degradable organic carbon in a representative sample of corporate waste from various facilities.





5.6 Summary of Corporate Emission Reductions

There are many opportunities for new GHG reductions within the city's operations. By implementing these initiatives, the city could reduce emissions by 20 percent. Table 5.6 provides a summary of the potential reductions in each corporate sector.

Table 5.6 – Summary of Estimated Impact of Reduction Initiatives on Corporate Sectors

Sector	Base Year Emissions (tonnes CO_2e)	GHG Projection (tonnes CO_2e)	Potential Reduction of GHG Emissions after Projected Growth	GHG Emissions After Measures	Percent Reduction of Projected Emissions
	2007	2017			
Building	1,302	1,337	426	912	-30%
Lighting[1]	40	49	15	34	-15%
Water and Wastewater[2]	37	40	4	36	-3%
Fleet[3]	981	1,043	159	884	-10%
Solid Waste	417	375	19	355	-15%
TOTAL	**2,777**	**2,844**	**623**	**2,221**	**-20%**

[1]LEDs for ornamental and overhead lighting are currently too expensive to be cost effective, although this may change in the near future and should be monitored by staff.

[2]An estimate is provided in the water and wastewater sector, since the volume of potable water and wastewater was not available, and must be used as an indicator for specific measures.

[3]The reductions for the vehicle fleet are aggressive and assume biodiesel will replace conventional diesel fuel by 2012.

It is important to remember that the 20 percent reduction calculated above represents the potential reductions achievable over the project period (2010-2017) relative to the projected emissions in 2017, which includes the growth of emissions during the project period.

5.7 Corporate Target Statement

The following corporate target statement is suggested:

An emission reduction target of 623 tonnes CO_2e, an amount that will reduce emissions by 20 percent below 2007 levels by 2017, is recommended for adoption as the city's corporate operations objective

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6. COMMUNITY REDUCTION INITIATIVES

Reduction initiatives have been selected from an initial list presented to Port Coquitlam staff. If implemented, each initiative will reduce energy consumption and the production of emissions in each applicable sector. Community sectors include community buildings (residential, commercial, and industrial), licensed vehicles on the road, and solid waste generated from all community sources.

A best estimate of greenhouse gas emissions reductions has been provided for the majority of reduction initiatives. Some initiatives do not result in a quantitative reduction, or the reduction may be counted within another initiative. Reduction initiatives that fall under the category of 'policy' may not have a direct effect on emissions, but may enable other initiatives. Therefore, if the policy and the corresponding initiative are both described, the estimated GHG reduction will be included with the specific initiative.

It is important to note the GHG reduction amounts are estimates and the actual reductions achieved for these initiatives, if any, will depend upon the resources applied by the City of Port Coquitlam, the effectiveness of the program, and the degree of uptake by the community.

Reduction initiatives are described either as affecting the base year, the current year, or growth. In general, it is extremely difficult to implement reduction initiatives in existing buildings. It is much easier for a government authority to influence the growth of emissions by developing policies, bylaws, and statements in the Official Community Plan. Ultimately, decisions by Council can have a profound affect on the growth of emissions. Influencing or controlling where community growth occurs, in both the number, size, and density of new dwellings, is the most effective, long-term solution to climate change mitigation. This is especially true in communities such as the City of Port Coquitlam that have experienced rapid growth in the past and will likely experience rapid growth in the future during healthier economic times.

Summary of Reduction Initiatives

Reduction initiatives that should be adopted and utilized to reduce the base year emissions in the City of Port Coquitlam community buildings are described in one of the following sections:

6.1 Community Buildings Reduction Initiatives - Senior Government Policy and Programs

6.2 Community Buildings Reduction Initiatives - City Policy and Programs

6.3 Community Transportation Reduction Initiatives - Senior Government Policy and Programs

6.4 Community Transportation Reduction Initiatives - City Policy and Programs

6.5 Community Transportation Reduction Initiatives - New Technologies

6.6 Community Solid Waste Reduction Initiatives

The City of Port Coquitlam will need to seek financial assistance to support the majority of the reduction initiatives as described below. Until significant assistance is secured for implementation, the City of Port Coquitlam can include reduction initiatives that affect the base year in climate action public education and outreach programs as part of the effort to gain community support for this plan.

Community greenhouse gas reductions are difficult to achieve in the absence of legislation, although, through careful planning and implementation of policies, modest reductions are possible.

The opportunities presented for community reductions are very conservative because these initiatives either have very modest funding resources or funding resources do not exist. Reductions in the on-the-road transportation sector will rely heavily on federal legislation imposing decreases in fuel consumption rates for vehicles and less carbon intensive fuels.

Senior government policy accounts for 55% of potential reduction initiatives, approximately 29,000 tonnes CO_2e. The City of Port Coquitlam is directly responsible for approximately 45% of potential GHG reductions (see figure 6.4.1). Senior government policy includes components of the emissions inventory under the jurisdiction, and therefore the influence, of federal, provincial, regional governments. Provincial crown corporations are also included under Senior Government responsibilities.

Figure 6a – Share of Responsibilities for GHG Reductions

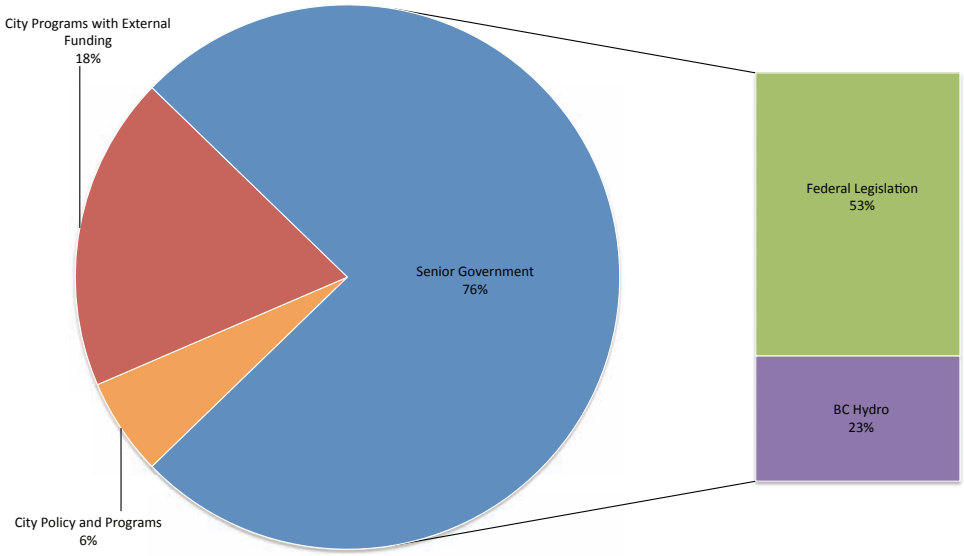


Table 6a – Summary of Potential GHG Reductions

Section	Reduction Initiative	Reduction Estimates			Energy Type Affected[1]	Affects Base Year/ Growth
		Consumption (GJ)	CO_2e (t)	Subtotal (t)		
6.1 Community Buildings Reduction Initiatives - Senior Government Policy and Programs	Zero Carbon Emissions from Electricity Generation	-	12,388	12,840	Electricity	Base Year
	EnerGuide Rating in MLS	12,652	452		CE	Base Year
6.2 Community Buildings Reduction Initiatives - City Policy and Programs	CAEE - Existing Single-Unit	20,857	745	10,016	CE	Base Year
	CAEE - Existing Row Housing	7,169	256		CE	Base Year
	CAEE - Existing Multi-Unit	7,936	284		CE	Base Year
	CAEE - Existing Commercial	33,458	1,101		CE	Base Year
	CAEE - Existing Industrial	13,841	708		CE	Base Year
	CAEE - New Single-unit	58,230	559		CE	Growth
	CAEE - New Row Housing	13,601	125		CE	Growth
	CAEE - New Multi-Unit	16,274	164		CE	Growth
	CAEE - New Commercial	2,673	85		CE	Growth
	CAEE - New Industrial	38,059	1,203		CE	Growth
	District Energy Systems - Residential Buildings	-	4,099		Natural Gas	Base Year
	District Energy Systems - Industrial Buildings	-	687		Natural Gas	Base Year
6.3 Community Transportation Reduction Initiatives - Senior Government Policy and Programs	California Tailpipe Emissions Standards	-	12,944	27,562	CE	Growth
	New Fuel Consumption Standards	-	2,989		CE	Growth
	New Biodiesel Standard	-	629		CE	Base Year
	Coast Meridian Overpass Project	-	11,000		Diesel Fuel	Base Year
6.4 – Community Transportation Reduction Initiatives - City Policy and Programs	Car free days	-	373	3,095	CE	Base Year
	Right Sizing Vehicles	-	2,722		CE	Base Year
	Subtotal	**224,749**	**53,513**			

[1] CE = Combined Energy

Table 6b – Summary of GHG Reduction Initiatives

Section	Reduction Initiative	Recommendation
6.1 Community Buildings Reduction Initiatives: Senior Government Policy and Programs	6.1.1 Zero Carbon Emissions from Electricity	BC Hydro will achieve zero carbon emissions from electricity generation
	6.1.2 EnerGuide rating in Multiple Listing Service (MLS) Advertising	The City should encourage EnerGuide ratings in MLS property listings
6.2 Community Buildings Reduction Initiatives: City Policy and Programs	6.2.1 Community Action on Energy and Emissions CAEE Targets	The city should become a member of the CAEE and endorse the CAEE targets
	6.2.1-a CAEE Existing Buildings Program Targets	The city should commit to achieving CAEE targets for existing community buildings
	6.2.1-b CAEE | Building Retrofits: Mechanical and Plumbing System Upgrades	The city should take steps towards achieving CAEE targets by promoting the following mechanical and plumbing system upgrades for existing community buildings
	6.2.1-c CAEE | Building Retrofits: Electrical System Upgrades	The city should take steps towards achieving CAEE targets by promoting the following electrical system upgrades for existing community buildings
	6.2.1-d CAEE | Improvements to Management and Operations Practices	The city should take steps towards achieving CAEE targets by promoting the following changes to the management and operations practices for existing commercial and industrial buildings
	6.2.1-e CAEE | Upgrade Insulation	The city should take steps towards achieving CAEE targets by encouraging residents to upgrade the insulation materials used in existing community buildings
	6.2.1-f CAEE | Repair Leaks and Drafts	The city should take steps towards achieving CAEE targets by encouraging residents to seal leaks and drafts in their residents
	"6.2.1-g CAEE | Upgrade Appliances to Energy Star	The city should encourage residents to upgrade their household appliances to those with an Energy Star rating
	6.2.1-h CAEE | Upgrade Windows	The city should promote the replacement of old windows to those with an energy star rating in existing residences
	6.2.1-i CAEE New Buildings Program Targets	The city should achieve CAEE targets for new buildings
	6.2.1-j Electricity and Alternative Energy Division (EAED)	The city can achieve CAEE targets by informing developers of potential funding resources from the EAED to use alternative energy sources in new developments
	"6.2.1-k Passive Solar Design	The city should encourage the orientation of new buildings to capitalize on passive solar gain as well as encouraging existing buildings to preserve their solar access
	6.2.1-l New Development lockers/bike storage	The city should require developers to incorporate showers, lockers and secured bike storage in new buildings.
	6.2.1-m Discourage Electric Baseboards	The city should discourage the installation of electric baseboards in new residential developments
	6.2.2 Brownfield Redevelopment	The city should explore the development of brownfields for commercial and residential development
	6.2.3 Community Energy Systems Program	The city should encourage the development of community energy systems by promoting the Community Energy Systems Program
	6.2.4 Pre-service for Waste Heat and District Energy Systems	The city should Identify suitable areas for district energy systems
	6.2.5 C-2000 Standard: Adopt the C-2000 Building Code for Commercial Buildings	The city should require that all new commercial buildings meet C-2000 building code
	6.2.6 Official Community Plan and City Bylaws	The city should continue policy mechanisms that encourage mixed use developments
	6.2.7 Sustainability Checklist	Utilize the city's sustainability checklist in the approval process for new developments
	6.2.8 Increase Density – Intensify	The city should increase population density to conserve land for future developments and increase future liveability
	"6.2.9 Density Bonuses/Amenity Bonuses	The city should provide density bonuses in conjunction with energy efficiency retrofits in town centres and growth concentration areas
	6.2.10 Distance Relationship Between Commercial and Residential Zones	The city should establish maximum allowable distances to commercial areas for all new residential developments

Section	Reduction Initiative	Recommendation
6.3 Community Transportation Reduction Initiatives: Senior Government Policy and Programs	6.3.1 California Tailpipe Emissions Standards	The city should encourage senior government to adopt policy equivalent to the California Tailpipe Emissions Standards
	6.3.2 New Fuel Consumption Standards	The city should support the federal government's new fuel consumption standards
	6.3.3 New Bio Diesel Standard	The city should support the implementation of the new federal diesel fuel and heating oil standards
	6.3.4 Coast Meridian Overpass Project	Completion of the Coast Meridian Overpass Project will result in significant GHG emissions reductions
6.4 Community Transportation Reduction Initiatives: City Policy and Programs	6.4.1 Active Transportation to and from Schools	The city should support school programs that encourage children to walk to school
	6.4.2 Car Free Days	The city should support and provide incentives for car free days and other initiatives such as corporate bike and walk to work programs that encourage the use of alternative and sustainable transport
	6.4.3 Co-Operative Auto Networks	The city should promote the use of car sharing networks by designating parking areas and providing incentives to developers
	6.4.4 Public Transport Vouchers	The city should encourage employers to provide public transport vouchers instead of free parking as part of salary packages or incentives such as bonuses to reduce vehicle use outside of work hours
	6.4.5 Reducing Vehicle Kilometres Traveled	The city should encourage trip reduction measures such as vanpool and rideshare programs, employer trip reduction programs, car-share cooperatives as well as distance travelled reductions
	6.4.6 Encourage Mixed Use Development	The city should reduce VKT by encouraging mixed use developments
	6.4.7 Limit Driving Distance To Commercial Locations	The city should reduce VKT by limiting the distance between commercial developments and residential areas
	6.4.8 Public Transportation Shelters	The city should promote the construction of abundant and appealing facilities for pedestrians and transit users
	6.4.9 Shared Parking	The city should limit parking availability and promote shared parking in mixed-use areas
	6.4.10 Pedestrian And Transit Facilities	The city should encourage enhancement of pedestrian and transit facilities through rezoning applications
	6.4.11 Implement Responsible Automobile Ownership Education Program	The city should encourage citizens to undertake regular vehicle maintenance, avoid idling, maintain proper tire pressure, observe speed limits, trip planning, and ride sharing
6.5 Community Transportation Reduction Initiatives: New Technologies	6.5.1 Right Sizing Vehicles	The city should promote consumer purchase of most fuel efficient vehicle to meet transportation needs and set objective to reduce average fuel efficiency of vehicles by a given amount
	6.5.2 Plug-in Electric Vehicles	The city should develop infrastructure for electric plug-in vehicles
6.6 Solid Waste Reduction Initiatives	6.6.1 Senior Government Policy and Programs	The city should support the development of Waste-to-Energy facilities

6.1 Community Buildings Reduction Initiatives: Senior Government Policy and Programs

Summary of Reduction Targets for the Buildings Sector

Reduction estimates are calculated in HES' Energy and Emissions Reporting and Monitoring System™ (EEMRS™). The reduction initiative is applied to an energy amount in the appropriate sector and the resulting reductions in energy consumption and resulting greenhouse gas emissions are reported in tables 6.1.4a and 6.1.4b. Energy is reported as combined energy, indicating that both natural gas and electricity are conserved. The overall reductions in each building category is summarized in table 6.1.5.

Reduction estimates have not been applied to the industrial sector and no reduction initiatives for industrial buildings are proposed with the exception of a general initiative for building retrofits.

A summary of base year emissions (2007), current year emissions (2007), forecasted emissions (2017), potential GHG reductions, and the overall reduction target for each of the community buildings subsectors is listed in table 6.1.5. The majority of reductions are possible in the residential sector totalling over 12,000 tonnes CO2e (nine percent). Emissions from industry are expected to rise by 12 percent over the project period.

Table 6.1a – Overall Reduction Target for Community Buildings

Subsector	Comparison Year emissions (CO_2e t)	Base Year emissions (CO_2e t)	Forecasted Emissions (CO_2e t)	Total Reduction Quantity	Overall Reduction Target
	2002	2007	2017		
Residential	66,049	68,485	74,226	12,037	**-9%**
Commercial	33,951	39,320	40,334	4,974	**-10%**
Industrial	19,845	27,197	36,202	5,846	**12%**
Total	**119,845**	**135,002**	**150,762**	**22,856**	**-5%**

The current overall reduction target for community buildings is to reduce greenhouse gas emissions by five percent relative to 2002 levels.

A five percent reduction is realistic, but relies heavily on construction standards for energy efficiency that reduce the combined energy consumption (e.g., both electricity and natural gas) in new buildings by 15 percent. Further, the target assumes that retrofits are implemented as per the CAEE targets for existing buildings.

6.1.1 Zero Carbon Emissions from Electricity

Recommendation: BC Hydro will achieve zero carbon emissions from electricity generation

The BC Energy Plan is the Province's vision for clean energy leadership to maximize efficiency and minimize environmental impacts. This plan is significant in the context of GHG emissions from electricity. Although British Columbia benefits from relatively clean hydroelectric power generation in comparison to fossil fuel electricity generation, there is room for improvements to the carbon intensity of electricity generation in the BC Energy Plan.

The BC Energy Plan proposes to reduce greenhouse gas emissions from electricity production by implementing the following strategies:

1. All new electricity generation projects will have zero net greenhouse gas emissions.
2. Zero net greenhouse gas emissions from existing thermal generation power plants by 2016.
3. Require zero greenhouse gas emissions from any coal thermal electricity facilities.
4. Ensure clean or renewable electricity generation continues to account for at least 90 per cent of total generation.
5. Government supports BC Hydro's proposal to replace the firm energy supply from the Burrard Thermal plant with other resources. BC Hydro may choose to retain Burrard for capacity purposes after 2014.
6. No nuclear power.

These strategies translate into no new net greenhouse emissions from new power production and through the purchase of offsets, GHG emissions from fossil fuel electricity generation are reduced to zero.

GHG Intensity by Calendar Year (t CO_2e/GWh)

Category	GHG Intensity by Calendar Year (t CO_2e/GWh)				
	2003	2004	2005	2006	2007
Total BC Hydro electricity generation	6	11	6	13	6
BC Hydro fossil fuel electricity generation	587	654	586	546	659
Total electricity generation	**22**	**28**	**24**	**26**	**22**

source: http://www.bchydro.com/about/company_information/reports/gri_index/en8_2__greenhouse.html

By reducing fossil fuel electricity generation to zero through the purchase of offsets by 2016, the electricity intensity would be reduced from 22 tonnes CO_2e/GWh (Gigawatt-hour) to 0.2 tonnes CO_2e/GWh (note: using the figures for 2007 reported by BC Hydro).

Using the figures reported by BC Hydro, the CO_2e emissions from the total electricity consumption in 2017 would be reduced by approximately 99%.

Reduction Estimates		Energy Type Affected	Affects
Building Type	CO_2e (t)		
All Community Buildings	12,387	**Combined Energy**	**Base Year**

6.1.2 EnerGuide rating in Multiple Listing Service (MLS) Advertising

Recommendation: The City should encourage EnerGuide ratings in MLS property listings

An EnerGuide rating is a standard measure of energy performance on a home`s energy consumption. It can give buyers a very clear picture of the energy efficiency of the home and gives detailed information on improvements and costs for upgrades particularly in the heating and electrical systems. A recent survey suggests 72 percent of Canadians would look for a greener home in their next home purchase, with 63 percent willing to pay more for an environmentally friendly home.

By encouraging the EnerGuide rating in the Canadian Real Estate Association's MLS, energy efficiency would gain a higher profile and further develop into a selling feature in the sale of energy efficient building designs.

The EnerGuide rating system works on a scale of 0 to 100. A rating of '0' represents air leakage, poor insulation and overall high energy consumption. A rating of '100' represents an airtight home that is well insulated and requires no purchased energy. Natural Resources Canada provides details on the rating system.

How effective this reduction initiative will be is largely dependent on real estate market conditions throughout the project period. Currently there is an average of 150 active listings for detached homes at any one time in Port Coquitlam with approximately 75 new listings and 50 units sold a month[1]. Assuming that the reduction initiative came into effect by 2011 and also assuming complete stability in Port Coquitlam's real estate market this would mean approximately 6,300 listings would be affected during the project period, of these approximately 3,800 are existing constructions. However future real estate activity is difficult to predict, as is the potential impact on overall energy efficiency this measure would have. The following reduction estimate should be interpreted as being preliminary and subject to change.

EnerGuide Ratings

Type of House	Rating
Older house not upgraded	0 to 50
Upgraded old house	51 to 65
Energy-efficient upgraded old house or typical new house	66 to 74
Energy-efficient new house	75 to 79
Highly energy-efficient new house	80 to 90
An "advanced house" that uses little or no purchased energy	91 to 100

Natural Resources Canada's computer software is utilized to model different options, identifying cost-effective measures that decrease energy consumption. Key areas of focus for improving energy efficiency are heating and ventilation equipment and the building envelope, such as windows, doors and insulation.

			Energy Type Affected	Affects Existing/ Growth
Consumption	units	CO_2e (t)		
12,652	GJ	452	Combined Energy	Base Year

[1] Real Estate Board of Greater Vancouver (www.rebgv.org)

6.2 Community Buildings Reduction Initiatives – City Policy and Programs

6.2.1 Community Action on Energy and Emissions (CAEE) Program Targets

Recommendation: The city should become a member of the CAEE and endorse the CAEE targets

The Community Action on Energy and Emissions initiative (CAEE) provides financial and research support to BC local governments and First Nations to advance energy efficiency, energy conservation and emissions reductions measures through government policy and planning tools. This initiative was previously called "Community Action on Energy Efficiency", but has broadened to deal with GHG emissions and air quality.[2]

Programs and Policy to Achieve CAEE Targets for Existing Buildings

6.2.1-a CAEE Existing Buildings Program Targets

Recommendation: The city should commit to achieving CAEE targets for existing community buildings

These upgrades include:

- Reducing the energy consumption in 12% of existing detached, single-family and row houses by an average of 17%
- Reducing the energy consumption in 16% of existing multi-unit residential buildings by an average of 9%
- Reducing the energy consumption in 20% of existing commercial, institutional and industrial buildings by an average of 14%

To achieve the CAEE targets, the City must pursue funding sources to implement community education and outreach programs to reduce energy consumption in existing and new buildings. Although it is considered difficult to retrofit existing buildings, the City should pursue endorsing the CAEE targets.

