

Town of **View Royal**

COMMUNITY ENERGY & GREENHOUSE GAS EMISSIONS PLAN

2012

For the 2007 Inventory Year





Town of **View Royal**

Prepared for:

Town of
View Royal

45 View Royal Ave.
Victoria, BC
Canada V9B 1A6

COMMUNITY ENERGY & GREENHOUSE GAS EMISSIONS PLAN

2012

For the 2007 Inventory Year

Prepared by:

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Acknowledgement

This is a draft document for internal discussion only. The proposed reduction initiatives and the resulting proposed reduction target have not been presented to Council for endorsement.

Staff are gratefully acknowledged for their efforts in the development of this plan.

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About Hyla Environmental Services Ltd.

HES Ltd. specializes in developing corporate and community energy and emissions plans for municipal government and departments within senior levels of government (regional, provincial, and federal). With over 13 years of dedicated experience to emissions management, HES' work extends to corporate and community sustainability plans, including integrated community sustainability plans. HES has developed software, Energy and Emissions Reporting and Monitoring System™ (EEMRS™), which is used to calculate emissions, develop emissions forecasts, and integrate account-level management to produce accurate, cost effective emissions management strategies. HES is a leader in this field having completed over 120 corporate energy and emissions inventories and 30 emissions management strategies. As well, HES produced the preliminary community-wide energy and emissions inventories for all municipal governments (189) in British Columbia on behalf of the Province of British Columbia's Ministry of Environment in 2009.

Acronyms

CO₂ – Carbon Dioxide

CO₂e– Carbon Dioxide Equivalent

EEMRS™ – Energy and Emissions Monitoring and Reporting System™

GHG – Greenhouse Gas

HES – Hyla Environmental Services Ltd.

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Executive Summary

Climate change is a global problem that requires local solutions. Local government across Canada have adopted a coordinated response to mitigate and manage greenhouse gas (GHG) emissions by integrating energy and carbon management into the municipal planning process.

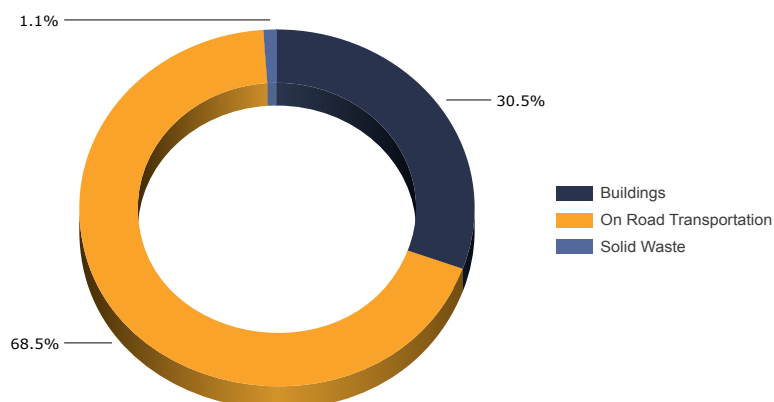
The Community Energy and GHG Emissions Plan is being developed to meet Provincial Bill 27 requirements¹ and the Town's voluntary commitments to the Federation of Canadian Municipalities' Partners for Climate Protection²; and, the Provincial Climate Action Charter.³

The scope of the community inventory for energy and GHG emissions covers residential buildings, commercial buildings, community transportation, and community solid waste. The inventory does not include air, water, and rail in the transportation sector nor agriculture and sequestration from trees.

Though Bill 27 only requires local governments in British Columbia to include GHG reduction targets in Official Community Plans, the Town is committed to developing both corporate and community GHG emissions plans. The Town's corporate energy and emissions plan was endorsed by Council in the spring of 2011.

Inventory Summary

In the 2007 base year, greenhouse gas emissions from the Town of View Royal's community totalled 32,314 tonnes CO₂e. On Road Transportation made up the greatest percent of GHG emissions at 69 percent.



Forecast Summary

A forecast of GHG emissions for the 2017 target year was developed using the best data available. Overall GHG emissions are expected to increase by one percent to 32,753 tonnes CO₂e (Table E1). Forecast emission increases have been moderated by zero GHG emissions from all electricity supplied by BC Hydro and the implementation of federal climate change legislation such as a tailpipe emissions standard.

Table E1 - GHG Emissions Forecast

| Forecasted Parameter | Base Year | Forecast Year | Percent Increase |
|--------------------------------------|-----------|---------------|------------------|
| | 2007 | 2017 | 2007 - 2017 |
| Emissions (tonnes CO ₂ e) | 32,315 | 32,753 | 1% |

Reduction Target Summary

The reduction target for the Town's community initiative is based on a ten-year period in accordance with the Federation of Canadian Municipalities' (FCM) PCP Program. With the Town's chosen base year of 2007 the target year is 2017, leaving the Town a five year (2012-2017) period to implement this plan.

¹ http://www.gov.bc.ca/fortherecord/bill/bi_environment.html?src=/environment/bi_environment.html

² <http://www.fcm.ca>

³ http://www.cd.gov.bc.ca/ministry/whatsnew/climate_action_charter_update.htm

The majority of the community's potential reduction initiatives are achieved in the on-road transportation sector through the implementation of a tailpipe emissions standard and reductions in vehicle use through increased transit use, walking, and cycling.

By implementing the initiatives described in this report, the Town of View Royal would be able to reduce GHG emissions by 12 percent below 2007 levels by 2017. Table E2 provides a summary of the potential reductions in each community sector. See the pie chart for a breakdown of categories of reduction initiatives (Chart E1).

Table E2 - Reduction Initiatives

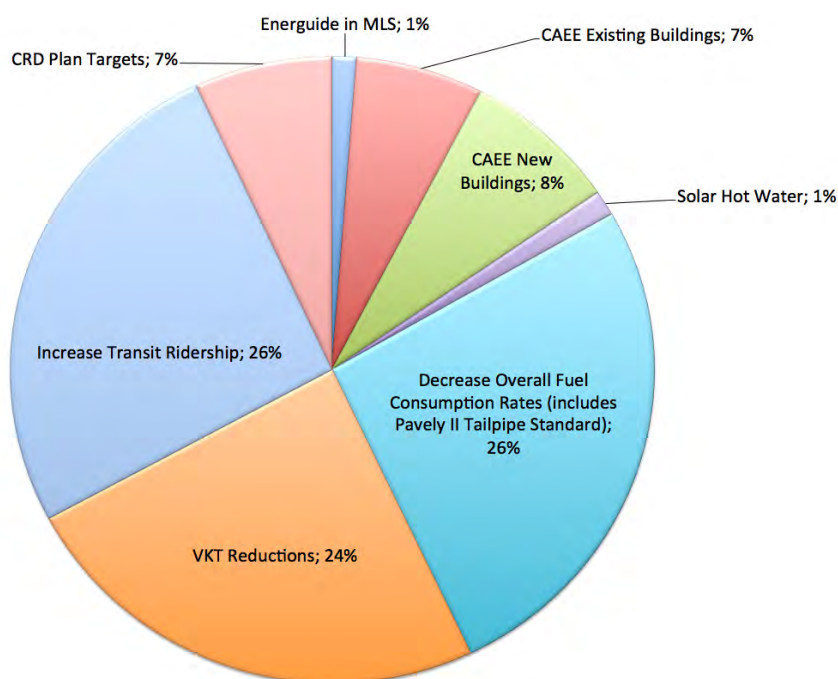
| Sector | Reduction Initiative | Level of Government | Reduction Quantity | | Implementation | | |
|------------------------|--|--|----------------------------|-----------------------------|----------------|------------------------|----------|
| | | | GHGs (t CO ₂ e) | Percent of Total Reductions | Cost | Level of Effectiveness | Priority |
| Buildings | New Buildings Targets ¹ | Municipal with Financial Resources | 294 | 8% | L | H | 1 |
| | EnerGuide Rating in Multiple Listing Service (MLS) Advertising | Senior Government | 46 | 1% | L | L | 4 |
| | Existing Buildings Targets ¹ | Municipal with Financial Resources | 242 | 7% | L | L | 3 |
| | Solar Hot Water | Municipal with Financial Resources | 49 | 1% | M | L | 5 |
| Subtotal | | | 631 | | | | |
| On Road Transportation | Decrease Overall Fuel Consumption Rates (includes Pavely II Tailpipe Standard) | Senior Government plus 'encouragement' from View Royal | 987 | 26% | L | H | 1 |
| | VKT Reductions | Shared | 912 | 24% | H | H | 2 |
| | Increase Transit Ridership | Shared | 977 | 26% | H | H | 2 |
| Subtotal | | | 3,507 | | | | |
| Solid Waste | CRD Plan Targets | Shared | 262 | 7% | H | H | 1 |
| Subtotal | | | 262 | | | | |
| Total | | | 4,400 | 100% | | | |

¹ Based on Community Action on Energy and Emissions (CAEE; Provincial Energy, Mines and Petroleum Resources)

Level of Effectiveness: H = High (3% or greater, except when noted); M = Moderate 2%; L = Low (1% or less); U = Unknown

Cost: H = \$100,000's; M = \$10,000's; L = \$1,000's; U = Unknown; N/A = None (senior government)

NOTE: Priority 1 is assigned to initiatives with low costs and high effectiveness whereas lower priorities are assigned to initiatives with higher costs and less effectiveness. Where costs are incurred by senior government (e.g., transit improvements), and the effectiveness is high, higher priority has been assigned.

Chart E1 - Breakout of Reduction Initiatives

Community Reduction Target Statement:

An emission reduction target of ~4,400 tonnes CO₂e is recommended for the Town of View Royal. This reduction amount will decrease community emissions 12 percent below 2007 levels by 2017.

The reduction target of 12 percent is further broken down into the reductions possible for each sector in Table E3. The greatest proportion of reductions are from the on road transportation sector.

Table E3 - Reduction Initiatives

| Sector | Base Year Emissions | Projected GHG Emissions with Legislation | Potential GHG Emission Reductions | GHG Emissions After Plan Implementation | Percent Reduction of Projected Emissions |
|------------------------|--------------------------|--|-----------------------------------|---|--|
| | Tonnes CO ₂ e | | | | |
| | 2007 | 2017 | | | |
| Residential Buildings | 3,860 | 3,670 | 631 | 3,039 | -21% |
| Commercial Buildings | 5,986 | 5,518 | | 5,518 | -8% |
| On Road Transportation | 22,119 | 23,216 | 3,507 | 19,086 | -14% |
| Solid Waste | 349 | 349 | 262 | 87 | -75.0% |
| Total | 32,314 | 32,753 | 4,400 | 28,353 | -12% |



1 Introduction, Inventory, and Forecast

This document describes the Town's community inventory of energy consumption and GHG emissions, provides a forecast of GHG emissions, and identifies potential GHG emissions reduction actions. The actions suggested are for buildings, land use, transportation, and solid waste; however, many land use decisions mentioned in this report are long term strategies covered in the Town's OCP. The report also provides an implementation matrix and appendices that provide further details supporting relevant sections.

1.1 Introduction

The Town of View Royal's Climate Action plan will be used by staff as an information, consultation, and implementation paper. The information outlined herein will complement work already completed for the Town's corporate Energy and GHG Emissions Plan and supports the GHG reduction target embedded in the Town's updated Official Community Plan (OCP).

1.1.1 Scope

Hyla Environmental Services (HES) has been hired by the Town to undertake the development of the Community Plan Discussion Paper. The scope of this document is to:

1. Provide a framework for the Final Community Climate Action Plan;
2. Develop a forecast of emissions by theoretical build-out by building type for the 2020 target year;
3. Include legislated changes that will occur prior to the 2020 target year in the forecast;
4. Identify reduction initiatives that will be undertaken by senior government;
5. Identify reduction initiatives that will be undertaken by the Town, including identification of initiatives that will require additional resources, and initiatives that can be undertaken with existing resources;
6. Provide coarse estimates of resource requirements for reduction initiatives that can be undertaken by the Town;
7. Outline the monitoring program to be considered by the Town including identification of the indicators to be used for monitoring; and,
8. Provide an implementation strategy.

1.1.2 Report Organization

The remainder of this plan consists of four sections. Section 2 presents the results of the energy and emissions inventory for the View Royal community and the forecasts of energy consumption, costs for consumption, and emissions for the year 2017. Section 3 presents the results of the consultation process, a summary of the reduction initiatives that Town staff wish to implement, as well as estimates of the potential reductions for each reduction initiative. Section 3 also contains an implementation matrix, with suggested actions for broad groups of reduction initiatives. Section 4 provides a summary of the emissions inventory, forecasts and reductions and provides recommendations for future reports. The Appendices provide information supporting the main sections such as inventory reports, consultation questionnaires and mailers, display boards, etc.

1.1.3 Consultation Process

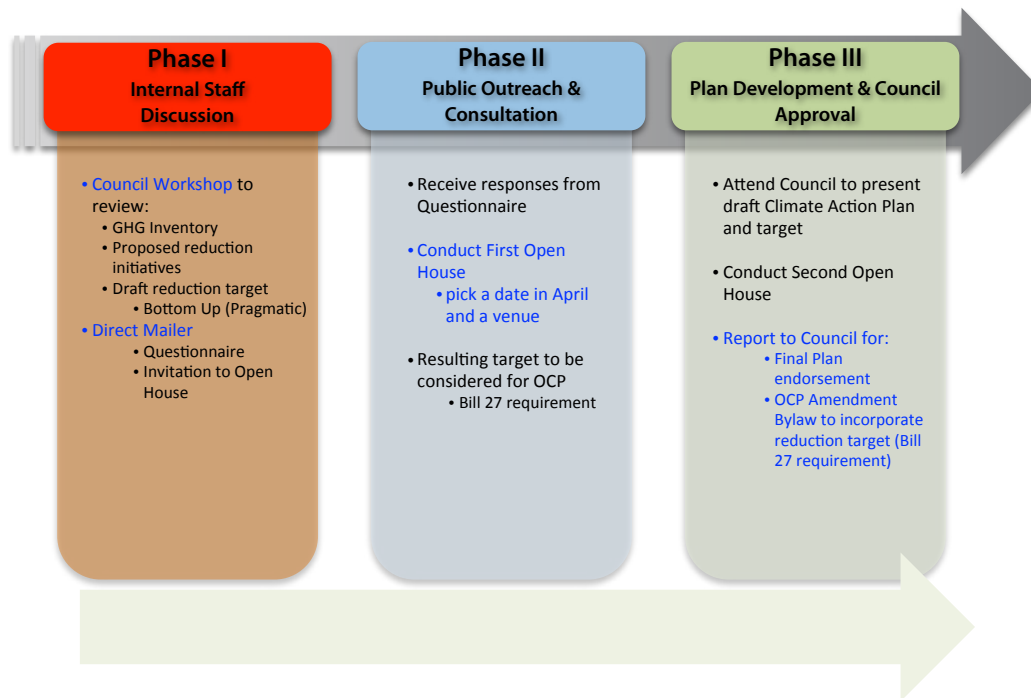
The development of the Final Climate Action Plan coincided with a stakeholder and public consultation process designed to gather comments and responses from interested Town residents and business owners. Figure 1.1 represents the process for plan development which includes stakeholder and public consultation. The results of the consultation process are presented in section 3.

Phase I of the process began on March 16, 2011 with a workshop with Council. Prior to the Council workshop, numerous discussions took place with staff regarding process and content. The purpose of the Council workshop was to review the inventory, the proposed reduction initiatives, the process for setting the reduction target, and the content of Open House One. Also, Council reviewed the Climate Action Questionnaire (see Appendix IV) and provided comments before it was sent to all Town residents and businesses. The mailer also contained an invitation to Open House One.

Phase II of the process began on May 3, 2011 with Open House One. The open house included a number of display boards, a self-running presentation on climate action and a video on the science of climate change. Ample opportunity was provided for those that attended to provide comments regarding the Town's Climate Action program (See Appendix 1). Two senior staff members from the Town assisted with questions. The mailer and survey were provided for those who had not already filled it out.

Phase III of the process will include a presentation of the results of the consultation and draft report to Council. With Council's approval, the Open House 2 will be conducted with the amended draft plan. Finally in Phase III, the final draft plan will be presented to Council for endorsement.

Figure 1.1 - Climate Action Plan Process



1.1.4 Regional and Local Context

View Royal is a small, but rapidly growing community with a population of just over 9,000. The municipality covers an area of just over 16 square kilometres (Figure 1.2); however, development is not distributed equally through the town: the southern, waterfront portion is much more highly developed and the northern portion is mainly parkland and rural lots.

While original subdivisions in View Royal date back almost a century, the community as a whole is relatively new. View Royal first became a municipality in 1988, with a total population then of less than 5,000. Development has occurred rapidly since then, with over 40% of the housing in the town being built between 1981 and 2000. View Royal offers a variety of employment options; however, it is typically seen as a bedroom community of Victoria with a large number of residents commuting to outside of the municipality. Most of the residential and commercial neighbourhoods in View Royal are automobile oriented and suburban in style; however, this may not continue to be the case in the future as the community continues to grow.

View Royal is well linked to neighboring municipalities and downtown Victoria. The Island Highway (Highway 1A) passes through the centre of the community and Highway 1, the Trans Canada, passes through the northern part of the town. Also, the Southern Railway of Vancouver Island railway (ENR) runs through the town carrying VIA Rail passenger trains. Environmental concern and increasing traffic congestion in the region have spurred discussion about implementing a commuter rail service and improving passenger service along this under utilized rail line. Additionally, BC Transit is currently working on plans to bring rapid transit service to View Royal and other West Shore communities. Increased public transit service to the town could drastically change development patterns.

The natural environment of View Royal continues to draw people to the community. View Royal offers waterfront neighbourhoods in addition to several parks and greenspaces, including the popular Thetis Lake Regional Park. Protecting the natural environment is a priority of View Royal and the region has established an urban containment boundary to ensure development does not encroach into rural areas. The new Official Community Plan establishes additional strategies for sustainable development, to ensure that the community continues to enjoy high levels of livability in the future.

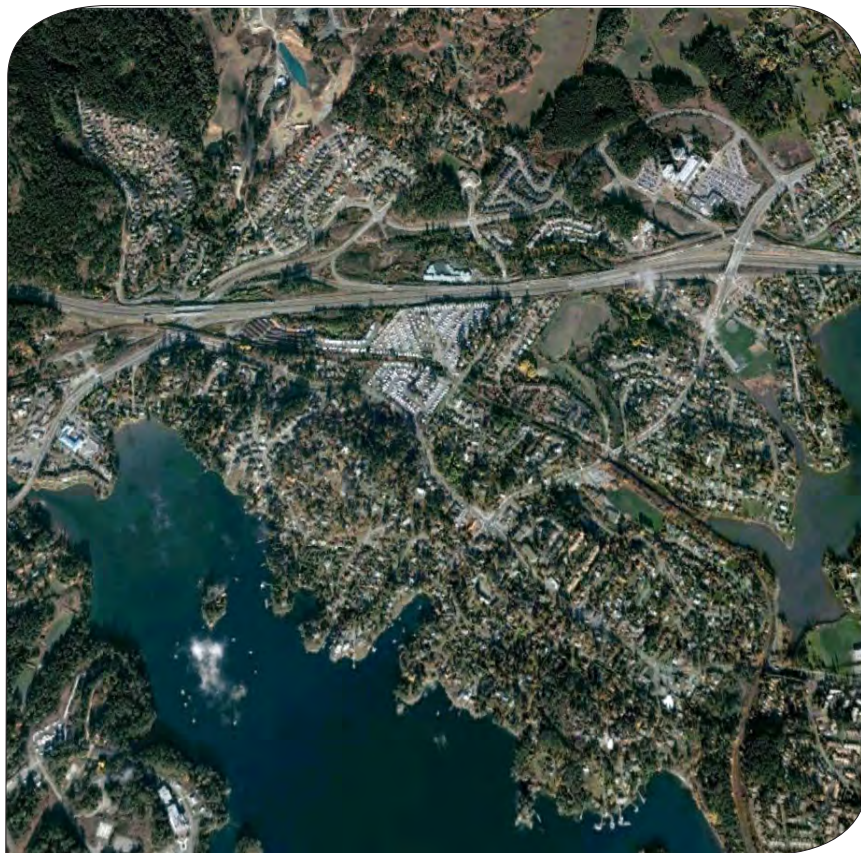


Figure 1.2 - Aerial photo of the Town of View Royal, British Columbia

1.1.5 Energy, Greenhouse Gas Emissions, and Climate Change

Energy

Energy use in the Town of View Royal is typical of most Canadian communities. Hydroelectric power and natural gas prevail as the primary energy types for buildings and other infrastructure. Hydroelectric power has a low carbon footprint compared to electricity produced by burning fossil fuel and is relatively cheap in comparison to other forms of electric power. In British Columbia, natural gas, when available, is the predominant choice for space heating. A few older homes in View Royal use other fossil fuels such as fuel oil and propane for space heating, but this number is insignificant according to comments from Fortis BC.¹ Natural gas is far more energy efficient than electricity when used for space heating; however, in terms of climate change issues, natural gas has a much higher carbon emissions factor per GJ of energy compared to electricity. Natural gas remains the energy source of choice for space heating because it is far less expensive than electric heating. One GJ of natural gas is approximately \$13 delivered, whereas 1 GJ (or approximately 277 kWh) of electricity costs approximately \$19. Therefore, low carbon emissions from hydroelectric power in B.C. tends to balance out with the higher carbon emissions from the use of natural gas when used for space heating.

Greenhouse Gas Emissions

Greenhouse gases (GHGs) include both natural and human produced gases that act to trap heat within the earth's atmosphere. Common greenhouse gases include Carbon dioxide (CO₂), Methane (CH₄) and Nitrous oxide (N₂O). Carbon dioxide is released in all combustion reactions, such as the burning of gasoline in a car engine. Methane is released directly into the atmosphere through the decomposition of solid waste in landfills.

1.1.6 Provincial Government Action

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

Climate Action Charter

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

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

Green Communities Amendment Act Bill 27

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

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

¹ Personal Communication

charges can be waived for small dwelling units and small lot 'green' subdivisions.

1.1.7 The Starting Point: Town of View Royal Energy Use and GHG Emissions

View Royal's energy use and emissions is rising as its population increases. For View Royal to meet the future GHG reduction target proposed herein, this plan must focus on ways in which the Town can reduce its overall energy intensity², and GHG intensity³. Put another way, the goal of this plan is to reduce both the community's energy use and the carbon content of the community's energy sources. This plan sets actionable GHG reduction strategies by sector— residential, commercial, transportation and municipal solid waste and assigns targets accordingly.

1.1.8 Monitoring and Reporting

The Town should engage a qualified consultant to monitor and report community energy and GHG emissions on an annual basis, or every two years depending upon the Town's wishes (costs to be confirmed with individual consultants). Currently, there are no protocols regarding monitoring frequency of community GHG emissions, although annual monitoring provides the Town with valuable information that may support Town policy that affects growth (i.e. zoning applications) and that may strengthen the Town's position when lobbying senior government to support infrastructure that reduces community GHG emissions (i.e., transit improvements). Due to time lags with data providers, updated community inventories could be prepared in May or June of a given year for the previous calendar year (e.g., a 2012 inventory would be prepared in May/ June of 2013).

Alternatively, the Town can rely on the Provincial Community Energy and Emissions Inventory (CEEI) Initiative to provide updated inventory information.

While undertaking monitoring, staff should also engage a consultant to review growth in the community sectors covered in this plan and advise staff of adjustments that may need to be made to the reduction initiatives described herein, if any. Alternatively this task can be done by existing staff.

Depending upon the final initiatives that the Town wished to implement, indicators could be developed by existing Town staff or by external consultants. These indicators should include measures of energy intensity in building stock and attempt to explain changes in the energy supply and demand in the community, if any. Changes in energy consumption per consumer over time are good indicators of trends and provide guidance to Town staff when making decisions about what reduction initiatives to implement and the resources required for implementation.

1.1.9 Resources

Monitoring & Reporting

The community inventory can be updated inexpensively by qualified consultants. Costs to prepare a community inventory, as per Appendix II, range between \$2,000 and \$4,000 depending upon the scope of the inventory and the availability of datasets from the data providers. These resource levels include nominal fees for building square footage data used to calculate energy intensity, if desired by the Town. The Town may also wish to source on road transportation fuel sales within the Town boundaries and use this data to monitor on road transportation over time.

² Energy intensity is a measure of the amount of energy a (state) uses to generate its overall economic output.

³ GHG intensity is a measure of GHG emissions of sources in a state compared to its overall economic output.

1.1.10 Overall Program Goal: The Reduction Quantity

The Town's overall target is a 12 percent reduction in greenhouse gas emissions below 2007 levels by 2020. This plan has a five year project period (2012-2017) for these initiatives to be implemented.

Since community GHG emissions result from the combustion of fuel, the use of electrical energy and the decomposition of solid waste, the plan incorporates various types of measures, or reduction initiatives, that reduce energy and emissions by:

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

1.1.11 Partners for Climate Protection Milestones

The Partners for Climate Protection (PCP) grew out of the efforts made by the Federation of Canadian Municipalities' and the ICLEI - Local Governments for Sustainability Cities for Climate Protection. The PCP is an umbrella initiative that fosters municipal participation in greenhouse gas emission reduction initiatives and sustainability. Its goal is to assist municipalities with their GHG management initiatives by providing tools and logistical support. The PCP initiative not only focuses on reducing existing GHG emissions, but also encourages municipalities to influence future GHG emissions through a variety of sustainable mechanisms such as land use, transportation planning, building codes, and development permits. By participating in the PCP initiative, municipalities receive up-to-date information on global climate change and important information regarding strategies to reduce GHG emissions, including innovative financing strategies and sample action plans. Currently it includes over 200 Canadian municipal and regional governments. British Columbia is the most active member of the network, with 65 municipalities committed to reducing GHG emissions.

This report is a direct result of the Town's efforts to fulfill the mandatory requirements of Bill 27 (page 4) and the voluntary requirements of the PCP initiative. This plan covers Milestone One to Three. All of the milestones are summarized below.

Milestone One: Create a greenhouse gas emissions inventory and forecast

Milestone Two: Set an emissions reduction target

Milestone Three: Develop an action plan

Milestone Four: Implement the action plan and related activities

Milestone Five: Monitor progress and report results

1.1.12 Methods for Preparation of the Inventory

Methods for PCP Milestone One are described herein. Reporting protocols are referenced and reduction initiatives are briefly discussed. An initial CEEI inventory for 2007 was completed by the province for the Town of View Royal. The inventory presented in this plan has been revised from the CEEI to address issues in the provincial inventory methodology. The following changes have been made to the inventory:

The emissions factor for electricity was adjusted to reflect the emissions factor reported by BC Hydro for the year 2007⁴; and,

Natural gas consumption data for apartment buildings that was classified under an industrial rate class has been assigned to the residential buildings sector.

Community emissions by sector include those resulting from residential, commercial and industrial buildings and their operations, on road transportation and solid waste generated within the community. An emissions review by source provides an analysis of the origin of emissions, which is attributed to the type of energy consumed during the activity or operation. Major sources of greenhouse gas emissions include electricity, natural gas, diesel fuel, and gasoline. Greenhouse gases are emitted as these fuels are burned. Methane from the decomposition of waste in landfills is also a major source of greenhouse gas emissions, but indirectly, as opposed to the emissions from burning fossil fuels.

⁴ This factor was released subsequent to the publishing of the CEEI reports.

The community inventory consists of gross energy values for electricity and natural gas consumed by customers in the residential, commercial, and industrial sectors within Town boundaries. Community electricity and natural gas consumption data was provided by Fortis BC and Fortis BC respectively.

Transportation sector emissions were approximated by estimating the fuel used by vehicles registered to Town of View Royal residents. The alternate option– gross fuel sales within the municipal boundary– is a less accurate estimate, since the residency of those purchasing fuel within Town boundaries is impossible to determine.

The method employed to approximate transportation emissions is Hyla Environmental Services' (HES) Energy and Emissions Monitoring and Reporting System (EEMRS™). EEMRS™ models community on road transportation emissions by using vehicle registration data, estimates of average annual vehicle kilometres travelled (VKT) estimate, and fuel consumption rates (FCR) for individual vehicle models. Vehicle registration data was obtained from the Insurance Corporation of British Columbia (ICBC); VKT for vehicle classes was provided by the Province of BC for 2007; and FCR for individual vehicle models was provided by Natural Resources Canada (NRCAN)^{5, 6}.

The calculations of CO₂e within EEMRS™ conforms with methods described in the International Panel on Climate Change Greenhouse Gas Inventory Reference Manual (IPCC 2006), the principles in the International Standards Organization (ISO) Draft International Standard for Greenhouse Gases (ISO 2005), and the general guidance within the FCM's guidance document for the preparation of PCP inventories (FCM 2006). Emissions coefficients are found in the IPCC document and emissions factors for electricity are provided by Fortis BC.

A detailed summary of the 2007 community energy and emissions inventory is presented in Appendix I.

Emissions Baseline

The community emissions baseline is the total greenhouse gas emissions from the community in the base inventory year. This number is either actual data or data that has been backcast from a year where actual data exists. The base year has been established as the year 2007 (the Province of British Columbia's base year). Building emissions for the 2007 community base year is derived from actual consumption data, whereas community transportation emissions are derived from activity data and estimates of vehicle kilometres travelled.

⁵ Province of BC

⁶ <http://www.oee.nrcan.gc.ca>

1.2 Community Energy and GHG Inventory

An overview of total energy consumed and emissions produced by the Town's community (residents and businesses) is presented below. Energy and emissions data are divided by sector (buildings, on road transportation and solid waste), subsector and emissions source. Buildings include all residential, commercial, and industrial buildings, if any. Government owned buildings (e.g., schools, institutions, etc.) are included in the commercial buildings subsector.

1.2.1 Community Inventory Summary

In the 2007 base year the community's total greenhouse gas emissions was 39,195 tonnes of CO₂e (See Appendix I for a detailed community inventory for 2007).

1.2.2 Community Inventory by Sector

Energy Consumption

In 2007 community buildings accounted for the majority of community energy consumption (499,320 GJ; 63 percent). Fuel for on road transportation amassed 37 percent of energy consumption (298,159 GJ; Table 1.1 & Chart 1.1).

Emissions by Sector

The on road transportation sector was the largest source of community emissions, generating 22,119 tonnes of CO₂e in 2007 (68 percent). Community buildings generated 9,846 tonnes of CO₂e (30 percent) whereas methane from the decomposition of community solid waste generated 349 tonnes of CO₂e (one percent; Table 1.1 & Chart 1.2). Although more energy is consumed in buildings, in proportion, less GHGs are emitted from buildings because the fuels in the transportation sector (e.g., gasoline and diesel fuel) are far more carbon intensive than the fuels in the buildings sector (e.g., electricity). Solid waste GHG emissions includes reductions at the source from diversion and reductions at the landfill through the capture and reuse of landfill gas.

Table 1.1 - Community Energy and Emissions by Sector (2007)

| Sector | Total Energy (GJ) | Total Emissions (CO ₂ e tonnes) | Percent Energy | Percent Emissions |
|------------------------|-------------------|--|----------------|-------------------|
| Buildings | 499,320 | 9,846 | 63% | 30% |
| On Road Transportation | 298,159 | 22,119 | 37% | 68% |
| Solid Waste | | 349 | 0% | 1% |
| Total | 797,479 | 32,314 | 100% | 100% |

Chart 1.1 - Consumption by Sector

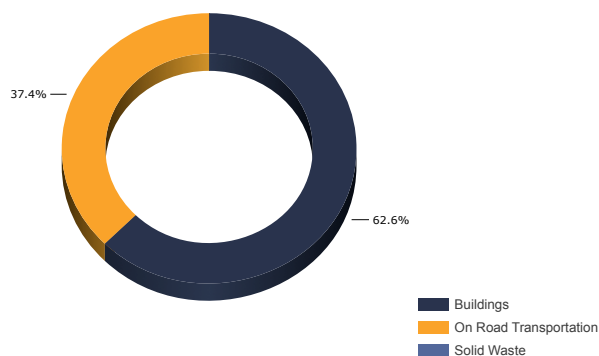
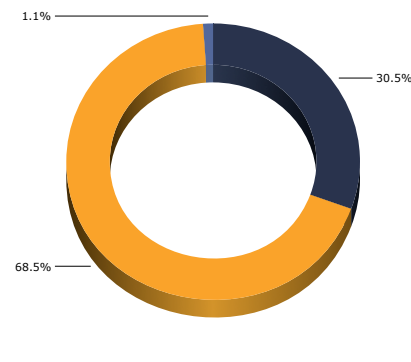


Chart 1.2 - Emissions by Sector



1.2.3 Community Inventory by Emissions Source

Although the community generates emissions from numerous sources, only seven are counted in the inventory: electricity; natural gas, fuel oil, propane, gasoline, diesel fuel, and methane produced from solid waste.

