



District of Invermere Greenhouse Gas Emission Reduction Strategy

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Background

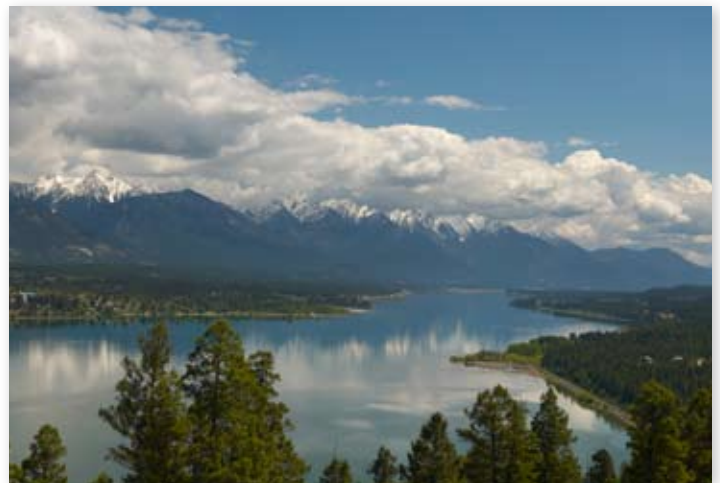
In July 2003, the District of Invermere joined the Partners for Climate Protection (PCP) initiative. This program, developed by the Federation of Canadian Municipalities (FCM) and ICLEI-Local Governments for Sustainability, represents the Canadian component of the more than 700 communities around the world integrating climate change mitigation into their decision-making processes.

The PCP framework guides communities through a voluntary five-milestone process, resulting in the completion and implementation of a greenhouse gas (GHG) emissions reduction plan. The five milestones include:

1. Creating a GHG emissions inventory and forecast
2. Setting an emissions reduction target
3. Developing a local action plan
4. Implementing the local action plan
5. Monitoring progress and reporting results.

It is intended that the results of this project will be used to satisfy Milestones 1-3 in full, and initiate the process of Milestone 4, Implementation. Wildsight will work with both the District of Invermere and PCP to ensure all efforts are recognized by the Federation of Canadian Municipalities.

In addition to the voluntary PCP program, in October 2008 the District of Invermere signed the Climate Action Charter, pledging to work towards carbon neutrality in their operations by 2012. Developed by the Province of British Columbia, the Climate Action Charter requires that signatory local governments monitor and report their GHG emissions on an annual basis. This inventory is the first step in the process of measuring and reducing GHG emissions. Concurrent to this project, a region-wide initiative is underway called 'Carbon Neutral Kootenay', developed by Columbia Basin Trust in partnership with the Regional Districts of East Kootenay, Central Kootenay and Kootenay-Boundary. A consulting group was hired to compile inventories for all municipalities within the Regional Districts. The results of this inventory will likely reveal a slightly different baseline, as the inventory in this document includes some buildings that are owned and leased by the District, but are beyond 'traditional services.' The purpose is to identify all opportunities for emission reduction, and to provide a comprehensive picture of the District of Invermere's emission profile.



The inventory protocol is detailed in the 'Emissions Inventory for the District of Invermere' section below. Further, community emissions are not included in the Carbon Neutral Kootenay project, and are included in this report.

Recent legislation from the Province of British Columbia has provided further urgency to the need for local governments to react to climate change. The Province recently amended the Local Government Act (Bill 27) to include legislation requiring all municipalities to revise their Official Community Plans to include GHG emission reduction targets and reduction strategies by May 2010. In order to assist communities satisfy the requirements of Bill 27, the Province has developed the Community Energy and Emissions Inventory (CEEI), a community-scoped inventory that is provided to every municipality throughout the Province. The CEEI for Invermere was supplemented with local data, as the scope of the project excluded some fuels, including propane and heating oil. Invermere does not have natural gas, and therefore relies heavily on alternate fuels for heating purposes.

Clearly, there are several different voluntary and legislated processes driving the need for the District of Invermere to take action on climate change. Because many of these processes apply to all municipalities across the Province, the cumulative impact of local action can be significant and certainly contribute to the Provincial targets for GHG emission reductions.

Introduction

Climate change has been a reality for millennia, and has influenced the ecosystems and species that exist today. While climate change can be attributed to natural forces and feedback loops in the environment, there are anthropogenic influences that accelerate and accentuate the impact and severity of climate change. The burning of fossil fuels is recognized as one of the most significant contributors to climate change. Urban development and land-use patterns are enhancing the vulnerability and sensitivity of our communities to the impacts of climate change.

Addressing climate change requires an understanding of the opportunities for both mitigation (reduction of GHG emissions) and adaptation (response to, and preparation for, inevitable changes). Adapting to climate change is a locally necessary response option, as the expected changes in temperature and precipitation patterns will inevitably lead to challenges in resource management and community development. Mitigation is a globally responsible response, and is one that can have multiple local spin-off benefits, including: improved air quality; healthier communities; and innovative fuel and waste reduction solutions. The impact of mitigation must be considered in a broad, province-wide context. The Province of British Columbia has set a target of 33% reduction in greenhouse gas emissions from baseline levels (2007) by 2020. The actions taken by communities throughout the province will contribute to this provincial goal, and result in significant emission reductions.

This Inventory Report will detail the total greenhouse gas emissions originating from the activities of the District of Invermere, as well as the local community. The following textbox identifies the sectors that are covered by the inventory:

Corporate Emissions:	Community Emissions*:
Vehicle fleet	Residential Buildings
Municipal Waste	Commerical Buildings
Water and Sewage	Industrial Buildings
Buildings	Waste
Streetlights	Transportation

**The Province of British Columbia provides all communities with an inventory developed through their Community Energy and Emissions Inventory initiative. This data has been used to allow fair comparison with other communities.*

The sectors listed above have been identified by Partners for Climate Protection for inclusion in inventories to satisfy Milestone 1. The community sectors are consistent with the Community Energy and Emissions Inventory, and the municipal sectors are consistent with the requirements of PCP. The Province of British Columbia has set a slightly different scope for corporate emissions, and does not include municipal waste. This inventory has been prepared to include municipal waste, as well some facilities that are beyond the traditional services of a local government. This is to satisfy the requirements of PCP, but also for completeness of the report. The District will not be required to report on the emissions from waste for their carbon neutral commitments.

Methodology

The development of a greenhouse gas emissions inventory is the first step in developing a greenhouse gas emissions reduction plan. A greenhouse gas emissions inventory provides the necessary baseline data to which future inventories will be compared, and reductions can be measured. The inventory also helps to identify areas of inefficiency, and opportunities for GHG emission reduction.

Currently, the joint Provincial-UBCM Green Communities Committee (GCC) is working to develop a British Columbia-specific protocol for measuring and monitoring emissions data in accordance with the targets of the Climate Action Charter. Although protocol and software developed by the Province are still in development, a finalized protocol is expected to be ready in the near future. The methodology implemented for this inventory is flexible enough that any protocol developed at the Provincial level can be adopted by the City if necessary in the future. Furthermore, a framework for developing an inventory to satisfy the Carbon Neutral commitments will be provided to the District through the Carbon Neutral Kootenay initiative.

Recognizing the need for a local-government specific protocol, with the support of the World Resources Institute and the World Business Council for Sustainable Development, ICLEI developed the Local Government Greenhouse Gas Emissions Protocol (LGGHG Protocol). Unique from other GHG emissions inventory protocols, the LGGHG Protocol is aimed specifically to assist local governments develop protocols and methodologies for measuring GHG emissions. The LGGHG Protocol was adapted for use in the GHG emission reduction plan for the District of Invermere.

The three main activities in the development of GHG emission inventory are:

1. Data Collection
2. Data Processing
3. Inventory Reporting

Table 1 outlines the specific information required to complete the GHG inventory. For the District of Invermere, data was collected from utility bills provided by city staff, from fuel logs for the vehicle fleet and from area propane distributors.



Table 1: Data Requirements by Sector

Sector	Information Required	Source
Buildings	<p>Electricity and heating data including:</p> <ul style="list-style-type: none"> • kWh for each building for one complete year • Litres of fuel used in each building (i.e. Natural Gas, Propane, Diesel, etc.) <p>Additional indicators: sq. feet of each building; hours or days of operation</p>	<ul style="list-style-type: none"> • Utility bills • Year end reports or financial reports • Utility provider
Streetlights	<p>Total kWh for streetlights and lighted signs under municipal jurisdiction</p> <p>Additional indicators: types and quantities of each bulb</p>	<ul style="list-style-type: none"> • Utility bills • Year end reports • Utility provider
Vehicle Fleets	<p>Total fuel usage (gasoline, diesel and propane; others where applicable) for each municipal vehicle; or</p> <p>Total fuel usage for contracted vehicles where the service is consistently used over years should also be included (i.e. snow removal or waste collection services)</p> <p>Additional indicators: cost of maintenance per vehicle; average days of use; model and year of each vehicle; present value</p>	<ul style="list-style-type: none"> • Fuel tracking records at municipal fuelling site • Annual kilometres travelled records • Financial records • Fuel providers
Water and Sewage Operations	<p>Electricity and heating data:</p> <ul style="list-style-type: none"> • kWh for all lift and pump stations, sewage treatment operations, etc. Litres of fuel for heating of operations buildings (i.e. natural gas, propane, etc.) 	<ul style="list-style-type: none"> • Utility bills • Year end reports or financial reports • Utility provider
Waste	<p>Total waste in kilograms or tonnes generated by the local government</p> <p>*Note: Waste is not generally separated between community and municipal sources, an estimation based on # of bins may be necessary</p> <p>Additional indicators: number of large bins at local government buildings; recycling bins in LG buildings.</p>	<ul style="list-style-type: none"> • Transfer stations where weight and source of waste are recorded • Estimation based on bins and other waste creation activities

Baseline Year

It was determined that using 2007 as the baseline year for the Corporate GHG emissions would be most appropriate for the following reasons:

1. The District of Invermere has committed to the Climate Action Charter, whereby the District must work towards becoming carbon neutral by 2012. A baseline of 2007 provides 5 years of monitoring leading up to 2012.
2. 2007 has been chosen by the Province of British Columbia as their baseline year for the provincial reduction target of 33% below baseline by 2020.

Emission factors

The quantity of GHG emissions per unit of energy used is determined by an emission factor that is unique to the type of fuel or energy consumed. An emission factor allows one to convert energy consumption into the associated greenhouse gas emissions. The following formula is a simplified example of converting energy data into emissions to demonstrate the use of an emission factor¹:

Fuel consumed x emission factor = emissions

Emission inventories generally report total emissions in units of carbon dioxide equivalents (CO₂e). The 'equivalents' represent a number of greenhouse gases that are weighted, depending on their global warming potential. The main greenhouse gases identified by the Intergovernmental Panel for Climate Change (IPCC) include: carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄), and halocarbons compounds (i.e. chlorine, fluorine, etc.)². The most significant gases resulting from municipal operations are CO₂, N₂O and CH₄, therefore these will be the gases used to calculate the carbon dioxide equivalent (CO₂e) in tonnes. Table 2 outlines the emissions factors used in the GHG inventory for Invermere. Nationally derived emissions factors were used where available. Province-specific electricity emissions factor was used, as published by BC Hydro. As a protocol is developed at the Provincial level, these emissions factors can be adapted.

Table 2: Emission Factors for 2007

Emission Source	Emission Factor	Data Source
Electricity	22 t CO ₂ e /GWh	BC Hydro, 2007
Gasoline	0.002538 t CO ₂ e/L	Transport Canada, 2006
Diesel	0.002784 t CO ₂ e/L	Transport Canada, 2006
Solid Waste	0.482 t CO ₂ e/t waste	PCP/ICLEI Inventory DB
Propane	0.001544 t CO ₂ e/L	Environment Canada, NIR
Heating Oil	0.00284 t CO ₂ e/L	BC Local Government Carbon Neutral Guidelines, 2009

Emissions Inventory for the District of Invermere: Milestone 1

As indicated above, the year 2007 was selected as the baseline year for the District of Invermere GHG emissions inventory. The emissions for the following five sectors were calculated:

1. Municipal vehicle fleet
2. Outdoor/Street lighting
3. Buildings
4. Water and sewage
5. Waste

Emissions Inventory for the Municipal Fleet

The District of Invermere has kept records of the vehicle fleet by the amount of fuel used monthly per vehicle. In 2007, the DOI vehicle fleet consisted of 23 vehicles. Of these vehicles, 9% of the municipal fleet vehicles were more than twenty years old, 52% were from the 1990's, and 39% were 2000 model year vehicles or newer. Table 4 details the total fuel consumed by the regularly use vehicles, and does not include machinery and equipment. Majority of the fuel consumed is by the 23 vehicles included in Table 3. Details of fuel consumption and emissions are being compiled for review by E3 Fleets. This fleet review will identify opportunities for fuel consumption and reduction.

¹ ICLEI (2008). *International Local Government GHG Emissions Analysis Protocol*

² IPCC (2007) *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*

Table 3: Summary of Emissions Produced by Regularly Used Corporate Vehicles

Fuel Type	# of regularly used vehicles	Total fuel used (L)	Total vehicle fuel emissions (t of CO ₂ e)
Gasoline	12	19,522	49.55
Diesel	11	27,804	77.41
TOTAL	23	47,326	126.96

While the detailed fleet information is useful for those vehicles driven on a daily basis, the emissions inventory should provide a snapshot of all fuel consumed, including by vehicles driven on a seasonal basis, as well as by equipment and tools. Table 4 provides total emissions for gasoline and diesel consumed at the Public Works yards, where fuel consumption is tracked monthly.

