

City of New Westminster
COMMUNITY ENERGY
& EMISSIONS PLAN

Stantec Consulting Ltd.
June 20, 2011



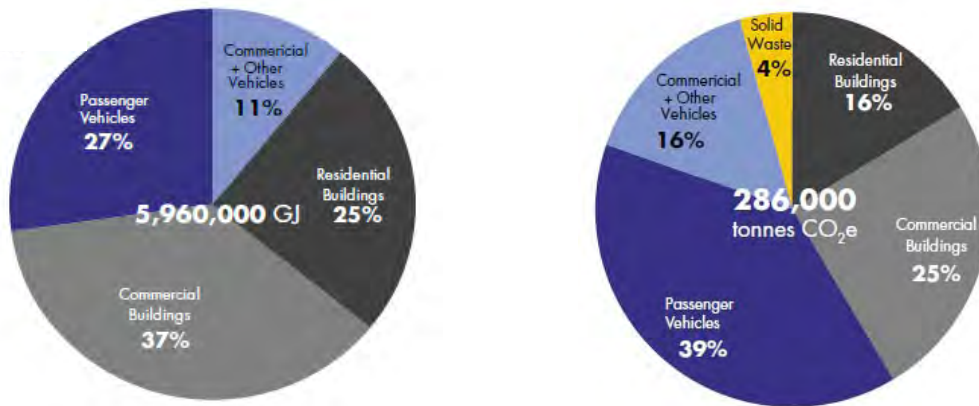
SUMMARY

The City of New Westminster has developed this Community Energy and Emissions Plan (CEEP) as part of its ongoing efforts to ensure we support a highly livable, healthy, sustainable community as we continue to grow and develop over the next 25 years and beyond. The CEEP supports sustainable community development by identifying opportunities for reducing community level energy consumption and GHG emissions with the benefits of:

- Reduced energy costs
- Reduced impacts to climate change
- Improved air quality
- Reduced vulnerability to energy markets
- Job creation and business opportunities
- A more sustainable community

This plan identifies:

Where are we now? Residents, businesses and organizations in New Westminster consume energy in order to heat and power buildings, and to move goods and people around. In order to purchase this energy, residents, businesses and organizations in New Westminster spend approximately \$114 million dollars annually. Approximately 38% of the energy we consume is used to move our vehicles, and 62% of the energy is used for our buildings. With respect to greenhouse gas emissions (GHGs), approximately 55% come from our vehicles, 41% from heating and powering our buildings, and the remaining 4% comes from the breakdown of our solid waste in landfills.



Where are we going? Although New Westminster's geographic boundaries are not expanding, the city's population continues to grow and is projected to increase by approximately 40% in 25 years. As population grows, so does demand for energy. If we continue using fossil fuels as the energy source, the result will be increasing GHG emissions, as well as an increasing reliance on energy sources with uncertainty about supply and volatility in costs.

Where do we want to be? To ensure New Westminster continues to be a place we want to live, work and play in, the plan defines our long-term vision and goals for the city with respect to energy:

We are a healthy, active and livable community. We are well positioned and ready to make choices to reduce our carbon footprint. We honour our past and embrace the future.

8 Goals for Reducing Energy and GHG Emissions in New West:

1. *Improve energy efficiency in existing buildings*
2. *Build the most energy efficient new buildings*
3. *Encourage renewable, responsible & local energy*
4. *Build neighbourhoods where residents can live, work and play in close proximity*
5. *Foster walking, cycling, and taking transit as the preferred ways of getting around*
6. *Support use of efficient and low-carbon mobility*
7. *Minimize waste generation*
8. *Maximize reuse, recycling and material recovery*

The City has adopted a GHG emission reduction target as follows:

Reduce community-wide GHG emissions by 15% by 2030

How will we get there? The CEEP identifies 35 actions the City can put into place, from education campaigns to policies about re-zoning, to help achieve this vision, goals and the GHG emission reduction target. Various levels of actions are defined from “Light Green” to “Moderate” to “Deep Green”. Implementation of the “Moderate” scenario is estimated to achieve the GHG emissions reduction target and is estimated to have the following costs for implementation:

Estimated City Staff Time: 1 FTE for 5 years

Estimated City Disbursement Costs: \$250,000 per year over 10 years

The City will need to dedicate staff time and annual funding to support the implementation of this plan. It will also be important to continually monitor, report and review progress on these activities so that they can be adjusted as necessary to improve the outcomes. This plan commits the City to taking action; however, **to fully achieve this plan, residents, businesses and organizations in New Westminster will each need to do their part.**

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1. INTRODUCTION

A Community Energy and Emissions Plan (CEEP) helps a community manage energy use and greenhouse gas (GHG) emissions. Why is it important to manage energy use and GHG emissions? Managing community energy use and emissions has many benefits including:

- **Reduced energy costs** – energy costs can be substantially reduced by being more energy efficient;
- **Reduced impacts to climate change** – managing carbon emissions helps to minimize impacts on the global ecosystem;
- **Improved air quality** – reducing the use of fossil fuels, especially in transportation, also reduces the amount of pollutants being released into the air we breathe;
- **Reduced vulnerability to energy markets** – reducing the dependence on fossil fuels helps to decrease the vulnerability to fluctuating energy supply and pricing;
- **Job creation and business opportunities** – promoting a green economy (clean technologies, renewable energies, water services, green transportation, waste management, green buildings and sustainable agriculture and forests) can open up new job and business opportunities;
- **More sustainable communities** – the activities that support energy conservation are aligned with other sustainable community objectives such as building compact, complete communities, more efficient infrastructure, walkable neighbourhoods, and protection of farmland and natural areas.

1.1 What is a CEEP?

This CEEP endeavours to answer the following questions:

Where are we now? Residents, businesses and organizations in New Westminster consume energy in order to heat and power buildings, and to move goods and people around. Because a lot of the energy we consume comes from burning fossil fuels (e.g. gasoline, diesel, natural gas), these activities also result in the release of GHG emissions. A profile of how energy is currently used in New Westminster on an annual basis provides us with an understanding of where and how much energy is consumed. This can help identify areas where we can become more efficient in our energy consumption. We can also better understand how much GHG emissions we generate and what types of energy sources (fossil fuels, hydro-electricity, alternative energy, etc.) we use.

Our current energy use and GHG emissions are described in Chapter 3.

Where are we going? Although geographically New Westminster is not growing, the city's population continues to grow and is projected to increase by approximately 40% in 25 years. As population grows, so does demand for energy. A "business-as-usual" (BAU) forecast tells us how much energy we will need as our community grows if we don't change our current patterns of energy consumption. The BAU forecast can also estimate how much our GHG emissions will grow unless we find alternative energy sources.

Our Business-As-Usual forecast is described in Chapter 3.

Where do we want to be? To ensure New Westminster continues to be a place we want to live, work and play in, it is important to define our long-term vision and goals for the city. A clear understanding of where we want to be helps us make better decisions with respect to planning, developing, and programming for our community. This CEEP defines a vision, goals and targets to help guide decisions that may impact future energy consumption and GHG emissions in the community. The goals focus on Buildings, Transportation and Solid Waste.

Our vision and goals for the long-term are described in Chapter 4.

How will we get there? Once we have a long-term direction, we need to put into place short, medium and longer-term measures that will help us get there. The CEEP identifies numerous actions and tools the City can put into place, from education campaigns to policies about re-zoning. To fully achieve the vision and goals of this plan, residents, businesses and organizations in New Westminster will each need to do their part.

Our strategies for achieving our vision and goals are described in Chapters 5 (Buildings), 6 (Transportation) and 7 (Solid Waste). Our implementation and communication plans are described in Chapters 8 and 9.

1.2 CEEP Objectives

The CEEP was developed to support sustainable community development through the reduction of community level energy consumption and GHG emissions. Preparation of this CEEP was undertaken to meet the following objectives:

- To provide strategic guidance about addressing community energy use and GHG emissions over the longer term;
- To align energy and GHG emissions initiatives with the City's existing sustainability goals and initiatives;
- To develop community-wide GHG reduction targets, policies and actions that can be incorporated into the City's Official Community Plan (OCP) to address provincial requirements established under Bill 27 (2008);
- To comply with the Federation of Canadian Municipalities Partners for Climate Protection (PCP) program requirements (milestone 1-3, "community" stream); and
- To comply with community level commitments under the B.C. Climate Action Charter.

1.3 Guiding Principles for Energy Planning

There are many activities that can help a community reduce its overall energy consumption and GHG emissions. Which ones are most effective? Which ones should be higher priority? In order to address energy and emissions, the **first priority is to identify opportunities for decreasing demand and increasing efficiency**; the second priority is to find alternative sources of energy that reduce emissions. With respect to transportation and mobility, compact land-use planning in combination with improved infrastructure for non-vehicular mobility provide the primary means of increasing efficiency over the long-term. In relation to buildings, BC Hydro has developed the “4Rs of Sustainable Community Energy Planning” which identifies a hierarchy of principles for energy planning (see Figure 1).

1. **Reduce energy demand:** First and foremost, look for ways to reduce the amount of energy we need to undertake our daily activities. This step requires us to be smarter about our energy use (e.g., turning the heat down when not in the room) and using more efficient technologies (e.g., better insulation, “passive solar” homes, etc.).

2. **Reuse waste heat to heat buildings and hot water:** The next step is to find places that we are releasing heat into the air that could be recovered or reused. This involves building-scale technologies (e.g. heat and drain water recovery ventilators) and planning our communities to encourage recovery of waste heat (e.g. trapping heat from sewer pipes and using it to heat buildings).

3. **Develop renewable heat sources to heat buildings and hot water:** Once we have looked at all the options for reducing demand and recovering waste heat, next we look for renewable sources of heat to supplement or replace our use of fossil fuels. This could entail installing solar panels for hot water, or heat pumps that extract heat from the ground, water or air.

4. **Develop renewable energy sources to supply electricity needs:** The final step is to identify options for supplementing or replacing electricity with renewable sources. This could entail installing photovoltaic solar panels, small wind turbines, or micro-hydro (where applicable) to generate local electricity.

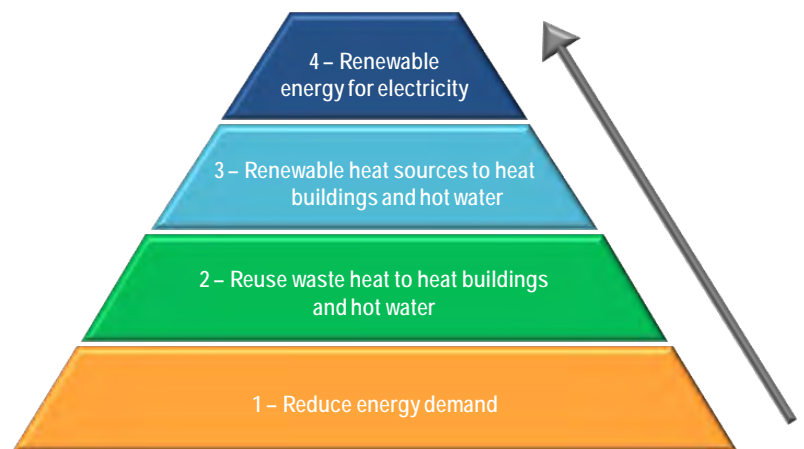


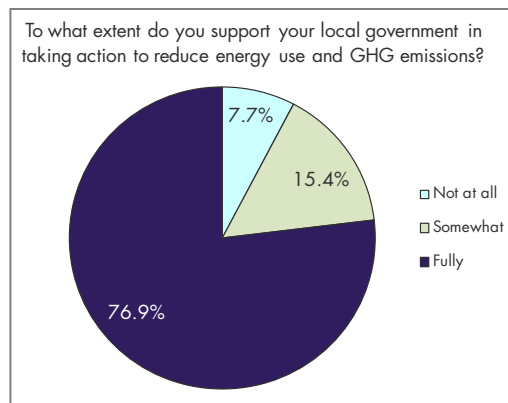
Figure 1. BC Hydro's 4Rs of Sustainable Community Energy Planning

1.4 How was the CEEP Developed?

The New Westminster CEEP was developed over the course of six months and involved a combination of input from staff, residents and organizations in the community, data collection, technical analysis, and research on policy and best practices. The City engaged a consultant to undertake the development of the CEEP. The following describes involvement of various people in the process:

City staff from several departments were involved throughout plan development. First, through a facilitated workshop staff created a draft CEEP vision and set of goals that align with the visions, goals and objectives previously defined through public processes (e.g. the Official Community Plan, the Downtown Neighbourhood Plan, the Livable City Strategy). Staff were also engaged in the identification and analysis of strategies and potential actions for the CEEP. A second facilitated staff workshop was held to analyse the strategies and begin developing a community-wide GHG emission reduction target. Staff reviewed the draft plan and provided feedback prior to plan finalization.

Input was gathered from **the public** through a survey (paper and web-based) to understand the level of importance residents place on taking action to become more energy efficient, reduce GHG emissions, and use more alternative energy sources; the degree to which residents support the City in taking action on these issues; and residents' willingness to take action – as individuals, organizations, and businesses. Among the 29 responses, there was a high level of support for having the City take action on energy and GHG emissions at the community-scale, as shown in the figure to the right.



A **public open house** was also held to provide contextual information about community-wide energy use and GHG emissions to residents, businesses and other interested parties. The open house included display of a series of information boards (see example to the right), an opportunity to ask questions, and an opportunity to provide input through discussion and through the survey.



Several **stakeholders** were invited to participate in a **CEEP Task Force workshop** to provide input to the development of strategies and actions for the plan. This Task Force met for a facilitated workshop to develop and discuss strategies that informed the CEEP development. Task Force members also reviewed and provided feedback on



the draft plan. Organizations that were represented at the workshop include:

- Environment Advisory Committee
- Bike and Pedestrian Advisory Committee
- Westminster Centre
- West End Business Association
- Sapperton Business Association
- Downtown BIA
- Chamber of Commerce
- Starlight Casino
- River Market
- Onni Group of Companies
- Kruger Products Limited
- Justice Institute
- Douglas College
- New Westminster School District
- Fraser Health Authority
- Metro Vancouver
- TransLink
- BC Hydro
- Terasen

The following table summarizes the activities undertaken during development of the CEEP in order to gather input from the public, as well as various other representatives of the community:

Input Activity	Date	Activity Objectives
Workshop with City staff from several departments: CEEP vision, goals and strategies	September 2010	To verify vision and goals within the context of City strategic goals; To gather input about potential CEEP strategies
Brochure distribution and webpage for the general public	October 2010 – January 2011	To inform residents about the process; Educate about current baseline; Present energy vision and goals
Public open house with information boards at City Hall	October 2010	To inform residents about the process; Educate about current baseline; Present energy vision and goals; Gather input through the survey
Public CEEP survey	October 2010 – January 2011	To gather input from residents about the vision and goals for the energy plan
Workshop with community stakeholders: Identifying strategies	November 2010	To gather technical input from stakeholders
Workshop with City staff: Analyzing strategies and developing targets	November 2010	To analyze strategies and develop targets for the OCP
Council session: CEEP Update and developing GHG reduction targets	January 2011	To update Council on CEEP progress and to discuss potential scenarios leading to GHG reduction targets

2. CONTEXT FOR ENERGY PLANNING

2.1 Energy, GHG Emissions and Climate Change

There is increasing evidence that global climate change resulting from emissions of carbon dioxide and other greenhouse gases (GHGs) is having a significant impact on the ecology of the planet. In addition, climate change is expected to have serious negative impacts on global economic growth and development. In 2005, the UK government commissioned an independent economic review called the Stern Review, which states that the *“costs of stabilizing the climate are significant but manageable; delay would be dangerous and much more costly.”*

Beyond the ecological and economic costs associated with delayed action on climate change, there are cost savings to be realized through efforts to conserve energy and to use it more efficiently, and economic opportunities available to communities that develop local energy supply and infrastructure. Actions that encourage energy efficiency and conservation, identify opportunities for capturing waste heat energy, and promote implementation of renewable energy will assist local governments in developing **energy resilient communities**, in addition to **mitigating climate change**.

Local governments can play a critical role in reducing energy consumption and GHG emissions and can take action by:

- Identifying opportunities to reduce consumption and GHG emissions from their operations, and;
- Implementing broader policies and programs to reduce energy consumption and GHG emissions throughout the community.¹

2.2 Federal and Provincial Context

Senior levels of government have made commitments to reducing energy consumption and GHG emissions, and have developed policies, programs and initiatives to meet those commitments. Here is a brief summary of the key commitments and initiatives at the federal and provincial levels:

¹ This document focuses on community emissions only. Corporate emissions are addressed separately in the City's Energy and Greenhouse Gas Emissions Management Plan (2008).

Federal initiatives

- In January 2010, the federal government set a **national target** to reduce GHG emissions by 17 percent, relative to 2005 levels, by 2020.
- In 2010, the federal government announced proposed **Passenger Vehicle and Light Truck Greenhouse Gas Emission Regulations** under the Canadian Environmental Protection Act (CEPA) to create national vehicle efficiency standards that harmonize with the US standards by 2011. If implemented, new vehicles sold in 2016 are expected to be 40% more efficient than vehicles sold in 2008. They also announced upcoming Heavy Duty Vehicle regulations which are not yet defined.

Provincial initiatives

- **Greenhouse Gas Reduction Targets Act** (Bill 44, 2007) establishes a province wide reduction of GHG emissions to a target of 33% below 2007 levels by 2020, and a reduction of 80% by 2050. Interim reductions targets were subsequently established as 8% by 2012 and 18% by 2016.
- **BC Climate Action Plan:** Developed to support Bill 44, the plan's actions are estimated to achieve 73% of the reductions required to meet the reduction target. Most notable in this plan is the introduction of a carbon tax.
- **Clean Energy Act:** In 2010 BC adopted the Clean Energy Act that defines several energy objectives for BC, including achieving electricity self-sufficiency, meeting 66% of the increase in demand by 2020 through conservation and demand management, and several others.
- **Local Government (Green Communities) Statutes Amendment Act** (Bill 27, 2008) which amends the Local Government Act to read:
 - LGA 877 (3) - An official community plan must include targets for the reduction of greenhouse gas emissions in the area covered by the plan, and policies and actions of the local government proposed with respect to achieving those targets (by May 31, 2010)
- **BC Climate Action Charter:** A provincial initiative introduced in September 2007 to encourage local governments to become carbon neutral in their local government operations by 2012.

2.3 Regional Context

In BC's lower mainland, the Metro Vancouver **Regional Growth Strategy** (RGS), which is currently in draft form, provides a guide for coordinated regional decision-making. The RGS aims to focus growth in urban centres aligned with frequent transit, where New Westminster is identified as a Regional City Centre (see Figure 2). As a member municipality, New Westminster must include a Regional Context Statement in its OCP that identifies how it will align with the RGS goals and strategies. How New Westminster grows and develops plays an important role in its community energy use and GHG emissions.

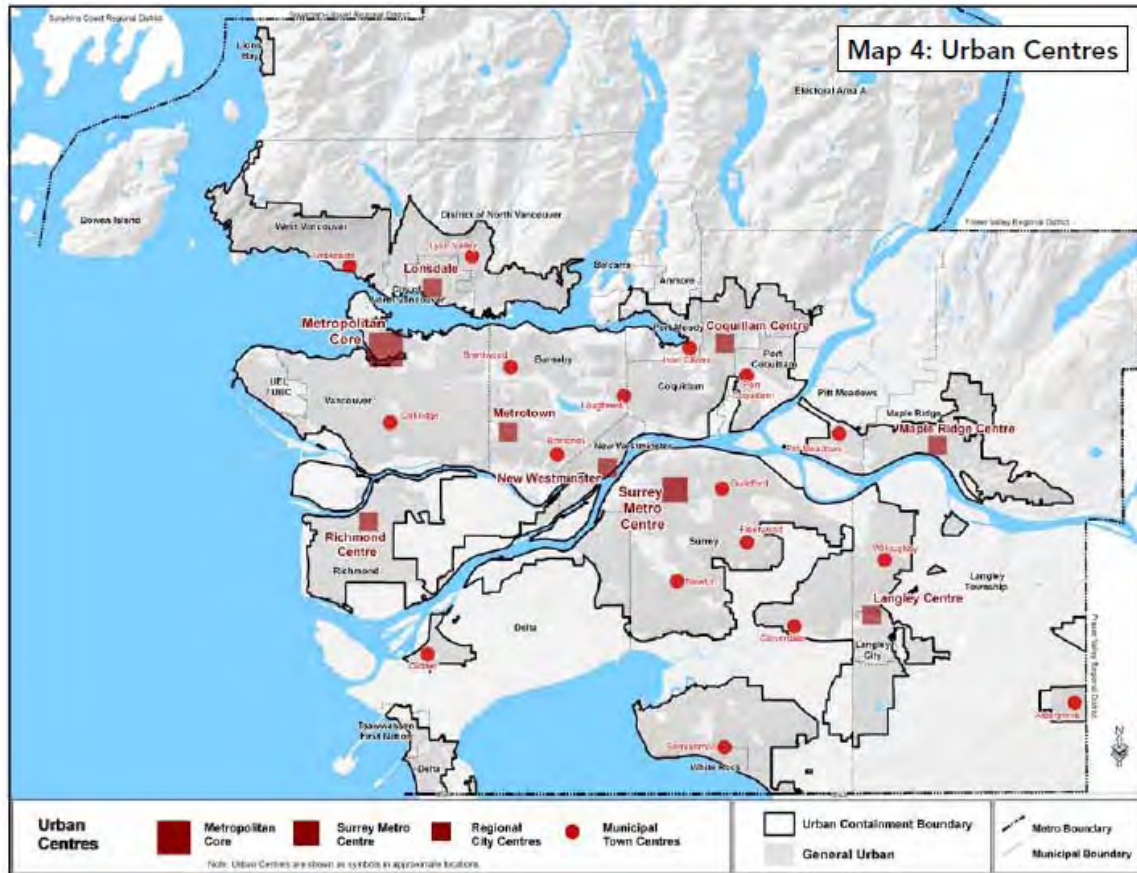


Figure 2. Map of Metro Vancouver RGS Core, City and Town Centres
 Source: Metro Vancouver 2040, Draft, January 2011

Regional Transportation Planning

TransLink is the regional transportation authority for the Metro Vancouver region. TransLink is guided by **Transport 2040**, the long-term strategy for Metro Vancouver’s regional transportation system. TransLink determines the location and service levels of local transit routes in New Westminster, and is responsible for managing the major road network in conjunction with the local municipalities and providing emissions testing for vehicles (AirCare). TransLink also delivers programs such as cost sharing of bicycle infrastructure for the regional bicycle network, and delivery of the TravelSmart program. TransLink’s planning, investments, and decisions will impact actions related to transportation in the City’s CEEP.

Regional Waste Management Planning

Metro Vancouver is also in the latter stages of finalizing an **Integrated Solid Waste and Resource Management Plan (ISWRMP)**. The ISWRMP will contribute to meeting the provincial GHG targets by facilitating waste reduction and by treating waste as a resource to be reused or recycled. It has actions that support energy-efficient infrastructure, such district energy systems, as well as actions to expand the generation of electricity and biofuels from municipal solid waste and the recovery of heat for use in industrial or district heating systems.

2.4 Our Community Context

Geography

New Westminster is a relatively dense urban community of approximately 1,500 hectares that is located in the centre of the Lower Mainland in British Columbia. Due to its relatively small geographic size, the City has almost no land available for new development, except through re-zoning or re-development of existing properties. This has led to an increase in density, which is typically associated with reduced energy requirements per capita relative to communities that continue to accommodate growth in the form of single-family homes.

Population

The number of people living in a community, and the rate it is growing, also has a significant impact on the amount of energy used. In 2010 the population of New Westminster was estimated at 66,892². Between 1996 and 2008 the population grew approximately 24% (1.8% per year). Over the same period, the population in Metro Vancouver grew 19%.

Economy and Employment

The economic base of a community impacts the types of non-residential buildings, their energy requirements, and the amount of transportation needed to supply the activities. The primary sector of employment in New Westminster is Health, Education and Government (37.5% of jobs). The three largest employers in New Westminster are the Royal Columbia Hospital (3,500 employees), Douglas College (950), and the New Westminster School Board (900).³ The City is also a large employer with 566 full-time staff, and approximately 1,000 when part-time staff is included.

Land Use

The City of New Westminster Official Community Plan (OCP) Bylaw No. 6476, 1998 was adopted by Council June 15, 1998. The OCP provides the framework for managing growth and creating a complete community. Goals for the OCP include reducing the need for automobile travel and the general reliance on cars.

The Downtown Community Plan (DCP) was presented to Council on January 25th, 2010. The plan envisions the downtown that is a place of economic growth, has services and amenities, is family friendly, maintains heritage alongside increasing density, and connects to the waterfront. With respect to energy, the DCP emphasizes the reduction of GHGs and energy efficiencies through the applications of design guidelines for new development.

The neighbourhood of Queensborough is currently developing a Community Plan. Several of the Draft Goals from the community plan process in 2009 identify changing transportation behaviours to reduce dependency on cars. For example, one goal is to reduce the need for automobile use by encouraging compact development with adequate density to support public transit. (Queensborough Community Plan Process, Draft Goal)

² BC Stats 2010 Sub-Provincial Population Estimates

³ City of New Westminster Community Profile, September 2009

3. OUR CURRENT SITUATION

3.1 Energy and GHG Emissions Baseline: 2007

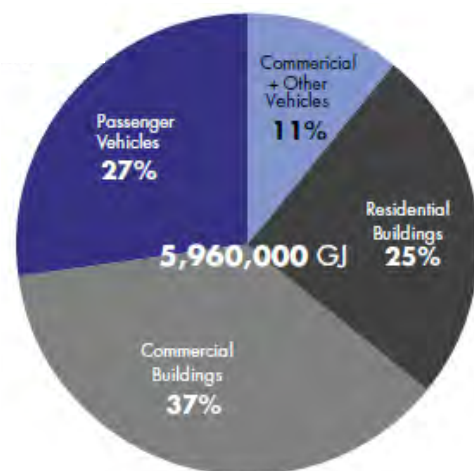
Where are we now? Residents, businesses and organizations in New Westminster consume energy in order to heat and power buildings, and to move goods and people around. This section describes how and how much energy is currently used in New Westminster on an annual basis, as well as the estimated GHG emissions resulting from community activities.

The Province has developed Community-wide Energy use and Emissions Inventories (CEEI) for all municipalities and regional districts in BC. These CEEI reports provide the total energy consumed through electricity and natural gas in the community and an estimate of propane, heating oil, wood and vehicle fuel consumed for the baseline year of 2007. The associated GHG emissions are also calculated for each energy consumption type, and for estimated waste emissions.⁴ The total amount of spending on energy in the community was also calculated, and is approximately \$114 million dollars for the 2007 year.

For this plan, CEEI data for New Westminster was reviewed and compared to other data sources for the purpose of cross checking the reliability of the data. The overall findings, based on the data that is available for comparison, are that the CEEI data provides a reasonable estimate of the energy consumption and GHG emissions for most categories, and therefore the CEEI values are used as reported by the Province. Details of the inventory and review are provided in Appendix A. Here is a summary of New Westminster's CEEI data:

Energy Use (2007)

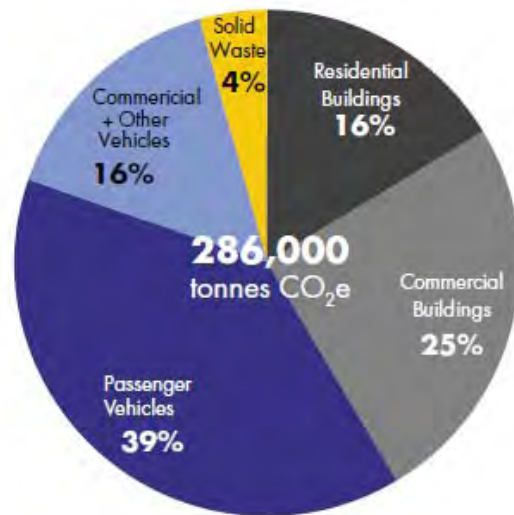
- **Buildings (62%):** Energy is consumed to heat, cool and power our buildings using natural gas and electricity. In residential buildings (houses, townhomes, apartments) about 44% of the energy is electricity and 56% is natural gas. In commercial and small/medium industrial buildings, about 42% is electricity and 58% is natural gas.
- **Transportation (38%):** Energy is consumed by vehicles to move people and goods. This energy primarily comes from burning gasoline, diesel and propane. Passenger vehicles account for the majority of the community's estimated transportation fuel use.