Consumption by Emissions Source

In terms of overall energy content, electricity used for residential and commercial buildings was the largest source of community energy, accounting for 37 percent of energy use in 2007. Gasoline was the other major source of community energy, responsible for 35 percent of energy consumption, followed by natural gas at 25 percent. Diesel fuel accounted for two percent of energy use and propane and fuel oil less than 1 percent (Table 1.2 & Chart 1.4).

Emissions by Emissions Source

Gasoline and natural gas accounted for 78 percent of community emissions in 2007. Gasoline combustion was the single largest source of community emissions, producing 62,763 tonnes of CO₂e (41 percent), and natural gas use produced 56,606 tonnes of CO₂e (37 percent). Diesel fuel and electricity were also major sources of community emissions in 2007. Diesel fuel use produced 15,730 tonnes of CO₂e (10 percent) while electricity use accounted for 5,619 tonnes of CO₂e (4 percent). Solid waste accounted for 7 percent of emissions and mobile propane less than 1 percent (Table 1.2 & Chart 1.6).

Table 1.2 - Community Emission Sources (2007)

| Energy Type | Total Consumption | Total GJ | Percent Energy | Total Emissions (CO ₂ e tonnes) | Percent Emissions |
|--------------|-------------------|----------|----------------|--|-------------------|
| Electricity | 82,564,819 kWh | 297,233 | 37% | 2,147 | 7% |
| Natural Gas | 201,100 GJ | 201,100 | 25% | 7,541 | 23% |
| Fuel Oil | 22,912 litres | 886 | 0% | 65 | 0% |
| Propane | 31,140 litres | 788 | 0% | 736 | 2% |
| Gasoline | 8,145,488 litres | 282,323 | 35% | 20,387 | 63% |
| Diesel Fuel | 391,647 litres | 15,149 | 2% | 1,089 | 3% |
| Solid Waste | | | | 349 | 1% |
| Total | | | 100% | 32,314 | 100% |

Chart 1.3 - Consumption by Source

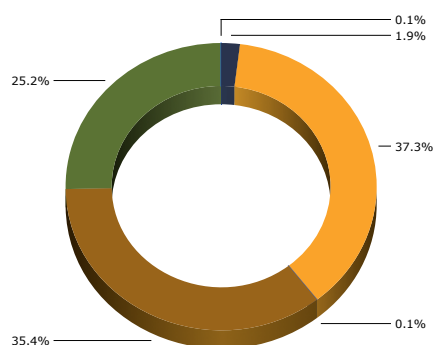
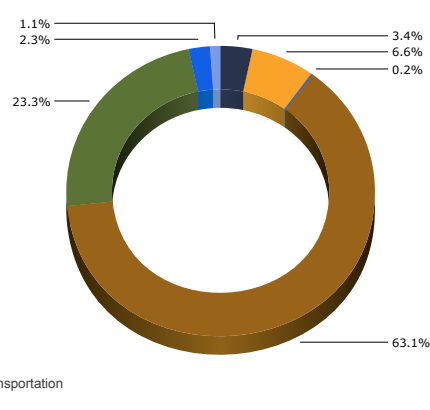


Chart 1.4 - Emissions by Source



1.2.4 Community Buildings Energy and Emissions Inventory

Community Buildings Energy Consumption

Commercial and residential buildings were approximately equal in percent energy consumption, both responsible for approximately 50 percent of total energy consumption (Chart 1.5).

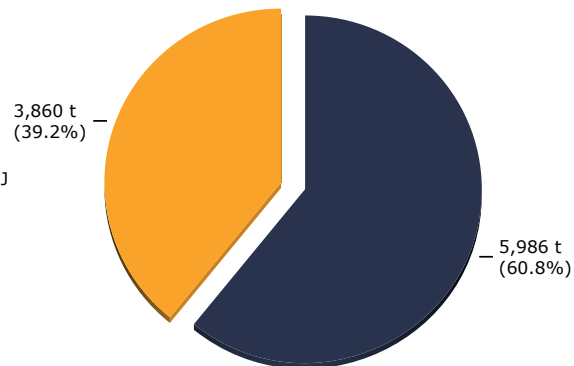
Community Buildings GHG Emissions

Commercial buildings were responsible for the majority of community buildings emissions, generating 5,986 tonnes of CO₂e (61 percent). Residential buildings generated 3,860 tonnes of CO₂e or 39 percent of the buildings sector's emissions (Chart 1.6).

Chart 1.5 - Consumption by Building Subsector



Chart 1.6 - Emissions by Building Subsector



■ Commercial Buildings ■ Residential Buildings

1.2.5 Residential Buildings

In 2007 residential buildings consumed a total of 51,173,622 kWh of electricity and 63,235 GJ of natural gas. Fuel oil and propane accounted for ~1000 GJ of energy consumption. The resulting emissions from electricity, natural gas, fuel oil, and propane totalled 3,860 tonnes of CO₂e. There were ~3,638 residential electricity connections and ~1,250 natural gas connections. Connection information is not available for fuel oil and propane as both values are coarse estimates provided by the Province of BC. Residential energy intensity was 14,066 kWh of electricity per connection and 51 GJ of natural gas consumed per connection (Table 1.3).

Table 1.3 - Summary of Community Residential Building Subsector Emissions (2007)

| BUILDINGS | Consumption By Type | | | | | | Emissions Total |
|-----------------------|---------------------|-------------|----------------|-------------------|-------------|-----------------------|-----------------------|
| | Type | Connections | Consumption | Energy/Connection | Energy (GJ) | CO ₂ e (t) | CO ₂ e (t) |
| Residential Buildings | Electricity | 3,638 | 51,173,622 kWh | 14,066 kWh/C | 184,225 | 1,331 | 3,860 |
| | Natural Gas | 1,251 | 63,235 GJ | 51 GJ/C | 63,235 | 2,371 | |
| | Fuel Oil | | 22,912 litres | L/C | 886 | 65 | |
| | Propane | | 3,959 GJ | ? GJ/C | 100 | 94 | |

1.2.6 Commercial Buildings

There were ~300 connections for commercial buildings in the Town in 2007. Note: this classification includes light industry such as commercial print shops, automotive body shops, etc. Commercial buildings generated 5,986 tonnes of CO₂e by consuming 31,391,197 kWh of electricity and 137,865 GJ of natural gas. Electrical energy consumption was ~100,000 kWh per connection while natural gas consumption per connection was ~1,650 GJ (Table 1.4).

Table 1.4 - Summary of Community Commercial Building Subsector Emissions (2007)

| BUILDINGS | Consumption By Type | | | | | | Emissions Total |
|----------------------|---------------------|-------------|----------------|-------------------|-------------|-----------------------|-----------------------|
| | Type | Connections | Consumption | Energy/Connection | Energy (GJ) | CO ₂ e (t) | CO ₂ e (t) |
| Commercial Buildings | Electricity | 301 | 31,391,197 kWh | 104,290 kWh/C | 113,008 | 816 | 5,986 |
| | Natural Gas | 84 | 137,865 GJ | 1,641 GJ/C | 137,865 | 5,170 | |

1.2.7 On Road Transportation Energy and Emissions Inventory

The community on road transportation sector includes all motorized vehicles registered with the Insurance Corporation of British Columbia, within the Town of View Royal. One condition of the provision of data is that the vehicles in each class are represented as a 'unit'. Vehicle classes have been grouped using gross vehicle weight ratings for individual vehicles.

Fuel Consumption

In 2007 light trucks, vans and SUVs accounted for the majority of community fuel consumption (50 percent) followed by small passenger cars (28 percent), and large passenger cars (17 percent). Surprisingly, commercial vehicles only comprise 1.5 percent of total energy consumed in the transportation sector. Motorhomes, and motorcycles and mopeds accounted for just under 5 percent of energy consumption (Chart 1.7 & Table 1.5).

GHG Emissions

In 2007 light trucks, vans and SUVs were the largest source of emissions in the community's on road transportation sector, responsible for 50 percent of community emissions. Small passenger cars (27 percent) were the second largest source of emissions followed by large passenger cars (17 percent). Motorhomes, and motorcycles and mopeds accounted for just under 5 percent of on road transportation emissions (Chart 1.8 & Table 1.5).

Chart 1.7 - Energy Consumption by Vehicle Class

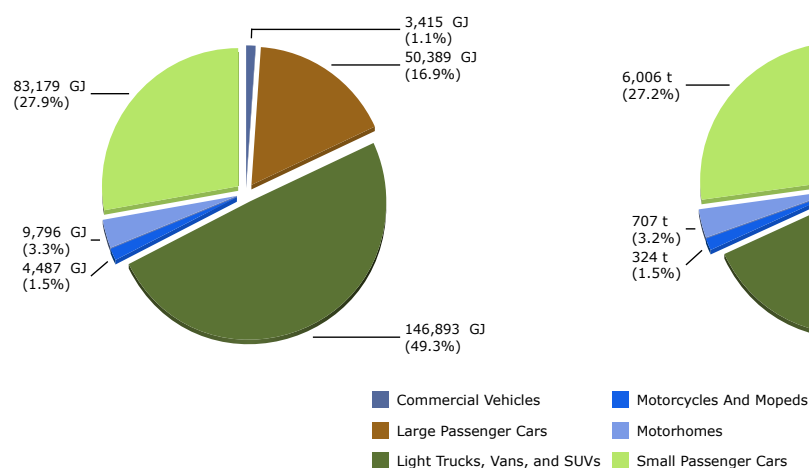


Chart 1.8 - Emissions by Vehicle Class

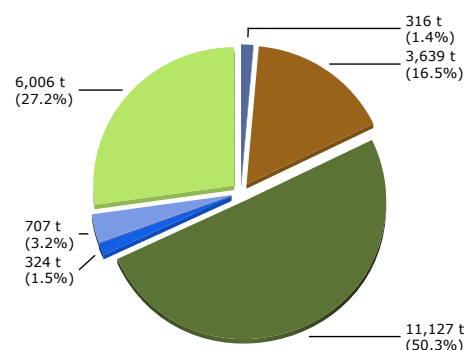


Table 1.5 - Summary of On Road Transportation Emissions (2007)

| ON ROAD TRANSPORTATION | Consumption By Type | | | | | |
|------------------------------|---------------------|-------|------------------|-------------|-------------|-----------------------|
| | Type | Units | Consumption | Litres/Unit | Energy (GJ) | CO ₂ e (t) |
| Small Passenger Cars | Diesel Fuel | | 51,647 litres | 771 L/U | 1,998 | 144 |
| | Gasoline | 2,164 | 2,342,212 litres | 1,082 L/U | 81,181 | 5,862 |
| Large Passenger Cars | Diesel Fuel | | 15,857 litres | 1,442 L/U | 613 | 44 |
| | Gasoline | 964 | 1,436,118 litres | 1,490 L/U | 49,776 | 3,594 |
| Light Trucks, Vans, And Suvs | Diesel Fuel | | 223,757 litres | 1,762 L/U | 8,655 | 622 |
| | Gasoline | 2,216 | 3,970,925 litres | 1,792 L/U | 137,632 | 9,939 |
| | Propane | 12 | 23,949 GJ | 1,996 GJ/C | 606 | 566 |
| Commercial Vehicles | Diesel Fuel | | 75,994 litres | 3,304 L/U | 2,939 | 211 |
| | Gasoline | 10 | 11,374 litres | 1,137 L/U | 394 | 28 |
| | Propane | 10 | 3,232 GJ | 323 GJ/C | 82 | 76 |
| Motorhomes | Diesel Fuel | | 24,392 litres | 2,439 L/U | 943 | 68 |
| | Gasoline | 137 | 255,403 litres | 1,864 L/U | 8,852 | 639 |
| Motorcycles And Mopeds | Gasoline | 348 | 129,456 litres | 372 L/U | 4,487 | 324 |
| SUBTOTAL | Propane | 5,839 | 27,181 GJ | | 688 | 642 |
| | Gasoline | | 8,145,488 litres | | 282,323 | 20,387 |
| | Diesel Fuel | | 391,647 litres | | 15,149 | 1,089 |

In Table 1.5, a 'Unit' is an individual vehicle. This terminology was specified by the data provider (ICBC).

1.2.8 Solid Waste

Community solid waste accounted for about one percent of total community emissions. In 2007 the solid waste produced by Town residents produced 349 tonnes of CO₂e (Table 1.6).

Table 1.6 - Summary of Solid Waste Data

| Sector | Mass (t) | Estimation Method | Emissions CO ₂ e (t) |
|-------------|----------|--------------------|---------------------------------|
| | 2007 | | |
| Solid Waste | 1,324 | Methane Commitment | 349 |

1.2.9 Community Inventory Summary

In the 2007 inventory year the Town of View Royal used ~800,000 GJ of energy and generated 32,314 tonnes CO₂e. Community buildings accounted for the greatest amount of energy consumption while on road transportation accounted for the largest share of community GHG emissions (Table 1.7).

Commercial buildings were responsible for the largest share of building sector emissions. In the buildings sector, natural gas was the largest source of both energy and GHG emissions.

Light trucks, vans and SUVs were the largest sources of emissions in the on road transportation sector. Gasoline was the dominant fuel source in terms of consumption and consequently produced the largest share of emissions among fuel types.

Table 1.7 - Community Energy Consumption and GHG Emissions Summary

| Sector | | Energy Type/Unit | Consumption | Energy (GJ) | GHG Emissions (Tonnes of CO ₂ e) | |
|------------------------|-----------------------|------------------|----------------|-------------|---|--------|
| | | | 2007 | | | |
| Buildings | Residential Buildings | Elect | 51,173,622 kWh | 184,225 | 1,331 | 3,860 |
| | | Nat Gas | 63,235 GJ | 63,235 | 2,371 | |
| | | Fuel Oil | 22,912 L | 886 | 65 | |
| | | Propane | 3,959 L | 100 | 94 | |
| | Commercial Buildings | Elect | 31,391,197 kWh | 113,008 | 816 | 5,986 |
| | | Nat Gas | 137,865 GJ | 137,865 | 5,170 | |
| On Road Transportation | | Gasoline | 8,145,488 L | 282,323 | 20,387 | 22,119 |
| | | Diesel | 391,647 L | 15,149 | 1,089 | |
| | | Propane | 27,181 GJ | 688 | 642 | |
| Solid Waste | | Tonnes | NA | NA | 349 | 349 |
| TOTAL | | | 797,479 GJ | | 32,314 t | |

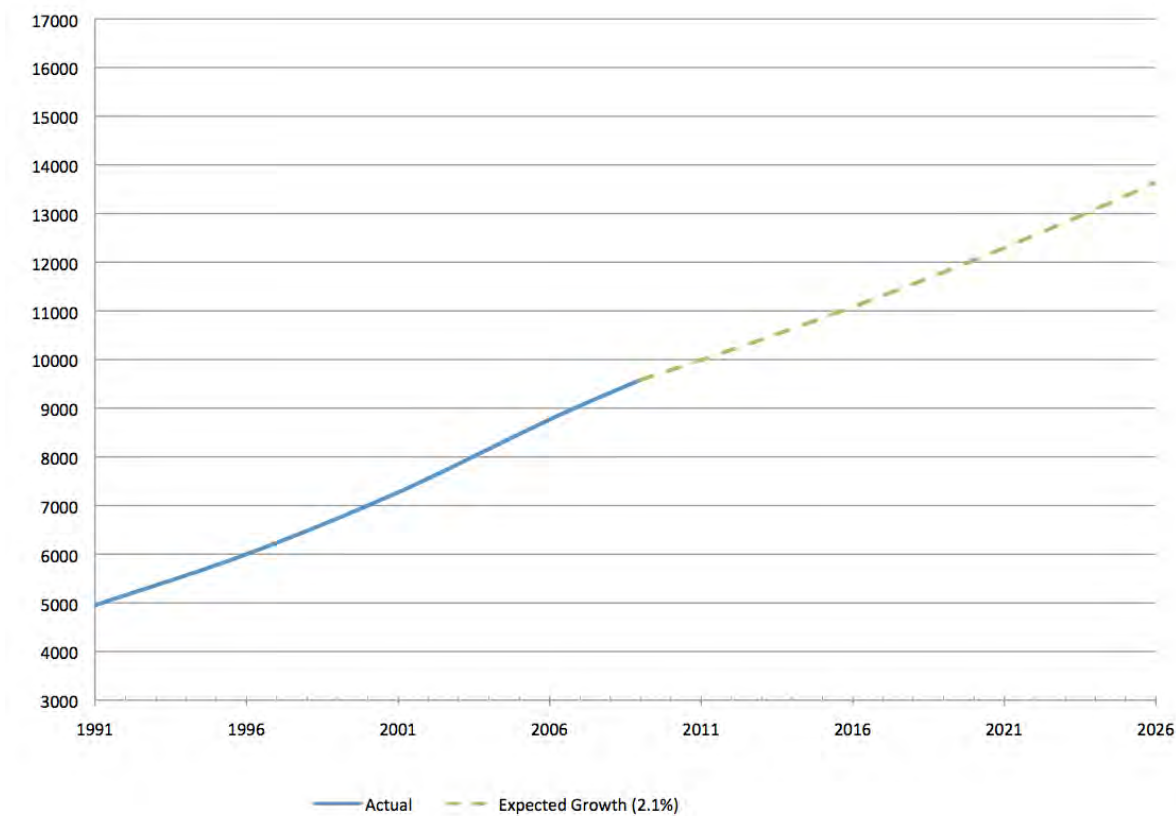
1.3 Community Forecasts

A forecast of community emissions for community buildings, on-road transportation, and solid waste sectors is presented in this subsection. Chart 1.9 represents the population growth for the Town using 2006 census data⁷ and data from the Capital Regional District for 2009.

According to the extrapolation presented in Chart 1.9, by 2017 the population of the Town of View Royal will be ~11,300. Earlier versions of the Town's OCP⁸ indicated that the saturation population for the Town, based on theoretical build-out and 2.5 persons per dwelling was approximately 10,841 people. The growth scenario below assumes that the Town's population will grow at a rate of 2.1% per annum.

Many other factors must be considered if a credible projection of GHG emissions is to be developed. These factors are presented in a framework along with related assumptions for each subsector (e.g., buildings, on-road transportation, solid waste).

Chart 1.9 - Projected Population Growth (1996-2018)



⁷ Statistics Canada, Census 2006

⁸ Official Community Plan Bylaw No. 361, 1999. Consolidated revision to April 2010.

1.3.1 Forecast of Community Buildings Energy and GHG Emissions

Several factors contribute to the forecast of GHG emissions for community buildings. These factors include the number and type of units projected, the energy types used for space heating in the projected units (e.g., electric or natural gas space heating), and the size and therefore the energy intensity of projected units by energy type.

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

$$\text{Growth in Emissions by Energy Type} = \text{Projected Number of Units} \times \text{Projected Energy Intensity by Energy Type} \times \text{Projected Emissions Factor}$$

Each of the three factors have been considered in the forecast for community buildings. Energy intensity was only used for the residential sector and not for the commercial sector because of the inconsistencies in energy intensity for commercial buildings.

Note: the projected emissions factor is excluded from calculations when considering electricity as the energy type because the GHG emissions from electricity provided by BC Hydro is expected to be offset at the source by 2017. The emissions factors for other energy types are constant. A framework and number of assumptions has been provided to support the forecast for each subsector.

Framework and Assumptions

Framework and Assumptions for Forecasts in the Community Buildings Sector:

- an 'Expected Growth' scenario and a 'High Growth' scenario are presented for the Residential Buildings Subsector only;
- the GHG emissions factor for electricity in the forecast year is zero as all GHG emissions from electricity are expected to be offset at their source by BC Hydro;
- consumption data for natural gas is not normalized for weather for 2017, nor is it normalized for any other inventory year presented (e.g., GHG emissions are absolute and normalization would be undertaken for detailed comparisons of specific consumption accounts);
- growth is significantly different for each community buildings subsector;
- growth is predicted for the forecast year 2017; and,
- energy and GHG emissions Inventories for the years 2005 and 2007 were available to provide guidance for the forecast although trends in the data were not necessarily used to develop the forecast.

Assumptions for Forecasts in the Residential Buildings Subsector:

- an 'Expected Growth' scenario and a 'High Growth' scenario are presented;
- the 'Expected Growth' scenario is the Town's best estimate of the number of newly constructed buildings that could be developed up to 2017 if one quarter of the total potential buildings that can be constructed given the limitations of available land (e.g., ~1,200) were built in the next five years and at a reasonable rate of construction given the current economic downturn;
- the 'High Growth' scenario is the Town's best estimate of the number of newly constructed buildings that could be developed up to 2017 if half of the total potential buildings that can be constructed given the limitations of available land (e.g., ~1,200) were built in the next five years;
- the ratio of residential units that are heated by electricity to those heated by natural gas has been adjusted from 2008 data that was available to the project but not published herein. Assume that the predicted number of low rise apartments will use electricity for space heating instead of natural gas; and,
- the calculation of the forecasted energy and resulting GHG emissions is based on a projection of the number of units added to the inventory between the base year (2007) and the forecast year (2017).

Assumptions for Forecasts in the Commercial Buildings Subsector:

- the ratio of commercial units that are heated by electricity to those heated by natural gas in 2007 was used to develop the 2017 forecast;

- trends in consumption in the commercial sector have been used as guidance for the forecast;
- a residential component has been factored into the forecast for commercial buildings;
- new commercial establishments are not necessarily new to the community and may be relocated businesses from other less desirable locations within the Town;
- owners of large commercial establishments indicate that growth is difficult to predict through turbulent economic times;
- consumption data specific to individual commercial establishments was not available; and,
- forecasts have been developed by choosing a annual increase based on an estimate from observed trends (e.g., 2005, 2007, and 2008).

Projection of Units for Community Buildings

Many methods of projecting the number of new residential and commercial units are possible. The method of projecting the number of units used herein is based on the best estimates of the number of units that will be constructed under the current zoning bylaws. An 'Expected Growth' scenario and a 'High Growth' scenario are presented in Table 1.8 for the residential buildings subsector. The 'Expected Growth' scenario is based on development that is possible under the existing OCP and Land Use Bylaws, whereas the 'High Growth' scenario is based on estimates of what is possible given changes to the OCP that are currently being discussed by the community and Council. The 'High Growth' scenario assumes a reasonable rate of construction, although there are many factors that affect the rate of construction that are not discussed herein.

Table 1.8 - Expected Growth and High Growth Scenarios for Residential Building Types (2017)

| Residential Building Type | Projected Units (2017) | |
|---------------------------|------------------------|-------------|
| | Expected Growth | High Growth |
| Apartments | 200 | 350 |
| Row Housing | 75 | 100 |
| Single Units | 150 | 200 |
| Total Units | 425 | 650 |

Projections for units in the commercial sector is not possible because of the inconsistencies of energy intensity in these types of buildings. Instead, an annual increase of 0.5 percent for the commercial sector has been used for the GHG emissions forecast for the commercial buildings subsector.

Table 1.9 presents the forecasted energy consumption and related GHG emissions for each of the residential building types predicted in Table 1.8. Commercial building have been added to Table 1.8 for to complete the buildings sector, although there is no forecast for the commercial buildings sector.

Under the 'Expected Growth' scenario, GHG emissions in buildings will increase by ~1,650 tonnes CO₂e. Under the 'High Growth' scenario, GHG emissions will increase by ~2,050 tonnes CO₂e.

Table 1.10 presents a summary of the base year (2007) GHG emissions, the GHG emission increments for the Expected Growth and High Growth scenarios, and the total GHG emissions forecast. Table 1.10 presents the same numbers that appear in Table 1.9, although apartments, row housing, and single units have been combined. A forecast for fuel oil and propane has not been provided.

Table 1.9 - Forecast of Community Energy and GHG Emissions Increments for Buildings (2017)

| Sector | | Energy Type/ Unit | Expected Growth Increment | High Growth Increment | Expected Growth | High Growth |
|-----------------------|--------------|----------------------|------------------------------|--------------------------|--|----------------|
| | | | Energy Consumption | | GHG Emissions (CO ₂ e tonnes) | |
| | | | 2017 | | | |
| Residential Buildings | Apartments | Elect (kWh) | 1,800,000 | 3,150,000 | 0 | 0 |
| | | Nat Gas (GJ) | 7,000 | 9,000 | 353 | 454 |
| | Row Housing | Elect (kWh) | 825,000 | 1,100,000 | 0 | 0 |
| | | Nat Gas (GJ) | 5,250 | 7,000 | 265 | 353 |
| | Single Units | Elect (kWh) | 2,100,000 | 2,800,000 | 0 | 0 |
| | | Nat Gas (GJ) | 13,500 | 18,000 | 681 | 909 |
| Commercial Buildings | | Elect (kWh) | 1,569,600 | 1,569,600 | 0 | 0 |
| | | Nat Gas (GJ) | 6,893 | 6,893 | 348 | 348 |
| Subtotal | | Elect (kWh) | 4,544,600 | 6,869,600 | 0 | 0 |
| | | Nat Gas (GJ) | 21,393 | 29,643 | 1,647 | 2,064 |
| TOTAL | | | | | 1,647 | 2,064 |

* Figures are for consumption and GHG emissions for all buildings for the forecasted amounts only. A 'High Growth' forecast is not possible in the commercial buildings sector. The 'Expected Growth' figures have been used in the final forecast.

Table 1.10 - Forecast of GHG Emissions for Buildings (2017)

| Sector | Energy Type/Unit | Base Year Emissions | Expected Growth Increment | High Growth Increment | Forecast Expected Growth | Forecast High Growth |
|--------------------------|---------------------|--|---------------------------------|-----------------------------|--------------------------------|----------------------------|
| | | 2007 | 2017 | 2017 | 2017 | 2017 |
| | | GHG Emissions (CO ₂ e tonnes) | | | | |
| Residential Buildings | Elect | 1,331 | 0 | 0 | 0 | 0 |
| | Nat Gas | 2,371 | 1,299 | 1,716 | 3,670 | 4,087 |
| | Fuel Oil | 65 | 0 | 0 | 0 | 0 |
| | Propane | 94 | 0 | 0 | 0 | 0 |
| Commercial Buildings | Elect | 816 | 0 | 0 | 0 | 0 |
| | Nat Gas | 5,170 | 348 | 348 | 5,518 | 5,518 |
| Subtotal | Elect | 2,147 | 0 | 0 | 0 | 0 |
| | Nat Gas | 7,541 | 1,647 | 2,064 | 9,188 | 9,605 |
| | Other | 159 | | | | |
| TOTAL | | 9,847 | 1,647 | 2,064 | 9,188 | 9,605 |

The total GHG emissions forecast for the Expected Growth scenario for buildings is ~9,200 tonnes CO₂e whereas the GHG emissions for the High Growth scenario is ~9,600 tonnes CO₂e. The GHG emissions forecast for the expected growth scenario will be used for the GHG emissions target calculation. Fuel oil and propane use in buildings has not been forecast because the consumption values of both energy types are not based on actual data and are not expected to increase.

1.3.2 Forecast of Community On-road Transportation Energy and GHG Emissions

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

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

Growth in Emissions =

$$\text{Projected Number of Vehicles per Vehicle Class} \times \text{Projected Fuel Consumption Rate by Fuel Type} \times \text{Projected Vehicle Kilometres Driven by Vehicle Class} \times \text{GHG Emissions Factor}$$

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

Number of Vehicles On-road

- insurance costs - high insurance rates can be cost prohibitive and prevent licensed drivers from owning a vehicle. Also, high insurance costs may result in owners taking existing vehicles off the road for portions of the year;
- vehicle price - the price of new vehicles may affect the number of vehicles on-road; and,
- availability of capital leases - leasing is a less expensive alternative to purchasing a vehicle and fewer newer vehicles may be purchased in the absence of economical leasing options.

Fuel Consumption Rate

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

Vehicle Kilometres Travelled

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

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

- The Insurance Corporation of British Columbia (ICBC) provides HES with data specific to the Town of View Royal. A condition of the provision of data is that we represent the vehicles in each vehicle class as a 'unit';
- Although VKT estimates play an important role in predicting GHG emission in the on-road transportation sector, we assume that VKT will not change significantly in the forecast year, the focus for the forecast is a prediction of the count of vehicle types;

- Trends from 2007 to 2008 are not taken into account because these trends are not necessarily representative of the number of vehicles that will be on-road in 2017. Rather, the number of vehicles per dwelling for 2007 has been used for personal vehicles and projected against the number of residential units predicted in Section 3.1;
- It is assumed that personal vehicles per capita does not significantly fluctuate between 2007 and 2017.
- Knowledge of the per capita rate of vehicles in apartments, row houses, and single units would greatly assist with the forecast; and,
- Commercial vehicles and motorhomes are not forecast because there are no reliable indicators, including trends, from which to base the forecast.

Unlike the methods used to forecast GHG emissions in community buildings, the forecast for personal vehicles in the on-road transportation sector uses the number of vehicles per dwelling (1.5 units/dwelling) in 2007 and the projected number of dwellings from the 'Expected Growth' scenario to predict the number of vehicles in 2017. The calculation of additional vehicles is 300 additional dwellings multiplied by 1.5 vehicles per dwelling, which is equal to 450 new vehicles. These new vehicles are proportioned amongst small and large passenger cars and light trucks, vans and SUVs according to the observed ratio for 2007 data. Although it is very likely that these proportions have changed since 2007 and will change in the future, current data is not available to analyze trends and develop an estimate.

Once the number of vehicles is predicted from the number of units per dwelling for personal vehicles and the predicted number of residential building types, the fuel used per unit in 2007 is used to calculate the fuel used for 2017. Table 1.11 presents the data for 2017 that has been used to calculate the number of additional units in 2017 and the forecast of units and fuel consumption.

Table 1.11 provides a count of vehicles by vehicle type for 2007, the fuel consumed by each vehicle class, the additional units projected for 2017, and the forecast of fuel consumption for 2017. The total number of units forecast for 2017 is 6,549 and the total volume of fuel consumed is approximately 9.6 million litres.