Table 4: Total Fuel Used by Entire Corporate Fleet

Total gasoline (L)	Emissions from gas (t)	Total diesel (L)	Emissions from diesel (t)	Total Emissions (t of CO ₂ e for fuel)
21,023	53.36	28,259	78.67	132.03

Total Fleet Vehicle Emissions from 2007 = 132.03 t CO₂e

Emissions Inventory for Municipal Outdoor Lighting

For the purpose of this inventory, the streetlights, ornamental lights and street-sign lights encompass only those paid for by the District of Invermere. Table 5 summarizes the energy used and emissions associated with electricity use by all outdoor streetlights and area lighting.

It should be noted that kWh figures for street lighting, ornamental lighting and the Community Hall outdoor lights were calculated for the bulb only based on BC Hydro billing. These data assume an average of 4100 hours of annual use (average of 11.25 hours of use daily) per fixture based on data collected from the International Dark Sky Association.

Table 5: Corporate Outdoor Light Energy and Emissions

Details	Electricity (kWh)	GWh	CO ₂ e (t)
Street lighting	163,590	0.163590	3.60
Ornamental lighting	28,618	0.028618	0.63
Traffic control	2,304	0.002304	0.05
Highway 93/5 Invermere on the Lake sign	2,797	0.002797	0.06
Community Centre outdoor lights	3,280	0.003280	0.07
Pynelogs baseball diamond [Rotary park]	1,515	0.001515	0.03
Tennis court area outdoor lights [Rotary park]	4,479	0.004479	0.10
Mount Nelson park area outdoor lighting	13,265	0.013265	0.29
Off-street lighting at 7th Ave and 4th St (old courthouse complex)	2,133	0.002133	0.05
Off-street lighting beside 7th Ave and 13th St (Valley Echo)	17,579	0.017579	0.39
Off-street lighting at 8th Ave and 7th St (Alley)	11,766	0.011766	0.26
TOTAL	251,326 kWh	0.251236 GWh	5.53 t CO ₂ e

Emissions Inventory for Municipal Buildings

The sources of emissions for municipal buildings are electricity and propane. Using bills from Superior Propane and BC Hydro, the total energy use and emissions for each building were calculated. Using the emissions factors identified in the Methodology section, the total emissions for each building were calculated.

For billing purposes, the District of Invermere distinguishes between energy used for heating and energy used for lighting of their buildings. This distinction was arbitrarily assigned without the use of metering or appliance/fixture energy audits and as such, the classification has not been carried forward into this document.

Table 6 outlines the total energy used and emissions produced by each municipally owned building for both heating and lighting. Note that the Public Yards category encompasses all buildings on that property.

Table 6: Corporate Building Energy use and Emissions

Location	Electricity (kWh)	GWh	Electricity CO ₂ e(t)	Propane (L)	Propane CO ₂ e(t)	Heating Oil (L)	Heating Oil CO ₂ e(t)
DOI office	42,428	0.042428	0.93	4,250.20	6.56	N/A	N/A
Old Municipal office	27,763	0.027763	0.61	N/A	N/A	N/A	N/A
Public works yards	166,548	0.166548	3.66	N/A	N/A	N/A	N/A
Community Hall	27,393	0.027393	0.60	37,159.30	57.37	N/A	N/A
Fire hall	116,537	0.116537	2.66	14,602.30	22.55	N/A	N/A
Courthouse	39,199	0.039199	0.86	11,811.00	18.24	N/A	N/A
Old cabin at Pothole Park	4,183	0.004183	0.09	N/A	N/A	N/A	N/A
Downtown public restrooms	31,594	0.031594	0.70	N/A	N/A	N/A	N/A
Kinsmen Beach concession stand (public change rooms/washrooms on this meter)	17,401	0.017401	0.38	N/A	N/A	N/A	N/A
Library	19,091.99	0.019091	0.42	N/A	N/A	3,908	11.10
Pynelogs Cultural Centre	49,080	0.049080	1.81	N/A	N/A	N/A	N/A
1600 7th St. (temp rental property)	8,050	0.008050	0.18	N/A	N/A	N/A	N/A

Table 7 summarizes total energy use of propane and electricity for all municipal buildings. Total emissions are also expressed in tonnes of CO₂e.

Table 7: Summary for Corporate Building Emissions

Energy Source	Total Consumption	Total Emissions
Propane	67,822.80 L	104.72 CO ₂ e
Electricity	0.549176 GWh	12.90 CO ₂ e
Heating Oil	3,908 L	11.10 CO ₂ e
TOTAL		128.72 t CO ₂ e

Emissions Inventory for Municipal Sewage and Water Operations

Energy use and GHG emissions from the sewage and water operations are calculated separately. This sector encompasses all lift stations, treatment plants and the water supply dam and operations. See Table 8 for a detailed table of the water lift stations, sewage facilities and water source energy use and associated emissions.

Table 8: Corporate Sewage and Water Operations Emissions

Location	Electricity (kWh)	GWh	CO ₂ e (t)	Propane (L)	CO ₂ e (t)
Athalmer sewage plant [lagoons]	330,626	0.330626	7.27	667.00	1.03
Athalmer sewer: Lakeside buffer tank warmers	549	0.000549	0.01	N/A	N/A
Athalmer sewer: additional warmers	29	0.000029	0.01	N/A	N/A
Athalmer sewer: pressure reducing station	6,975	0.006975	0.15	N/A	N/A
Athalmer sewer: lift station	58,071	0.058071	1.28	N/A	N/A
Lift Station 1: Kinsmen Beach	147,942	0.147942	3.26	N/A	N/A
Lift Station 2: Lakeview Lane	35,566	0.035566	0.78	N/A	N/A
Lift Station 3: Fort Point	2,181	0.002181	0.05	N/A	N/A
Lift Station 4: Industrial Park1	2,972	0.002972	0.07	N/A	N/A
Lift Station 5: Industrial Park2	1,483	0.001483	0.03	N/A	N/A
Lift Station 6: Westside1	1,963	0.001963	0.04	N/A	N/A
Lift Station 7: Westside2	5,177	0.005177	0.11	N/A	N/A
Lift Station 8: KPOKL	601	0.000601	0.01	N/A	N/A
PRV#1: 2101 Pine Ridge Dr	8,638	0.008638	0.19	N/A	N/A
PRV#2: 14th St	9,734	0.009734	0.21	N/A	N/A
PRV#3: 14th St/13th Ave	8,027	0.008027	0.18	N/A	N/A
PRV#4: 14th St/13th Ave	7,955	0.007955	0.18	N/A	N/A
PRV#5: 9th St/10th Ave	7,282	0.007282	0.16	N/A	N/A
PRV#6: 13th St/8th Ave	7,694	0.007694	0.17	N/A	N/A
PRV#7: 10A Ave	7,274	0.007274	0.16	N/A	N/A
Patty Ryan chlorination station	24,636	0.024636	0.54	N/A	N/A
Cemetery access pump	4,264	0.004264	0.09	N/A	N/A
TOTAL		0.679639	14.95	667.00 L	1.03

Total municipal sewage and water emissions from 2007 = 15.98 t CO₂e

Emissions Inventory for Municipal Waste

Determining the total waste created by the Municipality is the most difficult value to obtain. Due to the method of disposal (i.e. no scale, general transfer station for use by all citizens and municipal sectors), it is a challenge to identify the amount of waste generated by municipal operations.

The Regional District of East Kootenay tracks the quantity of waste sent to the landfill from curb side collection, however there is no method of distinguishing municipal waste from community waste. For municipal operations that do not weigh and separate their waste, it is best to employ the next best option of data collection, which is by number and size of bins located at municipal facilities. Conversion factors are available to determine the total weight of garbage based on average densities in waste collection bins.

To establish an approximation of the volume of waste generated by District of Invermere operations, it was assumed that large 'dumpster' bins placed immediately beside the following buildings would contain the waste mostly generated by DOI operations. The final volume of waste did not consider lifts (emptying) beyond the contracted once per week schedule, as the vendor indicated that these additional lifts balance out the weeks when the bins may not be at capacity.

Public Works Yard:

1 x 4 yard bin [emptied 1 x per week]

1 x 3 yard bin [emptied 1 x per week] (January 2007 only)

Total annual volume at full capacity: 223 cubic yards of waste

Community Hall:

1 x 4 yard bin [emptied 1 x per week]

Total annual volume at full capacity: 208 cubic yards of waste

Total volume of municipal waste: 431 cubic yards

EPA uncompacted mixed solid waste volume to weight conversion:³
 200lbs/y³ MSW (200 lbs) x (431 y³) = 86,200 lbs or 39.10 tonnes

Total municipal solid waste emissions from 2007: 18.85 t CO₂e

[CO₂e = (39.1 t waste) x (0.482 tCO₂/t waste) = 18.85 t CO₂e]

Summary of Corporate Emissions for the District of Invermere for 2007

Table 9 summarizes the total emissions in tonnes of CO₂e for each sector of the District of Invermere municipal operations in 2007.

Table 9: Summary of DOI Corporate Emissions

Sector	Emissions – CO ₂ e (t)
Vehicle fleet	132.03
Outdoor lighting	5.53
Buildings	128.72
Water/Sewage	15.98
Waste	18.85
TOTAL	301.11 t CO₂e

³Source: Waste Prevention, Recycling, and Composting Options: Lessons from 30 Communities, US Environmental Protection Agency, February 1994, 161 pp.

Emissions Inventory for the Community of Invermere: Milestone 1

As with the Corporate Inventory, there are five sectors for which energy data is collected to complete the community-based GHG emissions inventory. The five community sectors include:

1. Residential buildings
2. Commercial buildings
3. Industrial buildings
4. Transportation
5. Waste

The inventory for community emissions was developed using data provided by the Ministry of Environment's Invermere: Community Energy & Greenhouse Gas Emissions Inventory: 2007 report (CEEI report). The data provided by MoE were used as baseline, and where appropriate additional, localized data was collected to better reflect energy use in the community. As the inaugural year of these reports, the scope of the energy-types collected was limited. Fuel sources for heating beyond electricity and natural gas were not included for the 2007 Inventories, however will be captured in future inventories. For Invermere, the data gaps were reflected in the lack of propane and heating oil data. This data gap was addressed by collecting the best available data (estimates of propane sales in litres), which was provided by the three local propane distributors: Superior Propane, CanWest Propane and Lo-Cost Propane.

Supplemental waste data was provided by the Regional District of East Kootenay landfill records and through the District of Invermere waste management billing.

Community Building Sector

The CEEI municipal inventory looked at three key emission sources: Buildings, On-Road Transportation and Solid Waste. The Tables 10a – 10d summarizes total emissions from these sources.

Table 10a: Community Building Emissions (Electricity)

Building Type	Electricity Use (GJ)	CO ₂ e Electricity Emissions
Residential	120,385	736
Commercial	74,380	455
Industrial	6,287	38
TOTAL		1,229 t CO ₂ e

Table 10b: Community Building Emissions (Propane)

Building Type	Propane Use (L)	CO ₂ e Propane Emissions
All buildings	2,741,948	4,234
Residential Propane	1,096,779	1,694
Commercial Propane	1,645,169	2,540
TOTAL		4,234 t CO ₂ e

Table 10b data is based on approximate volumes of propane delivered to residential, commercial and industrial buildings in 2007. As the CEEI report did not collect propane data for the year 2007, propane gas distributors operating in the community of Invermere provided data in Table 10b. None of the propane companies currently track individual community volume data, only route, zone and region information. The best available data were estimations from area managers. Distributors estimate average percentage of total sales were 40% residential and remaining 60% being commercial customers. These emissions will be included in total community residential and commercial buildings emission figures summarized in Table 10d. Fuel distributors were not able to extract industrial accounts from their commercial accounts.

Table 10c: Community Building Emissions (Heating Oil)

Building Type	Heating Oil Use (L)	CO ₂ e Heating Oil Emissions
All buildings	84,000	239
Residential Heating Oil	63,000	179
Commercial Heating Oil	21,000	60
TOTAL		239 t CO₂e

Table 10c data based on approximate volumes of heating oil delivered to residential, commercial and industrial buildings in 2007. As the CEEI report did not collect heating oil data for the year 2007, the heating oil distributor operating in the community of Invermere provided the data in Table 10c. The distributor has estimated that 75% of total heating oil sold is distributed to residential customers and commercial customers use the remaining 25%. These emissions will be included in total community residential and commercial buildings emission figures summarized in Table 10d. Fuel distributors were not able to extract industrial accounts from their commercial accounts.

Table 10d: Total Community Building Emissions

Building	Electricity (kWh)	Electricity CO ₂ e(t)	Propane (L)	Propane CO ₂ e(t)	Heating Oil (L)	Heating Oil CO ₂ e(t)	Total Building Emissions CO ₂ e(t)
Residential	120,385	736	1,096,779	1,694	63,000,	179	2609
Commercial	74,380	455	1,645,169	2,540	21,000	60	3055
Industrial	6,287	38	unknown	unknown	unknown	unknown	38

Community Transportation Sector

Transportation data collected through the Community Energy and Emissions Inventory process are based on data provided by ICBC. Without tracking the mileage for every vehicle in a community, it is necessary to develop the inventory based on average kilometres driven annually, fuel type, and vehicle type. It is acknowledged that this is a less than ideal approach to tracking emissions in the transportation sector, however until mileage is collected universally, it is the best available approach to determining the baseline.