Reduction Estimates				Energy Type Affected	Affects
Building Type	**Consumption**	**units**	**CO_2e (t)**		
Single-Unit Housing	20,857	GJ	745	Combined Energy	Base Year
Row Housing	7,169	GJ	256	Combined Energy	Base Year
Multi Unit Residential Buildings	7,936	GJ	284	Combined Energy	Base Year
Commercial Buildings	33,458	GJ	1,101	Combined Energy	Base Year
Industrial Buildings	13,841	GJ	708	Combined Energy	Base Year
TOTAL	**83,261**	**GJ**	**3,094**	**Combined Energy**	**Base Year**

6.2.1-b CAEE | Building Retrofits: Mechanical and Plumbing System Upgrades

Recommendation: The city should take steps towards achieving CAEE targets by promoting the following mechanical and plumbing system upgrades for existing community buildings

These upgrades include:

- Replacing inefficient boilers and cooling systems with high efficiency units; replacing outdated cooling systems with updated higher efficiency systems; installing variable speed motors and drives on pumps and fans that consume less energy than their constant speed counterparts; converting air and water distribution systems to variable volume, reducing energy consumption compared to a constant volume configuration;
- installing renewable energy technologies such as solar pool heaters, ground-source heat pumps or solar walls;
- installing low-flow and flow-control devices to reduce the use of water; and, expanding or installing modern digital control systems to control and monitor the operation and scheduling of all systems.

2 www.bcclimateexchange.ca/

In the typical Canadian home water heating accounts for approximately 20 percent of total utility costs while space-heating can use 40-60 percent of household energy. Residents should be made aware of grant programs such as the ecoEnergy Retrofit program which provides grants for energy efficiency upgrades of up to $5,000 per residential dwelling, $50,000 a project for commercial buildings and up to $250,000 for corporate entities. A large portion of these grants are directed solely towards upgrades to mechanical and plumbing system upgrades.

6.2.1-c CAEE | Building Retrofits: Electrical System Upgrades

Recommendation: The city should take steps towards achieving CAEE targets by promoting the following electical system upgrades for existing community buildings

These upgrades include

- converting lighting systems to high-efficiency technology, like T8 lighting with reflectors or pulse charge high intensity discharge lighting;
- eliminating incandescent light bulbs. Canada is banning the sale of these bulbs in 2012;
- replacing conventional bulbs with energy star verified bulbs that use 75% less energy and produce 75% less heat than incandescent bulbs;
- dimming a bulb by 25% and consuming 20 % less energy;
- installing motion sensors, or a timing device to ensure equipment is only used when required;
- installing digital lighting control systems;
- converting electric heating to natural gas or solar power; and,
- installing power factor correction capacitors to reduce utility charges.

Lighting in homes accounts for between five and 20 percent of total household energy for residential buildings and more than 40 percent of commercial sector consumption[1].

[1] USDA, Office of Energy Efficiency and Renewable Energy, Building Technologies Program. 2002.

6.2.1-d CAEE | Improvements to Management and Operations Practices

Recommendation: The city should take steps towards achieving CAEE targets by promoting the following changes to the management and operations practices for existing commercial and industrial buildings

These upgrades include:

- operating strategies and schedules to ensure equipment is only running when required, and that optimum settings are in place;
- purchasing and maintenance practices to ensure high-efficiency equipment is used;
- implementing performance monitoring and reporting programs to ensure the project performs as expected;
- exploring fixed rate energy prices to ensure retrofit savings and avoid fluctuating energy prices; and,
- training staff in energy-conscious skills and techniques.

For more information on other voluntary programs, see the following: Federal Buildings Initiative developed and implemented by Natural Resources Canada; Eco Energy initiative; and, BC Hydro's Power Smart Program

6.2.1-e CAEE | Upgrade Insulation

Recommendation: The city should take steps towards achieving CAEE targets by encouraging residents to upgrade the insulation materials used in existing community buildings

By upgrading the insulation in homes, energy consumption will be greatly reduced. For example, homeowners can save up to 30% of their annual heating bills with proper attic floor insulation.

An emerging insulation method is Spray Foam, which can be applied on the walls, roof and other areas. It effectively eliminates air infiltration wherever it is used and prevents moisture from migrating into the walls. Spray Foam Insulation has a high R-value (up to 6.5 per inch) and can result in stronger structural Integrity.

Homeowners can receive up to $5,000 in grants to upgrade the insulation in their homes from Natural Resources Canada's ecoEnergy retrofit program.

See these web sites for more information: BC Hydro (www.bchydro.com); Natural Resources Canada (http://www.nrcan-rncan.gc.ca); Green Design Build (www.greendesignbuild.net)

6.2.1-f CAEE | Repair Leaks and Drafts

Recommendation: The city should take steps towards achieving CAEE targets by encouraging residents to seal leaks and drafts in their residents

Drafts are costly, can cause discomfort and energy is wasted. Sealing gaps and cracks with caulking and weather stripping is one of the most cost-effective steps you can take to keep the heat inside your home, reducing heat loss by 5-10%.

In many homes, 20% of all heat loss is through leaks and poor ventilation. If 10,000 B.C. households with gas heating were draft proofed to cut gas consumption an average of 5% , it could save a kilotonne (1,000 tonnes) of CO_2 emissions annually.

Residents can receive up to $430 in grants towards air sealing their homes from Natural Resources Canada's ecoEnergy retrofit program.

See the following web sites for more information:

BC Hydro (www.bchydro.com);

Green Design Build (www.greendesignbuild.net)

http://www.bcclimateexchange.ca/pdfs/EnergyEfficiencyOnlineGuide2009.pdf

6.2.1-g CAEE | Upgrade Appliances to Energy Star

Recommendation: The city should encourage residents to upgrade their household appliances to those with an Energy Star rating

Major equipment, such as furnaces in houses or chillers in commercial buildings, is accounted for within the various building rating systems. But other equipment, such as office computers or home appliances, is not usually considered. Rating systems are available for such equipment and they can be useful in developing policies relating to energy efficiency.

Residents should be made aware of numerous incentive programs for upgrading appliances. BC Hydro offers $50 rebates for Energy Star rated washers and refrigerators and $25 for Energy Star rated freezers.

The city could also examine adopting incentive programs similar to those currently in place in Victoria and Toronto. The Capital Regional District water service offers Victoria residents a $100 rebate on the purches of high-efficiency clothes washers while the City of Toronto offers residents a $60 rebate in its *Wash 'n' Save* program.

See the following web sites for more information:

BC Hydro (www.bchydro.com);

Green Design Build (www.greendesignbuild.net)

http://www.bcclimateexchange.ca/pdfs/EnergyEfficiencyOnlineGuide2009.pdf

http://www.toronto.ca/watereff/index.htm

http://www.crd.bc.ca/water/conservation/rebates/smartwash.htm

6.2.1-h CAEE | Upgrade Windows

Recommendation: The city should promote the replacement of old windows to those with an energy star rating in existing residences

Nearly one third of residential heat loss occurs through windows. By upgrading single paned windows to double paned, low E and argon windows with an energy star rating homeowners can reduce energy bills from 7 to 24%.

All new windows, except those with solid wood frames, are now required to be tested to meet the BC Energy Efficiency Act. A permanent label containing a registered trademark or certification organization symbol is required to verify the window.

Residents may receive up to $40 per Energy Star Window from the ecoEnergy retrofit program.

See the following web sites for more information:

BC Hydro (www.bchydro.com);

Natural Resources Canada (http://www.nrcan-rncan.gc.ca);

Green Design Build (www.greendesignbuild.net)

6.2.1-i CAEE New Buildings Program Targets

Recommendation: The city should achieve CAEE targets for new buildings

- Achieve an EnerGuide for New Houses rating of 80 for 100% of new detached, single-family and row houses by 2010
- Achieve energy performance 25% better than the Model National Energy Code for 100% of new multi-unit residential buildings by 2010
- Achieve energy performance 25% better than the Model National Energy Code for 100% of new commercial, institutional and industrial buildings by 2010

To achieve the CAEE targets, the City must pursue funding sources to implement community education and outreach programs to reduce energy consumption in existing and new buildings. Although it is considered difficult to retrofit existing buildings, the City should pursue the follwing policies and bylaws to encourage and/or require building energy efficiency that meets the CAEE targets.

Reduction Estimates				Energy Type Affected	Affects
Building Type	**Consumption**	**units**	**CO_2e (t)**		
Single Unit Dwelling	58,230	GJ	559	Combined Energy	Growth
Row Housing	13,601	GJ	125	Combined Energy	Growth
Multi-Unit	16,274	GJ	164	Combined Energy	Growth
Commercial	2,673	GJ	85	Combined Energy	Growth
Industrial Buildings	38,059	GJ	1,203	Combined Energy	Growth
TOTAL	**128,836**	**GJ**	**2,135**	Combined Energy	Growth

6.2.1-j Electricity and Alternative Energy Division (EAED)

Recommendation: The city can achieve CAEE targets by informing developers of potential funding resources from the EAED to use alternative energy sources in new developments

The BC Ministry of Energy, Mines and Petroleum Resources (MEMPR) also administers the Electricity and Alternative Energy Division (EAED), which is made up of four branches designed to create a thriving, competitive, reliable, efficient, and environmentally responsible energy sectors for electricity and alternative energy. Developers in the City should be made aware of this potential funding resource. The four broad energy sectors targeted by the Ministry of Energy, Mines and Petroleum Resources are as follows:

- **Alternative Energy** – Advancing energy efficiency policies and programs, facilitating evaluation, develop ment and deployment of leading edge clean energy technologies, and advancing community-based energy policy and programs;
- **Bioenergy and Renewable Energy** – Developing and implementing strategic policies related to bioenergy, renewable fuels, wind, solar, ocean renewable and geothermal energy;
- **Electricity Policy** – Development and maintenance of electricity related policies, legislation, regulations and programs; and,
- **Independent Power Producer Policy and Operations** – Leading the development and maintenance of provincial Crown land tenures operational policies and procedures for independent power producer (IPP) projects.

The EAED is also responsible for administering the Innovative Clean Energy (ICE) Fund. The fund supports the development of clean power and energy efficiency technologies in the electricity, alternative energy, transportation, and oil and gas sectors.

6.2.1-k Passive Solar Design

Recommendation: The city should encourage the orientation of new buildings to capitalize on passive solar gain as well as encouraging existing buildings to preserve their solar access

Passive solar homes are designed to conserve energy by strategic location of the building. The strategy behind the design is to let heat into the building during the winter and block the sun to keep it cool in the summer. By using deciduous trees or bushes to the south of the building, foliage will block sunshine that would otherwise result in excess heating during the summer. While In the winter, when leaves are shed, there is an increase in solar gain. Shutters can also mimic foliage, by blocking out sun In summer months and allowing light in during the winter months.

New buildings are the best candidates for Passive Solar construction when the orientation of the building, the proportion and size of window fixtures, wall densities, and construction materials can all be selected to maximize the free solar gains without adding to the price of construction.

Solar Buildings Research Network (www.solarbuildings.ca)

6.2.1-l New Development lockers/bike storage

Recommendation: The city should require developers to incorporate showers, lockers and secured bike storage in new buildings.

Currently, the City of Port Coquitlam's zoning by-law No. 3630, Section 10, requires that all new residential developments of three or more dwelling units must be equipped with bicycle parking facilities capable of accommodating one bicycle per unit.

The city should consider expanding this bylaw to include new non-residential units to encourage residents to commute to work by bicycle.

Vancouver's Parking By-law No. 6059, Section 6 specifies requirements for short-term and long-term bicycle parking spaces for:

- Residential units including seniors' housing;
- Health, educational and religious institutions;
- Cultural, recreational and sports facilities; and,
- Commercial developments (e.g. office, service, retail, industrial).

The bylaw also identifies the location, size, security and access characteristics of bicycle parking spaces. Long-term spaces must be in a separate room or chain-link compound, or in individual lockers. For non-residential uses, long-term bicycle parking spaces must be accompanied by a minimum number of clothing lockers for both men and women.

Vancouver's Building By-law No. 6134 requires non-residential developments to include long-term bicycle parking spaces and to also provide a minimum number of toilets, sinks, showers and grooming stations with counters, mirrors and electrical outlets.

Transport Canada's Development Guidelines to Support Sustainable Transportation give descriptions of sample bylaws which could be adapted for use in the City of Port Coquitlam.

6.2.1-m Discourage Electric Baseboards

Recommendation: The city should discourage the installation of electric baseboards in new residential developments

Electric baseboard heating is cheaper to install in new homes than traditional force air furnace systems. However, over the long term, the electrical operating costs of fuel for baseboard heating far exceeds that of natural gas for a force air heating system. Developers should be discouraged from installing electric baseboard heating in all new construction. Examples of other alternative low cost heating systems include airducts for central forced-air systems and hydronic systems.

Terratek Energy Solutions Inc.; CEA; Natural Resources Canada; and, B.C.

This reduction initiative applies to conversions of homes with existing electric baseboard heating. The reduction amount is minimal considering most homes cannot accommodate conversion.

6.2.2 Brownfield Redevelopment

Recommendation: The city should explore the development of brownfields for commercial and residential development

Canada's National Round Table on the Environment and the Economy (NRTEE) defines brownfields as abandoned, vacant, derelict or under-utilized commercial and industrial properties where past actions have resulted in actual or perceived contamination and where there is an active potential for redevelopment.

Brownfields are often located within or near established communities and include former railway yards, old industrial waterfronts, riverbanks, abandoned service stations, decommissioned refineries, former drycleaners or other commercial properties. The land will often require decontamination before it can be redeveloped. However, these convenient urban locations offer easy access to community infrastructure and town centers, making them primary targets for redevelopment even when the cost of decontamination is factored In.

If left unmanaged and idle, the toxic materials from brownfields may be a detriment to human health as well as the environment. By redeveloping the contaminated sites, air, water and soil quality will be improved as will any human health hazard.

The opportunity for brownfield redevelopment in Port Coquitlam is limited to the area underneath the Pitt River bridge.

See the following links for more information on Brownfields: Ontario Ministry of the Environment , Canadian Brownfields Network, BC Ministry of Environment.

A reduction estimate is not provided for this reduction initiative.

6.2.3 Community Energy Systems Program

Recommendation: The city should encourage the development of community energy systems by promoting the Community Energy Systems Program

The Commu1nity Energy Systems Program (CES) helps Canadian communities meet their energy needs more efficiently and cost-effectively.

The program identifies and develops opportunities for the use of district heating and cooling, combined heat and power (co-generation), waste heat recovery, thermal storage, and local sources of renewable energy, particularly biomass.

The program can be accessed through NRCan and clients use the program's capabilities to:

- Develop community energy plans;
- Conduct feasibility studies;
- Design district heating and cooling systems;
- Help with project management;
- Conduct trouble-shooting that requires specialized expertise;
- Develop system-design software;
- Develop innovative enhancements to new and existing equipment;

- Develop new district cooling technologies;
- Write technical and promotional manuals; and
- Help link system suppliers with potential adopters.

By encouraging zoning and rezoning applications that support community energy systems, municipalities can help communities more efficiently and cost-effectively meet their energy needs. The municipality may choose to establish their own utility and provide on-site renewable energy to new developments and lease access to the source.

It is extremely difficult to estimate energy and GHG emissions reductions for this reduction initiative. Best practices suggest that savings ranging from 40 to 70 percent of energy used for space heating can be achieved. Because estimates of reductions must be developed on a case-by-case basis, reduction estimates are not provided.

6.2.4 Pre-service for Waste Heat and District Energy Systems

Recommendation: The city should Identify suitable areas for district energy systems

Pre-servicing industrial areas for waste-heat recovery and executing a maintenance plan to save energy can be done by capturing and reusing rejected heat instead of buying more energy. Some excellent waste-heat recovery ideas are provided by the Canadian Industry Program for Energy Conservation. These include:

- Identify sources of waste heat
- Eliminate as many sources of waste heat as possible
- Reduce the temperature of the remaining waste heat
- Inspect and maintain equipment to minimize the production of waste heat
- Capture waste heat from a clean waste stream that normally goes into the atmosphere or down the drain, and then pipe the waste stream to where it can be used
- Re-use heat from cooling hydraulic oil within molding machines and the injection molds themselves. This also reduces the electrical load on the production process
- Install waste-heat reclamation equipment (e.g. replace a cooling tower circulation loop with a shell-and-tube heat exchanger)
- Combine a flue gas heat recovery unit with a heat pump
- Recover heat generated through refrigeration and upgrade the heat by using a heat pump
- Consider converting high-temperature flue gas heat (e.g. from metallurgical furnaces) into superheated steam for electric power generation.

District Heating Systems can be a key to energy conservation since they generate heat in a central location for residential and commercial requirements including space heating and water heating. A plant burning fossil fuels which uses a heat engine or power station to produce electricity and useful heat simultaneously, or a plant that utilizes biomass are the most common sources, although heat-only boiler stations and central solar heating can also be used. District heating plants can provide higher efficiencies and better pollution control than localized boilers.

Once generated, the medium utilized to transport the heat is water, or steam. It is then distributed to customers through a network of insulated pipes which are usually installed underground. Once it reached the customer, the network is connected to the dwellings central heating by heat exchangers, and water or steam used in the district heating system is not mixed with water in the central heating system of the dwelling.

Under the Community Charter local governments can require costumers to connect to district energy systems since they qualify as a municipal service. Local examples of district energy systems include the City of North Vancouver's system which is operated by the city-owned subsidiary Lonsdale Energy Corporation. This system is fueled by natural gas rather than renewable energy sources.

While significant gains in energy efficiencies can be gained through district energy systems they require significant study and planning before implementation. The city should require that developers evaluate the potential for district energy systems for all new developments. A coarse estimate has been provided for the potential GHG reductions if district energy systems were included in new residential and industrial developments.

Reduction Estimates		Energy Type Affected	Affects
Building Type	CO_2e (t)		
Residential Buildings	4,099	**Combined Energy**	**Base Year**
Industrial Buildings	687	**Combined Energy**	**Base Year**

http://www.communityenergy.bc.ca/

6.2.5 C-2000 Standard: Adopt the C-2000 Building Code for Commercial Buildings

Recommendation: The city should encourage developers to review this strategy to support achieving the CAEE targets.

A structure built to the C-2000 code has a goal of 50% less energy used than a similar building designed in accordance with the Model National Energy Code (MNECB). The goals for a C-2000 building are provided by Natural Resources Canada and are as follows:

- Achieve a gold rating from the LEED™ Green Building Rating System™
- Achieve C-2000 Program for Advanced Commercial Buildings criteria and CBIP compliance
- Use materials that are manufactured without CFCs and HCFCs
- Use equipment that does not use ozone-depleting substances
- Ensure that all new materials have zero VOC targets
- Ensure that half of all new materials have 20 percent post-consumer or 40 percent post-industrial recycled content
- Use a construction and demolition waste management plan for re-use and recycling in an effort to achieve zero waste
- Maximize use of salvaged products, to minimize use of new materials
- Ensure a minimum of 80 percent of all material is sourced from within 500 km of construction site
- Use a renewable energy source to provide at least 10 percent of the energy requirements
- Re-use at least 75 percent of the existing structure and shell of the building
- Integrate native and drought-tolerant trees and plantings as much as possible
- Develop a water conservation plan
- Use high reflective surface finishes for roof and parking lot construction
- Ensure the lighting load is at 22 W/m^2 or less

Considering the expected substantial increase in commercial buildings in the city of Port Coquitlam the adoption of the C-2000 standard is a crucial part of reducing community buildings reductions. Reduction estimates have not been provided for this program since they are covered under the CAEE program targets.

6.2.6 Official Community Plan and City Bylaws

Recommendation: The city should continue policy mechanisms that encourage mixed use developments.

Mixed use developments include a residential component and at least two of the following components: convenience retail; medical; community garden/centre; religious; club; civic; educational; entertainment; discretionary retail; government services; offices; sports fields; and, light industrial warehousing.

Mixed-use developments are neighbourhoods that consist of commercial and residential development. Often commercial and retail businesses can be located in the same building as residential units. This type of development meets the needs of residents by having services such as medical clinics, daycare facilities, and other small businesses in the same neighbourhood, minimizing automobile usage. Smart Growth BC advocates mixed land use to generate social and economic diversity resulting in vibrant, urban communities.

The expected outcome of smart growth and its accompanying reductions in automobile use do not always materialize since the theory of smart growth relies on the assumption that people live in close proximity to where they work, or vice versa. Smart growth is meant to densify neighbourhoods while meeting the needs of a growing community in lieu of a sprawling community where automobile reliance is imperative.

According to a recent report by Seattle-based Sightline Institute, all but the City of Vancouver and the City of North Vancouver received failing grades in the Metro Vancouver region for implementation of smart growth. Although, notwithstanding their achievements, intensification in Vancouver and the City of North Vancouver is a *de facto* standard since there are no other alternatives to accommodate population growth.

Mixed-use development is a principle of Port Coquitlams OCP and current policy specifies 170 commercial units per 3,000 residential units.

Reduction estimates have not been provided for this reduction initiative.

6.2.7 Sustainability Checklist

Recommendation: Utilize the city's sustainability checklist in the approval process for new developments

The city's sustainability checklist has been designed for use by developers and their consultants to assist City staff assess applications on a project-by-project basis using the sustainability criteria found within the checklist. Based on a triple bottom-line approach to sustainability, applicants outline how their development meets environmental, economic, social goals.

	Points	Wt	Total	*Soc*	*Env*	*Eco*
4. Environmental Protection & Enhancement						
a) Lands • Does not intrude on ALR or designated open lands • Protects riparian areas and other designated environmentally sensitive areas • Provides for native species habitat restoration/improvement • Redevelops environmentally contaminated site	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	2	/10			
b) Servicing • Does not require extension of existing municipal infrastructure (e.g. roads, water and sewer) • Located in existing commercial and transportation nodes	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	1	/5			
c) Construction/Design • Provides LEED certification (certified, silver, gold, platinum) or accepted green building best practices (e.g. Built Green BC, Green Globes)[3]	None – 0 Certified – 2 Silver – 3 Gold – 4 Platinum - 5	4	/20			

6.2.8 Increase Density – Intensify

Recommendation: The city should increase population density to conserve land for future developments and increase future liveability

Encourage high density, mixed use building developments within the Urban Containment Boundary, incorporating such initiatives as energy aware landscaping methods and buildings for passive solar gain. Housing more people on less land relieves the pressure to build on agriculturally productive land. This concept known as eco-density promotes appropriate densification in an effort to address climate change and a smaller ecological footprint (www.vancouver-ecodensity.ca).

Increasing housing density should provide a wide range of housing choices and corresponding prices. As a part of this densification, the buildings will share resources such as water and energy. Public transportation, walking and cycling will be supported by this denser, mixed-use development concept with services more easily accessible.