Table 1.11 - Forecast of Number of Units and Fuel Consumption for On-road Transportation (2017)

| Vehicle Class | Fuel Type | Units | Fuel (Litres) | Litres / Unit | Additional Units | Forecast of Units | Forecast of Consumption (Litres) |
|------------------------------|-------------|--------------|------------------|---------------|------------------|-------------------|----------------------------------|
| | | 2007 | | | 2017 | | |
| Small Passenger Cars | Gasoline | 2,164 | 2,342,212 | 1,082 | 175 | 2,339 | 2,531,745 |
| | Diesel Fuel | 67 | 51,647 | 771 | 5 | 72 | 55,826 |
| Large Passenger Cars | Gasoline | 964 | 1,843,372 | 1,912 | 78 | 1,042 | 1,992,539 |
| | Diesel Fuel | 11 | 18,782 | 1,707 | 1 | 12 | 20,302 |
| Light Trucks, Vans, and SUVs | Gasoline | 2,216 | 3,970,925 | 1,792 | 179 | 2,395 | 4,292,255 |
| | Diesel Fuel | 127 | 223,757 | 1,762 | 10 | 137 | 241,864 |
| | Mbl Propane | 12 | 23,949 | 1,996 | 1 | 13 | 25,887 |
| Commercial Vehicles | Gasoline | 10 | 11,374 | 1,137 | N/A | 10 | 11,374 |
| | Diesel Fuel | 23 | 75,994 | 3,304 | N/A | 23 | 75,994 |
| | Mbl Propane | 10 | 3,232 | 323 | N/A | 10 | 3,232 |
| Motorhomes | Gasoline | 137 | 255,403 | 1,864 | N/A | 137 | 255,403 |
| | Diesel Fuel | 10 | 24,392 | 2,439 | N/A | 10 | 24,392 |
| Motorcycles and Mopeds | Gasoline | 348 | 129,456 | 372 | N/A | 348 | 129,456 |
| TOTAL | | 6,099 | 8,974,495 | | 450 | 6,549 | 9,660,269 |

Table 1.12 provides the total units, fuel consumption, and GHG emissions for the target calculation. The GHG emissions have been calculated from the forecast amount of fuel consumed. Table 1.13 outlines the forecast of GHG emissions for on-road transportation before legislative requirements are included, while Table 1.14 outlines the forecast with the provincial tailpipe standard included.

Table 1.12 - Forecast of GHGs for On-road Transportation Without Tailpipe Standard Implementation (2017)

| Vehicle Class | Fuel Type | Forecast of Units | Forecast of Consumption (litres) | Forecast of GHG Emissions (tonnes CO ₂ e) |
|------------------------------|-------------|-------------------|----------------------------------|--|
| | | 2017 | | |
| Small Passenger Cars | Gasoline | 2,339 | 2,531,745 | 6,337 |
| | Diesel Fuel | 72 | 55,826 | 155 |
| Large Passenger Cars | Gasoline | 1,042 | 1,992,539 | 4,987 |
| | Diesel Fuel | 12 | 20,302 | 56 |
| Light Trucks, Vans, and SUVs | Gasoline | 2,395 | 4,292,255 | 10,743 |
| | Diesel Fuel | 137 | 241,864 | 673 |
| | Mbl Propane | 13 | 25,887 | 612 |
| Commercial Vehicles | Gasoline | 10 | 11,374 | 28 |
| | Diesel Fuel | 23 | 75,994 | 211 |
| | Mbl Propane | 10 | 3,232 | 76 |
| Motorhomes | Gasoline | 137 | 255,403 | 639 |
| | Diesel Fuel | 10 | 24,392 | 68 |
| Motorcycles and Mopeds | Gasoline | 348 | 129,456 | 324 |
| TOTAL | | 6,549 | 9,660,269 | 24,909 |

Provincial Regulations

In May 2008, the B.C. government enacted Bill 39, the Greenhouse Gas Reduction (Vehicle Emissions Standards) Act. Bill 39 enables the implementation of a government commitment made in the 2008 Throne Speech to set vehicle GHG emission standards equivalent to those laid out in California's 2004 regulation. Bill 39 will be brought into force by regulation – enacted when (and not before) the equivalent California regulation and standards are implemented. The Ministry of Environment is presently developing the regulation to accompany the new bill⁹. The federal government has also recently outlined a GHG emissions standard; a modification of the Californian standard. If the BC government rescinds its standard in lieu of a federal standard, the projected impact on GHG emissions may change. Table 1.13 illustrates the emissions limits under the Californian regulation.

⁹ Greenhouse Gas Reduction (Vehicle Emissions Standards Act Policy Intentions Paper for Consultation)

Table 1.13 - Forecast of GHG Emissions for On-road Transportation Before Legislative Requirements (2017)

| Model Year | Small Vehicles ¹ | Large Vehicles ² |
|------------|---|-----------------------------|
| | Fleet Average Greenhouse Gas Emissions (grams per mile CO ₂ e) | |
| 2011 | 267 | 390 |
| 2012 | 233 | 361 |
| 2013 | 227 | 355 |
| 2014 | 222 | 350 |
| 2015 | 213 | 341 |
| 2016 + | 205 | 332 |

¹ All Passenger Cars; and Light Duty Trucks 0-3750 lbs

² Light Duty Trucks < 3751 Lbs. Loaded Vehicles up to 8500 lbs. Medium Duty Passenger Vehicles

Because a tailpipe emissions standard regulates overall GHG emissions rather than fuel economy it provides an incentive for auto manufacturers to produce vehicles using alternative fuel sources (e.g. electric plug-in vehicles). With so much uncertainty around how manufacturers will meet emissions limits, forecast emissions for the on road transportation sector do not predict future fuel consumption. Taking into account the proposed emissions standard, 2017 emissions for this sector will be approximately 23,000 tonnes of CO₂e (Table 1.14).

Table 1.14 - Forecast of GHG Emissions for On-road Transportation With Tailpipe Standard (2017)

| Vehicle Class | Emissions Standard Non- Compliant Units | Emissions Standard Compliant Units | Emissions Standard Non-Compliant GHGs | Emissions Standard Compliant GHGs | 2017 Total Emissions |
|---------------------|--|---|---|---|-------------------------|
| | | | CO ₂ e (t) | | |
| Small Vehicles | 723 | 1,688 | 1,948 | 4,052 | 6,000 |
| Large Vehicles | 1,093 | 2,550 | 5,216 | 10,980 | 16,196 |
| Unaffected Vehicles | 595 | 0 | 1,021 | 0 | 1,021 |
| TOTAL | 7,865 | 5,980 | 31,315 | 18,728 | 23,216 |

1.3.3 Forecast of Community Solid Waste

For the purposes of this draft no growth has been assigned to community solid waste because programs in the Capital Regional District should result in a net decrease of GHG emissions in the community regardless of forecasted population increases.

1.3.4 Forecast of Community Greenhouse Gas Emissions

Table 1.15 presents the forecast of emissions by sector and by energy type as well as illustrating the expected percent change between 2007 and 2017. The forecast of emissions derived directly from the observed trend is a one percent increase from the 2007 emissions quantity.

Table 1.15 - Expected Forecast of Community Emissions (CO₂e tonnes) by Sector and Energy Type

| Sector | Emissions CO ₂ e (t) | Forecast of Emissions (CO ₂ e tonnes) | Percent Change |
|--------------------------|---------------------------------|--|----------------|
| | 2007 | 2017 | 2007-2017 |
| Residential Buildings | 3,861 | 3,670 | -5% |
| Commercial Buildings | 5,986 | 5,518 | -8% |
| Community Transportation | 22,119 | 23,216 | 5% |
| Community Solid Waste | 349 | 349 | 0% |
| Total | 32,315 | 32,753 | 1% |

1.3.5 Summary of Community Forecasts

Overall greenhouse gas emissions are forecast to increase by one percent. The estimate developed for the on-road transportation sector may be conservative given the ever decreasing fuel consumption rates of vehicles. The forecasts for community GHG emissions are summarized in Table 1.16.

Table 1.16 - Summary of Community Forecasts

| Forecasted Parameter | Base Year | Forecast Year | Percent Increase |
|--------------------------------------|-----------|---------------|------------------|
| | 2007 | 2017 | 2007 - 2017 |
| Emissions (tonnes CO ₂ e) | 32,315 | 32,753 | 1% |



2 Reduction Initiatives

2.1 Summary of Reduction Initiatives

Each initiative provides either a numerical estimate of GHG emissions reductions or contributes to the reduction total of another initiative. For example initiatives under 'policy' might affect emissions indirectly, through enabling other initiatives. When the policy and corresponding initiative are both described the estimated GHG reduction will be included with the specific initiative.

These GHG reductions are only estimates and their achievement is contingent on several factors: the program's effectiveness, the degree of uptake by the community, and the resources applied by the Town of View Royal.

Implementing reduction initiatives in existing buildings can be a challenge. However, government authorities can profoundly affect the growth of emissions by developing bylaws, policies, and statements in the Official Community Plan. Influencing community growth in terms of the size, number, and density of new dwellings is an effective, long-term solution to climate change mitigation.

Reduction initiatives that should be utilized to reduce base year emissions in the Town of View Royal are outlined in 4 broad categories:

- Community Buildings
- Land Use and Urban Design
- Community Transportation
- Solid Waste

The Town of View Royal will need financial assistance to implement most of these initiatives. Until significant assistance is secured, the Town can gain community support by promoting initiatives that affect the base year in climate action public education and outreach programs.

Without legislation community GHG reductions are hard to achieve, but careful planning and policy implementation can produce modest reductions.

Opportunities presented for community reductions are conservative because these initiatives lack funding resources. Reductions in the on-road transportation sector partially depend on federal legislation. Senior governments are also in charge of many transit improvements.

2.2 Meeting the OCP Target

The GHG reduction strategy represents a bottom up approach to reducing GHGs necessary to reach a realistic reduction target.

Table 2.1 shows all of the quantifiable reduction initiatives, their potential reduction quantity and percentage each initiative contributes towards the GHG target. Table 2.2 on page 24 provides a summary of the initiatives for each sector.

A total of ~4,400 tonnes CO₂e can be reduced by 2017 to meet a reduction target of 12 percent below 2017 levels.

Table 2.1 - Reduction Initiatives Sorted by Priority

| Sector | Reduction Initiative | Level of Government | Reduction Quantity | | Implementation | | |
|------------------------|---|--|----------------------------|-----------------------------|----------------|------------------------|----------|
| | | | GHGs (t CO ₂ e) | Percent of Total Reductions | Cost | Level of Effectiveness | Priority |
| Buildings | New Buildings Targets ¹ | Municipal with Financial Resources | 294 | 8% | L | H | 1 |
| | EnerGuide Rating in Multiple Listing Service (MLS) Advertising | Senior Government | 46 | 1% | L | L | 4 |
| | Existing Buildings Targets ¹ | Municipal with Financial Resources | 242 | 7% | L | L | 3 |
| | Solar Hot Water | Municipal with Financial Resources | 49 | 1% | M | L | 5 |
| Subtotal | | | 631 | | | | |
| On Road Transportation | Decrease Overall Fuel Consumption Rates (includes Paveley II Tailpipe Standard) | Senior Government plus 'encouragement' from View Royal | 987 | 26% | L | H | 1 |
| | VKT Reductions | Shared | 912 | 24% | H | H | 2 |
| | Increase Transit Ridership | Shared | 977 | 26% | H | H | 2 |
| Subtotal | | | 3,507 | | | | |
| Solid Waste | CRD Plan Targets | Shared | 262 | 7% | H | H | 1 |
| Subtotal | | | 262 | | | | |
| Total | | | 4,400 | 100% | | | |

¹ Based on Community Action on Energy and Emissions (CAEE; Provincial Energy, Mines and Petroleum Resources)

Level of Effectiveness: H = High (3% or greater, except when noted); M = Moderate 2%; L = Low (1% or less); U = Unknown

Cost: H = \$100,000's; M = \$10,000's; L = \$1,000's; U = Unknown; N/A = None (senior government)

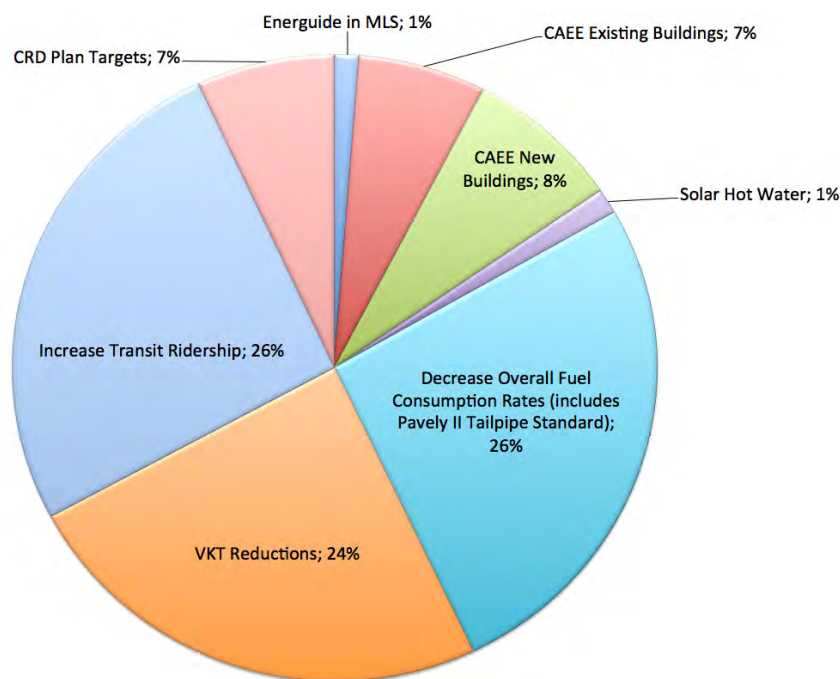
NOTE: Priority 1 is assigned to initiatives with low costs and high effectiveness whereas lower priorities are assigned to initiatives with higher costs and less effectiveness. Where costs are incurred by senior government (e.g., transit improvements), and the effectiveness is high, higher priority has been assigned.

Table 2.2 - Reduction Targets Summary

| Sector | Base Year Emissions | Projected GHG Emissions with Legislation | Potential GHG Emission Reductions | GHG Emissions After Plan Implementation | Percent Reduction of Projected Emissions |
|------------------------|--------------------------|--|-----------------------------------|---|--|
| | Tonnes CO ₂ e | | | | |
| | 2007 | 2017 | | | |
| Residential Buildings | 3,860 | 3,670 | 631 | 3,039 | -21% |
| Commercial Buildings | 5,986 | 5,518 | | 5,518 | -8% |
| On Road Transportation | 22,119 | 23,216 | 3,507 | 19,086 | -14% |
| Solid Waste | 349 | 349 | 262 | 87 | -75.0% |
| Total | 32,314 | 32,753 | 4,400 | 28,353 | -12% |

Chart 2.1 illustrates a breakout of the relative contribution of each reduction initiative to the reduction target. Reducing community VKT will be essential if the Town is to meet its GHG emissions reduction target. Achieving cuts in VKT will encourage substantial collaboration between all levels of government and include a major expansion of public transit service, beyond what is currently planned, as well as improvements to cycling and pedestrian infrastructure.

Chart 2.1 - Reduction Initiatives Breakout



A large proportion of the reduction quantity is comprised of many small initiatives (e.g. Vehicle Kilometers Traveled (VKT) reductions). While their individual contribution to the reduction quantity may seem minor, their cumulative effect is substantial.

2.3 Community Buildings

2.3.1 Senior Government Policy and Programs

Federal Government

EnerGuide Rating in Multiple Listing Service (MLS) Advertising

Responsibility: Federal

Funding: Federal

EnerGuide¹ offers a standardized rating for the energy efficiency of buildings. Since a majority of Canadians claim they would pay extra for an environmentally friendly design, boost a house's profile by registering the building's EnerGuide rating on a local realtor's multiple listings service. With the increasing costs for energy, having the EnerGuide rating will have the effect of increasing property values (Table 2.3). The calculation is based on an estimate of listed homes from 2012 to 2017 undertaking energy efficiency retrofits and resulting in a 33 percent improvement in energy consumption.

Table 2.3 - Reductions from Federal Government Programs for Community Buildings

| Reduction Initiative | Level of Government | Reduction Quantity | |
|-------------------------------------|---------------------|--------------------|---------------------------------|
| | | Energy (GJ) | GHGs (tonnes CO ₂ e) |
| EnerGuide rating in MLS Advertising | Federal Government | 1,256 | 46 |

¹ oee.nrcan.gc.ca

2.3.2 Local Government Policy and Programs

CAEE Existing Buildings Targets

The Community Action on Energy Efficiency (CAEE) covers reduction initiatives for new and existing buildings (Table 2.4). This section outlines initiatives ranging from solar installations to insulation upgrades. Several factors affect their success: building ownership (Map 2.1), building age (Map 4.2), building type (Map 4.3), and building state of repair (Map 2.4). This variation means these CAEE initiatives will be more effective in some areas (e.g. neighborhoods with older, damaged buildings) than others (e.g. neighborhoods with mostly new buildings). Before View Royal may join the CAEE, they must meet the following targets for existing buildings:

- Cut energy consumption in 12 percent of existing detached, single-unit and row houses by an average of 17 percent;
- Reduce energy consumption in 16 percent of existing multi-unit residential buildings by an average of 9 percent; and,
- Lower energy consumption in 20 percent of existing commercial, institutional and industrial buildings by 14 percent.

Table 2.4 - Reductions from Achieving CAEE Targets for Existing Buildings

| Reduction Initiative | Level of Government | Reduction Quantity | |
|--|----------------------------|--------------------|---------------------------------|
| | | Energy (GJ) | GHGs (tonnes CO ₂ e) |
| CAEE targets for existing single-unit homes | Municipality, With Support | 2,926 | 79 |
| CAEE targets for existing row housing | Municipality, With Support | 1,040 | 28 |
| CAEE targets for existing multi-unit homes | Municipality, With Support | 485 | 13 |
| CAEE targets for existing commercial buildings | Municipality, With Support | 5,118 | 122 |
| Total reductions from CAEE existing buildings | | 9,569 | 242 |

Policies Supporting the Achievement of CAEE Existing Buildings Targets

Improvements to Management and Operations Practices

Responsibility: Municipal **Funding:** Provincial/Federal or TBD

Promote energy-smart management and operation of commercial and industrial buildings. For example, establish a schedule for operating equipment to ensure energy is used responsibly and not wasted.

Building Retrofits: Electrical System Upgrades

Responsibility: Municipal **Funding:** Provincial/Federal or TBD

The electrical systems in existing buildings could be improved by installing timing devices, converting to natural gas or solar power, and switching to Energy Star verified bulbs.

Building Retrofits: Mechanical and Plumbing System Upgrades

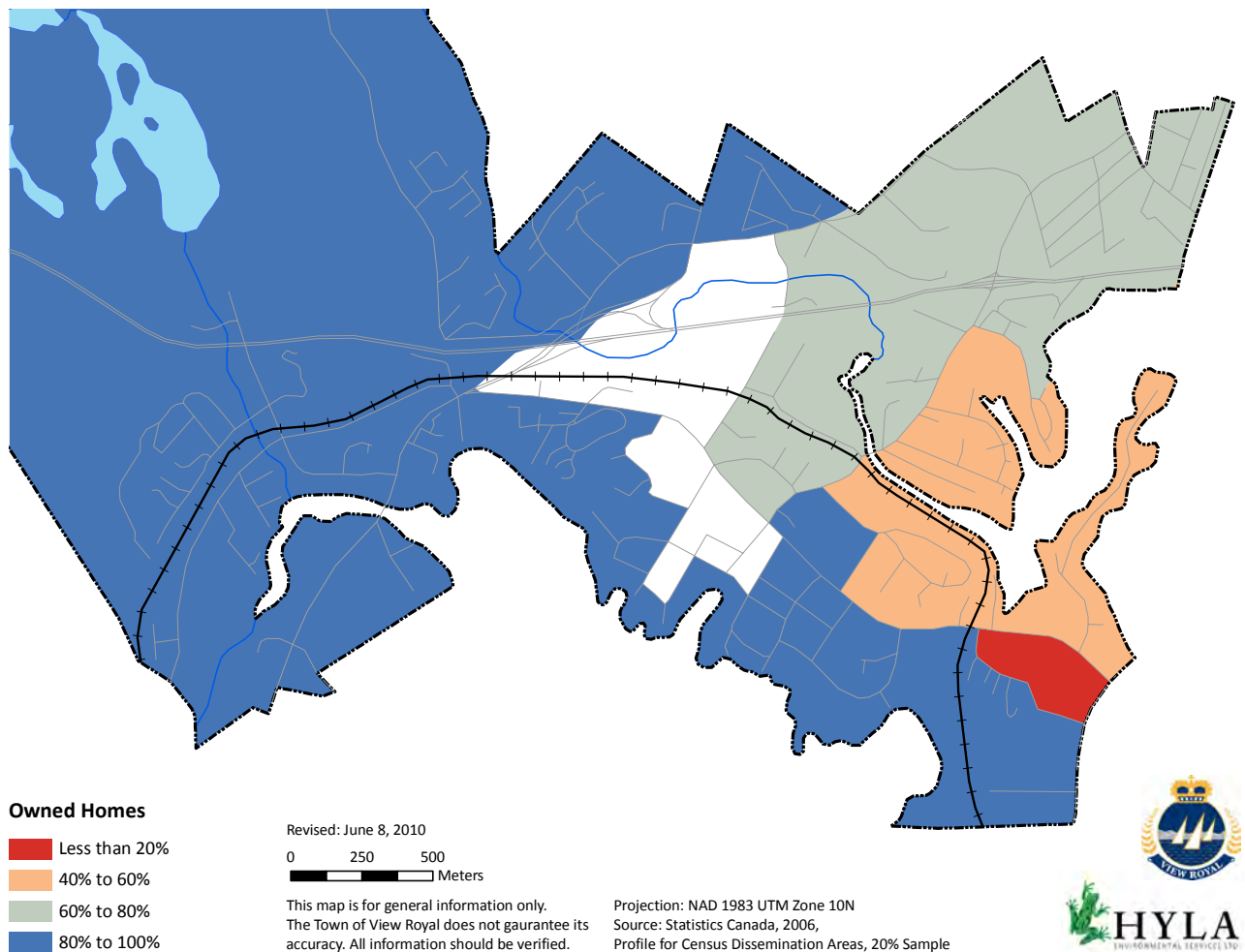
Responsibility: Municipal **Funding:** Provincial/Federal or TBD

Simple upgrades to mechanical and plumbing systems have long term benefits, such as saving water and energy and using renewable energy sources. To improve plumbing in existing buildings, install ground-source heat pumps, flow-control devices, and water distribution systems.

Replace Old A/C and Chillers with High Efficiency Models

Responsibility: Municipal **Funding:** Provincial/Federal or TBD

Substantial gains in efficiency of air conditioning and chiller units has been made and, as a result, energy use can be greatly reduced by replacing older, less efficient A/C and chiller units with new, high efficiency models. Support a goal of having at least 200 homes per year purchase more efficient air conditioners.



Map 2.1 - Building Ownership

Residents who own (and not rent) buildings are more likely to make energy efficient renovations. The map above shows the percentage of owned buildings for each census dissemination area in View Royal. A large proportion of the northwest quadrant of the map is rural area and parkland (see Appendix VI).

Install High Efficiency Water Heaters

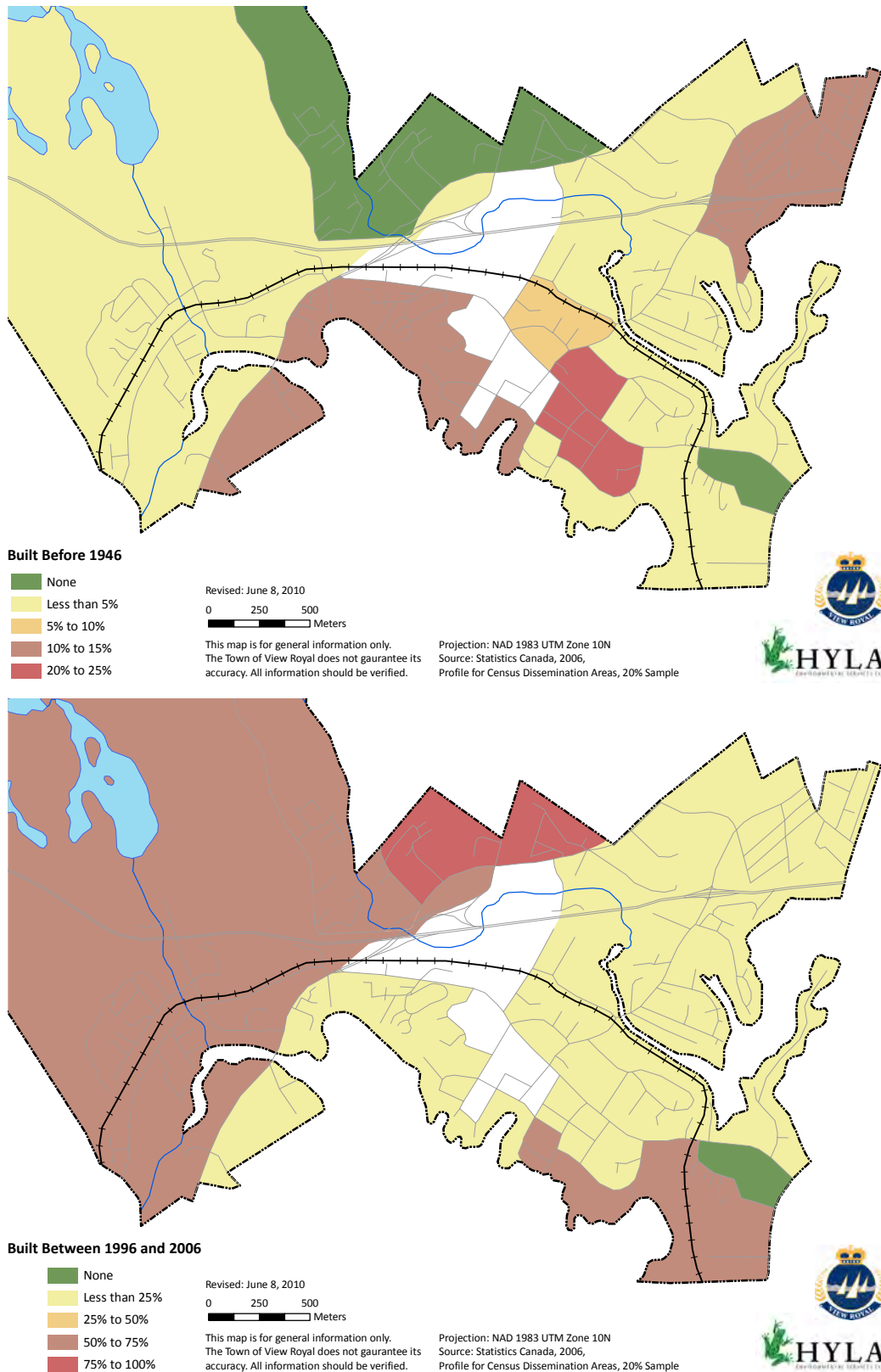
Responsibility: Municipal **Funding:** Provincial/Federal or TBD

Encourage the installation of high efficiency water heating systems when it becomes time to replace older, less efficient models.

Install Solar Hot Water Heaters

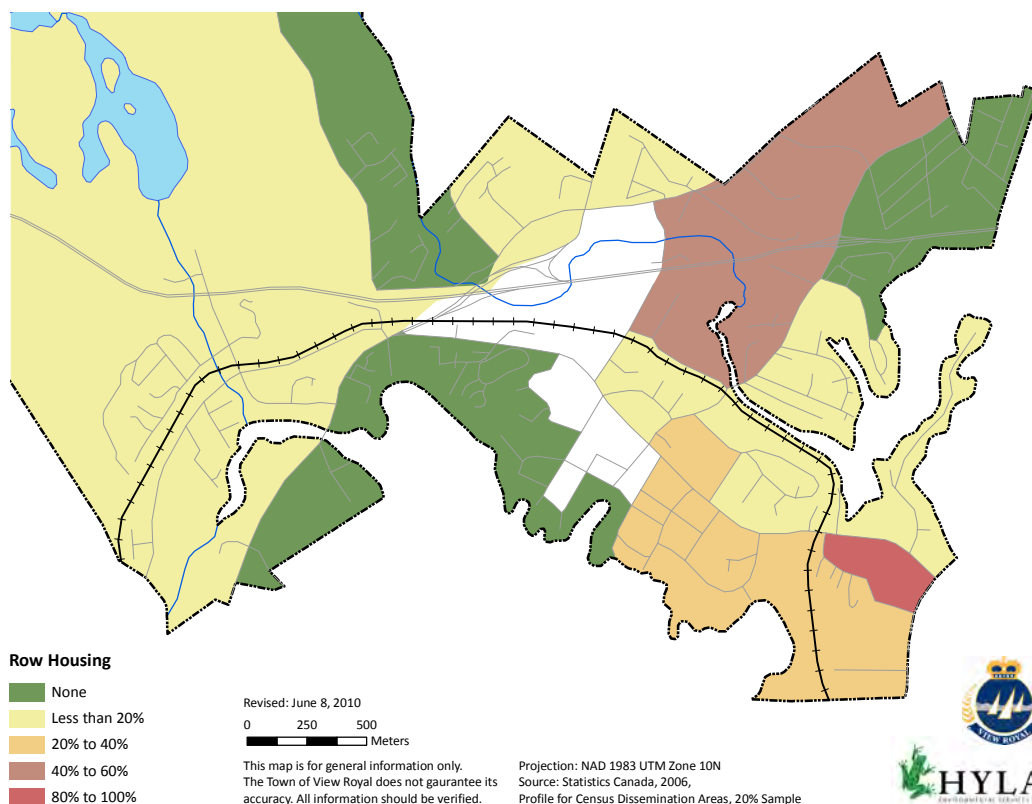
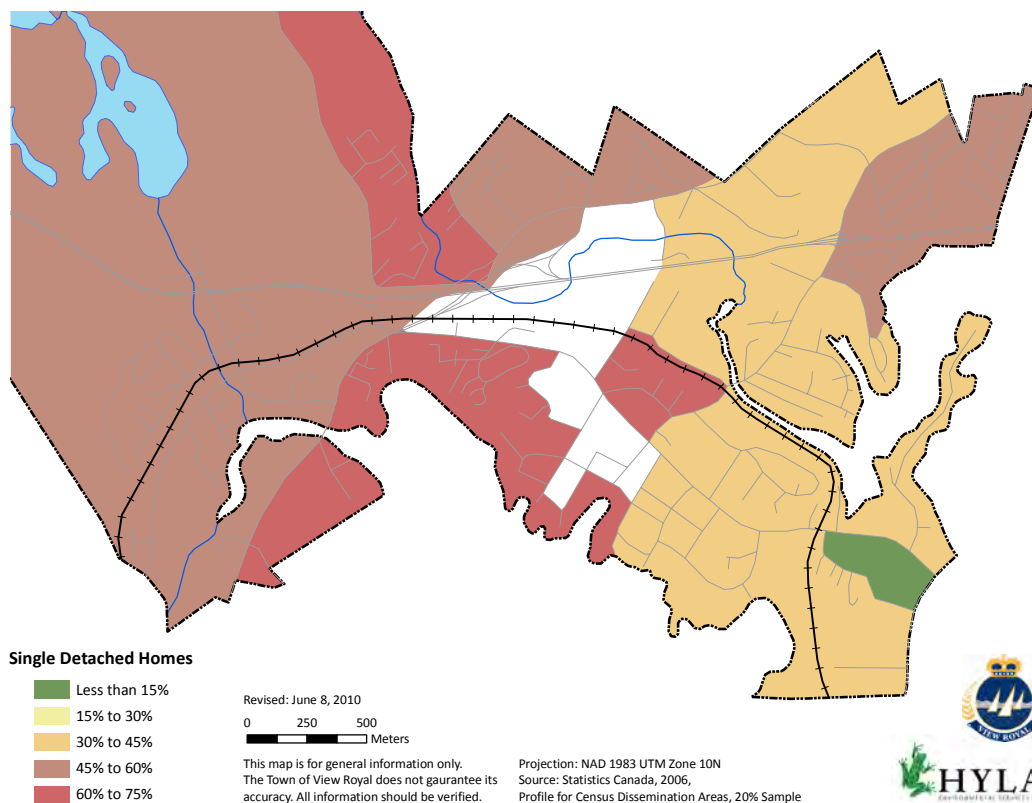
Responsibility: Municipal **Funding:** Provincial/Federal or TBD

Encourage the installation of solar hot water systems, especially when renovations are being undertaken. These systems better the environment and can reduce domestic hot water heating bills by 50-80 percent. Table 2.5 shows the potential reductions that could be achieved by encouraging solar hot water in residential buildings. The reduction estimate is based on potential energy savings and an uptake of solar hot water in 10% of existing residential buildings and a savings of 50 percent.