Table 11: Community On-Road Transportation Emissions

Energy Source	Energy Use (L)	CO ₂ e Emissions
Gasoline	5,631,874	14,065
Diesel	2,165,793	6,020
Mobile Propane	85,796	130
TOTAL EMSSIONS		20,215 t CO₂e

Table 11 data does not account for vehicle traffic through the community for tourists. It would be advised that a GHG emission reduction campaign be developed to target visitors to the community, particularly when the community implements projects to reduce their own GHG emissions. Any improvements to trails, walkability or public transit will not only reduce local resident transportation, but will reduce emissions from vehicle use for tourists and second-homeowners. Although the reductions of vehicle use for non-residents will not be reflected in future inventories, there are benefits to encouraging a change in behaviour, including improved air quality and promotion of healthy and active lifestyles.

Community Waste Sector

The Regional District of East Kootenay provided curbside collection data for Table 12. The RDEK recorded the amount of solid waste received at the Columbia Valley Landfill from curbside collection in the Invermere for February 2007 through to December 2007. The DOI changed to their current solid waste management vendor between January and February 2007. The previous vendor mixed bin content from private waste removal contracts with the municipal curbside waste prior to arriving at the landfill. The RDEK estimates that January 2008 data for waste curbside collection is likely very similar to what would have been generated at the same time in 2007 and as such, the January 2008 data has been used to complete the curbside calculations for the 2007 calendar year.

Table 12: Community Solid Waste Emissions

Community Solid Waste	Weight (t)	CO ₂ e Emissions
Curbside collected	417.07	26
Community bin collected*	1,621.77	781.69
TOTAL		807.69 t CO₂e

Data was collected from the Regional District of East Kootenay and through the DOI solid waste management vendors to determine a number reflective of the actual waste disposal from the community of Invermere. The following section identifies emissions from the disposal of waste in the community.

Curbside Collected Waste:

January 2008 data (32.4 t) + February 2007 to December 2007 data (384.67 t) = 417.07 (417.07 t waste) x (0.482 t CO₂e/t waste) = 26 t CO₂e

Community Bin Collected Waste*:

17,877 y³ of waste = 1,621.77 t (refer to EPA conversion factor found in municipal solid waste section above) (1,621.77 t waste) x (0.482 t CO₂e/t waste) = 781.69 t CO₂e

**It is important to note that this figure provides only an estimate of the waste contained within the bins at capacity. It is difficult to accurately assess the source of the waste collected in the bins placed throughout Invermere as often, the bins are utilized by individuals who do not reside within the community. Often the bins serve as mini transfer stations for residents of surrounding communities who do not have curbside waste collection services. A larger challenge to collecting an accurate community waste baseline is that the bins are also the main receptacle for tourist-generated waste. In peak season, the bins are often overflowing with waste generated by non-residents.*

Summary of Community Emissions

Table 13 summarizes total emissions for the community of Invermere. The baseline summary will be used to guide the development of emission forecasts, targets and reduction strategies. The Province of British Columbia will be providing annual updates to communities through the Community Energy and Emissions Inventory to assist communities in tracking and monitoring GHG emission reduction. The reports can be accessed at: www.toolkit.bc.ca.

Table 13: Summary of Community Emissions

Sector	CO ₂ e (t)
Residential Buildings	2609
Commercial Buildings	3055
Industrial Buildings	38
Vehicles and Transportation	20,215
Waste	808
TOTAL	26,725 t CO₂e

Emissions Forecast & Reduction Targets: Milestone 1 & 2

Located on the shores of Windermere Lake in British Columbia's Rocky Mountain Trench, the District of Invermere continues to experience a growing permanent and second homeowner population. Growth of the permanent population is expected to increase between 1.5% and 2.5% per annum over the coming decade. In general, the emissions profile parallels projections in resident population. However, similar to other East Kootenay communities, Invermere also expects increased residential development that will accommodate the ongoing influx of part-time resident and tourist populations. The District will likely have to expand utility services and possibly increase infrastructure beyond what is required for the permanent population to accommodate the needs of part-time residents and tourists.

District of Invermere Forecast and Targets

Table 14 details specific forecasts based on the energy and GHG emissions that are a direct result of District of Invermere corporate operations only. It should be noted that the exercise of forecasting emissions, as stated by the Community Energy Association of BC is 'inherently flawed' because of the inability to predict future availability of technologies, the economy or the potential for behavioural change. Forecasting, however, is useful in allowing us to compare scenarios against 'business as usual' to determine realistic reduction targets.

The forecasts below are best estimates based on expected corporate growth over the coming decade. If the District decides to pursue the development of a multi-use community centre or deviate significantly from expected operations, the forecast should be adjusted to reflect those plans.

Table 14: Forecasts for Business As Usual Emissions for the District of Invermere (2020)

Sector	Forecasted Changes	Resulting Emissions Increase (%)
Buildings	<ul style="list-style-type: none"> No significant plans for expansion to District buildings or facilities Discussion around the potential of a multi-use community centre, however this is not included in the budget projections Potential expansion of staff, which may require new office facilities Growth will not directly mirror populations projections, however a modest expansion of 1% by 2020 is estimated 	4%
Streetlights	<ul style="list-style-type: none"> Plans indicate a reduction of streetlights due to revision of OCP standards for streetlight placement (i.e. increasing distance between lamps) New developments will require streetlights, therefore an increase of 2% annually, consistent with growth projections is estimated 	0.4%
Water & Sewage	<ul style="list-style-type: none"> New developments will require access to the water and sewage operations, therefore new lift stations are expected Development of new parks and greenspaces will require irrigation Population growth, development of greenspace, and changes to climate are going to influence water consumption by an estimated 2.5% annually 	1.3%
Vehicle Fleet	<ul style="list-style-type: none"> Expected to mirror population growth at 2% annually No major purchases or changes to the current fleet expected 	8.8%
Waste	<ul style="list-style-type: none"> Expected to increase at same rate as building expansion, therefore a 1% increase annually is likely. 	0.6%
TOTAL INCREASE FROM BASELINE (%)		15.1%

Table 15 summarizes the forecasted emissions profile for the District of Invermere operations, comparing the baseline scenario with the anticipated increases in each of the sectors.

Table 15: Summary of Emissions Forecast for the District of Invermere (2020)

Sector	Baseline Emissions 2007 (t CO ₂ e)	BAU Emissions 2020 (t CO ₂ e)	Result
Buildings	128.72	141.59	BAU: Total increase of 46.28 tonnes, or ~15% over the baseline year of 2007 by 2020.
Streetlights	5.53	6.64	
Water & Sewage	15.98	19.98	
Vehicle Fleet	132.03	158.44	
Waste	18.85	20.74	
TOTAL	301.11 t CO₂e	347.39 t CO₂e	

When developing reduction targets for the District of Invermere, it must be kept in mind that there is forecasted to be a 15% increase in emissions by 2020 and that there is already an established interim target of carbon neutral by 2012. The carbon neutral target already commits the District to the following actions:

- a. Report on GHG emissions annually
- b. Undertake ongoing efforts to reduce emissions as much as possible through operational and behavioural changes
- c. Offset any remaining GHG emissions by purchasing high-quality offsets through the Pacific Carbon Trust.

Several options for GHG emission reduction targets were considered for the District of Invermere beyond the carbon neutral target.

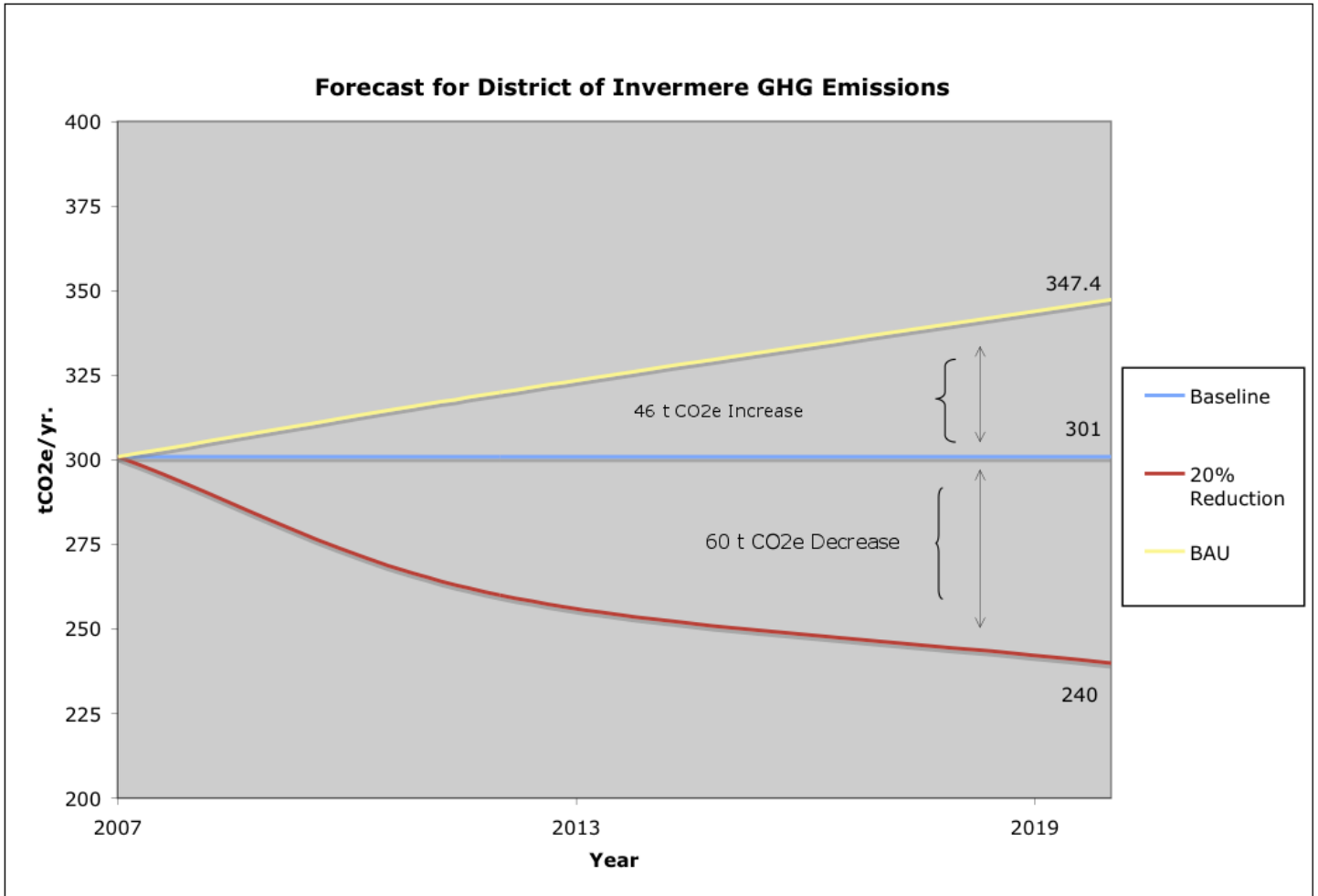
1. Under the BC Greenhouse Gas Reduction Target Act (GGRTA), Provincial greenhouse gas emissions must be 33% below 2007 levels by 2020. The GGRTA also sets a target of an 80% reduction in GHG emission levels below 2007 baseline by 2050.
2. Partners for Climate Protection recommends a reduction for corporate emissions of 20% below baseline emissions within ten years.

For the District of Invermere, it was determined that the target of 20% reduction of GHG emissions below baseline by 2020 would be the most realistic and achievable target. The following points summarize the implications of the target of 20% below baseline emissions by 2020.

- A 20% reduction from baseline emissions would require the reduction of 60 tonnes of GHG emissions, resulting in a new baseline of 241 t CO₂e
- According to the BAU forecast, by 2020 the District of Invermere can expect an increase in their annual emissions by 15%, or 46.28 tonnes by 2020.
- To capture the forecasted emissions, the District of Invermere must reduce a total of 106.5 tonnes of GHG emissions by 2020 to reach the desired 241 t CO₂e.

Figure 1 below demonstrates the reduction target of 20% below baseline by 2020, considering the forecasted emissions.

Figure 1: Reduction Target and Forecast for the District of Invermere



Community of Invermere Forecast and Targets

Community emissions forecasts rise and fall along with changes in population and economic projections. The District of Invermere expects population and economic gains to average out to approximately 2% per annum over the next decade.

Table 16: Community of Invermere Forecasted Emissions (2020)

Sector	Forecasted Changes	Emissions Increase from Baseline (%)
Residential Buildings	<ul style="list-style-type: none"> It is expected that second homes will account for an average of 45% of all new units in the next decade. Increase in 'green building' and more stringent building codes, requiring reduced energy and water consumption likely to be developed to meet the climate action charter commitments Housing affordability is the District's priority issue when considering any strategies addressing residential development Residential buildings utilize approximately 40% of all propane distributed to community buildings and approximately 75% of bulk heating oil sold within the community. Residential propane and heating oil emissions (as listed in the Inventory at the beginning of this document) are included in this forecast figure Emissions generated by residential heating oil are expected to decline as aging systems and rising fuel costs encourage alternatives. 	2.9%
Commercial Buildings	<ul style="list-style-type: none"> 2% annual growth expected Increase emissions from commercial buildings, of approximately 10% by 2020 Commercial buildings utilize approximately 60% of all propane distributed to community buildings and approximately 25% of bulk heating oil sold within the community (Industrial buildings are grouped in as 'commercial' buildings by fuel distributors but are expected to account for a small amount of this figure) Commercial propane and heating oil emissions (as listed in the Inventory at the beginning of this document) are included in this forecast figure 	2.3
Industrial Buildings	<ul style="list-style-type: none"> Increase in industrial buildings expected to parallel commercial developments; 2% annual growth 	Negligible
Transportation	<ul style="list-style-type: none"> Small increase in local vehicle use with new full time units, but majority associated with summer tourists and vacation properties Current inventory methodology does not capture transportation emissions generated by shadow populations (tourists, second homeowners, etc.) and therefore, those emissions are not forecast in this document For now, estimate considers annual 2% increase, mirroring population growth to remain comparable with baseline data Transportation forecast should be revisited, as the CEEI's are refined for transportation. 	15.1%
Waste	<ul style="list-style-type: none"> Increase in waste by approximately 3% as collected from new developments 	0.9%
TOTAL INCREASE FROM BASELINE (%)		21.1%

Table 17 summarizes the baseline and forecasted business as usual scenarios.