⁴ Revised inventories for 2007 are available at www.env.gov.bc.ca/epd/climate/ceei/index.htm and were last updated September 2010. It is expected that subsequent inventories will be released for the year 2010, and bi-annually after that.

GHG Emissions (2007)

- **Buildings:** Using electricity and natural gas in our buildings leads to 41% of the community's GHG emissions. Most of the GHGs result from natural gas use.
- **Transportation:** Using gasoline, diesel and propane for transportation leads to approximately 55% of the community's GHG emissions. Our community inventory includes only vehicles registered in New Westminster.
- **Solid waste:** Some of our waste goes to landfills where it decomposes and releases methane gas, a potent GHG. The rest of our waste goes to a waste-to-energy facility in Burnaby.



3.2 25-year Business As Usual Forecast

Where are we going? The city's population continues to grow and is projected to increase by approximately 40% in 25 years. As population grows, so does demand for energy. A "business-as-usual" (BAU) forecast tells us how much energy we will need as our community grows if we don't change our current patterns of energy consumption. The BAU forecast can also estimate how much our GHG emissions will grow unless we find alternative energy sources. A business-as-usual (BAU) 25-year forecast was developed for community-wide energy consumption and GHG emissions to 2032.

BAU Forecast Assumptions

Although the BAU forecast is driven by population growth, it also takes into consideration expected efficiency improvements resulting from senior government regulations that will occur regardless of action taken by the City. Assumed efficiency improvements include:

- Increase residential building energy efficiency by 10% by 2020⁵ (e.g. building code improvements, appliance / equipment improvements, etc.)
- Increase commercial building energy efficiency by 9% by 2020 (e.g. building code improvements, appliance / equipment improvements, etc.)
- Increase passenger vehicle fuel economy by 40% by 2030⁶ (e.g. general fleet turnover and improved efficiencies in vehicle design from existing policy initiatives)
- Increase commercial vehicle fuel economy by 15% by 2030.

⁵ Residential and commercial building targets from the BC Energy Efficient Buildings strategy.

⁶ Passenger and commercial vehicle efficiency improvements expected based on the federal government announcements to increase fuel efficiency requirements by 2016 (light duty) and 2018 (heavy duty).

BAU Forecast Results

Based on the projected population growth of 1.4% per year, and the expected improvements in efficiency outlined above, the resulting business-as-usual forecast is outlined in Table 1 and Figure 3. Note that although overall electricity, energy consumption and GHG emissions are increasing in the forecast, expected improvements in efficiency as described above are forecast to lead to a decrease in per capita GHG emissions and consumption. Refer to Appendix A for BAU forecast results split by sector.

Table 1. BAU 2032 Forecast for Energy and GHG Emissions

	2007	2020	2032
Population	61,349	73,502	84,466
Total Energy Consumption (GJ)	6.0 million	6.3 million	6.9 million
Total Energy per capita (GJ)	97.1	85.4	79.3
Change from 2007	-	+5 %	+16 %
Electricity Consumption (GJ)	1.6 million	1.7 million	2.0 million
Electricity per capita (GJ)	26.0	23.5	23.5
Change from 2007	-	+9 %	+28 %
GHG Emissions (tonnes of CO ₂ e)	286,000	298,000	317,000
GHG Emissions per capita (tonnes of CO ₂ e)	4.7	4.1	3.6
Change from 2007	-	+4 %	+8 %

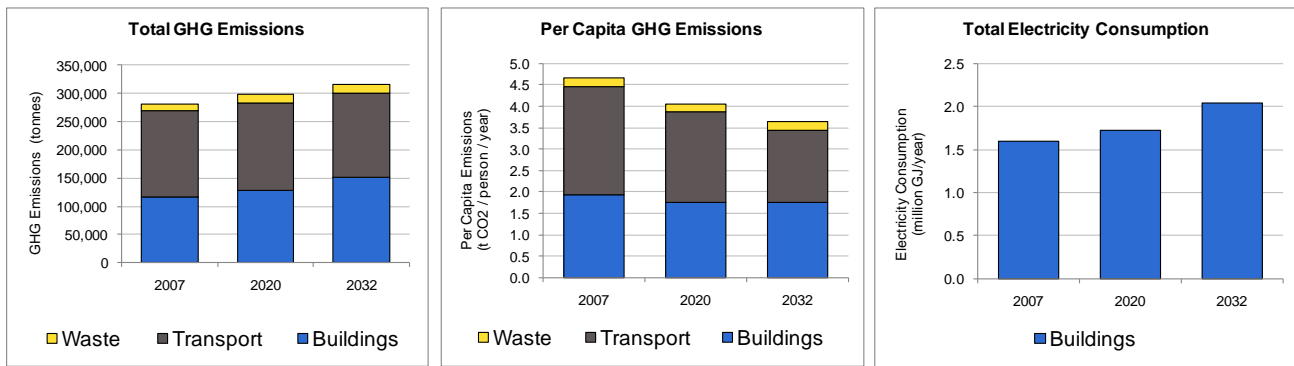


Figure 3. BAU 2032 Forecast for GHG Emissions

3.3 Building Thermal Load 2007 to 2032

This section describes the District Energy (DE) potential in New Westminster, by examining where the thermal energy loads are. It is used to highlight areas that might have enough demand for energy that could support the investment required for a DE system.

The estimated thermal energy requirements (space and hot water heating) is shown in Figure 4 for 2007 and estimated for 2032 in Figure 5. This energy requirement is supplied by a

mixture of electricity and natural gas. Depending on the building configuration some of this load could be supplied by a District Energy system.

The areal energy density is a useful starting point for evaluating the opportunities for District Energy, and is shown below as GJ per hectare of land area. This represents the customer base (GJ of energy required) and the service area (ha that must have DE infrastructure services)⁷. Higher densities represent more promising candidates for DE development. The figures indicate thermal energy densities of 3,000 GJ per ha are currently met in the Downtown and Uptown neighbourhoods, and by 2032, densities of over 2,000 GJ per ha are expected in Sapperton.⁸ Several of the neighbourhoods are forecast to have only small changes in the thermal energy demand (e.g. West end).

Many factors contribute to the viability of a DE system including the availability of a low cost energy source (e.g. waste heat), the rate of development, the type of system, whether cooling is also needed, etc. In North America, most DE systems are installed in large green field developments or re-development (e.g. the athlete's village at Southeast False Creek) or at large institutional campuses (e.g. UBC).

Specific challenges to developing DE system(s) in New West include:

- An established, serviced building stock. The City is virtually built out and so there are a limited number of large development sites that could be 'anchor tenants' for a new DE system. In built areas a DE system would have to be developed through existing neighbourhoods, and 'entice' customers to connect to the system. This represents a large capital investment that has to compete with established electricity and natural gas systems. The return on this investment would be poor without a regulated requirement to connect. Currently the City could not force existing buildings to connect.
- Building compatibility. The thermal energy density in the downtown area is substantial. However, much of the thermal energy in new buildings is provided by electric resistance heating.⁹ Conversion of a building wired for electrical heat to hydronic heat is expensive. To encourage this conversion the DE system would have to offer a return to the client that is attractive, and achieved within their business case timeframe (i.e. a few years). This might require substantial incentives.
- Low density neighbourhoods. The business case to connect existing detached dwellings to a DE system is typically poor and retrofits are difficult. Many of the neighbourhoods (e.g. Victory Heights) do not have high thermal energy density now,

⁷ DE distribution systems in actuality linear infrastructure and the investment is based on the number of metres of pipe installed. However at this scale, without any specific development proposal, this areal metric is an approximation for the amount of infrastructure required.

⁸ For comparison, the South East False Creek DE system in Vancouver is estimated to have energy densities of about 3000 GJ/ ha and the East Fraserland development which is including a DE system is in the range of 1500 GJ / ha.

⁹ Typical MF development currently employs electric baseboard heaters for in suite heating and natural gas for hot water, make-up air (forced air to hallways and common areas), and unique common features (pools, Jacuzzis, fitness rooms, etc.)

nor are they predicted to by 2030. Retrofit of detached dwelling neighbourhoods is rarely economic.

DE systems are most promising in areas of new building construction. New buildings can be more affordably built from scratch with hydronic systems without incurring the retrofit cost penalty.

To highlight this opportunity, the change of thermal load from 2006 to 2030 is estimated by neighbourhood and is shown in Figure 6. Only the downtown area is going to have increases in loads greater than 1,000 GJ / ha. Several neighbourhoods have increases that are small (less than 250 GJ / ha). This map also overlays:

- the location of large sewer infrastructure (pipes > 800mm diameter), indicating potential locations for heat recovery from sewers in future; and
- the location of existing civic and institutional facilities that may provide either potential opportunities for heat recovery, or as potential anchor tenants for future systems.

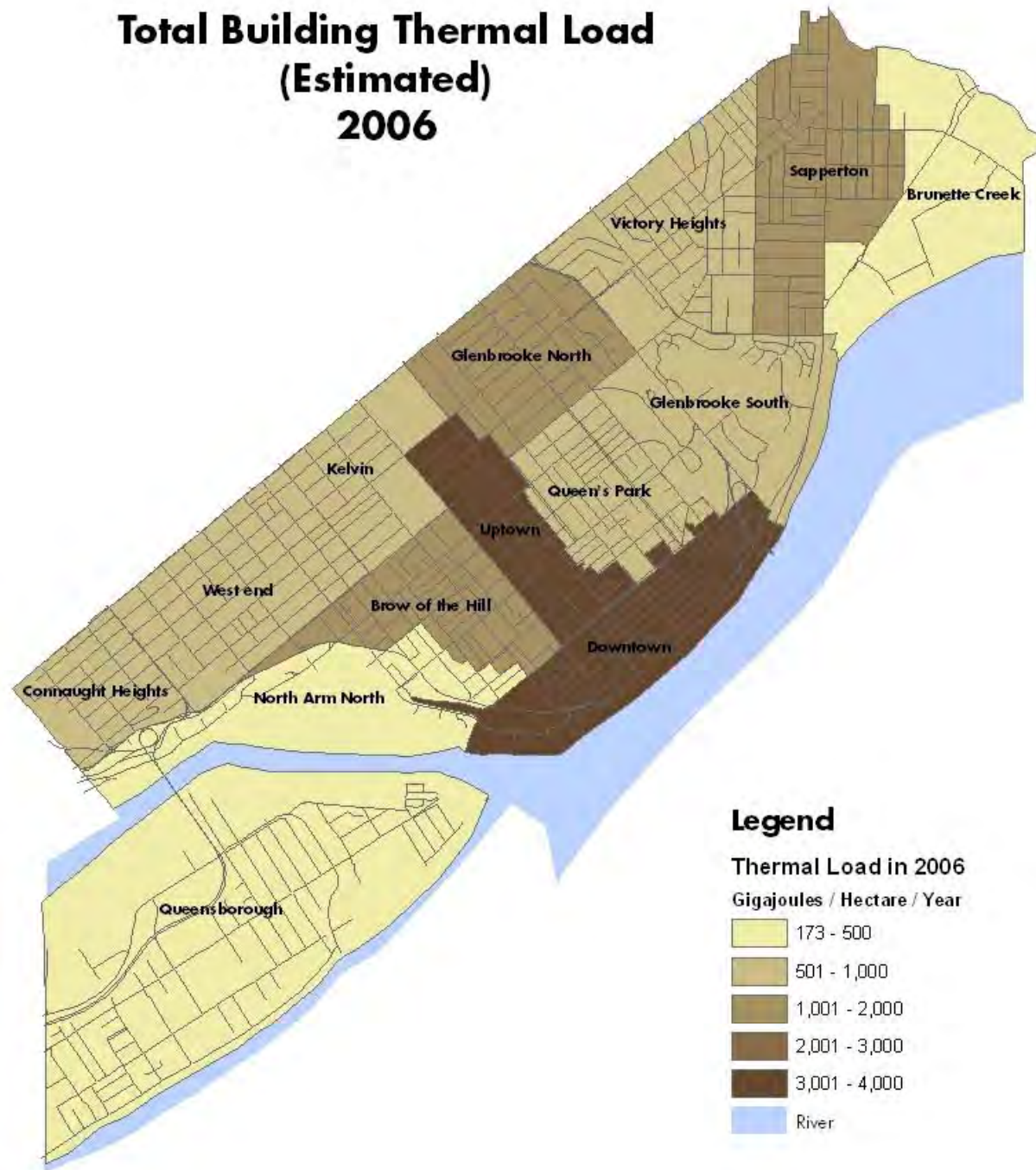


Figure 4. Estimated thermal load by neighbourhood (2006)

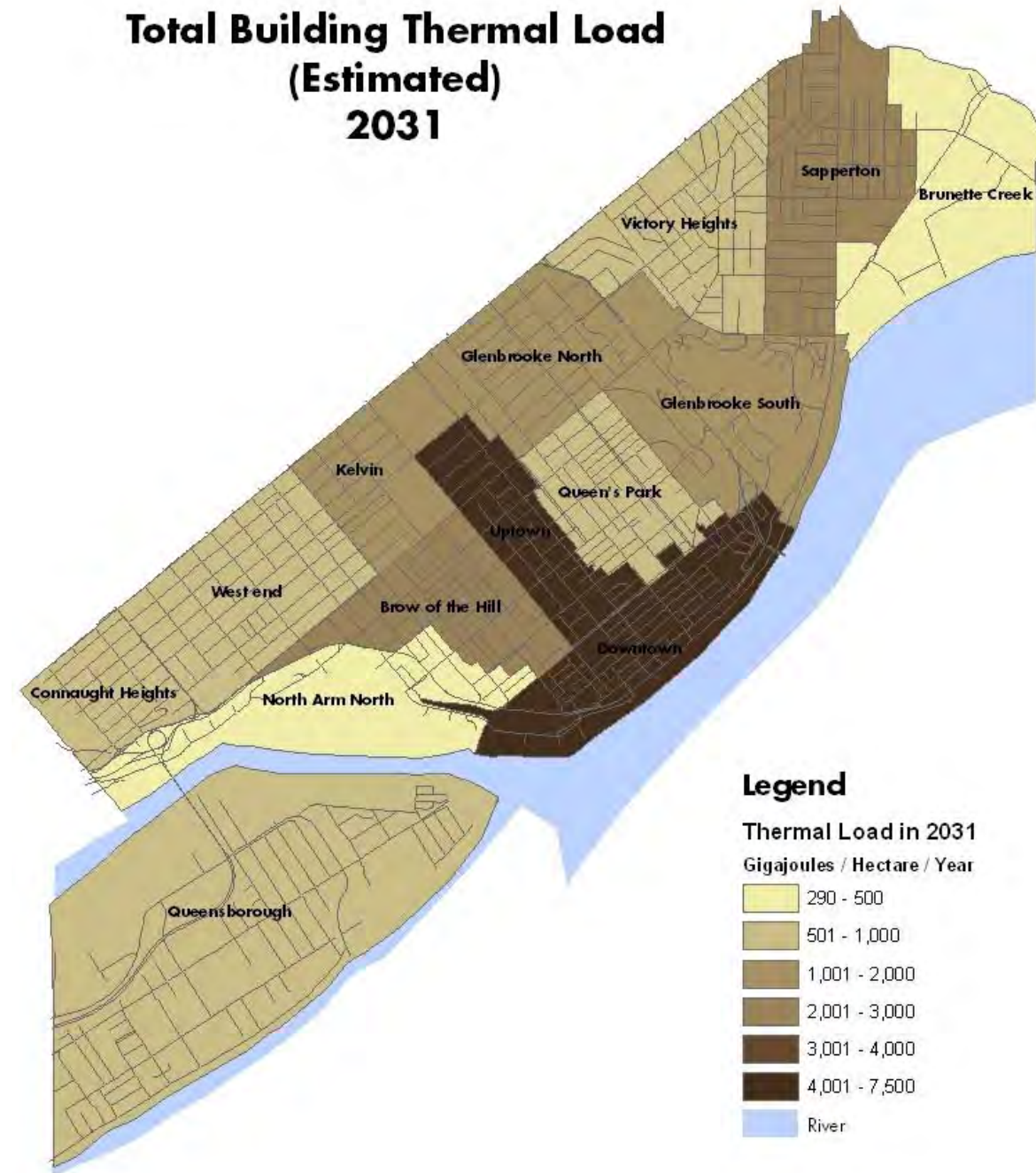


Figure 5. Estimated thermal load by neighbourhood (2031)

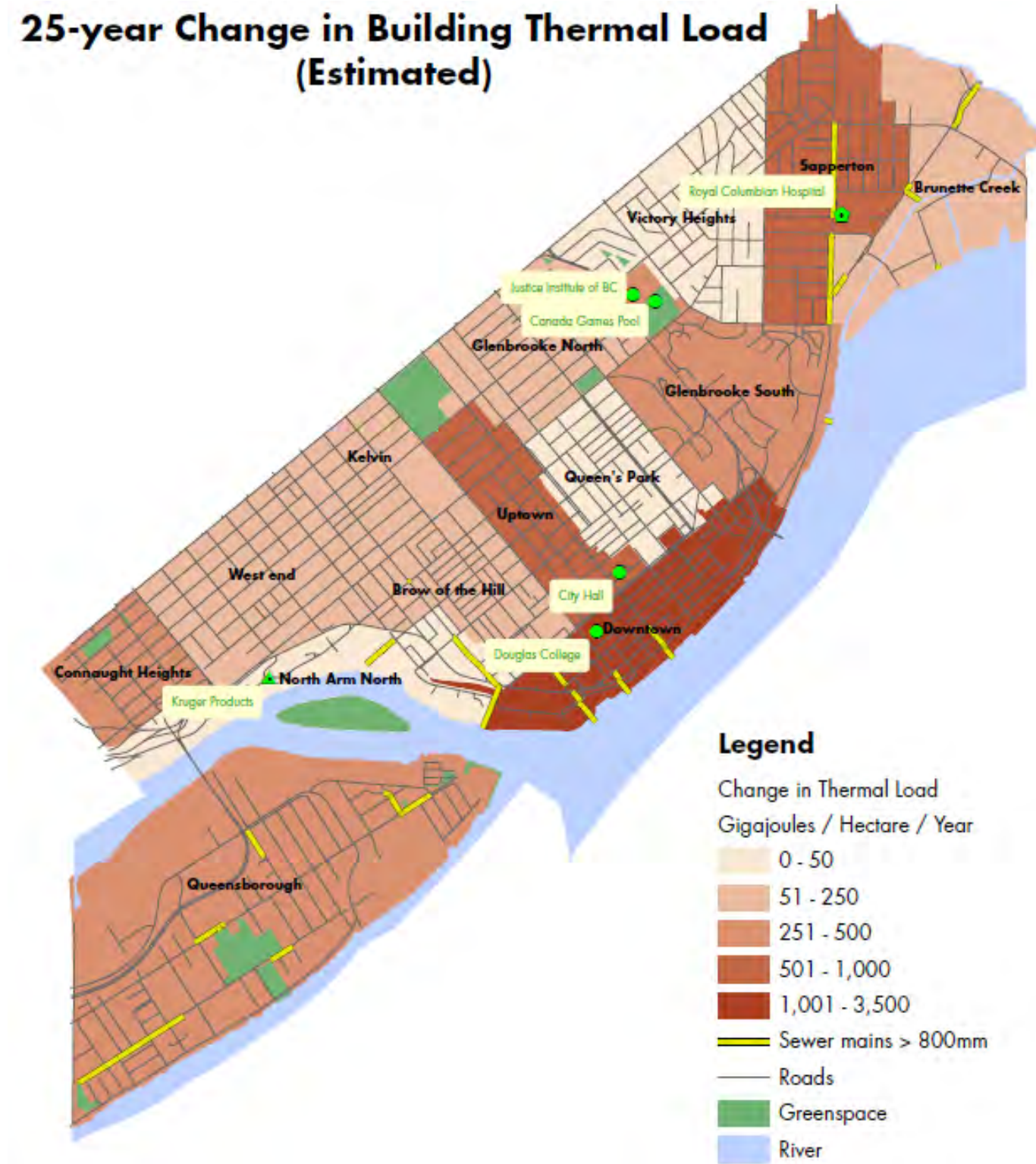


Figure 6. Estimated change in thermal load by neighbourhood (2006 to 2031)

3.4 What initiatives are already happening in New West?

There are many initiatives undertaken by the City, its residents, its businesses and other community organizations that will help the community become more energy efficient and reduce greenhouse gas emissions. Some of these initiatives are highlighted in the table below and have been grouped by “Buildings” – initiatives relating to the built environment that impact building energy use; “Land Use and Transportation” – initiatives relating to the way our community is laid out and our mobility and mode of choice for getting around; and “Solid waste” – initiatives relating to reducing, reusing and recycling our waste.

Buildings: Improving efficiency and using alternative energy
<ul style="list-style-type: none">• City of New Westminster Corporate GHG reduction plan is currently in implementation – improving efficiency of civic facilities• The City adopted a Civic LEED Gold standard for new facilities and major renovations in August 2009• Sustainability Report Card is used by the City to evaluate Zoning Bylaw amendment or development permit applications• Westminster Centre Mall (built in 2008) was the first market LEED Gold office building in the region• Electric Utility Commission has an agreement with BC Hydro to offer all power smart programs to customers in New Westminster• The City has opted-in to the Solar Hot Water Ready initiative that will require all new single family homes be built to accommodate future installation of a solar hot water systems• Various groups are exploring the feasibility of building a district energy system to provide heat to a group of adjacent buildings• Downtown Community Plan developed with Design Guidelines that encourage solar orientation, passive energy, etc.
Land Use and Transportation: Building a compact, walkable community with good access to transit
<ul style="list-style-type: none">• Current land-use policies promote compact development, focusing growth in multi-family units, with most focus on high-rise apartments close to skytrain stations making New West poised to be a highly walkable and livable city• Current land use policies also work to preserve commercial and industrial land, which can provide local jobs• The City’s Transit Oriented Development (TOD) policy strongly encourages decreases in parking as much as feasible given the proximity to frequent transit and amenities• City currently has a Transportation Demand Management (TDM) coordinator position and

several **TDM initiatives:**

- Map and information about preferred bike routes available to public
- City Corporate Sustainable Commute Program
- Major Employer Sustainable Commute Program
- Active and Safe Routes to School Program (currently underway for 9 elementary schools, and 3 Middle Schools)
- Downtown Community Plan includes a target to reach **60% mode share by sustainable transportation** (walk, bike, transit)
- Development of **Station Area Plans** (e.g., Braid Station Area Plan)
- Regular investments in **improving pedestrian environment** (sidewalks, crosswalks, benches, etc.), and cycling infrastructure (Greenway, bike lanes)
- Ongoing **conversion of bus stops** to be more accessible
- Corporate GHG reduction plan implementation – improving efficiency of civic fleet
- Anti-idling bylaw

Solid Waste: Reduce, reuse, recycle

- The City launched the “**Cleaner Greener Collection**” program that collects kitchen waste (cooked and uncooked food and food soiled paper) from single family residences and brings it to a facility to be composted
- Subsidized **worm composting program** is provided by the City for residents in apartments
- Resident groups have organized a **zero waste neighbourhood challenge** to measure and reduce household waste (eg. Glenbrooke North)

4. DEFINING OUR ENERGY FUTURE

To ensure New Westminster continues to be a place we want to live, work and play in, it is important to define our long-term vision and goals for the city. A clear understanding of **where we want to be** helps us make better decisions with respect to planning, developing, and programming for our community. This CEEP defines a vision, goals and targets to help guide decisions that may impact future energy consumption and GHG emissions in the community.

Prior to defining the CEEP Vision and Goals, it is important to understand existing community goals that have been developed through public consultation processes. The following list summarizes several goals from existing New Westminster planning documents that are relevant to the CEEP:

- *Guide and manage growth in a manner which is consistent with the principles of sustainable development and complete communities. (OCP)*
- *Provide for the balanced growth of residential, commercial, industrial and institutional development. (OCP)*
- *Its high density residential and commercial buildings in close proximity to transit provide a showcase for the attributes of sustainable and responsible growth in the Metro Vancouver region. (Downtown Community Plan Vision)*
- *Downtown is a walkable, well-connected neighbourhood that is safe and pleasant for the pedestrian with a public realm that sets the stage for a vibrant and engaging community life. (Downtown Community Plan Goal)*
- *Promote energy efficiency in settlement pattern and building design throughout the City. (OCP)*
- *Work towards designing communities in which residents live within walking distance of parks, schools, recreational facilities and commercial opportunities. (OCP)*
- *Encouraging high density development around transit stations. (Livable City Strategy).*
- *Provide a variety of transportation choices that give priority to walking, cycling, and transit. (OCP)*
- *Reduce the need for automobile travel and the general reliance on the automobile. (OCP)*
- *Reduce the need for automobile use by encouraging compact development with adequate density to support public transit. (Queensborough Community Plan Process, Draft Goal)*

4.1 A Vision for Community Energy & Emissions

Based on the direction defined in the OCP and other related plans, a vision for community energy and emissions were created and circulated to stakeholders and the community for comment. The statement below describes New Westminster's desired future:

We are a healthy, active and livable community. We are well positioned and ready to make choices to reduce our carbon footprint. We honour our past and embrace the future.



Image created by Joshua David, as part of City's environmental poster contest 2010

4.2 Community Energy & Emissions Goals

The following CEEP goals describe a desired future direction for New Westminster's energy consumption and community's GHGs as it relates to the three sectors that make up the bulk of the community's energy consumption and GHG emissions: Buildings, Land Use and Transportation, and Solid Waste. The goals are specific to New Westminster, but are aligned with the "4Rs of Sustainable Community Energy Planning" described earlier (efficiency first, then seek out alternatives). The goals for solid waste are extrapolated from Metro Vancouver's Integrated Solid Waste and Resource Management Plan.

Goals for Buildings

1. To increase the energy efficiency of older buildings.
2. To promote the most energy efficient new buildings.
3. To encourage the use of renewable, responsible and local energy sources in buildings.

Goals for Land Use and Transportation

1. To build neighbourhoods where residents can live, work and play in close proximity.
2. To foster walking, cycling and taking transit as the preferred ways of getting around.
3. To support use of efficient and low-carbon mobility.

Goals for Solid Waste

1. Minimize waste generation.
2. Maximize reuse, recycling and material recovery.

4.3 Future Scenarios and Potential Targets

Accurate prediction of the future is not possible. Many factors will influence the behaviour and actions of residents. However, a generalized reduction scenario can be established to define the magnitude of actions that would need to happen in order to achieve reductions. These actions may range from education and outreach, to provision of financial incentives, to investments in infrastructure, to implementation of new policies and regulations. Although specific actions are defined, it is anticipated that they will be implemented opportunistically (e.g. certain circumstances may accelerate a particular action, like new funding becoming available) and will be regularly reviewed and updated. Any actions with financial implications will be reviewed and approved by senior staff and Council.

Three scenarios are defined using various combinations of the actions outlined in this plan: "Light Green", "Moderate" and "Deep Green" scenarios. The "Deep Green" scenario assumes we execute all the actions in this plan while the "Light Green" scenario assumes that only some actions, or parts of actions, are being pursued. Energy and GHG implications associated with bundles of actions in each scenario were estimated based on research of impacts and potential uptake expected for the measures, as well as consultation with City staff and stakeholders. The City of New Westminster has adopted the **GHG emission reduction target** that is associated with implementation of the "Moderate" scenario, with aspirations to achieve the reduction target associated with the "Deep Green".