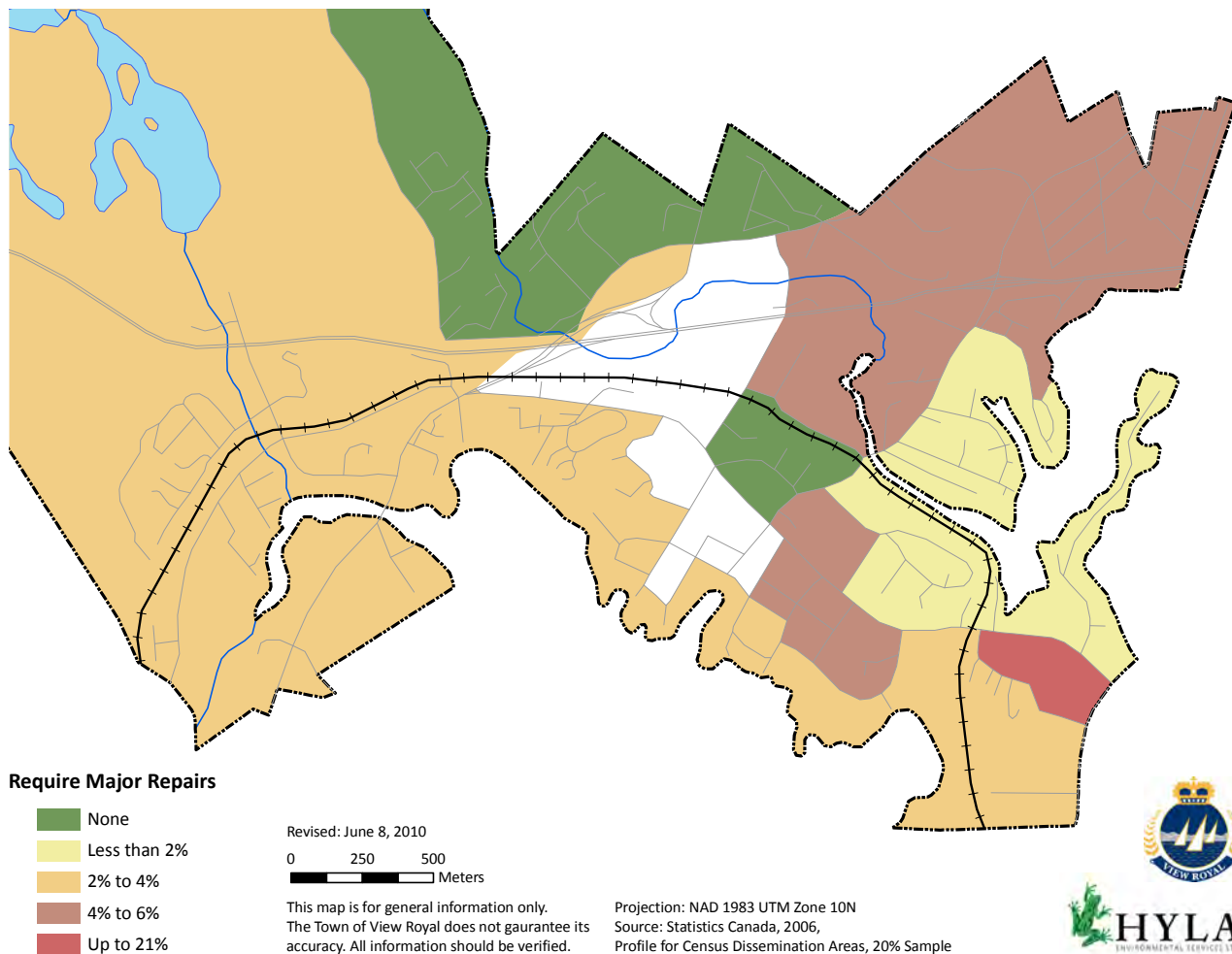
Map 2.2 - Percentage of Buildings in each Age Category

Building Age can influence the effectiveness of initiatives aimed at reducing a neighbourhood's energy use. This figure shows the percentage of buildings built before 1946 (top) and from 1996 to 2006 (bottom) in each census dissemination area in the Town of View Royal. A large proportion of the northwest quadrant of the map is rural area and parkland (see Appendix VI).



Map 2.3 - Building Type

The Town has a wide range of housing types, and each uses energy differently. This figure shows the percentage of each type including single unit (top) and row housing (bottom). A large proportion of the northwest quadrant of the map is rural area and parkland (see Appendix VI).



Map 2.4 - Buildings Requiring Major Repairs

The uptake of initiatives can be affected by the state of building repair. Renovate buildings in need of repair to make them more energy efficient. If buildings are too old or damaged, owners are more likely to tear them down, than invest in energy efficiency upgrades. A large proportion of the northwest quadrant of the map is rural area and parkland (see Appendix VI).

Table 2.5 - GHG Reductions from Solar Hot Water

| Reduction Initiative | Level of Government | Energy Savings (GJ) | Energy Cost Savings | GHG Reductions (t CO ₂ e) |
|----------------------|---------------------------------------|---------------------|---------------------|--------------------------------------|
| Solar Hot Water | Municipality With Financial Resources | 1,832 | \$20,161 | 49 |

Upgrade Appliances to Energy Star

Responsibility: Municipal **Funding:** Provincial/Federal or TBD

Encourage residents to favor energy efficient products and only buy appliances with an Energy Star rating..

Upgrade Insulation

Responsibility: Municipal **Funding:** Provincial/Federal or TBD

Improve home insulation by encouraging residents to use Spray Foam, a type of insulation that protects against drafts and prevents moisture from leaking through walls. Such upgrades also reduce annual heating bills.

Upgrade Windows

Responsibility: Municipal **Funding:** Provincial/Federal or TBD

Energy efficient windows are a worthy investment for home owners. Since 33 percent of heat is lost through single paned windows, installing double paned windows can substantially reduce the cost of heating.

Weatherize Homes by Repairing Leaks and Drafts

Responsibility: Municipal **Funding:** Provincial/Federal or TBD

Simple preventative measures like sealing cracks with caulking and weather stripping can reduce CO₂ leakage into the atmosphere and prevent heat loss from homes, which saves residents on their heating bills.

Install Low Flow Shower Heads & Faucets

Responsibility: Municipal **Funding:** Provincial/Federal or TBD

Low flow shower heads and faucets reduce the use of hot water, and thus decrease energy use and GHG emissions. The City should encourage installation of low flow shower heads/faucets.

Encourage Lowering Building Temperature at Night

Responsibility: Municipal **Funding:** Provincial/Federal or TBD

Lowering building temperature by just a few degrees at night can have a surprisingly large impact on energy use. Digital thermostats automate the process of turning down the thermostat at night (or during hours when no one is using the building). The City should encourage residents to turn down the thermostat at night.

Shorten Showers

Responsibility: Municipal **Funding:** Provincial/Federal or TBD

Heating water requires large amounts of energy, and produces substantial GHG emissions. Reducing the length of showers can help reduce hot water use and thus decrease GHG emissions. Aim for uptake by 30% of households.

Use Cold Water for Washing Clothes

Responsibility: Municipal **Funding:** Provincial/Federal or TBD

Often, it is only necessary to use cold water to wash clothes. Not using hot water saves energy and reduces GHG emissions. Aim for uptake by 30% of households.

Use Energy-Saving Setting to Dry Dishes

Responsibility: Municipal **Funding:** Provincial/Federal or TBD

Producing heat to dry dishes uses a large amount of energy, while air drying requires no additional energy. Energy-saving settings use less or no additional energy to dry dishes. Aim for uptake by 30% of households.

Turn Off Lights When Not in Use

Responsibility: Municipal **Funding:** Provincial/Federal or TBD

Leaving lights on when no one is in the room wastes energy. Promote energy efficiency by having residents shut off lights when they are not in use. Aim for uptake by 30% of households.

Turn Off Electronics When Not in Use

Responsibility: Municipal **Funding:** Provincial/Federal or TBD

Depending on the type, electronic equipment can use a lot of energy when in use. Additionally, even when equipment is not in use, but still plugged in, it can use energy. Encourage residents to turn off their TVs, computers, and other equipment when not in use. Additionally, promote energy efficiency by encouraging people to unplug phone chargers and other adapters when not in use. Aim for uptake by 30% of households.

Get Rid of Second Fridge

Responsibility: Municipal **Funding:** Provincial/Federal or TBD

Fridges, particularly older models, use a lot electricity. The City should encourage households with two fridges to get rid of the older, less efficient model.

For more information, go to BC Hydro's Power Smart website: <http://www.bchydro.com/powersmart/residential.html>

Power Smart For Home



BC Hydro
powersmart



CUT YOUR ENERGY WASTE

We have tips, product discounts and in-depth advice to help you make your home more efficient, reducing energy consumption and your BC Hydro bills.

Also learn how there are now two avenues for further savings, via incentives under the LiveSmart BC home efficiency program and the revived ecoENERGY Retrofit federal program.

New Buildings Targets

There are numerous ways to enhance energy efficiency in new buildings. Table 2.6 summarizes the reductions that may be possible in different housing types. These guidelines cover everything from construction standards, to amenities like bike lockers, to locations such as Brownfield sites.

The province suggests that following targets for new buildings are achievable:

- An EnerGuide rating of 80 for 100 percent of new detached, single-unit and row houses by 2017.
- A 25 percent better energy performance than the Model National Energy Code for all new multi-unit residential buildings by 2017.
- A 25 percent higher energy performance than the Model National Energy Code for all new commercial, institutional and industrial buildings by 2017.

Table 2.6 - Reductions from Achieving CAEE Targets for New Buildings

| Reduction Initiative | Level of Government | Reduction Quantity | |
|---|----------------------------|--------------------|---------------------------------|
| | | Energy (GJ) | GHGs (tonnes CO ₂ e) |
| CAEE targets for new single-unit homes | Municipality, With Support | 3,300 | 124 |
| CAEE targets for new row housing | Municipality, With Support | 1,485 | 56 |
| CAEE targets for new multi-unit homes | Municipality, With Support | 743 | 28 |
| CAEE targets for new commercial buildings | Municipality, With Support | 2,320 | 87 |
| Total reductions from CAEE new buildings | | 7,847 | 294 |

Policies Supporting the Achievement of New Buildings Targets

Energy Efficient Construction

Responsibility: Municipal **Funding:** Provincial/Federal or TBD

The aim of the Energy Efficient Buildings Strategy is to reduce GHGs in Canada. The Strategy sets energy efficient goals and strategies to meet them. Developers should review an energy efficiency guide for ideas like using recyclable materials during construction and installing energy efficient appliances in new buildings.

Electricity and Alternative Energy Division (EAED)

Responsibility: Municipal **Funding:** Provincial/Federal or TBD

The Electricity and Alternative Energy Division (EAED) is responsible for cultivating a sector for environmentally responsible sources of energy. Advise developers to ask the EAED for funding.

R-2000 Standard: Adopt R-2000/Power Smart Performance Standards**Responsibility: Municipal Funding: Provincial/Federal or TBD**

The R-2000 program is a great building strategy for new homes. The program involves features like high performance windows and air filtration systems. It should be promoted for its cost-effectiveness and energy efficiency.

C-2000 Standard: Adopt the C-2000 Building Code for Commercial Buildings**Responsibility: Municipal Funding: Provincial/Federal or TBD**

The C-2000 building code outlines several strategies for reducing energy use. Salvaging, recycling, and reusing construction materials are a few examples. New commercial developments should follow C-2000 standards.

Passive Solar Design**Responsibility: Municipal Funding: Provincial/Federal or TBD**

Passive solar heating heat homes with less energy and do not cost more to install. To support the passive solar design, construct new buildings strategically so they maximize the sun's energy. In existing buildings, preserve their solar access.

Discourage Electric Baseboards**Responsibility: Municipal Funding: Provincial/Federal or TBD**

Electric baseboard heating should be discouraged. Although their installation is initially cheaper than a forced air system they expend more energy and grow costly in the long term.

Natural Resource Canada Renewable Energy Deployment Initiative**Responsibility: Municipal Funding: Municipality through outreach**

NRCan's initiative program promotes renewable alternatives to diesel and gasoline, such as biomass, active solar hot water, and air-heating systems. Take advantage of these operating initiatives.

OCP and Local Government By-laws**Provide Rebates on Building Permit Fees for New Energy Efficient Building****Responsibility: Municipal Municipality loses revenue**

Give rebates on permit fees to all buildings that meet or exceed a certain energy efficiency standard. For added incentive offer varying rebates based on whether buildings meet a "silver" or "gold" standard. The standard could be determined by a sliding scale, or by a minimum requirement.

Provide Rebates on Permit Fees for Renovations that meet the EnerGuide Requirements**Responsibility: Municipal Municipality loses revenue**

Provide rebates to renovation permits that meet EnerGuide's standard for energy efficiency and raise the minimum standard each year.

Community Energy Systems**Responsibility: Municipal Funding: Municipal Outreach**

Community energy systems (CES) supply energy to groups of buildings cheaply and effectively, with energy savings of up to 70 percent. Encourage new buildings to utilize CES whenever possible. We have not included a reduction amount for this initiative because the increment of expected buildings by building form (e.g., single unit, apartment, etc.) is not high enough to warrant a district energy system.

Examine Opportunities for GeoExchange Systems**Responsibility: Municipal Funding: Municipal Outreach**

GeoExchange systems tap into energy from underground, capturing thermal energy by pumping water from a well (open systems) or pumping through a network of pipes (closed systems). Consider GeoExchange energy and possible initiatives that promote the system's use.

Solar Hot Water

Responsibility: Municipal **Funding:** Municipal Outreach

Solar hot water systems should be installed in new buildings. They are gentler on the environment and easily pay for themselves by buffering users from rising energy costs and cutting heating bills by 50 to 80 percent. These systems differ from photovoltaic cells, which generate electricity.

Pre-service for Waste Heat and District Energy Systems

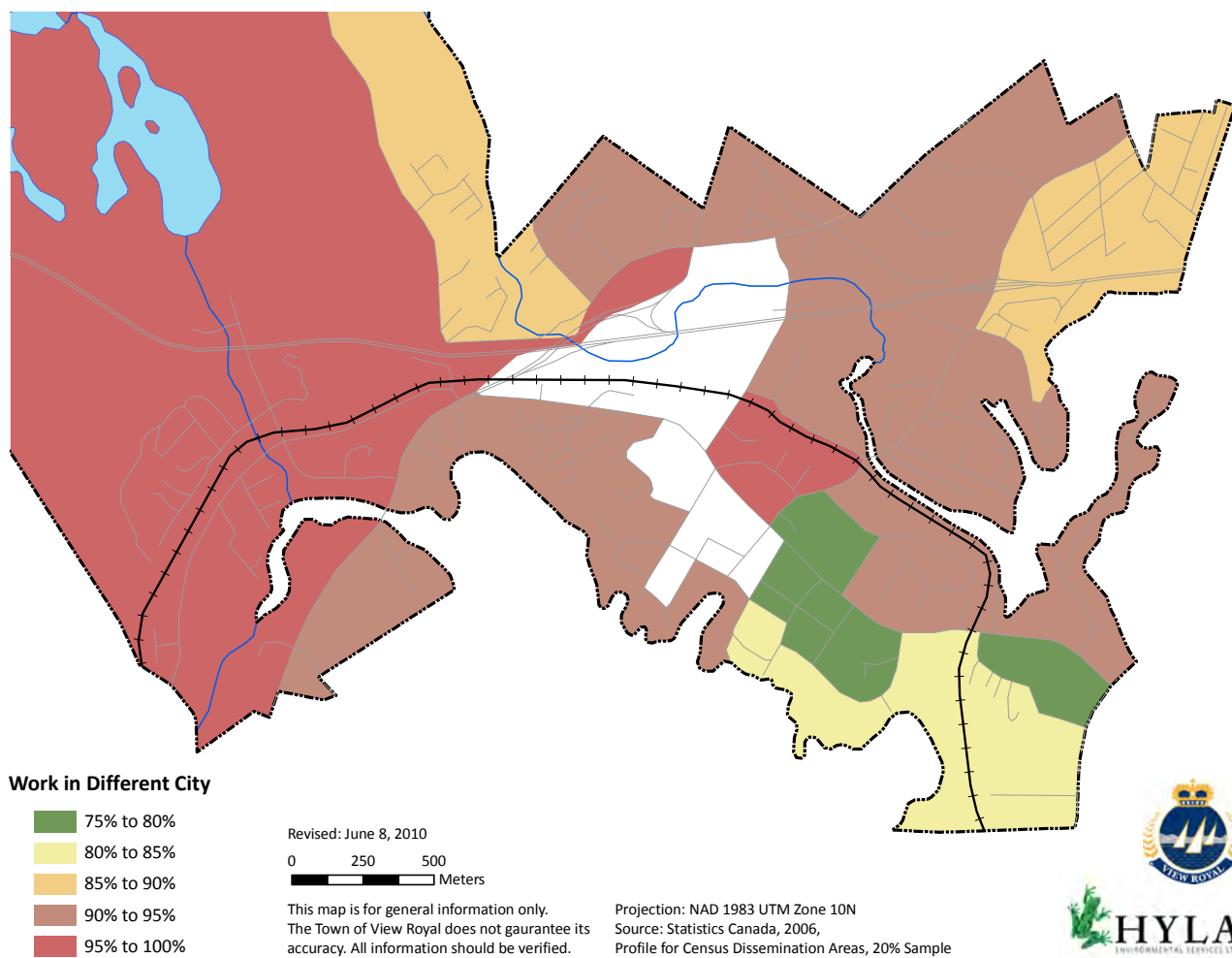
Responsibility: Municipal **Funding:** Municipal Outreach

Instead of spending more on energy, pre-service industrial areas for waste-heat recovery by capturing and re-using rejected heat. For useful ideas on waste-heat recovery consult the Canadian Industry Program for Energy Conservation

Encourage Mixed-use Buildings

Responsibility: Municipal **Funding:** Municipal Outreach

Mixed-use buildings fuse residential and commercial space to great effect, as residents are within walking distance of many services. There are many social and environmental benefits to such communities. They promote compact land use and create jobs close to homes, which leads to fewer commuters (Map 2.5).



Map 2.5 - Percentage Residents Working Outside of View Royal

A good mix of commercial and residential developments reduces VKT, as fewer people must leave their communities to get to work. A large proportion of the northwest quadrant of the map is rural area and parkland (see Appendix VI).

Sustainability Checklist

Responsibility: Municipal **Funding:** Municipal Outreach

Town staff can ensure new developments meet View Royal's standards on the economy, society, and environment by using a sustainability checklist to review building applications.

Maintain Locker/Bike Storage Requirements in New Developments

Responsibility: Municipal **Funding:** Municipal Outreach

New buildings, especially offices and employment centres, should offer facilities for cyclists, like lockers, showers, and secured storage for bikes. Such facilities are even more crucial in developments built near multiple bike routes. Periodically review these facilities to ensure they meet a growing demand. (e.g. provide enough bike lockers).

Encourage New Buildings to Meet LEED™ Standards

Responsibility: Municipal **Funding:** Municipal Outreach

A universal set of design criteria outlined by the LEED (Leadership in Energy and Environmental Design) promotes sustainable building practices by offering standards for several projects and building types, including residential and commercial buildings.

Encourage New Buildings to Meet BuiltGreen Standards

Responsibility: Municipal **Funding:** Municipal Outreach

BuiltGreen is an industry initiative for environmentally friendly building standards in British Columbia and Alberta. BuiltGreen offers certification on various residential buildings, including row and single unit homes and apartment towers.

2.4 Land use and Urban Design

The impact of land use and urban design on community energy use is significant and difficult to quantify. Reduction quantities were not assigned to these initiatives, but do not discount them - urban design and land use have long lasting implications. Altering a city's structure is expensive, it is not easy to alter roads and buildings once they are built.

The land use initiatives in this section enable initiatives in the community buildings and community transportation sections. Thus ignoring advice on land use could put the success of other initiatives at risk.

GHG emissions should be considered in the plans for future land use. View Royal should continue to mix commercial and residential units, increase densities, and ensure developments are built to facilitate cycling, walking, and transit use.

The style of land use can affect both the buildings and transportation sections. Avoid zoning for residential and commercial areas far from each other, or supporting large retail outlets centered around parking lots. Instead, a mixture of residential, commercial, and employment areas centered along transit routes with infrastructure for cyclists and pedestrians would reduce energy consumption from buildings and transportation. A good urban design links energy efficient neighbourhoods with environmentally friendly transport.

2.4.1 Local Government Policy and Programs

Increase Density – Intensify

View Royal's population density varies considerably by area (Map 2.6). To conserve and protect land, house more people on less property and incorporate transit and pedestrian friendly structures in the design. Apart from high-rises, single family neighbourhood intensification (e.g. secondary suites) helps accommodate a growing population. This is not to say that all single-family homes should have secondary suites, but that higher densities in these areas form part of the Town's long range plans. In areas that will not be serviced by public transit in the short term, intensification should be avoided. Requirements for better transit and non-auto transportation infrastructure would then be developed before intensification could be considered.

Concentrate High Density and Commercial Areas on Major Transit Routes

More people drive when they do not live near transit routes. Build high-density developments near busy transit routes to lessen the dependence on use of private vehicles. Further utilize a transit-oriented design by placing commercial buildings along major transit routes and avoiding areas poorly served by transit.

Decrease Distance to Commercial Locations

Encourage commercial development near populated areas and public transit and avoid zoning large residential areas that lack commercial established that are most frequently visited by residents.

Most residents of View Royal are within walking distance of commercial areas (Map 2.7). However, residences in the northwest part of Town are far from commercial areas. Although not necessarily achievable, the ideal configuration is a commercial area within 10 minute's walk of any part of the Town. This will lower vehicle dependence, traffic congestion, and associated CO₂ emissions. The Town should continue to support commercial services in the northwest part of View Royal (e.g. grocery stores, food and retail services).

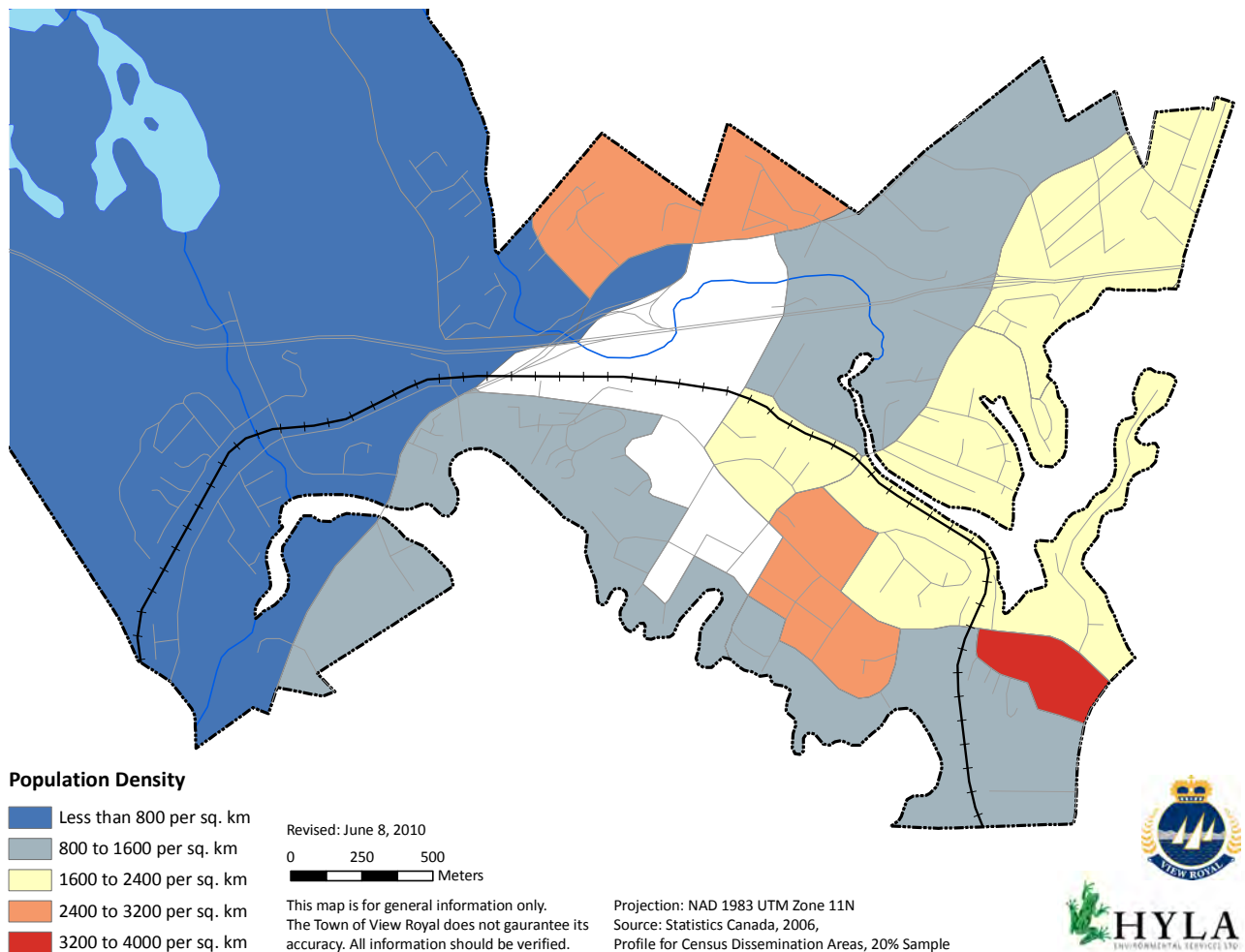
Decrease Distance Between Residential and Employment Areas

Develop commercial, residential, and employment centres within a maximum allowable distance from each other. Consider adding new land uses to large residential-only zones in built up areas before major re-development. Residents should be able to access employment and commercial areas without vehicles.

Try not to build large industrial parks and employment areas far from high frequency transit routes. Instead, develop employment, residential, and commercial centres in the same area. Also construct mixed-use buildings along transit routes.

Encourage Mixed Use Neighbourhoods

Mixed-use developments offer both residential and commercial space. This benefits the environment as residents can often walk, bus, or bike to nearby services. Since stores are so close to home they drive less and rely more on other modes of transport. This leads to improved transit services and less traffic congestion. Additionally, mixed-use neighbourhoods usually foster strong communities.



Map 2.6 - Population Density in View Royal

Population density can have a substantial impact on per capita energy use. Multi-unit buildings typically have higher energy efficiency than detached homes due to smaller unit sizes and shared walls and ceilings. Additionally higher density housing supports better transit service, providing a better alternative to private vehicles as well as encourages mixed use development. A large proportion of the northwest quadrant of the map is rural area and parkland (see Appendix VI).

Encourage Neighbourhood Commercial

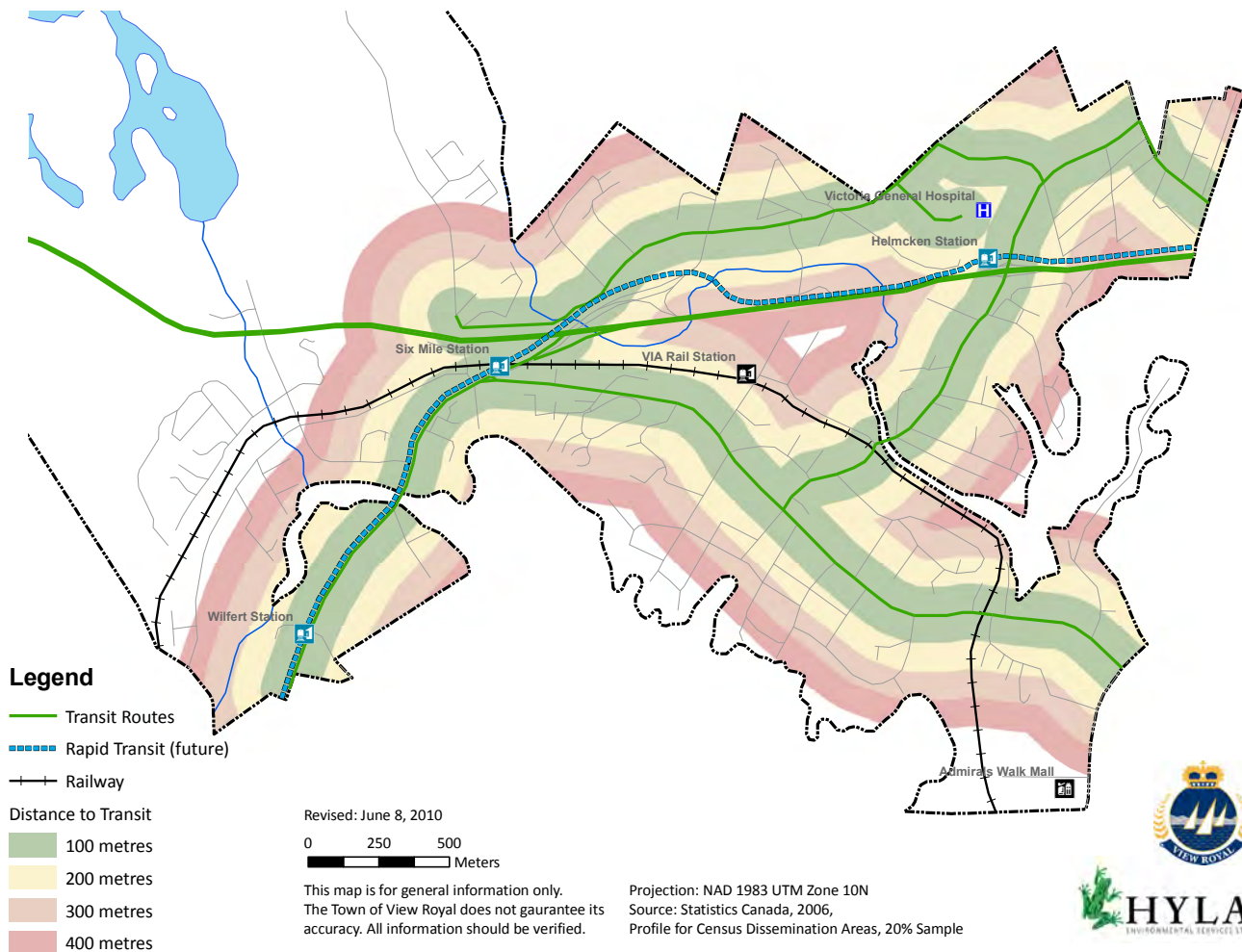
Small-scale retail outlets, such as corner stores or coffee shops, can be included in multi-unit buildings with residential units above. The convenience of neighbourhood commercial developments is essential for lowering private vehicle use, as residents can run errands by foot (Figure 2.2). Neighbourhood commercial buildings also support transit use by enabling transit users to stop at a neighbourhood store on the way home from a bus stop or transit station.

Neighbourhood commercial zoning should be considered in all parts of the Town that are not already within a 5 to 10 minute walk of a pedestrian friendly commercial area, particularly in locations near a bus route.



Figure 2.2 - Neighbourhood Commercial

An example of a neighbourhood commercial store in North Vancouver. Encouraging the development of small commercial facilities in areas that aren't in walking distance of commercial facilities can help decrease the number and distance of vehicle trips.



Map 2.7 - Distance to Commercial Areas

Ensure most areas of the Town are within walking distance of commercial areas, to discourage the use of private vehicles. The map above highlights locations within 400 to 1000 metres of a commercial area. A large proportion of the northwest quadrant of the map is rural area and parkland (see Appendix VI).

Encourage Pedestrian Centered and Transit Oriented Design

New commercial buildings should not be centered on large parking lots. Instead, align these buildings along transit routes, with easy pedestrian access to transit shelters (Figure 2.3). Metred on-street parking allows drivers access without encouraging vehicle use and also creates a buffer between pedestrians and traffic. In residential areas (especially near transit stops) provide pedestrian walkways, crosswalks, and other traffic calming measures.