Table 17. Summary of Emissions Forecast for the Community of Invermere (2020)

Sector	Baseline Emissions 2007 (t CO ₂ e)	BAU Emissions 2020 (t CO ₂ e)	Result
Residential Buildings	2,609	3,392	BAU: Total increase of 5687 tonnes, or ~21% over the baseline year of 2007 by 2020.
Commercial Buildings	3,055	3,666	
Industrial Buildings	38	46	
Transportation	20,215	24,258	
Waste	808	1,050	
TOTAL	26,725 t CO₂e	32,412 t CO₂e	

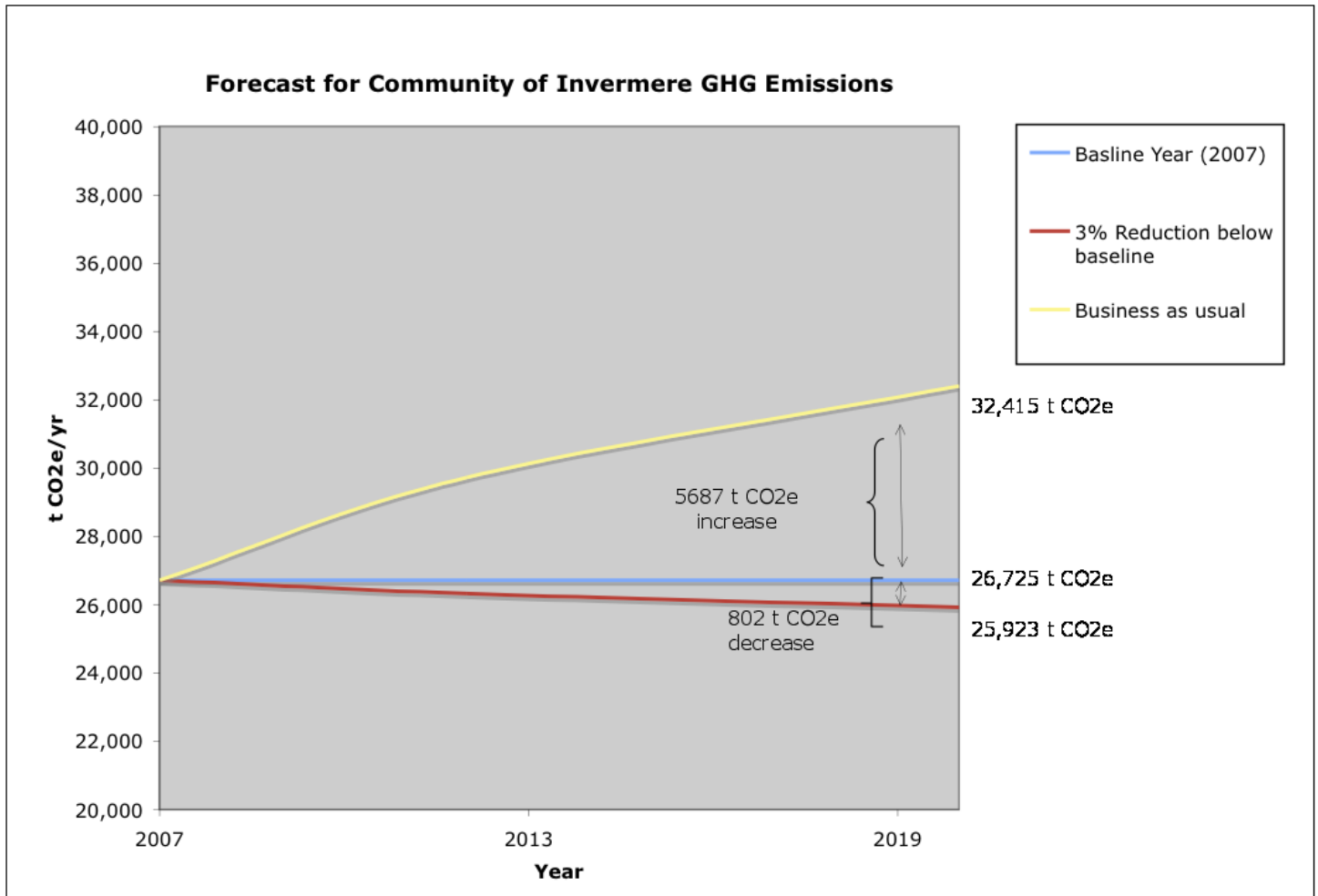
Partners for Climate Protection recommends setting a reduction target of 6% below baseline levels for community emissions. Community emission reductions are much more difficult to achieve than corporate emissions due to the reliance on behavioural change and participation in projects. Furthermore, the initiatives may require financial investment from the District of Invermere to implement some of the reduction options.

It would be advised that the community consider setting a target of 3% below baseline emissions as a preliminary target. The emission reductions should be monitored, and if progress is being made, the reduction target can be revised to be more aggressive. The nature of the community, having significant influence from tourists and part-time residents can add a challenge to the successful implementation of reduction strategies. It is very plausible that a more aggressive target could be adopted in the near future. Further, amending policies to require new homes to be built to optimal energy efficient standards will reduce the forecasted emissions.

The following points summarize the implications of a 3% reduction below baseline by 2020. The emission forecast and reduction scenario is graphically demonstrated in Figure 2.

- A 3% reduction from baseline emissions would require the reduction of 801.75 tonnes of GHG emissions, which would result total of 25,923 t GHG emissions.
- According to the BAU forecast, by 2020 the community can expect an increase in their emissions by 21%, or 5687 tonnes.
- To capture the forecasted emissions, the community must reduce annual emissions by 6489 tonnes of GHG emissions by 2020 to reach the desired 25,923 t of emissions.

Figure 2: Forecast and Reduction Targets for the District of Invermere



Summary of Forecasts and Reduction Targets

District of Invermere [Corporate Emissions]

- Forecasted increase of 46.28 t CO₂e over baseline by 2020
- Reduction target of 20% below baseline by 2020
- Total reductions required to meet target: 106.5 t CO₂e

Community of Invermere

- Forecasted increase of 5687 t CO₂e over baseline by 2020
- Reduction target of 3% below baseline by 2020
- Total reductions required to meet target: 6489 t CO₂e

Greenhouse Gas Emission Reduction Strategies: Milestone 3

Once the GHG emissions inventory has been used to develop a forecast and targets, Milestone 3 of the Partners for Climate Protection framework recommends the development of a greenhouse gas emission reduction plan. In developing the greenhouse gas emissions reduction plan for Invermere, initiatives were considered based on the following three criteria:

- **Cost-Effectiveness**
Is the cost of the initiative going to be recovered through decreased energy costs? Is there a less than 10-yr. payback? Is there funding available to support implementation?
- **Greenhouse gas emission reduction potential**
What is the estimated reduction of GHG emissions as a result of this initiative? Where possible, the quantity has been estimated.
- **Ease of Implementation**
Are there communities that have successfully implemented this initiative? Are there materials and resources already available? Is there capacity either at the City or within the community to implement this initiative?

Developing a reduction plan requires input from community and staff, and ideally will include an estimation of the reduction potential for the recommended strategies. Since January 2009, there has been ongoing communication with staff as well as one main consultation each with DOI executive staff, Mayor and Council. A community workshop was held for the public, to provide an opportunity for input into the GHG emission reduction plan.

On May 26th 2009 a meeting was held with DOI executive staff, and with the Committee of the Whole the following day to present the preliminary inventory, and to determine the reduction strategies that staff and elected officials would like to explore.

On June 10th 2009, approximately two-dozen residents attended a community workshop to discuss their ideas for reducing GHG emissions in Invermere. Mayor Gerry Taft opened the 3-hour event, addressing representatives from various community groups, a staff member from the DOI and Council member. The proceedings from that meeting are located in Appendix A and include all of the recommendations that were put forward by the community, as well as a summary of the observed changes in the community. Because this climate action plan focuses on initiatives that best meet the criteria described above, there are many great ideas developed in the engagement sessions that are not included in this report. Further research may be necessary to determine the feasibility of the ideas, and should be considered perhaps by local community groups to lead in the future.

The following sections summarize the reduction strategies for the District of Invermere corporate and community emissions, based on the input from the sessions described above, as well as from a great deal of research that has been done to identify reduction strategies that have been successfully implemented in other communities. The full details of each recommendation (funding opportunities, GHG emission reduction potential, case studies, etc.) can be found in Appendix B for the Municipal emissions and Appendix C for the community.

Unique to many greenhouse gas emission reduction strategies, the reduction opportunities in this report have been quantified where possible, based on engineer studies, case studies or successful application in other communities. These quantifications are an estimate, and may or may not reflect the actual reductions that will be achieved through implementation. The reduction strategies have been developed with the intention of meeting the reduction targets set for 2020. Where possible, case studies and suggested policies have been included in the report and appendix so that implementation is successful. Communities across Canada have facilitated implementation of reduction strategies through a variety of means, but all successful initiatives must have a champion or leader to ensure plans are followed through, and successes are monitored.

The Provincial government has mandated that all Official Community Plans must integrate GHG emission reduction targets and strategies by May 31st 2010. This is an opportunity for some of the strategies below to be integrated into the planning processes for the community. As part of the OCP, targets may be amended if necessary, upon regular review of the OCP. The development of a sustainable and resilient community requires integration of planning processes, and a commitment to a dynamic approach to decision making. This plan is intended to provide guidance towards a sustainable community, but is only one step in the process. Successful implementation will require commitment from the District and community, and a desire to see change.

Municipal Energy and Emission Reduction Opportunities

The Municipal target of 20% below baseline emissions by 2020 means a reduction of 106.5 t CO₂e must be achieved. The following sections summarize the emission reduction strategies that will help the District of Invermere achieve these reductions, and meet the targets. Although not the focus of this particular report, these reduction strategies can also be used in meeting the carbon neutral target for corporate emissions by 2012. These two projects are complimentary in their approaches and outcomes. While the carbon neutral target focuses on annual emission inventories, and using offsets to achieve neutrality, the strategies included in this report are intended for long-term implementation and GHG reduction, ultimately lowering overall emissions and reducing the cost of purchasing offsets.

Reduction strategies are broken into the sectors of buildings, utilities (streetlights and water operations), vehicles and waste. Table 18 summarizes the recommendations. See Appendix B for details of each recommendation, including case studies and examples of successful implementation. Where possible, estimations of the potential greenhouse gas emission reduction have been quantified. These quantifications are based on successful implementation of the strategies in other communities, therefore results may vary in the application in Invermere. In many cases, a full assessment is required to determine accurate reduction potentials.

Table 18: Recommended Municipal Emission Reduction Strategies

Sector	Recommendationswe	Estimated Reduction Potential
Buildings	<ul style="list-style-type: none"> • Replace all T12 lamps with T8 (high-performance if desired), and magnetic ballasts with electronic ballasts at the time of retrofit. • Install occupancy light sensors where possible. • Remove all incandescent bulbs and replace with compact fluorescent bulbs. • Perform lighting performance assessment to reduce number of lamps where light levels are excessive. 	Certain reduction of lighting costs, but minimal GHG emission reduction due to the low emission factor of electricity.
	<ul style="list-style-type: none"> • In buildings that are used on a regular basis, programmable thermostats should be installed and checked regularly. In buildings with sporadic occupancy, consider installing new electronic standard thermostats that are easily accessible for occupants to adjust to marked temperatures when the building is not in use. • Weatherstripping on all doors and windows should be checked and replaced where necessary. • Apply insulation to the following uninsulated buildings/areas: Public Works shop; Courthouse cell block; Downtown washroom building; • Upgrade insulation to buildings during scheduled roof replacements (e.g. Community Hall). • Consider converting the oil furnace in the Library to air sourced electric heat pumps. • When replacing electronic equipment, purchase EnergyStar rated products. • Develop a protocol for ensuring all non-essential electronics are powered down completely (i.e. unplugged from wall or switching off the power bar they are plugged in to) each evening and over weekends/holidays 	A comprehensive program of weatherstripping, caulking, and sealing building envelopes can reduce infiltration and heat loss, leading to energy savings.
	<ul style="list-style-type: none"> • Develop a Green Building Policy for all future new buildings, or acquisitions of buildings by the Municipality. Set a minimum performance standard for new buildings. • Develop an energy and water conservation policy for all existing buildings, which guides specifications for retrofits or additions and encourages the implementation of renewable energy. • Review and adapt the Official Community Plan to reflect changes in municipal buildings policies. 	Reduce emissions from future buildings (reduced forecast). Implementing green building standards to new buildings could cut energy use by up to 30%. Forecasted emissions could be reduced by 43 t CO ₂ e.
Streetlights	<ul style="list-style-type: none"> • Replace mercury vapour lamps at Community Hall as required with high-pressure sodium lamps. • Replace traditional light fixtures with flat-lens fixtures that direct light more efficiently downwards. 	Potential modest GHG reduction with certain reductions in operating costs.
	<ul style="list-style-type: none"> • Investigate the feasibility of solar-powered lights at public parks and pedestrian areas. • Pursue partnership and funding to support a solar light project as a demonstration of dedication for alternative energy sources. 	High public awareness initiative, very minimal GHG reduction.