Intensification doesn't necessarily mean that people need to live in high rises. Neighbourhood intensification is equally important to ease community growth, especially in single family detached residential neighbourhoods. During public education and outreach sessions, the City of Port Coquitlam could ask residents a number of questions about neighbourhood intensification such as:

1. Should the region relax bylaws controlling secondary suites to allow the construction of secondary suites above garages, and in outbuildings such as coach houses?
2. Should there be a requirement to rough-in a secondary suite, where appropriate, in new construction?

Current Port Coquitlam policy limits secondary suites to areas zoned for Residential Single Dwelling (RS1-4).

6.2.9 Density Bonuses/Amenity Bonuses

Recommendation: The city should provide density bonuses in conjunction with energy efficiency retrofits in town centres and growth concentration areas

Density Bonuses are typically used to implement upgrades in the community and achieve public benefits. This incentive allows developers to construct more floor space in exchange for a community amenities that meet community needs such as a waterfront walkway, open space, daycare facility, stream preservation, landscaping, tree maintenance and preservation, fishing pier, or underground parking.

The city is currently working on a comprehensive density bonus supplement for apartments and townhouses.

6.2.10 Distance Relationship Between Commercial and Residential Zones

Recommendation: The city should establish maximum allowable distances to commercial areas for all new residential developments

By establishing a maximum distance between an existing commercial area and a new residential development, the need for vehicle use will decrease. By encouraging higher densities and mixed neighbourhoods, fossil fuels from many sources are conserved. If the area being built is residential, there should be a commercially zoned area in close proximity. By establishing a maximum distance between an existing commercial area and a new residential development, the need for vehicle use will decrease. By encouraging higher densities and mixed neighbourhoods, fossil fuels from many sources are conserved. If the area being built is residential, there should be a commercially zoned area in close proximity.

6.3 Community Transportation Reduction Initiatives - Senior Government Policy and Programs

Reduce vehicle use in favour of non-auto modes and sustainable transportation as follows:

- Active Transportation to and from schools;
- Car free days;
- Co-operative auto networks;
- Public transportation vouchers; and,
- Enhanced mobility for non-auto modes of transportation.

Summary of Reductions and Targets for the On-the-road Transportation Sector

With the exception of the GHG emissions associated with the Coast Meridian Overpass Project, GHG reduction estimates for the transportation sector are calculated in HES' Energy and Emissions Reporting and Monitoring System™ (EEMRS™). The reduction initiative is applied to an energy amount in the appropriate sector and the resulting reductions in energy consumption and resulting greenhouse gas emissions are reported in 6.2.6 in litres of gasoline for passenger vehicles.

Passenger vehicles are responsible for the majority of the GHG emissions in the transportation sector (74%) and can be influenced by a much broader range of initiatives than commercial vehicles.

A summary of base year emissions (2007), forecasted emissions (2017), reduction initiatives, and the overall reduction target for the community transportation sector is listed in table 6.2.7a. The overall decrease of greenhouse gas emissions of approximately 31,000 tonnes CO2e is an estimate based on three major initiatives: the Coast Meridian Overpass; new tailpipe emissions standards; and, new fuel consumption standards.

Ultimately, the price of fuel alone will have the most significant affect on consumer choice of vehicle, driving habits, and kilometers driven per year.

The overall reduction target in the community transportation sector is to reduce base year emissions by 10 percent, or a reduction quantity of approximately 31,000 tonnes CO2e. Note that in the absence the California Tailpipe Emissions Standards, the reduction is reduced to two percent.

Table 6.4a – Overall Reduction Target for On-the-road Transportation (Inclusive of Tailpipe Standard)

Subsector	Comparison Year emissions (CO_2e t)	Base Year emissions (CO_2e t)	Forecasted Emissions (CO_2e t)	Total Reduction Quantity	Overall Reduction Target
	2002	2007	2017		
On-the-road Transportation	120,226	165,076	179,784	30,657	**-10%**

Growth in the transportation sector is significant and therefore achieving a reduction in this sector will be difficult without widespread technological change. Significant reductions in fuel consumption rates, plug-in hybrid vehicles and plug-in vehicles are suggested as the technological change that will have the greatest impact on the transportation sector.

6.3.1 California Tailpipe Emissions Standards

Recommendation: Senior government will adopt policy that sets vehicle GHG emission standards equivalent to those laid out in California's 2004 regulation.

California and 13 other states finally won federal permission today to set tough new tailpipe standards that for the first time limit greenhouse gas emissions from cars, trucks and SUVs.

For the next two years, those states will lead the charge, pressuring automakers to build cleaner, more fuel efficient vehicles.

Then, starting in 2012, the rest of the country begins to play catch up.

Under the California rules, 2009 model year cars and light trucks are limited to 323 carbon dioxide-equivalent grams of greenhouse gases per mile. That drops to 301 for 2010 model year vehicles, 267 for 2011, and 233 for 2012. When converted, this initiative amounts to a reduction of 75 grams/km. The reduction estimate is based on 2,500 vehicles (10% of the projected population of vehicles) meeting the standard in 2012 each driving an average of 17,000 km.

Currently the American federal government is planning to adopt nationwide emissions standards that are equivalent to California's. Since the American auto-market is substantially larger than Canada's it is likely that there will be spill over affect as manufacturers adopt the new standards. However the city should encourage senior levels of government to harmonize tailpipe emissions standards with the United States.

Reduction Initiative	Reduction Initiative Category	Estimated Reduction
		CO_2e (t)
California Tailpipe Emissions Standards	Technological Change	12,944

6.3.2 New Fuel Consumption Standards

Recommendation: The city should support the federal government's new fuel consumption standards.

The new federal auto emissions standards will begin in 2012 and increase each year so that by 2016, cars average 39 mpg and pickups and SUVs average 30 mpg. Canadian fuel consumption rates would be 6.0 L/100km and 7.8 L/100km respectively (i.e., 1 mile per gallon = 235.214583 liters per 100 kilometers).

This initiative will filter through to Canada as it is expected that automobiles destined for the smaller Canadian market will be identical to those destined for the USA market. Alternatively, Environment Canada may adopt the same legislation.

The reduction estimate is based on 10 percent of small and large passenger cars, and light trucks, vans, and SUVs in 2012 using 35 percent less fuel (e.g., we estimate 10 percent of vehicles will be model year 2012 and will consume 30 percent less fuel based on an average weighted fuel consumption rate of 8.4 L/100km for cars and light trucks, vans, and SUVs).

Reduction Initiative	Reduction Initiative Category	Estimated Reduction
		CO_2e (t)
New Fuel Consumption Standards	Technological Change	2,989

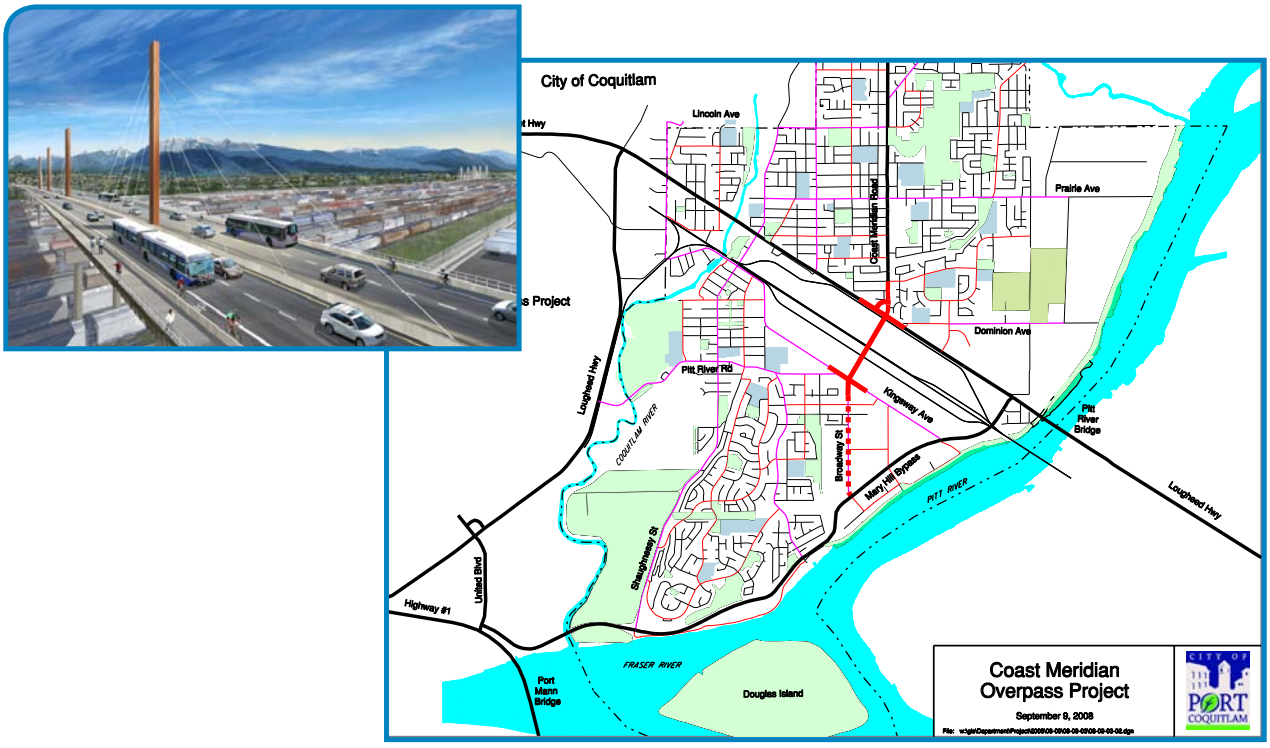
6.3.3 New Bio Diesel Standard

Recommendation: The city should support the implementation of the new federal diesel fuel and heating oil standards.

Bill C-33 will require that all diesel fuel and heating oil in Canada must contain at least two percent renewable biodiesel by 2012. The bill also requires that all gasoline contains five percent ethanol or biodiesel by 2010.

Reduction Initiative	Reduction Initiative Category	Estimated Reduction
		CO_2e (t)
New Biodiesel Standard	Technological Change	629

Figure 6.2.1 – Location of Coast Meridian Overpass Project



6.3.4 Coast Meridian Overpass Project

Recommendation: Completion of the Coast Meridian Overpass Project will result in GHG emissions reductions.

Improvements to local transportation infrastructure can result in significant fuel consumption savings and reductions in greenhouse gas emissions. The City's Coast Meridian Overpass Project (figure 6.2.1) is an example of a project that will result in reductions in GHG emissions through reduced vehicle kilometres travelled and vehicle idling time. An estimate of GHG emissions reduced as one of the many benefits of the project was provided by Urban Systems[3].

Now under construction, the Coast Meridian Overpass will be a critical new transportation link between north and south Port Coquitlam and for the entire region. Construction began in March 2008 and will be completed in early 2010. The expected benefits of the CMO are that it will:

- Add a third north-south transportation link across the Canadian Pacific Railway yard;
- Improve access to community facilities, commercial services and employment throughout the City;
- Improve emergency response times and reliability;
- Reduce air pollution caused by idling vehicles; and
- Reduce congestion on Lougheed Highway.

The project corresponds with the City's Official Community Plan, which reflects the community's vision of Port Coquitlam as a transit-supportive, environmentally sustainable and complete community. Project benefits include greenhouse gas reductions through reduced travel distance and vehicle idling.

Reduction Initiative	Reduction Initiative Category	Estimated Reduction
		CO_2e (t)
Coast Meridian Overpass Project	Local Improvements	11,000

6.4 Community Transportation Reduction Initiatives - City Policy and Programs

6.4.1 Active Transportation to and from Schools

Recommendation: The city should support school programs that encourage children to walk to school

Choosing active transportation instead of driving will result in improved health and air quality. Additional long-term benefits of this behavioral change also include cost savings since cars will be used less. Successful active transportation initiatives must address the barriers affecting transportation choice and work with various stakeholders in the community.

This reduction initiative can be categorized as behavioral change. It is listed as a stand alone initiative because the target audience is public and private schools throughout the community. The City of Port Coquitlam should work with the local school board to implement this measure.

6.4.2 Car Free Days

Recommendation: The city should support and provide incentives for car free days and other initiatives such as corporate bike and walk to work programs that encourage the use of alternative and sustainable transport

Car free days are intended to demonstrate to the community the potential effects if there were significantly fewer cars being driven. Most car free days are accompanied by a strong push for active and sustainable transportation as well as developing an enhanced sense of community. Bike and walk to work programs have been successful in Canada for a number of years however more long-term initiatives are needed to sustain the high participation levels experienced during these special events.

3 A Note on Volume/Capacity Analysis and Urban Transportation Economics. Urban Systems Ltd. May 2006

Reduction Initiative	Reduction Initiative Category	Estimated Reduction CO_2e (t)
Car free days	Sustainable Transportation	373

6.4.3 Co-Operative Auto Networks

Recommendation: The city should promote the use of car sharing networks by designating parking areas and providing incentives to developers

By registering with an auto network, individuals pay a monthly fee and are able to borrow cars by the hour or kilometer. Auto networks typically operate fuel-efficient, well-maintained vehicles ranging from SmartCars to mini-vans and pick-up trucks. By using an auto network, individuals may reduce their transportation costs while not limiting their access to mobility. One auto network, Zipcar, has tripled its enrollments from 2006 with 66 percent of customers claiming they will sell their personal vehicle or not buy one at all. Forty percent of these new registrants have enrolled as a direct result of increasing fuel costs. Car sharing also reduces overall demand for parking, which can allow for more efficient land use.

In 2005 the City of Vancouver introduced a by-law that enabled developers to reduce the ratio of parking required in Multi-unit residential applications where car sharing is a featured amenity of the buildings. The by-law allows for a reduction of three parking spaces for every co-operative car (and associated stall) the developer provides.

Currently there neither of the major car sharing networks, the Co-operative Auto Network and Zipcar, operate in Port Coquitlam. The city should consider policies, such as incentives for developers to include car-sharing in their buildings, to encourage the growth of car sharing networks in Port Coquitlam.

6.4.4 Public Transport Vouchers

Recommendation: The city should encourage employers to provide public transport vouchers instead of free parking as part of salary packages or incentives such as bonuses to reduce vehicle use outside of work hours

Employers can choose the amount provided for each employee transit voucher and these benefits can be considered tax-deductible business expenses. In Washington D.C., discounted transit has been provided to private and public sector employees since 1993 and all federal agencies are required to provide the vouchers to all employees. There are now 138 large private sector firms, each with at least 100 employees that participate in the program resulting in an estimated 27,221 fewer daily vehicle trips and over 675,000 kilometers saved over a three year period in Washington. This savings is equal to 4,600 tonnes CO_2e each year that would otherwise be emitted into the atmosphere. Employers may also offer employees a choice between subsidized parking and a cash allowance intended for transit.

Considering the substantial growth the city expects its industrial sector, this reduction measure will be essential to mitigate the associated growth in emissions from commuter vehicles.

Two-seater car: smart fortwo/cabriolet

1.0 L, 3 cylinder, 5-speed automatic (with manual mode)

Fuel consumption: city 5.9 L/100 km (48 mi./gal.); highway 4.8 L/100 km (59 mi./gal.)

Subcompact car: MINI Cooper/Cooper Clubman/Cooper Convertible (co-winner)

1.6 L, 4 cylinder, 6-speed manual

Fuel consumption: city 7.1 L/100 km (40 mi./gal.); highway 5.3 L/100 km (53 mi./gal.)

Subcompact car: Toyota Yaris (co-winner)

1.5 L, 4 cylinder, 5-speed manual

Fuel consumption: city 6.9 L/100 km (41 mi./gal.); highway 5.5 L/100 km (51 mi./gal.)

Compact car: Honda Civic Hybrid

1.3 L, 4-cylinder hybrid, continuously variable (CVT)

Fuel consumption: city 4.7 L/100 km (60 mi./gal.); highway 4.3 L/100 km (66 mi./gal.)

Mid-size car: Toyota Prius

1.5 L, 4-cylinder hybrid, continuously variable (CVT)

Fuel consumption: city 4.0 L/100 km (71 mi./gal.); highway 4.2 L/100 km (67 mi./gal.)

Full-size car: Honda Accord Sedan (co-winner)

2.4 L, 4 cylinder, 5-speed manual

Fuel consumption: city 9.4 L/100 km (30 mi./gal.); highway 6.4 L/100 km (44 mi./gal.)

Full-size car: Hyundai Sonata (co-winner)

2.4 L, 4 cylinder, 5-speed automatic

Fuel consumption: city 9.5 L/100 km (30 mi./gal.); highway 6.2 L/100 km (46 mi./gal.)

Station wagon: Volkswagen Jetta Wagon TDI Clean Diesel

2.0 L, 4 cylinder, 6-speed manual

Fuel consumption: city 6.8 L/100 km (42 mi./gal.); highway 4.8 L/100 km (59 mi./gal.)

Pickup truck: Ford Ranger and Mazda B2300 (co-winners)

2.3 L, 4 cylinder, 5-speed manual

Fuel consumption: city 9.9 L/100 km (29 mi./gal.); highway 7.5 L/100 km (38 mi./gal.)

Special-purpose vehicle: Ford Escape Hybrid

2.5 L, 4 cylinder hybrid, continuously variable (CVT)

Fuel consumption: city 5.8 L/100 km (49 mi./gal.); highway 6.4 L/100 km (44 mi./gal.)

Minivan: Mazda 5

2.3 L, 4 cylinder, 5-speed manual

Fuel consumption: city 9.6 L/100 km (29 mi./gal.); highway 7.0 L/100 km (40 mi./gal.)

Large van: Chevrolet Express Cargo/GMC Savana Cargo

4.3 L, 6 cylinder, 4-speed automatic

Fuel consumption: city 14.1 L/100 km (20 mi./gal.); highway 10.0 L/100 km (28 mi./gal.)

6.4.5 Reducing Vehicle Kilometers Traveled

Recommendation: The city should encourage trip reduction measures such as vanpool and rideshare programs, employer trip reduction programs, car-share cooperatives as well as distance travelled reductions

Vehicle Kilometers Travelled (VKT) Reduction Objective: Set goals that limit vehicle travel to community population growth. If overall VKT is known, consider setting objective of preventing VKT from exceeding population growth rate (1% - 2%/year).

VKT Reduction Objective By Vehicle Type: Reduce vehicle kilometers traveled by vehicle type (e.g. heavy trucks, light trucks, multi-passenger vehicles, single-passenger vehicles, etc.) and/or reduce total fuel volume sales throughout community (policy or global objective only implemented if appropriately tracked).

Trip reduction measures can be implemented by employers, cities, and regional districts on both a voluntary and mandatory basis. Individuals can also get involved by signing up with online carpool networks. VKT reduction objectives can effectively promote reductions in vehicle use over time and can offer insight into the success of many ongoing sustainable transportation initiatives.

6.4.6 Encourage Mixed Use Development

Recommendation: The city should reduce VKT by encouraging mixed use developments

For new residential developments, include at least two of the following components: convenience retail; medical; community garden/centre; religious; club; civic; educational; entertainment; discretionary retail; government services; offices; sports fields; light industrial warehousing

Encouraging developments that incorporate both residential and commercial sectors are beneficial since they reduce dependence on vehicles in everyday life. Residents are able to walk to many of their routine destinations such as grocery stores while businesses are guaranteed local customers. Mixed use developments tend to be higher in density resulting in less demand for parking and a more pedestrian friendly environment. Mixed use developments also have the benefit of providing the necessary preconditions for economically viable sustainable energy systems such as district heating.

6.4.7 Limit Driving Distance To Commercial Locations

Recommendation: The city should reduce VKT by limiting the distance between commercial developments and residential areas.

To reduce automobile dependence, encourage commercial developments close to populous (not greater than 10 km) and discourage retailers from establishing on the fringe of the local government boundary to avoid zoning bylaws.

Locate commercial centres near transit nodes and residential neighborhoods enables individuals to use public transit for work, recreation and school.

6.4.8 Public Transportation Shelters

Recommendation: The city should promote the construction of abundant and appealing facilities for pedestrians and transit users.

The use of updated and universally accessible bus shelters is an important component in public transit use, particularly for seniors and less mobile individuals. Shelters that are well lit, have adequate space for wheelchairs, level pavement, and easy to understand route information are ideal and encourage transit use for all members of the community.

While bus shelters are controlled by TransLink and operated by a private contractor the city should work with Translink to ensure shelters meet the needs of the local community.

6.4.9 Shared Parking

Recommendation: The city should limit parking availability and promote shared parking in mixed-use areas.

Promote shared parking between residential and commercial vehicles. Shared parking can be successful as commercial and residential parking demands are often highest at different times of the day. The same parking site could be used by a resident from 5 pm to 7 am and a commercial vehicle from 7 am to 5 pm.

Minimum Parking Requirements: Reduce minimum parking requirement to one space per unit in new developments. Investigate the provision of parking incentives for vehicles with two or more passengers or that do not use fossil fuels or that meet a high standard for emissions reduction.

Reducing minimum parking requirements in zoning regulations is important in creating high density pedestrian friendly communities. Using on street parking to fulfill parking requirements may also be an effective method to minimize parking requirements as well as establishing priority parking for car-pool, rideshare, or fuel efficient vehicles.

6.4.10 Pedestrian And Transit Facilities

Recommendation: The city should encourage enhancement of pedestrian and transit facilities through rezoning applications.

Street Design: Multi-modal street design, narrowing the road and reducing the barrier effect are three important measures utilized to encouraging safe and active transportation.

Multi-modal street design includes traffic calming, interconnected streets, bicycle lanes and signals, optical recognition of bicycles at left turn lanes, HOV/transit lanes, and preferential traffic rules. Specific community objectives, location and traffic volume are important factors to incorporate in traffic calming initiatives. Traffic calming projects have been successful in reducing vehicle traffic, speed and accidents as well as encouraging active transport in many circumstances. Street design initiatives involve planners, engineers and community residents.

Narrow road intersections to reduce the length of crosswalks and encourage active transportation.

The barrier effect can be reduced through creation of car-free areas and street patterns that support walking, cycling, and transit access for all new residential developments.

6.4.11 Implement Responsible Automobile Ownership Education Program

Recommendation: The city should encourage citizens to undertake regular vehicle maintenance, avoid idling, maintain proper tire pressure, observe speed limits, trip planning, and ride sharing.

It is estimated that 70 percent of vehicles have at least one under inflated tire resulting in 1 million tonnes of CO_2e (carbon dioxide equivalent) each year. By reducing the vehicle's carrying load by 100 lbs. fuel economy increases by 1-2 percent and up to 5

percent by removing items from the vehicle's roof. Other responsible ownership actions such as maintaining an engine speed below 3,000 rpm and making multiple right hand turns instead of left turns in congested areas can also increase fuel efficiency by decreasing distance driven. Gradually accelerating and braking will also improve fuel efficiency saving money and fuel. Scan gauges are available that help monitor fuel consumption while driving and optimize driving habits.