Figure 2.3 - Pedestrian Friendly and Non Pedestrian Friendly Development Styles

Local examples of a pedestrian oriented development (top) and an automobile oriented development (bottom). Pedestrian friendly developments encourage alternative modes of transportation by fusing residential and commercial units in the same area and featuring infrastructure designed for transit users, cyclists, and pedestrians (note the wide sidewalk, transit shelter, and nearby bike route). Automobile oriented development is unpleasant and even dangerous for pedestrians, cyclists and transit users, and typically leads to higher automobile use and associated GHG emissions.

2.5 Community Transportation

Community on road transportation was the source of the majority of the community's 2007 GHG emissions and the quantity is expected to grow significantly even with current legislation (see "1.3.2 Forecast of Community On-road Transportation Energy and GHG Emissions" on page 18). If major reductions are achieved in the transportation sector, the Town's target is more likely to be achieved.

Transportation initiatives can only occur through collaboration with all levels of government. Areas where the Town has greatest control are reducing VKT through urban design and working with senior government to improve transit and alternative transportation options. Reducing average vehicle fuel consumption rates will result in significant GHG emissions reductions.

The most significant reductions to transportation GHG emissions will be through senior government regulation of fuel consumption rates and GHG emissions standards. Canada's implementation of both the California Tailpipe Standard and the Pavely II Tailpipe Emissions Standard were discussed in section 1 and form part of the forecast of emissions. Both initiatives rely heavily on vehicle replacement and the Town can only encourage its residents and businesses to replace aging vehicles to take advantage of lower fuel consumption rates in new vehicles.

Table 2.7 provides a list of reduction initiatives with an estimate of potential reductions. Table 2.8 summarizes the Total GHG emissions reductions for on road transportation.

Table 2.7 - Summary of On Road Transportation GHG Reduction Initiatives

| Reduction Initiative | Level of Government | Reductions |
|---|--|---------------------------|
| | | GHG (t CO ₂ e) |
| Decrease Overall Vehicle Fuel Consumption Rates | Senior Government plus 'encouragement' from View Royal | 987 |
| VKT Reductions | Shared | 912 |
| Increase Transit Ridership | Shared | 2,231 |
| TOTAL | | 4,130 |

Table 2.8 - Potential On Road Transportation GHG Emissions Reductions

| Sector | Base Year Emissions | 2017 Emissions | Potential Reduction | Percent Reduction |
|------------------------|---------------------|----------------|---------------------|-------------------|
| | t CO ₂ e | | t CO ₂ e | 2007-2017 |
| On Road Transportation | 22,119 | 24,909 | 4,130 | -14% |

2.5.1 Local Government Policy and Programs

Decrease Overall Vehicle Fuel Consumption Rates

The tailpipe standards have not been double counted in this section, rather, the small reduction included in replacement of older vehicles is a modest estimate of what may occur if the Town encourages new vehicle purchases. Table 2.9 summarizes the estimated reductions for the reduction initiatives that follow.

Right Sizing Vehicles

Responsibility: Municipal Funding: Municipal Outreach

The Town should encourage people to buy vehicles that meet transportation needs and that have a lower fuel consumption rate. The Town should consider setting an objective to reduce average fuel consumption rate of vehicles by a given amount. For commuter vehicles, excellent, real world fuel consumption rates range between 6 L/100km to 8 L/100km. Note that plug-in electric vehicles will have a net zero GHG emissions footprint if energy and emissions to construct these vehicles is not included as a life cycle GHG emissions cost (e.g., in any vehicles life cycle, there are GHG emissions produced from research and development, production, marketing, and distribution).

Table 2.9 - Decreasing Overall Vehicle Fuel Consumption Rates

| Reduction Initiative | Level of Government | Reduction Quantity GHGs (tonnes CO ₂ e) |
|-----------------------|---------------------|--|
| Right Sizing Vehicles | Municipal | 987 |

Reduce Vehicles Kilometres Travelled (VKT)

Private automobiles are the Town's single largest source of GHG emissions. Lowering the use of private single occupant vehicles can drastically reduce GHG emissions from transportation. This section outlines initiatives for reducing the number and distance of single occupant trips. Initiatives that encourage people to cycle, walk or use public transit are covered in separate sections. This section features ways to reduce VKT. The estimate of the total GHG emission reductions from initiatives that reduce VKT are summarized in Table 2.10.

Active Transportation to and from Schools

Responsibility: Municipal Funding: Municipal Outreach

Promote school programs that facilitate children walking or biking instead of being driven to school. Also consider the related safety and infrastructure issues. This program is offered by the Insurance Corporation of BC, although is included in this section because the Town may influence this initiative in its schools.

Promote Car Free Days

Responsibility: Municipal Funding: Municipal Outreach

Promote car free days and similar initiatives like corporate bike and walk to work programs. Car free days help educate people about alternative transportation options while showing them first hand the benefits of less traffic.

Co-Operative Auto Networks

Responsibility: Municipal Funding: Municipal Outreach

Encourage people to join co-operative auto networks. Members pay a small monthly fee to borrow a range of vehicles stashed in various locations around the Town. Vehicles include everything from mini-vans to pick-up trucks. View Royal is not currently served by any car-sharing companies.

Shared Parking

Responsibility: Municipal **Funding:** Municipal Outreach

Put restrictions on available parking by lowering the minimum requirement to one space per unit in all new developments.

Un-hide the Costs of Parking to Reduce Private Vehicle Use

Responsibility: Municipal **Funding:** Municipal

Initiatives that draw people’s attention to their driving habits can help to lower private vehicle use, as they consider alternative forms of transportation. One option is to put parking costs on display instead of hiding them. For example, in new residential buildings parking spaces could be sold individually rather than lumped with the unit’s price. Examine other areas where the cost of providing parking is hidden (e.g. providing free parking on Town lots) and instead charge for parking directly.

Develop and Implement a Transportation Demand Management Plan

Responsibility: Municipal **Funding:** Shared

Develop a Transportation Demand Management Plan. Such a plan would make people aware of their driving habits and push them to consider more environmentally friendly options like cycling, carpooling, or taking transit to work.

Table 2.10 - Reductions from Decreasing VKT

| Reduction Initiative | Level of Government | Reduction Quantity GHGs (tonnes CO ₂ e) |
|----------------------|----------------------|--|
| VKT Reduction | Municipal Government | 912 |

Increase the Use of Public Transit

Compared to single occupant vehicles, public transit emits far fewer emissions per capita. Public transit agencies are considering options like hybrid buses, electric buses, rapid transit, and alternative fuel buses, all of which would drastically cut transit emissions to almost zero. Public transport also reduces traffic congestion, improves air quality, and allows for more compact development.

The level of public transit service and associated ridership varies by region (Map 2.8). All urban areas are well served by BC Transit buses, with bus stops within 400 metres from almost any place in the Town (Map 2.9). However, the level of transit service varies. In some areas, transit runs about 20 hours per day, mostly at 15 minutes headway. Community shuttle routes are less frequent, running about 14 hours a day (excluding Sundays) at 30 - 60 minutes headway. More people would use public transit if the service in certain areas was improved and neighboring communities had better connections running between them.

The reduction initiatives that follow offer various ways for the Town to raise public transit use and lower GHG emissions. Table 2.11 on page 46 summarizes the total reductions estimated from increasing the use of public transit.

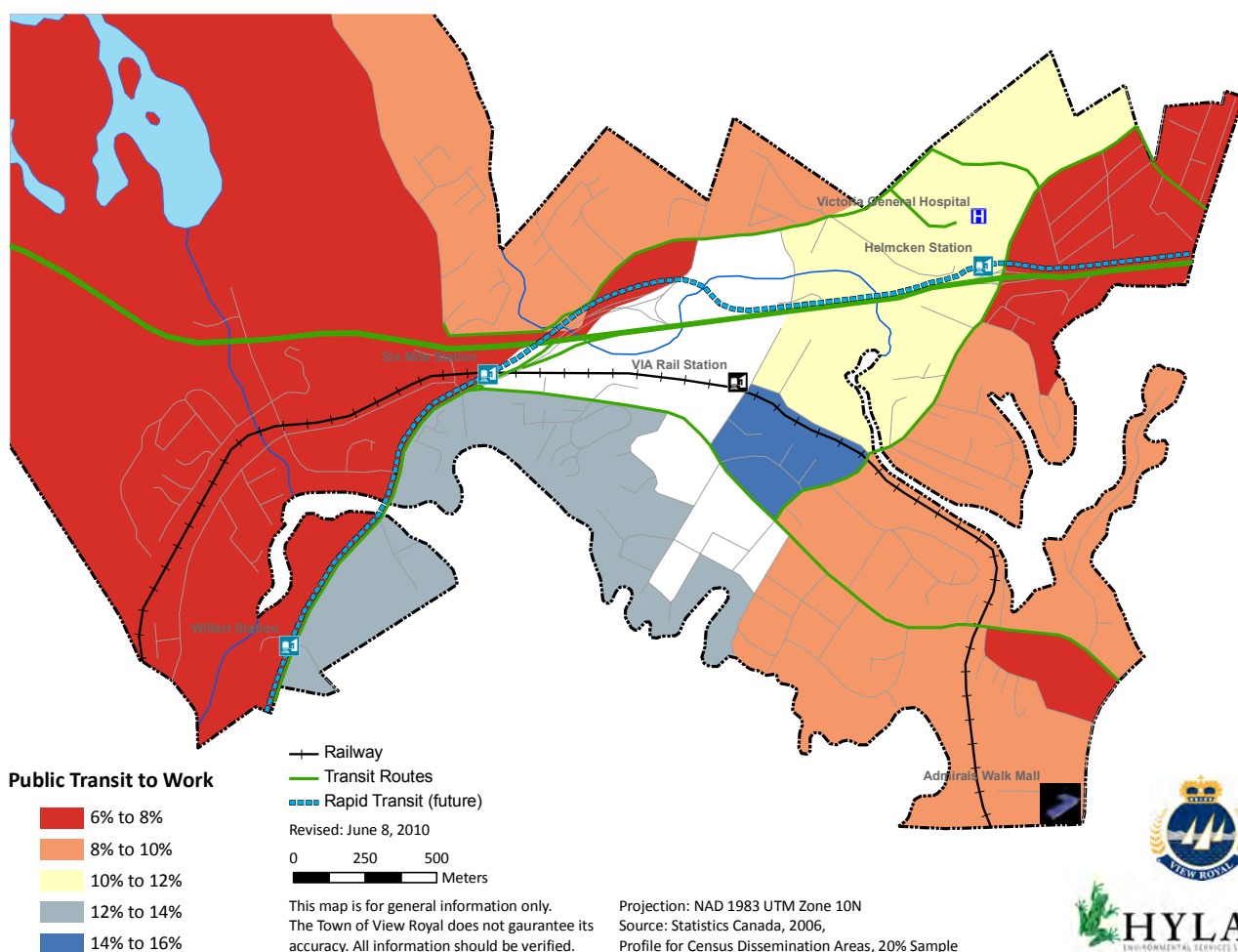


Figure 2.4 - Transit Shelter near Trans Canada Highway
BC Transit provides local and express transit service through View Royal. Ensuring that high quality, accessible transit shelters are located along transit routes can help increase ridership.



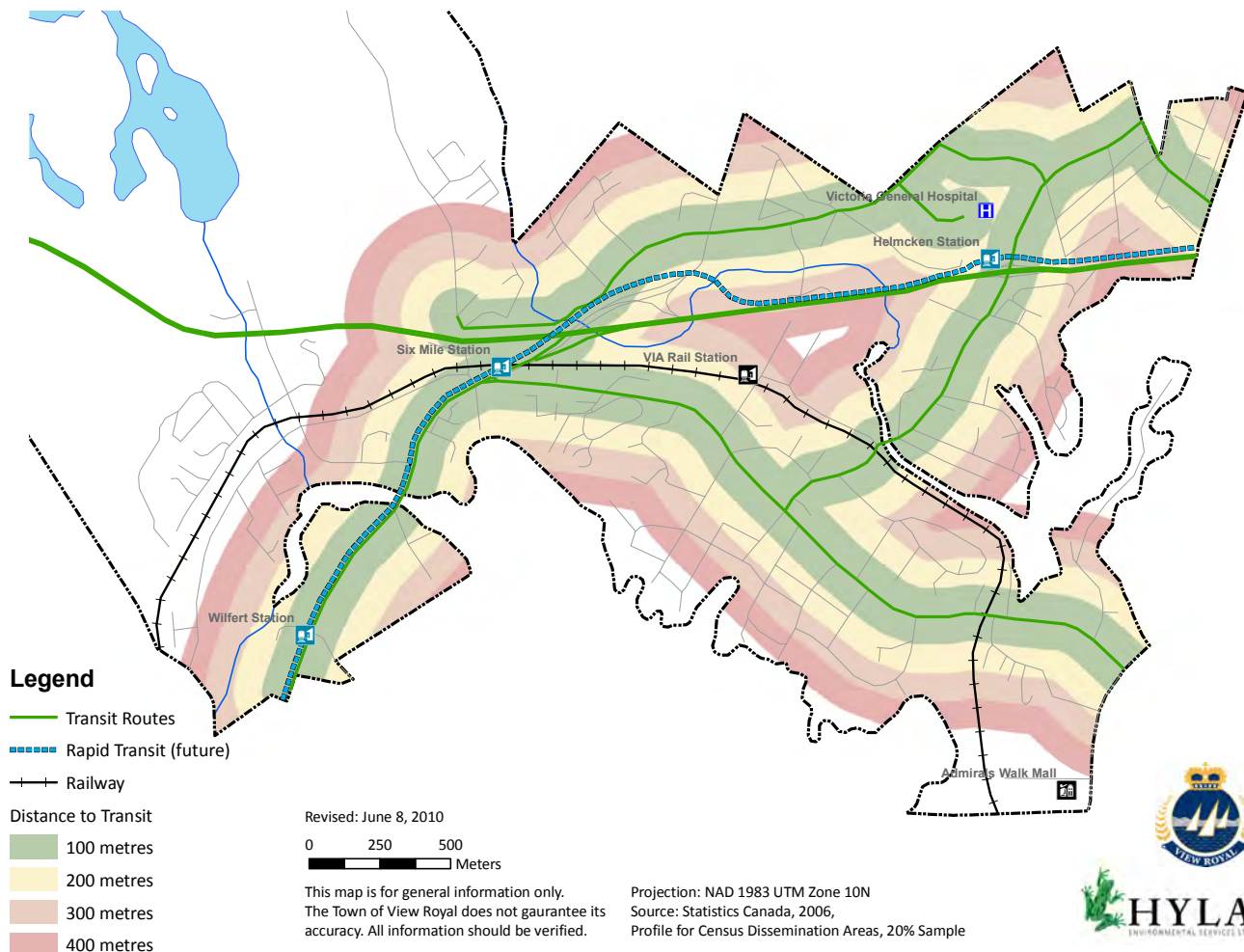
Figure 2.5 - BC Transit buses in View Royal

New BC Transit buses (above) will replace inefficient, high floor buses (below) in Greater Victoria. BC Transit is upgrading its fleet in Greater Victoria with more energy efficient, comfortable and accessible buses. Increasing public transit service can help decrease the use of private vehicles and thus lower GHG emissions.



Map 2.8 - Percentage of People Who Commute to Work by Public Transit

Public transit produces substantially fewer emissions per user than private vehicles. The level of public transit service and the associated ridership varies greatly by community region. This map displays the percentage of people, for each census dissemination area, who use public transit to get to work. View Royal's western region has lower transit ridership, and higher private automobile usage. A large proportion of the northwest quadrant of the map is rural area and parkland (see Appendix VI).



Map 2.9 - Distance to Public Transit

Shorter walking distances to public transit can lower private vehicle use. The above map shows areas within 100 to 400 metres of a transit route. Overall, most parts of the Town are near transit services. Note this is a basic analysis using “as the crow flies” distance, a more detailed analysis would use actual walking distance. A large proportion of the northwest quadrant of the map is rural area and parkland (see Appendix VI).

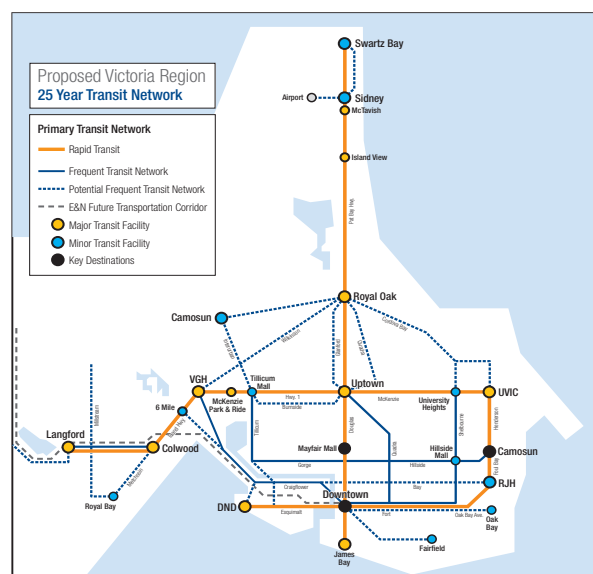


Figure 2.6 - Future Greater Victoria Rapid Transit Network

Rapid transit greatly increases transit use and decreases private vehicle use and associated greenhouse gas emissions. As the network grows, it becomes exponentially more useful as users can reach an increasing number of destinations easily. The Town should support aggressive expansion of the rapid transit network in Greater Victoria, as well as the use of the E & N transportation corridor for passenger rail service

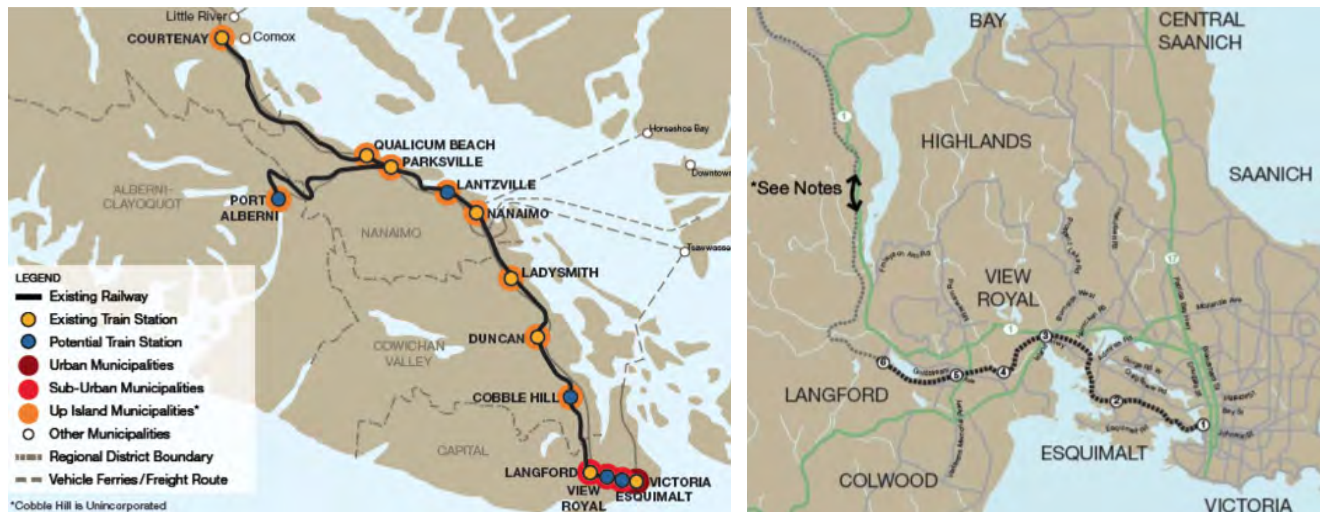


Figure 2.7 - Potential Passenger Service Expansion on the E & N Railway

The B.C. Ministry of Transportation and Infrastructure funded a study by the IBI Group to examine the future of the E & N Railway, which runs through View Royal. The line's maintenance will continue, with modest expansion of passenger service. If population density along the line continues to increase (along with rising demand for freight traffic) railway upgrades could allow for more frequent passenger service to Up Island, as well the introduction of commuter rail service to downtown Victoria. The Town of View Royal should continue to lobby for improvements to the rail line to provide residents with an alternative to private vehicles. A large proportion of the northwest quadrant of the map is rural area and parkland (see Appendix VI).

Encourage New Buildings to Feature Public Transit More Prominently

Responsibility: Municipal **Funding:** Municipal

Developers should consider including public transit features in their building design. For example, design the main entrance of a building to face a road served by public transit or build a quality transit shelter during the building's construction.

Public Transportation Shelters

Responsibility: Municipal **Funding:** Municipal

Encourage transit use in the community by constructing nice facilities for pedestrians and transit users. Well-lit shelters with level pavement, adequate space for wheelchairs, and simple route information are ideal.

Public Transport Vouchers

Responsibility: Municipal **Funding:** Municipal

Large companies can promote transit use by giving employees monthly bus passes or a cash allowance intended for transit. A highly successful program in Washington reduced daily driving trips by 22,221 over 3 years. Such programs are more effective in large companies, but smaller companies could promote alternative transportation by working together to develop their own incentives.

Employers in View Royal should be made aware of the BC Transit employer program. For municipal employees consider implementing a public transit voucher program, which would reduce GHG emissions and serve as an example for local businesses.

Identify Grants for Transit Improvement Projects

Responsibility: Municipal **Funding:** Municipal

Look into provincial and federal grants to fund projects that improve public transportation. Projects include upgrades to bus shelters.

BC Transit is responsible for large transit improvement projects. Thus View Royal and BC Transit should together lobby senior governments for project funding.

Construct Transit Priority Lanes

Responsibility: Municipal **Funding:** Municipal

Investigate opportunities to construct transit priority lanes (or H.O.V.) lanes and other preferential traffic rules (e.g. transit signals at intersections), especially where a transit route is located on a congested roadway. Investigate other ways the Town can increase transit priority such as installing “bus bulges” in locations where it is difficult for transit buses to pull into traffic.

Develop and Maintain a Comprehensive Transit Plan

Responsibility: Municipal **Funding:** Municipal

Collaborate with BC Transit, nearby municipalities, and the community to create a Town transit plan that outlines ways of making public transit more attractive and reliable for the community.

Ensure transit is explicitly incorporated in long range planning (e.g. identify corridors for long term transit expansion). Work with the community to distinguish areas with poor transit access and indicate them when BC Transit is identifying areas for transit improvements.

Support Transit Expansion Projects

Responsibility: Municipal **Funding:** Municipal

Support senior government efforts to expand regional public transportation networks and lobby for increased transit service in the Town. Prioritize public transit improvement over road expansion (e.g. use more transportation funding on public transportation projects). Also, consider extending the hours, routes, and frequency of transit service.

Table 2.11 - Reductions from Increased Transit Ridership

| Reduction Initiative | Level of Government | Reduction Quantity GHGs (tonnes CO ₂ e) |
|----------------------------|---------------------|--|
| Increase Transit Ridership | Shared | 997 |

Encourage Cycling and Walking

Cycling and walking are transportation options with no emissions. The percentage of people who walk or cycle in View Royal varies by area (Map 2.10 on page 47). The maps are based on data from the 2006 census, prior to some cycling infrastructure improvements. Any increase in the proportion of residents walking or cycling will be reflected in the 2011 census. Continued investment in cycling infrastructure may encourage previous auto-users to walk or cycle more often, leading to substantial emissions reductions. Upgrades to infrastructure make public transit more accessible, helping those that would not walk or cycle for their entire journey. Promoting walking and cycling has other benefits, like easing traffic, lowering air pollution, improving public health and developing more livable communities.

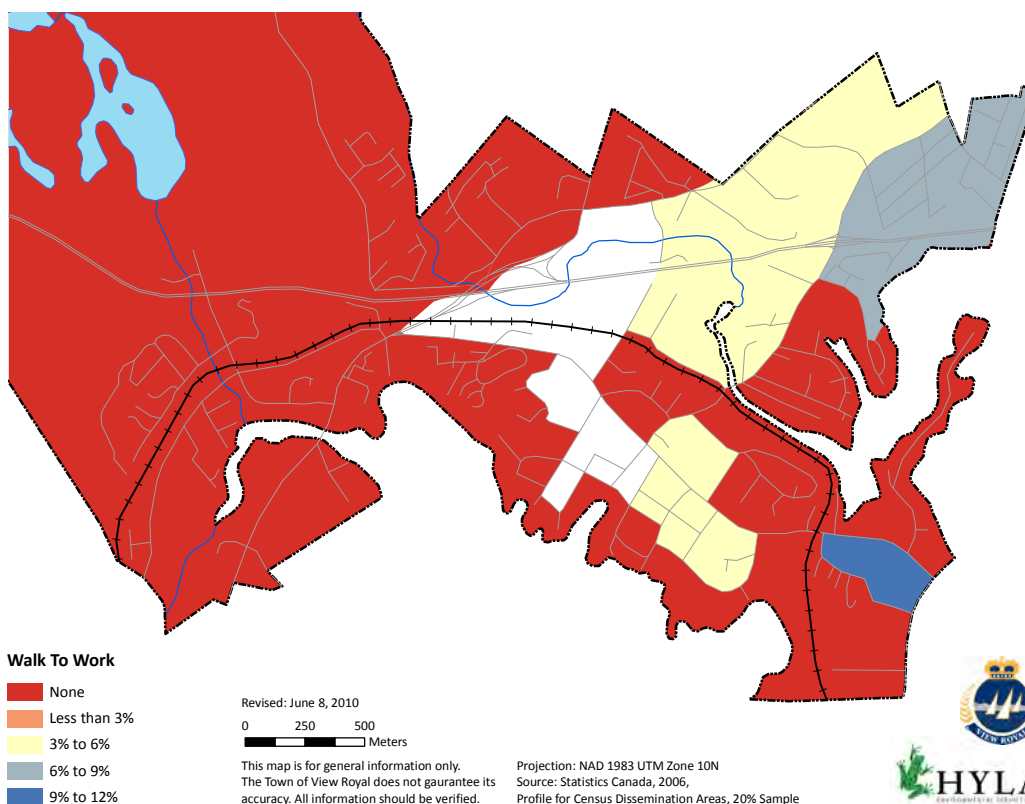
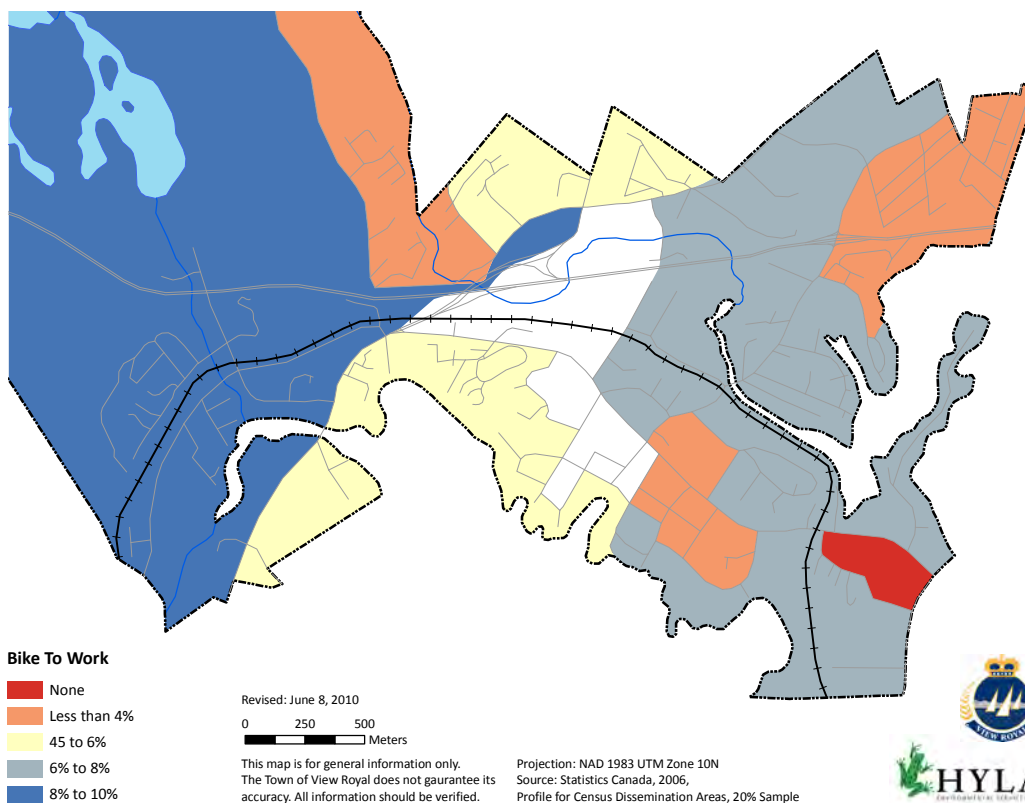
Encourage Enhancement of Pedestrian and Cycling facilities

Responsibility: Municipal **Funding:** Municipal

Traffic calming and interconnected streets are examples of multi-modal street designs. A third example, narrow road intersections, reduce the length of crosswalks and encourage active transportation. Traffic calming projects have successfully reduced vehicle speed, traffic, and accidents. To entice people into walking, design a green-space buffer be-



Figure 2.8 - Pedestrian and Cyclist Route in View Royal
Creating “shortcuts” and dedicated trails for pedestrians and cyclists can help make it more convenient to walk or cycle.



Map 2.10 - Percentage of People Who Cycle and Walk to Work

Cycling and walking are two of the best ways to get around without using fossil fuels. The top map show the percentage of people in each census dissemination area who primarily bike to work and the bottom map shows the percentage of people who primarily walk to work. A large proportion of the northwest quadrant of the map is rural area and parkland (see Appendix VI).

tween pedestrians and roadways. Also consider building car-free areas in new developments. These initiatives require planners, engineers and community residents to work collaboratively.

Road networks with many cul-de-sacs, and winding “no-through” roads that lack pathways for pedestrians and cyclists almost always result in drastically higher personal vehicle use relative to areas with interconnected street networks. The fractured nature of View Royal’s street design around the highways and railway tracks does not encourage pedestrian and cycling use. In some cases the distance pedestrians must walk is ten times what it could be if there was a pedestrian pathway. Not only do breaks in the road network force pedestrians on to long detours, but they also prevent cyclists from using parallel streets as alternative routes to major roadways.

Retrofitting existing areas is extremely difficult. However, there are ways to gradually add pedestrian and cyclist infrastructure. For example, in new developments, require easements for a pedestrian path, such as when higher density buildings replace single-family homes. This creates corridors that enable neighbourhood streets to be used as bike routes. Also, adding crosswalks and curb extensions at major roads can help for easier movement along neighbourhood streets. Make pedestrian routes more attractive by establishing on-street parking or a row of trees to buffer sidewalks from major roadways.

Improve Cycling Infrastructure

Responsibility: Municipal **Funding:** Municipal

Invest in bike racks, lanes and signals, and optical recognition of bikes at left turn lanes. Traffic calming and interconnected streets would further improve cycling and pedestrian conditions. Seek opportunities for bike lane and bike parking expansion, and for building more off-street bicycle routes (Figure 2.9).



Figure 2.9 - Cycling Infrastructure

Above is a bike route in View Royal. Such infrastructure makes it safer and more enjoyable for residents to cycle, which reduces vehicle use and associated GHGs.

The Town should continue to increase the number of bike racks and install bike lockers in new locations. Ensuring there is a location for cyclists to lock-up their bikes at all major destinations can help to encourage more people to cycle. Additionally, the Town should continue its aggressive expansion of cycling projects to continue to draw more people to cycle. Improving safety and ease of access to commercial areas of the Town, especially Admirals Walk and the future Town Centre and neighbourhood nodes are important goals for the future.