The City has adopted the following target (relative to 2007 levels):



"Moderate" scenario:

Reduce community-wide GHG emissions by 15% by 2030

With an aspiration to achieve the following target (relative to 2007 levels):



"Deep Green" scenario:


Reduce community-wide GHG emissions by 30% by 2030

The "Moderate" scenario is summarized on the next page, and summaries of the "Light Green" and "Deep Green" scenarios are available in Appendix B. Detailed descriptions of actions are provided in Chapters 5 (Buildings), 6 (Land Use and Transportation) and 7 (Solid Waste). In addition to all of the measures outlined in this plan, it is estimated that an additional 5% reduction in GHG emissions will be achieved by 2030 through a combination of market forces, new technology that is not yet defined, and additional measures identified by senior levels of government, or by the City. These activities cannot yet be defined and are labelled as "Future Reductions" in the estimated reductions graph below and in Appendix B.

Moderate Scenario


New Westminster CEEP 25-year Forecast

Population




2007 → 2032
60,000 → 84,000

GHG Emission Target



2020 → 2030
-5% → -15%

Total GHG Emissions (CO₂e)

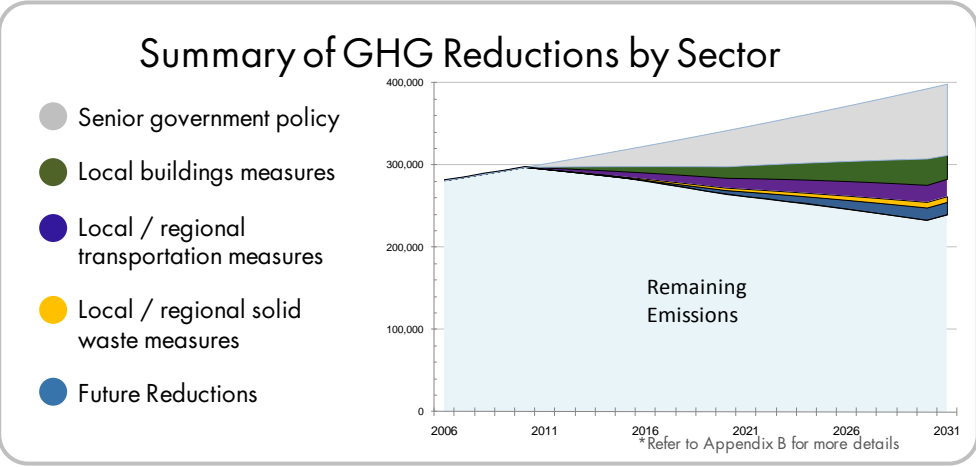


2007 → 2032
286,000 → 233,000

Per Capita GHGs (CO₂e)



2007 → 2032
4.8 → 2.9



- Key Features of the Moderate Scenario**
- Includes all features of light green scenario
 - Moderate financial incentive program to encourage energy audits and retrofits on older homes
 - Build 1 district energy systems, with bylaw requiring connections
 - Increase transit frequency on major bus routes (TransLink)
 - Build additional cycling routes

5. BUILDINGS

Buildings account for the majority of the energy consumed in the community; 3,699,317 GJ or 55% of total energy consumption in 2007. When energy consumption is converted into GHG emissions, buildings account for only 36% of total emissions or 118,398 tonnes CO₂e. This is because the majority of the energy consumed by buildings is from hydro electricity, which is a less carbon intensive energy source than fossil fuels such as natural gas, gasoline, propane, etc.



Figure 7. Westminster Centre, LEED Gold certified
Source: City of New Westminster

Reducing energy demand in both existing and new buildings and finding ways to incorporate alternative energy systems are the key strategies for reducing GHG emissions from buildings.

This section deals exclusively with activities at the building scale and presents:

- the context with respect to current and future building stock and the associated energy use and GHG emissions;
- key strategies and related actions that will result in energy and emissions reductions, and;
- potential scenarios for reducing energy and GHG emissions and the reduction targets associated with each of these scenarios

5.1 Context

Housing

In 2007, residential buildings accounted for 25% of the energy consumed in the community and 16% of total GHG emissions. The type, form and function of buildings, including their size, age and construction, impact the amount of energy that is needed to heat and power them. While there is variation in building energy use within the City's building stock, generally speaking, smaller, newer dwellings built in a more compact form tend to consume less energy than larger, older single family dwellings.

Key statistics with respect to New Westminster's current housing stock and their relevance for energy and emissions planning are as follows:

- Over 66% of dwellings are low-rise and high-rise apartments. Only 19% of dwellings are single family detached homes.**
 Apartments have a lower energy intensity (energy consumed per unit) than other dwelling types, and New Westminster has more apartment buildings than most Lower Mainland municipalities (Figure 8).
- Approximately two-thirds of dwellings are over 20 years old.**
 Primarily due to advances in building codes, newer dwellings tend to be more energy efficient than older dwellings. Studies suggest that the energy intensity of new homes built to current building standards is about 15% lower than the existing building stock.
- Almost half of dwellings are rented.**
 This can present challenges for retrofitting existing buildings. Often in older buildings, heat and hot water costs are included in rent which means there is a lack of direct financial incentive for residents to change their energy consumption behaviour. Tenants are also less inclined to make energy efficiency investments in dwellings where they may only live temporarily. In other cases, property owners may be reluctant to make the upfront capital investments without direct control over the behaviour of the occupants and resulting payback periods.

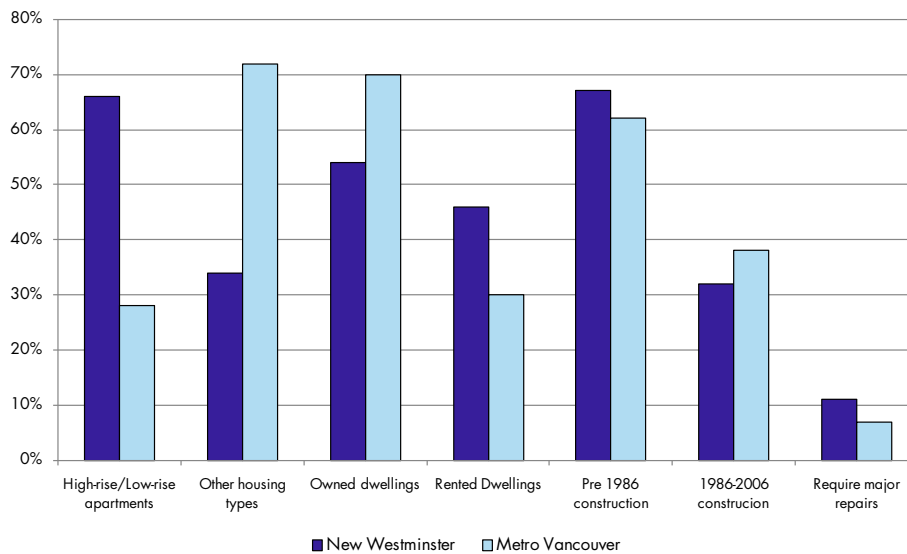


Figure 8. Housing Type and Characteristics
 Source: Statistics Canada Census, 2006

Moving forward, the City has plans to continue to encourage medium-to-high density residential development. New growth is expected to be accommodated mainly in the Downtown and Queensborough neighbourhoods. According to the Downtown Plan, 26% of the City’s housing stock will be in the Downtown by 2031 and 98% of that Downtown housing stock will be in apartment form. In Queensborough, the current housing mix is diverse with 31% in single family homes; 23% in apartments, 15% in primary suites of homes having secondary suites; 15% in secondary suites; 13% in townhomes, and 3% in movable dwellings. Housing projections to 2031 for the Queensborough neighbourhood show growth in all

dwelling types, with the following housing split: 14% single family homes; 13% residential multi-family (row homes); 58% residential multi-family (low rise apartments); and 26% residential multi-family (high rise apartments).

Commercial, Industrial and Institutional Buildings

The amount and type of commercial, institutional and industrial activity in a community defines the amount of energy consumed and GHGs emitted by non-residential buildings. The combined total space available in buildings for these activities has been in slight decline in New Westminster over the last 10 years, and in 2007 was reported as 12.8 million square feet of floorspace¹⁰. During this period, the commercial floorspace area has increased by 11%, while industrial and institutional floorspace have decreased by 14% and 12%, respectively (see Figure 9).

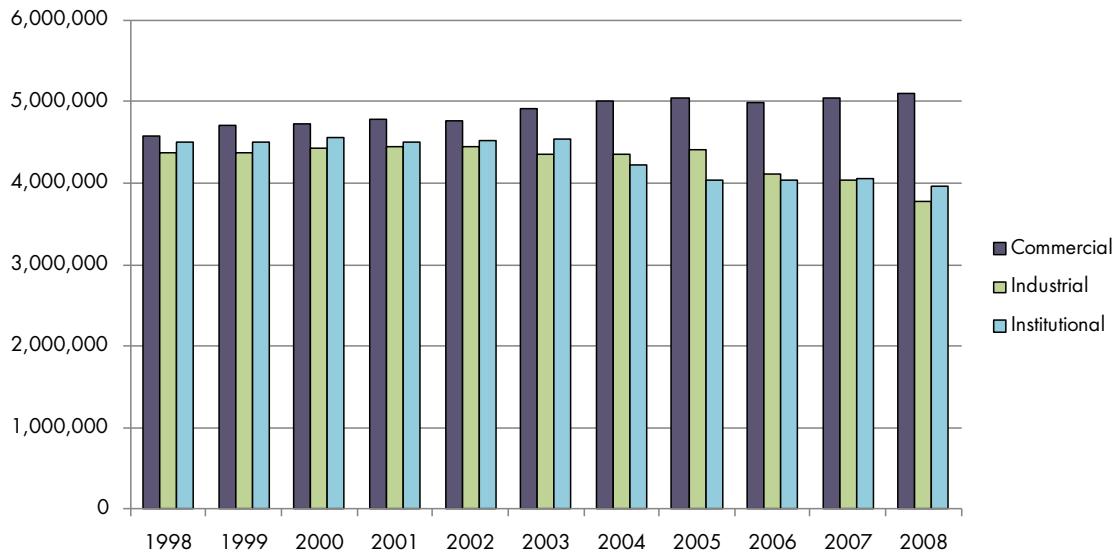


Figure 9. Non-residential Floorspace Area (1998-2008)

Source: City of New Westminster Community Profile, 2009

In 2007, commercial buildings (including small/medium industrial buildings) accounted for 37% of the community’s total energy consumption. When converted into GHG emissions, this represents 25% of total emissions in the community.

In an effort to improve the sustainability of commercial buildings and to reduce their demand on municipal services and infrastructure, the City has recently updated the existing Development Cost Charges (DCCs) program to reflect the actual costs attributable to accommodating new growth (i.e. new cost burden on the municipality to support the accompanying infrastructure and amenities). DCC rates are structured such that they

¹⁰ City of New Westminster Community Profile, 2009

encourage the development or redevelopment of more smaller, more efficient buildings, which may serve to improve the resource efficiency (including the energy efficiency) of commercial development over time.

Mixed use developments and redevelopments that incorporate commercial and institutional spaces alongside diverse housing options and transit continue to move forward in New Westminster. In Sapperton, development of the Brewery District is underway with the first building currently under construction.

Alternative Energy in Buildings

There are a few known alternative energy systems in place or under development in New Westminster and the City is interested in encouraging more. The City will participate in the Solar Hot Water Ready program that, once a bylaw is established, will require that all new single family homes in New Westminster be built to accommodate future installation of solar hot water systems.

A major barrier to the implementation of alternative energy systems is the real or perceived financial cost associated with installing these technologies. In fact, many of these technologies are fully commercialized today and are just not widely deployed. Efforts to communicate the benefits of these systems and to encourage and support their implementation at the building scale will help to overcome these barriers.

5.2 Strategy for Existing Buildings

GOAL: TO IMPROVE ENERGY EFFICIENCY IN EXISTING BUILDINGS

Description

Older buildings are prone to having compromised air sealing from windows and doors, poor or no insulation of walls, and inefficient furnaces and water heating appliances, all of which contribute to increased energy demand and GHG emissions. Further, almost 70% of the building stock that exists today in New Westminster is over 25 years old. As such, existing buildings present a significant opportunity to reduce energy demand and GHG emissions in New Westminster.



Figure 10. Installation of a geo-exchange system in New Westminster

Source: DEC Design Mechanical Consultants

This strategy looks at ways to encourage homeowners, landlords, commercial building owners and property managers to retrofit their buildings so that they perform to higher standards of energy performance. Given the make-up of the existing residential building stock, this strategy has a particular focus on multi-unit residential buildings (MURBs) and policies and actions that the City can employ to encourage strata councils to undertake energy efficiency retrofits.

Role of Other Agencies

- BC Building Code requires existing buildings to meet new standards when undertaking renovations
- Federal government, provincial government and utility (BC Hydro and Terasen) rebate and incentive programs encourage voluntary improvements in energy efficiency in residential and commercial buildings

City Actions

Action 1 Develop a retrofit campaign targeting MURB residents

A barrier to the implementation of multi-unit residential building (MURB) retrofits is the complications involved in arranging financing when dealing with multiple owners. Retrofit financing through MURB strata corporations presents a potential opportunity to overcome this barrier. With the large quantity of owned and rented units in MURBs in New Westminster,

there is a large opportunity for conserving energy by working with stratas and/or owners of rental buildings.

- Light Green: The City will work with the Electric Utility Commission (EUC) to:
 - Package and promote information on existing retrofit incentives programs (use electric utility bills as a communications vehicle)
 - Engage strata councils and property owners/managers in discussions around how to further encourage energy retrofits in MURBs
- Moderate/Deep Green: The City will also:
 - Explore opportunities to create a retrofit financing program modelled after programs being offered (and piloted) by the Cities of Toronto and Vancouver¹¹, where stratas can receive up to \$60,000 in incentives towards a retrofit project

Action 2 Promote existing programs for commercial/institutional buildings

- Light / Moderate / Deep Green: The City will work with BC Hydro and other partners to gather information on existing energy efficiency programs targeted at commercial and institutional buildings and provide it to Electric Utility customers. Other complimentary programs such as those offered through Natural Resources Canada's Office of Energy Efficiency should also be communicated to customers.

Action 3 Provide training to building permit and inspections staff

- Light / Moderate / Deep Green: The City will ensure that building inspectors receive training to build their knowledge and understanding of ways to improve energy efficiency and reduce demand in buildings. The training should result in increased familiarity with a variety of building scale alternative energy systems and their installation requirements, as well as familiarity with incentive programs, local suppliers and installers.

Action 4 Work with its Electric Utility Commission and BC Hydro Power Smart to implement demand management strategies

Having a municipally-owned utility presents the City of New Westminster with a unique opportunity to reach residents and businesses directly with outreach and incentives aimed at reducing demand. Through this action the City will work directly with the Electric Utility to investigate opportunities for implementing demand management strategies.

- Light Green strategies might include:
 - Providing educational information and raising awareness around energy efficiency opportunities via messaging on electric utility bills and/or billing inserts jointly

¹¹ City of Vancouver program information: <http://gw.vancouver.ca/greencapital/MURB-pilot-details.htm>

provide by the EUC and BC Hydro Power Smart

- Moderate strategies might further include:
 - Subsidizing the installation of energy efficient appliances and alternative energy equipment (e.g., programmable thermostats, new furnaces, etc) through electric utility bills that go beyond incentives offered by senior levels of government and provincial utilities
 - Implementing conservation-oriented rate structures to manage peak demand and encourage energy conservation
- Deep Green strategies may also include:
 - Assisting customers with financing for large scale efficiency investments in buildings by tying repayment to electric utility bills

Action 5 Offer incentives for energy audits in detached dwellings

- Moderate / Deep Green: The City will develop an incentive program targeted at dwelling owners in an effort to encourage building energy audits and retrofits. Such a program may include cash rebates for completing energy audits and/or retrofits that are validated through a third party system (i.e. EnerGuide, LEED®, ASHRAE 90.1). Alternatively, the building permit application process could serve as a vehicle for providing rebates and for communicating such a program.

Action 6 Offer incentives for building energy retrofits

- Moderate / Deep Green: The City will extend the current incentive programs targeted at residential and commercial building owners (with BC Hydro Power Smart) in an effort to encourage building energy audits and retrofits. The incentives may be offered in the form of building permit fee rebates for energy retrofits that require a permit.

Action 7 Expand revitalization tax exemption program

- Moderate / Deep Green: The City currently offers revitalization tax exemptions for improvements made to heritage buildings. The Community Charter now allows for revitalization tax exemptions to be offered for the purposes of energy and water conservation. Local governments must clearly define the revitalization program in a bylaw. The City should investigate opportunities for expanding the current program to include energy efficiency improvements made to existing buildings. The objective of this action is to create financial value for building “green” that stays with the property owner (as opposed to the occupants/tenants). This value can be used by builders as a marketing tool for the extra features of the energy efficient home and provides a clearly defined ‘value’ to offset the incremental cost to the purchaser.

Examples and Best Practices

- City of Toronto TowerWise program
- City of Vancouver MURB retrofit Incentive program
- District of Saanich Energy Advisor and Retrofit Program
- District of Squamish online Build Green Guide

Secondary Indicators

Existing Energy Efficient (Residential) Buildings:

- Percent of existing residential buildings renovated to high energy performance standards (e.g., EnerGuide for Homes 80 or higher)

Existing Energy Efficient (Commercial) Buildings:

- Percent of existing commercial buildings renovated to high energy performance standards (e.g., exceeding ASHRAE 90.1)

5.3 Strategy for New Buildings

GOAL: TO BUILD THE MOST ENERGY EFFICIENT NEW BUILDINGS

Description

New buildings present the City with opportunities to encourage higher standards of energy performance in new construction, and reduce the overall need for new energy supply and replacement of infrastructure. In New West, new construction will mainly focus on multi-unit residential buildings and commercial buildings. As a result, the energy performance of new construction is already likely to be better in New West than in communities where projected growth is largely in single family dwellings.

This strategy focuses on developing incentives and policies to more strongly encourage and require new large developments to attain higher energy performance standards. Multi-family residential and commercial/institutional buildings are the primary target for the actions within this strategy.

Role of Other Agencies

- BC Climate Action Plan targets a 20% reduction in residential and a 9% reduction in commercial building energy demand by 2020.
- BC Building Code currently requires new homes achieve equivalent of an EnerGuide 77 rating. Changes to the Code in 2011 are expected to increase this to an equivalent of an EnerGuide 80 rating.

City Actions

Action 8 Use the Sustainability Report Card to structure a fee rebate program

- Light / Moderate / Deep Green: The City is in the process of developing a Sustainability Report Card that will enable staff and Council to evaluate development applications against the City's sustainability objectives. The City will look to establish building fee rebates based on the levels of performance (or scores) attained on the Sustainability Report Card.

Action 9 Broaden the reach of the Downtown Plan Design Guidelines

- Light / Moderate / Deep Green: The Downtown Plan includes design guidelines that promote energy efficient development (e.g., orientation for solar aspect and ventilation, high albedo roofing materials, shading devices, maximum glazing, on-site renewable energy production).
- In an effort to promote these energy efficient building practices more broadly, the City will incorporate applicable energy-efficiency design guidelines into other neighbourhood plans, the Official Community Plan (during the next revision) and the Zoning Bylaw.

Action 10 Require higher energy performance standards in new commercial and multi-family residential developments

- Light Green: As part of new developments, the City will encourage or require improved energy efficiency in outdoor facilities such as lighting. For example, the City can require installation of adaptive lighting in parking lots to reduce electricity consumption.
- Moderate / Deep Green: In addition to efficiencies in the outdoor areas, the City will require higher energy performance for the buildings through re-zoning approvals. Approval of a re-zoning is at the discretion of Council, though it is typically guided by an interpretation of the broader objectives of an OCP or neighbourhood plan. This action provides clear direction to staff, Council and the development community by requiring high energy performance standards in new commercial and large multi-family residential buildings. The City will use the Leadership in Energy and Environmental Design (LEED®) for New Construction scorecard as the basis for evaluation. Specifically, the City will require all re-zonings to meet a minimum point score within the LEED Energy and Atmosphere category. This may be incorporated into the Sustainability Report Card.

Examples and Best Practices

- City of Toronto Green Standard Checklist
- City of Vancouver Green Buildings Policy for Rezoning
- City of Vancouver Passive Design Toolkit

Secondary Indicators

New Energy Efficient (Residential) Buildings:

- Percent of new residential buildings exceeding energy performance standards in the current building code (validated through third party rating systems such as EnerGuide, LEED®, etc)

New Energy Efficient (Commercial) Buildings:

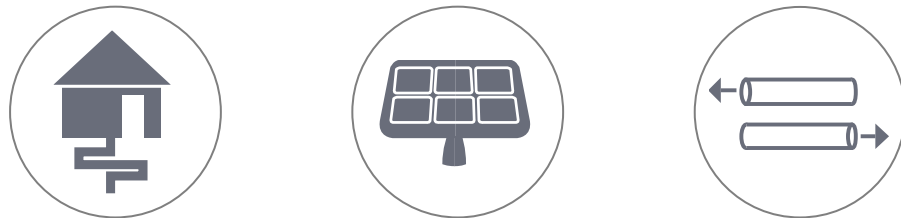
- Percent of new commercial buildings exceeding energy performance standards in the current building code (validated through third party rating systems such as LEED®, ASHRAE 90.1, etc)

5.4 Strategy for Energy Supply

GOAL: TO ENCOURAGE RENEWABLE, RESPONSIBLE & LOCAL ENERGY

Description

Energy used to heat and power buildings currently comes mainly from a combination of electricity (primarily from hydro), and natural gas. Encouraging use of alternative energy systems in new and existing buildings will reduce the community's collective reliance on fossil fuel energy sources, particularly for heating. Alternative energy systems that may be used in on a building-scale include solar panels for hot water, solar photovoltaic panels for electricity, and heat exchange systems (in the ground, air or water) for heat and hot water.



At larger scales (e.g. groups of buildings or blocks), district energy systems may supply heat and hot water using heat recovered from sewers or other available heat sources, heat exchange systems, or several other potential sources. Developing these kinds of alternative energy systems on individual buildings, or on larger groups of buildings, can lead to increased community resilience, particularly when energy comes from local sources.

This strategy outlines education, incentives and policies that the City can implement to encourage alternative energy systems at the buildings scale and to develop and encourage connection to district energy systems.

Refer to Appendix C for a brief overview of renewable energy opportunities in New Westminster.

Role of Other Agencies

- Federal government, provincial government and utility (BC Hydro and Terasen) rebate and incentive programs encourage voluntary installation of alternative energy systems in residential and commercial buildings
- SolarBC is an initiative run by the BC Sustainable Energy Association that aims to get solar panels on 100,000 buildings in BC by 2020. To date, the program has led to the installation of over 500 systems on homes, over 30 on schools, and over 30 on municipal buildings.

City Actions

Action 11 Promote building scale alternative energy

- Light / Moderate / Deep Green: The City will identify an opportunity to install a building-scale alternative energy unit on a Civic facility, then build on this initiative to promote building scale alternative energy systems to residents. This could be done by packaging information on existing programs and incentives and promoting it via the City's website. One opportunity for this may include installation of solar hot water panels at the Multi-Use Civic Facility currently being designed (at 777 Columbia Street).

Action 12 Train City building inspectors on alternative energy technologies

- Light / Moderate / Deep Green: Building on Action 3, the City will ensure that building inspectors receive training to build their knowledge and understanding of building scale alternative energy systems. The training should result in increased familiarity with a variety of building scale alternative energy systems and their installation requirements, as well as familiarity with incentive programs, and local suppliers and installers.

Action 13 Identify and promote "eco-industrial networking" opportunities

- Deep Green: "Eco industrial networking" (EIN) is the exchange of materials/resources between industrial operations, where one industry's waste becomes another industry's resource. When permitting new industrial development, the City will work with developers to investigate opportunities to make use of waste resources from other industrial operations and to consider how the waste resources from their operations might benefit another industry. The City may also wish to incorporate EIN language and objectives into a comprehensive industrial strategy. This process was undertaken by the District of North Vancouver when planning for the re-development of the Maplewood Flats area.

Action 14 Offer free inspections for alternative energy systems

- Light / Moderate / Deep Green: The City will offer free inspections to building owners that install alternative energy systems. This action will result in minimal lost revenue and will serve to reinforce the City's support for actions that reduce energy demand and GHG emissions.

Action 15 Allow Local Improvement Charges

- Moderate / Deep Green: To encourage building owners to install alternative energy systems or hydronic systems (for connection to district energy systems), the City will consider implementing Local Improvement Charges that tie the installation costs to property taxes. In this way, the cost burden for these systems is borne over time by the property owner that continues to benefit from the reduced energy demand afforded by these systems. As a

starting point, a Local Improvement Area can be established in conjunction with development of any district energy systems (e.g. around the Royal Columbian Hospital) for eventual expansion to the surrounding buildings.

Action 16 Identify and support district energy zones

- Light / Moderate / Deep Green: To ensure that existing development is able to benefit from future district energy opportunities during major renovations or redevelopment, and that new development maximizes these opportunities from the beginning, the City will:
- - Understand where potential opportunities exist and identify specific zones;
 - Identify potential energy supply sources (e.g. sewer heat recovery);
 - Update zoning and development guidelines to encourage or require hydronic systems in identified district energy zones;¹²
 - Investigate partnerships, financing and governance models to advance a potential system for New West.

The maps provided in section 3.3 identify the three most likely neighbourhoods where future district energy may be feasible due to projected increases in energy load: Downtown, Uptown and Sapperton/Brunette (see Table 2 for a summary of projected thermal load increases). Further study should be pursued in these neighbourhoods to identify the feasibility of future projects. These studies should be conducted in partnership with local developers and/or potential “anchor tenants” (e.g. major institutional buildings).

Table 2. Projected increases in thermal loads for high growth neighbourhoods

Neighbourhood	Projected Increase in Thermal Load by 2032	Projected Growth in Non-Residential Floorspace	Projected Growth in Residential Units
Downtown	3,400 GJ/Ha	10 million sqft	7,000
Uptown	760 GJ/Ha	2.5 million sqft	800
Sapperton/Brunette	900 GJ/Ha	1.2 million sqft	1,500

Action 17 Include policies to support alternative energy in the OCP

- Light / Moderate / Deep Green: To solidify and communicate the City’s commitment to pursuing alternative energy opportunities, the City will look to include policies to support alternative energy during the next OCP update. The City of Dawson Creek, for example, has included the following supportive policies in their OCP:
-

¹² See City of Dawson Creek OCP Policy 4.5.3 for example: “If a District Energy System is established, create a Service Area Bylaw that requires connection to a district energy system, possibly Dawson Creek’s existing biomass system.”

Guideline 16.52: Renewable Energy Generation

It is strongly encouraged that all buildings over 1000 square feet meet at least 10% of their annual combined lighting, space heating and water heating energy demand using one or more of the following renewable energy generation technologies:

- Solar thermal hot water heater;
- Solar photo-voltaic (PV) panels;
- Micro-wind turbine; and
- Ground-source heat pump.

Guideline 16.54: District Energy-Ready

All buildings are encouraged to be built with a hydronic heating system to facilitate future connection to a district heating system. Mechanical rooms should be located closest to the street, where possible, to accommodate access to equipment to facilitate conversion to a district energy at some point in the future.

The outcomes of Action 16 will help to guide the development of these policies, which might include things such as Local Service Area Bylaws¹³ to ensure buildings are prepared for future connection to district energy systems (i.e. installation of hydronic systems for multi-family and commercial developments and re-developments).

Action 18 Require evaluation of alternative or district energy feasibility

- **Moderate / Deep Green:** New development presents the best opportunity for implementation of alternative energy supply and district energy systems. The re-zoning application process provides a potential mechanism to trigger an investigation of these opportunities. As such, the City will require alternative or district energy feasibility studies for re-zoning approvals of all large, new developments. District energy feasibility studies should be encouraged in areas projected to have high thermal load growth (as described in section 3.3), or in zones as identified by further study (see Action 16). The City of Vancouver instituted such a policy in 2008¹⁴.