<p>Water & Sewage</p>	<ul style="list-style-type: none"> • Install variable speed drive at the sewage treatment plant. • Investigate the feasibility of installing a heat reclamation system at sewage treatment plant. • Investigate the feasibility of building micro-hydro generation facility that would bypass the pressure reducing stations to generate hydroelectricity within the water system. • Set a community water conservation target. This can be a combined consumption reduction and efficiency target (i.e. 20% reduction in consumption). • Implement and actively promote a community-wide water conservation initiative to address conservation targets, and to reduce emissions from water and sewage operations. • Expand low-flow water fixture exchange program to include businesses, schools, and other community organizations. Ensure all municipal buildings are retrofitted with low-flow fixtures. • Install rain barrels at all municipal facilities where watering is carried out manually. • Investigate potential use of moisture sensors for municipal irrigation systems to avoid unnecessary watering. Educate and assign specific staff responsible for adjusting irrigation systems to make sure they do not operate on days when it has rained. 	<p>VSD and heat reclamation systems will reduce energy costs and contribute to modest GHG reductions. Micro-hydro station are excellent demonstrations of the DOI's commitment to sustainability and can supplement electricity used for water and sewage facilities. Low emissions factors for hydroelectricity result in small GHG reduction potential.</p> <p>Community reduction in water consumption results in reduced emissions for water treatment and pumping. With 20% target, approximately 4 t CO₂e can be reduced.</p>
<p>Vehicle Fleet</p>	<ul style="list-style-type: none"> • Develop a general Policy for all vehicle and equipment maintenance. Integrate the requirement for regular efficiency maintenance measures (tire pressure, filters, etc.), the Idling Policy, and vehicle use behaviours. • Explore the option of alternative transportation for summer months. A bike fleet may be feasible where multiple people are required on a job, requiring only one truck-trip for equipment. • Develop a route-planning system. Determine each morning where vehicles are needed, and how to most efficiently deliver people and equipment to each site. • Monitor reductions through the E3 Fleet Program. • Develop a policy to ensure vehicle replacement considers 'right-sizing' of vehicles. Make internal operational decisions on the vehicles assigned for each job or purpose. • Develop a Vehicle Purchasing Policy to guide future purchases for the Vehicle Fleet. 	<p>Idling reduction and driver behaviour can reduce fuel consumption considerably. Reducing unnecessary trips will also contribute. Reducing fuel consumption by 10% results in reductions of approximately 15.84 t CO₂e.</p> <p>Right sizing vehicles and implementing a vehicle purchasing policy can reduce the forecasted emissions dramatically. Approx.13 t CO₂e</p>
<p>Waste</p>	<ul style="list-style-type: none"> • Implement a comprehensive recycling program at all municipal buildings. • Consider interim composting facility for municipal buildings, such as a vermicomposting system. • Encourage behavioural change to reduce waste coming into buildings (i.e. waste-free lunches, no plastic water bottles, etc.). • Reduce excessive use of paper by adjusting printers, etc. to double-sided function. 	<p>Reducing waste by 30% will reduce approximately 6 t CO₂e. More accurate waste tracking may reveal higher quantities of waste.</p>
<p>Emission Reduction Potential</p>	<p>Quantified</p> <p>Estimated (Behavioural/Policy Based)</p>	<p>82 t CO₂e</p> <p>At least 100 t CO₂e</p>

Community Energy and Emission Reduction Opportunities

Based on the baseline and forecasted emissions, setting a reduction target of 3% requires the community of Invermere to reduce 6489 t CO₂e of emissions by 2020. If actual development differs significantly from current expectations of the coming decade, the forecasted emissions may be reduced. To ensure reduction strategies remain appropriate, a review of the forecasted emissions may be completed within five years if necessary.

Achieving reductions in community emissions is particularly challenging, as it requires behavioural change on the individual level. For those that are aware of the importance of GHG reduction, or of sustainable communities, this may be an easy task. For most however, a great deal of education and awareness is necessary before change occurs. Although the following strategies result in the reduction of emissions at the community level, many will require the resources, and initiative from the District of Invermere to facilitate and/or coordinate the reductions strategies. Creating partnerships within the community (i.e. with Wildsight, or other similar, existing organizations) can relieve some of the organizational pressure from the District. Furthermore, the unique situation of Invermere being an attractive destination for second homeowners creates an additional challenge of education and communicating to non-residents. It would be advised that the District reach out to these residents, and encourage them to participate in strategies that are implemented in the community.

Table 19 summarizes the reduction strategy recommendations for community emissions. Where possible, the potential emission reductions were quantified, however it should be noted that the actual reduction potential is highly dependent on the success of education and awareness programs. Monitoring of implementation is the best method of determining reductions.

One general recommendation that should be reflected in all strategies is the idea of centralizing resources. Creating a location, whether physically or online that provides a ‘one-stop-shop’ resource centre for residents will ease the implementation of many of the community measures. This, along with the identification of champions for this project within the District will ensure the success of the reduction strategy. It is important for the implementation stage that residents are aware of where to access resources, how to implement the strategies, and what support exists to help them take action.

Table 19: Recommended Community Emission Reduction Strategies

Sector	Recommendations	Estimated Reduction Potential
Residential Buildings	<ul style="list-style-type: none"> Implement development guidelines or policy that encourages or requires all new residential homes to meet minimum energy efficient standards. Consider setting a standard of EnerGuide 77 or 80 (Built Green Gold or Platinum, respectively) for new buildings. Develop sustainability or energy efficiency guidelines or checklists for new developments. Amend existing bylaws, policies or building codes to allow for sustainable and low impact development strategies. 	Considerable potential for reducing forecasted emissions through green building codes. Potential for at least 235 t CO ₂ e reduction in forecast.
	<ul style="list-style-type: none"> Continue Wood Stove Exchange program and consider mandatory exchange of appliances that do not meet EPA certification standards when voluntary interest subsides. Set policy standards for any new wood burning appliance to meet at least the minimum EPA certification standards 	Wood burning appliances are often considered ‘carbon neutral’ as the fuel they burn absorbed the carbon from the atmosphere however, wood stoves emit pollutants and should be managed to improve air quality and public wellbeing. Studies have demonstrated emissions from an EPA certified wood stove are reduced by 94% for particulate matter; 80% for volatile organic compounds; and, 85 % for polycyclic aromatic hydrocarbons over older appliances. ⁴

⁴Environment Canada. Clean Air Online: Choosing an Appliance. http://www.ec.gc.ca/cleanair-airpur/Wood_Burning_Appliances-WS1CF9A564-1_En.htm

<p>Residential Buildings (continued)</p>	<ul style="list-style-type: none"> • Provide local residents with the tools and resources necessary to facilitate residential retrofit programs such as: website of audit links, funding sources, how-to workshops, a community directory of local contractors. • Consider providing incentives for energy audits (i.e. financial incentives or provision of energy efficient fixtures), and promotion of ecoEnergy audits and retrofits. • Develop an incentive program for homeowners that choose to renovate 'green' (i.e. waived or reduced building inspection fees). 	<p>20% reduction in energy consumption, equating to 522 t CO₂e reduction from existing homes; Possible through retrofits, demand management, incentives, etc.</p>
	<ul style="list-style-type: none"> • Provide local residents with the tools and resources necessary to facilitate the installation residential solar hot water systems. • Consider providing incentives for installation of systems such as rebates on materials or tax credits. • Inclusion of solar harvesting for energy production in new building policies. 	<p>50 systems installed by 2020 would reduce at least 100 t CO₂e.</p>
	<ul style="list-style-type: none"> • Increase participation in the Team Power Smart program in Invermere. Encourage at least 200 additional homeowners to join and reduce their energy consumption by 10%. • Partner with local organizations to establish a resource centre, located at a municipal building or other centrally located space, where materials, grant applications and other 'green home' resources are available. • Offer incentives to builders who build to higher energy efficient standards. • Dedicate a webpage or link to tracking participation in the various programs offered to the community. Provide on-line resources and links to facilitate individual action, and to provide a centralized location for all residential-related reduction opportunities. 	<p>Education and participatory based. Minimal GHG reductions.</p> <p>Education based recommendations. Successful marketing and involvement of the community will result in significant behavioural change, and associated GHG emission reduction.</p>
<p>Commercial/Industrial Buildings</p>	<ul style="list-style-type: none"> • At least 50% of lodgings in Invermere participate in an energy or environmental rating program. • Develop a reward system to recognize environmental stewardship at local businesses. • Set reduction targets for energy reduction among commercial businesses of a 10% reduction by 2015 and 20% by 2020. • Engage commercial, retail and small businesses in an energy audit and assessment of energy reduction opportunities, delivered by BC Hydro. • Provide the tools and resources necessary for the commercial sector to access incentives and rebates for energy retrofits possibly through the Chamber of Commerce. 	<p>Primarily education and awareness based.</p> <p>20% energy reduction for commercial buildings equals 733 t CO₂e reduction quality.</p>
<p>Transportation</p>	<ul style="list-style-type: none"> • Further promote Invermere as an Idle Free community. • Work with local residents and organizations to deliver information through workshops, local media, schools and businesses. • Monitor (through surveys, observation, data collection) the successes and behavioural change as a result of Idle Free signage and awareness initiatives. 	

<p>Transportation (continued)</p>	<ul style="list-style-type: none"> Expand idle-free signage to include crossroads, downtown zones, all downtown parking lots, parks and beaches. Work with Invermere Hospital and RM6 school board to encourage development of idle-free grounds policy at the hospital and all area schools. Encourage local businesses with parking lots to post idle-free signage (e.g. Sobeys, AG Valley Foods, Best Western, Chisel Peak Medical Centre, Athalmer restaurants and gas station, etc.) Provide bike facilities (i.e. racks, storage rooms at businesses, etc.) to encourage bike commuters and local bike transportation. Amend Road Design Standards to include bike lane development on major roads within the District. Encourage alternative transportation through the continued education and promotion of existing programs such as Commuter Challenge, Walk to Work Week and Bike BC. Integrate trail connections into Policy for all new developments. Investigate feasibility of creating an Invermere-branded local shuttle service that would allow residents and tourists to hop on and off at key locations spread around all of Invermere. System should run frequently (hourly) and during both daytime and evening hours to encourage people to use the shuttle instead of their personal vehicles for going to work, running errands, etc. Create designated 'Park & Cruise' areas at key town traffic inflows. Ensure there are safe and clearly marked pathways and bike lanes connecting the 'Park & Cruise' areas. Foster a community walking ethic by designating 'Pedestrian Zones' that prohibit vehicles from portions of the downtown core during peak pedestrian traffic (e.g. vehicles prohibited from a section of the 7th Ave core during busy Saturday Farmers Market hours in the summer months). Implement a lawnmower exchange program, in coordination with local retailers, or through the municipal government to encourage the use of reel, or four-stroke engine mowers. Provide a 'loan' mower at City Hall, or a resource centre to allow interested homeowners test a reel, or push mower. 	<p>Minimal reduction potential immediately. Public awareness and education must be successfully implemented.</p>
<p>Waste</p>	<ul style="list-style-type: none"> Conduct a feasibility study for the implementation of a curbside composting program. Opportunities may exist to partner with area businesses and surrounding RDEK communities. Examine opportunity to install methane capturing, co-generation equipment at the facility. Encourage the composting of yard waste. Consider banning organic yard waste from the landfill (i.e. household organic waste pile at the Transfer Station). Ban organic yard waste burning. Provide backyard composters at a subsidized cost along with composting reading material. Education and awareness around safe backyard composting opportunities, and vermicomposting programs. Encourage the reduction of the use of plastic bags at all retail stores in Invermere. Consider enforcing a voluntary ban. Participation of local café's and restaurants in a reusable mug incentive program. Retrofit all public garbage bins to include bear-proof recycling bins. Expand placement of bins to include all major pedestrian routes beyond the downtown core (currently lacking any waste receptacles) 	<p>Significant opportunity for emission reduction with diversion of organic waste from streamflow. If 45% of waste is diverted to a composting facility, reductions of up to 473 t CO₂e can be possible.</p> <p>Community awareness and education based recommendations. Successful campaigns and implementation of recommendations may result in further reductions, and encourage waste reduction at home.</p>

Waste (continued)	<ul style="list-style-type: none"> Promote and advertise waste reduction events, such as Waste Reduction Week, or Zero Waste days (see: Recycling Council of BC http://www.rcbc.bc.ca/) 	
	<ul style="list-style-type: none"> Set a long-term “waste-free” community objective Establish an accessible local ‘re-use’ centre for household and everyday items in the DOI. Establish a depot for electronics recycling in the DOI. 	Diverting an additional 20% from the wastestream can further reduce emissions 210 t CO ₂ e
Emission Reduction Potential	Quantified	7124 t CO ₂ e
	Estimated (Behavioural/Policy Based) <i>**For community emissions, it is very difficult to predict participation in initiatives, or tendency for behavioural change. Initiatives should be monitored over time to determine accurate reduction potentials.</i>	Potential for significant additional reductions (1000t plus) with successful community engagement.

Appendix B and Appendix C provide detailed information to assist in planning and implementing the GHG reduction strategies outlined in Tables 18 and 19. Sample policies, tools and community examples are also presented below.

Conclusions and Next Steps

The District of Invermere set the groundwork for local climate action with the development of their 2008 Environmental Agenda & Action Plan. Understanding that natural, healthy environments foster active, resilient citizens and local economies, the District prepared a list of actions and policies intended to reduce corporate and community environmental impacts. This GHG Reduction Plan incorporates many of the ideas and directions of the EAAP document and also offers quantitative GHG reductions associated with actions, case study resources and funding opportunities to facilitate the ease of implementing the recommended reduction strategies.