Develop and Maintain a Comprehensive Non-Auto Transportation Plan

Responsibility: Municipal **Funding:** Municipal

Collaborate with the regional district and nearby municipalities to develop a non-auto transportation plan. The plan should have maps with walking and biking routes to busy Town centres alongside suggestions on how to make these routes more safe and reliable.

Work with neighbouring municipalities to establish safe and easy cycling and walking routes from View Royal to nearby municipalities. Ideally these routes should be non-auto transportation corridors supported by new development and infrastructure projects.

Support Cycling and Pedestrian Projects

Responsibility: Municipal **Funding:** Municipal

Promote better cycling and pedestrian infrastructure by lobbying for more funding and advocating for their inclusion in regional transportation plans.

Ensure cyclists and pedestrians are considered during the planning stages of senior government projects. Lobby for these projects to contain funding for cycling and pedestrian infrastructure and ensure that new projects to not impede the flow of cyclists or pedestrians.

Identify Grants for Non-auto Transportation Projects

Responsibility: Municipal **Funding:** Municipal

Begin a fund for non-auto transportation projects. Consider provincial and federal government grants for cycling infrastructure and pedestrian improvement projects like constructing new sidewalks and bicycle lanes.

View Royal should employ provincial funding for constructing sidewalks, and federal and provincial economic stimulus funding for expanding cycling routes and building sidewalks in areas that lack them.

2.5.2 New Technology

Public Transit

Investigate Transit Priority Technologies

Responsibility: Municipal **Funding:** Municipal

Consider installing transit priority technologies at traffic signals of major transit routes. These signals allow transit vehicles to lengthen green lights or shorten red lights. Work with BC Transit to identify areas in View Royal that might benefit from such technology.

Work with BC Transit to Implement Real-time Transit Technologies

Responsibility: Municipal **Funding:** Municipal

Real-time transit technologies, such as the NextBus system being tested by BC Transit provide transit users with real-time information on when the next bus will arrive through the use of a display located at major transit stops. Investigate the potential for installing such a system at major bus stops within the Town. Additionally, the Town should work with BC Transit to improve route information for View Royal in Google Transit (e.g. add transit routes, not just stops).

Private Vehicles

Plug-in Electric Vehicles

Responsibility: Municipal **Funding:** Municipal

The complete development of the electric plug-in vehicle will see a great reduction in GHG emissions, but developers require 3-5 years before these vehicles will be ready for the mainstream market.

2.6 Solid Waste

2.6.1 Local Government Policy and Programs

Waste Reduction Programs

New Waste Collection Policy

Responsibility: Municipal **Funding:** Municipal

Adopt a new waste collection policy that reduces the amount of garbage entering the landfill. This policy could require single-stream recycling or greater recycling bin capacity (Table 2.12). See Appendix II for the Town's current waste pickup program.

Table 2.12 - Reductions from Solid Waste Diversion Rate Increase

| Reduction Initiative | Level of Government | Reduction Quantity GHGs (tonnes CO ₂ e) |
|-------------------------------------|---------------------|---|
| Increase Solid Waste Diversion Rate | Shared | 262 |

2.7 Community Reductions Summary

2.7.1 Reduction Initiatives

Table 2.13 summarizes the quantifiable community reduction initiatives along with the level of government responsible for each. If all reduction initiatives are implemented View Royal can reduce its 2017 forecast emissions quantity by 4,400 tonnes of CO₂e.

Table 2.13 - Community Reduction Initiatives Summary

| Sector | Reduction Initiative | Level of Government | Reduction Quantity | | Implementation | | |
|------------------------|---|--|----------------------------|-----------------------------|----------------|------------------------|----------|
| | | | GHGs (t CO ₂ e) | Percent of Total Reductions | Cost | Level of Effectiveness | Priority |
| Buildings | New Buildings Targets ¹ | Municipal with Financial Resources | 294 | 8% | L | H | 1 |
| | EnerGuide Rating in Multiple Listing Service (MLS) Advertising | Senior Government | 46 | 1% | L | L | 3 |
| | Existing Buildings Targets ¹ | Municipal with Financial Resources | 242 | 7% | L | L | 4 |
| | Solar Hot Water | Municipal with Financial Resources | 49 | 1% | M | L | 5 |
| Subtotal | | | 631 | | | | |
| On Road Transportation | Decrease Overall Fuel Consumption Rates (includes Paveley II Tailpipe Standard) | Senior Government plus 'encouragement' from View Royal | 987 | 26% | L | H | 1 |
| | VKT Reductions | Shared | 912 | 24% | H | H | 2 |
| | Increase Transit Ridership | Shared | 977 | 26% | H | H | 2 |
| Subtotal | | | 3,507 | | | | |
| Solid Waste | CRD Plan Targets | Shared | 262 | 7% | H | H | 1 |
| Subtotal | | | 262 | | | | |
| Total | | | 4,400 | 100% | | | |

¹ Based on Community Action on Energy and Emissions (CAEE; Provincial Energy, Mines and Petroleum Resources)

Level of Effectiveness: H = High (3% or greater, except when noted); M = Moderate 2%; L = Low (1% or less); U = Unknown

Cost: H = \$100,000's; M = \$10,000's; L = \$1,000's; U = Unknown; N/A = None (senior government)

NOTE: Priority 1 is assigned to initiatives with low costs and high effectiveness whereas lower priorities are assigned to initiatives with higher costs and less effectiveness. Where costs are incurred by senior government (e.g., transit improvements), and the effectiveness is high, higher priority has been assigned.

2.7.2 Reduction Target

The reduction target is calculated from the percent difference total of emissions in 2017 after all the initiatives have been applied and the 2007 base year emissions quantity. Table 2.14 offers a breakdown of the community reduction target by sector. The overall community reduction target is to reduce emissions by 12 percent below 2007 levels by 2017.

Table 2.14 - Community Reduction Target Summary

| Sector | Base Year Emissions | Projected GHG Emissions with Legislation | Potential GHG Emission Reductions | GHG Emissions After Plan Implementation | Percent Reduction of Projected Emissions |
|------------------------|--------------------------|--|-----------------------------------|---|--|
| | Tonnes CO ₂ e | | | | |
| | 2007 | 2017 | | | |
| Residential Buildings | 3,860 | 3,670 | 631 | 3,039 | -21% |
| Commercial Buildings | 5,986 | 5,518 | | 5,518 | -8% |
| On Road Transportation | 22,119 | 23,216 | 3,507 | 19,086 | -14% |
| Solid Waste | 349 | 349 | 262 | 87 | -75.0% |
| Total | 32,314 | 32,753 | 4,400 | 28,353 | -12% |

3 Implementation, Monitoring & Reporting, and Resources

3.1 Implementation

An implementation matrix is presented below (Table 3.1) with suggested actions for broad groups of reduction initiatives. These reduction initiatives are summarized in the Reduction Initiatives Section.

Table 3.1 - Implementation

| Reduction Category | Reduction Subcategory | Recommendation | Action | Priority | Resources Required | Year |
|---|--|---|--|----------|---|-----------------------------|
| Community Buildings – Senior Government Policy and Programs – Federal Government | EnerGuide rating in Multiple Listing Service (MLS) Advertising | The Town is participating in the CRD's pilot to encourage EnerGuide ratings in MLS property listings. | | 1 | N/A | Make public aware of audits |
| Community Buildings – Local Government Policy and Programs – Existing Buildings Targets | Improvements to Management and Operations Practices | Promote changes to the management and operations practices for existing commercial and industrial buildings. | Staff query to Ministry of Energy, Mines and Petroleum Resources regarding provincial program and Council report to join if and when program has resources. Otherwise, promotional materials from BC Hydro and Fortis BC to be utilized. | 1 | Existing staff. Provincial funds to implement as proposed by staff in response to funding calls | 2012 |
| | Electrical System Upgrades | Promote changes to electrical system upgrades for existing community buildings | | | | |
| | Mechanical and Plumbing System Upgrades | Promote changes to mechanical and plumbing system upgrades for existing community buildings. | | | | |
| | Replace Old Air conditioning Units and Chillers | Promote replacement of existing AC and chiller units. Some residents may benefit more from heat pump | | | | |
| | High Efficiency Water Heaters | Promote replacement of old water heaters and insulate existing water heaters. | | | | |
| | Solar Hot Water | Encourage developers to include solar hot water systems in new and existing buildings. | | | | |
| | Upgrade Appliances to Energy Star | Encourage residents to upgrade their appliances to those with an Energy Star rating. This helps people distinguish energy efficient products from those that are not. | | | | |
| | Upgrade Insulation | Promote upgrade to insulation materials used in existing community buildings. | | | | |

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| Community Buildings – Local Government Policy and Programs – Existing Buildings Targets | Upgrade Windows | Promote the replacement of old windows to those with an energy star rating in existing residences. | Staff query to Ministry of Energy, Mines and Petroleum Resources regarding provincial program and Council report to join if and when program has resources. Otherwise, promotional materials from BC Hydro and Fortis BC to be utilized. | 1 | Existing staff. Provincial funds to implement as proposed by staff in response to funding calls | 2012 |
| | Repair Leaks and Drafts | Encourage people to seal up cracks in their homes with caulking and weather stripping. | | | | |
| | Shower heads, building temperature at night, length of showers, cold water washing, dry dishes, turn off lights and electronics, dispose of second fridge | Encourage residents to replace existing fixtures and change behaviours to save money on their energy bills and reduce GHG emissions. | | | | |
| Community Buildings – Local Government Policy and Programs – CAEE New Buildings Targets | Energy Efficient Construction | Encourage energy efficient construction. For instance, encourage the use of recyclable materials during construction, and the installation of energy efficient appliances in new building. | Undertake Supporting Programs Education (SPE) seminar for staff's outreach to community | 1 | Local consultant to develop (\$1K - \$3K) | 2012 |
| | Electricity and Alternative Energy Division (EAED) | The Town can achieve targets by informing developers of potential funding resources from the EAED to use alternative energy sources in new developments. | Undertake SPE seminar for staff's outreach to community | 2 | Consultant to develop (\$1K - \$3K) | 2012 |
| | R-2000 Standard: Adopt R2000/Power Smart performance standards | The Town should encourage developers to review this strategy to support achieving the CAEE targets, including the R-2000 standard for residential buildings. | | | | |
| | C-2000 Standard: Adopt the C-2000 Building Code for Commercial Buildings | Encourage developers to review this strategy to support achieving the targets, including the C-2000 standard for commercial buildings. | | | | |
| | Passive Solar Design | Encourage the orientation of new buildings to capitalize on passive solar gain as well as encouraging existing buildings to preserve their solar access. | | | | |
| | Discourage Electric Baseboards | Discourage the installation of electric baseboards in new residential developments. | | | | |
| | Natural Resource Canada Renewable Energy Deployment Initiative | Encourage the community to take advantage of operating incentives provided by NRCan's initiative program. | | | | |

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| Community Buildings – Local Government Policy and Programs – OCP and Local Government By-laws | Provide Rebates on Building Permit Fees for New Energy Efficient Building | Offer rebates on permit fees to buildings that meet or surpass a certain standard of energy efficiency. | Develop a policy or guidance document that describes each initiative for distribution to development community as appropriate | 1 | Existing Planning Staff | 2012 |
| | Provide Rebates on Permit Fees for Renovations that meet the EnerGuide Requirements | Offer rebates to renovation permits that meet EnerGuide's standard for energy efficiency. To keep making improvements, raise the minimum standard every year. | | | | |
| | Community Energy Systems | The Town should encourage new buildings to utilize community energy systems whenever possible. | Undertake SPE seminar for staff's outreach to community | 1 | Consultant to develop | 2012 |
| | Examine Opportunities for GeoExchange Systems | The Town should investigate when GeoExchange systems are practical for new developments, and require GeoExchange in such developments. | | | | |
| | Solar hot water systems should be installed in new and existing buildings | The Town should encourage solar hot water systems. | | | | |
| | Pre-service for Waste Heat and District Energy Systems | Encourage the development of pre-servicing for waste heat and district energy systems in new developments. | | | | |
| | Encourage Mixed-use Buildings | Encourage the construction of mixed use buildings, especially on major transit routes. | | | | |
| | Sustainability Checklist | Town staff can use a sustainability checklist to help them assess new building applications. | Work with consultant to develop sustainability checklist for Development Permits and Rezoning Applications | 1 | Existing community plan budget | 2012 |
| | Continue to Require New Development to Have Lockers/ Bike Storage | Utilize the Town's sustainability checklist in the approval process for new developments. | Incorporate into sustainability checklist as well as most other initiatives that fall under local government policies and programa | 1 | | 2012 |
| | Encourage New Buildings to Meet LEED Standards | LEED provides standards for a wide variety of building types and projects, including standards for residential and commercial buildings. Encourage new buildings to meet these standards. | | | | |
| | Encourage New Buildings to Meet BuiltGreen Standards | BuiltGreen currently offers certifications for a variety of residential buildings, including single unit homes, row homes, and apartment towers. New buildings should be encouraged to meet these standards. | | | | |

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| Landuse and Urban Design – Local Government Policy and Programs | Increase Density – Intensify | The Town should increase population density to conserve land for future developments and increase future livability. | Incorporate into OCP as much as practical and into sustainability checklist | 1 | Existing Planning Staff | 2012-2012 |
| | Concentrate High Density and Commercial Areas on Major Transit Routes | The Town should ensure density is concentrated along major transit routes, and encourage high density development on major transit routes, where appropriate. | | | | |
| | Decrease Distance to Commercial Locations | The Town should look at mechanisms, including mixed-use buildings and neighbourhood commercial, to reduce distance to commercial locations. | | | | |
| | Decrease Distance Between Residential and Employment Areas | The Town should establish maximum allowable distances to commercial areas for all new residential developments, and zone commercial spaces in areas currently outside of this distance. | | | | |
| | Encourage Mixed Use Neighbourhoods | The Town should continue policy mechanisms that encourage mixed use developments. | | | | |
| | Encourage Neighbourhood Commercial | Encourage the construction of neighbourhood retail buildings in areas that are currently only residential buildings. | | | | |
| | Encourage Pedestrian Centred and Transit Oriented Design | The Town should continue to undertake pedestrian enhancement projects, and ensure new developments adhere to the principles of pedestrian oriented design. | | | | |
| | Decrease Distance to Commercial Locations | The Town should look at mechanisms, including mixed-use buildings and neighbourhood commercial, to reduce distance to commercial locations. | | | | |

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| Community Transportation – Local Government Policy and Programs – Decrease Overall Vehicle Fuel Consumption Rates | Right Sizing Vehicles | The Town of View Royal should promote consumer purchase of most fuel efficient vehicle to meet transportation needs. Includes replacing aging vehicles with newer vehicles with lower fuel consumption rates | | | | |
| Community Transportation – Local Government Policy and Programs – Reduce Vehicle Kilometres Travelled | Active Transportation to and from Schools | Support school programs that encourage children to walk or bike to school. | | 3 | Existing Planning Staff | |
| | Promote Car Free Days | Support car free days and other initiatives such as corporate bike and walk to work programs, as a way of educating people about alternative transportation. | | 2 | Existing Planning Staff | 2012 |
| | Co-Operative Auto Networks | The Town should promote the use of car sharing networks by designating parking areas and providing incentives to developers. | | 2 | Existing Planning Staff | 2012 |
| | Shared Parking | The Town should limit parking availability and promote shared parking in mixed-use areas. | | 3 | Existing Planning Staff | 2012 |
| | Un-hide the Costs of Parking to Reduce Private Vehicle Use | Investigate initiatives that make people more aware of their driving habits in order to reduce private vehicle use and highlight alternative forms of transportation. | | | | |
| | Develop and Implement a Transportation Demand Management Plan | Develop a Transportation Demand Management Plan to get people thinking about their driving habits, and to encourage them to try alternative transportation methods. | | 4 | Existing Planning Staff | 2012 |

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| Community Transportation – Local Government Policy and Programs – Increase the Use of Public Transit | Encourage New Buildings to Feature Public Transit More Prominently | Require new buildings to incorporate transit stops and pedestrian routes into their design | | | | 2012 |
| | Public Transportation Shelters | The Town should promote the construction of abundant and appealing facilities for pedestrians and transit users. | | | | |
| | Public Transport Vouchers | Large companies can offer employees monthly transit passes or a cash allowance intended for use on public transit. The Town should implement such a program for all staff, and encourage other organizations to do the same. | | | | |
| | Identify Grants for Non-auto Transportation Projects | Start a fund for non-auto transportation projects. The Town should look into grants for providing cycling infrastructure and for pedestrian improvement projects. | | | | 2012 |
| | Support Transit Expansion Projects | Support efforts by senior government to expand regional public transportation networks and lobby for increased transit service in the Town. Prioritize public transit improvement projects over road expansion projects. | | | | |
| Community Transportation – Local Government Policy and Programs – Encourage Walking and Cycling | Encourage Enhancement of Pedestrian facilities | Continue to undertake enhancements to pedestrian facilities and investigate the potential for additional traffic calming projects. | | | | 2012 |
| | Improve Cycling Infrastructure | The Town should invest in bicycle lanes and signals, optical recognition of bicycles at left turn lanes, as well as new bike racks. | | | | 2012 |
| | Develop and Maintain a Comprehensive Non-Auto Transportation Plan | Work with BC Transit, neighbouring municipalities and Port Coquitlam to create a plan that focuses on non-auto transportation. | | | | 2012 |
| | Support Cycling and Pedestrian Projects | Support improvements to cycling and pedestrian infrastructure and lobby for increased funding for non-auto transportation modes. | | | | |
| | Identify Grants for Non-auto Transportation Projects | Start a fund for non-auto transportation projects. The Town should look into grants for providing cycling infrastructure and for pedestrian improvement projects. | | | | 2012 |

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| Community Transportation – New Technology – Public Transit | Investigate Transit Priority Technologies | Examine the potential for transit priority technologies at traffic signals on major transit routes. | | | | |
| | Work with BC Transit to Implement Real-time Transit Technologies | Work with BC Transit to implement real-time transit technologies on major transit routes within the Town. | | | | |
| Community Transportation – New Technology – Private Vehicles | Plug-in Electric Vehicles | Monitor developments in the electric vehicle industry, and ensure adequate infrastructure is in place to support electric vehicles. | | | | |
| Solid Waste – Senior Government Policy and Programs – Regional Government | Waste Challenge | Support the Regional Waste Challenge. | Staff to stay apprised of the Regional District's plan | 1 | | 2012 |

3.2 Resources

3.2.1 Monitoring & Reporting

The community inventory can be updated inexpensively by qualified consultants. Costs to prepare a community inventory, as per Appendix I, range between \$2,000 and \$4,000 depending upon the scope of the inventory and the availability of datasets from the data providers. Alternatively, the Town can receive this information from the Province of BC if and when it becomes available.

Comparisons of the 2006 and 2011 Stats Canada Census data would be of considerable value to monitor the changes that have occurred in the community in a five year period.

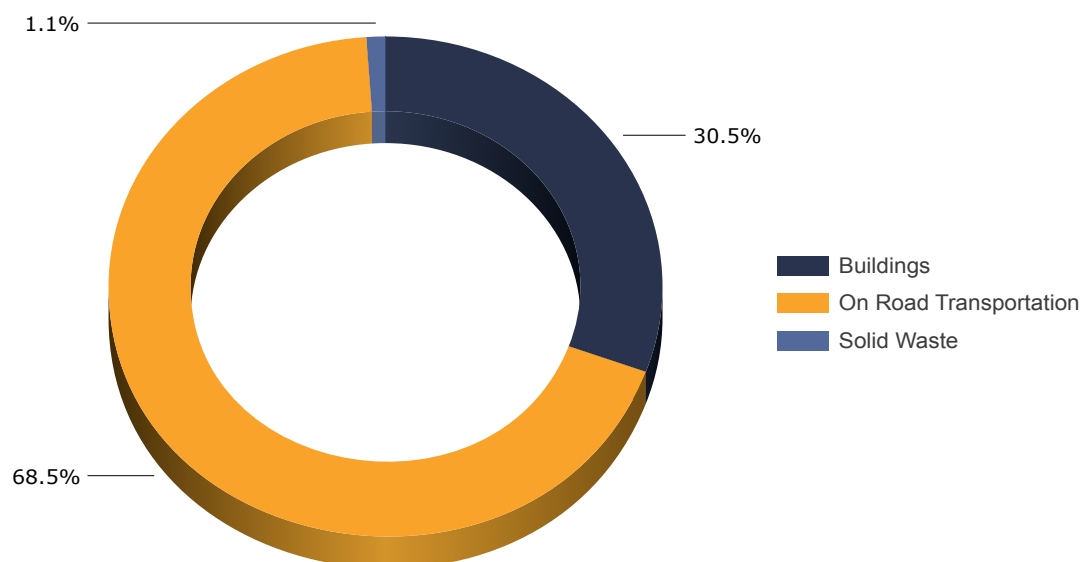
3.2.2 Implementation

Many of the reduction initiatives fall under the responsibility of existing staff, which may refer to a sustainability coordinator or planning staff. Existing planning staff cannot undertake all reduction initiatives listed herein and the Town should consider creating a full or part time position to assist senior staff with implementation of the reduction initiatives listed herein.

4 Summary

4.1 Inventory Summary

In the 2007 base year, greenhouse gas emissions from the Town of View Royal' community totalled 32,314 tonnes CO₂e. On Road Transportation made up the greatest percent of GHG emissions at 69 percent.



4.2 Forecast Summary

A forecast of GHG emissions for the 2017 target year was developed using the best data available. Overall GHG emissions are expected to increase by one percent to 32,753 tonnes CO₂e. Forecast emission increases have been moderated by zero GHG emissions from all electricity supplied by BC Hydro and the implementation of federal climate change legislation such as a tailpipe emissions standard.

| Forecasted Parameter | Base Year | Forecast Year | Percent Increase |
|--------------------------------------|-----------|---------------|------------------|
| | 2007 | 2017 | 2007 - 2017 |
| Emissions (tonnes CO ₂ e) | 32,315 | 32,753 | 1% |

4.3 Reduction Target Summary

The majority of the community's potential reduction initiatives are achieved in the on-road transportation sector through the implementation of a tailpipe emissions standard and reductions in vehicle use through increased transit use, walking, and cycling.

By implementing the initiatives described in this report, the Town of View Royal would be able to reduce GHG emissions by 12 percent below 2007 levels by 2017. The table that follows provides a summary of the potential reductions in each community sector.

| Sector | Reduction Initiative | Level of Government | Reduction Quantity | | Implementation | | |
|------------------------|---|--|----------------------------|-----------------------------|----------------|------------------------|----------|
| | | | GHGs (t CO ₂ e) | Percent of Total Reductions | Cost | Level of Effectiveness | Priority |
| Buildings | New Buildings Targets ¹ | Municipal with Financial Resources | 294 | 8% | L | H | 1 |
| | EnerGuide Rating in Multiple Listing Service (MLS) Advertising | Senior Government | 46 | 1% | L | L | 3 |
| | Existing Buildings Targets ¹ | Municipal with Financial Resources | 242 | 7% | L | L | 4 |
| | Solar Hot Water | Municipal with Financial Resources | 49 | 1% | M | L | 5 |
| Subtotal | | | 631 | | | | |
| On Road Transportation | Decrease Overall Fuel Consumption Rates (includes Paveley II Tailpipe Standard) | Senior Government plus 'encouragement' from View Royal | 987 | 26% | L | H | 1 |
| | VKT Reductions | Shared | 912 | 24% | H | H | 2 |
| | Increase Transit Ridership | Shared | 977 | 26% | H | H | 2 |
| Subtotal | | | 3,507 | | | | |
| Solid Waste | CRD Plan Targets | Shared | 262 | 7% | H | H | 1 |
| Subtotal | | | 262 | | | | |
| Total | | | 4,400 | 100% | | | |

¹ Based on Community Action on Energy and Emissions (CAEE; Provincial Energy, Mines and Petroleum Resources)

Level of Effectiveness: H = High (3% or greater, except when noted); M = Moderate 2%; L = Low (1% or less); U = Unknown

Cost: H = \$100,000's; M = \$10,000's; L = \$1,000's; U = Unknown; N/A = None (senior government)

NOTE: Priority 1 is assigned to initiatives with low costs and high effectiveness whereas lower priorities are assigned to initiatives with higher costs and less effectiveness. Where costs are incurred by senior government (e.g., transit improvements), and the effectiveness is high, higher priority has been assigned.

Community Reduction Target Statement:

An emission reduction target of ~4,400 tonnes CO₂e is recommended for the Town of View Royal. This reduction amount will decrease community emissions 12 percent below 2007 levels by 2017.

The reduction target of 12 percent is further broken down in to the reductions possible for each sector in the table below. The greatest proportion of reductions are from the on road transportation sector.

| Sector | Base Year Emissions | Projected GHG Emissions with Legislation | Potential GHG Emission Reductions | GHG Emissions After Plan Implementation | Percent Reduction of Projected Emissions |
|------------------------|--------------------------|--|-----------------------------------|---|--|
| | Tonnes CO ₂ e | | | | |
| | 2007 | 2017 | | | |
| Residential Buildings | 3,860 | 3,670 | 631 | 3,039 | -21% |
| Commercial Buildings | 5,986 | 5,518 | | 5,518 | -8% |
| On Road Transportation | 22,119 | 23,216 | 3,507 | 19,086 | -14% |
| Solid Waste | 349 | 349 | 262 | 87 | -75.0% |
| Total | 32,314 | 32,753 | 4,400 | 28,353 | -12% |

Glossary of Terms (IPCC 2009)

Carbon dioxide (CO₂): A naturally occurring gas; also a byproduct of burning fossil fuels and biomass, as well as land use changes and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the earth's radiative balance. It is the reference gas against which other greenhouse gases are measured and therefore has a Global Warming Potential of 1.

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

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

Equivalent CO₂ (CO₂e): The concentration of CO₂ that would cause the same amount of radiative forcing as a given mixture of CO₂ and other greenhouse gases.

GJ (GigaJoules): A Canadian unit of heating value equivalent to 943,213.3 Btu. The standard gas unit in Canada is

the gigajoule pursuant to GISB under Order 587-A (1997). A gigajoule (GJ) is a metric term used for measuring energy use. For example, 1 GJ is equal to 277.8 kWh of electricity, 26.9 m³ of natural gas, 25.9 litres of heating oil. Similar to the energy released when burning a million wooden matches, a gigajoule of gas will cook over 2500 hamburgers, and a gigajoule of electricity will keep a 60-watt bulb continuously lit for six months.

Greenhouse gas: Gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. This property of greenhouse gases causes the greenhouse effect. Water vapour (H₂O), carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄) and ozone (O₃) are the primary greenhouse gases in the Earth's atmosphere. Moreover, there are a number of entirely human-made greenhouse gases in the atmosphere, such as the halocarbons and other chlorine- and bromine-containing substances, dealt with under the Montreal Protocol. Besides CO₂, N₂O, and CH₄, the Kyoto Protocol deals with the greenhouse gases sulphur hexafluoride (SF₆), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs).

Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC): The Kyoto Protocol was adopted at the Third Session of the Conference of the Parties (COP) to the UNFCCC in 1997 in Kyoto, Japan. It contains legally binding commitments in addition to those included in the UNFCCC. Countries included in Annex B of the Protocol (Organisation for Economic Co-operation and Development countries and

countries with economies in transition) agreed to reduce their anthropogenic greenhouse gas emissions (CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆) by at least 5% below 1990 levels in the commitment period 2008 to 2012. The Kyoto Protocol entered into force on February 16, 2005.

Methane (CH₄): An odorless, colorless, flammable gas, CH₄, the major constituent of natural gas, that is used as a fuel and is an important source of hydrogen and a wide variety of organic compounds.

Nitrous Oxide (N₂O): A powerful greenhouse gas with a global warming potential most recently evaluated at 310. Major sources of nitrous oxide include soil cultivation practices, especially the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning.

United Nations Framework Convention on Climate Change (UNFCCC): The Convention was adopted on May 9, 1992, in New York and signed at the 1992 Earth Summit in Rio de Janeiro by more than 150 countries and the European Community. Its ultimate objective is the "stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." It contains commitments for all parties. Under the Convention, parties included in Annex I aim to return greenhouse gas emissions not controlled by the Montreal Protocol to 1990 levels by the year 2000. The convention entered into force in March 1994. See: Kyoto Protocol.

Appendix I - Community GHG Emissions Inventory (2007)

View Royal Community Energy & Greenhouse Gas Emissions Inventory: 2007

| BUILDINGS | | Consumption By Type | | | | Energy & Emissions Total | |
|------------------------------|-------------|---------------------|------------------|----------------|-------------------|--------------------------|-----------------------|
| | | Type | Connections | Consumption | Energy/Connection | Energy (GJ) | CO ₂ e (t) |
| RESIDENTIAL BUILDINGS | Electricity | 3,638 | 51,173,622 kWh | 14,066 kWh/C | | 184,225 | 1,331 |
| | Natural Gas | 1,251 | 63,235 GJ | 51 GJ/C | | 63,235 | 2,371 |
| | Fuel Oil | | 22,912 litres | L/C | | 886 | 65 |
| | Propane | | 3,959 GJ | ? GJ/C | | 100 | 94 |
| COMMERCIAL BUILDINGS | Electricity | 301 | 31,391,197 kWh | 104,290 kWh/C | | 113,008 | 816 |
| | Natural Gas | 84 | 137,865 GJ | 1,641 GJ/C | | 137,865 | 5,170 |
| | | | | | | | |
| SUBTOTAL | | Electricity | 3,939 | 82,564,819 kWh | | 297,233 | 2,147 |
| | | Natural Gas | 1,335 | 201,100 GJ | | 201,100 | 7,541 |
| | | FuelOil | | 22,912 999 | | 886 | 65 |
| | | Propane | | 3,959 GJ | | 100 | 94 |
| ON ROAD TRANSPORTATION | | Consumption By Type | | | | Energy & Emissions Total | |
| | | Type | Units | Consumption | Litres/Unit | Energy (GJ) | CO ₂ e (t) |
| SMALL PASSENGER CARS | Diesel Fuel | 67 | 51,647 litres | 771 L/U | | 1,998 | 144 |
| | Gasoline | 2,164 | 2,342,212 litres | 1,082 L/U | | 81,181 | 5,862 |
| LARGE PASSENGER CARS | Diesel Fuel | 11 | 15,857 litres | 1,442 L/U | | 613 | 44 |
| | Gasoline | 964 | 1,436,118 litres | 1,490 L/U | | 49,776 | 3,594 |
| LIGHT TRUCKS, VANS, AND SUVS | Diesel Fuel | 127 | 223,757 litres | 1,762 L/U | | 8,655 | 622 |
| | Gasoline | 2,216 | 3,970,925 litres | 1,792 L/U | | 137,632 | 9,939 |
| | Propane | 12 | 23,949 GJ | 1,996 GJ/C | | 606 | 566 |
| COMMERCIAL VEHICLES | Diesel Fuel | 23 | 75,994 litres | 3,304 L/U | | 2,939 | 211 |
| | Gasoline | 10 | 11,374 litres | 1,137 L/U | | 394 | 28 |
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Energy & Emissions Monitoring and Reporting System™ v3.01

Draft Report Produced on 2012-01-15
Page 1

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

| Waste Management and Emissions Report - Q3 2023 | | | | | | | | | |
|---|-----------------------|----------------|-------------|-------------|----------------|-----------------------|-------------|--------------------------|--------|
| Category | Waste Management Data | | | | Emissions Data | | | | |
| | Quantity (kg) | Volume (L) | Weight (kg) | Energy (GJ) | Mass (t) | CO ₂ e (t) | Energy (GJ) | CO ₂ e (t) | |
| Motorhomes | Propane | 10 | 3,232 | GJ | 323 | GJ/C | 82 | 76 | |
| | Diesel Fuel | 10 | 24,392 | litres | 2,439 | L/U | 943 | 68 | |
| | Gasoline | 137 | 255,403 | litres | 1,864 | L/U | 8,852 | 639 | |
| | Gasoline | 348 | 129,456 | litres | 372 | L/U | 4,487 | 324 | |
| Subtotal | | 5,839 | 27,181 | GJ | 688 | | 298,159 | 22,119 | |
| Solid Waste | Gasoline | | 8,145,488 | litres | 282,323 | | 15,149 | 1,089 | |
| | Diesel Fuel | | 391,647 | litres | | | | | |
| | Direct Emissions | | | | | | | | |
| | Type | | | | Mass (t) | CO ₂ e (t) | | Emissions Total | |
| Community Solid Waste | Solid Waste | Waste in Place | | | 1,324 | 349 | | 349 | |
| | Solid Waste | | | | 1,324 | 349 | | 349 | |
| Grand Total | | | | | | | | | |
| Activity | Consumption | | | Energy | | CO ₂ e | | Energy & Emissions Total | |
| | Electricity | 82,564,819 | kWh | 297,233 | GJ | 2,147 | t | 797,479 | 32,314 |
| Natural Gas | 201,100 | GJ | 201,100 | GJ | 7,541 | t | | | |
| Fuel Oil | 22,912 | litres | 886 | GJ | 65 | t | | | |
| Propane | 31,140 | GJ | 788 | GJ | 736 | t | | | |
| Gasoline | 8,145,488 | litres | 282,323 | GJ | 20,387 | t | | | |
| Diesel Fuel | 391,647 | litres | 15,149 | GJ | 1,089 | t | | | |
| Solid Waste | | | | | | 349 | t | | |

Appendix II - Residential Garbage and Household Food Waste Collection

Lawn and Garden Waste

Lawn and Garden Waste Collection Service

Lawn and garden waste is collected three times per year on Saturdays at the curbside. See the coloured leaves on the enclosed calendar for your scheduled Saturday.