Examples and Best Practices

- City of Dawson Creek OCP Guidelines supportive of renewable and district energy
- Alternative Energy Evaluations (Vancouver)
- Showcase Projects (Dockside - Victoria, South East False Creek - Vancouver)
- Eco-industrial networking in Maplewood Flats (District of North Vancouver)

¹³ For example, see City of North Vancouver Bylaw 7575 <http://www.cnv.org/c//DATA/2/98/BYLAWS%207575.PDF>

¹⁴ See the following for the City of Vancouver policy: <http://vancouver.ca/commsvcs/guidelines/R024.pdf>

Secondary Indicators

Connections to Alternative Energy Supply:

- Percent of homes in New West connected to alternative energy supply
- Percent of commercial buildings in New West connected to alternative energy supply

5.5 Reduction Scenarios

Using the strategies and actions detailed above, three reduction scenarios have been created to present possible paths for the City to take to reduce community-wide energy consumption and GHG emissions. The “light green” scenario presents a soft approach to energy demand management and GHG emissions reductions. This scenario focuses on elements of the actions that are likely to result in a smaller percentage of the population actually changing behaviours and taking action (e.g., education and outreach oriented activities). The “moderate” scenario presents a higher level of effort and investment including more financial incentives and regulatory measures. Finally, the “deep green” scenario presents a more aggressive approach by the City, including further financial incentives and stronger regulatory measures.

Table 3. Assumptions made in the three scenarios for Buildings

Focus of the Action	Uptake in the community % of ... by 2032		
	Light Green	Moderate	Deep Green
Strategy for Existing Buildings:			
% residential buildings have undergone energy efficiency retrofits	25%	50%	60%
% commercial buildings have undergone energy efficiency retrofits	10%	15%	35%
Strategy for New Buildings			
% new single family/duplex/row homes meet equivalent of Downtown Plan design guidelines with respect to energy conservation and passive design	15%	30%	60%
% new multi-family residential and commercial buildings achieve LEED Gold equivalent with respect to energy	15%	30%	60%
Strategy for Energy Supply			
% existing buildings and % new buildings have solar hot water	5% and 10%	10% and 15%	25% and 50%
% new buildings have geo-exchange systems	5%	15%	25%
% new commercial/multi-family buildings are connected to a District Energy system	0%	75% new buildings in 1 DE zone	75% new buildings in 2 DE zones

6. LAND USE & TRANSPORTATION

6.1 Context

Like many municipalities in the Lower Mainland, transportation activities make up the largest source of greenhouse gas emissions and consume the most energy in community activities in New Westminster. In 2007, transportation was responsible for 55% of the city's emissions, with passenger cars being responsible for 39% of the city's total emissions. As such, actions that can reduce the reliance on private automobiles and increase the use of alternative forms of transportation such as public transit, walking, and cycling have the potential to significantly reduce GHG emissions and energy consumption.

Land Use Planning

Two of the major factors that impact transportation and energy consumption are the types and densities of land uses within a community. Higher density developments, accompanied by investments in pedestrian and cycling infrastructure (e.g. sidewalks, crosswalks, cycling lanes, and bicycle parking), traffic calming measures, and a mixture of land use types, are typically associated with higher percentages of walking, cycling, and public transit use.



Pedestrian and Cycling Facilities

As shown in Figure 11 and Figure 12, the City of New Westminster has a high walkability rating when compared to other Lower Mainland municipalities. This is likely influenced by the city's grid street pattern, and the fact that the city's developments are higher in density and land uses are often mixed, especially in the Downtown. At the same time, however, the topography of New Westminster can be a deterrent to walking and cycling, especially for the elderly and young children. As for pedestrian infrastructure, there are some commercial areas that provide excellent walking conditions. An example is Columbia Street in Downtown New Westminster and the Sapperton community.

In the area of cycling infrastructure, there are bicycle facilities that offer a large degree of traffic separation: BC Parkway and Central Valley Greenway. There are also several signed bike routes, and the City has developed a pocket size Bike Route map to facilitate use of these¹⁵. New cycling lanes are also proposed in the 2008 New Westminster Trail and Greenway Plan, and these routes are to be located in Queensborough and along the Waterfront.

¹⁵ The New Westminster Bike Route map is available here:
[http://www.newwestcity.ca/database/rte/NW_BikeMapFeb28\(2\).pdf](http://www.newwestcity.ca/database/rte/NW_BikeMapFeb28(2).pdf)

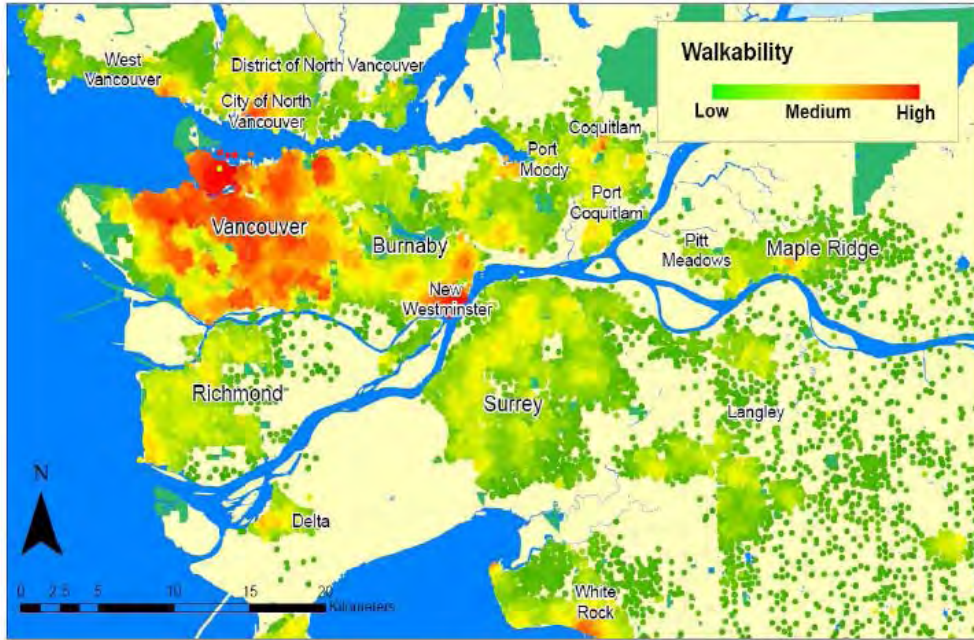


Figure 11. Neighbourhood walkability across Metro Vancouver¹⁶

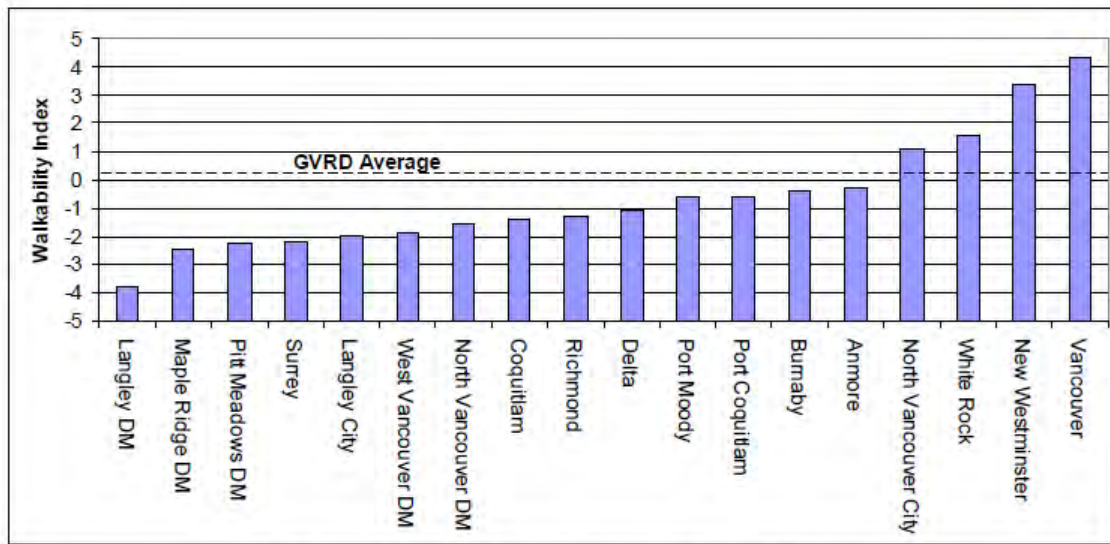


Figure 12. Average walkability indices across Metro Vancouver

¹⁶ Source of walkability map and chart: Devlin, A., Frank, L.A., and vanLoon, J. 2009. Physical Activity and Transportation Benefits of Walkable Approaches to Community Design in British Columbia.

Transit

Another major factor influencing travel behaviour and therefore the amount of energy consumed for transportation is a community's transit service levels. Figure 13 shows the transit network for the entire municipality. As these figures indicate, New Westminster is well-served by the SkyTrain system. There are a total of five SkyTrain stations located within the municipality. There are also a number of bus routes that serve New Westminster. Two north-south frequent transit corridors provide frequent transit service along 6th Street and 8th Street. There is also east-west frequent transit service along Sixth Avenue (from the 22nd Street Station to 5th Street). However, there is an absence of a frequent transit corridor that provides convenient east-west travel across the rest of the city. Identification of an appropriate east-west frequent transit corridor will be an important component of upcoming planning processes (e.g. the City's master transportation plan, updating the Official Community Plan, and updating the Area Transit Plan). The 106 connects Uptown with Downtown, providing a frequent bus connection between these two important nodes.¹⁷

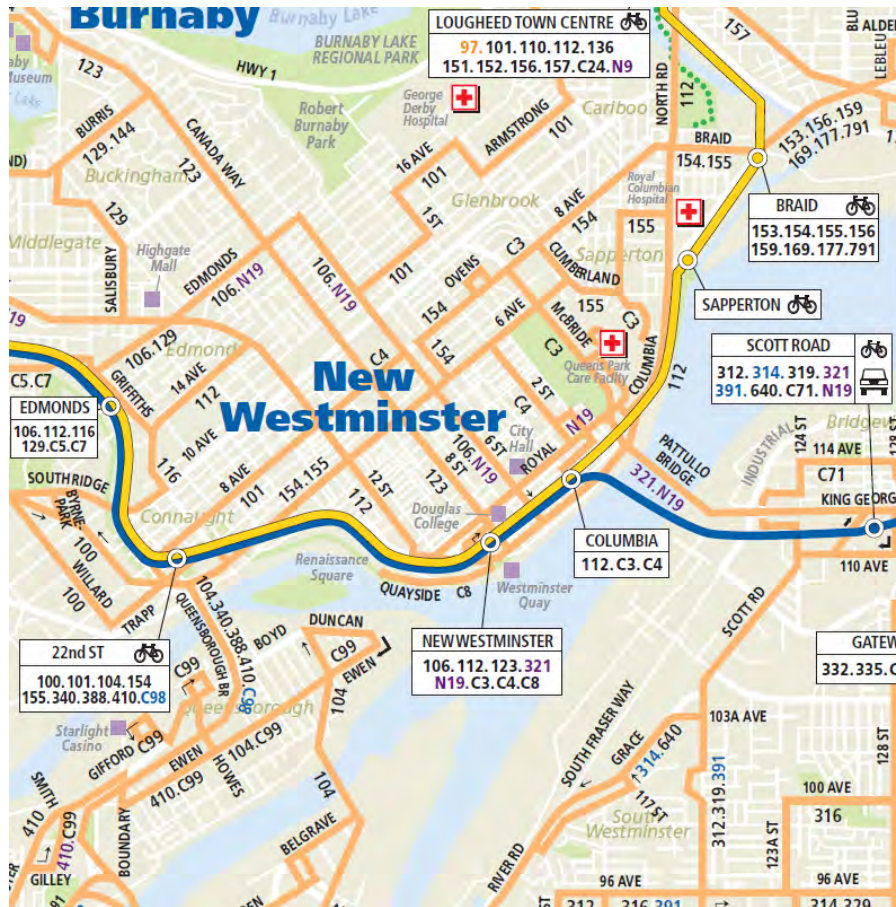


Figure 13. Transit Network in New Westminster
Source: TransLink Transit System Map, 2010

¹⁷ TransLink defines the frequent transit network as “an interconnected network of corridors where transit service is provided every 15 minutes or better throughout the day and into the evening 7 days a week.”

Vehicles

The types of vehicles and distances driven are important factors in defining the amount of energy consumed for transportation in a community. In New Westminster, the majority of registered vehicles are personal (over 96%), where 43% are small passenger cars and 34% are light trucks, vans and SUVs. A summary of the community vehicle fleet is provided in Table 4.

Table 4. Summary of Registered Vehicles in New Westminster

VEHICLE TYPE	NUMBER REGISTERED	% OF REGISTERED VEHICLES
Small Passenger Cars	12,850	43%
Large Passenger Cars	5,733	19%
Light Trucks, Vans, SUVs	10,168	34%
Commercial Vehicles	244	1%
Tractor Trailer Trucks	410	1%
Motorhomes	158	1%
Motorcycles, Mopeds	459	2%
Bus	12	0%

Source: BC MoE CEEL, 2007

Commuting to Work

Daily commuting patterns also define the amount of energy needed to transport residents to work. Over 60% of New Westminster residents drive to work, and another 5% ride as passengers. One quarter take public transit to work and almost one third of residents take sustainable transportation modes to work (i.e. walking, cycling and transit). The following figure illustrates the split of modes used for commuting.

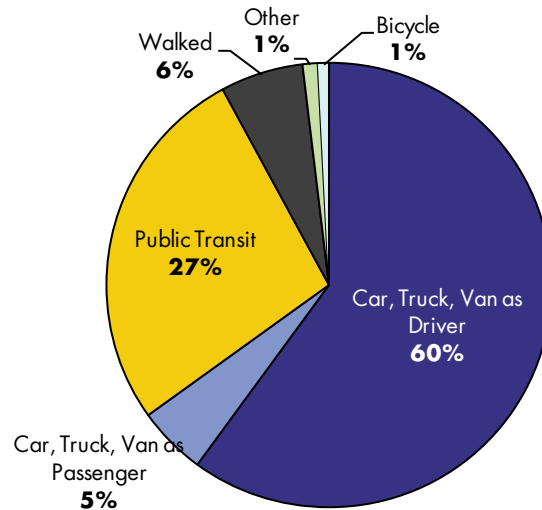


Figure 14. Commuter mode split for residents of New Westminster

Source: Statistics Canada Census, 2006

Non-commuting Travel

Discretionary trips to places such as restaurants, theatres, grocery stores, and shopping centres also make up a large percentage of an average person's total trips. As such, the locations of these destinations and the methods of travel used for these trips are also important to consider.

As shown in Figure 15, in 2008, 60% of all trip types (including commuting and discretionary trips) were made using private automobiles, 22% were made using transit, 16% were made by foot, and 1% was made by bicycling. This indicates that traveling by foot is more common for discretionary trips than for commuting trips, and that residents are more likely to travel by car and/or public transit for commute trips than for discretionary trips.

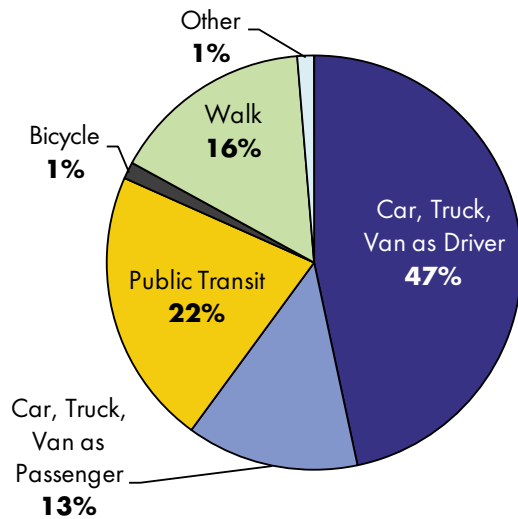


Figure 15. Mode split for all trip types for residents of New Westminster
Source: TransLink 2008 Trip Diary Survey

6.2 Strategy for Compact Community Planning

GOAL: TO BUILD NEIGHBOURHOODS WHERE RESIDENTS CAN LIVE, WORK AND PLAY IN CLOSE PROXIMITY

Description

As mentioned in Section 6.1, the types and densities of land use within a community have a significant impact on the amount of energy used for transportation. In New Westminster, there are already many high density developments and many areas with mixed land uses. With the expectation that the city's population will grow by approximately 40% to 85,000 by 2031, it will be important to continue to encourage more compact, mixed-use developments.

This strategy looks at ways to encourage more compact, mixed-use developments so that residents can travel shorter distances and use more sustainable forms of transportation such as walking, cycling and transit to access employment, educational facilities, and daily amenities. This strategy mainly focuses on corridors that are already or may be part of a frequent transit network in the future.

Role of Other Agencies

- The Metro Vancouver Regional Growth Strategy supports building compact communities and envisions New Westminster as one of the urban centres of the region.
- TransLink supports focused growth of higher-density and mixed use development in alignment with the Frequent Transit Network, and works with municipalities to coordinate this.

City Actions

Action 19 Continue encouraging compact, mixed-use development with strong incentive-based Transit Oriented Development policy

- Light / Moderate / Deep Green: In 2008, the New Westminster Council adopted a Transit Oriented Development (TOD) policy that defines what TOD is and how parking reductions would be considered in TODs. The City will continue to apply this policy (around rapid transit stations) and develop it further to provide more guidance and incentives for developers to build higher density, more mixed-use developments (potentially expanding the policy to apply to bus-based frequent transit networks).

Action 20 Focus higher density and mixed-use developments around frequent transit corridors

Light / Moderate / Deep Green: Work with TransLink to confirm the frequent transit corridors

- where higher density and mixed use developments will be focused. These corridors could include Sixth St and Eighth St as the north-south corridors, and Sixth Avenue as the east-west corridor¹⁸. This action will also need to align with and feed into several processes, including:
- - Development of the City's Master Transportation Plan (beginning in 2011);
 - Update of the City's OCP (expected in the next 2 years);
 - Development of a Regional Context Statement for the Regional Growth Strategy; and
 - Update of the Burnaby / New Westminster Area Transit Plan in coordination with TransLink.

Action 21 Review Official Community Plan to allow for more mixed-use developments / neighbourhoods

- Light / Moderate / Deep Green: The Official Community Plan (OCP) is expected to be updated in the near future. At the time of update, a review will be conducted to ensure the OCP supports the frequent transit network by allowing higher density and more mixed-use developments / neighbourhoods along those corridors. A buffer distance of 400m (or a five-minute walk) can be used for bus routes and 800m (or a ten-minute walk) can be used around SkyTrain stations.

In the review of the OCP and the creation of neighbourhood plans, the environmental and energy efficiency benefits of compact, transit oriented development should also be emphasized. As well, where applicable, the concepts developed in the Downtown Community Plan should be extended to other neighbourhood plans.

Specific neighbourhoods that have the potential to be future high density development areas are Sapperton, where TransLink's main office will be relocated, Braid Station, and Victoria Hill, where there is a possibility of a new SkyTrain station being built.

Examples and Best Practices

- TransLink's "Transit Oriented Communities: A Primer on Key Concepts" (2010), includes the 6D's of creating transit-oriented communities: Distance, Destination, Density, Diversity, Design, and Demand Management.¹⁹
- Calgary Transit Oriented Development Policy Guidelines and Best Practices Handbook
- Collingwood Village, Vancouver, Transit Oriented Development Urban Village

¹⁸ The most suitable east-west frequent transit corridor has not yet been identified and will need to be identified through upcoming transportation and land use planning processes.

¹⁹ Available online at:

http://www.translink.ca/~media/Documents/bpotp/plans/transit_oriented_communities/Transit_Oriented_Communities_Primer.ashx

Secondary Indicators

Compact, mixed-use developments:

- Residential density
- Land use diversity index (e.g. Simpson's Diversity Index)

Focusing high density developments along frequent transit network:

- Residential density within a 400m buffer around frequent bus corridors and an 800m buffer around SkyTrain stations
- Percent (%) of city's population and jobs located within a 400m buffer around frequent bus corridors and an 800m buffer around SkyTrain stations.

6.3 Strategy for Sustainable Transportation

GOAL: TO FOSTER WALKING, CYCLING, AND TAKING TRANSIT AS THE PREFERRED WAYS OF GETTING AROUND

Description

The mode of transportation used for a trip has the most significant impact on energy consumption and greenhouse gas emissions. The energy and greenhouse gas emissions associated with sustainable forms of transportation such as walking, cycling, and public transit are much less than private automobiles. As such, this strategy examines ways to promote alternative forms of transport and reduce the usage of passenger vehicles.

Scale of Implementation

City-wide, with cycling being emphasized in Queensborough, Uptown, the West End, and along the waterfront, and transit usage being emphasized in higher density development areas.

Role of Other Agencies

- TransLink to work with the City to improve the transit network through service reviews and update of the Burnaby/New Westminster Area Transit Plan, and also explore offering and promoting alternative fare media programs that offer discounts.
- TransLink to work with the City to support the regional cycling network and explore the feasibility of a public bike sharing program

City Actions

Action 22 Enhance pedestrian environment

- Light / Moderate / Deep Green: New Westminster is already considered one of the lower mainland's most walkable cities, yet there is potential to improve on this as the community continues to increase in density and re-develop. Areas expecting the most growth (e.g. Downtown, Uptown and Queensborough) have particularly strong opportunities and may be the focus of pedestrian improvements. "Streetscaping" can be undertaken in these key areas to incorporate improved sidewalk conditions, enhanced landscaping, additional street furniture, improved lighting, pedestrian-friendly building fronts, and improved signage. The City will continue to increase efforts to build and install these types of pedestrian facilities on major streets and intersections to increase safety and encourage pedestrian activity. These activities align with and extend the City's current Pedestrian Charter.²⁰

Specific areas that should be considered for improvements include the following:

- Downtown - Tenth St, Carnarvon St, Lorne St, Agnes St, and First St;
- Access to waterfront (e.g. at Eighth St, Mckenzie St, Sixth St, Fourth St, Elliot St, and McBride);
- Commercial areas - build wider sidewalks;
- Points where arterial streets enter the city-centre - install urban traffic management measures, where feasible;
- Pedestrian access to Douglas College – the sidewalk should be rebuilt;
- Walkability in Queensborough; and
- Installation of a pedestrian / cycling bridge that connects Queensborough to the mainland (as is currently in the initial stages of planning).

Action 23 Enhance cycling environment

Although some parts of the City are characterized by steep topography where it can be a challenge to persuade people to cycle, there are many areas of the City such as Queensborough, Uptown, the West End, and the waterfront, where the topography is relatively flat and cycling can be promoted.

- Light / Moderate: Within these areas, cycling lanes should be considered where possible, including:
 - Build an off-street Waterfront Greenway, which has been identified in the Downtown Community Plan
 - Upgrade the BC Parkway, which will further improve the cycling environment along

²⁰ The City's Petestrian Charter is available at: : [http://www.newwestcity.ca/database/rte/Pedestrian%20Charter\(1\).pdf](http://www.newwestcity.ca/database/rte/Pedestrian%20Charter(1).pdf)

this path

- Develop a bike route that connects the Central Valley Greenway with uptown along a route with less severe inclines – note that identification of priority cycling routes will need to consider location of frequent transit network in order to minimize potential conflict
- Provide frequent, visible and attractive short-term bicycle parking, and consider opportunities to install bike racks that add to the aesthetic of the street (e.g. are designed as works of art)
- Encourage new developments to install end-of-trip facilities for cycling (e.g. secure bicycle parking, showers, change rooms, and lockers)



- Deep Green: The City will investigate potential for a public bike (or electric bike) sharing system. This is currently being explored in other lower mainland communities (Vancouver and North Vancouver). There may also be potential to install a bicycle lift to help riders overcome the steep topography and join the waterfront/downtown area to the uptown area. This undertaking, however, would require significant financial resources.

Action 24 Improve transit network

- Light / Moderate / Deep Green: TransLink is the authority that determines transit routes and service levels. The City will work with TransLink to increase transit service frequency and hours of operation, especially in areas of high growth such as Sixth St and Eighth St. Service levels should also be increased along a continuous east-west bus route so as to provide
- higher frequency service in the east-west direction (for example, extending frequent transit service along Sixth Avenue). The highest priority east-west corridor should be identified and analysed as part of the City's upcoming master transportation planning process and the update of the Area Transit Plan.

As well, the City will encourage TransLink to undertake improvements to the New Westminster, Braid, Sapperton and Columbia SkyTrain stations. The City will support rapid transit expansion to the northeast sector, the Broadway corridor, and Surrey. To increase the likelihood of these recommended improvements being implemented in a timely manner, they should be included in the next update of the Burnaby/New Westminster Area Transit Plan.

The City will also encourage TransLink to develop regional transportation demand measures (e.g. regional tolling) that foster a mode shift away from private single-occupancy vehicles.

Along with an increase in transit service and frequency, there will be a need for more space at exchanges (bays and layover), as well as consideration for different vehicle types suitable for supporting higher frequency and capacity.

Action 25 Increase comfort and reliability of transit system

- Light Green: Currently, there are a number of bus stops that do not have bus shelters, seats or

other transit rider amenities. As feasible, the City will upgrade transit stops to increase users' comfort in consultation with TransLink and the shelter provider.

- Moderate/Deep Green: As well, in areas of high congestion, the City will consider implementing transit priority measures such as transit signal priority, queue jump lanes, and high-occupancy lanes. This will help increase the reliability of the transit system and make transit more competitive with private automobiles.

Action 26 Offer and promote alternative fare media programs

Alternative fare media programs provide opportunities to provide transit passes at discounted or group rates. Currently, TransLink provides an Employer Pass program that requires a company to have at least 25 participants to enroll. TransLink's experience has shown that the Employer Pass program has been growing in popularity. Together with monthly passes, the sale of these discounted passes has steadily increased (e.g. 15,042 participants in 2007; 18,200 participants in 2008, and; 20,869 participants in 2009)²¹), and the use of prepaid fare media continues to exceed growth in cash sales. However, few employers in New Westminster are large enough to participate. TransLink will be implementing a SmartCard in 2013 that allows innovative pricing.

- Light Green: The City will encourage TransLink to expand the Employer Pass program to allow smaller employers with less than 25 transit users to sign up for the program.

Another alternative fare media program is a Community Transit Pass for neighbourhoods that are well served by frequent transit service. A Community Pass is usually set up in conjunction with new large multi-family residential developments (i.e., apartments), or in well defined areas developed by a common development corporation (i.e., subdivisions) where passes are provided with incentives (e.g., density bonuses or reduced parking requirements) and in exchange provide households with Community Transit Passes for household members. In the agreement for the Community Pass at Simon Fraser University, the corporation responsible for developing UniverCity (the SFU Community Trust) was able to negotiate with TransLink a discounted rate for the community pass by guaranteeing at least 50% of the residents will commit to purchasing this pass. If the uptake for the program in any one year is not 50% of the residents living in UniverCity, the SFU Community Trust makes up the difference in fee payments to TransLink.

- Moderate: The City of New Westminster will work with TransLink to encourage developers of high-density developments to have similar arrangements. The City will also identify the potential for existing neighbourhoods and developments to enroll in such a program.
- Deep: The City can work with businesses to provide further discounts to employees for transit passes. This could be implemented as an expansion of the City's TDM program with major employers. Winnipeg, Manitoba has implemented the EcoPass program, where employers are encouraged to provide 5% to 100% discount on monthly transit passes. In return, Winnipeg Transit provides a rebate to the employer of up to one-third of the subsidy provided

²¹ TransLink 2009 Sustainability Report 9 (Appendix 3.6)

by the employer and the employer can spend less on parking-related costs. Initially launched in 2000, by 2002, the Winnipeg Employer Pass has increased transit ridership by 45%, increased ticket sales by 500%, and increased net revenues by 30%.²²

Action 27 Develop a targeted outreach / incentive campaign

An outreach / incentive program should be coordinated with TransLink's Wayfinding project (which is developing regional standards for conveying transportation information) and with TransLink's TravelSmart program in order to encourage residents to use more sustainable modes of transportation. The initial target audience could be residents located on frequent transit corridors and in higher density areas. This program would include the following actions:

- Light Green:
 - Distribute brochures and maps that label transportation choices and routes (transit, cycling, car cooperatives, etc), and provide information about transit programs. This information could be provided on the City's website;
 - Provide more information about local services and amenities within close proximity to transit services as part of the Streetscaping (e.g. at major bus stops the City of Richmond provides a map showing the areas that are within a 5 and 10-minute walk of the bus stop);
- Moderate / Deep Green:
 - Expand on TransLink's TravelSmart program to provide specific materials, resources and incentives needed to suit target group needs in the community.