6.5 Community Transportation Reduction Initiatives - New Technologies

The price of fuel and the security of fuel supply are resulting in rapid technological change in the automotive industry. The single most significant reduction in GHG emissions in the transportation sector may be a brief presence of the plug-in hybrid vehicle (PHEV) followed by introduction of the electric plug in vehicle (EPV)[4].

While the tailpipe/fuel consumption standards listed in section 6.3 could also be considered technological change, however since they are required by senior government legislation they have been grouped with other senior government policy.

6.5.1 Right Sizing Vehicles

Recommendation: The city should promote consumer purchase of most fuel efficient vehicle to meet transportation needs and set objective to reduce average fuel efficiency of vehicles by a given amount.

When buying a car, look for the EnerGuide fuel consumption rating and consider the primary use of the vehicle in right-sizing. Many auto networks are available if a larger vehicle is only occasionally required. Choosing a fuel efficient vehicle does not need to cost more. According to a recent BCAA analysis, hybrid's are competitive with conventional vehicles. In fact, a Honda Civic Hybrid saves approximately $4,000 over a five year period compared to its gasoline equivalent, the Honda Civic EX. Canadians are reevaluating their vehicle usage with many cutting back on fuel consumption.

The annual ecoENERGY for vehicle Awards, administered by Natural Resources Canada's Office of Energy Efficiency, are presented for the most fuel-efficient vehicles for the current model year.

The current EcoEnergy Award winning vehicles for low fuel consumption in their class are listed on the following page.

Reduction Initiative	Reduction Initiative Category	Estimated Reduction
		CO_2e (t)
Right Sizing Vehicles	Efficient Vehicle Use	2,722

6.5.2 Plug-in Electric Vehicles

Recommendation: The city should develop infrastructure for electric plug-in vehicles

The single most significant reduction in GHG emissions in the transportation sector will be the introduction of the electric plug in vehicle. Contrary to popular articles plug in vehicles are a new, unproven technology that may not be introduced into mainstream markets for three to five years.

Currently the Chevrolet Volt is the only electric plug-in vehicle planned for mass production in the near future. It will be capable of driving 40 miles on a single charge, require 8 hours to charge on a standard outlet, and will be equipped with a gas generator to extend its range. Chevrolet expects to have the Volt put on the american market by late 2010. Volkswagen is also developing a electric plug-in with a range ok 130 km that it plans to have on the market by 2013.

The success of electric plug-in vehicles depends on a number of factors including the development of plug-in infrastructure, the future ratio of electricity to fossil fuel cost, the cost of plug-in vehicles, and the ability of plug-in vehicles to meet consumer preferences. Due to these complicating factors no estimate of GHG reductions has been made.

The City of Port Coquitlam however can take steps towards developing the necessary infrastructure for electric plug-in vehicles. An example of potential supporting policy is that recently made by the City of Vancouver which now requires developers to include plug-in stations in at least 20 percent of parking stalls in new condominium and apartment buildings.

4 http://www2.news.gov.bc.ca/news_releases_2005-2009/2008EMPR0069-001808.htm

6.6 Solid Waste Reduction Initiatives

Solid waste initiatives in the City are mainly driven by the regional authority, Metro Vancouver, although the City plays a significant role with collection efficiency and support for region-wide education programs.

Currently, Metro Vancouver's initiatives have resulted in diversion of more than half of the total waste generated in the region from disposal at the landfill through residential recycling programs, municipal recycling depots, and private efforts in the commercial and demolition/ construction sectors. Existing waste diversion initiatives and Zero Waste Challenge actions include:

- Residential recycling
- Backyard composting
- Yard waste collection and drop off
- Disposal bans
- Extended Producer Responsibility (EPR)
- Food waste composting
- Recycling pilot projects
- Education
- Concrete, asphalt and gypsum recycling

Additional reduction of greenhouse gas emissions at disposal sites through landfill gas capture will further reduce GHG emissions.

Metro Vancouver estimates greenhouse gas emissions from solid waste generated within member municipalities and provides this information to its member municipalities. Reduction initiatives have not been quantified in Metro Vancouver's Zero Waste Challenge, although a diversion rate of 70 percent would result in significant reductions from the base year quantity of 9,948 tonnes. The total reduction quantity is not provided because the reductions are incorporated into the forecast as business as usual. Other reductions are possible, but may occur at the landfill in the form of landfill gas capture. These reductions are under the control of the regional authority and have not been estimated.

6.6.1 Senior Government Policy and Programs

Recommendation: The city should support the development of Waste-to-Energy facilities

Currently Metro Vancouver plans to build at least one waste-to-energy facility as a means to divert the waste stream away from landfills and reduce methane gas emissions, effectively lowering the carbon imprint of municipal solid waste. More will be known about future facilities once Metro Vancouver's draft Solid Waste Management Plan is published.

Metro Vancouver estimates greenhouse gas emissions from solid waste generated within member municipalities and provides this information to its member municipalities. Reduction initiatives have not been quantified in Metro Vancouver's Zero Waste Challenge, although a diversion rate of 70 percent would result in significant reductions from the base year quantity.

For more information visit the following website:

Metro Vancouver (http://www.metrovancouver.org/)

Natural Resources Canada (http://www.nrcan-rncan.gc.ca/)

6.7 Community Target Statement

Table 6.7 below summarizes the information contained in Tables 6.1a and 6.4a. From these summaries combined, the following community target statement is suggested for endorsement by Council:

An emission reduction target of 53,513 tonnes CO_2e, an amount that will reduce overall GHGs by eight percent below 2007 levels by 2017, is recommended for adoption as the city's community objective

Table 6.7 – Summary of Estimated Reduction Initiatives on Community Sectors

Sector		Base Year Emissions (tonnes CO_2e)	GHG Projection (tonnes CO_2e)	Potential Reduction of GHG Emissions	GHG Emissions After Measures	Percent Reduction of Projected Emissions
		2007	2017			
Buildings	Residential	68,485	74,226	12,037	62,189	**-9%**
	Commercial	39,320	40,335	4,974	35,361	**-10%**
	Industrial	27,197	36,202	5,845	30,357	**12%**
On-the-road Transportation		165,076	179,784	30,657	149,127	**-10%**
Solid Waste		9,948	9,948	0	9,948	**0%**
	TOTAL	**312,033**	**342,512**	**53,513**	**286,982**	**-8%**

Note: It is important to remember that the eight percent decrease calculated above represents the potential outcome over the project period (2009-2017) relative to the projected growth in emissions in 2017, which includes the growth of emissions during the project period. Note that significant changes will occur in the on-the-road transportation sector after the project period (2017).

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7. FINAL SUMMARY & RECOMMENDED TARGETS

Corporate

The City of Port Coquitlam has calculated its corporate energy consumption, costs for consumption, and GHG emissions for the base year (2007) and a comparison inventory year (2002).

CHANGES IN GHGs FROM 2002 - 2007: The overall percent change in greenhouse gas emissions is an increase of five percent in a five year period. Inventory results are shown in the table below.

Sector	Energy Type	Emissions CO_2e (t)	Total CO_2e (t)	Emissions CO_2e (t)	Total CO_2e (t)	Percent Change
		2002		2007		02-07
Buildings	Electricity	133	1,371	140	1,302	-5%
	Natural Gas	1,239		1,162		
Outdoor Lighting	Electricity	45	45	40	40	-11%
Water & Wastewater	Electricity	22	29	30	37	28%
	Natural Gas	6		7		
Vehicle Fleet	Diesel Fuel	491	805	695	981	22%
	Gasoline	315		286		
Corporate Waste		386	386	417	417	8%
Total		**2,637 tonnes CO_2e**		**2,777 tonnes CO_2e**		**5%**

Overall greenhouse gas emissions increased by five percent in a five year period (2002 - 2007) from 2,637 tonnes to 2,767 tonnes CO_2e

CHANGES IN ENERGY & COSTS FROM 2002 - 2007: The overall increase in energy consumption is six percent from 2002 to 2007, whereas increases in costs for energy are 31 percent (see table below). Increases in energy consumption are due to the addition and/or expansion of city-owned buildings and engineering assets. Increases for costs for consumption are also due to additions and/or expansions, as well as increases in costs for energy.

Parameter	2002	2007	Percent Change 2002-2007
Energy Consumption	65,537 GJ	69,312 GJ	6%
Energy Costs	$786,528	$1,030,215	31%

FORECASTS FOR GHGs, ENERGY, & COSTS FOR 2007 - 2017: Overall corporate energy consumption is forecast to increase by three percent from 2007 to 2017 which is a small increase and consistent with the absence of new building stock in the capital plan. Overall costs for corporate energy are forecast to increase by 158 percent due to the forecasted increase in the unit cost for electricity, natural gas, and automotive fuel. Overall emissions are forecast to increase by 5 percent, higher than the forecast for energy due to the difference in energy types in each of the sectors (electricity and natural gas consumption vary between sectors that are forecast to increase by different amounts). The forecasts for corporate energy consumption, costs, and emissions are summarized in the table that follows.

Forecasted Parameter	Corporate Comparison Year	Corporate Base Year	Corporate Forecast Year	Corporate Percent Increase
	2002	2007	2017	2007-2017
Energy Consumption	65,537 GJ	69,312 GJ	71,298 GJ	3%
Energy Costs	$786,528	$1,030,215	$2,658,930	158%
Emissions	2,637 tonnes CO_2e	2,777	2,914	5%

SUMMARY OF GHG REDUCTIONS FOR PROJECT PERIOD: The City of Port Coquitlam can reduce its 2007 base year emissions quantity of 2,777 tonnes CO_2e by 623 tonnes or 20% by 2017. Interviews with city staff confirm that the reduction quantity is achievable and should be explored further within reasonable program resources and a commitment from Council and management to undertake the programs proposed herein.

Sector	Base Year Emissions (tonnes CO_2e)	Reduction of GHG Emissions Complete	GHG Projection (tonnes CO_2e)	Potential Reduction of GHG Emissions after Projected Growth	GHG Emissions After Measures	Percent Reduction of Projected Emissions
	2007	2002-2007	2017			
Building	1,302	0	1,337	425	912	-30%
Lighting[1]	40	5	49	15	34	-15%
Water and Wastewater[2]	37	0	40	4	36	-3%
Fleet[3]	981	0	1,043	159	884	-10%
Solid Waste	417	0	375	20	355	-15%
TOTAL	2,777	5	2,844	623	2,221	-20%

[1]LEDs for ornamental and overhead lighting are currently too expensive to be cost effective, although this may change in the near future and should be monitored by staff.

[2]An estimate is provided in the water and wastewater sector, since the volume of potable water and wastewater was not available, and must be used as an indicator for specific measures.

[3]The reductions for the vehicle fleet are aggressive and assume biodiesel will replace conventional diesel fuel by 2012.

In order to achieve this target, it is recommended that Council approve the emissions reduction quantity for the city's operations as follows:

An emission reduction target of 623 tonnes CO_2e, an amount that will reduce emissions by 20 percent below 2007 levels by 2017, is recommended for adoption as the city's corporate operations objective

Community

The City of Port Coquitlam has also calculated its community energy consumption and GHG emissions for the base year (2007) and a comparison inventory year (2002).

CHANGES IN GHGs FROM 2002 - 2007: The overall percent change in GHG emissions is an increase of 23 percent in a five year period. Inventory results are shown in the table below.

Sector	Energy Type/Unit	Consumption	CO_2e (t)	Total CO_2e (t)	Consumption	CO_2e (t)	Total CO2e (t)	Overall Percent Change
		2002			2007			02-07
Buildings	Elect (kWh)	357,513,316	8,580	119,845	401,891,268	8,243	135,002	+12%
	Nat Gas (GJ)	2,175,293	111,265		2,458,644	125,758		
On Road Transportation	Gasoline (L)	42,961,571	12,226	120,225	53,399,986	133,360	165,076	+37%
	Diesel (L)	4,413,061	107,291		11,293,133	31,388		
	Propane (L)	439,793	669		215,690	328		
Solid Waste	Tonnes	-	12,638	12,638	-	9,948	9,948	-21%
TOTAL		252,708			310,025			**+23%**

Overall greenhouse gas emissions increased by 23 percent in a five year period (2002 to 2007) from 252,708 tonnes to 310,025 tonnes CO_2e

FORECASTS FOR ENERGY & GHGs FOR 2007 - 2017: Overall energy consumption is forecasted to increase by 10 percent and overall greenhouse gas emissions are forecasted to increase by 10 percent by 2017 (see table below).

Forecasted Parameter	Community Base Year	Community Year	Community Forecast Year	Percent Increase
	2002	2007	2017	2007 - 2017
Energy Consumption	5,133,217 GJ	6,198,574 GJ	6,808,955 GJ	10%
Emissions	252,708 tonnes CO_2e	310,025 tonnes CO_2e	340,495 tonnes CO_2e	10%

SUMMARY OF GHG REDUCTIONS FOR PROJECT PERIOD: The City of Port Coquitlam can reduce its GHG emissions from its 2007 base year quantity of 312,033 tonnes CO_2e by eight percent by the year 2017 (see table below).

Sector		Base Year Emissions (tonnes CO_2e)	GHG Projection (tonnes CO_2e)	Potential Reduction of GHG Emissions after Projected Growth	GHG Emissions After Measures	Percent Reduction of Projected Emissions
		2007	2017			
Buildings	Residential	68,485	74,226	12,037	62,189	**-9%**
	Commercial	39,320	40,335	4,974	35,361	**-10%**
	Industrial	27,197	36,202	5,845	30,357	**12%**
On-the-road Transportation		165,076	179,784	30,657	149,127	**-10%**
Solid Waste		9,948	9,948	0	9,948	**0%**
	TOTAL	**312,033**	**342,512**	**53,513**	**286,982**	**-8%**

In order to achieve this target, it is recommended that Council approve the emissions reduction quantity for the community as follows:

An emission reduction target of 53,513 tonnes CO_2e, an amount that will reduce overall GHGs by eight percent below 2007 levels by 2017, is recommended for adoption as the city's community operations objective.

REFERENCES

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ISO (2006), Draft International Standard ISO/TC 207 WG5 N162. Greenhouse gases - Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals. 28pp.

IPCC (2006), IPCC Guidelines for National Greenhouse Gas Inventories, Prepared by the National. Greenhouse Gas Inventories Programme, Eggleston H.S., Buendia L., Miwa K., Ngara T. and Tanabe K. (eds). Published: IGES, Japan.

GLOSSARY OF TERMS (IPCC 2006)

Carbon dioxide (CO_2): A naturally occurring gas; also a by-product of burning fossil fuels and biomass, as well as land use changes and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the earth's radiative balance. It is the reference gas against which other greenhouse gases are measured and therefore has a Global Warming Potential of 1.

Climate change: A statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.

Note that the Framework Convention on Climate Change (UNFCCC), in its Article 1, defines "climate change" as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods." The UNFCCC thus makes a distinction between "climate change" attributable to human activities altering the atmospheric composition and "climate variability" attributable to natural causes.

Emissions factor: The estimated average emission rate of a given greenhouse gas for a given source.

Equivalent CO_2 (CO_2e): The concentration of CO_2 that would cause the same amount of radiative forcing as a given mixture of CO_2 and other greenhouse gases.

GJ (GigaJoules): A Canadian unit of heating value equivalent to 943,213.3 Btu. The standard gas unit in Canada will be the gigajoule pursuant to GISB under Order 587-A (1997). The Gigajoule is the standard unit of natural gas heating measurement in Canada. A gigajoule (GJ) is a metric term used for measuring energy use. For example, 1 GJ is equal to 277.8 kWh of electricity, 26.9 m^3 of natural gas, 25.9 litres of heating oil. Similar to the energy released when burning a million wooden matches, a gigajoule of gas will cook over 2500 hamburgers, and a gigajoule of electricity will keep a 60-watt bulb continuously lit for six months.

Greenhouse gas: Gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. This property of greenhouse gases causes the greenhouse effect. Water vapour (H_2O), carbon dioxide (CO2), nitrous oxide (N_2O), methane (CH_4) and ozone (O_3) are the primary greenhouse gases in the Earth's atmosphere. Moreover, there are a number of entirely human-made greenhouse gases in the atmosphere, such as the halocarbons and other chlorine- and bromine-containing substances, dealt with under the Montreal Protocol. Besides CO_2, N_2O, and CH_4, the Kyoto Protocol deals with the greenhouse gases sulphur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs).

Methane (CH_4): An odorless, colorless, flammable gas, CH_4, the major constituent of natural gas, that is used as a fuel and is an important source of hydrogen and a wide variety of organic compounds.

Nitrous oxide (N_2O): A powerful greenhouse gas with a global warming potential most recently evaluated at 310. Major sources of nitrous oxide include soil cultivation practices, especially the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning.

Appendix A1 - Detailed Summary of Corporate Energy and Emissions: 2002

CITY OF PORT COQUITLAM

Port Coquitlam

Corporate Energy & Greenhouse Gas Emissions Inventory: 2002

Account & Address	Account Consumption & Costs by Energy Type					Account Subtotal		
	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
2002								
BUILDINGS								
Administration Offices								
City Hall - 2580 Shaughnessy St	Electricity	512,542 kWh	1,845 GJ	$21,998	12.3 t	3,035 GJ	$30,052	73.2 t
	Natural Gas	1,190 GJ	1,190 GJ	$8,054	60.9 t			
Old Parks And Rec Bldg - 2253 Leigh Sq	Electricity	25,382 kWh	91 GJ	$1,697	0.6 t	91 GJ	$1,697	0.6 t
Terry Fox Library - 2470 Mary Hill Rd	Electricity	171,359 kWh	617 GJ	$10,937	4.1 t	1,124 GJ	$14,371	30.1 t
	Natural Gas	507 GJ	507 GJ	$3,434	25.9 t			
Administration Offices Subtotal	Electricity	709,283 kWh	2,553 GJ	$34,632	17.0 t	***4,250 GJ***	***$46,120***	***103.8 t***
	Natural Gas	1,697 GJ	1,697 GJ	$11,488	86.8 t			
Arts | Cultural Centre								
The Outlet - 2250 Mcallister Ave	Electricity	15,912 kWh	57 GJ	$1,087	0.4 t	105 GJ	$1,596	2.8 t
	Natural Gas	47 GJ	47 GJ	$509	2.4 t			
Arts | Cultural Centre Subtotal	Electricity	15,912 kWh	57 GJ	$1,087	0.4 t	***105 GJ***	***$1,596***	***2.8 t***
	Natural Gas	47 GJ	47 GJ	$509	2.4 t			
Community Centre								
Women's Centre - 2420 Mary Hill Rd	Electricity	8,052 kWh	29 GJ	$506	0.2 t	91 GJ	$1,270	3.4 t
	Natural Gas	62 GJ	62 GJ	$764	3.2 t			
Community Centre Subtotal	Electricity	8,052 kWh	29 GJ	$506	0.2 t	***91 GJ***	***$1,270***	***3.4 t***
	Natural Gas	62 GJ	62 GJ	$764	3.2 t			
Fire Services								

Port Coquitlam

Corporate Energy & Greenhouse Gas Emissions Inventory: 2002

Account & Address	Account Consumption & Costs by Energy Type					Account Subtotal		
	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
Fire Hall No. 1 - 1725 Broadway St	Electricity	156,428 kWh	563 GJ	$10,153	3.8 t	1,574 GJ	$16,999	55.5 t
	Natural Gas	1,011 GJ	1,011 GJ	$6,846	51.7 t			
Fire Hall No. 2 - 3196 Toronto St	Electricity	78,811 kWh	284 GJ	$5,165	1.9 t	1,076 GJ	$10,530	42.4 t
	Natural Gas	793 GJ	793 GJ	$5,365	40.5 t			
Firehall Smokehouse - 1725 Broadway St	Electricity	328 kWh	1 GJ	$79	0.0 t	1 GJ	$79	0.0 t
Fire Services Subtotal	Electricity	235,567 kWh	848 GJ	$15,397	5.7 t	***2,652 GJ***	***$27,608***	***97.9 t***
	Natural Gas	1,804 GJ	1,804 GJ	$12,211	92.3 t			
Ice Arenas								
Poco Rec Complex & Wilsons Seniors Centre - 2150 Wilson Ave	Electricity	1,992,990 kWh	7,175 GJ	$67,165	47.8 t	12,780 GJ	$105,109	334.5 t
	Natural Gas	5,605 GJ	5,605 GJ	$37,944	286.7 t			
Ice Arenas Subtotal	Electricity	1,992,990 kWh	7,175 GJ	$67,165	47.8 t	***12,780 GJ***	***$105,109***	***334.5 t***
	Natural Gas	5,605 GJ	5,605 GJ	$37,944	286.7 t			
Indoor Pools								
Hyde Creek Recreation Centre - 1379 Laurier Ave	Electricity	1,622,369 kWh	5,841 GJ	$56,617	38.9 t	15,143 GJ	$158,939	514.7 t
	Natural Gas	9,302 GJ	9,302 GJ	$102,322	475.8 t			
Indoor Pools Subtotal	Electricity	1,622,369 kWh	5,841 GJ	$56,617	38.9 t	***15,143 GJ***	***$158,939***	***514.7 t***
	Natural Gas	9,302 GJ	9,302 GJ	$102,322	475.8 t			
Misc.								
Port Coquitlam Heritage & Cultural Society - 2581 Mary Hill Rd 108	Electricity	7,651 kWh	28 GJ	$546	0.2 t	118 GJ	$1,158	4.8 t
	Natural Gas	90 GJ	90 GJ	$612	4.6 t			
Misc. Subtotal	Electricity	7,651 kWh	28 GJ	$546	0.2 t	***118 GJ***	***$1,158***	***4.8 t***
	Natural Gas	90 GJ	90 GJ	$612	4.6 t			
Misc. Bldgs								
Cemetary - 4000 Oxford St	Electricity	9,315 kWh	34 GJ	$654	0.2 t	34 GJ	$654	0.2 t
Wilsons Seniors Centre - 2150 Wilson Ave				$198			$198	0.0 t
	Identify consumption load							

Hyla Environmental Services Ltd., 400 Capilano Road, #1708, Port Moody, BC V3H 0E1 rhaycock@hesltd.ca M: 604.469.2910 F: 604.469.2940