Only these lawn and garden materials are accepted:

- **Grass, leaves, flowers, shrub clippings and weeds** in clear plastic bags (weight limit 35 lbs per bag). Please shake off any extra soil from flowers and weeds to reduce weight. **Note** that invasive and noxious weeds, such as Scotch Broom, English Ivy, and Himalayan Blackberry, are not allowed in the collection service. They are allowed at the Hartland Landfill and can be included in your weekly garbage.
- **Bundled branches** (branch size limit 3 in. thick, 3 ft. long; bundle size 35 lb limit).

Up to five bags of the above items will be collected per dwelling unit. To put out additional bags, you need to attach an Extra Bag Decal to each extra bag. Decals can be purchased at the Town Hall.

Private strata roads cannot accommodate the size of the lawn and garden waste collection trucks. Residents on these roads need to place the lawn and garden waste at the edge of the main road into the strata.

Lawn and garden waste that doesn't comply with the above guidelines will not be collected.

If participation levels are such that your lawn and garden waste is not collected on the Saturday designated for your collection area, leave it out for collection the following day (Sunday).

The Canteen Composting Facility at 605 Canteen Road in Esquimalt is available to View Royal residents free of charge at the gate Monday to Saturday from 8:00 a.m. to 5:00 p.m. For more information, please call the facility at 250-386-3343 or drop into the Town Hall for an informational brochure.

View Royal #C110guidelines

Residential Garbage and Household Food Waste Collection in View Royal

Waste Management provides the residential garbage and household food waste collection for View Royal residents.



Garbage and household food waste is collected in separate containers that are emptied by a truck using automated arms. Collection regulations for residents to follow are detailed in Town of View Royal Bylaw No. 745, 2009.

An annual charge for this collection is added to your property tax notice as a separate line item to be paid in conjunction with your residential property taxes.



Questions? Contact Waste Management:
250-652-6242 (8 a.m. – 4:30 p.m. M-F)
www.wmcanada.com

June 2010

Household Food Waste Regulations

YES

Fruit and vegetable scraps
Food leftovers, plate scrapings
Meat, fish, giblets and bones
Dairy products, butter, mayonnaise
Eggshells
Bread, cereal, grains
Pastas, pizza
Baked goods, candies
Soiled paper towels and tissues
Soiled paper food packaging, ice cream cartons
Paper cups and plates
Coffee filters and grounds
Tea bags
Solidified fat and grease
Baking ingredients
Houseplants, cut and dried flowers (shake off excess soil)
Nuts and shells

NO

Yard and garden waste
Plastic bags and wrap
Styrofoam
Plastic containers and cutlery
Foil wrap, pouches, and pie plates
Metal or glass
Cereal and cracker box liners
Chip and cookie bags
Pet food bags and other lined bags
Butter wrappers
Make-up remover pads, cotton swabs and balls
Dental floss, rubber bands
Soiled diapers, baby wipes
Sanitary hygiene products, condoms
Dryer sheets and lint
Cigarettes and butts
Vacuum contents and bags
Pet feces or litter



NOTE:

BPI Certified Compostable Bags are required for household food waste collection. They must meet ASTM D6400-9 Standard Specifications for Compostable Plastics. Please put your household food waste container out every week, regardless of the amount of waste it contains. Please keep the inside of your container clean.

Garbage Regulations

YES

Non-recyclables
Plastic wrap
Chip and cookie bags
Foil pouches
Soiled diapers, baby wipes
Sanitary hygiene products
Double-bagged pet feces, litter
Double-bagged vacuum dust
Double-bagged cool ashes
Broken ceramics, dishware
Broken mirrors
Window glass

NO

Yard and garden waste
Recyclables
Computers, TVs or electronics
Batteries
Hazardous waste
Medical waste or syringes
Fuel tanks or motor oil
Concrete, rocks, or dirt
Liquids
Fluorescent bulbs

Weight Limit:
40 kg or 88 lbs

Extra Garbage:
Garbage that exceeds the one allowed container per week must be bagged and have an extra bag decal attached to each extra bag. Decals can be purchased at the Town Hall.



For missed collection, please contact Waste Management at: **250-652-6242** (8 a.m. – 4:30 p.m. M-F)

30% post-consumer recycled paper

Appendix III - Community Comparisons

I Housing Type

As Figure A1 illustrates, View Royal has fewer residents living in single unit homes compared to the Canadian average, with a proportion similar to the B.C. average. Other nearby communities such as Victoria and Esquimalt have a much lower proportion of single family homes, while Highlands and Sooke have more single family homes.

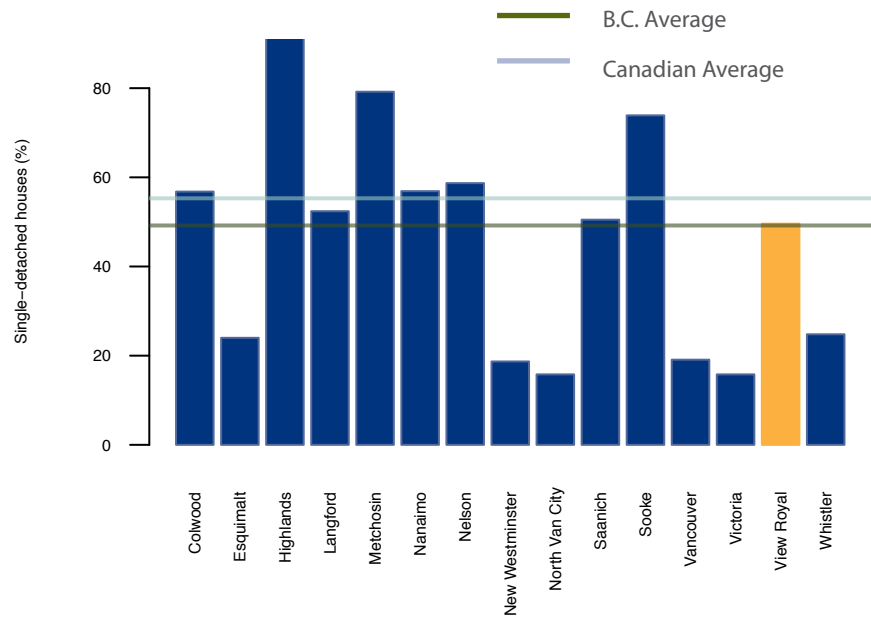


Figure A1 - Single Unit Detached Housing

This graph illustrates the percentage of residents living in single unit detached homes in 2006, for selected municipalities in B.C. Data provided by Statistics Canada 2006 Community Profiles.

The percentage of View Royal residents who live in row housing is higher than both the B.C. and Canadian averages (Figure A2); however there is considerable variability in the amount of row housing among B.C. communities. Few B.C. communities match View Royal in proportion of row housing.

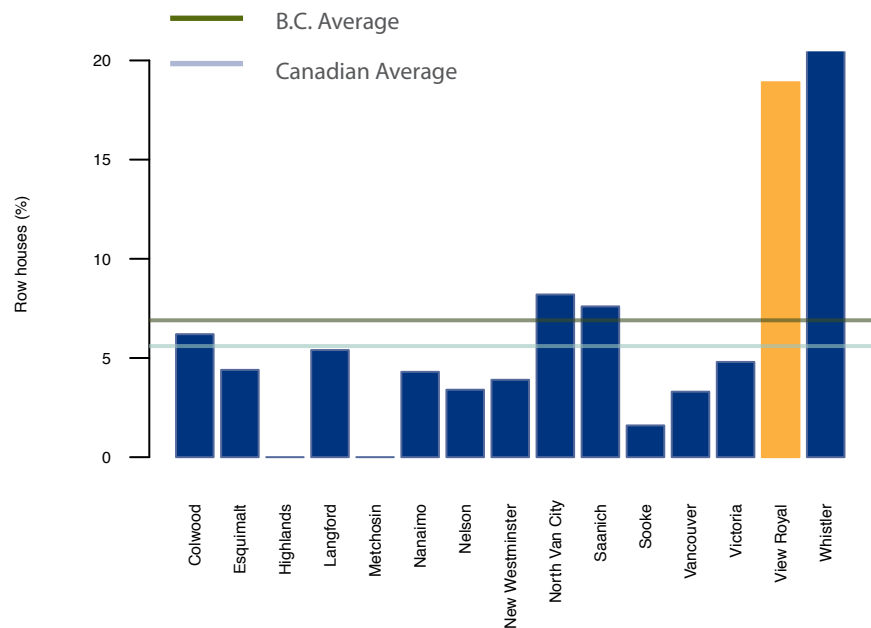


Figure A2 - Row Housing

This graph illustrates the percentage of residents living in row housing in 2006, for selected municipalities. Data provided by Statistics Canada 2006 Community Profiles.

A lower percentage of View Royal residents live in apartments (of less than 5 stories) relative to the provincial and the Canadian average. Some cities, such as the City of North Vancouver and Whistler, have a much higher percentage of residents who live in apartments of less than 5 stories compared to View Royal (Figure A3). Higher density developments use less energy than the same number of low density units due to a smaller average unit size, and shared walls and ceilings in high density developments.

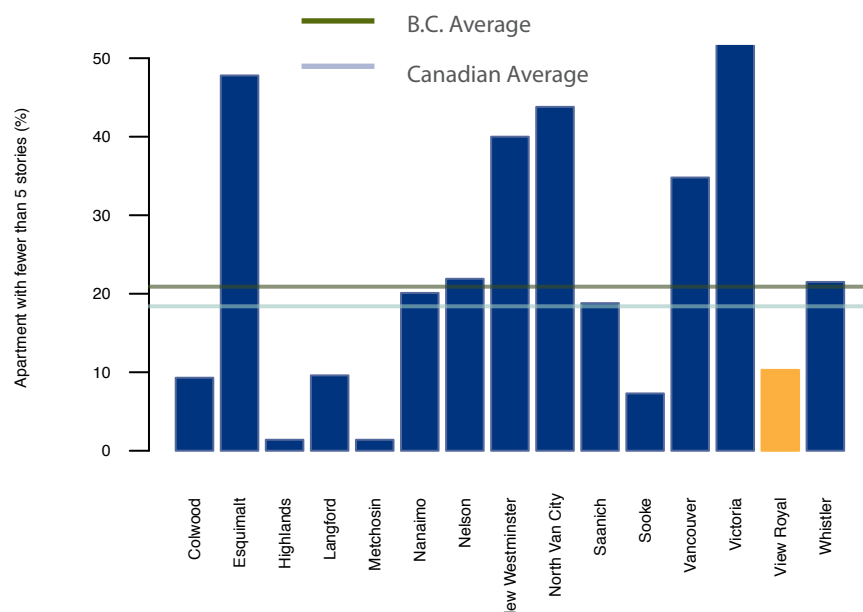


Figure A3 - Apartments with fewer than 5 stories

This graph illustrates the percentage of people living in apartments (with fewer than 5 stories) in 2006, for selected municipalities in B.C. Data provided by Statistics Canada 2006 Community Profiles.

II Housing Age

Building age is another major factor in a building's energy efficiency. Older buildings were built with fewer (if any) energy efficiency standards compared to the standards and practices for new buildings.

Figure A4 shows the percentage of buildings built before 1986 in selected B.C. municipalities. View Royal has a lower percentage of old buildings relative to the B.C. average, but the number is similar to the Canadian average. The low number of old buildings means there is likely to be a large number of energy efficient buildings already in View Royal; however, it also means programs to increase energy efficiency of buildings in View Royal may be less effective than they would be in communities with more older housing.

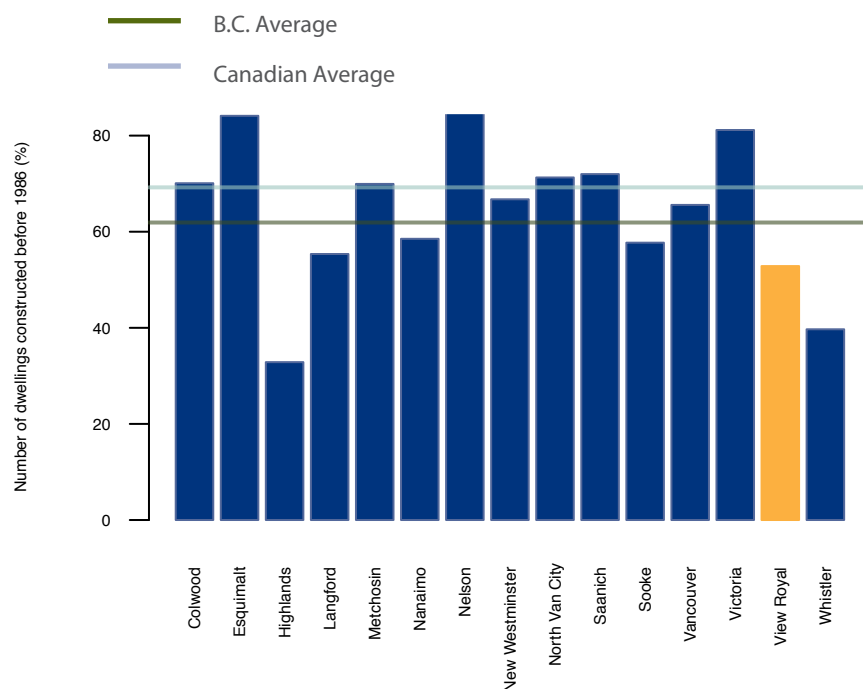


Figure A4 - Buildings Constructed Before 1986

This graph illustrates the percentage of buildings constructed in 1986 (based on buildings numbers in 2006), for selected municipalities in B.C. Data provided by Statistics Canada 2006 Community Profiles.

III Owner/Renter Ratio

The percentage of owner occupied buildings in a community can influence the success of programs designed to increase community buildings' energy efficiency. Cities with many residents owning (as opposed to renting) the building they live in may have an easier time convincing residents to undertake energy efficiency upgrades. Typically the building owner pays for renovations, but the building resident receives the benefit of decreased utilities. Figure A5 shows the percentage of buildings occupied by the owner.

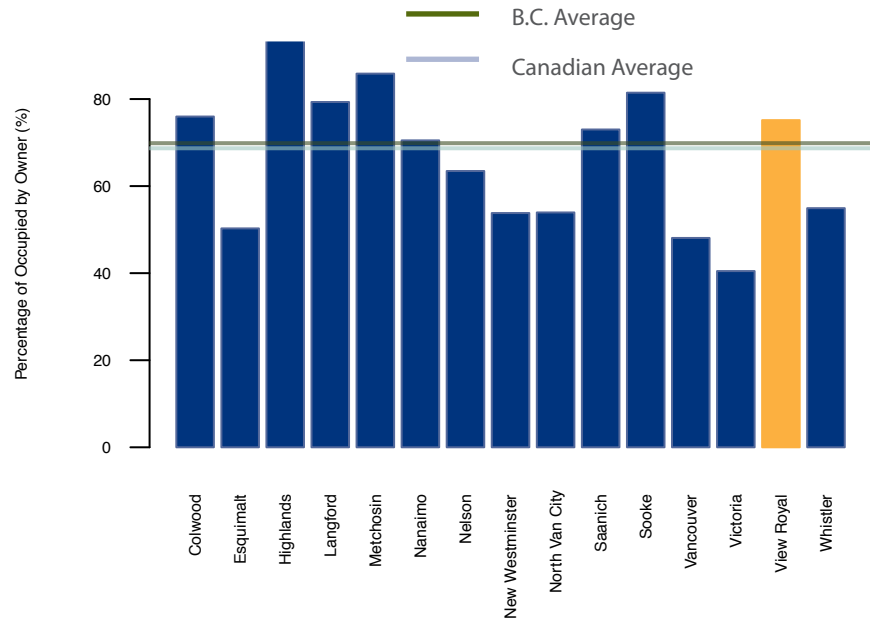


Figure A5 - Buildings Occupied by Owner
This graph illustrates the percentage of buildings occupied by their owner, for selected municipalities in B.C. Data provided by Statistics Canada 2006 Community Profiles.

IV Transportation Mode Share

Transportation is, on average, the largest source of GHG emissions for B.C. municipalities. Those who commute alone in a vehicle have the highest average emissions (the GHG emissions of those who use transit, walk or cycle are much lower).

As Figure A6 indicates the percentage of people in View Royal who commute to work in a private vehicle. While there are many factors influencing the per capita emissions from transportation, higher rates of private automobile usage are a major factor in high greenhouse gas emissions.

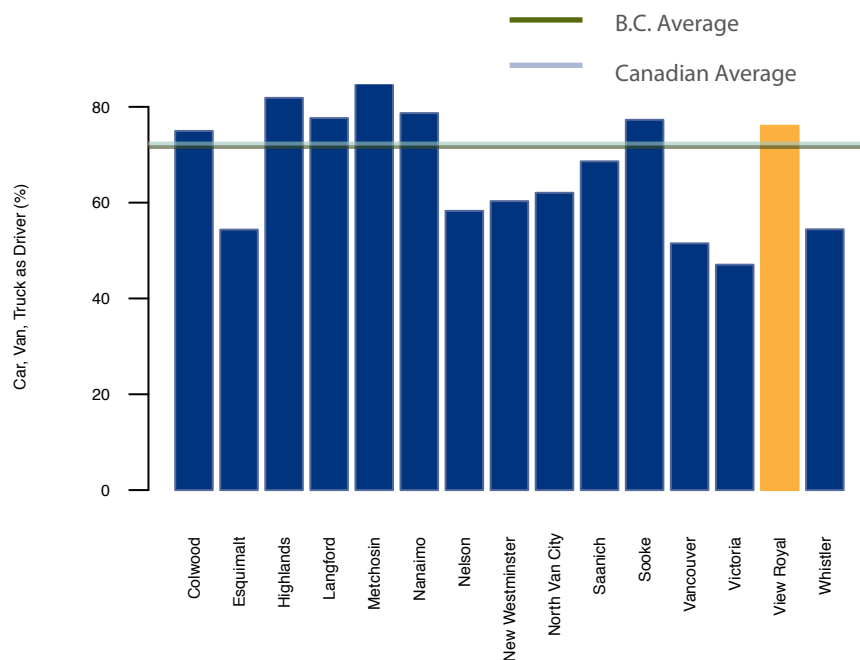


Figure A6 - Private Vehicle to Work

This graph illustrates the percentage of people who drove a private vehicle to work (either with or without passengers) in 2006, for selected municipalities in B.C. Data provided by Statistics Canada 2006 Community Profiles.

Transit usage in View Royal is slightly lower than the B.C. and Canadian average. Additionally, several other nearby communities, such as Esquimalt and Victoria have higher transit usage than View Royal (Figure A7). Increasing transit use can help decrease greenhouse gas emissions in View Royal.

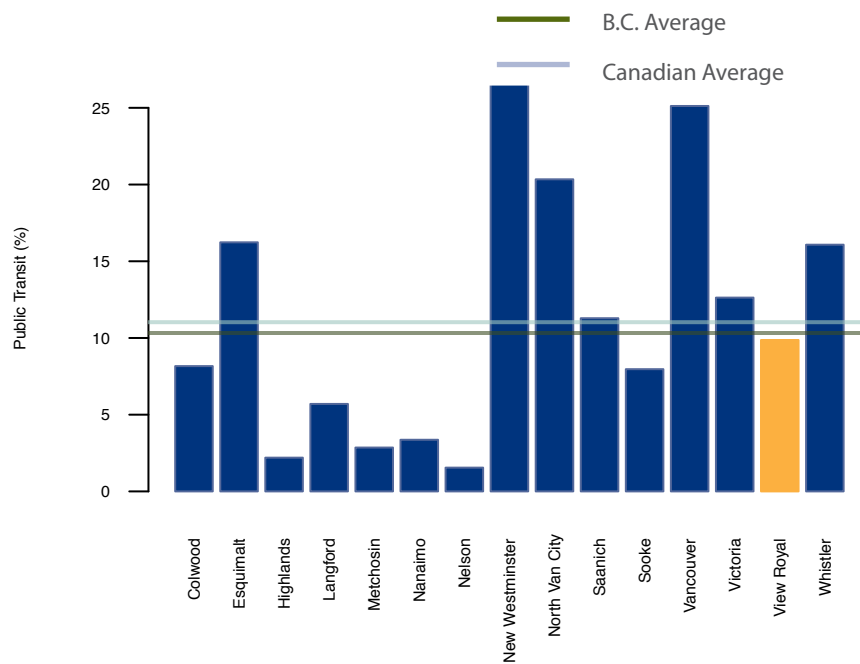


Figure A7 - Public Transit to Work

This graph illustrates the percentage of people who use public transit to get to work in 2006, for selected municipalities in B.C. Data provided by Statistics Canada 2006 Community Profiles.

Walking and cycling are two of the best ways to get around without using fossil fuels. According to data from 2006, the number who walked or cycled to work in View Royal was lower than the provincial and the Canadian averages (Figure A8). There is a wide range in the walking and cycling mode share among B.C. communities, with compact walkable cities such as Nelson and Victoria boasting about 30 percent of residents walking or cycling to work, compared to much lower levels in other communities.

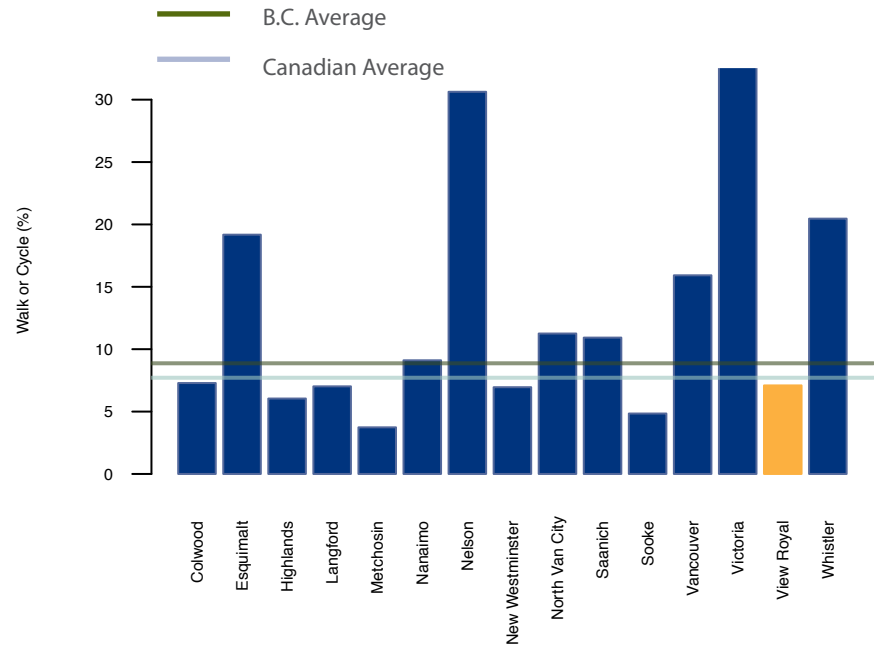


Figure A8 - Walk or Cycle to Work

This graph illustrates the percentage of people who walked or cycled to work in 2006, for selected municipalities in British Columbia. Data provided by Statistics Canada 2006 Community Profiles.

Appendix IV - Climate Action Questionnaire



Town of View Royal Climate Action Questionnaire

Climate change is a global issue that can be, in part, solved at the local level.

The Town is committed to addressing climate change by implementing policies and programs to reduce greenhouse gas (GHG) emissions. The consumption of fossil fuels results in the production of GHG, and thus successful climate change mitigation depends upon our ability to reduce energy consumption. The Town is required by the Province to set GHG reduction targets in its Official Community Plan. For more information about the Town's climate action program, visit: <http://www.viewroyal.ca/EN/main/town/projects/climateaction.html>

Here's what you can do to help:

1. Attend the Town's Open House

Tuesday, May 3rd, 2011 (4 - 6 pm) at Town Hall

Wednesday, May 4th, 2011 (6 - 8 pm) at Town Hall

We are encouraging residents to attend one of the open houses. This is your opportunity to tell Council how you think the Town can reduce energy consumption and GHG emissions.

2. Complete the Questionnaire

Online Completion is Encouraged! Go to:

<http://www.surveymonkey.com/s/viewroyalclimateaction>

Drop off or mail your responses by May 11, 2011 to:

Town of View Royal, 45 View Royal Avenue, Victoria, BC V9B 1A6

To keep informed on the Town's Community Climate Action initiatives, please provide your email: _____

1. I am answering this survey as:

☐ A Town resident

☐ A Town business owner residing outside of the Town boundaries

2. Please rank the following environmental issues in terms of priority for action (1=highest, 6= lowest). Please use each ranking only once.

| | | | | | |
|--------------|-------|--------------------|-------|-------------------------|-------|
| Air Quality | _____ | Climate change | _____ | Motor vehicle pollution | _____ |
| Biodiversity | _____ | Energy supply/cost | _____ | Preserving greenspace | _____ |

3. Have increasing energy costs (i.e. gasoline, natural gas, and electricity costs) changed your behaviour in any of the areas listed below?

| | Yes | No | | Yes | No |
|-----------------------------|--------------------------|--------------------------|---|--------------------------|--------------------------|
| Home energy efficiency | <input type="checkbox"/> | <input type="checkbox"/> | Your home location | <input type="checkbox"/> | <input type="checkbox"/> |
| Workplace energy efficiency | <input type="checkbox"/> | <input type="checkbox"/> | Your workplace location | <input type="checkbox"/> | <input type="checkbox"/> |
| Type of vehicle owned | <input type="checkbox"/> | <input type="checkbox"/> | Mode of transportation for commuting | <input type="checkbox"/> | <input type="checkbox"/> |
| Drive fewer kilometres | <input type="checkbox"/> | <input type="checkbox"/> | Mode of transportation for other activities | <input type="checkbox"/> | <input type="checkbox"/> |

4. If you have any other environmental concerns, issues, or suggestions, please list them below.

Community transportation GHG emissions makes up nearly 60% of our emissions, but the calculations are based on an average number of kilometres that is not specific to the Town of View Royal. Can you help us gather information specific to our community (please note for the following questions your information will not be shared and will only contribute to an average)?

5. What is your primary mode of transportation to work?

☐ Personal vehicle (alone)
 ☐ Bicycle
 ☐ Public transit
☐ Ride-share or carpool
 ☐ Walking
 ☐ I don't commute to work

6. What is your one-way commuting distance to work (in kilometres)?

Commuting distance: _____ km ☐ I don't commute to work

7. In your household, how many personal vehicles are licensed for on-road use? (If you don't have a vehicle, check zero and skip to question 11)

☐ Zero
 ☐ One
 ☐ Two
 ☐ Three
 ☐ Four or more

8. Please tell us about the primary vehicle you drive.

Make and model (e.g., Ford Taurus) _____

9. Please tell us how far you've travelled in your primary vehicle.

Approximately how many kilometres did the vehicle travel in 2010? _____ km
 What is the current reading on the odometer of your vehicle? _____ km

10. What type of fuel does your primary vehicle use?

- ☐ Diesel fuel ☐ Gasoline-electric hybrid ☐ Natural gas
☐ Gasoline ☐ Propane ☐ Other: _____

The Town of View Royal is currently evaluating a number of reduction initiatives designed to decrease GHG emissions. Please provide your input on the following initiatives for community buildings, land use, and transportation by indicating the priority each initiative should be given.

11. Please indicate the priority you feel the Town of View Royal should give to the following reduction initiatives for **community buildings** (i.e., all buildings in the Town owned by residents and businesses).

| | Not a priority | Low priority | Medium priority | High priority | Very high priority |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Encourage energy efficiency retrofits for existing community buildings. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Require stringent energy efficiency standards for new buildings. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Encourage renewable energy technology for new and existing buildings. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Implement centralized energy systems for groups of buildings. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

12. Please indicate the priority you feel the Town of View Royal should give to the following reduction initiatives for **land use planning**.

| | Not a priority | Low priority | Medium priority | High priority | Very high priority |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Encourage mixed use buildings in neighbourhood centres. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Increase density and intensity of housing. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Encourage planning for a variety of transportation options. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Encourage pedestrian centred and transit oriented design. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Consider neighbourhood commercial buildings in appropriate locations. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

13. Please indicate the priority you feel the Town of View Royal should give to the following reduction initiatives for **transportation**.

| | Not a priority | Low priority | Medium priority | High priority | Very high priority |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Promote consumer purchase of the most fuel efficient vehicle to meet transportation needs. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Improve alternative transportation infrastructure, such as public transit shelters, trails, sidewalks, crosswalks, etc. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Invest in bicycle infrastructure, such as bicycle lanes and bicycle parking. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Work with BC Transit and senior levels of government to improve regional rapid transit (e.g., light rail, commuter rail, regional bus service). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

14. If you had \$100 to spend on the following issues, how would you allocate it to those listed below? Your answer must total 100 dollars.

| | | | | | |
|--|-------|--|-------|-------------------------------------|-------|
| Emergency preparedness | _____ | Grants to community organizations | _____ | Pedestrian and bicycle improvements | _____ |
| Affordable housing | _____ | Public safety | _____ | Transit improvements | _____ |
| Environmental protection (e.g., invasive species removal, storm water quality) | _____ | Libraries | _____ | Recreation facilities | _____ |
| Road improvements | _____ | Subsidies for green building retrofits | _____ | | |

15. Of your own personal finances on an annual basis, how much money would you be willing to spend on climate change issues?