Action 28 Provide a bicycle safety education program

- Light / Moderate / Deep Green: The City will work with a cycling organization (e.g. Vancouver Area Cycling Coalition) to expand the bicycle safety education program to more community centres, schools and business centres. The City can promote existing and new cycle routes at the same time. Furthermore, to improve the safety of cyclists, an education campaign for drivers is needed. The City will encourage ICBC to use various media (signs, radio ads, newspaper articles) to promote the safety of pedestrians and cyclists through an annual campaign.²³

Examples and Best Practices

- Montreal BIXI program
- Vancouver and North Vancouver public bike sharing studies (currently underway)

²² Transport Canada. (2002). *Eco-Pass: Employer-Sponsored Transit Passes*. <http://www.tc.gc.ca/eng/programs/environment-utsp-ecopass-844.htm>

²³ For example, the "Street Smart" campaign is run annually to increase awareness and change behaviours for pedestrian and cycling safety. <http://www.bestreetsmart.net/index.php>

- Winnipeg's EcoPass
- Simon Fraser University' Community Pass for UniverCity
- BC Transit's Community Pass Program in Victoria

Secondary Indicators

Enhance pedestrian environment:

- Kilometres of sidewalk
- Walking mode share*

Enhance cycling environment:

- Kilometres of designated cycling lanes and multi-user separated pathways, and routes
- Cycling mode share*

Increase reliability and comfort of transit system:

- Percent of bus arrivals being on-time
- Percent of bus stops with shelters and seats

Improve transit network

- Transit mode share*
- Transit service hours per capita (Note: data not available at a municipal level)

*The City should consider developing mode share targets in the Transportation Master Plan.

6.4 Strategy for Low Carbon Mobility

GOAL: TO SUPPORT USE OF EFFICIENT AND LOW-CARBON MOBILITY

Description

In conjunction with enhancing the community's sustainable transportation options, it is also important to support more efficient travel for trips that continue to be taken in vehicles. This strategy identifies opportunities for supporting more efficient vehicle travel through various programs targeted at:

- reducing single-occupancy vehicle trips (particularly for commuting),
- influencing the purchase of smaller, cleaner vehicles, and
- reducing commercial vehicle fuel use (through "greener" fleets and improved trip planning for goods movement).

Transportation Demand Management (TDM) programs include a variety of services and incentives that influence how, where, when, and why people travel to encourage more sustainable travel behaviours and reduce single-occupancy vehicle trips.

Role of Other Agencies

- Government of Canada has planned new, more stringent emission standards for light and heavy vehicles.
- TransLink could be encouraged to use cleaner, transit vehicle technologies, such as battery-electric transit vehicles, or hybrids.

City Actions

Action 29 Promote commute trip reduction strategies through TDM outreach

- Light: The City of New Westminster is currently implementing a Transportation Demand Management program to work with major employers and 12 schools (9 elementary and 3 middle) to encourage sustainable transportation amongst commuters and students. This TDM program is funded until the end of December 2011. The City will continue the current TDM outreach programs with schools and business, and will expand these to include school staff, other schools, and other employers that have not participated to date.

The City will investigate opportunities to demonstrate leadership by providing employees incentives for choosing sustainable commuting modes (e.g. parking pricing, further discounts on transit passes, etc).

- Moderate / Deep Green: The City will also work with businesses to provide parking "cash-outs", where commuters who are currently being offered a subsidized parking space can instead choose the cash equivalent or a monthly transit pass.

Action 30 Expand ride-share program

- Moderate / Deep Green: Ride-share programs currently exist within Metro Vancouver. However, these programs typically require users to be committed to the program on a long-term basis and to use the service frequently. This essentially excludes users who may only need to use the program from time-to-time. The City will work with a ride-share program provider to develop a ride matching programming that offers better convenience, comfort and flexibility for users.

Action 31 Expand parking management strategies

- Moderate / Deep Green: One of the parking management strategies already being implemented within the City is priority parking for green vehicles and carpoolers. This will be further promoted, and the City will consider parking fee reductions for green vehicles and carpoolers.

As well, the City has purchased several smart parking meters that are programmed to adjust the parking rates according to the time of day. The City will investigate options for installing these meters in more areas to develop a demand-drive parking meter program, and aim for an 85% occupancy rate. The increased parking revenues can then be used to fund more sustainable forms of transportation.

In addition, the City will continue to engage the Province in discussions about allowing and encouraging developers to unbundle parking from housing costs where feasible. This would help reduce housing costs and encourage people to consider living without a vehicle.

Action 32 Provide greater enforcement / promotion of existing policies and regulations

- Light / Moderate / Deep Green: In 2008, the City of New Westminster passed an anti-idling bylaw and provides related educational materials on their website. The City will identify opportunities to increase the level of enforcement of this bylaw to encourage compliance by actively distributing stickers and brochures at idling hot spots, and issuing tickets as needed.

Action 33 Provide or require enhanced electric vehicle infrastructure

- Moderate / Deep Green: The City currently encourages new developments to install electric vehicle plug-ins within parking lots through optional parking incentives. This could be expanded to be a requirement for all new developments, rather than it being an option.

As well, the City will develop a plan to install plug-ins for electric vehicles at community facilities and in key public spaces.

Action 34 Develop a program to increase commercial vehicle fuel efficiency

- Light Green: The City will develop a "Green Fleet Challenge" to encourage local businesses to reduce commercial fleet emissions by, for example, 20% by 2020. This may include:

- Providing businesses with lessons learned from City's fleet emission reduction efforts;
 - Working with Metro Vancouver and local businesses to provide the Climate Smart program²⁴;
 - Providing workshops on green driving techniques;
 - Encouraging them to join the E3 Fleet program; and
 - Awarding businesses demonstrating most reductions.
- **Moderate:** The City may also encourage trucking companies to cooperatively delegate a neutral partner to deliver their goods to the Downtown. This neutral carrier collects the goods to be transported to the inner city (from the cooperating trucking companies) and delivers the goods to their destinations. Alternatively, the City may take the lead on this initiative (see Deep Green).
- **Deep Green:** The City will identify further opportunities for reducing commercial vehicle fuel consumption as part of the Transportation Master Planning process. Opportunities the City may consider include:
- Identifying preferred trucking routes and providing appropriate signage to ensure commercial trucks use these routes;
 - Launching a City Logistics project, which aims to reduce the total number of truck-trips made within the city, and/or mitigate their negative impacts. This is achieved either by reducing the number of loaded and empty truck trips, or by increasing vehicle load factors. The City can identify and establish common terminals or consolidation centres that are available to all carriers in the city, where shipments from various sources can be consolidated so that the number of final deliveries made to each destination is minimized.

Action 35 Identify innovative funding opportunities

- **Light / Moderate / Deep Green:** To help fund some of the programs mentioned above, the City will consider implementing innovative funding opportunities. This may include:
- Establishing a Sustainable Transportation Fund from the revenue collected from cash-in-lieu of reduced parking requirements;
 - Collect Local Improvement Charges on properties adjacent to walking/cycling/transit investments (i.e., the beneficiaries) to help fund the projects for new / additional facilities; and
 - As a Climate Action Charter "Reduction Project", the City could investigate the potential to use its carbon offset dollars towards carbon-reducing transportation initiatives.

²⁴ See <http://climatesmartbusiness.com/>. This is offered in other lower mainland communities, including North Vancouver (see <http://www.cnv.org/?c=3&i=597>).

Examples and Best Practices

- City of Richmond bus stop maps and information
- City of Vancouver electric vehicle charging infrastructure
- Jack Bell Ride-Sharing and Vanpooling Program
- Redwood City and San Francisco, CA's demand-driven parking meter system

Secondary Indicators

Promote commute, school and campus trip reduction strategies:

- Mode share of ride-share users

Expand ride-share program:

- Mode share of ride-share users

Expand parking management programs:

- Revenue collected from parking fees
- Average parking occupancy rate
- Percent of new developments that have unbundled parking

Provide greater enforcement / promotion of existing policies and regulations:

- Percent of new private developments with electric vehicle plug-ins within parking lots
- Percent of community facilities with electric vehicle plug-ins within parking lots

Innovative funding opportunities:

- Revenue collected from innovative funding programs for sustainable transportation projects and programs

6.5 Reduction Scenarios

Using the same approach as has been done in the area of buildings, three reduction scenarios have been developed for transportation - the "light green" softer approach to energy demand management and GHG emissions reductions, the "moderate" approach, and the "deep green", more aggressive approach that will lead to more substantial behaviour change and uptake by residents.

Every scenario assumes the same projected increases in population, and the same projected increases in density. These projections are based on the City’s current planning where new residential units are primarily high-rise units, low-rise units, with a small percentage as row and single family dwellings. In turn, as density increases, it is assumed that the required pedestrian infrastructure and more mixed-use developments will be built. As a result, the vehicle usage will be reduced. Figure 16 shows the estimated reduction in vehicle kilometres traveled (VKT) as a result of this densification by neighbourhood.

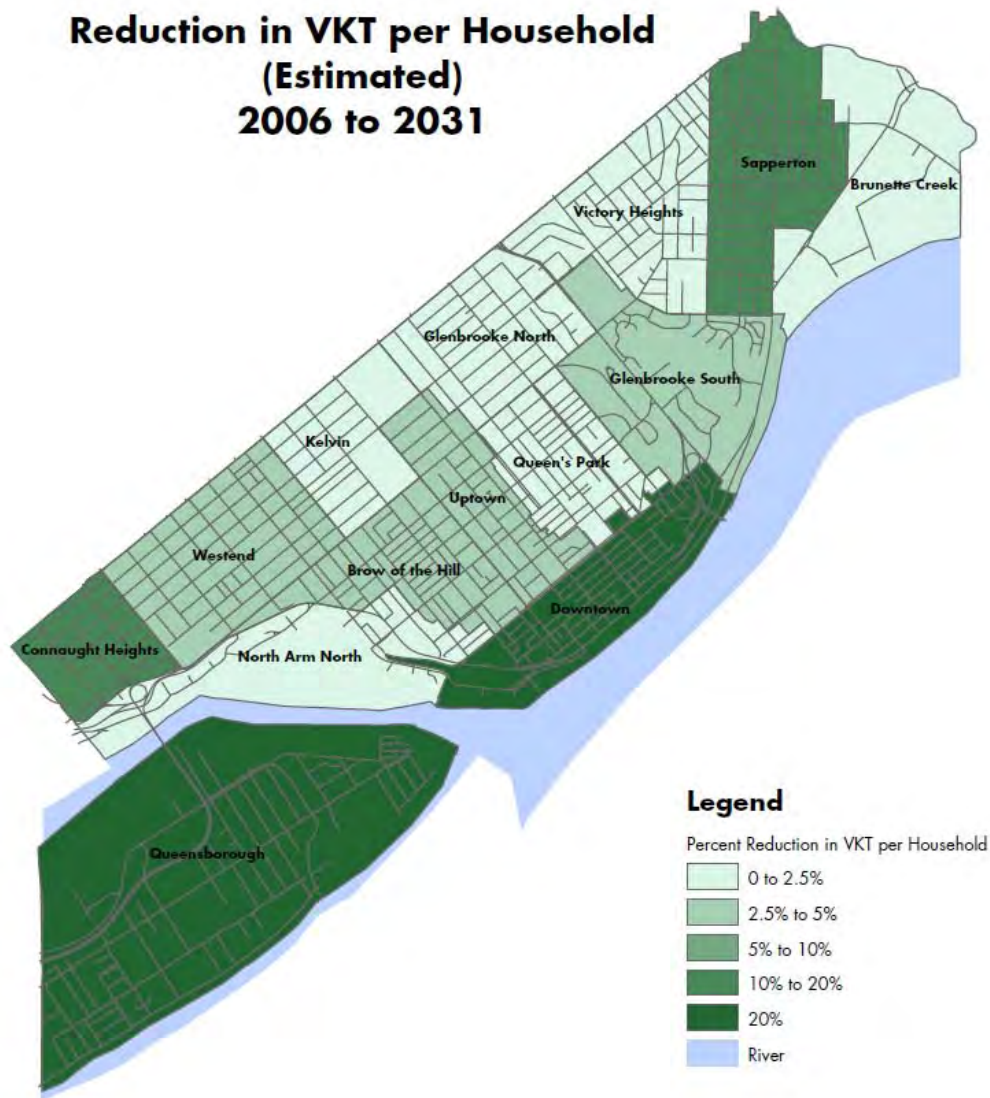


Figure 16. Estimated reduction in Vehicle Kilometres Travelled (VKT) resulting from compact growth

Beyond these reductions in VKT due to densification, further reductions are estimated for additional initiatives. In the “light green” scenario, the City implements most of the actions described in the previous sections to some extent. Actions that are fully implemented mainly focus on outreach/education, programs or projects that are already in place or being

planned, and policies/regulations that can be relatively easy to update. Those that are partially implemented focus on the softer elements of the action (e.g. education/outreach, improvements that require less significant resources and substantial changes to current policies, and non-financial incentives).

In the “deep green” scenario, the City implements all actions to their fullest extent, providing more resources to implement the projects and programs and working collaboratively with TransLink to make more substantial improvements to the transit and cycling network. They will also offer more attractive incentives for residents to use sustainable transportation.

Table 5 summarizes the assumptions made to create the three scenarios, and the overall reductions in greenhouse gas emissions in the community as a result of the actions.

Table 5. Estimated overall GHG Reductions by Scenario

Focus of the Action	Estimated reductions by 2032		
	Light Green	Moderate	Deep Green
Compact Community Planning:			
All scenarios assume the current density projections provided by the City are implemented (i.e. primarily high-rise units in focused corridors)	10% reduction in total VKT	10% reduction in total VKT	10% reduction in total VKT
Pedestrian improvements (beyond natural improvements during densification)	0% reduction in total VKT	2% reduction in total VKT	5% reduction in total VKT
Shift to Sustainable Modes of Transportation:			
Transit improvements, outreach and incentives	2% reduction in total VKT	3% reduction in total VKT	5% reduction in total VKT
Cycling improvements, outreach and incentives	1% reduction in total VKT	2% reduction in total VKT	4% reduction in total VKT
Low Carbon Mobility:			
TDM program (with businesses and schools)	2% reduction in GHG emissions	3% reduction in GHG emissions	5% reduction in GHG emissions
Electric vehicle infrastructure	0% reduction in GHG emissions from personal vehicles	1% reduction in GHG emissions from personal vehicles	2% reduction in GHG emissions from personal vehicles
Green Fleet Challenge	1% reduction in commercial total VKT	5% reduction in commercial total VKT	10% reduction in commercial total VKT

7. SOLID WASTE

Waste does not directly consume energy but when deposited into landfills, it decomposes and releases methane which is a greenhouse gas. To keep waste out of the landfill requires a focus on **diverting waste** to other uses as well as **minimizing the amount of waste generated** in the first place.

This section deals exclusively with activities related to solid waste and presents:

- the context with respect to solid waste management in the region; and;
- key strategies and related actions for reducing energy and emissions reductions in solid waste.



7.1 Context

In 2007, 4.3% of total GHG emissions in New Westminster came from solid waste.²⁵ This is slightly lower than the provincial average of 5.1%. Half of the city's waste goes to the landfill, the other half goes to a waste-to-energy facility.

As a member municipality of the Metro Vancouver Regional District, the City's waste is managed in accordance with the regional Integrated Solid Waste Resource Management Plan (ISWRMP). The ISWRMP sets a target of diverting 70% of potential garbage from the waste stream by 2015. Programs at the regional level include the Zero Waste Challenge, which encourages reducing, reusing and recycling as a way to produce the least amount of garbage possible.

At the municipal level, the City's curbside garbage collection and recycling program for single-family residential homes are contributing to this diversion. Through the Cleaner Greener Residential Curbside collection program, the City also recently expanded its yard trimmings program to include food waste. The City offers recycling for most multi-family dwellings and apartments, however these buildings typically have waste collected by the private sector. Most businesses in New Westminster arrange their own garbage and recycling collection service with private haulers.

²⁵ 2007 Community Energy and Emissions Inventory (CEEI) for City of New Westminster.

7.2 Strategy for Minimizing Waste

GOAL: MINIMIZE WASTE GENERATION

Description

The amount of waste generated is directly linked to the amount and type of goods and services consumed. Greater awareness is needed to change consumption behavior and materials unsuitable for reuse and recycling should be eliminated or as a minimum reduced.

Scale of Implementation

City-wide

Role of Other Agencies

- The BC Ministry of Environment's Extended Producer Responsibility (EPR) Program requires producers of designated products to take responsibility for the life cycle management of their products, including collection and recycling.
- Metro Vancouver is responsible for managing the garbage produced by residents and businesses in the Lower Mainland. The Integrated Solid Waste and Resource Management Plan directs how our waste is managed.
- The Province of BC manages the Building Code that regulates space allocation for waste management, building construction material re-use, etc.



City Actions

- The City has agreed to pursue the following actions in support of the ISWRMP goals 1 and 2:
 - Partner with Metro Vancouver in support of transferring additional waste management responsibilities to producers and consumers (supporting ISWRMP Strategy 1.1)
 - Work with Metro Vancouver to introduce material bans (after alternatives are identified) and suitable public information programs (supporting ISWRMP Strategy 1.2).
 - Partner with and assist Metro Vancouver in the development and delivery of public and business information and education programs (supporting ISWRMP Strategy 1.3).

Examples and Best Practices

- City of Edmonton Waste Management Centre

7.3 Strategy for Maximizing Recovery and Recycling

GOAL: MAXIMIZE REUSE, RECYCLING AND MATERIAL RECOVERY

Description

This goal looks at opportunities to reuse materials and products that would otherwise enter the landfill. It also explores greater access and convenience for recycling services.

Scale of Implementation

City-wide

Role of Other Agencies

- The BC Ministry of Environment's Extended Producer Responsibility (EPR) Program require producers of designated products to take responsibility for the life cycle management of their products, including collection and recycling.
- Metro Vancouver is responsible for managing the garbage produced by residents and businesses in the Lower Mainland. The Integrated Solid Waste and Resource Management Plan direct how our waste is managed.
- The Province of BC manages the Building Code that regulates space allocation for waste management, building construction material re-use, etc.

City Actions

- The City has agreed to pursue the following actions in support of the ISWRMP goals 1 and 2:
 - Work with Metro Vancouver to increase the opportunities for reuse (supporting ISWRMP Strategy 2.1).
 - Work with Metro Vancouver on actions designed to a) implement effective disposal bans for collecting municipal waste at source, b) inform businesses and residents of recycling opportunities, c) increase the efficiency and consistency of recycling collection services over the region, d) establish Eco-centres, e) promote recycling at community events and festivals, and f) work with school districts and individual schools to promote waste reduction and recycling (supporting ISWRMP Strategy 2.2).
 - Facilitate the siting of private sector recycling activities in the Zoning Bylaw (supporting ISWRMP Strategy 2.3).
 - Require recycling and composting facilities on site in multi-family dwellings and commercial buildings, and encourage provision of composting facilities.
 - Work with Metro Vancouver on the evaluation of regional scale recycling facilities and development of recycling markets (supporting ISWRMP Strategy 2.3).
 - Work with Metro Vancouver to develop a process to require DLC recycling at construction/demolition sites (supporting ISWRMP Strategy 2.4).

- Collaborate with Metro Vancouver in junk mail reduction pilot programs and community social marketing programs in community facilities (supporting ISWRMP Strategy 2.5).
- In collaboration with Metro Vancouver, develop and implement a work plan, including appropriate communication programs for the diversion of organic waste from single family residences, multi-family residences, and the ICI sector (supporting ISWRMP Strategy 2.6).
- Work with Metro Vancouver on programs to reduce the use of disposable take-out food and beverage packaging including plastic and other disposable bags (supporting ISWRMP Strategy 2.8).
- Work with Metro Vancouver to improve diversion rates in multi-family and commercial buildings (supporting ISWRMP Strategy 2.9).
- Manage diverted materials in accordance with the requirements of the Environmental Management Act and regulations in that materials will not be disposed unless all feasible opportunities for higher uses of the materials have been taken (supporting ISWRMP Strategy 2.10).

Secondary Indicators

Diversion of Organic Waste:

- Annual tonnes of organics diverted from the landfills

8. IMPLEMENTATION AND MONITORING

8.1 CEEP Implementation Governance / Management

The City will need to dedicate staff time and annual funding to support the implementation of this plan. However, the community will need to work collaboratively with the City to ensure New Westminster reaches the identified vision, goals and targets. It will also be important to continually monitor, report and review progress on these activities so that they can be adjusted as necessary to improve the outcomes.

To undertake the coordination and monitoring of this plan in collaboration with community partners, Council should consider appointing either a dedicated person or committee. The two models are briefly described below.

Energy Manager

A new Energy Manager position could be established to manage the implementation and monitoring of the CEEP. This individual should be reporting annually to Council on the progress of the Plan. The City can consider applying to the BC Hydro Community Energy Manager Program that provides up to 50 percent of the salary of a full-time senior staff member for a period of two years.

To facilitate support and understanding of the CEEP over the long-term, the Energy Manager is encouraged to establish and work with a committee of partners and stakeholders. This however does not transfer responsibility from the Energy Manager to committee members, who might merely act in an advisory capacity.

As part of the CEEP implementation in Fort St John, the City appointed a full-time Energy Manager who continues to assess and work with others to take action towards the community's reduction targets.

Task Force

Where the City is not able to dedicate full-time resources, the responsibility for implementation might need to be shared among a group of dedicated individuals. An Energy Task Force can be appointed by Council. The Task Force should involve a City staff person that can report back to Council on progress. The Task Force should have a clear Terms of Reference to guide their activities and to outline their responsibilities.

As part of the larger Sustainability Strategy, the City of Rossland appointed a series of task forces, including an Energy Task Force, that continues to work collaboratively towards the community's desired energy future. <http://visionstoaction.ca/content/energy>.

8.2 Action Plan: Resourcing, Budgeting, Timing

For each of the strategies, a number of recommended actions have been identified. Each of these recommended actions are outlined below, indicating who would be responsible for leading implementation, the timeframe and very rough budget estimates of staff labour and disbursements (consulting fees, potential capital costs in some cases). Internal full-time labour cost is assumed at about \$100,000 / annum, including salary, benefits and overhead. The timeframe indicates short-term (1-2 year), medium term (3-5 year) and long-term (5-10 year) priorities. The costs and responsibilities for these actions should be reviewed annually as part of the detailed budget planning process.

Staff resource estimates consider:

1. Internal – coordination among staff in relevant departments; research; data analysis/reviews, reporting; managing consultants
2. External – communication with stakeholders or target groups; coordination of outreach campaigns; developing / building partnerships; facilitating / coordinating meetings

Disbursement costs consider:

1. Hiring consultants; lawyers; etc.
2. Production of outreach materials; incentive program pay-outs / lost revenues
3. Some capital costs if / where possible

Our estimates of these costs are summarized below for implementation of the Moderate scenario (see Appendix D for a more detailed outline of costs and estimates for the Light Green and Deep Green scenarios). Transportation actions and costs are expected to be further defined by the Master Transportation Planning process that the City will be undertaking in the near future. Note that FTE estimates may overlap with existing duties, or there may be overlap between actions. Furthermore, some direct costs estimated may already be incorporated in other plans.

Moderate Scenario:

Estimated GHG Reductions by 2030:



Approximately 1 FTE per year for 5 years

Approximately \$250,000 budget for direct costs per year for 10 years



Costs for implementation of the Solid Waste actions are not included, as they have previously been identified in a report to Council regarding the Solid Waste Management Plan in 2010.

8.3 Monitoring our Progress

In applying an adaptive management approach to plan implementation, it is important to monitor changes in energy use and GHG emissions over time to gauge the effectiveness of activities being undertaken. To accomplish this, a monitoring program needs to be developed that tracks specific indicators of progress. Proposed primary and secondary indicators for this plan are outlined below. Suggested data sources are also described.

The **primary indicators** directly track progress towards the desired reduction outcome of energy consumption and GHG emission levels. It is recommended that the City report on these indicators every 2 years, to coincide with provincial plans to update the CEEI reports.

Primary Indicator	Data Source
1 Total GHG emissions (tonnes of CO ₂ e)	Provincial CEEI
2 Total GHG emissions from the buildings sector (tonnes of CO ₂ e)	Provincial CEEI
3 Total GHG emissions from the transportation sector (tonnes of CO ₂ e)	Provincial CEEI
4 Total GHG emissions from solid waste (tonnes of CO ₂ e)	Provincial CEEI
5 Total energy consumed (G) per capita)	Provincial CEEI
6 Total electricity consumption (GWh per capita)	Provincial CEEI or New Westminster Utility

These primary indicators are supported by a set of **secondary indicators** that are linked to the on-the-ground outcomes which contribute to the longer term desired outcomes. They provide clear benchmarks against which to measure the progress of actions in fulfilling some of the commitments believed to advance our overall performance.