Port Coquitlam

Corporate Energy & Greenhouse Gas Emissions Inventory: 2002

Account & Address	Account Consumption & Costs by Energy Type					Account Subtotal		
	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
Misc. Bldgs Subtotal	Electricity	9,315 kWh	34 GJ	$853	0.2 t	***34 GJ***	***$853***	***0.2 t***
Outdoor Pools								
Centennial Park Pool - 3050 Shaughnessy St	Electricity	31,454 kWh	113 GJ	$2,091	0.8 t	909 GJ	$7,480	41.5 t
	Natural Gas	796 GJ	796 GJ	$5,389	40.7 t			
Centennial Park Pool - Flint St				$74			$74	0.0 t
Robert Hope Pool - 2159 Lamprey Dr	Electricity	9,750 kWh	35 GJ	$698	0.2 t	455 GJ	$4,861	21.7 t
	Natural Gas	420 GJ	420 GJ	$4,163	21.5 t			
Routley Pool - 2140 Audrey Dr	Electricity	7,798 kWh	28 GJ	$556	0.2 t	192 GJ	$2,256	8.6 t
	Natural Gas	164 GJ	164 GJ	$1,701	8.4 t			
Sun Valley Park Pool - Hamilton St	Electricity	4,338 kWh	16 GJ	$331	0.1 t	148 GJ	$1,730	6.9 t
	Natural Gas	132 GJ	132 GJ	$1,399	6.7 t			
Outdoor Pools Subtotal	Electricity	53,341 kWh	192 GJ	$3,750	1.3 t	***1,704 GJ***	***$16,401***	***78.6 t***
	Natural Gas	1,512 GJ	1,512 GJ	$12,651	77.3 t			
Parks & Playing Fields								
Cameron Park - 1842 Morgan Ave	Electricity	96 kWh	0 GJ	$73	0.0 t	0 GJ	$73	0.0 t
Castle Park - 1000 Citadel Dr	Electricity	19,701 kWh	71 GJ	$1,328	0.5 t	88 GJ	$1,446	1.4 t
	Natural Gas	18 GJ	18 GJ	$118	0.9 t			
Cedar Park - 900 Prairie Ave	Electricity	13,454 kWh	48 GJ	$923	0.3 t	77 GJ	$1,117	1.8 t
	Natural Gas	29 GJ	29 GJ	$194	1.5 t			
Confederation Park - 1250 Confederation	Electricity	10,375 kWh	37 GJ	$723	0.2 t	98 GJ	$1,138	3.4 t
	Natural Gas	61 GJ	61 GJ	$415	3.1 t			
Gates Park #1 - 2400 Reeve Street	Electricity	87,825 kWh	316 GJ	$5,319	2.1 t	316 GJ	$5,319	2.1 t
Gates Park #2 - 2400 Reeve St	Electricity	63,660 kWh	229 GJ	$4,181	1.5 t	382 GJ	$5,217	9.4 t
	Natural Gas	153 GJ	153 GJ	$1,036	7.8 t			
Lions Park Washrooms - Lions Park	Electricity	5,833 kWh	21 GJ	$662	0.1 t	21 GJ	$662	0.1 t

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Port Coquitlam

Corporate Energy & Greenhouse Gas Emissions Inventory: 2002

Account & Address	Account Consumption & Costs by Energy Type					Account Subtotal		
	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
McLean Park - 3149 Wellington St	Electricity	10,414 kWh	37 GJ	$726	0.2 t	432 GJ	$3,395	20.4 t
	Natural Gas	394 GJ	394 GJ	$2,669	20.2 t			
McLean Park - 3149 Wellington St	Electricity	40 kWh	0 GJ	$74	0.0 t	0 GJ	$74	0.0 t
Thompson Park - 1700 Taylor St	Electricity	12,366 kWh	45 GJ	$852	0.3 t	60 GJ	$1,172	1.1 t
	Natural Gas	16 GJ	16 GJ	$319	0.8 t			
Parks & Playing Fields Subtotal	Electricity	223,765 kWh	806 GJ	$14,862	5.4 t	***1,476 GJ***	***$19,613***	***39.6 t***
	Natural Gas	670 GJ	670 GJ	$4,751	34.3 t			
Police Services								
Community Police Station - 3312 Cst Meridian Rd	Electricity	12,784 kWh	46 GJ	$880	0.3 t	46 GJ	$880	0.3 t
Community Police Station - 2228 Mcallister Ave 107	Electricity	22,066 kWh	79 GJ	$1,482	0.5 t	115 GJ	$1,721	2.3 t
	Natural Gas	35 GJ	35 GJ	$239	1.8 t			
Police Services Subtotal	Electricity	34,850 kWh	125 GJ	$2,362	0.8 t	***161 GJ***	***$2,601***	***2.6 t***
	Natural Gas	35 GJ	35 GJ	$239	1.8 t			
Public Works Bldgs & Yards								
Public Works Yard - 1737 Broadway St	Electricity	617,856 kWh	2,224 GJ	$25,307	14.8 t	5,615 GJ	$48,259	188.2 t
	Natural Gas	3,390 GJ	3,390 GJ	$22,952	173.4 t			
Public Works Bldgs & Yards Subtotal	Electricity	617,856 kWh	2,224 GJ	$25,307	14.8 t	***5,615 GJ***	***$48,259***	***188.2 t***
	Natural Gas	3,390 GJ	3,390 GJ	$22,952	173.4 t			
Buildings Subtotal		Consumption	Energy	Costs	CO_2e	***44,127 GJ***	***$429,527***	***1,371.3 t***
	Electricity	5,530,952 kWh	19,911 GJ	$223,084	132.7 t			
	Natural Gas	24,215 GJ	24,215 GJ	$206,443	1,238.6 t			
LIGHTING								
Ornamental Lighting								
Lombardy Drive Streetlight - 970 Lombardy Dr	Electricity	48 kWh	0 GJ	$3	0.0 t	0 GJ	$3	0.0 t
Ornamental Streetlighting - Ornamental Street Ltg	Electricity	1,493,765 kWh	5,378 GJ	$86,898	35.9 t	5,378 GJ	$86,898	35.9 t

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Port Coquitlam

Corporate Energy & Greenhouse Gas Emissions Inventory: 2002

Account & Address	Account Consumption & Costs by Energy Type					Account Subtotal		
	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
Seymour Street Streetlights - 3155 Seymour St				$311			$311	0.0 t
Ornamental Lighting Subtotal	Electricity	1,493,813 kWh	5,378 GJ	$87,212	35.9 t	***5,378 GJ***	***$87,212***	***35.9 t***
Outdoor Pool Lighting								
Robert Hope Pool - 2159 Lamprey Dr	Electricity	6,198 kWh	22 GJ	$452	0.1 t	22 GJ	$452	0.1 t
Outdoor Pool Lighting Subtotal	Electricity	6,198 kWh	22 GJ	$452	0.1 t	***22 GJ***	***$452***	***0.1 t***
Traffic Signal								
Coast Meridian/Laurier T S - Cst Meridian/Laurier	Electricity	15,269 kWh	55 GJ	$881	0.4 t	55 GJ	$881	0.4 t
Coast Meridian/Prairie T S - Coast Meridian Rd At	Electricity	24,618 kWh	89 GJ	$1,421	0.6 t	89 GJ	$1,421	0.6 t
Coast Meridian|Lincoln Ave T S - Coast Meridian|Lincoln Ave	Electricity	19,119 kWh	69 GJ	$1,103	0.5 t	69 GJ	$1,103	0.5 t
Kingsway/Broadway T S - Kingsway Ave/Broadway	Electricity	6,907 kWh	25 GJ	$399	0.2 t	25 GJ	$399	0.2 t
Kingsway/Wilson T S - Kingsway Ave/Wilson	Electricity	16,032 kWh	58 GJ	$925	0.4 t	58 GJ	$925	0.4 t
Kingsway|Mary Hill Rd T S - Kingsway|Mary Hill Rd	Electricity	15,778 kWh	57 GJ	$910	0.4 t	57 GJ	$910	0.4 t
Lougheed Hwy|Shaughnessy St T S - Lougheed Hwy|Shaughnessy St	Electricity	34,600 kWh	125 GJ	$1,996	0.8 t	125 GJ	$1,996	0.8 t
Mary Hill T S - 1210 Mary Hill Rd	Electricity **Has this signal already been retrofitted?**	20,228 kWh	73 GJ	$1,362	0.5 t	73 GJ	$1,362	0.5 t
Mary Hill/Wilson T S - Mary Hill Wilson	Electricity	9,627 kWh	35 GJ	$556	0.2 t	35 GJ	$556	0.2 t
Pitt River/Mary Hill Bypass T S - Pitt River Rd/Mary	Electricity	14,113 kWh	51 GJ	$814	0.3 t	51 GJ	$814	0.3 t
Pitt River/Mclean T S - Pitt River Rd And	Electricity	8,342 kWh	30 GJ	$481	0.2 t	30 GJ	$481	0.2 t
Pitt River/Reeve T S - Pitt River Rd At	Electricity	9,924 kWh	36 GJ	$573	0.2 t	36 GJ	$573	0.2 t
Prairie T S - 2100 Prairie Ave	Electricity	3,487 kWh	13 GJ	$201	0.1 t	13 GJ	$201	0.1 t
Prairie/Oxford T S - Prairie Ave	Electricity	14,448 kWh	52 GJ	$834	0.3 t	52 GJ	$834	0.3 t
Prairie/Toronto T S - Prairie Ave/Toronto	Electricity	10,483 kWh	38 GJ	$605	0.3 t	38 GJ	$605	0.3 t

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Port Coquitlam

Corporate Energy & Greenhouse Gas Emissions Inventory: 2002

Account & Address	Account Consumption & Costs by Energy Type					Account Subtotal		
	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
Prairie|Cedar T S - Prairie|Cedar	Electricity	3,272 kWh	12 GJ	$189	0.1 t	12 GJ	$189	0.1 t
Prairie|Cedar T S - Prairie|Cedar	Electricity	2,590 kWh	9 GJ	$149	0.1 t	9 GJ	$149	0.1 t
Route 7 At Oxford St - Route 7 At Oxford St	Electricity	16,967 kWh	61 GJ	$979	0.4 t	61 GJ	$979	0.4 t
Route 7|Hastings T S - Route 7|Hastings	Electricity	17,763 kWh	64 GJ	$1,025	0.4 t	64 GJ	$1,025	0.4 t
Rte 7|Cst Meridian Rd T S - Rte 7|Cst Meridian Rd	Electricity	22,053 kWh	79 GJ	$1,272	0.5 t	79 GJ	$1,272	0.5 t
Rte 7|Ottawa St T S - Rte 7|Ottawa St	Electricity	19,332 kWh	70 GJ	$1,115	0.5 t	70 GJ	$1,115	0.5 t
Shaughnessy/Lions T S - Shaughnessy St-Lions	Electricity	12,627 kWh	45 GJ	$729	0.3 t	45 GJ	$729	0.3 t
Shaughnessy/Prairie T S - Shaughnessy St-	Electricity	14,448 kWh	52 GJ	$834	0.3 t	52 GJ	$834	0.3 t
Shaughnessy/Wilson T S - Shaughnessy St	Electricity	16,482 kWh	59 GJ	$951	0.4 t	59 GJ	$951	0.4 t
Shaughnessy|Mcallister T S - Shaughnessy|Mcallistr	Electricity	7,503 kWh	27 GJ	$433	0.2 t	27 GJ	$433	0.2 t
Westwood/Kitchener T S - Westwood St	Electricity	11,872 kWh	43 GJ	$685	0.3 t	43 GJ	$685	0.3 t
Traffic Signal Subtotal	Electricity	367,882 kWh	1,324 GJ	$21,422	8.8 t	***1,324 GJ***	***$21,422***	***8.8 t***
Lighting Subtotal		Consumption	Energy	Costs	CO_2e	***6,724 GJ***	***$109,086***	***44.8 t***
	Electricity	1,867,894 kWh	6,724 GJ	$109,086	44.8 t			
Water & Wastewater								
Deep Water Well - Hatchery								
Hyde Creek Well - 3636 Coast Meridian	Electricity	21,609 kWh	78 GJ	$1,462	0.5 t	78 GJ	$1,462	0.5 t
Deep Water Well - Hatchery Subtotal	Electricity	21,609 kWh	78 GJ	$1,462	0.5 t	***78 GJ***	***$1,462***	***0.5 t***
Drainage Pump Station								
Barberry S T M - 1000 Barberry Dr	Electricity	28,264 kWh	102 GJ	$1,884	0.7 t	102 GJ	$1,884	0.7 t
Cedar S T M - 3915 Cedar Dr	Electricity	19,812 kWh	71 GJ	$1,440	0.5 t	71 GJ	$1,440	0.5 t

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Port Coquitlam

Corporate Energy & Greenhouse Gas Emissions Inventory: 2002

Account & Address	Account Consumption & Costs by Energy Type					Account Subtotal		
	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
Dominion S T M - Dominion Ave E End	Electricity	136,851 kWh	493 GJ	$7,973	3.3 t	493 GJ	$7,973	3.3 t
Ellis S T M - 1088 Ellis Dr Rr	Electricity	1,406 kWh	5 GJ	$141	0.0 t	5 GJ	$141	0.0 t
Harbour Old S T M - Ft Of Argue St	Electricity	40,453 kWh	146 GJ	$2,765	1.0 t	146 GJ	$2,765	1.0 t
Harbour S T M - Harbour Rd E/End Argu	Electricity	90,360 kWh	325 GJ	$6,078	2.2 t	325 GJ	$6,078	2.2 t
Laurier S T M - East End Prairie Ave	Electricity	21,447 kWh	77 GJ	$1,499	0.5 t	77 GJ	$1,499	0.5 t
Maple S T M - Dyke	Electricity	2,964 kWh	11 GJ	$258	0.1 t	11 GJ	$258	0.1 t
Reeve S T M - 2700 Pitt River Rd	Electricity	36,515 kWh	131 GJ	$2,505	0.9 t	131 GJ	$2,505	0.9 t
Shaughnessy Street Underpass Stm - Shaughnsy St Undrps	Electricity	4,025 kWh	14 GJ	$311	0.1 t	14 GJ	$311	0.1 t
Drainage Pump Station Subtotal	Electricity	382,097 kWh	1,376 GJ	$24,855	9.2 t	***1,376 GJ***	***$24,855***	***9.2 t***
Liquid Waste Pump Station								
Ambleside S S P S - E End Ambleside Cls	Electricity	9,248 kWh	33 GJ	$650	0.2 t	33 GJ	$650	0.2 t
Bloomfield S S P S - 3600blk Bloomfield Pl	Electricity	11,621 kWh	42 GJ	$804	0.3 t	42 GJ	$804	0.3 t
Brand S S P S - Brown St	Electricity	18,125 kWh	65 GJ	$1,226	0.4 t	65 GJ	$1,226	0.4 t
Broadway S S P S - Broadway At Maryhill	Electricity	21,916 kWh	79 GJ	$1,472	0.5 t	79 GJ	$1,472	0.5 t
Dominion S S P S - Dominion Ave West Of	Electricity	32,073 kWh	115 GJ	$2,131	0.8 t	115 GJ	$2,131	0.8 t
Freemont S S P S - 702 Prairie Ave	Electricity	43,445 kWh	156 GJ	$2,869	1.0 t	156 GJ	$2,869	1.0 t
Halifax S S P S - 1250 Halifax Pl Pump	Electricity	14,379 kWh	52 GJ	$983	0.3 t	52 GJ	$983	0.3 t
Handley S S P S - Handley Cresc	Electricity	61,935 kWh	223 GJ	$4,069	1.5 t	223 GJ	$4,069	1.5 t
Hyde S S P S - 1236 Lynwood Ave	Electricity	14,607 kWh	53 GJ	$998	0.4 t	53 GJ	$998	0.4 t
Kingsway S S P S - 1165 Kingsway Ave	Electricity	5,568 kWh	20 GJ	$411	0.1 t	20 GJ	$411	0.1 t
Langan S S P S - 1681 Langan Ave	Electricity	26,567 kWh	96 GJ	$1,774	0.6 t	96 GJ	$1,774	0.6 t
Lynwood S S P S - 970 Lynwood Ave	Electricity	20,053 kWh	72 GJ	$1,351	0.5 t	72 GJ	$1,351	0.5 t

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Corporate Energy & Greenhouse Gas Emissions Inventory: 2002

Account & Address	Account Consumption & Costs by Energy Type					Account Subtotal		
	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
Nacht S S P S - Mcchessney N Nacht	Electricity	16,059 kWh	58 GJ	$1,092	0.4 t	58 GJ	$1,092	0.4 t
Pitt River S S P S - 2400 Pitt River Rd	Electricity	35,888 kWh	129 GJ	$2,379	0.9 t	129 GJ	$2,379	0.9 t
Shaughnessy/Citadel S S P S - Shaughnessy/Citadel	Electricity	108,232 kWh	390 GJ	$7,177	2.6 t	390 GJ	$7,177	2.6 t
Trenton S S P S - 800 Kingsway Ave	Electricity	2,565 kWh	9 GJ	$216	0.1 t	9 GJ	$216	0.1 t
Westview S S P S - Shaughnessy St And	Electricity	37,655 kWh	136 GJ	$2,494	0.9 t	136 GJ	$2,494	0.9 t
Liquid Waste Pump Station Subtotal	Electricity	479,933 kWh	1,728 GJ	$32,098	11.5 t	***1,728 GJ***	***$32,098***	***11.5 t***
Potable Water Pump Station								
Citadel P W P S - 1241 Ricard Pl	Electricity	20,873 kWh	75 GJ	$401	0.5 t	200 GJ	$1,245	6.9 t
	Natural Gas	125 GJ	125 GJ	$844	6.4 t			
Penny Place P W P S - Penny Place	Electricity	24,793 kWh	89 GJ	$1,659	0.6 t	89 GJ	$1,659	0.6 t
Potable Water Pump Station Subtotal	Electricity	45,666 kWh	164 GJ	$2,060	1.1 t	***289 GJ***	***$2,904***	***7.5 t***
	Natural Gas	125 GJ	125 GJ	$844	6.4 t			
PRV Station								
Coquitlam Ave P R V - Coquitlam Ave	Electricity	1,321 kWh	5 GJ	$135	0.0 t	5 GJ	$135	0.0 t
Mary Hill P R V - Rear 1716 Mar	Electricity	465 kWh	2 GJ	$57	0.0 t	2 GJ	$57	0.0 t
Mason/Oxford P R V - Mason At Oxford	Electricity	1,881 kWh	7 GJ	$172	0.0 t	7 GJ	$172	0.0 t
Sandra Way Opp P R V - Sandra Way Opp 2158	Electricity	1,395 kWh	5 GJ	$140	0.0 t	5 GJ	$140	0.0 t
PRV Station Subtotal	Electricity	5,062 kWh	18 GJ	$504	0.1 t	***18 GJ***	***$504***	***0.1 t***
Water & Wastewater Subtotal		Consumption	Energy	Costs	CO_2e	***3,488 GJ***	***$61,822***	***28.8 t***
	Electricity	934,368 kWh	3,364 GJ	$60,978	22.4 t			
	Natural Gas	125 GJ	125 GJ	$844	6.4 t			

Vehicle Fleet

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Port Coquitlam

Corporate Energy & Greenhouse Gas Emissions Inventory: 2002

Account & Address	Account Consumption & Costs by Energy Type					Account Subtotal		
	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
Diesel Fuel Vehicles								
Heavy Fire Dept. Truck - -	Diesel Fuel	23,716 litres	917 GJ	$13,992	65.9 t	917 GJ	$13,992	65.9 t
Heavy Truck Or Van - -	Gasoline	40,069 litres	1,389 GJ	$26,045	100.1 t	6,567 GJ	$105,025	472.1 t
	Diesel Fuel	133,865 litres	5,178 GJ	$78,980	372.1 t			
Tractors, Graders, Backhoes, Loaders - -	Diesel Fuel	18,939 litres	733 GJ	$11,174	52.6 t	733 GJ	$11,174	52.6 t
Diesel Fuel Vehicles Subtotal	Gasoline	40,069 litres	1,389 GJ	$26,045	100.1 t	***8,217 GJ***	***$130,191***	***590.7 t***
	Diesel Fuel	176,520 litres	6,828 GJ	$104,146	490.6 t			
Gasoline Vehicles								
Light Truck, Van, Suv - -	Gasoline	82,177 litres	2,848 GJ	$53,415	205.2 t	2,848 GJ	$53,415	205.2 t
Light Vehicles - -	Gasoline	3,826 litres	133 GJ	$2,487	9.6 t	133 GJ	$2,487	9.6 t
Gasoline Vehicles Subtotal	Gasoline	86,003 litres	2,981 GJ	$55,902	214.8 t	***2,981 GJ***	***$55,902***	***214.8 t***
Vehicle Fleet Subtotal		Consumption	Energy	Costs	CO_2e	***11,197 GJ***	***$186,093***	***805.5 t***
	Gasoline	126,072 litres	4,370 GJ	$81,947	314.8 t			
	Diesel Fuel	176,520 litres	6,828 GJ	$104,146	490.6 t			
Solid Waste								
Solid Waste								
Admin Annex - 2253 Leigh Sq	Solid Waste		5 cu. yds	0.78	0.4 t			0.4 t
	Estimate. Requires Site Visit							
City Hall - 2580 Shaughnessy St	Solid Waste		624 cu. yds	93.60	49.6 t			49.6 t
Community Police Station X2 - -	Solid Waste		5 cu. yds	0.78	0.4 t			0.4 t
	Estimate							
Fire Hall No. 1 - 1725 Broadway St	Solid Waste		156 cu. yds	23.40	12.4 t			12.4 t
Fire Hall No.2 - 3196 Toronto St	Solid Waste		156 cu. yds	23.40	12.4 t			12.4 t

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Port Coquitlam

Corporate Energy & Greenhouse Gas Emissions Inventory: 2002

Account & Address	Account Consumption & Costs by Energy Type					Account Subtotal		
	Type	Estimation Method	Volume	Mass	CO_2e	Energy	Costs	CO_2e
Hyde Creek Park - Hyde Creek	Solid Waste		624 cu. yds	93.60	49.6 t			49.6 t
Lions Park - Lions Park	Solid Waste		416 cu. yds	62.40	33.1 t			33.1 t
Maclean Park - 3149 Wellington St	Solid Waste		832 cu. yds	124.80	66.1 t			66.1 t
Outdoor Pools/Parks & Sportsfields - Combined	Solid Waste	Estimate	5 cu. yds	0.78	0.4 t			0.4 t
Poco Rec Complex & Wilsons Seniors Centre - 2150 Wilson Ave	Solid Waste		1,248 cu. yds	187.20	99.2 t			99.2 t
Port Coquitlam Heritage & Cultural Society - 2581 Mary Hill Rd 108	Solid Waste	Estimate	3 cu. yds	0.39	0.2 t			0.2 t
Public Works Yard - 2581 Mary Hill Rd 108	Solid Waste		624 cu. yds	93.60	49.6 t			49.6 t
Terry Fox Library - 2470 Mary Hill Rd	Solid Waste		156 cu. yds	23.40	12.4 t			12.4 t
The Outlet (Old Post Office) - 2250 Mcallister Ave	Solid Waste	Estimate. Requires Site Visit	3 cu. yds	0.39	0.2 t			0.2 t
Solid Waste Subtotal	Solid Waste		4,857 cu. yds	728.52	386.1 t			***386.1 t***