100 _____ 250 _____ 500 _____ 1000 _____ >1000 _____ 0 _____

Appendix V - Climate Action Questionnaire Results

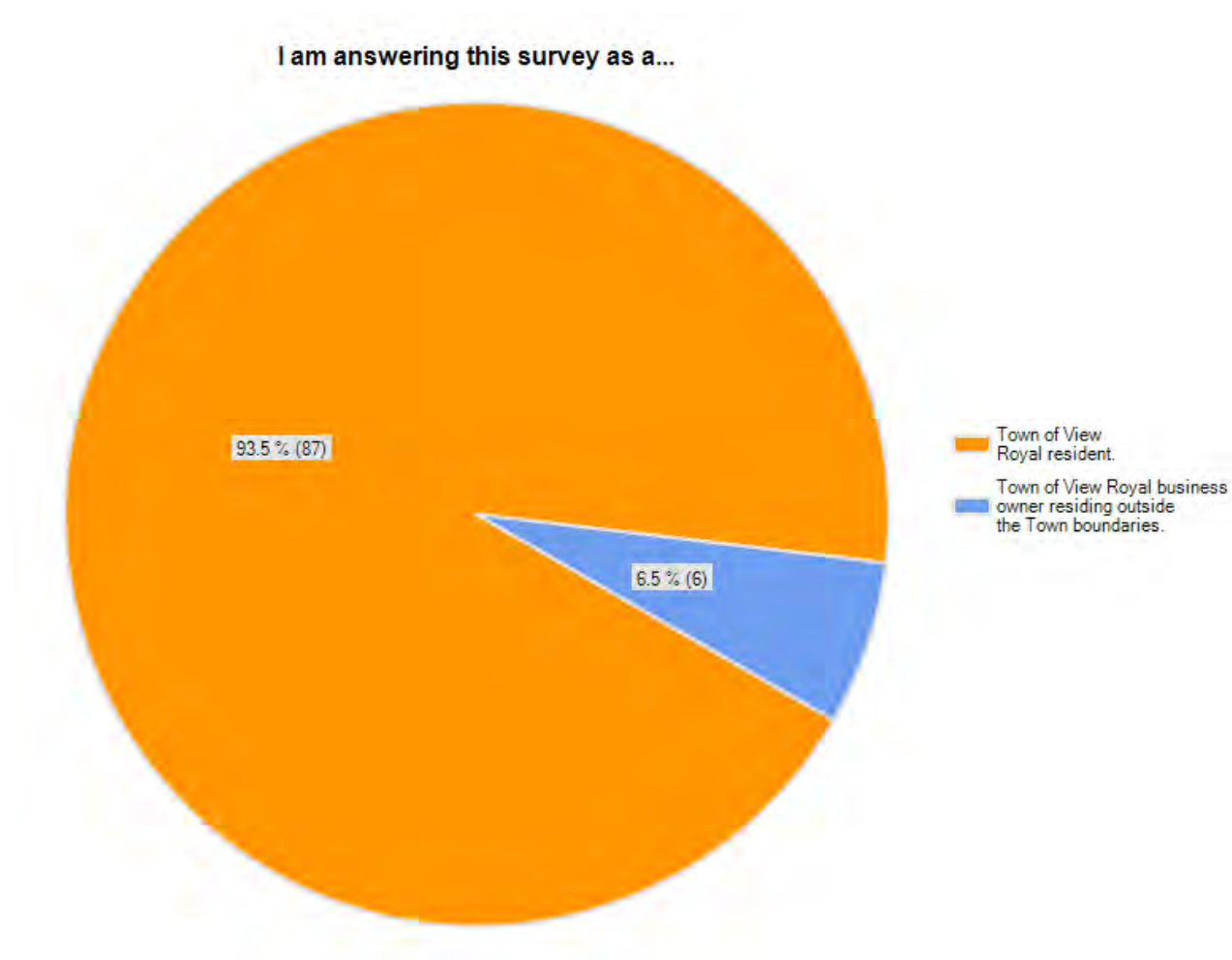
The Climate Action Questionnaire is shown in Appendix IV on page 75. The survey was mailed to all View Royal residents and businesses and was available at the Climate Action Open House on May 3, 2011.

The questionnaire contained questions about transportation choices and behaviours as well as questions on a variety of other climate change and environmental issues. A summary of the responses is provided in the following charts. Open ended responses are provided at the end of this appendix.

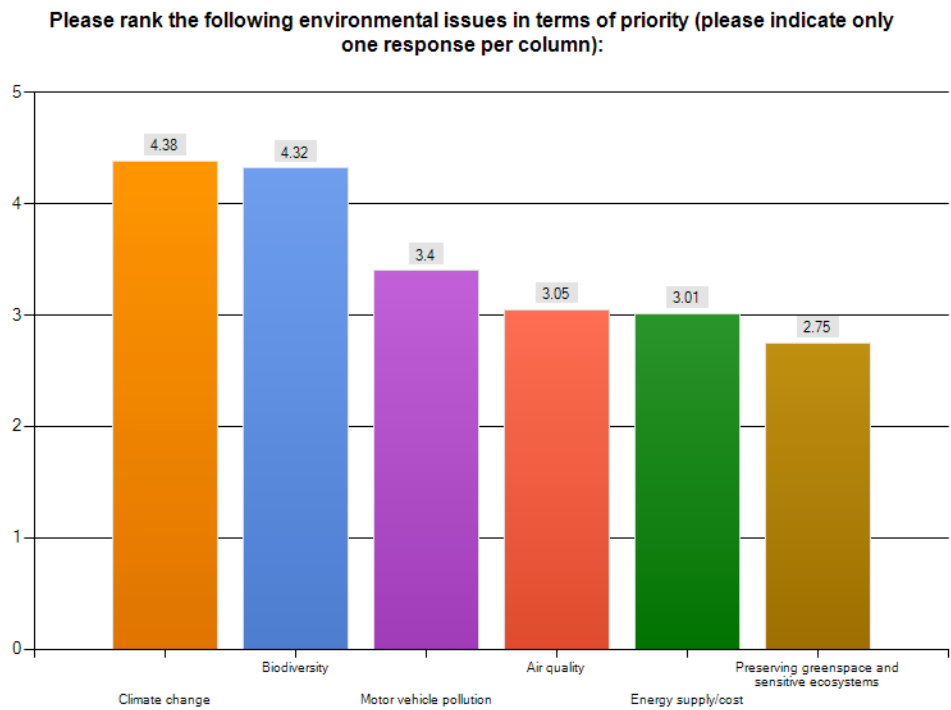
There was a total of 97 responses, the majority (94%) of which were from View Royal residents (six business owners or employees working in View Royal, but residing elsewhere).

I Questionnaire Summary Figures

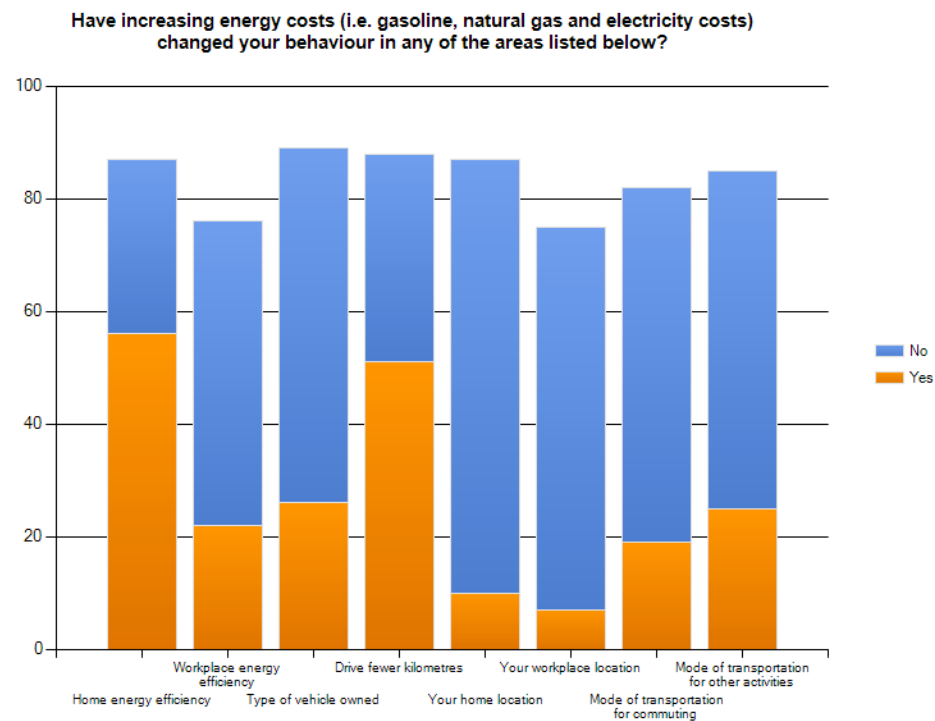
Q1



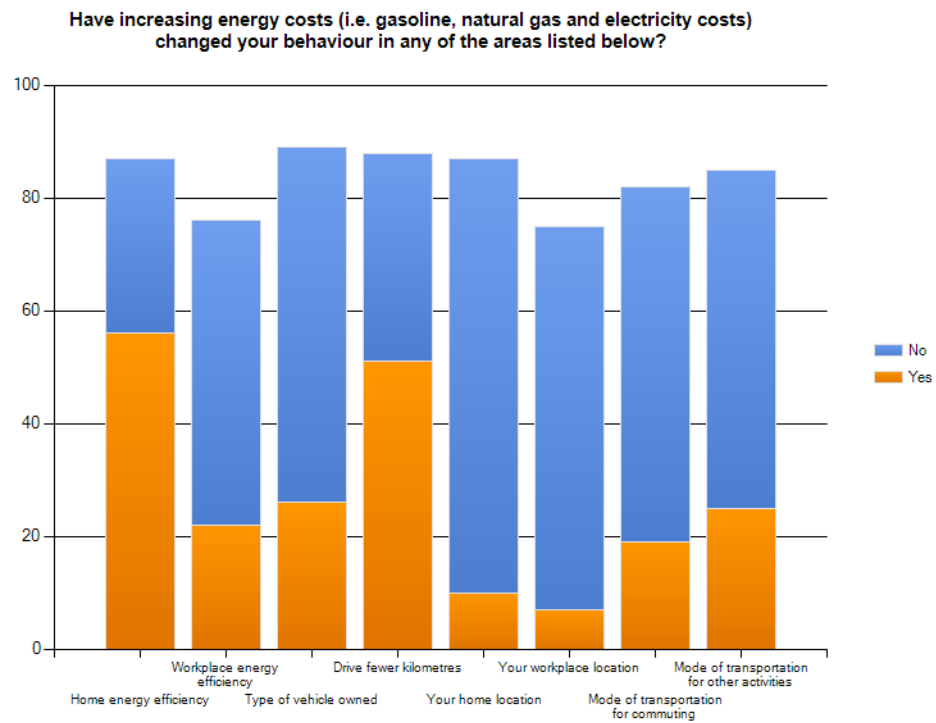
Q2



Q3

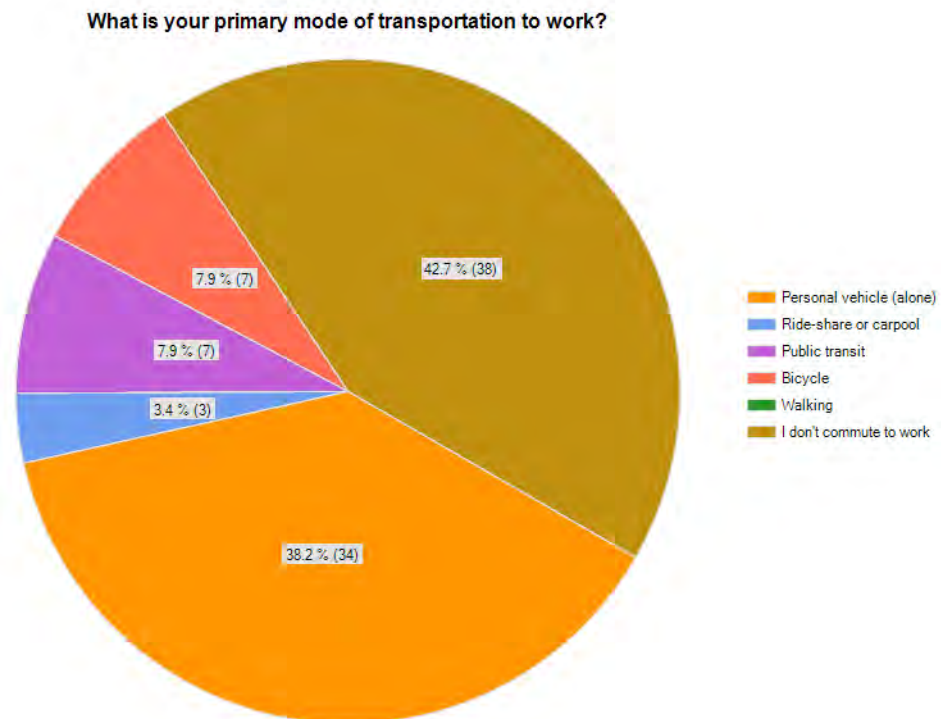


Q3



Q4. See open-ended responses

Q5

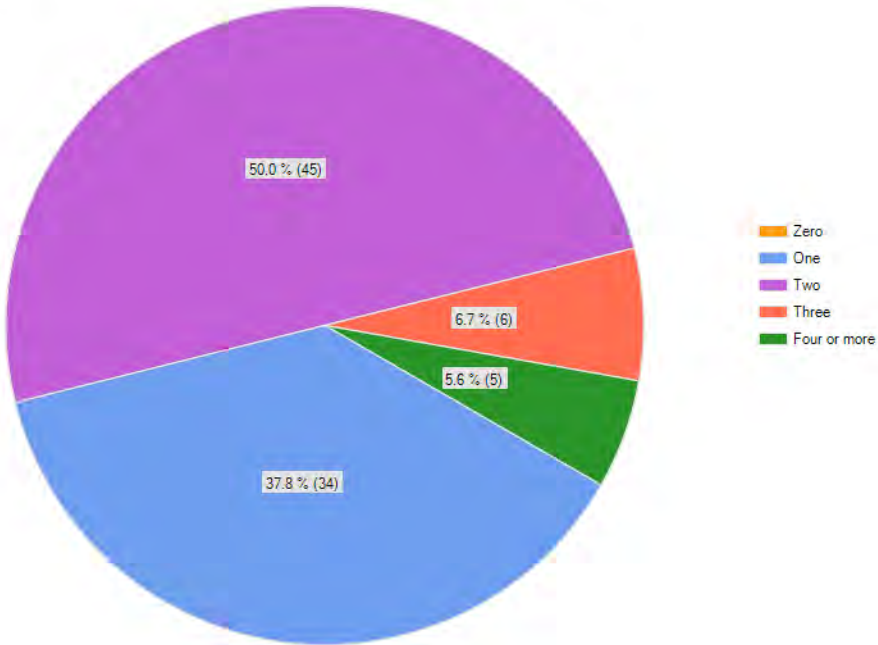


Q6. What is your one-way commuting distance to work (in kilometres)?

| Statistic | Value |
|-----------|-------|
| N | 44 |
| ave | 12.4 |
| median | 11.1 |
| min | 1 |
| max | 50 |

Q7

In your household, how many personal vehicles are licensed for on-road use?



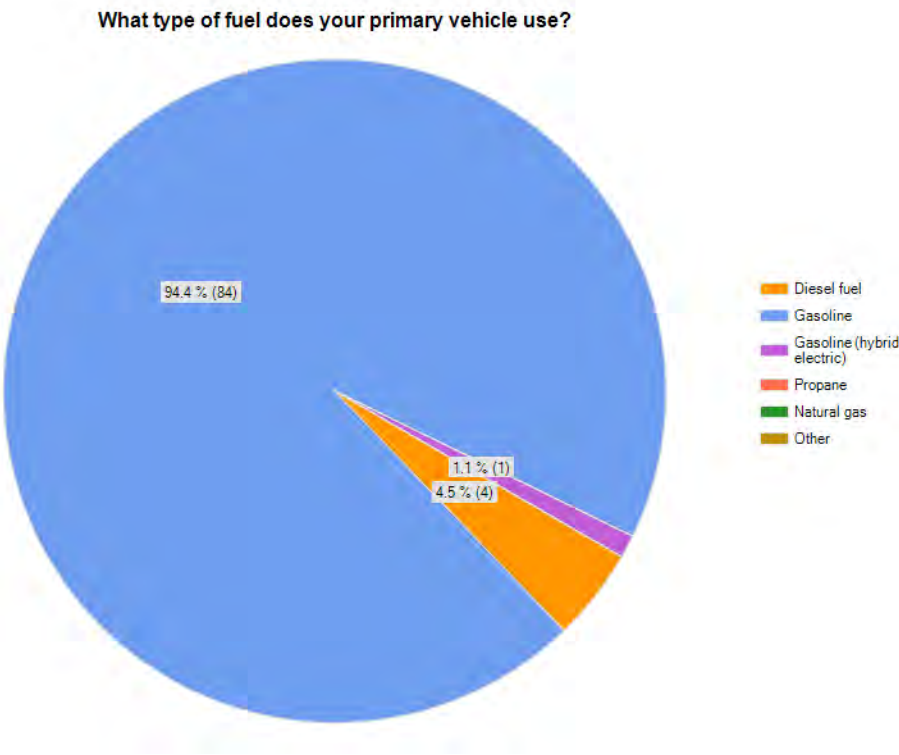
Q8. Average Model Year of Vehicles

| Statistic | Value |
|-----------|-------|
| N | 84 |
| ave | 2003 |
| min | 1989 |
| max | 2010 |

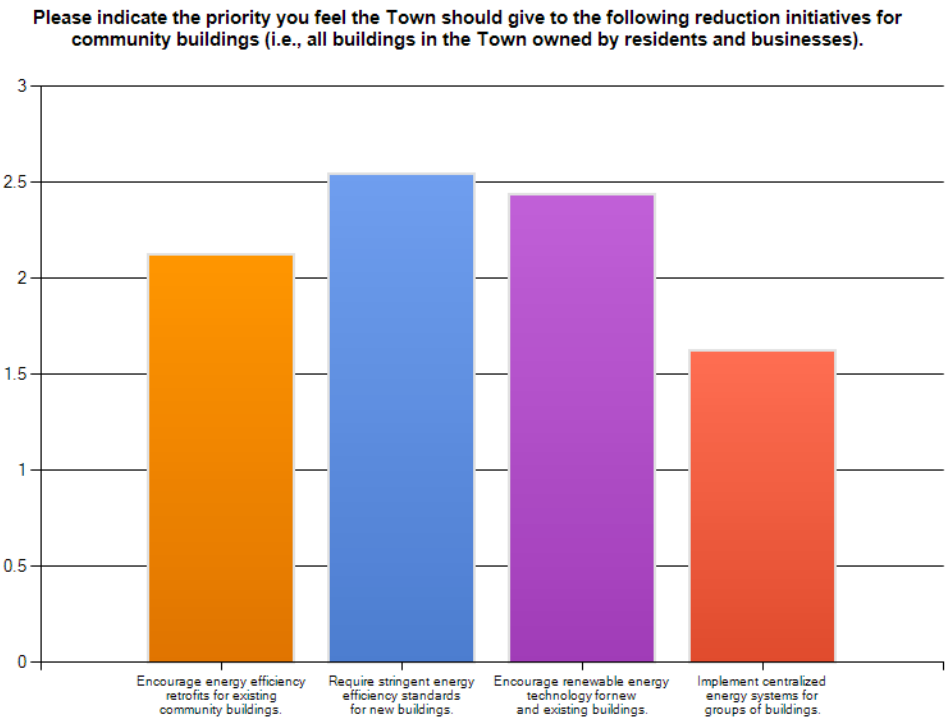
Q9. Average kilometres travelled of respondents in 2010

| Statistic | Value |
|-----------|---------|
| N | 76 |
| ave | 13,664 |
| median | 12,100 |
| min | 3,000 |
| max | 135,000 |

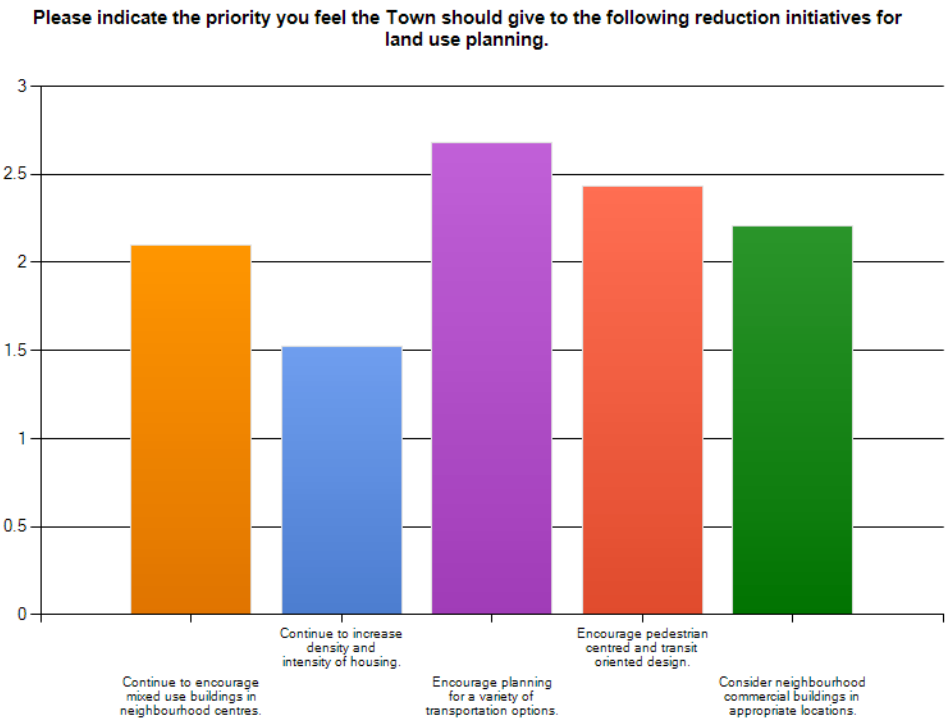
Q10



Q11

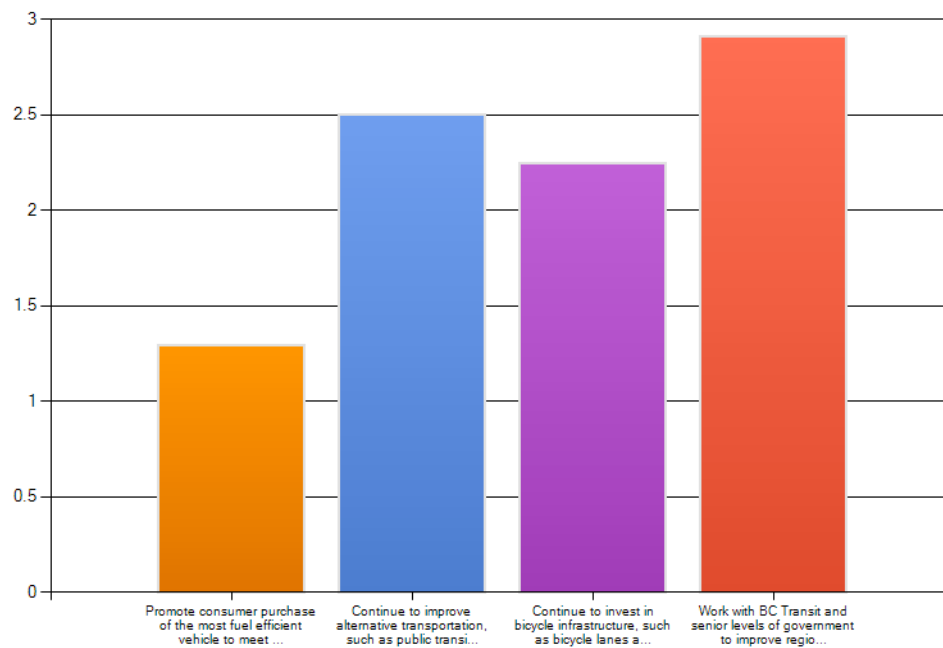


Q12



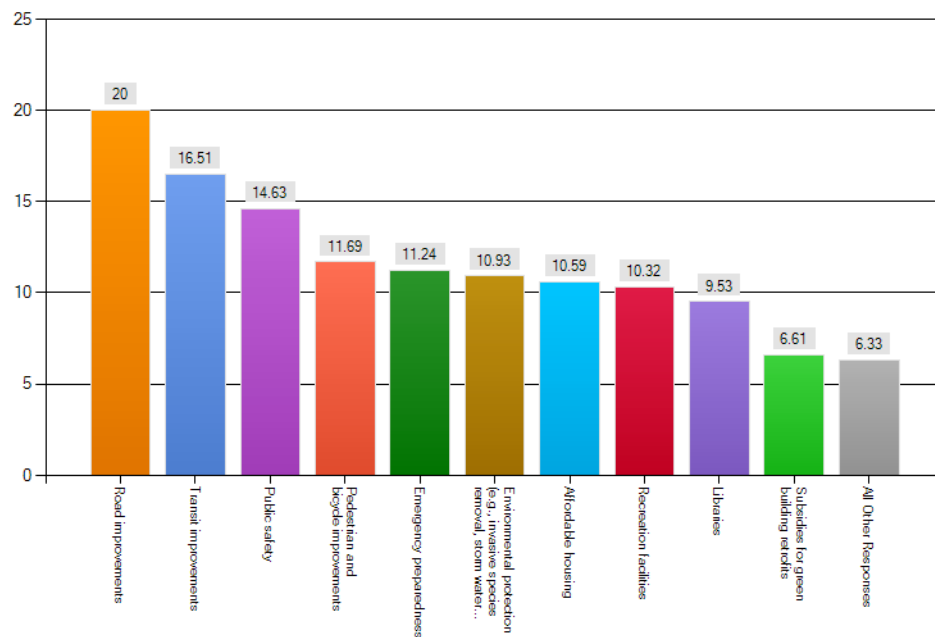
Q13

Please indicate the priority you feel the Town should give to the following reduction initiatives for transportation.



Q14

If you had \$100 to spend on the following issues, how would you allocate it to those listed below? The answer must total 100 dollars.



II Open-Ended Questionnaire Results

This section contains open-ended responses to the questionnaire. Responses transcribed as received by residents.

Q4. If you have any other environmental concerns/issues/suggestions, please list them below.

- *would be nice to have a subsidy for home improvements*
- Invasive species must be dealt with
- *Town needs a better web of off-road paths - foot and cycle*
- Cycling lanes should be 1 metre, no wider. Cycling paths and improvements should be user-pay system
- *We would love to go more green but the cost can be prohibitive, eg. solar panels it would be great if the Town provided subsidies as Saanich does*
- As all environmental issues are interconnected, and affect each other, I find question 2 almost impossible to answer. They all rank number one to me
- *We cannot burn our leaves, but when we go for a walk after dark, you can hardly breathe for fireplaces are burning everything including plastic, foam, etc. makes me angry*
- Concerned about the lack of contribution from larger corporations. Contribution of business seems disproportionate
- *Let us apply ourselves where our efforts will have an effect. Air quality is a regional issue and climate change is a global issue*
- Need improvements to park and ride and additional room to park at Helmken Rd and Hwy 1 and 6 mile. Need safe bike/scooter/motorcycle parking as well
- Lower thermostats to conserve energy
- recycle 90%. only use garbage pickup once every 6 weeks
- *grow own vegetables*
- I am concerned about urban sprawl and the loss of green space
- I would use the bus for transportation if the council would stop digging up the roads
- Will change mode of transport when the council stop messing up the roads and let the busses run as they should
- Environmental concern has changed my behaviour in all areas in Question 3 (not cost)
- *View Royal should enact pesticides bylaw, and dark skies convention*
- I am retired so workplace does not enter into my concerns
- Concerned about recycled sewage. Want assurance it is not finding its way into compost
- *Despite millions of dollars spent on road improvements, there have been no real new provisions for motor vehicles, including public transit buses. The result is that there has been no easing of the "Colwood crawl" and the very slow movement of vehicles through View Royal greatly adds to air and noise pollution. As buses face the same congestion there is no incentive to move to public transit. A significant number of commuters transit View Royal and this number is increasing. Pretending that these vehicles don't exist or that the 2 lanes on the TransCanada and single lane on the Island Highway can handle this traffic without polluting, annoying and sometimes dangerous congestion is at best, misguided*
- Should not permit to develop the greenspace for housing anymore
- The first question is a difficult one to answer, because they are all related. I consider all of these issues a number one priority for action, because they all influence the other. All of these issues are a contributor to climate change and need to be addressed in the present
- *Given that transportation is a significant contributor to GHG emissions and, therefore, very impactful on climate change, I am very interested in all things related to the creation of alternative and effective transportation opportunities*

- *The Town should actively promote residential building energy retrofit. City Green used to supply pamphlets to the Town and I hope they still do so. They should be prominently on display, so that residents while paying their tax bill will see them*
- Noise pollution from cars/trucks that have noise generating devices or motorcycles. Should be a huge fine for this
- RE: question 2 - all options are equally important
- I don not think this should be a priority for local government outside of a plan for use of green spaces
- *Would like to see the railway developed for commuter, between Victoria and the Westshore, and use the railway tracks for electric rapid transit, instead of running a new line parallel to Hwy.1*
- very tired of the BS called AGW or climate change
- *I am concerned that the tragically inept pace of construction on the Old Island Goat Track means I am too often stuck in a glorified parking lot instead of being in motion from Point A to Point B*
- *The 13 bumbling administrations that make up the GVA are lucky so few people actually live here. You'd really be in trouble if you had to move several hundred thousand people around like they do in Calgary or Edmonton, or even a million or more as in Vancouver*
- *It would barely be tolerable if we ended up with a 4-lane road that really got people moving through that Admirals/Craigflower intersection, but I fear we're going to end up with the same 2-lane goat track with precious space dedicated to cyclists, plus a sidewalk that nobody will ever walk on*
- Well done wasting Ottawa's money
- winter is too long
- days are too short
- Global warming is a fraud and just an excuse to raise taxes and screw successful people. We can stop driving all of our cars, and so long as China and India keep rolling along, building new coal generation power stations, nothing will change, except becoming subservient to the Chicoms and the thick, stupid bureaucrats at the
- AL GORE LIES!
- *improvements must be cost effective*
- *I have serious concerns with severely increased traffic emissions during View Royal road improvements. Hiring additional traffic control personnel to work with the flag people could ease excessive idling waits and improve safety. Even one person at each lane merge point could keep a smooth progression. Diagrammatic signage indicating the proper procedure -fill both lanes,merge alternating- would also help*
- Note: We are retired and workplace issues are not applicable
- remediation of old gun range at Thetis Lake. having municipality equipment use Biodiesel (B-20 or higher) whenever possible
- Friday has very little road congestion due to the Friday Flex, if we stagger public employee flex days based off of seniority, highest gets first pick and down the line it would reduce idling, pollution and lessen the need to expand existing infrastructure
- Ensuring the any environmental solutions are balanced against the cost of implementation.
- water quality
- wastewater treatment
- Invasive species seem to be taking over some of our parks
- Cars idling when stopped at the construction

Written Comments (anonymous– placed into comments box) at the May 2011 Open House

- Town could help people get out of their cars by immediately finishing the ramp to Portage Park and investing in a trail along the rail to Hallowell to allow bicycles and strollers easy access to Admirals Walk. Easy implies off highway, not having to navigate Admirals and Island Hwy intersection
- Town could supply a continuously updated collection of grants and grant information for home insulation on the towns website
- Town should demand all new buildings meet highest insulation and GHG standards
- Some things should be done immediately, even dramatically. Other things can only happen over time. I suggest that public engagement and acceptance is critical to this whole process

Written Comments provided on Post-it Notes at the May 2011 Open House

- Implement by-laws that provide tangible benefits to developers and the community
- Implement a system that includes monetary values for ecological goods and services
- Reduce and/or eliminate barriers that hinder the population from taking positive action (e.g., new policy bylaw)
- Encourage buildings with 6 or 8 inch walls, circulating air heat from heat pumps with electric backup
- Have annual awards to buildings that are made to Gold Standard (e.g., a plaque?) given by the local government to recognize and promote greater participation and better practices of 'green' in VR buildings
- Let people know about 'Marathon tanks. Super efficient at retaining heat and guaranteed never to leak
- I would encourage solar hot water. It would have to be made affordable through subsidies or bulk orders
- Invest in cycling and walking opportunities
- Have cyclists stop at roadway rather than a 60 ton truck stopping and staring cyclists should yield and promote less vehicle emissions

Appendix VI - Official Community Plan Map

Note: in the maps presented in Section 2, the percentages designated in the northwestern part of the Town are largely skewed due to the large rural and parkland component in this area.