	Goal	Secondary Indicator	Data Source
Buildings	To improve energy efficiency in existing buildings	<ul style="list-style-type: none"> • Existing Energy Efficient (Residential) Buildings: Percent of existing residential buildings renovated to high energy performance standards (e.g., EnerGuide for Homes 80 or higher). • Existing Energy Efficient (Commercial) Buildings: Percent of existing commercial buildings renovated to high energy performance standards (e.g., exceeding ASHRAE 90.1). 	<p>City Building Permit Data</p> <p>City Building Permit Data</p>
	To build the most energy efficient new buildings	<ul style="list-style-type: none"> • New Energy Efficient (Residential) Buildings: Percent of new residential buildings exceeding energy performance standards in the current building code (validated through third party rating systems such as EnerGuide, LEED®, etc) • New Energy Efficient (Commercial) 	<p>City Building Permit Data</p> <p>City Building</p>

		<p>Buildings: Percent of new commercial buildings exceeding energy performance standards in the current building code (validated through third party rating systems such as LEED®, ASHRAE 90.1, etc)</p>	Permit Data
	To encourage renewable, responsible & local energy	<ul style="list-style-type: none"> • Connections to Alternative Energy Supply: Percent of homes in New West connected to alternative energy supply; Percent of commercial buildings in New West connected to alternative energy supply 	City Building Permit Data
Land Use and Transportation	To build neighbourhoods where residents can live, work and play in close proximity	<ul style="list-style-type: none"> • Compact development: Residential density; Residential density within a 400m buffer around frequent bus corridors and an 800m buffer around SkyTrain stations; Percent (%) of City’s population and jobs located within a 400m buffer around frequent bus corridors and an 800m buffer around SkyTrain stations. • Mixed-use development: Land use diversity index (e.g. Simpson’s Diversity Index) 	<p>Census Data (GIS format)</p> <p>City GIS Data</p>
	To foster walking, cycling, and taking transit as the preferred ways of getting around	<ul style="list-style-type: none"> • Pedestrian environment: Kilometres of sidewalk; Walking mode share • Cycling environment: Kilometres of designated cycling lanes and routes; Cycling mode share • Transit quality: Percent of bus arrivals being on-time; Percent of bus stops with shelters and seats • Transit use: Transit mode share; Transit service hours per capita 	<p>City GIS Data;</p> <p>Census Data</p> <p>City GIS Data;</p> <p>Census Data</p> <p>TransLink, City Data</p> <p>Census Data, TransLink</p>
	To support use of efficient and low-carbon mobility	<ul style="list-style-type: none"> • Commute trips: Mode share of ride-share users • Parking management: Revenue collected from parking fees; Average parking occupancy rate; Percent of new developments that have unbundled parking • Alternative fuel vehicles: Percent of new private developments with electric vehicle plug-ins within parking lots; Percent of community facilities with electric vehicle plug-ins within parking lots • Percentage of alternative fuel vehicles owned by residents and businesses of New West • Innovation funding: Revenue collected from innovative funding programs for sustainable transportation projects and programs 	<p>Census Data</p> <p>City Parking meter Data</p> <p>City Building Permit Data</p> <p>ICBC</p> <p>City Finance Data</p>

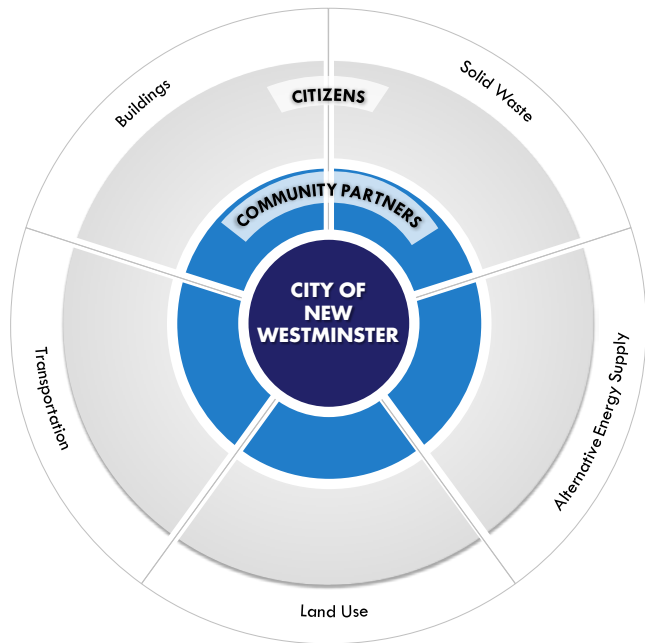
Plan Implementation	These indicators are suggested for tracking the progress of CEEP implementation	<ul style="list-style-type: none"> • Number of actions underway per year • Number of actions completed • Number of partners collaborating on plan implementation • Number of residents participating in outreach and/or incentive programs 	CEEP program manager
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9. OUTREACH STRATEGY FOR IMPLEMENTATION

9.1 A Three-part Partnership

The purpose of the various actions in this report is to catalyse change in the way people use energy. As a local government, the City of New Westminster can use certain powers granted by legislation and within their mandate to help manage energy and emissions for the community. While the CEEP identifies actions that fall within the City's mandate, it also identifies actions that can only succeed with the help of partners and residents. In this sense, the CEEP relies on a three-part partnership between the City, its community partners and residents.

This joint responsibility poses a challenge for implementation in that the City does not fully control the actions of citizens and community partners. It can try to influence others and rely on their good will to work jointly towards common goals. Whether we are expecting change within the City's policies and practices or appealing to residents to change their behaviours, it will require effective communication to bring the various target audiences on side. Communication is therefore an essential step in implementing lasting energy and climate change action in support of a healthy, livable community.



9.2 A Strategy for Outreach

At the time of initiating each action, an outreach strategy will have to be identified to establish the best path towards successful implementation. The key elements of the outreach strategy include:

1. Identifying the budget and timeline
2. Defining the objectives
3. Defining and understanding the target group(s)
4. Identifying supporting stakeholders
5. Defining key messages
6. Identifying communication products, dissemination channels and milestones

Identifying Budget & Timeline

The availability of funds and time create the constraints within which the outreach strategy is designed. The various activities should of course match what we are capable of within these funding and time limitations but it does not have to dampen creativity. Identify the critical timeline and what budget is available. Is there opportunity for more funding down the road? Are there other funding partners that can be approached? Are there opportunities to leverage off other initiatives?

Defining the objectives

Before initiating outreach on a specific action, it is necessary to reflect on the objectives. What do we want our outreach to achieve? The objectives should be:

- Clear, specific, and measurable
- Realistic within the timeframe, budget and resources

Identifying & understanding the Target group(s)

For each action to succeed, it is important to understand which target group(s) the action is intended for. Who are we targeting with this action? Who will be directly impacted by this action? What are their current attitudes and knowledge about the issue? What motivates them?

The better we know our target audience, mutually work together, and gain trust, the better our chances to influence them. There are basically three types of motivators:

- **Rational motives:** self-interested or safety-related motives like saving money or better health
- **Social motives:** belonging or societal motives like fitting in with a group or being respected by others
- **Emotional motives:** moral or self-actualizing motives like saving the environment or care for family, friends or grandchildren

Identifying supporting Stakeholders

Change in energy- and emission-related behaviour is often part of a larger change in the target groups' environment. Individuals may find it difficult to change if their environment does not support the change or if they run into social, technical, and organizational barriers.

To support the target groups in making the necessary changes and to accept the required action, it might be necessary to involve external organizations and people. Who will be

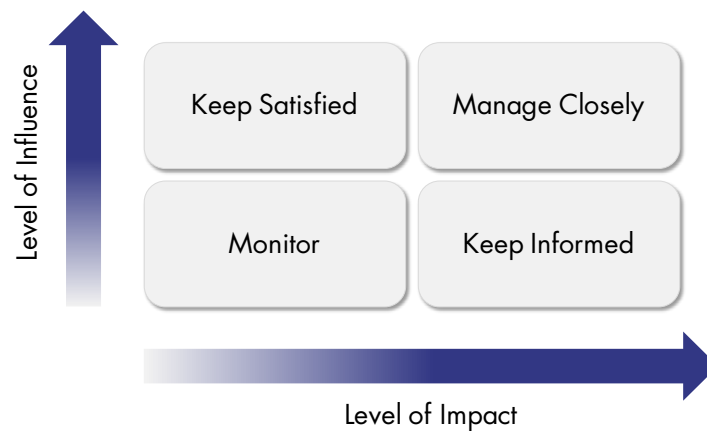
indirectly impacted by this action? Who can help facilitate the action's success? These may include stakeholders in some of the following roles:

- stakeholders that can help by providing resources and competences (e.g., funding partners)
- stakeholders influencing the target group and their possibilities to save energy (e.g. the utility)
- stakeholders who are indirectly influenced by the action and may support or oppose it

Successful projects engage not only end-user target groups, but other relevant stakeholders as well. These stakeholders can be viewed as 'indirect target groups'. Their participation can be crucial for achieving and sustaining change over the long-term.

As shown in the image below, stakeholders can be mapped in relation to their a) level of influence and b) level of impact as it pertains to the specific action. This will help to identify the stakeholders that the City will need to:

- work with closely to ensure successful implementation
- keep satisfied but not compromise with too much
- keep informed on a regular basis
- monitor



Defining the key message

To effectively reach the target group(s) with the call to action, it is important to have a clear message that resonates. What is our message? Do we have one message for multiple audiences or multiple messages tailored for multiple audiences?

The message should be framed to introduce 3 parts: problem – solution – action. There are various ways to get the target group(s) 'on board' and engaged with the call to action. Understanding the target group(s) and what motivates them (described earlier) will help to inform framing the message in the right context and with the right balance of rational, emotional and social motivators.

Identifying Communication Products, Dissemination channels and schedule

Once the message is defined, it is a question of how best to capture and disseminate the message? Our message must be seen and heard to have any value at all. What's more, it must be seen and heard by the right people to have any impact. The choice of our communications tactics depends on the type and content of the message, available resources, and also – most crucially – on how the audience likes to receive information. It can cover a wide range of tactics, including:

- Community based social marketing (CBSM) approaches that seek commitments from individuals to make a change
- Press (press release, radio, editorial, etc.)
- Online (social marketing websites and profiles, email newsletters, websites, etc.)
- TV (news, interviews, documentary, etc.)
- Print (brochures, posters, letters, leaflets, reports, etc.)
- Public Relations (event, phone calls, conference, competition, etc.)
- Interactive (conference calls, meetings, workshops, etc.)

Within the larger outreach timeline, identify a schedule with milestone dates that can be used to track interim progress against the overall outreach timeline.

9.3 Example & Template

ACTION: Promote BC Hydro PowerSmart programs to commercial/institutional customers (continuous optimization program)					
OUTREACH BUDGET: \$					
OUTREACH TIMELINE:					
COMMUNICATION OBJECTIVES: <ul style="list-style-type: none"> To make commercial and institutional customers aware of the various PowerSmart programs To encourage participation in the PowerSmart programs 					
TARGET GROUP	KNOWLEDGE LEVEL & INFLUENCE ON CEEP OUTCOMES	MOTIVATORS	KEY MESSAGES	COMMUNICATION FORMAT & SCHEDULE	SUPPORTING STAKEHOLDERS
Local commercial businesses	<ul style="list-style-type: none"> Knowledge: 6 out of 10 Influence: Building operation and maintenance 	<ul style="list-style-type: none"> Rational motivation, such as cost savings, market share / attracting customers 	<ul style="list-style-type: none"> Benefits to the bottom line Green branding potential Potential for low-hanging fruits 	<ul style="list-style-type: none"> Presentation at Chamber of commerce meetings (when?) Print information accompanying utility bill (when?) Green awards / competition announcements (when?) 	<ul style="list-style-type: none"> Chamber of Commerce BC Hydro Electric Utility Board
Local institutions (e.g. Hospital, Colleges, School District, City facilities)	<ul style="list-style-type: none"> Knowledge: 8 out of 10 Influence: Building operation and maintenance; Building retrofits 	<ul style="list-style-type: none"> Rational motivation, such as cost savings Social motivation, such as leadership in the community and among peers 	<ul style="list-style-type: none"> Benefits to the bottom line Potential for low-hanging fruits Lead-by-example potential / staying current with peers 	<ul style="list-style-type: none"> Meetings with operation managers (when?) Print information accompanying utility bill (when?) Green awards / competition announcements (when?) 	<ul style="list-style-type: none"> BC Hydro Electric Utility Board Health Authority School District College Council

ACTION: Offer building permit rebates for residential energy audits and retrofits					
OUTREACH BUDGET: \$					
OUTREACH TIMELINE:					
COMMUNICATION OBJECTIVES:					
<ul style="list-style-type: none"> To make residential customers aware of permit rebates for conduction building audits and retrofits To increase the number of residential energy retrofits 					
TARGET GROUP	KNOWLEDGE LEVEL & INFLUENCE ON CEEP OUTCOMES	MOTIVATORS	KEY MESSAGES	COMMUNICATION FORMAT & SCHEDULE	SUPPORTING STAKEHOLDERS
Homeowners and Stratas	<ul style="list-style-type: none"> Knowledge: 5 out of 10 Influence: Building operation and maintenance; Building retrofits 	<ul style="list-style-type: none"> Rational motivation, such as property taxes, cost savings, property value increase, healthy homes Emotional motivation, such as environmental impacts 	<ul style="list-style-type: none"> Demonstrate costs and benefits – understanding lifecycle and payback Access to grants, funding, incentive programs Benefits to the environment Health benefits to building occupants Access to alternative products 	<ul style="list-style-type: none"> Print information accompanying utility bill (when?) Demonstration projects with media (when?) Workshops / seminars (when?) Challenges or competitions with prizes (when?) Home improvement retailers' promotion event (when?) 	<ul style="list-style-type: none"> Neighbourhood groups Building management agencies BC Hydro Electric Utility Board City Council Building permitting staff at the City Home-improvement retailers and/or contractors

APPENDIX A: INVENTORY & FORECAST DETAILS

Baseline Inventory: 2007

Summary of Community-Wide Electricity Consumption, Total Energy Consumption, and GHG Emissions (2007)

Component	Electricity Consumption (kWh)	Energy Consumption (GJ)	GHG Emissions (tonnes CO ₂ e)
Residential Buildings	182,356,848	1,481,663	46,583
Commercial Buildings	259,957,721	2,218,254	71,815
Transportation	n/a	2,258,145	155,022
Solid Waste	n/a	n/a	12,239
Total	442,314,569	5,958,062	285,659
Total per Capita	-	-	4.7

Source: Province of BC CEEI Inventories

The complete 2007 Provincial CEEI report for New Westminster is included in Appendix E.

Comparison of 2007 CEEI data to other data sources

CEEI VALUE (2007)	COMPARATIVE VALUE	NOTES
Number of residential electricity accounts: 27,152	Total private dwellings from Stats Canada (2006): 28,670	Very good agreement. Some private dwellings in multi-unit buildings may have shared accounts.
Average residential electricity use: 6,716 kWh/dwelling	BC Hydro Conservation Potential Review (CPR) 2007. Average electricity consumption for Lower Mainland regions are provided by dwelling type and age. Based on Stats Can housing split data (2006), approximate residential electricity use: 6,997 kWh/dwelling	Good agreement. Note: assumed apartments are all electrically heated and non-apartments are natural gas heated.
Number of residential natural gas accounts: 8,059	Number of non-apartment dwellings 2006 (e.g. single family, semi-detached, row, duplex): 9,165	Reasonably good agreement, assuming most non-apartment dwellings use natural gas and most apartments use electricity.
Average residential natural gas use: 102 GJ/account	Terasen average usage statistics for lower mainland <u>detached dwellings</u> (2004): 100 GJ/dwelling	Very good agreement, assuming most accounts are detached and semi-detached dwellings.

CEEI VALUE (2007)	COMPARATIVE VALUE	NOTES
Number of personal vehicles registered (28,751) per occupied dwelling: 1.1	National vehicle use survey (Stats Canada) estimated vehicles per household: 1.1 in major urban centres 1.3 overall average for Canada	Very good agreement. Due to access to the SkyTrain network, it is expected New Westminster would be close to major urban centres for vehicle ownership rates.
GHG Emissions from light-duty vehicles: 111,603 CO₂e	Metro Vancouver's 2005 Lower Fraser Valley Air Emissions Inventory & Forecast and Backcast estimates emissions from light-duty vehicles as: 103,389 CO₂e	Reasonable agreement.
GHG Emissions from heavy-duty vehicles: 43,419 CO₂e	Metro Vancouver's 2005 Lower Fraser Valley Air Emissions Inventory & Forecast and Backcast estimates emissions from heavy-duty vehicles as: 21,533 CO₂e	Poor agreement. Difference likely attributed to Metro Vancouver's use of TransLink's VKT data, which was found to be considerably lower for heavy-duty vehicles than the EPA's VKT estimates that were used in the CEEI calculations.
Tonnes of solid waste disposed (33,637) per capita: 0.57	Tonnes of solid waste disposed per capita (2005) from Recycling and Solid Waste Management 2005 Summary: 0.71	Reasonable agreement.

25-year Forecast Assumptions: 2032

Population and job growth projections used for forecasts

YEAR	PROJECTED POPULATION	PROJECTED JOB GROWTH
2007	61,349	-
2020	73,502	-
2032	84,466	55 %
Average Growth	1.4%	-

Source: City of New Westminster population projections

Residential Development Forecast, 2008 to 2031 (units)

Dwelling Type	Downtown	Mainland (outside Downtown)	Queensborough	Total
Single Detached units (net new)	0	0	628	628
Townhouse units	0	98	533	632
Apartment units – Low rise	348	1,535	1,278	3,160
Apartment units – High rise	6,610	2,850	117	9,578
Total # of new units	6,958	4,483	2,556	13,997

Source: These numbers were developed by adjusting the New Westminster Urban Development Forecast 2008-2041, Coriolis Consulting Corp, 2008, to be in-line with population forecasts from Metro Vancouver

The following table is based on Metro Vancouver estimates for population and job growth conducted across the region during development of the RGS, and has been adjusted by City planners. The estimates were completed by "Traffic zones", and these were applied to the closest neighbourhoods for the purpose of this study.

**Population and job growth projections by neighbourhood
(used for thermal density mapping)**

Neighbourhoods	Traffic zones (Metro Van)	Pop 2006	Pop 2031	Pop change	Jobs 2006	Jobs 2031	Job change
Downtown	4740, 4770, 4800	8754	19865	127%	6050	12139	101%
Brunette Creek	4840	73	73	0%	1081	2004	85%
Sapperton	4830	4,830	7,217	49%	5273	7877	49%
Glenbrooke South	4820	3,063	3,393	11%	788	1300	65%
Victory Heights (incl	4810	3,913	3,913	0%	1130	1466	30%
Queen's Park	4791, 4792	2,585	2,585	0%	282	418	48%
Glenbrooke North	4780	3,688	3,888	5%	1052	1408	34%
Uptown	4762, 4761	9607	10907	14%	5627	7451	32%
Brow of the Hill	75% 4751, 4752, 4730	10,046	11,386	13%	2806.25	3589.5	28%
Kelvin	25% 4751	1,991	1,991	0%	290.75	337.5	16%
West End	4720	4,501	4,895	9%	614	711	16%
Queensborough	4710	5729	11,000	92%	2652	4184	58%
Connaught Heights	4700	1,722	3,146	83%	358	462	29%
TOTAL		60,502	84,259	39%	28,004	43,347	55%
			<i>RGS Estimates for 2031: 92,000</i>			<i>44,000</i>	

25-year Business-As-Usual Forecast Results: 2032

Community-Wide Electricity Consumption, Total Energy Consumption, and GHG Emissions by Sector (2032)

Component	Electricity Consumption (GJ)	Natural Gas Consumption (GJ)	Transportation Fuels (GJ)	Total Energy Consumption (GJ)	GHG Emissions (tonnes CO ₂ e)
Residential Buildings	840,000	1,050,000	n/a	1,890,000	57,800
Commercial/ Small-Medium Industrial Buildings	1,210,000	1,650,000	n/a	2,860,000	90,300
Transportation	n/a	n/a	2,140,000	2,140,000	147,500
Solid Waste	n/a	n/a	n/a	n/a	17,300
Total	2,050,000	2,700,000	2,140,000	6,890,000	316,800
Total per Capita	24	31	25	79	3.6

Estimated Thermal Loads by zoning / region for residential units and non-residential floorspace (2006)

	kWh/ft^2	Space Heating	Hot Water	Total Thermal	Unit				
						SH Common	HW Common	Total	
Space Heating & Domestic Hot Water (Lower Mainland)	Single family	15,932	3,321	19,253	kWh/yr/unit				Residential Space Heating Data Source: BC Hydro Conservation Potential Review 2007 Pg 18 Exhibit 2.3: Net Space Heating and Cooling Loads for Existing Residential Units, by Dwelling Type, F2006 (kWh/yr)15 Residential Hot Water Data Source: Appendix A: Annual Appliance Unit Energy Exhibit A1: Annual Appliance Electricity Use (UEC) for the Lower Mainland in F2006, (kWh/yr.)
	row housing	7,638	2,773	10,411	kWh/yr				
	low-rise	3,080	1,852	4,932	kWh/yr	23,108	16,763	39,871	
	high-rise	1,890	1,852	3,742	kWh/yr	183,277	131,118	314,395	
	Restaurant	14.5	25.4	39.9	kWh/ft^2				Commercial Space Heating & HW Data Source: BC Hydro Power Smart Conservation Potential Review (CPR) 2007 Commercial Sector APPENDIX A Building Profile – Lower Mainland
	Food Retail	5.3	0.5	5.8	kWh/ft^2				
	Small Non-Food Retail	12.4	0.6	13	kWh/ft^2				
	Medium non-food retail	8.3	0.6	8.9	kWh/ft^2				
	Large Non-Food Retail	4.6	0.8	5.4	kWh/ft^2				
	Small Office	12.2	0.8	13	kWh/ft^2				
	Medium Office	10.7	0.8	11.5	kWh/ft^2				
	Large Office	10.5	0.8	11.3	kWh/ft^2				
	Medium Hotel/Motel	8.5	8.2	16.7	kWh/ft^2				
	Large Hotel	10.1	8.3	18.4	kWh/ft^2				
	Warehouse/Wholesale	4.4	0.5	4.9	kWh/ft^2				
	Medium School	15.1	0.6	15.7	kWh/ft^2				
Large School	9	0.6	9.6	kWh/ft^2					
University / College	18.1	0.8	18.9	kWh/ft^2					
Nursing Home	9	4.5	13.5	kWh/ft^2					
Hospital	26.4	4	30.4	kWh/ft^2					

Estimated Thermal Loads by zoning / region for non-residential floorspace (2006)

	CPR category													thermal energy/sqft			
	Restaurant	Food Retail	Small Non-Food Retail	Medium non-food retail	Large Non-Food Retail	Small Office	Medium Office	Large Office	Medium Hotel/Motel	Large Hotel	Warehouse/Wholesale	Medium School	Large School		University / College	Nursing Home	Hospital
Downtown Commercial	0.1		0.45				0.45										15.015
Sapperton Commercial		0.1	0.65			0.25											12.28
Queensborough Commercial	0.1	0.2		0.2	0.5												9.63
Westend Commercial		0.1	0.75			0.15											12.28
Uptown Commercial	0.1	0.1	0.35			0.45											14.295
Other Commercial			0.75			0.25											13
Destination Casino	0.1								0.9								20.55
Light Industrial										1							4.9
Institutional						1											11.5
Nursing Home														1			13.5
Commercial Large Format		0.2			0.8												5.48
Commercial - Hotel	0.15							0.85									20.18
Hospitals																1	
Douglas College													1				
Justice Institute													1				

Note: 2031 thermal load projections for 2031 assumed a 10% reduction in energy demand per sqft, based on the targets in the BC Energy Plan and also used in the BAU assumptions described earlier.

APPENDIX B: SCENARIO RESULTS

Scenario Summaries

Summaries of the three scenarios developed are provided over the next three pages, followed by tables and graphs that outline the projected changes in GHG emissions and energy consumption that may result from implementation of each scenario.

New Westminster CEEP 25-year Forecast

Population

2007 60,000 → 2032 84,000

GHG Emission Target

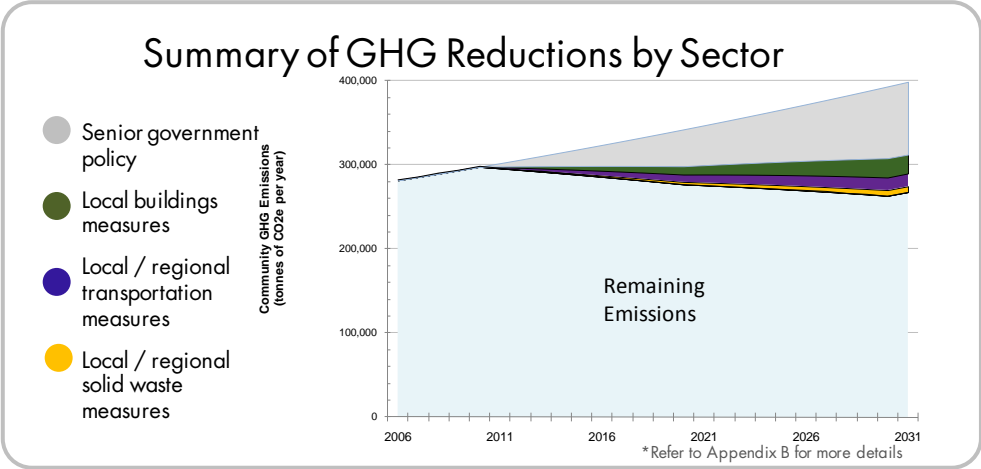
2020 -2% → 2030 -5%

Total GHG Emissions (CO₂e)

2007 286,000 → 2032 265,000

Per Capita GHGs (CO₂e)

2007 4.8 → 2032 3.2




- Key Features of the Light Green Scenario**
- Compact land use development where most new residential units are in low and high-rise buildings in mixed-use neighbourhoods in proximity to frequent transit
 - Education and outreach programs to encourage energy audits and retrofits on older buildings – including multi-family residential and commercial buildings
 - Education and outreach programs to encourage installation of renewable energy (e.g. solar hot water systems)
 - Install pedestrian and transit infrastructure improvements (wider sidewalks, accessible bus stops, bus shelters, etc.) with new development

Moderate Scenario


New Westminster CEEP 25-year Forecast

Population




2007: 60,000 → 2032: 84,000

GHG Emission Target



2020: -5% 2030: -15%

Total GHG Emissions (CO₂e)

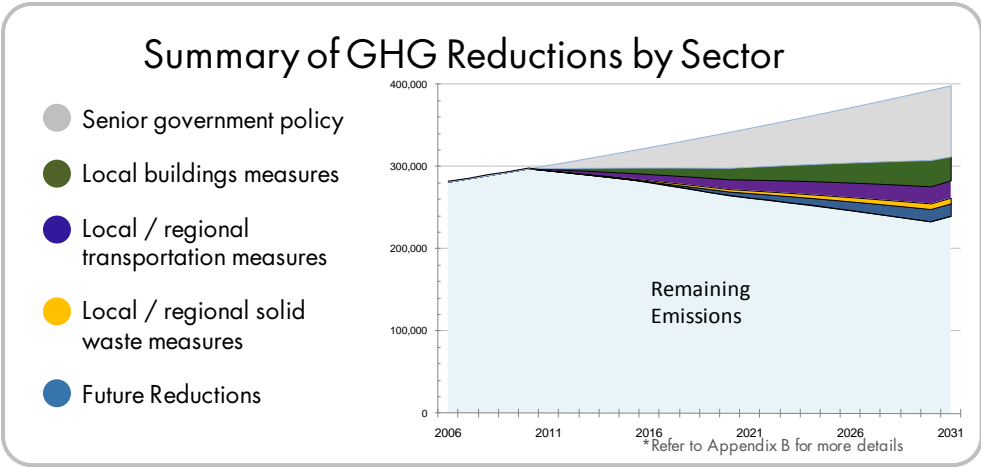


2007: 286,000 → 2032: 233,000

Per Capita GHGs (CO₂e)



2007: 4.8 → 2032: 2.9




- Key Features of the Moderate Scenario**
- Includes all features of light green scenario
 - Moderate financial incentive program to encourage energy audits and retrofits on older homes
 - Build 1 district energy systems, with bylaw requiring connections
 - Increase transit frequency on major bus routes (TransLink)
 - Build additional cycling routes

Deep Green Scenario


New Westminster CEEP 25-year Forecast

Population




2007: 60,000 → 2032: 84,000

GHG Emission Target



2020: -15% 2030: -30%

Total GHG Emissions (CO₂e)

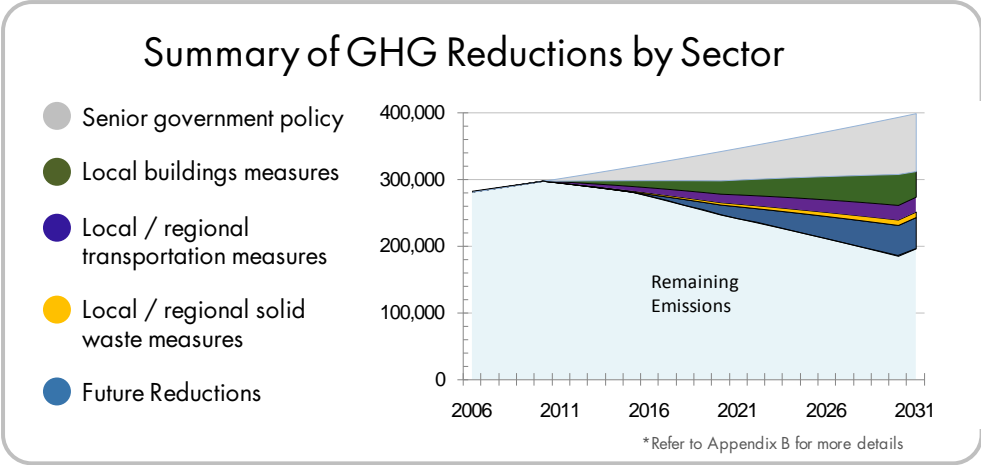


2007: 286,000 → 2032: 195,000

Per Capita GHGs (CO₂e)



2007: 4.8 → 2032: 2.4



- Key Features of the Deep Green Scenario**
- Includes all features of light green and moderate scenarios
 - Strong focus on financial incentive programs to encourage energy audits and retrofits on older buildings – including multi-family residential and commercial
 - Build 2 district energy systems, with bylaws requiring connections
 - Install electric vehicle outlets at all civic facilities and require them at new multi-family and commercial developments
 - Double transit frequency on major bus routes (TransLink)

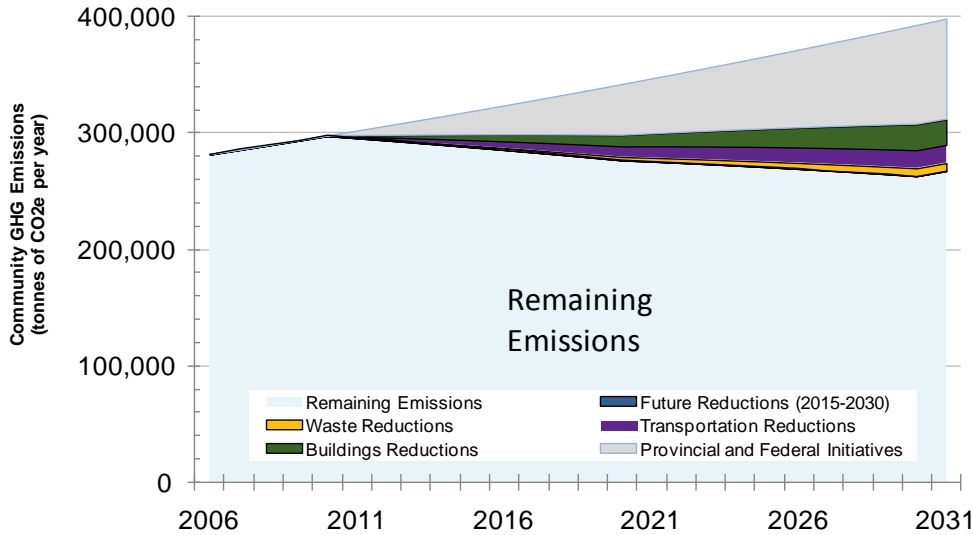
Projected Energy and Emissions Changes by Sector: ● "Light Green" Scenario

The following table outlines the estimated changes in GHG emissions and energy consumption resulting from implementing the "light green" scenario. The recommended target for 2030 is a reduction of 5% in community GHG emissions from 2007 levels, which comes from rounding-down the estimated reductions to the "nearest 5".