Solid Waste Subtotal		Volume	Mass	CO_2e			***386.1 t***
	Solid Waste	4,857 cu. yds	728.52 t	386.1 t			

Total	Type	Consumption	Energy	Costs	CO_2e	***65,537 GJ***	***$786,528***	***2,636.6 t***
	Electricity	8,333,214 kWh	30,000 GJ	$393,148	200.0 t			
	Natural Gas	24,340 GJ	24,340 GJ	$207,287	1,245.0 t			
	Gasoline	126,072 litres	4,370 GJ	$81,947	314.8 t			
	Diesel Fuel	176,520 litres	6,828 GJ	$104,146	490.6 t			
			Volume	Mass	CO_2e			
	Solid Waste		4,857 cu. yds	728.52 t	386.1 t			

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Appendix A2 - Detailed Summary of Corporate Energy and Emissions: 2007

CITY OF PORT COQUITLAM

Port Coquitlam

Corporate Energy & Greenhouse Gas Emissions Inventory: 2007

Account & Address	Account Consumption & Costs by Energy Type					Account Subtotal		
	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
2007								
BUILDINGS								
Administration Offices								
ADMIN ANNEX - 2253 LEIGH SQ	Electricity	114,175 kWh	411 GJ	$7,950	2.6 t	868 GJ	$13,180	26.0 t
	Natural Gas	457 GJ	457 GJ	$5,230	23.4 t			
	Addition. Two natural gas accounts. One billed to 2564 Shaughnessy							
CITY HALL - 2580 SHAUGHNESSY ST	Electricity	486,222 kWh	1,750 GJ	$22,024	11.2 t	3,252 GJ	$45,113	88.0 t
	Natural Gas	1,501 GJ	1,501 GJ	$23,089	76.8 t			
TERRY FOX LIBRARY - 2470 MARY HILL RD	Electricity	139,593 kWh	503 GJ	$9,716	3.2 t	1,059 GJ	$16,737	31.7 t
	Natural Gas	557 GJ	557 GJ	$7,021	28.5 t			
Administration Offices Subtotal	Electricity	739,989 kWh	2,664 GJ	$39,690	17.0 t	***5,179 GJ***	***$75,029***	***145.7 t***
	Natural Gas	2,515 GJ	2,515 GJ	$35,340	128.7 t			
Arts | Cultural Centre								
THE OUTLET - 2250 MCALLISTER AVE	Electricity	134,636 kWh	485 GJ	$8,262	3.1 t	830 GJ	$12,373	20.8 t
	Natural Gas	345 GJ	345 GJ	$4,111	17.7 t			
	Renovation							
Arts | Cultural Centre Subtotal	Electricity	134,636 kWh	485 GJ	$8,262	3.1 t	***830 GJ***	***$12,373***	***20.8 t***
	Natural Gas	345 GJ	345 GJ	$4,111	17.7 t			
Bridge Deck Heat Coil								
HEATED PEDESTRIAN BRIDGE - LOUGHEED	Electricity	120 kWh	0 GJ	$63	0.0 t	0 GJ	$63	0.0 t
Bridge Deck Heat Coil Subtotal	Electricity	120 kWh	0 GJ	$63	0.0 t	***0 GJ***	***$63***	***0.0 t***
Community Centre								

Port Coquitlam

Corporate Energy & Greenhouse Gas Emissions Inventory: 2007

Account & Address	Account Consumption & Costs by Energy Type					Account Subtotal		
	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
Women's Centre - 2420 Mary Hill Rd	Electricity	6,484 kWh	23 GJ	$440	0.1 t	112 GJ	$1,580	4.7 t
	Natural Gas	88 GJ	88 GJ	$1,140	4.5 t			
Community Centre Subtotal	Electricity	6,484 kWh	23 GJ	$440	0.1 t	***112 GJ***	***$1,580***	***4.7 t***
	Natural Gas	88 GJ	88 GJ	$1,140	4.5 t			
Fire Services								
Fire Hall No. 1 - 1725 Broadway St	Electricity	169,808 kWh	611 GJ	$11,685	3.9 t	1,568 GJ	$22,232	52.9 t
	Natural Gas	957 GJ	957 GJ	$10,547	48.9 t			
Fire Hall No. 2 - 3196 Toronto St	Electricity	102,484 kWh	369 GJ	$7,133	2.4 t	1,241 GJ	$16,928	46.9 t
	Natural Gas	872 GJ	872 GJ	$9,795	44.6 t			
Firehall Smokehouse - 1725 Broadway St	Electricity	20,686 kWh	74 GJ	$1,481	0.5 t	74 GJ	$1,481	0.5 t
Fire Services Subtotal	Electricity	292,978 kWh	1,055 GJ	$20,299	6.7 t	***2,883 GJ***	***$40,641***	***100.3 t***
	Natural Gas	1,829 GJ	1,829 GJ	$20,342	93.5 t			
Ice Arenas								
Poco Rec Complex & Wilsons Seniors Centre - 2150 Wilson Ave	Electricity	1,943,618 kWh	6,997 GJ	$68,504	44.7 t	13,159 GJ	$84,297	359.9 t
	Natural Gas	6,162 GJ	6,162 GJ	$15,793	315.2 t			
Ice Arenas Subtotal	Electricity	1,943,618 kWh	6,997 GJ	$68,504	44.7 t	***13,159 GJ***	***$84,297***	***359.9 t***
	Natural Gas	6,162 GJ	6,162 GJ	$15,793	315.2 t			
Indoor Pools								
Hyde Creek Recreation Centre - 1379 Laurier Ave	Electricity	1,715,075 kWh	6,174 GJ	$63,490	39.4 t	13,485 GJ	$148,704	413.4 t
	Natural Gas	7,311 GJ	7,311 GJ	$85,214	374.0 t			
Indoor Pools Subtotal	Electricity	1,715,075 kWh	6,174 GJ	$63,490	39.4 t	***13,485 GJ***	***$148,704***	***413.4 t***
	Natural Gas	7,311 GJ	7,311 GJ	$85,214	374.0 t			
Misc.								
Port Coquitlam Heritage & Cultural Society - 2581 Mary Hill Rd 108	Electricity	5,951 kWh	21 GJ	$460	0.1 t	104 GJ	$1,765	4.4 t
	Natural Gas	82 GJ	82 GJ	$1,305	4.2 t			
Misc. Subtotal	Electricity	5,951 kWh	21 GJ	$460	0.1 t	***104 GJ***	***$1,765***	***4.4 t***
	Natural Gas	82 GJ	82 GJ	$1,305	4.2 t			

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	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
Misc. Bldgs								
Cemetary - 4000 Oxford St	Electricity	9,657 kWh	35 GJ	$718	0.2 t	35 GJ	$718	0.2 t
Wilsons Seniors Centre - 2150 Wilson Ave	Electricity	1,570 kWh	6 GJ	$204	0.0 t	6 GJ	$204	0.0 t
Misc. Bldgs Subtotal	Electricity	11,227 kWh	40 GJ	$923	0.3 t	***40 GJ***	***$923***	***0.3 t***
Outdoor Pools								
Centennial Park Pool - 3050 Shaughnessy St	Electricity	34,387 kWh	124 GJ	$2,425	0.8 t	150 GJ	$3,052	2.1 t
	Natural Gas	26 GJ	26 GJ	$627	1.3 t			
Centennial Park Pool - Flint St				$71			$71	0.0 t
Robert Hope Pool - 2159 Lamprey Dr	Electricity	12,770 kWh	46 GJ	$945	0.3 t	441 GJ	$6,125	20.5 t
	Natural Gas	395 GJ	395 GJ	$5,181	20.2 t			
Routley Pool - 2140 Audrey Dr	Electricity	9,099 kWh	33 GJ	$680	0.2 t	219 GJ	$3,280	9.7 t
	Natural Gas	186 GJ	186 GJ	$2,600	9.5 t			
Sun Valley Park Pool - Hamilton St	Electricity	4,611 kWh	17 GJ	$367	0.1 t	199 GJ	$2,915	9.4 t
	Natural Gas	182 GJ	182 GJ	$2,548	9.3 t			
Outdoor Pools Subtotal	Electricity	60,866 kWh	219 GJ	$4,488	1.4 t	***1,008 GJ***	***$15,443***	***41.7 t***
	Natural Gas	789 GJ	789 GJ	$10,956	40.3 t			
Parks & Playing Fields								
Cameron Park - 1842 Morgan Ave				$76			$76	0.0 t
Castle Park - 1000 Citadel Dr	Electricity	16,290 kWh	59 GJ	$1,179	0.4 t	59 GJ	$1,179	0.4 t
Cedar Park - 900 Prairie Ave	Electricity	23,626 kWh	85 GJ	$1,685	0.5 t	106 GJ	$2,239	1.6 t
	Natural Gas	21 GJ	21 GJ	$554	1.1 t			
Confederation Park - 1250 Confederation	Electricity	8,188 kWh	29 GJ	$615	0.2 t	29 GJ	$615	0.2 t
Gates Park #1 - 2400 Reeve Street	Electricity	335,528 kWh	1,208 GJ	$17,539	7.7 t	1,383 GJ	$19,950	16.7 t
	Natural Gas	175 GJ	175 GJ	$2,411	9.0 t			

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Gates Park #2 - 2400 Reeve St	Electricity	77,731 kWh	280 GJ	$5,435	1.8 t	469 GJ	$7,785	11.5 t
	Natural Gas	189 GJ	189 GJ	$2,350	9.7 t			
Lions Park Washrooms - Lions Park	Electricity	11,281 kWh	41 GJ	$964	0.3 t	41 GJ	$964	0.3 t
Mclean Park - 3149 Wellington St	Electricity	5,824 kWh	21 GJ	$451	0.1 t	119 GJ	$1,956	5.2 t
	Natural Gas	98 GJ	98 GJ	$1,505	5.0 t			
Mclean Park - 3149 Wellington St				$71			$71	0.0 t
Skateboard Park - 2300 Lions Way	Electricity	2,991 kWh	11 GJ	$256	0.1 t	11 GJ	$256	0.1 t
Thompson Park - 1700 Taylor St	Electricity	9,531 kWh	34 GJ	$709	0.2 t	82 GJ	$1,603	2.7 t
	Natural Gas	48 GJ	48 GJ	$893	2.4 t			
Parks & Playing Fields Subtotal	Electricity	490,990 kWh	1,768 GJ	$28,981	11.3 t	***2,300 GJ***	***$36,694***	***38.5 t***
	Natural Gas	532 GJ	532 GJ	$7,713	27.2 t			
Police Services								
Community Police Station - 3312 Cst Meridian Rd	Electricity	12,925 kWh	47 GJ	$945	0.3 t	47 GJ	$945	0.3 t
Community Police Station - 2228 Mcallister Ave 107	Electricity	12,892 kWh	46 GJ	$941	0.3 t	111 GJ	$2,025	3.6 t
	Natural Gas	64 GJ	64 GJ	$1,084	3.3 t			
	identified from account appearing in NG match layout							
Police Services Subtotal	Electricity	25,818 kWh	93 GJ	$1,886	0.6 t	***157 GJ***	***$2,970***	***3.9 t***
	Natural Gas	64 GJ	64 GJ	$1,084	3.3 t			
Public Works Bldgs & Yards								
Operation Centre - 1737 Broadway St	Electricity	662,575 kWh	2,385 GJ	$28,334	15.2 t	5,379 GJ	$66,608	168.4 t
	Natural Gas	2,994 GJ	2,994 GJ	$38,274	153.1 t			
Public Works Bldgs & Yards Subtotal	Electricity	662,575 kWh	2,385 GJ	$28,334	15.2 t	***5,379 GJ***	***$66,608***	***168.4 t***
	Natural Gas	2,994 GJ	2,994 GJ	$38,274	153.1 t			
Buildings Subtotal		Consumption	Energy	Costs	CO_2e	***44,637 GJ***	***$487,092***	***1,301.8 t***
	Electricity	6,090,327 kWh	21,925 GJ	$265,820	140.1 t			
	Natural Gas	22,711 GJ	22,711 GJ	$221,272	1,161.7 t			

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Account & Address	Account Consumption & Costs by Energy Type					Account Subtotal		
	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
LIGHTING								
Ornamental Lighting								
Argue Street Streetlights - 2381 Argue St|Ifo	Electricity	8,343 kWh	30 GJ	$628	0.2 t	30 GJ	$628	0.2 t
Lombardy Drive Streetlight - 970 Lombardy Dr	Electricity **Confirmed - Ornamental Streetlight**	48 kWh	0 GJ	$3	0.0 t	0 GJ	$3	0.0 t
Ornamental Streetlighting - Ornamental Street Ltg	Electricity	1,584,594 kWh	5,705 GJ	$104,608	36.4 t	5,705 GJ	$104,608	36.4 t
Seymour Street Streetlights - 3155 Seymour St	Electricity **Identified as street light by Steve Brown - April 2/08**	1,374 kWh	5 GJ	$310	0.0 t	5 GJ	$310	0.0 t
Ornamental Lighting Subtotal	Electricity	1,594,359 kWh	5,740 GJ	$105,549	36.7 t	***5,740 GJ***	***$105,549***	***36.7 t***
Outdoor Pool Lighting								
Robert Hope Pool - 2159 Lamprey Dr	Electricity	3,523 kWh	13 GJ	$293	0.1 t	13 GJ	$293	0.1 t
Outdoor Pool Lighting Subtotal	Electricity	3,523 kWh	13 GJ	$293	0.1 t	***13 GJ***	***$293***	***0.1 t***
Parking Lot Lighting (open)								
Parking Lot Lighting - 2251 Mcallister Ave	Electricity	3,953 kWh	14 GJ	$322	0.1 t	14 GJ	$322	0.1 t
Parking Lot Lighting (open) Subtotal	Electricity	3,953 kWh	14 GJ	$322	0.1 t	***14 GJ***	***$322***	***0.1 t***
Traffic Signal								
Coast Meridian/Laurier T S - Cst Meridian/Laurier	Electricity	3,795 kWh	14 GJ	$234	0.1 t	14 GJ	$234	0.1 t
Coast Meridian/Prairie T S - Coast Meridian Rd At	Electricity **Retrofit**	4,223 kWh	15 GJ	$260	0.1 t	15 GJ	$260	0.1 t
Coast Meridian|Lincoln Ave T S - Coast Meridian|Lincoln Ave	Electricity **new account for 2007 inventory**	4,249 kWh	15 GJ	$262	0.1 t	15 GJ	$262	0.1 t
Cst Meridian/Prairie|1 - Cst Meridian/Prairie|1	Electricity	166 kWh	1 GJ	$12	0.0 t	1 GJ	$12	0.0 t

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Cst Meridian|Riverwd T S - Cst Meridian|Riverwd	Electricity new account for 2007 inventory	3,866 kWh	14 GJ	$238	0.1 t	14 GJ	$238	0.1 t
Kingsway/Broadway T S - Kingsway Ave/Broadway	Electricity	3,284 kWh	12 GJ	$202	0.1 t	12 GJ	$202	0.1 t
Kingsway/Wilson T S - Kingsway Ave/Wilson	Electricity	3,658 kWh	13 GJ	$225	0.1 t	13 GJ	$225	0.1 t
Kingsway|Dixon T S - Kingsway|Dixon	Electricity new account for 2007 inventory	2,135 kWh	8 GJ	$132	0.0 t	8 GJ	$132	0.0 t
Kingsway|Mary Hill Rd T S - Kingsway|Mary Hill Rd	Electricity new account for 2007 inventory	3,321 kWh	12 GJ	$205	0.1 t	12 GJ	$205	0.1 t
Lougheed Hwy|Shaughnessy St T S - Lougheed Hwy|Shaughnessy St	Electricity Retrofit. new account for 2007 inventory	5,634 kWh	20 GJ	$347	0.1 t	20 GJ	$347	0.1 t
Lougheed/Shaughnessy|1 - Lougheed/Shaughnessy|1	Electricity	456 kWh	2 GJ	$33	0.0 t	2 GJ	$33	0.0 t
Maple|Kingsway T S - Maple|Kingsway	Electricity	1,666 kWh	6 GJ	$102	0.0 t	6 GJ	$102	0.0 t
Mary Hill T S - 1210 Mary Hill Rd	Electricity No retrofit	23,631 kWh	85 GJ	$1,685	0.5 t	85 GJ	$1,685	0.5 t
Mary Hill/Wilson T S - Mary Hill Wilson	Electricity	3,831 kWh	14 GJ	$236	0.1 t	14 GJ	$236	0.1 t
Niciola|Ottawa St T S - Niciola|Ottawa St	Electricity new account for 2007 inventory	3,870 kWh	14 GJ	$238	0.1 t	14 GJ	$238	0.1 t
Ottawa|Dominion T S - Ottawa|Dominion	Electricity	1,955 kWh	7 GJ	$120	0.0 t	7 GJ	$120	0.0 t
Pitt River/Mary Hill Bypass T S - Pitt River Rd/Mary	Electricity	3,788 kWh	14 GJ	$233	0.1 t	14 GJ	$233	0.1 t
Pitt River/Mclean T S - Pitt River Rd And	Electricity	3,654 kWh	13 GJ	$225	0.1 t	13 GJ	$225	0.1 t
Pitt River/Reeve T S - Pitt River Rd At	Electricity	3,689 kWh	13 GJ	$227	0.1 t	13 GJ	$227	0.1 t
Prairie T S - 2100 Prairie Ave	Electricity	2,772 kWh	10 GJ	$171	0.1 t	10 GJ	$171	0.1 t
Prairie/Oxford T S - Prairie Ave	Electricity	3,831 kWh	14 GJ	$236	0.1 t	14 GJ	$236	0.1 t
Prairie/Toronto T S - Prairie Ave/Toronto	Electricity	3,843 kWh	14 GJ	$237	0.1 t	14 GJ	$237	0.1 t

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	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
Prairie|Cedar T S - Prairie|Cedar	Electricity	3,700 kWh	13 GJ	$228	0.1 t	13 GJ	$228	0.1 t
	new account for 2007 inventory							
Prairie|Cedar T S - Prairie|Cedar	Electricity	9,553 kWh	34 GJ	$589	0.2 t	34 GJ	$589	0.2 t
	new account for 2007 inventory							
Route 7|Hastings T S - Route 7|Hastings	Electricity	3,950 kWh	14 GJ	$243	0.1 t	14 GJ	$243	0.1 t
	new account for 2007 inventory							
Route 7|Oxford St T S - Route 7|Oxford St	Electricity	2,344 kWh	8 GJ	$144	0.1 t	8 GJ	$144	0.1 t
	new account for 2007 inventory							
Rte 7|Cst Meridian Rd T S - Rte 7|Cst Meridian Rd	Electricity	4,366 kWh	16 GJ	$269	0.1 t	16 GJ	$269	0.1 t
	new account for 2007 inventory							
Rte 7|Ottawa St T S - Rte 7|Ottawa St	Electricity	3,843 kWh	14 GJ	$237	0.1 t	14 GJ	$237	0.1 t
	new account for 2007 inventory							
Shaughnessy/Lions T S - Shaughnessy St-Lions	Electricity	4,128 kWh	15 GJ	$254	0.1 t	15 GJ	$254	0.1 t
Shaughnessy/Prairie T S - Shaughnessy St-	Electricity	3,628 kWh	13 GJ	$224	0.1 t	13 GJ	$224	0.1 t
Shaughnessy/Wilson T S - Shaughnessy St	Electricity	4,306 kWh	16 GJ	$265	0.1 t	16 GJ	$265	0.1 t
Shaughnessy|Mcallister T S - Shaughnessy|Mcallistr	Electricity	688 kWh	2 GJ	$42	0.0 t	2 GJ	$42	0.0 t
Westwood/Kitchener T S - Westwood St	Electricity	4,211 kWh	15 GJ	$259	0.1 t	15 GJ	$259	0.1 t
Traffic Signal Subtotal	Electricity	136,035 kWh	490 GJ	$8,618	3.1 t	***490 GJ***	***$8,618***	***3.1 t***
Lighting Subtotal		Consumption	Energy	Costs	CO_2e	***6,256 GJ***	***$114,781***	***40.0 t***
	Electricity	1,737,869 kWh	6,256 GJ	$114,781	40.0 t			
Water & Wastewater								
Deep Water Well - Hatchery								
Hyde Creek Well - 3636 Coast Meridian	Electricity	78,342 kWh	282 GJ	$5,483	1.8 t	282 GJ	$5,483	1.8 t

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	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
Deep Water Well - Hatchery Subtotal	Electricity	78,342 kWh	282 GJ	$5,483	1.8 t	***282 GJ***	***$5,483***	***1.8 t***
Drainage Pump Station								
Barberry S T M - 1000 Barberry Dr	Electricity	37,236 kWh	134 GJ	$2,629	0.9 t	134 GJ	$2,629	0.9 t
Cedar S T M - 3915 Cedar Dr	Electricity	27,156 kWh	98 GJ	$1,936	0.6 t	98 GJ	$1,936	0.6 t
Dominion S T M - Dominion Ave E End	Electricity	239,567 kWh	862 GJ	$12,964	5.5 t	862 GJ	$12,964	5.5 t
Ellis S T M - 1088 Ellis Dr Rr	Electricity	162 kWh	1 GJ	$80	0.0 t	1 GJ	$80	0.0 t
Harbour Old S T M - Ft Of Argue St	Electricity	52,533 kWh	189 GJ	$3,682	1.2 t	189 GJ	$3,682	1.2 t
Harbour S T M - Harbour Rd E/End Argu	Electricity	183,071 kWh	659 GJ	$11,205	4.2 t	659 GJ	$11,205	4.2 t
Laurier S T M - East End Prairie Ave	Electricity	36,934 kWh	133 GJ	$2,613	0.8 t	133 GJ	$2,613	0.8 t
Maple S T M - Dyke	Electricity	19,200 kWh	69 GJ	$1,357	0.4 t	69 GJ	$1,357	0.4 t
Reeve S T M - 2700 Pitt River Rd	Electricity	44,625 kWh	161 GJ	$3,139	1.0 t	161 GJ	$3,139	1.0 t
Drainage Pump Station Subtotal	Electricity	640,484 kWh	2,306 GJ	$39,604	14.7 t	***2,306 GJ***	***$39,604***	***14.7 t***
Liquid Waste Pump Station								
Ambleside S S P S - E End Ambleside Cls	Electricity	18,149 kWh	65 GJ	$1,304	0.4 t	65 GJ	$1,304	0.4 t
Bloomfield S S P S - 3600blk Bloomfield Pl	Electricity	14,203 kWh	51 GJ	$1,030	0.3 t	51 GJ	$1,030	0.3 t
Brand S S P S - Brown St	Electricity	17,421 kWh	63 GJ	$1,255	0.4 t	63 GJ	$1,255	0.4 t
Broadway S S P S - Broadway At Maryhill	Electricity	23,252 kWh	84 GJ	$1,658	0.5 t	84 GJ	$1,658	0.5 t
Dominion S S P S - Dominion Ave West Of	Electricity	38,767 kWh	140 GJ	$2,733	0.9 t	140 GJ	$2,733	0.9 t
Freemont S S P S - 702 Prairie Ave	Electricity	46,254 kWh	167 GJ	$3,248	1.1 t	167 GJ	$3,248	1.1 t
Halifax S S P S - 1250 Halifax Pl Pump	Electricity	17,251 kWh	62 GJ	$1,242	0.4 t	62 GJ	$1,242	0.4 t
Handley S S P S - Handley Cresc	Electricity	57,631 kWh	207 GJ	$4,034	1.3 t	207 GJ	$4,034	1.3 t
Hyde S S P S - 1236 Lynwood Ave	Electricity	15,819 kWh	57 GJ	$1,143	0.4 t	57 GJ	$1,143	0.4 t