Next steps of this process should include the development of an implementation committee with representatives from the District, Community and business. It will be crucial in putting recommendations into actions that there be representation and participation from a wide range of stakeholders. Ideally, this committee will integrate the adaptation and mitigation processes, and act as the umbrella organizing team for the coordination of initiatives throughout the community and municipal operations. It is important to communicate to residents about program events, expectations and successes on a regular basis. Monthly newspaper features and dedicating a prominent community bulletin board to display updates may be ideal.

Monitoring outcomes and adapting the strategies within this document to meet changing realities is required to ensure successful emission reductions. The District plays a significant role in creating community behavioural change and strong leadership is required to help Invermere residents and visitors take action to reduce emissions. With clearly laid out strategies, readily available funding sources and a commitment to greenhouse gas reduction, the District is set to make Invermere a vibrant, sustainable community.



Appendix A: GHG Emissions Engagement Sessions, Meeting Proceedings

District of Invermere Greenhouse Gas Emission
Reduction Strategy

Corporate & Community Engagement Sessions

May 2009 – June 2009

Amanda Fedrigo, Program Coordinator,
Climate Solutions for the Kootenays, Wildsight

Completed for the District of Invermere June 2009



Appendix A: Meeting Proceedings

Acknowledgements

The inventory process of the District of Invermere Greenhouse Gas Emission Reduction Strategy was made possible by the in-kind support of District of Invermere staff. Wildsight would like to thank the District of Invermere Council for their continued support of this project and to Mayor Gerry Taft for his welcome at the community engagement session.

Our thanks to Meredith Hamstead, The Mountain Range, College of the Rockies Invermere Campus and David Thompson Secondary School.

The La Salle Adams Fund is acknowledged for generously funding the District of Invermere Greenhouse Gas Emission Reduction Plan in its entirety.

Background

In partnership with Wildsight, the District of Invermere commenced work on their Climate Action Plan in January 2009. The greenhouse gas inventory portion of the Climate Action Plan was recently completed and presented to DOI staff, Council, and the community at three individual engagement sessions.

This document contains all public and local government input contributed during the following three engagement sessions:

- District of Invermere - Staff Engagement Session
District of Invermere, Council Chambers
May 26th 2009.
- District of Invermere - Committee of the Whole Engagement Session
District of Invermere, Council Chambers
May 27th 2009.
- Invermere Community Engagement Session
David Thompson Secondary School, Invermere
June 10th 2009.

Introduction

To develop concise, well planned climate change strategies, the process of open communication and the sharing of different ideas are paramount. Public community and local government engagement sessions are an example of one opportunity that can serve to inform and educate stakeholders about climate change issues and solutions. Moreover, extensive stakeholder participation opportunities can raise awareness within decision makers of issues and concerns that may not otherwise have been apparent.

In May and June 2009, Wildsight conducted three local engagement sessions to enhance participation in the design and implementation of Invermere's forthcoming Climate Action Plan. The first session brought together District of Invermere (DOI) staff. A second session was held for the DOI Mayor and Council followed by a third session for all

members of the Invermere and area public.

The general framework for the three sessions was consistent:

- Presentation of background climate change material
- Introduction of DOI Climate Action Plan process underway
- [Input opportunity] Open discussion⁵ in response to facilitator's question, "what local environmental changes have you observed over the past years/decades?"
- Presentation of DOI Greenhouse Gas Emissions Inventory (corporate) and Invermere Greenhouse Gas Inventory (community) summaries
- [Input opportunity] Open discussion⁶ in response to facilitator's question, "What are some strategies we could implement to reduce our greenhouse gas emissions?"
- Presentation of 'next steps' of the DOI Climate Action Plan process
- Adjournment

District of Invermere Observations: Staff

Attendees of the DOI staff engagement session were asked to provide examples of environmental changes observed over their time spent in and around Invermere. For ease of data management, responses have been grouped into categories as determined by the author. No pre-determined categories were presented at the engagement session.

General Weather/Precipitation

- More temperate climate
- Less thunderstorms
- Increased wind? (some felt increase, others felt decrease)
- More extreme rain events

Seasonal Observations

- Seasons used to be more defined
- Greater seasonal extremes
- Golf season starting later and later each year on account of prolonged cold temperatures and snow
- Autumn: Longer autumnal season
- Winter:
Snowpack has decreased
- Spring:
No real 'springtime' anymore
Early snowpack melts have decreased
Less flash flood/runoff

^{5,6} In the public engagement session, participants were grouped into three focus groups to streamline data collection prior to opening the floor up to full-group dialogue.

Appendix A: Meeting Proceedings

Transportation

- More road traffic
- Bigger trucks
- More rail traffic and increased spread of coal dust into neighbourhoods
- Boat traffic on Windermere Lake greatly increased

Vegetation

- Decline in Prickly Pear Cactus population
- More trees in [Rocky Mountain] Trench resultant of fire suppression

Wildlife/Fauna

- Greater number of deer in town (Invermere)
- Increased calls received at the DOI regarding deer in town
- Decrease in number of mosquitoes
- Explosion in Box Elder bug populations
- Pine Beetle population no longer controlled by freezing events as too mild

Lakes, Rivers & Wetlands

- Increased ground water availability
- Quality of water entering DOI supply has improved

District of Invermere Recommendations: Staff

DOI staff members were asked to provide strategies that could be implemented to reduce greenhouse gas emissions generated through buildings, waste or transportation. Discussions tended to focus on the issue of waste as staff members had been considering strategies prior to the engagement session and this was the first opportunity to garner input.

1. Waste

- Local waste incinerating co-generation plant in industrial park area
- Community compost facility
- Methane capture
- Regional District of East Kootenay (RDEK) compost program
- Capture heat from sewage treatment process
- Businesses must be accountable
- Carbon sequestration should be explored

2. General Emission Reduction Strategies

- Install turbines in water lines across community to generate additional electricity
- Install turbines at pressure reducing stations to power the station

and pumps

- Open this dialogue to the public via DOI municipal website www.invermere.net

District of Invermere Observations: Committee of the Whole

Attendees of the DOI Committee of the Whole engagement session were asked to provide examples of environmental changes observed over their time spent in and around Invermere. For ease of data management, responses have been grouped into categories as determined by the author. No pre-determined categories were presented at the engagement session.

General Weather/Precipitation

- Less annual precipitation
- Greater weather extremes
- Area glaciers abating

Seasonal Observations

- Seasons delayed or shifted to start and end later than expected dates
- Greater seasonal variability
- Winter: Less wind in the winter than 15 years ago
Less extreme cold weather events
- Spring: Springs have grown windier
No heat wave in April 2009 as in previous years

Vegetation

- More dead trees (fir locally and pine in Cranbrook area)
- Gardening season was delayed in 2009

Wildlife/Fauna

- Hunting seasons have been shifted to start and end later than expected dates
- No large running of elk populations in 2008
- Early appearance of ticks in 2009
- Increased deer in town

District of Invermere Recommendations: Committee of the Whole

DOI Committee of the Whole members were asked to provide strategies that could be implemented to reduce greenhouse gas emissions generated through buildings, waste or transportation.

1. Buildings (Residential, Commercial, Industrial)

- Create incentives for solar powered lighting/water heating

2. Waste

- Consider community composting and biological solids facility

Appendix A: Meeting Proceedings

- Enhanced local recycling system to address current wasteful system (Invermere's recyclables are transported to Cranbrook then shipped internationally for processing and sold back to Canadians as final products)
- Open a local re-use centre
- Establish a local outlet to manage 'E-waste' (electronics waste)

3. Transportation

- Promote local manufacturing to avoid having to import over great distances
- Discourage urban sprawl through planning, bylaws and best use of spaces
- Encourage pedestrians to walk by making paths and boardwalks available to downtown
- There is a need make the pathways project currently listed in the DOI Environmental Action Plan a higher priority (currently restricted by funding shortage to complete the project)
- Promote local food production
- Create public transit and carpooling incentives

4. General Emission Reduction Strategies

- Consider true run-of-river local hydroelectric power generation

Community Observations

Attendees of the community engagement session were asked to provide examples of environmental changes observed over their time spent in and around Invermere. For ease of data management, responses have been grouped into categories as determined by the author. No pre-determined categories were presented to the public at the engagement session.

General Weather

- More variable/less predictable
- More extreme
- Are the area dams affecting weather patterns?
- Windier
- Weather comes from all directions

Seasonal Observations

- Winter: More warming cycles
Generally not as cold as in past
Less snowfall
Implications of decreased snowfall for Panorama and local economy
Ice forms later on Windermere Lake than in past
Fluctuating inversions
Less snowpack/highly variable snowpack
Can no longer make outdoor ice rinks in the Okanagan during

winter months as you once were able to

- Spring: Colder over the past +/- 5 years

Transportation

- More road traffic
- Bigger trucks
- More rail traffic and increased spread of coal dust into neighbourhoods
- Boat traffic on Windermere Lake greatly increased

Population

- Increased population in area
- More buildings

Vegetation

- Fruit berries are smaller than in the past decades
- At least one full garden zone change (upwards) – now planting species that were not typically suitable

Wildlife/Fauna

- Fewer birds
- Swallow species in decline
- [Invermere] deer population explosion
- Bears in town now in both spring and fall
- Bear hibernation starts later
- Geese and robins now tending to overwintering here
- Fewer Kokanee salmon spawning – impacts of warming water temperatures?

Lakes, Rivers & Wetlands

- Lower water levels in Lake Lillian and Windermere
- 2003 was an "unusually" high water due to greater run-off and rain events
- Ice forms later on Windermere Lake than in past
- Boat traffic on Windermere Lake greatly increased
- Windermere Lake has more weeds than in past
- Windermere Lake water quality consistent
- Fewer Kokanee salmon spawning – impacts of warming water temperatures?

Air Quality

- Deterioration of air quality

Waste

- Bottled water is everywhere [wasteful and takes away from ethic to maintain local water qualities and water availability]

Appendix A: Meeting Proceedings

Community Recommendations

Stakeholders were randomly grouped into three focus groups asked to make recommendations on buildings, waste or transportation. During the presentation of each group's list of recommendations, the floor was opened to discussion of each suggestion and the focus topic itself. Additional commentary generated from the open floor discussions was recorded and is also presented herein.

1. Buildings (Residential, Commercial, Industrial)

- Extra taxes for excessive buildings (i.e. two car garage would be taxed more than a single car structure)
- Need to address issue of empty homes (vacation rentals, second homes etc) as these are needlessly consuming energy – higher taxes for underutilized properties?
- District supported workshops for residents and builders
- Tie into the health aspect of 'healthy' homes
- Phase out high water use appliances and require front loading washing machines for homes
- Incorporate solar energy
- Remove any bylaw or community association rules against outdoor clotheslines
- Change health regulation to encourage grey water recycling
- Ban lawn watering, go to xeriscaping
- District should provide incentives such as rain barrels , composters, woodstove rebates
- Develop a responsible lighting and fixtures program
- Woodstove exchange should continue and then consider mandatory switch out of wood burning appliances that do not meet minimum EPA standards
- Set standard for all woodstoves, minimum EPA standards
- Mandatory building permits to have homeowner-paid recycling bins for construction waste
- Create a "clean site" requirement for granting occupancy permits under DOI Building Bylaws

1.a Old Buildings

- Retrofit old buildings
- Provide financial support/incentives to upgrade
- Raise awareness about energy audit availability/benefits and retrofits
- Inform builders about retrofit rebates and incentives

1.b New Buildings

- Built to high building code
- Low flow fixtures

- High R-value insulation
- Should include rain water collection, storage and reuse system
- Set standard for all woodstoves, minimum EPA standards
- All new developments should conduct a transportation impacts assessment
- All new developments MUST be subject to the highest water, energy and waste standards
- DOI building bylaws should be amended to increase building standards and to set development permit areas

1.c Commercial/Industrial Buildings

- Address businesses about cost effectiveness through energy reduction

2. Waste

- Community-wide/valley-wide composting facility (example provide: Olds) which could handle domestic organic wastes, food outlet wastes, waste sludge, lawn waste, golf course clippings etcetera
- Provide public compost options for residences (in vessel?)
- Community yard waste composting could give the product back to the community
- Ban plastic bags
- DOI could provide cloth bags
- Businesses must be accountable for the waste they are generating directly and through the products they make available to the community (stores must take back packaging and deal with its disposal; don't provide 'to-go' cups etc, both on- and off-site waste must be managed)
- Develop a local "Retail Waste Reduction" working group to promote and increase recycling and composting, develop a retail waste reduction strategy, address and reduce retail packaging and disposables etc
- Recycling AND bear-proof garbage bins available throughout downtown core and along all major pedestrian routes (not the large dumpster size bins currently spread across town, but the smaller ornamental bins for pedestrians to access while walking along)
- Establish a community, non-profit re-use centre that could handle not only furniture and other household items but construction items and other large items currently going to the landfill
- Provide an enhanced recycling system to include bottles
- Explore regional use of locally recycled materials (local market development)
- Waste incineration as means of local energy production [co-generation facility]

Appendix A: Meeting Proceedings

- Improve landfill waste sorting to avoid missing items that could be recycled/repurposed
- Improve the incentives to recycle
- Develop a community education initiative promoting the concept of “reduce”
- Set a long-term “waste free” community objective (including landfill-free, realistic near-term target could be perpetually extending the life of the Columbia Valley landfill)
- Limit the number of garbage bags
- DOI and community should be educated about international best practices for waste diversion
- Ensure that our landfill meets current best practices (i.e. metal plates vs. garbage cap)

3. Transportation

- Encourage/promote local food production
- Incentives for gardens/local food production
- All new developments should conduct a transportation impacts assessment
- Remove downtown parking
- Increase the idle-free community and idle-free zone signage (tourists and many community members have no idea that we are idle-free)
- Offer incentives for developers to develop closer to the town core by permitting them to install fewer parking spaces (incentive: cheaper for the developer)
- Create designated ‘Park & Walk’ areas at key town traffic inflows, ensure there are safe and clearly marked path ways and bike lanes connecting the ‘Park & Walk’ areas
- Create connectivity corridors through walking paths and routes that we promote to tourists and locals alike, promote with visible maps of routes posted in accessible areas and have routes marked with clear signage throughout
- Something needs to be done about growing motorized boat traffic on Lake Windermere (maybe zoning?)