Reduction Scenario: Estimated Reductions			
	2007	2020	2030
Total GHG Emissions	285,659	276,818	263,182
Change from 2007	-	-8,841	-22,477
% Change GHG Emissions Total from 2007	-	-3%	-8%
Per Capita Emissions (t/person)	4.7	3.8	3.1
% Change GHG Emissions Per capita from 2007	-	-19%	-33%
Total Electricity Consumption (GJ)	1,592,331	1,620,162	1,737,660
Change from 2007 (GJ)	-	27,831	145,329
% Change Electricity Consumption from 2007	-	2%	9%
Per Capita Electricity Consumption (GJ/person)	26.0	22.0	20.6
% Change GHG Emissions Per capita from 2007	-	-15%	-21%
Total Energy Consumption (GJ)	5,958,062	5,840,740	5,771,867
Change from 2007 (GJ)	-	-117,322	-186,195
% Change Energy Consumption from 2007	-	-2%	-3%
Per Capita Energy Consumption (GJ/person)	97.1	79.5	68.3
% Change GHG Emissions Per capita from 2007	-	-18%	-30%

The following graph displays the estimated GHG emission reductions that could result from implementing the Light Green scenario.

“Light Green” GHG Emission Reductions



The following chart reports the estimated reductions in GHG emissions (relative to the 2030 population-scaled emissions) for each sector that result from implementing the Light Green scenario.

Emissions Sector	GHG Emissions Reductions (tonnes of CO ₂ e)	Proportion of CEEP GHG Emissions Reductions
Senior Government Initiatives	85,000	-
Existing Residential Buildings	17,000	37%
NEW Residential Buildings	3,000	7%
Existing Commercial Buildings	3,000	7%
NEW Commercial Buildings	1,000	2%
Personal Vehicles	15,000	33%
Commercial + Other Vehicles	-	0%
Waste	7,000	15%

Notes: Senior Government Initiatives are estimated to reduce total emissions by 22%.

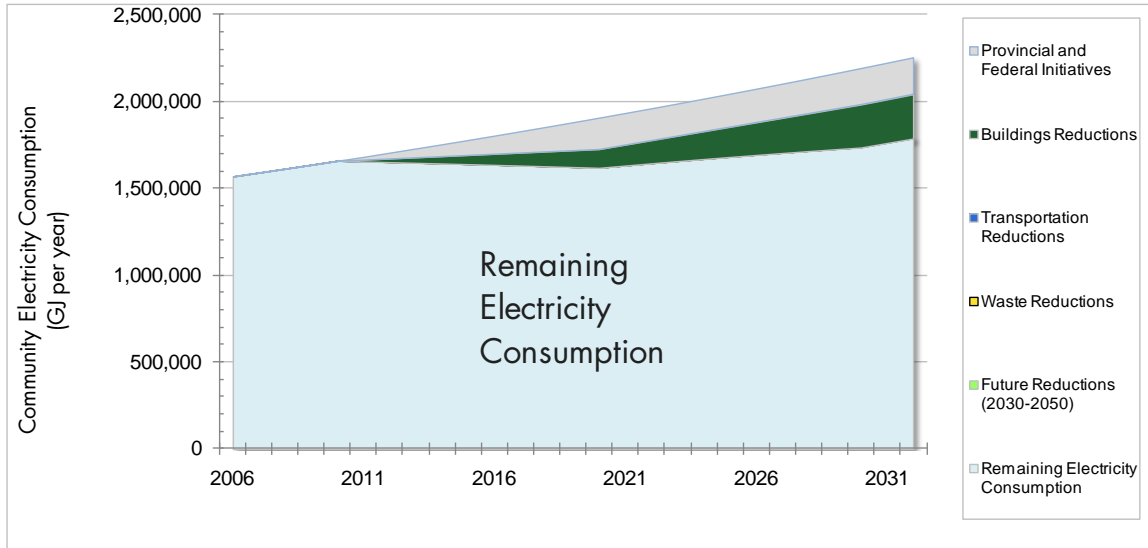
The reductions are presented here by emissions sector (Buildings, Transportation, Waste); the reductions are also presented by Goal in the table in Appendix D)

Implementing the Light Green scenario results in an estimated reduction of:

- 13% of total electricity consumption relative to the BAU
- 15% of total GHG emissions relative to the BAU

The following graph demonstrates anticipated changes in Electricity consumption under the Light Green scenario.

“Light Green” Electricity Changes



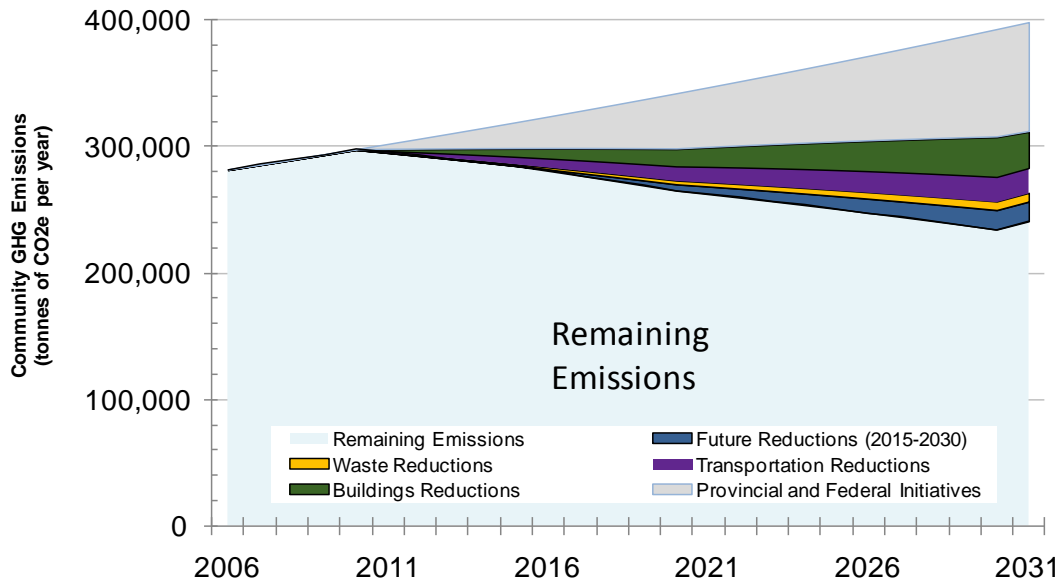
Projected Energy and Emissions Changes by Sector: ● “Moderate” Scenario

The following table outlines the estimated changes in GHG emissions and energy consumption resulting from implementing the “moderate” scenario. The recommended target for 2030 is a reduction of 15% in community GHG emissions from 2007 levels, which comes from rounding-down the estimated reductions to the “nearest 5”.

Reduction Scenario: Estimated Reductions			
	2007	2020	2030
Total GHG Emissions	285,659	264,335	232,416
Change from 2007	-	-21,324	-53,243
% Change GHG Emissions Total from 2007	-	-7%	-19%
Per Capita Emissions (t/person)	4.7	3.6	2.8
% Change GHG Emissions Per capita from 2007	-	-23%	-41%
Total Electricity Consumption (GJ)	1,592,331	1,568,115	1,618,039
Change from 2007 (GJ)	-	-24,216	25,708
% Change Electricity Consumption from 2007	-	-2%	2%
Per Capita Electricity Consumption (GJ/person)	26.0	21.3	19.2
% Change GHG Emissions Per capita from 2007	-	-18%	-26%
Total Energy Consumption (GJ)	5,958,062	5,533,852	5,118,996
Change from 2007 (GJ)	-	-424,210	-839,066
% Change Energy Consumption from 2007	-	-7%	-14%
Per Capita Energy Consumption (GJ/person)	97.1	75.3	60.6
% Change GHG Emissions Per capita from 2007	-	-22%	-38%

The following graph displays the estimated GHG emission reductions that could result from implementing the Moderate scenario.

“Moderate” GHG Emission Reductions



The following chart reports the estimated reductions in GHG emissions (relative to the 2030 population-scaled emissions) for each sector that result from implementing the Moderate scenario.

Emissions Sector	GHG Emissions Reductions (tonnes of CO2e)	Proportion of CEEP GHG Emissions Reductions
Senior Government Initiatives	85,000	-
Existing Residential Buildings	21,000	35%
NEW Residential Buildings	4,000	7%
Existing Commercial Buildings	4,000	7%
NEW Commercial Buildings	3,000	5%
Personal Vehicles	20,000	33%
Commercial + Other Vehicles	1,000	2%
Waste	7,000	12%

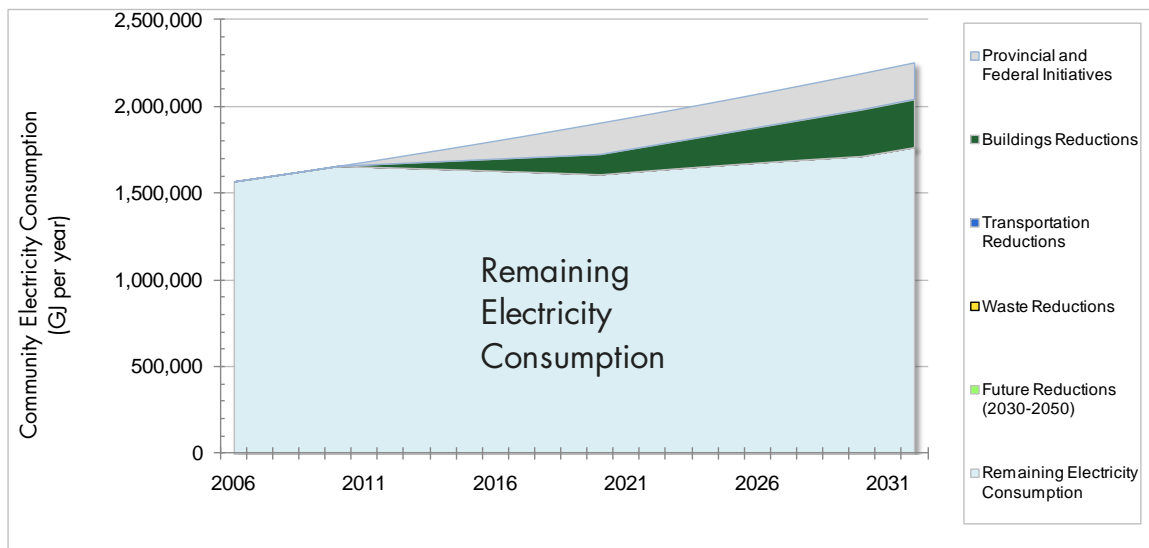
Notes: Senior Government Initiatives are estimated to reduce total emissions by 22%.

Implementing the Moderate scenario results in an estimated reduction of:

- 19% of total electricity consumption relative to the BAU
- 25% of total GHG emissions relative to the BAU

The following graph demonstrates anticipated changes in Electricity consumption under the Moderate scenario. Please note that estimated increases in electricity consumption due to electric vehicle use are included in the "Buildings" sector.

"Moderate" Electricity Changes

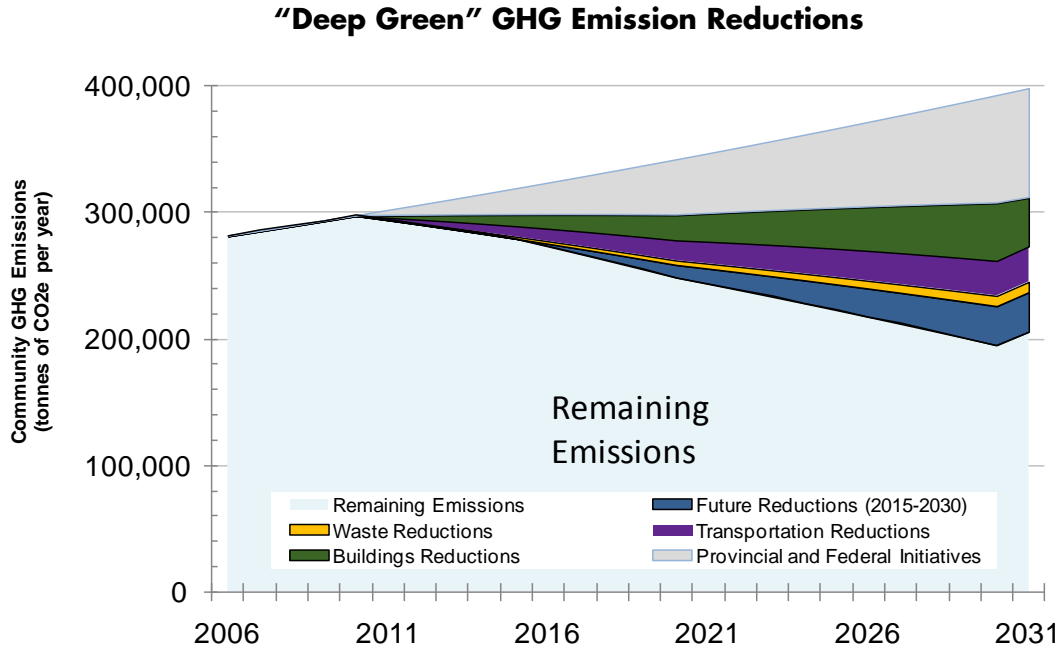


Projected Energy and Emissions Changes by Sector: ● “Deep Green” Scenario

The following table outlines the estimated changes in GHG emissions and energy consumption resulting from implementing the “deep green” scenario. The recommended target for 2030 is a reduction of 30% in community GHG emissions from 2007 levels, which comes from rounding-down the estimated reductions to the “nearest 5”.

Reduction Scenario: Estimated Reductions			
	2007	2020	2030
Total GHG Emissions	285,659	246,874	191,458
Change from 2007	-	-38,785	-94,201
% Change GHG Emissions Total from 2007	-	-14%	-33%
Per Capita Emissions (t/person)	4.7	3.4	2.3
% Change GHG Emissions Per capita from 2007	-	-28%	-51%
Total Electricity Consumption (GJ)	1,592,331	1,491,831	1,442,713
Change from 2007 (GJ)	-	-100,500	-149,618
% Change Electricity Consumption from 2007	-	-6%	-9%
Per Capita Electricity Consumption (GJ/person)	26.0	20.3	17.1
% Change GHG Emissions Per capita from 2007	-	-22%	-34%
Total Energy Consumption (GJ)	5,958,062	5,138,555	4,281,227
Change from 2007 (GJ)	-	-819,507	-1,676,835
% Change Energy Consumption from 2007	-	-14%	-28%
Per Capita Energy Consumption (GJ/person)	97.1	69.9	50.7
% Change GHG Emissions Per capita from 2007	-	-28%	-48%

The following graph displays the estimated GHG emission reductions that could result from implementing the Deep Green scenario.



The following chart reports the estimated reductions in GHG emissions (relative to the 2030 population-scaled emissions) for each sector that result from implementing the Dark Green scenario.

Emissions Sector	GHG Emissions Reductions (tonnes of CO ₂ e)	Proportion of CEEP GHG Emissions Reductions
Senior Government Initiatives	85,000	-
Existing Residential Buildings	23,000	27%
NEW Residential Buildings	6,000	7%
Existing Commercial Buildings	10,000	12%
NEW Commercial Buildings	7,000	8%
Personal Vehicles	29,000	34%
Commercial + Other Vehicles	3,000	3%
Waste	8,000	9%

Notes: Senior Government Initiatives are estimated to reduce total emissions by 22%.

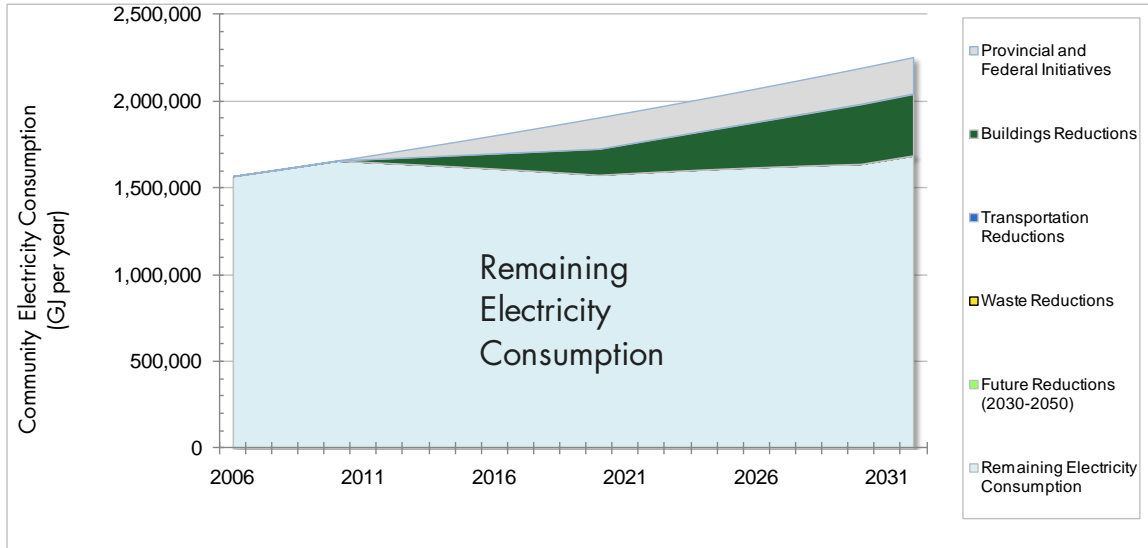
The reductions are presented here by emissions sector (Buildings, Transportation, Waste); the reductions are also presented by Goal in the table in Appendix D)

Implementing the Deep Green scenario results in an estimated reduction of:

- 27% of total electricity consumption relative to the BAU
- 38% of total GHG emissions relative to the BAU

The following graph demonstrates anticipated changes in Electricity consumption under the Deep Green scenario. Please note that estimated increases in electricity consumption due to electric vehicle use are included in the "Buildings" sector.

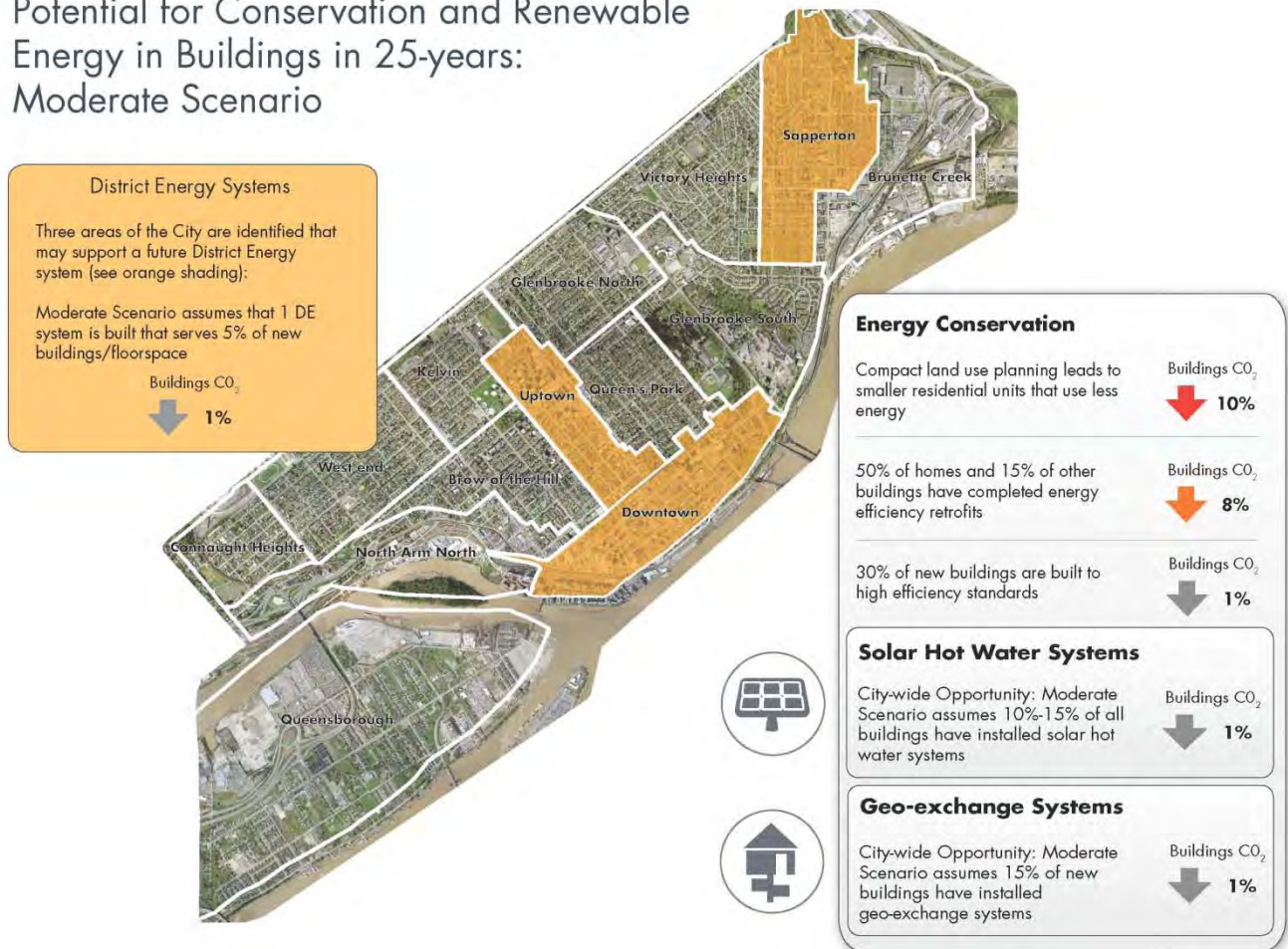
"Deep Green" Electricity Changes



APPENDIX C: RENEWABLE RESOURCE DISCUSSION

A high-level review of potential renewable resources for New Westminster under the “Moderate” scenario is provided below, with anticipated reductions for each type. Note that energy conservation measures are anticipated to have much more overall impact on total GHG emissions from buildings, and should be the primary focus. A brief description of each resource is also described.

Potential for Conservation and Renewable Energy in Buildings in 25-years: Moderate Scenario



Solar Thermal

Solar hot water systems generate heat from sunlight through solar collectors, most commonly mounted on the roof. A fluid carries heat from the collectors and pumps it through a heat exchanger to a tank for storage and subsequent use. The solar energy reaching the New Westminster area ranges from a low daily average of 1.4 kWh/m²/day in the winter to a high of 5.9 kWh/m²/day in the summer, with an annual daily average of 3.7 kWh/m²/day. The relatively low cost of electricity in British Columbia make solar thermal systems generally more viable than photovoltaic electricity generating systems.

Assumptions for New Westminster: each installation will result in a 10% reduction in the building's GHG emissions and a 2% increase in the building's electricity consumption.

In the 2032 "Moderate" scenario, 10% of existing buildings and 15% of new residential buildings have installed solar hot water systems, resulting in a 1% reduction in building GHG emissions from the BAU scenario.

Geo-exchange

Geo-exchange extracts heat from the ground through the use of heat pumps. Geo-exchange systems are growing in popularity and have primarily been installed in individual homes or buildings. They are now also beginning to build larger systems serving multiple buildings. The type of soil will impact the cost and effectiveness of the ground field. Other similar heat sources, such as groundwater or water from wastewater treatment can also be used with heat pumps. Commercial/institutional buildings are generally more cost effective than homes due to larger size, but economics will vary from project to project.

Assumptions for New Westminster: each installation will result in a 70% reduction in the building's GHG emissions and a 50% increase in the building's electricity consumption.

In the 2032 "Moderate scenario, 15% of new buildings have geo-exchange systems installed, resulting in 1.5% reduction in building GHG emissions from the BAU scenario.

Sewer Heat Recovery

There are often significant amounts of latent heat in raw sewage, and there may be opportunities to capture and utilize the otherwise wasted energy. Strategic junctions in larger sewer mains may provide sufficient flow to supply the energy required to justify the installation of energy capture infrastructure. The South-East False Creek (SEFC) Neighbourhood Energy Utility (NEU) is an example of a North American installation of such technology that is used throughout Europe. There may be potential for sewer heat recovery from some of the larger mains where building densities are expected to increase – see locations of major sewer pipes (greater than 800 millimetres in diameter) on the map in Section 3.3, Figure 6.

Photovoltaics

Solar panels convert sunlight into electricity using photovoltaic cells. Site selection for solar generation installations is based on the insolation at a given location, or the amount of solar

radiation power on a surface, taking into account the seasonal variation in sun angle, atmospheric haze and cloud cover. Solar installations are often integrated into existing developed areas such as rooftop surfaces to reduce the demand on traditional power sources. An estimate of solar generating costs in British Columbia is approximately \$1.5 per kilowatt-hour for small-scale installations and \$0.7 for commercial-scale installations in favourable locations (BC Hydro Resource Options Report, 2005).

Wind

Wind power generation uses turbines to convert the energy of surface winds to electrical energy. The high costs of wind power generation equipment generally require sites with a minimum average annual wind speed of 4.5 metres per second to be marginally feasible, and must consider wind direction and obstructions, along with potential installation challenges such as slope and terrain. Wind speeds in the New Westminster area average 3 m/s at a height of 10 metres. Furthermore, the lot sizes and building density of the city are not conducive to supporting the installation of wind power generating equipment.

Large Facilities

Certain types of large facilities generate excess heat through their operations. There may be opportunities to capture / recover waste heat to provide space heating to adjacent facilities. In New Westminster, there are two large facilities identified:

Royal Columbian Hospital

- 330 East Columbia St
- Cluster of 4 – 5 buildings with an existing power plant
- Potentially significant expansion soon – possible opportunity to upgrade power plant to meet DE needs

Kruger Products

- 1625 5th Avenue
- Paper making and distribution centre

APPENDIX D: IMPLEMENTATION COST ESTIMATES

The following two pages provide a more detailed assessment of the cost of implementing the scenarios.