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Kingsway S S P S - 1165 Kingsway Ave	Electricity	5,362 kWh	19 GJ	$428	0.1 t	19 GJ	$428	0.1 t
Langan S S P S - 1681 Langan Ave	Electricity	23,312 kWh	84 GJ	$1,662	0.5 t	84 GJ	$1,662	0.5 t
Lynwood S S P S - 970 Lynwood Ave	Electricity	9,444 kWh	34 GJ	$703	0.2 t	34 GJ	$703	0.2 t
Nacht S S P S - Mcchessney N Nacht	Electricity	15,997 kWh	58 GJ	$1,157	0.4 t	58 GJ	$1,157	0.4 t
Pitt River S S P S - 2400 Pitt River Rd	Electricity	45,592 kWh	164 GJ	$3,202	1.0 t	164 GJ	$3,202	1.0 t
Shaughnessy/Citadel S S P S - Shaughnessy/Citadel	Electricity	114,480 kWh	412 GJ	$7,978	2.6 t	412 GJ	$7,978	2.6 t
Trenton S S P S - 800 Kingsway Ave	Electricity	1,256 kWh	5 GJ	$139	0.0 t	5 GJ	$139	0.0 t
Westview S S P S - Shaughnessy St And	Electricity	41,603 kWh	150 GJ	$2,933	1.0 t	150 GJ	$2,933	1.0 t
Liquid Waste Pump Station Subtotal	Electricity	505,794 kWh	1,821 GJ	$35,848	11.6 t	***1,821 GJ***	***$35,848***	***11.6 t***
Potable Water Pump Station								
Citadel P W P S - 1241 Ricard Pl	Electricity Natural Gas	3,240 kWh 144 GJ	12 GJ 144 GJ	$344 $2,112	0.1 t 7.4 t	156 GJ	$2,456	7.5 t
Penny Place P W P S - Penny Place	Electricity	48,322 kWh	174 GJ	$3,396	1.1 t	174 GJ	$3,396	1.1 t
Potable Water Pump Station Subtotal	Electricity Natural Gas	51,562 kWh 144 GJ	186 GJ 144 GJ	$3,740 $2,112	1.2 t 7.4 t	***330 GJ***	***$5,852***	***8.6 t***
PRV Station								
Coquitlam Ave P R V - Coquitlam Ave	Electricity	5,213 kWh	19 GJ	$412	0.1 t	19 GJ	$412	0.1 t
Mary Hill P R V - Rear 1716 Mar	Electricity	1,443 kWh	5 GJ	$151	0.0 t	5 GJ	$151	0.0 t
Mason/Oxford P R V - Mason At Oxford	Electricity	2,873 kWh	10 GJ	$247	0.1 t	10 GJ	$247	0.1 t
Sandra Way Opp P R V - Sandra Way Opp 2158	Electricity	1,268 kWh	5 GJ	$135	0.0 t	5 GJ	$135	0.0 t
PRV Station Subtotal	Electricity	10,797 kWh	39 GJ	$946	0.2 t	***39 GJ***	***$946***	***0.2 t***

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Account & Address	Account Consumption & Costs by Energy Type					Account Subtotal		
	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
Water & Wastewater Subtotal		Consumption	Energy	Costs	CO_2e	***4,778 GJ***	***$87,733***	***37.0 t***
	Electricity	1,286,979 kWh	4,633 GJ	$85,621	29.6 t			
	Natural Gas	144 GJ	144 GJ	$2,112	7.4 t			
VEHICLE FLEET								
Diesel Fuel Dump Trucks								
FORD HDCC - EQ1319	Diesel Fuel	4,925 litres	191 GJ	$4,827	13.7 t	191 GJ	$4,827	13.7 t
FORD M DUMP - EQ1236	Diesel Fuel	1,930 litres	75 GJ	$1,891	5.4 t	75 GJ	$1,891	5.4 t
FORD M DUMP - EQ1238								0.0 t
FORD M DUMP - EQ1241	Diesel Fuel	2,685 litres	104 GJ	$2,631	7.5 t	104 GJ	$2,631	7.5 t
FORD M DUMP - EQ1243	Diesel Fuel	1,865 litres	72 GJ	$1,828	5.2 t	72 GJ	$1,828	5.2 t
FORD M DUMP - EQ1244	Diesel Fuel	3,200 litres	124 GJ	$3,136	8.9 t	124 GJ	$3,136	8.9 t
FORD M DUMP - EQ1245	Diesel Fuel	2,114 litres	82 GJ	$2,071	5.9 t	82 GJ	$2,071	5.9 t
FORD M DUMP - EQ1246	Diesel Fuel	3,726 litres	144 GJ	$3,651	10.4 t	144 GJ	$3,651	10.4 t
FORD M DUMP - EQ1247	Diesel Fuel	1,239 litres	48 GJ	$1,214	3.4 t	48 GJ	$1,214	3.4 t
IHC/DEL S/A - EQ1321	Diesel Fuel	2,390 litres	92 GJ	$2,342	6.6 t	92 GJ	$2,342	6.6 t
IHC/DEL SA495 - EQ1320	Diesel Fuel	2,755 litres	107 GJ	$2,700	7.7 t	107 GJ	$2,700	7.7 t
IHC/DEL T/A - EQ1322	Diesel Fuel	8,224 litres	318 GJ	$8,059	22.9 t	318 GJ	$8,059	22.9 t
IHC/DEL T/A - EQ1323	Diesel Fuel	9,200 litres	356 GJ	$9,016	25.6 t	356 GJ	$9,016	25.6 t
Diesel Fuel Dump Trucks Subtotal	Diesel Fuel	44,251 litres	1,712 GJ	$43,366	123.0 t	***1,712 GJ***	***$43,366***	***123.0 t***
Diesel Fuel Equipment								
LE ROI COMPRESSOR - EQ8076	Diesel Fuel	40 litres	2 GJ	$39	0.1 t	2 GJ	$39	0.1 t
Diesel Fuel Equipment Subtotal	Diesel Fuel	40 litres	2 GJ	$39	0.1 t	***2 GJ***	***$39***	***0.1 t***

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Account & Address	Account Consumption & Costs by Energy Type					Account Subtotal		
	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
Diesel Fuel Fire Dept. Vehicles								
Mack Se 1674 - Eq0080	Diesel Fuel	1,502 litres	58 GJ	$1,471	4.2 t	58 GJ	$1,471	4.2 t
Diesel Fuel Fire Dept. Vehicles Subtotal	Diesel Fuel	1,502 litres	58 GJ	$1,471	4.2 t	***58 GJ***	***$1,471***	***4.2 t***
Diesel Fuel Flushers								
Safe-Jet-Vac - Eq1702	Diesel Fuel	19,934 litres	771 GJ	$19,536	55.4 t	771 GJ	$19,536	55.4 t
Diesel Fuel Flushers Subtotal	Diesel Fuel	19,934 litres	771 GJ	$19,536	55.4 t	***771 GJ***	***$19,536***	***55.4 t***
Diesel Fuel Generators								
Ebi Kohler - Eq6502	Diesel Fuel	561 litres	22 GJ	$550	1.6 t	22 GJ	$550	1.6 t
Sdmo Trailerman - Eq6505	Diesel Fuel	408 litres	16 GJ	$400	1.1 t	16 GJ	$400	1.1 t
Sim-Power - Eq6501	Diesel Fuel	301 litres	12 GJ	$295	0.8 t	12 GJ	$295	0.8 t
Ubilt Godwin - Eq6447	Diesel Fuel	141 litres	5 GJ	$138	0.4 t	5 GJ	$138	0.4 t
Diesel Fuel Generators Subtotal	Diesel Fuel	1,412 litres	55 GJ	$1,383	3.9 t	***55 GJ***	***$1,383***	***3.9 t***
Diesel Fuel Heavy Fire Trucks								
Mack Co - Eq0070	Diesel Fuel	416 litres	16 GJ	$407	1.2 t	16 GJ	$407	1.2 t
Smeal/Spartan 75' - Eq0088	Diesel Fuel	9,170 litres	355 GJ	$8,987	25.5 t	355 GJ	$8,987	25.5 t
Smeal/Spartan 75' - Eq0091	Diesel Fuel	14,732 litres	570 GJ	$14,437	40.9 t	570 GJ	$14,437	40.9 t
Svi/Spartan Advantage Ff - Eq0093	Diesel Fuel	1,065 litres	41 GJ	$1,044	3.0 t	41 GJ	$1,044	3.0 t
Diesel Fuel Heavy Fire Trucks Subtotal	Diesel Fuel	25,383 litres	982 GJ	$24,876	70.6 t	***982 GJ***	***$24,876***	***70.6 t***
Diesel Fuel Medium to Heavy Trucks								
Ford - Eq1186	Diesel Fuel	938 litres	36 GJ	$919	2.6 t	36 GJ	$919	2.6 t
Ford Cube Van - Eq1237	Diesel Fuel	1,469 litres	57 GJ	$1,439	4.1 t	57 GJ	$1,439	4.1 t
Ford Cube Van - Eq1239	Diesel Fuel	2,040 litres	79 GJ	$1,999	5.7 t	79 GJ	$1,999	5.7 t

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	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
Ford Cube Van - Eq1240	Diesel Fuel	3,729 litres	144 GJ	$3,654	10.4 t	144 GJ	$3,654	10.4 t
Ford Fl. Deck - Eq1235	Diesel Fuel	1,842 litres	71 GJ	$1,805	5.1 t	71 GJ	$1,805	5.1 t
Ford Super Duty - Eq1104	Diesel Fuel	1,297 litres	50 GJ	$1,271	3.6 t	50 GJ	$1,271	3.6 t
Ihc 4900 - Eq1218	Diesel Fuel	843 litres	33 GJ	$826	2.3 t	33 GJ	$826	2.3 t
Ihc Van - Eq1401	Diesel Fuel	2,238 litres	87 GJ		6.2 t	87 GJ		6.2 t
Ihc Van - Eq1402	Diesel Fuel	2,329 litres	90 GJ		6.5 t	90 GJ		6.5 t
Ihc/Itb - Eq1403	Diesel Fuel	1,174 litres	45 GJ	$1,151	3.3 t	45 GJ	$1,151	3.3 t
Ihc/Itb - Eq1404	Diesel Fuel	1,271 litres	49 GJ	$1,246	3.5 t	49 GJ	$1,246	3.5 t
Ihc/Itb - Eq1405	Diesel Fuel	448 litres	17 GJ	$439	1.2 t	17 GJ	$439	1.2 t
Diesel Fuel Medium to Heavy Trucks Subtotal	Diesel Fuel	19,616 litres	759 GJ	$14,748	54.5 t	***759 GJ***	***$14,748***	***54.5 t***
Diesel Fuel Off Road Vehicles & Equipment								
Bobcat Excavator - Eq2037	Diesel Fuel	193 litres	7 GJ	$189	0.5 t	7 GJ	$189	0.5 t
Case Load/Hoe - Eq2039	Diesel Fuel	2,002 litres	77 GJ	$1,962	5.6 t	77 GJ	$1,962	5.6 t
Cat Load/Hoe - Eq2031	Diesel Fuel	4,182 litres	162 GJ	$4,099	11.6 t	162 GJ	$4,099	11.6 t
Ford/Tiger Flail - Eq2029	Diesel Fuel	1,808 litres	70 GJ	$1,772	5.0 t	70 GJ	$1,772	5.0 t
J.D. Grader - Eq3004	Diesel Fuel	731 litres	28 GJ	$716	2.0 t	28 GJ	$716	2.0 t
Jacobsen Mower - Eq2033	Diesel Fuel	2,113 litres	82 GJ	$2,070	5.9 t	82 GJ	$2,070	5.9 t
Jacobsen Mower - Eq2038	Diesel Fuel	6,386 litres	247 GJ	$6,258	17.7 t	247 GJ	$6,258	17.7 t
Jd Load/Hoe - Eq2030	Diesel Fuel	2,271 litres	88 GJ	$2,225	6.3 t	88 GJ	$2,225	6.3 t
John Deere Loader - Eq2035	Diesel Fuel	1,318 litres	51 GJ	$1,291	3.7 t	51 GJ	$1,291	3.7 t
Kubota - Eq6899	Diesel Fuel	181 litres	7 GJ		0.5 t	7 GJ		0.5 t
Kubota Mower - Eq6050	Diesel Fuel	669 litres	26 GJ	$656	1.9 t	26 GJ	$656	1.9 t

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Kubota Mower - Eq6051	Diesel Fuel	230 litres	9 GJ	$225	0.6 t	9 GJ	$225	0.6 t
Kubota Mower - Eq6053	Diesel Fuel	1,262 litres	49 GJ		3.5 t	49 GJ		3.5 t
Diesel Fuel Off Road Vehicles & Equipment Subtotal	Diesel Fuel	23,345 litres	903 GJ	$21,464	64.9 t	***903 GJ***	***$21,464***	***64.9 t***
Diesel Fuel Packers								
Freight/Labrie Condor/Sterling - Eq1514	Diesel Fuel	22,252 litres	861 GJ	$22,029	61.8 t	861 GJ	$22,029	61.8 t
Freight/Labrie Condor/Sterling - Eq1515	Diesel Fuel	20,544 litres	795 GJ	$20,133	57.1 t	795 GJ	$20,133	57.1 t
Freight/Labrie Condor/Sterling - Eq1516	Diesel Fuel	23,614 litres	913 GJ	$23,141	65.6 t	913 GJ	$23,141	65.6 t
Freight/Labrie Condor/Sterling - Eq1517	Diesel Fuel	23,371 litres	904 GJ	$22,904	65.0 t	904 GJ	$22,904	65.0 t
Freight/Labrie Condor/Sterling - Eq1518	Diesel Fuel	19,536 litres	756 GJ	$19,145	54.3 t	756 GJ	$19,145	54.3 t
Wht/Ezp Exp/App - Eq1510	Diesel Fuel	448 litres	17 GJ	$439	1.2 t	17 GJ	$439	1.2 t
Wht/Ezp Exp/App - Eq1511	Diesel Fuel	2,669 litres	103 GJ	$2,616	7.4 t	103 GJ	$2,616	7.4 t
Diesel Fuel Packers Subtotal	Diesel Fuel	112,435 litres	4,349 GJ	$110,409	312.5 t	***4,349 GJ***	***$110,409***	***312.5 t***
Diesel Fuel Tractors, Graders, & Backhoes								
New Holland Tractor - Eq2034	Diesel Fuel	354 litres	14 GJ	$347	1.0 t	14 GJ	$347	1.0 t
New Holland Tractor - Eq2036	Diesel Fuel	1,829 litres	71 GJ	$1,792	5.1 t	71 GJ	$1,792	5.1 t
Diesel Fuel Tractors, Graders, & Backhoes Subtotal	Diesel Fuel	2,183 litres	84 GJ	$2,139	6.1 t	***84 GJ***	***$2,139***	***6.1 t***
Gasoline Equipment								
Building Maintenance Small Equipment - Jackson	Gasoline	64 litres	2 GJ		0.2 t	2 GJ		0.2 t
Fire Hall Small Equipment - Eq0099	Gasoline	757 litres	26 GJ		1.9 t	26 GJ		1.9 t
Hyde Creek Centre Pick-Up - Hc351	Gasoline	1,417 litres	49 GJ		3.5 t	49 GJ		3.5 t
Parks Small Equipment - Pk9958	Gasoline	1,616 litres	56 GJ		4.0 t	56 GJ		4.0 t
Parks Small Equipment - Pr921	Gasoline	89 litres	3 GJ		0.2 t	3 GJ		0.2 t

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	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
Public Works Small Equipment - Pw 111	Gasoline	1,090 litres	38 GJ		2.7 t	38 GJ		2.7 t
Small Equipment And If Epuipment Has Been Locked Out - Eq9800	Gasoline	1,684 litres	58 GJ		4.2 t	58 GJ		4.2 t
Small Tools Construction - Cw 100	Gasoline	1,921 litres	67 GJ		4.8 t	67 GJ		4.8 t
Toro Turfsweeper - Eq6876	Gasoline	382 litres	13 GJ	$375	1.0 t	13 GJ	$375	1.0 t
Trades Small Equipment - Tr 589	Gasoline	61 litres	2 GJ		0.2 t	2 GJ		0.2 t
Utilities Small Equipment - Ut 779	Gasoline	557 litres	19 GJ		1.4 t	19 GJ		1.4 t
Utilities Small Equipment - Ut 883	Gasoline	470 litres	16 GJ		1.2 t	16 GJ		1.2 t
Gasoline Equipment Subtotal	Gasoline	10,109 litres	350 GJ	$375	25.2 t	***350 GJ***	***$375***	***25.2 t***
Gasoline Light Trucks, Vans, and SUVs								
Chev Express - Eq1189	Gasoline	2,866 litres	99 GJ	$2,809	7.2 t	99 GJ	$2,809	7.2 t
Dodge Caravan - Eq1179	Gasoline	980 litres	34 GJ	$960	2.4 t	34 GJ	$960	2.4 t
Dodge Caravan - Eq1180	Gasoline	672 litres	23 GJ	$658	1.7 t	23 GJ	$658	1.7 t
Ford - Eq1185	Gasoline	1,473 litres	51 GJ	$1,444	3.7 t	51 GJ	$1,444	3.7 t
Ford - Eq1192	Gasoline	3,106 litres	108 GJ	$3,044	7.8 t	108 GJ	$3,044	7.8 t
Ford - Eq1194	Gasoline	2,831 litres	98 GJ	$2,774	7.1 t	98 GJ	$2,774	7.1 t
Ford - Eq1195	Gasoline	3,107 litres	108 GJ	$3,045	7.8 t	108 GJ	$3,045	7.8 t
Ford - Eq1196	Gasoline	2,835 litres	98 GJ	$2,778	7.1 t	98 GJ	$2,778	7.1 t
Ford - Eq1197	Gasoline	2,391 litres	83 GJ	$2,343	6.0 t	83 GJ	$2,343	6.0 t
Ford Mv 4x4 - Eq0077	Gasoline	195 litres	7 GJ	$191	0.5 t	7 GJ	$191	0.5 t
Ford Ranger - Eq0094	Gasoline	1,000 litres	35 GJ	$980	2.5 t	35 GJ	$980	2.5 t
Ford Ranger - Eq1111	Gasoline	1,578 litres	55 GJ	$1,547	3.9 t	55 GJ	$1,547	3.9 t
Ford Ranger - Eq1113	Gasoline	1,583 litres	55 GJ	$1,551	4.0 t	55 GJ	$1,551	4.0 t

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	Type	Consumption	Energy	Costs	CO_2e	Energy	Costs	CO_2e
Ford Ranger - Eq1164	Gasoline	793 litres	27 GJ	$777	2.0 t	27 GJ	$777	2.0 t
Ford Ranger - Eq1165	Gasoline	558 litres	19 GJ	$547	1.4 t	19 GJ	$547	1.4 t
Ford Ranger - Eq1190	Gasoline	1,295 litres	45 GJ	$1,269	3.2 t	45 GJ	$1,269	3.2 t
Ford Ranger - Eq1191	Gasoline	1,220 litres	42 GJ	$1,195	3.0 t	42 GJ	$1,195	3.0 t
Ford Reg Cab - Eq1108	Gasoline	2,169 litres	75 GJ	$2,125	5.4 t	75 GJ	$2,125	5.4 t
Ford Reg Cab - Eq1109	Gasoline	1,225 litres	42 GJ	$1,201	3.1 t	42 GJ	$1,201	3.1 t
Ford Sc Ss - Eq1176	Gasoline	3,697 litres	128 GJ	$3,623	9.2 t	128 GJ	$3,623	9.2 t
Ford Supercab - Eq0095	Gasoline	1,808 litres	63 GJ	$1,772	4.5 t	63 GJ	$1,772	4.5 t
Ford Supercab - Eq1106	Gasoline	2,895 litres	100 GJ	$2,837	7.2 t	100 GJ	$2,837	7.2 t
Ford Supercab - Eq1107	Gasoline	4,854 litres	168 GJ	$4,757	12.1 t	168 GJ	$4,757	12.1 t
Ford Supercab - Eq1110	Gasoline	3,977 litres	138 GJ	$3,897	9.9 t	138 GJ	$3,897	9.9 t
Ford Supercab - Eq1112	Gasoline	2,255 litres	78 GJ	$2,210	5.6 t	78 GJ	$2,210	5.6 t
Ford Supercab - Eq1114	Gasoline	919 litres	32 GJ	$901	2.3 t	32 GJ	$901	2.3 t
Gmc Savana - Eq0084	Gasoline	1,499 litres	52 GJ	$1,469	3.7 t	52 GJ	$1,469	3.7 t
Jeep Suv - Eq0079	Gasoline	1,065 litres	37 GJ	$1,044	2.7 t	37 GJ	$1,044	2.7 t
Mazda B4000 - Eq0092	Gasoline	598 litres	21 GJ	$586	1.5 t	21 GJ	$586	1.5 t
Mazda B4000 - Eq1174	Gasoline	2,197 litres	76 GJ	$2,153	5.5 t	76 GJ	$2,153	5.5 t
Gasoline Light Trucks, Vans, and SUVs Subtotal	Gasoline	57,640 litres	1,998 GJ	$56,487	143.9 t	***1,998 GJ***	***$56,487***	***143.9 t***
Gasoline Medium to Heavy Trucks & Vans								
Chev - Eq1182	Gasoline	915 litres	32 GJ	$897	2.3 t	32 GJ	$897	2.3 t
Chev - Eq1183	Gasoline	771 litres	27 GJ	$756	1.9 t	27 GJ	$756	1.9 t
Chev - Eq1184	Gasoline	892 litres	31 GJ		2.2 t	31 GJ		2.2 t