3.a Improve Public Transit

- Need a LOCAL transit system that runs all day and in the evening hourly
- Current public transit hours NOT convenient or practical for day-to-day local travel needs (i.e. grocery shopping, to work and back etc)
- Consider an Invermere-branded ‘golf cart’ system where local ambassadors drive golf carts along route where residents and tourists can hop on and off at key locations. Runs continuously throughout day and evening
- Tie into Panorama service
- Cranbrook bus that runs Monday and Friday is useful

3.b Need to increase bicycle use and get people out of their cars

- Need more lanes
- Bike lanes need to be marked and have good signage
- Need more bike racks around town
- Create a local free-use bicycle fleet program where anyone can borrow a bike from and return the bike to any DOI designated bike rack as dispersed throughout the community
- Restrict extended cab trucks and oversized vehicles from parking in the angled parking downtown (safety concern that cyclists have to swerve out into traffic when going around large vehicle)

3.c Pedestrian only downtown:

- From AG to CIBC
- Consider trial one day per week - ideally Saturday in line with Farmers Market in summer
- Will attract more tourists to downtown core
- Turn downtown parking into seating area, park area, corridors

4. General Emission Reduction Strategies

- Need for political leadership: local government enforcement of bylaws (e.g. pesticide –free bylaw)
- Highlight successful homes/businesses
- Look at Portland, OR as a case study
- Consider carbon sequestration technologies should be explored
- Need to engage tourists and second home owners to reduce their emissions as well
- Need for ongoing public awareness of ways to save energy (unplug idle appliances), conserve water and reduce emissions in general
- Encourage and develop community share programs (truck share program as in Kimberley, community lawnmower share)
- Find ways to develop a community conservation ethic (brand our community/valley by our values “we’re a waste-free community” or “idle-free Invermere” etc)
- Develop youth education and engagement opportunities (through schools, by piggy-backing on existing events such as Earth Day or VAD, by working with non-profit groups such as Lake Windermere Project as educational ambassadors)
- Focus on what is do-able today
- Promote/utilize ‘community pride’

Appendix A: Meeting Proceedings

Conclusion

Widespread stakeholder input provides citizen-based science essential for developing climate action strategies. The data collected through the three Invermere community engagement sessions highlight important local environmental observations. At the same time, the sessions showed trends in the types of initiatives the DOI and community feel are key strategies to reduce greenhouse gas emissions in Invermere.

The list* of environmentally relevant phenomena below are observations noted at multiple engagement sessions (* turn into a figure?). A greater number of participant references made to specific environmental occurrences may indicate a higher likelihood of that phenomenon actually occurring.

1. Greater weather/seasonal extremes
2. Explosive growth of in-town deer population
3. Less snowpack [winter precipitation]
4. Less reliable seasons (seasons starting and ending later than expected dates and weather within season is unpredictable)
5. More traffic
6. Windier

Dozens of insightful, locally relevant climate action mitigation and adaptation strategies were proposed during the engagement sessions. Input received from the three groups indicates a strong interest in the five initiatives below:

1. Community composting facility
2. Development of new and improvement of existing bicycle and walking routes, LOCAL public transit
3. Create a local re-use centre
4. Need for recycling and bear-proof garbage bins downtown and throughout community
5. Invermere go “plastic-bag free”

Similar initiatives are successfully underway in other B.C. communities and could be modeled in this area as a means to GHG reduction.

This report demonstrates the importance of an open communication process and the sharing of different stakeholder ideas when developing climate action strategies. Inviting all members of the community to share their knowledge and opinion about specific issues can strengthen public ownership and pride in an initiative. Also, enabling widespread stakeholder buy-in can also help decision makers craft strategies that may be publicly validated, supported and implemented more so than non-inclusive plans.

To ensure a climate action plan that is both relevant and achievable, Wildsight continues to consult with all members of the community as we develop the adaptation and mitigation strategies required for Invermere’s Climate Action Plan.

Appendix B: District of Invermere Municipal GHG Reduction Strategies

Appendix B: District of Invermere Municipal GHG Reduction Strategies

Below is detailed information for each recommendation listed in Table 18 of the preceding section. This document is intended to guide the Municipality in addressing expected GHG emissions. As forecasts play out and new opportunities arise over time, the strategies below may require amendments. Staff and Council may wish to integrate the document into ongoing meetings so that ideas, opportunities and revisions can be added regularly.

Municipal Buildings

Total Baseline Emissions = 128.72 t CO₂e

Below is detailed information for each recommendation listed in Table 18 of the preceding section. This document is intended to guide the Municipality in addressing expected GHG emissions. As forecasts play out and new opportunities arise over time, the strategies below may require amendments. Staff and Council may wish to integrate the document into ongoing meetings so that ideas, opportunities and revisions can be added regularly.

The District of Invermere has relatively few large facilities amongst its assets. Ice rinks and aquatic facilities tend to account for the majority of municipal building emissions. The Regional District of East Kootenay owns but leases out the Eddie Mountain Arena located within the District of Invermere. The Invermere Curling Club owns the curling rinks. Invermere does not have any aquatic facilities. The District is investigating the future development of a large multi-use community centre. Should the project be approved, it is recommended that this document be reviewed and amended to consider the new asset.

There is excellent opportunity to improve the efficiency of existing municipal buildings and to reduce local greenhouse gas emissions. In June 2009, all District owned buildings underwent an engineering assessment to determine energy efficiency opportunities. Following the assessment of facilities, the Energy Efficiency Opportunity Assessment of Corporate Buildings: District of Invermere report was issued. This document identifies areas for potential upgrade and retrofit to improve energy efficiency, and reduce greenhouse gas emissions.

The section below highlights recommendations made in the opportunity assessment report and provides additional information to help implement the strategies.

Municipal Buildings - Lighting Retrofit

As identified in the Opportunity Assessment, a lighting retrofit should be implemented in all corporate facilities. Original lighting in most municipal facilities is predominately T12 lights. T8 lights are

now available, which reduce energy consumption by up to 33%. Magnetic ballasts should also be replaced with electronic ballasts when lighting is upgraded. Electronic ballasts are more efficient, saving 3W-8W per ballast.⁷ High-performance T8s, although more expensive than the traditional T8s, last longer and are even more efficient.⁸ Where possible, light sensors should be installed in common rooms to reduce unnecessary lighting. Sensors can reduce energy use in areas particularly where the occupancy is unpredictable. BC Hydro identifies conference rooms, restrooms, corridors and storage areas as the most effective for sensors. Office spaces still achieve energy reductions, but at a lower rate of 13-50% (compared with up to 85% energy use reduction in the other spaces).

Recommendations:

- Replace all T12 lamps with T8 (high-performance if desired), and magnetic ballasts with electronic ballasts at the time of retrofit.
- Remove all incandescent bulbs and replace with compact fluorescent bulbs
- Install light sensors where possible
- Perform lighting performance assessment to reduce number of lamps where overlit (e.g. areas of the Library were found to be over-lit)

Cost-Effectiveness: T8 lamps can last up to 30 years in an office environment, and may require servicing or cleaning once every 3 years. The energy savings of up to 25-30% for the conversion of T12 to T8 lamps is significant, and will result in reduced energy bills. Successful implementation of motion sensors will also improve energy efficiency. According to BC Hydro, retrofitting an existing T12 lamp and magnetic ballast with a T8 lamp and electronic ballast will be \$55 per fixture. The payback, depending on lighting load, is estimated to be between 2 and 6 years.

Funding may be available from:

- BC Hydro <http://www.bchydro.com/ecatalog/eCatServlet?cmd=techincentives&catId=105> or contact Customer service.

GHG Emission Reduction Potential: BC Hydro is the energy provider for Invermere. As hydro electricity has a relatively low emission factor, GHG reduction potential for lighting retrofits is minimal. Despite small changes in associated emissions, the District will benefit from reduced electricity bills by retrofitting lights.

Ease of Implementation: Lighting retrofits are generally simple and can often be completed in-house. The magnetic ballasts used in the District office can be replaced with electronic ballasts that employ a similar mounting system and are the same size meaning ceilings will need no pre or post retrofit modifications or repairs. If replacing all outdated ballasts with electronic ones

⁷ http://www.bchydro.com/powersmart/technology_tips/buying_guides/lighting/fluorescent_ballasts.html

⁸ http://www.bchydro.com/powersmart/technology_tips/buying_guides/lighting/full_size_fluorescent_lamps.html

Appendix B: District of Invermere Municipal GHG Reduction Strategies

is not cost effective, ballasts can be replaced as they fail. Other retrofit suggestions such as replacing incandescent lights with CFLs, installing occupancy sensors and reducing light levels in overlit areas are all easily implemented and affordable.

Case Studies

The **City of Dryden** completed a feasibility study to determine payback for a retrofit of lighting from T12 to T8 for their City Hall. They calculated a potential reduction of energy use by 18,509kWh, and a payback of about 9 years. This does not include incentives or rebates.

The **City of Burnaby** completed a lighting retrofit at their recreation complex as part of a bundled energy efficiency project, and Port Moody saw significant savings in electricity after an energy efficient retrofit at their arena.

Municipal Buildings – Controls Retrofit

Most DOI buildings are too small or do not have complex enough equipment to require computerized building automation systems. The Courthouse building is the sole exception, having a fully automated system in place.

Many facilities have programmable thermostats in place. During the opportunity assessment walk through, it was noted that often the schedules were overridden by manual adjustments, reducing the effectiveness of the programmable thermostats.

Recommendations

In buildings that are used on a regular basis, programmable

thermostats should be installed, programmed and checked regularly. In buildings with sporadic occupancy, consider installing new electronic standard thermostats that are easily accessible for occupants to adjust to marked temperatures when the building is not in use.

Cost Effectiveness: Programmable thermostats are relatively inexpensive, priced between about \$25 and \$200. New electronic standard thermostats retail around \$20 and are more precise than conventional 'set and forget' controls.

GHG Emission Potential: According to BC Hydro, setting temperatures down by five degrees for eight hours every night will decrease heating costs by about 10%⁹. A good rule of thumb is 2% savings for each degree the thermostat is lowered over an eight hour period¹⁰. ENERGY STAR qualified programmable thermostats offer at least four daily temperature settings for at least two different program periods (for example, weekdays and weekends) and can result in 10 to 15% energy savings¹¹. The emission reduction potential associated with thermostat adjustments may be minimal for buildings with hydro electricity as the sole source of energy.

Ease of Implementation: Retrofitting new thermostats is fairly simple and can often be done by maintenance staff. Work associated with establishing an efficient heating program involves educating staff and building occupants on proper use of thermostats, setting appropriate temperature programs and regularly monitoring thermostats to ensure the controls remain at the correct settings.

To encourage efficient heating of buildings, post clear operating instructions and expected temperature settings beside all thermostats. Natural Resources Canada (NRCAN) indicates that EnergyStar programmable thermostats come with the following set-point temperatures pre-programmed¹²:

BC Hydro and NRCAN recommends the following thermostat settings to provide comfort and avoid overheating/cooling:

Settings	Time	Set-Point Temp [Heating Season]	Set-Point Temp [Cooling Season]
Wake	6 a.m.	Less than 21°C	Higher than 26°C
Day	8 a.m.	17°C	30°C
Evening	6 p.m.	Less than 21°C	Higher than 26°C
Overnight	10 p.m.	16°C	Higher than 28°C

⁹ http://www.bchydro.com/guides_tips/green-your-home/heating_guide/programmable_thermostat.html

¹⁰ <http://oee.nrcan.gc.ca/residential/personal/thermostats-controls.cfm>

¹¹ <http://oee.nrcan.gc.ca/residential/personal/thermostats-controls.cfm>

¹² <http://oee.nrcan.gc.ca/residential/business/energystar/procurement/thermostats.cfm>

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Settings*	Time**	Temperature [Heating Season] ¹³	Temperature [Cooling Season] ¹⁴
Pre-Occupancy Daytime Hours	prior to operating hours	16°C	Higher than 28°C
Operating Hours	8:00 a.m. – 3:30 p.m.	20°C	Higher than 24°C
Prior to Closing	1 hour before closing	16°C	Higher than 28°C
Overnight, Weekends & Holidays		16°C	Higher than 28°C

* Adapted to reflect municipal operations

Scheduled temperature changes will vary according to building occupancy schedule. Buildings that are underutilized/unoccupied for certain periods of the day (e.g. public works buildings when crews are out in the community) present opportunity to program a second set back stage. Sporadically occupied facilities should have thermostats set to minimum heating and cooling figures. When considering cooling in the summer season, for each degree you operate an air conditioner below 25°C, you use 3 to 5 percent more energy. Heat and cool only where and when you need it. There is no need to adjust temperatures prior to staff arrivals and making changes within the last hour of business rather than at the end of business hours will result in additional energy savings.