City of New Westminster Community Energy and Emissions Plan

Scenario #	Action	Timeframe for Completion	Lead Department(s)	Outreach plan (Y/N)	Description of Resources and Disbursements required	Staff Resources (\$)		Disbursements (\$)		Estimated % of GHG Reductions		
						Light Green	Deep Green	Light Green	Deep Green	Light Green	Deep Green	
BUILDINGS												
GOAL 1 TO IMPROVE ENERGY EFFICIENCY IN EXISTING BUILDINGS												
●●●●	1	Develop a retrofit campaign targeting MURB residents	Years 1-2	Development	Y	LG: Design and print brochures and engage stratas through workshops; DG: Coordinate financing program for stratas - City does not provide financing	\$ 10,000	\$ 30,000	\$ 25,000	\$ 25,000	15%	21%
●●●●	2	Promote existing programs for commercial/institutional buildings	Years 1-2	Electric Utility	Y	Create utility bill inserts with "quick start" info on grants for commercial buildings	\$ 5,000	\$ 5,000	\$ -	\$ -		
●●●●	3	Provide training to building permit and inspections staff	Years 1-2	Development	N	One workshop for staff	\$ 1,500	\$ 1,500	\$ 10,000	\$ 10,000		
●●●●	4	Work with Electric Utility to implement demand management strategies	LG: Years 1-2 DG: Years 3-5	Engineering	Y	LG: Utility bill inserts with "quick start" info on energy efficiency and grants available; DG: financing large-scale appliances; rate structure changes	\$ 5,000	\$ 15,000	\$ -	Capital needed for loans; repayment with interest		
●●●●	5	Offer incentives for building energy audits	Years 3-5	Electric Utility	Y	DG: 2-year program offering up to \$500,000 (e.g. up to \$250/audit for 2000 homes)	\$ -	\$ 15,000	\$ -	\$ 500,000		
●●●●	6	Offer incentives for building energy retrofits	Years 3-5	Electric Utility	Y	DG: 2-year program offering up to \$500,000 (e.g. up to \$1000/retrofit for 500 homes)	\$ -	\$ 15,000	\$ -	\$ 500,000		
●●●●	7	Expand revitalization tax exemption program	Years 3-5	Development	Y	Tax exemptions (e.g. \$10,000/property over 5 years for 100 properties)	\$ -	\$ 18,000	\$ -	\$ 1,000,000		
GOAL 2 TO BUILD THE MOST ENERGY EFFICIENT NEW BUILDINGS												
●●●●	8	Use the Sustainability Score Card to structure a fee rebate program	Years 3-5	Development	Y	Lost revenue from permits (e.g. \$250/permit of 500 permits)	\$ 5,000	\$ 5,000	\$ 25,000	\$ 125,000	3%	5%
●●●●	9	Broaden the reach of the Downtown Plan Design Guidelines	At time of OCP process	Development	OCP consultation	Incorporate into OCP / neighbourhood plan processes - no incremental costs; review and update Zoning bylaw	\$ 5,000	\$ 5,000	\$ -	\$ -		
●●●●	10	Require higher energy performance standards in new commercial and multi-family residential developments through re-zoning approvals process	Years 5-10	Development	Y	LG: Regular communication with large property developers about energy performance goals (quarterly meetings); DG: Create re-zoning bylaw requiring energy performance	\$ 4,000	\$ 10,000	\$ -	\$ -		
GOAL 3 TO ENCOURAGE RENEWABLE, RESPONSIBLE & LOCAL ENERGY												
●●●●	11	Promote building scale alternative energy	Years 1-2	Engineering	Y	Place information boards at civic facilities with alternative energy systems; hold tours / seminars; publish cost-benefit information	\$ 5,000	\$ 12,000	\$ 5,000	\$ 5,000	3%	12%
●●●●	12	Train City building inspectors on alternative energy technologies	Years 1-2	Development	N	One workshop for staff	\$ 1,500	\$ 1,500	\$ 10,000	\$ 10,000		
●●●●	13	Identify and promote "eco-industrial networking" opportunities	Years 3-5	Development	Y	Research and update industrial strategy to identify opportunities for energy / waste exchange	\$ -	\$ 10,000	\$ -	\$ 20,000		
●●●●	14	Offer free inspections for alternative energy systems	Years 1-5	Development	Y	Lost revenue from permits / inspections (e.g. \$250/installation of 200 systems)	\$ -	\$ -	\$ 50,000	\$ 50,000		
●●●●	15	Allow Local Improvement Charges	Years 3-5	Development	Y	Create bylaw, advertise opportunity (website, newspaper, mail=out), manage applications	\$ -	\$ 22,500	\$ -	Capital needed to finance LICs		
●●●●	16	Identify and support district energy zones	Years 1-2	Utility	N	Estimated 2 pre-feasibility studies (note: there may be potential to get 50% of funded by BC Hydro)	\$ 10,000	\$ 10,000	\$ 60,000	\$ 60,000		
●●●●	17	Include policies to support alternative energy in the OCP	At time of OCP process	Development	OCP consultation	Incorporate into OCP / neighbourhood plan processes - no incremental costs	\$ -	\$ -	\$ -	\$ -		
●●●●	18	Require evaluation of alternative and district energy feasibility	Years 5-10	Development	Y	Create bylaw and conduct consultation with developers	\$ -	\$ 10,000	\$ -	\$ 25,000		

City of New Westminster Community Energy and Emissions Plan

Scenario	#	Action	Timeframe for Completion	Lead Department(s)	Outreach plan (Y/N)	Description of Resources and Disbursements required	Staff Resources (\$)		Disbursements (\$)		Estimated % of GHG Reductions	
							Light Green	Deep Green	Light Green	Deep Green	Light Green	Deep Green
Transportation												
GOAL 1 TO BUILD NEIGHBOURHOODS WHERE RESIDENTS CAN LIVE, WORK AND PLAY IN CLOSE PROXIMITY												
●●●	19	Continue encouraging compact, mixed-use development with strong Incentive-based Transit Oriented Development Policy	Ongoing	Development	Y (ongoing)	No incremental cost estimated	\$ -	\$ -	\$ -	\$ -	60%	31%
●●●	20	Focus higher density and mixed-use developments around frequent transit corridors	Years 1-2	Development & Engineering	Y	Regular meetings with TransLink	\$ 20,000	\$ 20,000	\$ -	\$ -		
●●●	21	Review Official Community Plan to allow for more mixed-use developments / neighbourhoods	At time of OCP process	Development	OCP consultation	Incorporate into OCP / neighbourhood plan processes - no incremental cost estimated	\$ -	\$ -	\$ -	\$ -		
GOAL 2 TO FOSTER WALKING, CYCLING, AND TAKING TRANSIT AS THE PREFERRED WAYS OF GETTING AROUND												
●●●	22	Enhance pedestrian environment	Ongoing	Engineering	N	Current funding of \$250,000 per year. Estimate includes additional annual funding, but does not include estimated \$10 million for Queensborough pedestrian crossing	\$ 12,500	\$ 12,500	\$ 250,000	\$ 750,000	7%	16%
●●●	23	Enhance cycling environment	Ongoing	Engineering	Y	LG: include cycling in the Queensborough pedestrian crossing (cost not estimated), complete planned pathways and build cycling lanes in Queensborough; DG: bike sharing program	\$ 12,500	\$ 20,000	\$ 250,000	\$ 750,000		
●●●	24	Improve transit network	Years 1-2	Engineering	N	Regular meetings with TransLink and optimize Translink funding contribution	\$ 20,000	\$ 20,000	\$ -	\$ -		
●●●	25	Increase comfort and reliability of transit system	Ongoing	Engineering	N	LG: upgrade bus shelters for comfort; DG: building transit signal priority and lanes	\$ 5,000	\$ 20,000	\$ 300,000	\$ 1,000,000		
●●●	26	Offer and promote fare media programs	Years 1-5	Engineering	Y	Promote employer pass program through meetings with business organizations; Regular meetings with TransLink to enhance programs; DG: further incentives provided by the City	\$ 7,500	\$ 15,000	\$ -	\$ 100,000		
●●●	27	Develop a targeted outreach / incentive campaign	Years 3-5	Engineering	Y	Targeted outreach to schools, businesses, residents with incentives; DG: rebates, discounts or other incentives provided	\$ 15,000	\$ 50,000	\$ 25,000	\$ 75,000		
●●●	28	Provide a bicycle safety education program	Years 1-5	Engineering	Y	Coordinate workshops at community centres throughout city; provide workshops at schools	\$ 15,000	\$ 15,000	\$ -	\$ -		
GOAL 3 TO SUPPORT USE OF EFFICIENT AND LOW-CARBON MOBILITY												
●●●	29	Promote commute trip reduction strategies through TDM outreach	Years 1-5	Engineering	Y	Coordinate programs for schools and businesses	\$ 25,000	\$ 75,000	\$ 5,000	\$ 5,000	5%	11%
●●●	30	Expand ride-share program	Years 1-2	Engineering	Y	Regular meetings with ride-share provider; outreach	\$ -	\$ 30,000	\$ -	\$ 20,000		
●●●	31	Expand parking management strategies	Years 5-10	Engineering	Y	Expect increased parking revenues if implemented (amount not estimated)	\$ -	\$ 15,000	\$ -	\$ -		
●●●	32	Provide greater enforcement / promotion of existing policies and regulations	Years 3-10	Engineering	Y	Greater bylaw enforcement	\$ 25,000	\$ 25,000	\$ -	\$ -		
●●●	33	Provide or require enhanced electric vehicle infrastructure	Years 3-10	Engineering	Y	Installation of electric outlets at civic facilities	\$ -	\$ 70,000	\$ -	\$ 200,000		
●●●	34	Develop a program to reduce commercial vehicle fuel	Years 1-5	Engineering	Y	LG: Report City corporate commute and fleet successes to businesses; develop a green fleet award; DG: Launch a City Logistics project	\$ 25,000	\$ 75,000	\$ -	\$ -		
●●●	35	Identify innovative funding opportunities	Years 3-5	Engineering	N	Undertake study to identify most suitable options for implementing fees	\$ 7,500	\$ 7,500	\$ 30,000	\$ 30,000		
CEEP IMPLEMENTATION												
●●●		Management, monitoring and reporting on CEEP implementation efforts	Years 1-5	Engineering	N	Internal coordination of efforts, monitoring and reporting to Council; may include working with Task Force and/or regular communication with partners	\$ 75,000	\$ 250,000	\$ -	\$ -		
Resource Totals							\$ 317,000	\$ 905,500	\$ 1,045,000	\$ 5,260,000		
● Actions assumed in the "Light Green" scenario												
● Actions assumed in the "Moderate Green" scenario												
● Actions assumed in the "Deep Green" scenario												
							TOTAL Program Costs "Light Green" Scenario (Staff Resources + Disbursements)					\$ 1,362,000
							TOTAL Program Costs "Dark Green" Scenario (Staff Resources + Disbursements)					\$ 6,165,500

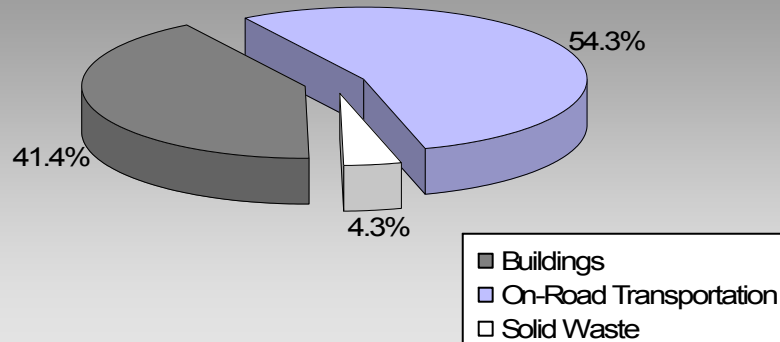
APPENDIX E: 2007 PROVINCIAL CEEI FOR NEW WESTMINSTER

New Westminster City Updated 2007 Community Energy and Emissions Inventory

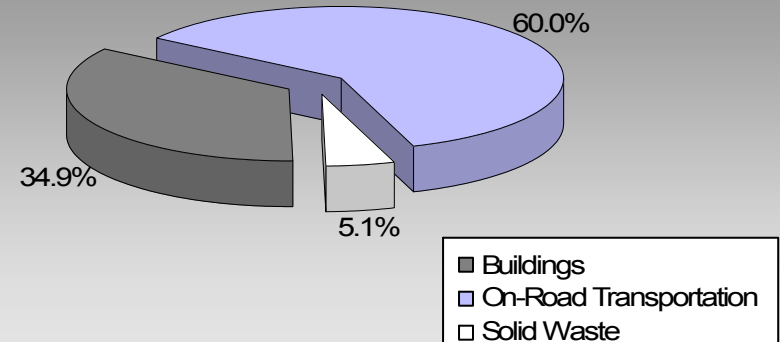
BC's Community Energy and Emission Inventories...supporting efforts towards Complete, Compact, Energy-Efficient Communities

Where are the majority of our community's emissions coming from?

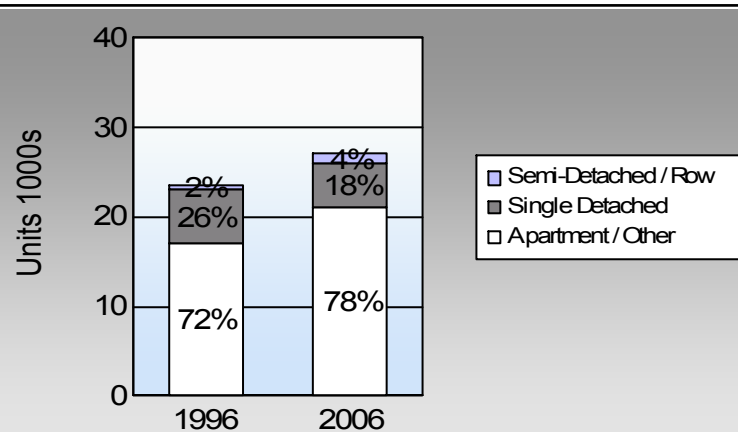
**New Westminster City
2007 GHG Emissions Sources**



**Total for BC
Communities**








Are we living more compactly? Housing Type



In BC, single family detached housing made up 49% of housing in 2006.

Are we driving less?

Commute To Work

	1996	2006
	65.5%	60.3%
	5.8%	4.9%
	20.0%	26.8%
	6.6%	6.1%
	0.9%	0.8%

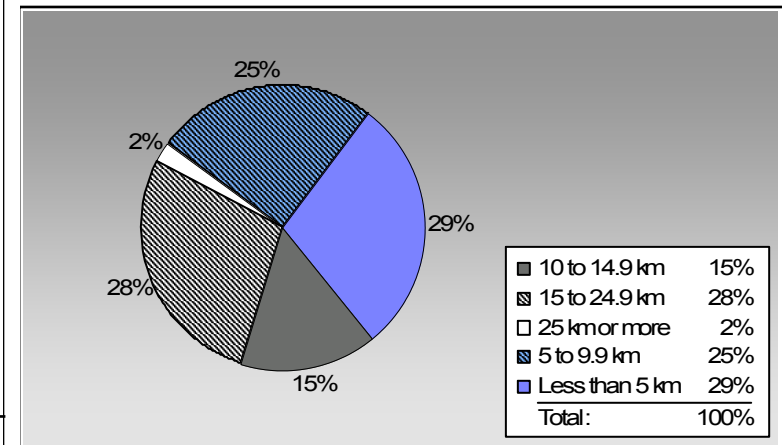
In BC, 10% of people took transit, 7% walked, and 2% cycled to work in 2006.

Residential Density

New Westminster City: 46.4 people per net ha
BC municipal average: 7.4 people per net ha

Are we living closer to where we work?

Commute Distance



In BC, 41% of people lived within 5km of their work in 2006.

Sectors

On Road Transportation		<u>Vehicles</u>	<u>Consumption</u>	<u>Measurement</u>	<u>Average-VKT(km)</u>	<u>Energy (GJ)</u>	<u>CO2e (t)</u>
Small Passenger Cars	Gasoline	12,590	16,575,487	Litres	13,204	580,142	39,457
	Diesel Fuel	260	275,682	Litres	13,515	10,559	753
	Other Fuel	< 10	747	Litres		29	1
Small Passenger Cars						590,730	40,211
Large Passenger Cars	Gasoline	5,616	9,814,520	Litres	14,482	343,508	23,280
	Diesel Fuel	101	177,944	Litres	13,317	6,815	486
	Other Fuel	16	27,985	Litres	10,965	1,072	43
Large Passenger Cars						351,395	23,809
Light Trucks, Vans, SUVs	Gasoline	9,791	18,854,746	Litres	13,368	659,916	45,093
	Diesel Fuel	328	706,917	Litres	16,474	27,075	1,931
	Other Fuel	49	91,073	Litres	10,879	3,488	140
Light Trucks, Vans, SUVs						690,479	47,164
Commercial Vehicles	Gasoline	40	182,371	Litres	13,576	6,383	426
	Diesel Fuel	204	980,152	Litres	20,962	37,540	2,638
	Other Fuel	< 10	15,802	Litres	11,356	605	24
Commercial Vehicles						44,528	3,088
Tractor Trailer Trucks	Gasoline	< 10	11,384	Litres		398	27
	Diesel Fuel	410	14,545,702	Litres	93,887	557,100	39,142
	Other Fuel	< 10	2,976	Litres	7,085	114	5
Tractor Trailer Trucks						557,612	39,174
Motorhomes	Gasoline	146	145,214	Litres	2,996	5,083	340
	Diesel Fuel	12	15,671	Litres	5,597	600	42
	Other Fuel	< 10	1,108	Litres	2,189	42	2
Motorhomes						5,725	384
Motorcycles, Mopeds	Gasoline	459	179,583	Litres	5,363	6,285	419
Motorcycles, Mopeds						6,285	419
Bus	Gasoline	12	127,687	Litres	26,313	4,469	300
	Diesel Fuel	< 10	169,027	Litres	43,920	6,474	455
	Other Fuel	< 10	11,704	Litres	15,902	448	18
Bus						11,391	773

New Westminster City Updated 2007 Community Energy and Emissions Inventory

	Gasoline:	1,606,184	109,342
	Diesel:	646,163	45,447
	Other Fuel:	5,798	233
On Road Transportation Totals	All Fuels:	2,258,145	155,022

Buildings	<u>Type</u>	<u>Connections</u>	<u>Consumption</u>	<u>Measurement</u>	<u>Energy (GJ)</u>	<u>CO2e (t)</u>
Residential	Electricity	27,152	182,356,848	Kilowatt Hours	656,484	4,499
	Natural Gas	8,059	825,179	GigaJoules	825,179	42,084
Residential					1,481,663	46,583
Commercial/Small-Medium Industrial	Electricity	3,190	259,957,721	Kilowatt Hours	935,847	6,412
	Natural Gas	1,342	1,282,407	GigaJoules	1,282,407	65,403
Commercial/Small-Medium Industrial					2,218,254	71,815
					Electricity:	1,592,331
					Natural Gas:	2,107,586
					Propane:	
					Wood:	
					Heating Oil:	
Buildings Totals	Buildings:				3,699,917	118,398

Solid Waste	<u>Mass (t)</u>	<u>CO2e (t)</u>
Community Solid Waste	33,637	12,239

New Westminster City Updated 2007 Community Energy and Emissions Inventory

Grand Total	CONSUMPTION	ENERGY (GJ)	CO2e (t)
Diesel Fuel	16,871,095 L	646,163	45,447
Electricity	442,314,569 kWh	1,592,331	10,911
Gasoline	45,890,992 L	1,606,184	109,342
Natural Gas	2,107,586 GJ	2,107,586	107,487
Other Fuel	151,395 L	5,798	233
Solid Waste	33,637 T	0	12,239
Total of Transportation / Buildings / Solid Waste:		5,958,062 GJ	285,659 tonnes

Memo Items

Buildings	Type	Connections	Consumption	Measurement	Energy (GJ)	CO2e (t)
Large Industrial	Electricity	5	withheld	Kilowatt Hours	-	-
	Natural Gas	33	withheld	GigaJoules	-	-
Large Industrial					-	-

Supporting Indicators

Below you will find supporting indicators for which data is provided. These are the first five supporting indicators for which data is provided as a part of the updated 2007 CEEI. Columns with all zeros indicate data unavailable in these CEEI reports. Thirteen additional supporting indicators are under consideration for future reports (see next page). Local government feedback is requested on all supporting indicators. Please take the time to complete the short CEEI Survey at <http://www.env.gov.bc.ca/cas/mitigation/ceei/index.html> or contact us directly at CEEIRPT@gov.bc.ca.

Housing Type - Private dwellings by structural type

Housing type is important for reducing building-related GHG emissions and energy consumption. A trend toward fewer single family dwellings indicates an increase in residential density, which is known to reduce transportation-related GHG emissions.

	1996		2001		2006	
	Units	%	Units	%	Units	%
Single Detached House	6,020	20	6,170	24	4,945	18
Semi-Detached House	210	1	200	1	115	0
Row House	345	1	705	3	970	4
Apartment, Duplex	1,275	4	2,005	8	3,030	11
Apartment, 5 storeys or higher	6,255	21	6,405	25	6,970	26
Apartment, under 5 storeys	9,360	32	10,395	40	10,905	40
Other Single Attached House	35	0	115	0	55	0
Movable Dwelling	40	0	40	0	50	0

Commute to Work - Employed labour force - by mode of commute

An increase in the number of people choosing to walk, cycle and use transit reduces GHG emissions. More compact, complete, connected communities should see an increase in the use of these transportation modes.

	1996		2001		2006	
	People	%	People	%	People	%
Car, Truck, Van as Driver	15,765	66	17,260	64	18,390	60
Car, Truck, Van as Passenger	1,400	6	1,530	6	1,485	5
Public Transit	4,815	20	5,395	20	8,155	27
Walked	1,595	7	1,995	7	1,870	6
Bicycle	205	1	275	1	250	1
Motorcycle	70	0	50	0	80	0
Taxicab	55	0	50	0	60	0
Other Method	155	1	210	1	200	1

Residential Density

* Net of Crown land, parks, Indian Reserves, water features, airports, ALR, waste disposal sites.

Increasing residential densities is known to reduce vehicle use resulting in fewer transportation-related GHG emissions. There are many additional benefits from more compact development.

2009	
Population	65,016.0
Net Land Area (ha) *	1,399.9
Residential Density (people per net ha)	46.4

Commute Distance

Shorter commute distances generally reduce GHG emissions by increasing the likelihood of people walking, cycling or using transit. Commute distance is also indicative of the 'completeness' of a community from an employment perspective.

	2006	
	People	%
Less than 5 km	7,625	29
5 to 9.9 km	6,695	25
10 to 14.9 km	4,070	15
15 to 24.9 km	7,435	28
25 km or more	565	2

Parks and Protected Greenspace

* Total is net of Indian Reserves

** The quantity of parkland may be underestimated

Parks and protected greenspaces are important for the protection and enhancement of community carbon sinks.

	2009	
	Area (ha)	%
National Parks	0.0	0.0
Provincial Parks / Protected Areas	0.0	0.0
Local Parks	102.0	5.5
Agricultural Land Reserve	0.0	0.0
Other land use	1,753.8	94.5
Total Land Area	1,855.8	100.0

Supporting Indicators Under Consideration

The following supporting indicators are under consideration for inclusion in future CEEI reports. The 2007 CEEI reports provide these 'placeholder' indicators to give indication of data that may be provided in the future by the Province on an ongoing basis to assist in monitoring actions to reduce GHG emissions and energy consumption. Please submit feedback to CEEIRPT@gov.bc.ca (see survey on CEEI website).

On-Road Transportation (and Land Use)

Proximity to Transit	Persons, dwelling units (du) and employment within 400m of a quality transit stop/line
Proximity to Services	Persons and dwelling units (du) within 400m of services (e.g. grocery store, school, other retail etc.)
Transit Ridership	Annual per capita transit ridership

Buildings

Residential; Public Building Energy Intensity	Average energy use per person per square metre of floor space
Floor Space	Average residential dwelling unit size

Solid Waste (and Water)

Waste Diversion	Tonnes of waste diverted
Avoided Waste Emissions	Tonnes of CO ₂ e of avoided future emissions due to reduced waste since 2007
Water Use	Per capita residential water use

Land-Use Change

Impervious Surface Cover	% change in impervious surface cover
Tree Canopy Cover	% change in tree canopy cover

Community and Renewable Energy Supply

District Energy	# and energy output (e.g. buildings connected, energy consumed in GJ or kWh) of district energy systems by energy type (e.g. renewable or non-renewable)
On-Site Renewable Energy	# and energy output (in GJ or kWh) from households producing and/or consuming on-site renewable heat (e.g. biomass, solar thermal, geo-exchange) and/or electrical (e.g. solar photovoltaic, small wind, small scale hydro) energy
Energy Recovery From Waste	Energy (GJ or kWh) recovered from waste (e.g. from landfill gas, sewage treatment, industrial operations, farm)

This is your local government's Updated 2007 Community Energy and Emissions Inventory (CEEI) Report

What is a CEEI Report?

CEEI Reports are a result of a multi-agency effort to provide a province-wide solution to assist local governments in BC to track and report on community-wide energy consumption and greenhouse gas (GHG) emissions every two years. CEEI Reports are one of the many resources available through the Climate Action Toolkit (<http://www.toolkit.bc.ca>), a web-based service provided through the ongoing collaboration between UBCM and the Province.

Why does my local government need a CEEI Report?

A community energy and GHG emissions inventory can be a valuable tool that helps local governments plan and implement GHG and energy management strategies, while at the same time strengthening broader sustainability planning at the local level. CEEI reports fulfill local governments' Climate Action Charter commitment to measure and report their community's GHG emissions profile, establish a base year inventory for local governments to consider as they develop targets, policies, and actions related to BC's *Local Government Act* requirements, and fulfill Milestone One requirements for those local government members of the Federation of Canadian Municipalities' (FCM's) Partners in Climate Protection (PCP) program.

A first in North America!

CEEI is a first in North America and a first step for BC communities. The 2007 CEEI Reports are based on best available province-wide data. The accuracy and detail of CEEI reports will continue to improve to meet increasing local and provincial government information needs. Improvements have been made from the original draft 2007 CEEI Reports posted in Spring 2009. These include estimates for residential heating oil, propane and wood use, breaking out small and medium from large industrial buildings, including updated land-use change and new agricultural sectors as 'memo items', and the first of a suite of 'supporting indicators'. Following the 2010 CEEI Reports, inventories will be generated every two years, and will continue to improve as government information needs, international protocols and new data sources emerge.

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For More Information:

- The full list of all BC local government Updated 2007 CEEI Reports, CEEI Data Summary Report, Technical Methods and Guidance Document, and additional information on the Secondary Indicators are available at: <http://www.env.gov.bc.ca/cas/mitigation/ceei/index.html>.
- For guidance on target setting and community actions, go to <http://www.toolkit.bc.ca> and <http://www.cd.gov.bc.ca/lgd/greencommunities/targets.htm>.

We Need Your Feedback:

- To continue to guide us on CEEI, particularly now with the new Indicators. Please take the time to complete the short CEEI Survey at <http://www.env.gov.bc.ca/cas/mitigation/ceei/index.html> or contact us directly at CEEIRPT@gov.bc.ca

Notice to the Reader: This CEEI Report uses information from a variety of sources to estimate GHG emissions. While the methodologies, assumptions and data used are intended to provide reasonable estimates of greenhouse gas emissions, the information presented in this report may not be appropriate for all purposes. The Province of BC and the data providers do not provide any warranty to the user or guarantee the accuracy or reliability of the data contained in this report. The user accepts responsibility for the ultimate use of such data. We need your help to make these reports better, where you do note inaccuracies, please contact us.