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Chev Ext Cab - Eq1198	Gasoline	588 litres	20 GJ	$576	1.5 t	20 GJ	$576	1.5 t
Chev Ext Cab - Eq1199	Gasoline	2,134 litres	74 GJ	$2,092	5.3 t	74 GJ	$2,092	5.3 t
Chevrolet 2500 - Eq1242	Gasoline	2,794 litres	97 GJ	$2,738	7.0 t	97 GJ	$2,738	7.0 t
Ford - Eq0097	Gasoline	1,269 litres	44 GJ	$1,244	3.2 t	44 GJ	$1,244	3.2 t
Ford Cube Van - Eq1153	Gasoline	434 litres	15 GJ	$426	1.1 t	15 GJ	$426	1.1 t
Ford Cube Van - Eq1230	Gasoline	1,625 litres	56 GJ	$1,593	4.1 t	56 GJ	$1,593	4.1 t
Ford E250 - Eq0090	Gasoline	1,463 litres	51 GJ	$1,433	3.7 t	51 GJ	$1,433	3.7 t
Ford M Dump - Eq1231	Gasoline	2,088 litres	72 GJ	$2,046	5.2 t	72 GJ	$2,046	5.2 t
Ford M Dump - Eq1233	Gasoline	3,347 litres	116 GJ	$3,280	8.4 t	116 GJ	$3,280	8.4 t
Ford M Dump - Eq1234	Gasoline	2,386 litres	83 GJ	$2,338	6.0 t	83 GJ	$2,338	6.0 t
Ford Super Duty - Eq1101	Gasoline	4,135 litres	143 GJ	$4,053	10.3 t	143 GJ	$4,053	10.3 t
Ford Super Duty - Eq1102	Gasoline	2,919 litres	101 GJ	$2,861	7.3 t	101 GJ	$2,861	7.3 t
Ford Super Duty - Eq1103	Gasoline	1,339 litres	46 GJ	$1,312	3.3 t	46 GJ	$1,312	3.3 t
Ford Super Duty - Eq1105	Gasoline	1,972 litres	68 GJ	$1,933	4.9 t	68 GJ	$1,933	4.9 t
Ford Super Duty - Eq1187	Gasoline	2,900 litres	101 GJ	$2,842	7.2 t	101 GJ	$2,842	7.2 t
Ford Super Duty - Eq1193	Gasoline	7,517 litres	261 GJ	$7,367	18.8 t	261 GJ	$7,367	18.8 t
Gmc - Eq1188	Gasoline	303 litres	11 GJ	$297	0.8 t	11 GJ	$297	0.8 t
Gmc Ccabg3+3 - Eq1232	Gasoline	1,103 litres	38 GJ	$1,081	2.8 t	38 GJ	$1,081	2.8 t
M Dump F350 - Eq1228	Gasoline	601 litres	21 GJ		1.5 t	21 GJ		1.5 t
Gasoline Medium to Heavy Trucks & Vans Subtotal	Gasoline	43,497 litres	1,508 GJ	$41,164	108.6 t	***1,508 GJ***	***$41,164***	***108.6 t***
Gasoline Passenger Cars								
Chev 4Dr - Eq1026	Gasoline	110 litres	4 GJ	$107	0.3 t	4 GJ	$107	0.3 t

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Dodge 4dr - Eq1027	Gasoline	784 litres	27 GJ	$768	2.0 t	27 GJ	$768	2.0 t
Ford H/Back - Eq1021	Gasoline	389 litres	13 GJ	$381	1.0 t	13 GJ	$381	1.0 t
Ford Taurus - Eq0096	Gasoline	1,128 litres	39 GJ	$1,105	2.8 t	39 GJ	$1,105	2.8 t
Gasoline Passenger Cars Subtotal	Gasoline	2,410 litres	84 GJ	$2,362	6.0 t	***84 GJ***	***$2,362***	***6.0 t***
Gasoline-Electric Hybrid Vehicles								
Ford Hybrid - Eq1028	Gasoline	751 litres	26 GJ	$736	1.9 t	26 GJ	$736	1.9 t
Honda Hybrid - Eq1029	Gasoline	22 litres	1 GJ	$22	0.1 t	1 GJ	$22	0.1 t
Honda Hybrid - Eq1030	Gasoline	34 litres	1 GJ	$34	0.1 t	1 GJ	$34	0.1 t
Gasoline-Electric Hybrid Vehicles Subtotal	Gasoline	807 litres	28 GJ	$791	2.0 t	***28 GJ***	***$791***	***2.0 t***
Vehicle Fleet Subtotal		Consumption	Energy	Costs	CO_2e	***13,641 GJ***	***$340,609***	***981.0 t***
	Gasoline	114,463 litres	3,967 GJ	$101,178	285.9 t			
	Diesel Fuel	250,101 litres	9,674 GJ	$239,431	695.1 t			
Solid Waste								
Solid Waste								
Admin Annex - 2253 Leigh Sq	Solid Waste		312 cu. yds	46.80	24.8 t			24.8 t
	Estimate. Requires Site Visit							
City Hall - 2580 Shaughnessy St	Solid Waste		624 cu. yds	93.60	49.6 t			49.6 t
Community Police Station X2 - -	Solid Waste		5 cu. yds	0.78	0.4 t			0.4 t
	Estimate							
Fire Hall No. 1 - 1725 Broadway St	Solid Waste		156 cu. yds	23.40	12.4 t			12.4 t
Fire Hall No.2 - 3196 Toronto St	Solid Waste		156 cu. yds	23.40	12.4 t			12.4 t
Hyde Creek Park - Hyde Creek	Solid Waste		624 cu. yds	93.60	49.6 t			49.6 t

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Corporate Energy & Greenhouse Gas Emissions Inventory: 2007

Account & Address	Account Consumption & Costs by Energy Type					Account Subtotal		
	Type	Estimation Method	Volume	Mass	CO_2e	Energy	Costs	CO_2e
Lions Park - Lions Park	Solid Waste		416 cu. yds	62.40	33.1 t			33.1 t
Maclean Park - 3149 Wellington St	Solid Waste		832 cu. yds	124.80	66.1 t			66.1 t
Outdoor Pools/Parks & Sportsfields - Combined	Solid Waste	Estimate	5 cu. yds	0.78	0.4 t			0.4 t
Poco Rec Complex & Wilsons Seniors Centre - 2150 Wilson Ave	Solid Waste		1,248 cu. yds	187.20	99.2 t			99.2 t
Port Coquitlam Heritage & Cultural Society - 2581 Mary Hill Rd 108	Solid Waste	Estimate	3 cu. yds	0.39	0.2 t			0.2 t
Public Works Yard - 2581 Mary Hill Rd 108	Solid Waste		624 cu. yds	93.60	49.6 t			49.6 t
Terry Fox Library - 2470 Mary Hill Rd	Solid Waste		156 cu. yds	23.40	12.4 t			12.4 t
The Outlet (Old Post Office) - 2250 Mcallister Ave	Solid Waste	Estimate. Requires Site Visit	78 cu. yds	11.70	6.2 t			6.2 t
Solid Waste Subtotal	Solid Waste		5,239 cu. yds	785.85	416.5 t			***416.5 t***

Solid Waste Subtotal			Volume	Mass	CO_2e			***416.5 t***
	Solid Waste		5,239 cu. yds	785.85 t	416.5 t			

Total	Type	Consumption	Energy	Costs	CO_2e	***69,312 GJ***	***$1,030,215***	***2,776.2 t***
	Electricity	9,115,175 kWh	32,815 GJ	$466,222	209.6 t			
	Natural Gas	22,856 GJ	22,856 GJ	$223,384	1,169.1 t			
	Gasoline	114,463 litres	3,967 GJ	$101,178	285.9 t			
	Diesel Fuel	250,101 litres	9,674 GJ	$239,431	695.1 t			
			Volume	Mass	CO_2e			
	Solid Waste		5,239 cu. yds	785.85 t	416.5 t			

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Appendix B1 - Detailed Summary of Community Energy and Emissions: 2002

Port Coquitlam

Community Energy & Greenhouse Gas Emissions Inventory: 2002

This is Port Coquitlam's 2002 Community Energy and Greenhouse Gas Emissions Inventory

DATA SOURCES:

Residential and Commercial Buildings

Electricity Consumption: BC Hydro Ltd. – consumption and number of accounts

Natural Gas Consumption: Terasen Gas Inc. – consumption and number of accounts

Industrial Buildings

Electricity Consumption: BC Hydro Ltd. – consumption and number of accounts.

Natural Gas Consumption: Terasen Gas Inc. – number of accounts and consumption.

Community Transportation

Activity Data:

Insurance Corporation of British Columbia – licensed vehicles on the road

Natural Resources Canada – Fuel consumption rates for individual vehicles

Province of BC – Vehicle kilometres traveled for the appropriate region of the Province

Community Solid Waste

Solid Waste: per capita disposal rates for municipal solid waste at the regional landfill facility.

DATA DEFICIENCIES

Fuel oil for space heating for residential and commercial buildings, if any, is deficient. Accessible datasets does not exist for this fuel source and no estimate has been provided by HES.

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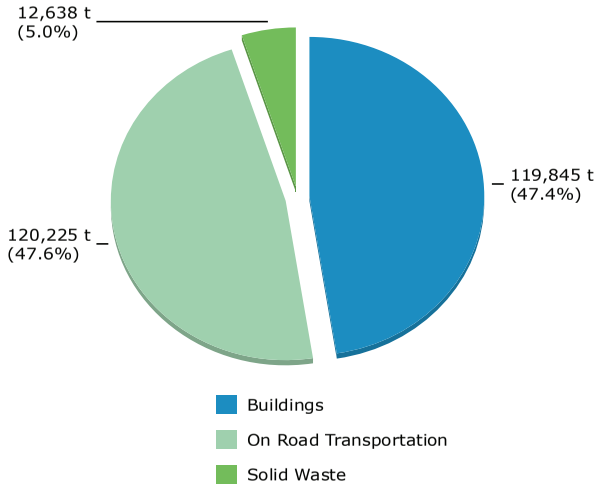
CO_2e (tonnes) by Sector*



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Port Coquitlam
Community Energy & Greenhouse Gas Emissions Inventory: 2002

Buildings	Consumption By Type						Energy & Emissions Total	
	Type	Connections	Consumption	Energy/Connection	Energy (GJ)	CO_2e (t)	Energy (GJ)	CO_2e (t)
Residential Buildings	Electricity	17,231	168,984,997 kWh	9,807 kWh/C	608,346	4,056	**1,820,342**	**66,048**
	Natural Gas	13,149	1,211,996 GJ	92 GJ/C	1,211,996	61,993		
Commercial Buildings	Electricity	1,787	117,802,156 kWh	65,922 kWh/C	424,088	2,827	**1,032,587**	**33,952**
	Natural Gas	1,395	608,499 GJ	436 GJ/C	608,499	31,124		
Industrial Buildings	Electricity	479	70,726,164 kWh	147,654 kWh/C	254,614	1,697	**609,412**	**19,845**
	Natural Gas	28	354,798 GJ	12,671 GJ/C	354,798	18,148		
Subtotal	Electricity	19,497	357,513,316 kWh		1,287,048	8,580	**3,462,341**	**119,845**
	Natural Gas	14,572	2,175,293 GJ		2,175,293	111,265		

On Road Transportation	Consumption By Type						Energy & Emissions Total	
	Type	Units	Consumption	Litres/Unit	Energy (GJ)	CO_2e (t)	Energy (GJ)	CO_2e (t)
Small Passenger Cars	Gasoline	12,541	11,654,874 litres	929 L/U	403,958	29,107	**409,856**	**29,530**
	Diesel Fuel	65	152,478 litres	2,346 L/U	5,898	424		
Large Passenger Cars	Gasoline	11,122	13,254,374 litres	1,192 L/U	459,397	33,101	**464,249**	**33,450**
	Diesel Fuel	77	125,458 litres	1,629 L/U	4,853	349		
Light Trucks, Vans, And Suvs	Gasoline	3,181	6,589,122 litres	2,071 L/U	228,379	16,455	**239,588**	**17,218**
	Diesel Fuel	98	196,690 litres	2,007 L/U	7,608	547		
	Mobile Propane	74	142,278 litres	1,923 L/U	3,601	216		
Commercial Vehicles	Gasoline	558	7,880,798 litres	14,123 L/U	273,148	19,681	**433,017**	**31,080**
	Diesel Fuel	560	3,938,434 litres	7,033 L/U	152,339	10,947		
	Mobile Propane	73	297,515 litres	4,076 L/U	7,530	452		
Motorhomes	Gasoline	312	1,271,570 litres	4,076 L/U	44,073	3,176	**44,073**	**3,176**

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Port Coquitlam

Community Energy & Greenhouse Gas Emissions Inventory: 2002

On Road Transportation continued

Motorcycles And Mopeds	Gasoline	557	2,270,078	litres	4,076	L/U	78,681	5,669	**78,681**	**5,669**
Bus	Gasoline	10	40,755	litres	4,076	L/U	1,413	102	**1,413**	**102**
Subtotal	Gasoline	28,281	42,961,571	litres			1,489,048	107,291	**1,670,876**	**120,225**
	Diesel Fuel	800	4,413,061	litres			170,697	12,266		
	Mbl Propane	147	439,793	litres			11,131	669		

Solid Waste	Direct Emissions			Emissions Total
	Type	Estimation Method	Mass (t)	CO_2e (t)	CO_2e (t)
Community Solid Waste	Solid Waste			12,638	**12,638**
Subtotal	Solid Waste			12,638	**12,638**

Grand Total	**Activity**	**Consumption**	**Energy**	**CO_2e**	**Energy & Emissions Total**	
					Energy (GJ)	CO_2e (t)
	Electricity	357,513,316 kWh	1,287,048 GJ	8,580 t		
	Natural Gas	2,175,293 GJ	2,175,293 GJ	111,265 t		
	Gasoline	42,961,571 litres	1,489,048 GJ	107,291 t	**5,133,217**	**252,708**
	Diesel Fuel	4,413,061 litres	170,697 GJ	12,266 t		
	Mbl Propane	439,793 litres	11,131 GJ	669 t		
	Solid Waste			12,638 t		

Port Coquitlam

Community Energy & Greenhouse Gas Emissions Inventory: 2002

This is Port Coquitlam's 2002 Community Energy and Greenhouse Gas Emissions Inventory

DATA SOURCES:

Residential and Commercial Buildings

Electricity Consumption: BC Hydro Ltd. – consumption and number of accounts
Natural Gas Consumption: Terasen Gas Inc. – consumption and number of accounts

Industrial Buildings

Electricity Consumption: BC Hydro Ltd. – consumption and number of accounts.
Natural Gas Consumption: Terasen Gas Inc. – number of accounts and consumption.

Community Transportation

Activity Data:
Insurance Corporation of British Columbia – licensed vehicles on the road
Natural Resources Canada – Fuel consumption rates for individual vehicles
Province of BC – Vehicle kilometres traveled for the appropriate region of the Province

Community Solid Waste

Solid Waste: per capita disposal rates for municipal solid waste at the regional landfill facility.

DATA DEFICIENCIES

Fuel oil for space heating for residential and commercial buildings, if any, is deficient. Accessible datasets does not exist for this fuel source and no estimate has been provided by HES.

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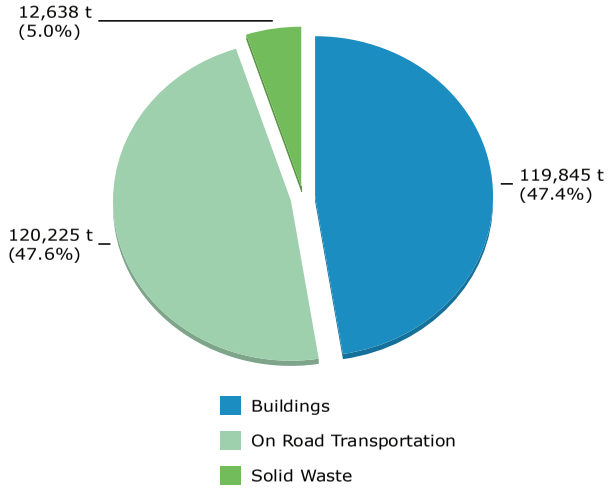
CO_2e (tonnes) by Sector *



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Draft Report Produced on 03/12/2009

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HYLA ENVIRONMENTAL SERVICES LTD.
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Energy & Emissions Monitoring and Reporting System™ v3.01

Appendix B2 - Detailed Summary of Community Energy and Emissions: 2007

Port Coquitlam

Community Energy & Greenhouse Gas Emissions Inventory: 2007

This is Port Coquitlam's 2007 Community Energy and Greenhouse Gas Emissions Inventory

DATA SOURCES:

Residential and Commercial Buildings

Electricity Consumption: BC Hydro Ltd. – consumption and number of accounts

Natural Gas Consumption: Terasen Gas Inc. – consumption and number of accounts

Industrial Buildings

Electricity Consumption: BC Hydro Ltd. – consumption and number of accounts.

Natural Gas Consumption: Terasen Gas Inc. – number of accounts and consumption.

Community Transportation

Activity Data:

Insurance Corporation of British Columbia – licensed vehicles on the road

Natural Resources Canada – Fuel consumption rates for individual vehicles

Province of BC – Vehicle kilometres traveled for the appropriate region of the Province

Community Solid Waste

Solid Waste: per capita disposal rates for municipal solid waste at the regional landfill facility.

DATA DEFICIENCIES

Fuel oil for space heating for residential and commercial buildings, if any, is deficient. Accessible datasets does not exist for this fuel source and no estimate has been provided by HES.

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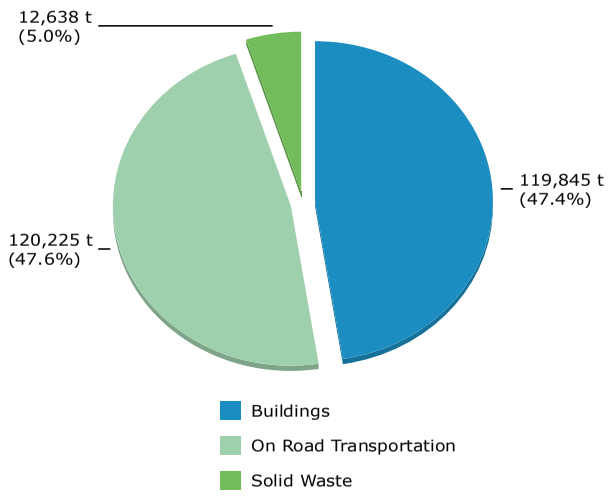
CO_2e (tonnes) by Sector *



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Port Coquitlam
Community Energy & Greenhouse Gas Emissions Inventory: 2007

Buildings	Consumption By Type						Energy & Emissions Total	
	Type	Connections	Consumption	Energy/Connection	Energy (GJ)	CO_2e (t)	Energy (GJ)	CO_2e (t)
Residential Buildings	Electricity	18,337	183,486,201 kWh	10,006 kWh/C	660,550	4,220	**1,916,967**	**68,485**
	Natural Gas	13,356	1,256,417 GJ	94 GJ/C	1,256,417	64,265		
Commercial Buildings	Electricity	2,022	135,291,859 kWh	66,910 kWh/C	487,051	3,112	**1,194,941**	**39,320**
	Natural Gas	1,532	707,890 GJ	462 GJ/C	707,890	36,208		
Industrial Buildings	Electricity	525	83,113,208 kWh	158,311 kWh/C	299,208	1,912	**793,545**	**27,197**
	Natural Gas	13	494,338 GJ	38,026 GJ/C	494,338	25,285		
Subtotal	Electricity	20,884	401,891,268 kWh		1,446,809	9,243	**3,905,453**	**135,002**
	Natural Gas	14,901	2,458,644 GJ		2,458,644	125,758		

On Road Transportation	Consumption By Type						Energy & Emissions Total	
	Type	Units	Consumption	Litres/Unit	Energy (GJ)	CO_2e (t)	Energy (GJ)	CO_2e (t)
Small Passenger Cars	Gasoline	16,559	13,769,970 litres	832 L/U	477,267	34,389	**481,030**	**34,659**
	Diesel Fuel	156	97,294 litres	624 L/U	3,763	270		
Large Passenger Cars	Gasoline	6,316	6,890,396 litres	1,091 L/U	238,821	17,208	**241,119**	**17,373**
	Diesel Fuel	66	59,404 litres	900 L/U	2,298	165		
Light Trucks, Vans, And Suvs	Gasoline	15,408	27,596,274 litres	1,791 L/U	956,487	68,918	**965,608**	**69,547**
	Diesel Fuel	116	177,069 litres	1,526 L/U	6,849	492		
	Mobile Propane	52	89,781 litres	1,727 L/U	2,272	136		
Commercial Vehicles	Gasoline	2,286	4,080,873 litres	1,785 L/U	141,443	10,191	**394,092**	**28,308**
	Diesel Fuel	1,210	6,449,381 litres	5,330 L/U	249,462	17,926		
	Mobile Propane	90	125,909 litres	1,399 L/U	3,187	191		
Tractor Trailer Trucks	Diesel Fuel	243	4,467,864 litres	18,386 L/U	172,817	12,418	**172,817**	**12,418**

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Port Coquitlam

Community Energy & Greenhouse Gas Emissions Inventory: 2007

On Road Transportation continued

Motorhomes	Gasoline	255	486,093	litres	1,906	L/U	16,848	1,214	**18,477**	**1,331**
	Diesel Fuel	20	42,121	litres	2,106	L/U	1,629	117		
Motorcycles And Mopeds	Gasoline	1,055	392,460	litres	372	L/U	13,603	980	**13,603**	**980**
Bus	Gasoline	22	183,920	litres	8,360	L/U	6,375	459	**6,375**	**459**
Subtotal	Gasoline	41,901	53,399,986	litres			1,850,843	133,360	**2,293,121**	**165,076**
	Diesel Fuel	1,811	11,293,133	litres			436,818	31,388		
	Mbl Propane	142	215,690	litres			5,459	328		

Solid Waste	Direct Emissions				Emissions Total
	Type	Estimation Method	Mass (t)	CO_2e (t)	CO_2e (t)
Community Solid Waste	Solid Waste	Methane Commitment	22,638	9,948	**9,948**
Subtotal			22,638	9,948	**9,948**

Grand Total	**Activity**	**Consumption**	**Energy**	**CO_2e**	**Energy & Emissions Total**	
					Energy (GJ)	CO_2e (t)
	Electricity	401,891,268 kWh	1,446,809 GJ	9,243 t		
	Natural Gas	2,458,644 GJ	2,458,644 GJ	125,758 t		
	Gasoline	53,399,986 litres	1,850,843 GJ	133,360 t	**6,198,574**	**310,025**
	Diesel Fuel	11,293,133 litres	436,818 GJ	31,388 t		
	Mbl Propane	215,690 litres	5,459 GJ	328 t		
	Solid Waste			9,948 t		

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