New Municipal Building Policies

At the time of this report no major developments, retrofits or acquisitions of new buildings are budgeted for by the DOI. Preliminary discussions have taken place regarding the possible development of a multi-use community centre in the near future. It is important for both mitigation and adaptation purposes that new buildings be constructed with consideration of future climate and energy scenarios. When new buildings are constructed, there is an immediate opportunity to reduce operating and maintenance costs by ensure the most energy and water efficient technologies are incorporated. Where budget is an issue, at the very least buildings should be designed to have appropriate aspect so as to take advantage of passive solar heating and lighting. Furthermore, efforts should be made to ensure that water capturing, solar capturing and where applicable wind capturing technologies are incorporated into the building design.

As the District of Invermere embraces its growing resident population and continues to develop as an important tourist destination, there is significant opportunity to demonstrate leadership in green building.

Recommendations:

- Develop a Green Building Policy for all future new buildings, or acquisitions of buildings by the Municipality. Set a minimum

performance standard for new buildings.

- Develop an energy and water conservation policy for all existing buildings, which guides specifications for retrofits or additions and encourages the implementation of renewable energy.
- Review and adapt the Official Community Plan to reflect changes in municipal buildings policies.

Cost Effectiveness: Developing policies use only staff time. Implementing the policy, and ensuring energy efficient standards for new buildings may result in higher upfront capital costs. The savings of an energy efficient building, however, has been demonstrated, and particularly where simple design such as solar aspect can be incorporated, the long-term savings are significant.

Funding:

- Green Municipal Funds provides funding or loans for the construction or renovations of energy efficient buildings, or buildings that incorporate renewable energy. <http://www.sustainablecommunities.fcm.ca/GMF/GMF-2009-call-for-applications/Energy-2009-call-for-application.asp>
- EcoEnergy Renewable Energy Initiative <http://www.ecoaction.gc.ca/ecoenergy-ecoenergie/faq-2-eng.cfm>

GHG Emission Reduction Potential: Part of the forecast of emissions for the City includes the development of a large conference centre based on a facility of similar size, built to traditional building standards. It is estimated that construction that meets a standard of Built Green Gold, for example, is 30% more efficient than traditional construction. Although further assessment should be done to calculate potential savings in construction of a facility to Built Green Gold, or LEED Silver or Gold standards, a reduction in the forecasted emissions of 20 t/CO₂e could result. Applying an energy efficiency policy to all buildings could significantly reduce current consumption.

Ease of Implementation: Developing a Policy is one piece of this recommendation, and is perhaps the easier piece. Implementing and following the Policy may be a challenge, particularly where the capital

¹³ BC Hydro, *Thermostats for Efficiency and Comfort: Fact Sheet, Oct 2007*

¹⁴ <http://oee.nrcan.gc.ca/residential/business/energystar/most-energy-efficient.cfm>

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costs of a project are significantly higher than if traditional building standards were required. It is recommended that the capital costs be compared with a long-term operating cost analysis when considering new building construction. The long-term savings in energy, and the potential to produce excess energy (i.e. through solar power production), may reduce the payback period.

Case Studies

The **Town of Banff** has implemented a Green Building Policy that requires all new buildings to meet a minimum of LEED Silver certifications.

The **Municipality of Saanich** has developed the 'Energy Conservation Policy for the Municipality of Saanich', which is included in XX. This Policy is geared more towards existing buildings, and has the objective to "increase the energy efficiency of new and existing structures, equipment, and transportation systems in the Municipality..."

Municipal Building Audits and Retrofits: General Recommendations

- In addition to the above recommendations, the District can undertake the following strategies to further reduce greenhouse gas emissions from buildings:
- Apply insulation to the following uninsulated buildings/areas: Public Works shop; Courthouse cellblock; Downtown washroom building.
- Upgrade insulation to buildings during scheduled roof replacements (e.g. Community Hall)
- Weatherstripping on all doors and windows should be inspected and replaced where necessary.
- Install solar hot water heaters as possible
- Consider installing a 'Green Roof' as a community demonstration of the District's commitment to innovative, green building. Most DOI facilities have flat roofs that make them ideal for holding vegetation.

Similar initiatives could be implemented at a number of municipal buildings, and it is recommended that the District of Invermere consider the positive impact of leadership in creating low-energy and sustainable communities.

Utilities (Water and Streetlights)

Total Baseline Emissions [streetlights]= 5.53 t CO₂e

Total Baseline Emissions [water & sewage]= 15.98 t CO₂e

Streetlight Replacement Program

Aware of the economical and environmental benefits of highly efficient full cut-off lighting, the District of Invermere is working toward developing a responsible lighting bylaw to guide the installation of new lighting and the replacement of existing lighting. In the interim, the District is replacing dropped lens streetlights that burn out or are damaged with flat lens high-pressure sodium lights. District staff are also working with developers to encourage full cut-off residential and commercial lighting to reduce light pollution and energy consumption in new developments.

Mercury vapour lamps are the least efficient of all high intensity discharge lights.

Replacing the 400W mercury vapour lamps at the Community Hall with high-pressure sodium lamps will save 70% or more energy.

Natural Resources Canada
<http://oee.nrcan.gc.ca/publications/equipment/lighting/>

Recommendations:

Replace traditional light fixtures with flat-lens fixtures that direct light more efficiently downwards.

Cost Effectiveness: With potential energy savings of 35%, there is significant potential for costs savings if the lamps are replaced as older ones burnout. It may be inefficient to undertake an entire replacement process at once, however the incremental replacement is feasible, and strongly recommended. BC Hydro has recognized the benefit of reduced wattage streetlights, and the effectiveness of the flat lens fixtures. They have developed an incentive program to help municipalities switch out the current lamps and fixtures. The incentives in some cases will result in a lower cost for HPS lamps than for mercury vapour.

Funding:

- BC Hydro Power Smart Rebate for Streetlight
http://www.bchydro.com/news/articles/conservation/power_smart_rebates.html

GHG Emission Reduction Potential: The potential for greenhouse gas emission reduction is quite minimal for this initiative as the energy is provided solely through hydro electricity. The District may however benefit from significant cost savings and further demonstrate the District's commitment to energy conservation. The estimated GHG emission reduction is approximately 1.5 tonnes of GHG emissions annually once all fixtures are replaced. This is a conservative estimation, and would likely be higher if the flat lenses were implemented to allow for lower wattage lamps. The most significant benefit from this retrofit would be the cost savings.

Appendix B: District of Invermere Municipal GHG Reduction Strategies

Although the initial investment required would be higher, the District may consider investigating the installation of LED retrofits and lamps. LED lamps consume significantly less energy to produce the same amount of lumens as high intensity discharge lamps.

Ease of Implementation: There are local sources for the lamps, financial incentives available, and a general need to replace lamps on a regular basis. These factors result in a relatively simple ease of implementation. Staff would have to source an appropriate supplier of both bulbs and flat lens fixtures (if desired). District staff could likely complete the conversion over time.

Case Studies

Calgary, Alberta: Between 2002 and 2005, the City of Calgary retrofitted their 37,000 streetlights with more efficient flat-lens high-pressure sodium fixtures. Unlike conventional “cobra head” lighting fixtures, flat lens fixtures prevent light from wastefully entering the night sky. Having reduced their lamp wattage from 200W to 100W on residential roads, and from 250W to 150W on collector roads, Calgary saves an estimated \$1.7 million annually in electrical costs. The retrofit costs will be paid off by 2012.¹⁵

Ann Arbor, Michigan, USA: Ann Arbor plans to become the first U.S. city to convert 100% of its downtown streetlights to energy-efficient LED technology. In 2007, the process began, and the City expects to install 1,045 LED streetlights over a two-year period. LED lights typically burn five times longer than the bulbs they replace and require less than half the energy. Each fixture draws 56 watts and is projected to last 10 years, replacing fixtures with bulbs that use more than 120 watts and last only two years. Each globe streetlight that is retrofitted to LED will save \$107 per year in energy and maintenance costs, for a total savings of approximately \$112,000 per year. Once all the streetlights have been retrofitted, the City expects to cut its public lighting energy use in half and reduce greenhouse gas emissions by 2,425 tons of CO₂ per year – the equivalent of taking 400 cars off the road for one year. The City anticipates a 3.8-year payback on its initial investment.¹⁶

Solar Powered Public Lighting

Receiving approximately 2000 hours of sunlight annually, the District of Invermere has excellent potential for solar powered applications. Although not generally considered economically feasible for large-scale lighting projects on account of the high cost of equipment, solar

powered streetlights for smaller applications are gaining popularity. Invermere residents enjoy approximately 2000 hours of sunshine annually making the District an ideal location for solar powered initiatives.¹⁷ Examples of small-scale applications well suited for solar power include lamps in public parks and pedestrian areas.

Recommendations:

- Investigate the feasibility of solar-powered lights at public parks and pedestrian areas.
- Pursue partnerships and funding to support a solar light project as a demonstration of dedication for alternative energy sources.

Cost Effectiveness: Solar lamp units are more expensive than their wired counterparts and broad application across Invermere may not be financially feasible. The District can consider partnering with a lamp manufacturer or non-profit group who may be able to reduce upfront costs. The City of Kelowna, was able to obtain funding from the Federal Government, and partner with a solar lighting supplier to offset the costs of installing multiple lamps. The BC Sustainable Energy Associations SolarBC program provides funding for solar initiatives across the province and will be opening a new window for local governments to apply for their Solar Communities funding in early 2010. For resources and additional information visit: www.solarbc.ca

GHG Emission Reduction Potential: Implementing this strategy will enable to District to save energy and reduce costs if funding was available, however the emission reduction would be minor as Invermere’s streetlights are powered entirely by hydro electricity (low emissions factor).

Ease of Implementation: Solar powered are making their way into several BC communities as demonstrated in the Case Studies section below. Funding would be required to offset purchase and installation costs. These costs may be reduced through partnering with a solar equipment manufacturer or distributor. Solar power installers and distributors are available locally.

Case Studies

The **City of Kelowna** has been working with Carmanah Technologies Corporation to equip parks, paths and other public spaces with solar-powered LED lamps. The City has committed to installing 100 Carmanah EverGen lights.

The **City of Dawson Creek** become a Solar Community under SolarBC and has also installed solar powered streetlights as a continuing demonstration of their dedication to renewable energy. The City has also installed solar hot water heaters on many municipal buildings.

¹⁵ <http://content.calgary.ca/CCA/City+Hall/Business+Units/Roads/Streetlights/EnviroSmart+Streetlight+Retrofit/EnviroSmart+Streetlight+Retrofit.htm>

¹⁶ <http://www.icleiusa.org/success-stories/saving-money-1/ann-arbor-mich-cuts-streetlight-bills-in-half-with-leds/?searchterm=ann%20arbor>

¹⁷ [Tourism BC, www.hellobc.com/en-CA/Geography/Invermere.htm](http://www.hellobc.com/en-CA/Geography/Invermere.htm)

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Water Utilities

There is ample opportunity to curb the energy used by District water and sewage operations. As an example, BC Hydro data indicates installing variable speed drives can reduce energy use by up to 50%.¹⁸ While implementing the following recommendations will result in reduced utility bills, GHG reductions will likely be modest given the low emission factor for hydro electricity. The projects below can be showcased as demonstrations of the District's commitment to sustainability.

Recommendations:

- Install variable speed drives at the sewage treatment plant to match energy requirements with pumping requirements.
- Investigate the feasibility of installing a heat reclamation system and the sewage treatment plant.
- Investigate the feasibility of building one or more micro-hydro generation facilities that would bypass the pressure reducing stations to generate hydroelectricity from the local water system.

Cost Effectiveness: The cost of variable speed drives will be higher than the cost of comparable constant speed units however, additional costs may be offset by the reduced energy requirement associated

with matching energy requirements with pumping requirements. As pumps commonly lose efficiency over time, maintenance and replacement costs associated with a VSD installation should be considered when determining payback time. Developing a heat reclamation system at the sewage lagoons and micro-hydro generation plant(s) at PRV stations are large capital expense projects required government funding. Thorough feasibility studies should be conducted to evaluate cost benefit ratios and payback times. Grants may be available through FCM's Green Municipal Fund.

Greenhouse Gas Reduction Potential: Emission reductions are limited given all above recommendations offset mostly hydroelectricity. Heat recovery systems can be used to offset the small amount of propane used at the sewage lagoons and if practical, can be pumped to surrounding facilities for additional emissions reductions.

Ease of Implementation: Replacing constant frequency motors with variable speed ones is fairly simple, as this generally does not involve changes to infrastructure. Feasibility studies are required to investigate the usefulness of developing larger projects like a heat reclamation system of micro-hydro station. Both of these projects are relatively new possibilities for local governments in Canada and their application in smaller municipalities like Invermere may be limited due to potential costs.

Water Conservation

Water conservation measures, although applied throughout the community, ultimately reduce the emissions through the municipal water system. The community inventory does not capture individual home water consumption, however the municipal inventory must account for drinking water supply, distribution, and wastewater treatment and discharge. Recommendations for water consumption reduction are included in the municipal reduction strategy section for this reason. It will ultimately be up to the consumers, however to contribute to the target of water conservation.

Located in a semi-arid portion of the Rocky Mountain Trench, the District of Invermere faces the challenge of a growing a community with a limited water supply. The District has taken several measures to prolong the water quality and availability of surface water supplies including the installation of a leak detection system, year-round water restrictions, temporary halts in issuing development permits, partnering with local water stewardship and conservation programs and the adoption of a low-flow water fixture bylaw and exchange program. One of the DOI's most successful water management initiatives has been the mandatory water metering across the community. One of the first communities in the Province to enforce water metering, the program demonstrated a 30% reduction in water consumption within the first year.¹⁹

When a report commissioned by the District in 2005 indicated

Case Studies

The **Capital Regional District** on Vancouver Island received funding from FCM to investigate the installation of PRV energy recovery through micro-hydroelectricity generation. A bypass would move water pressurized by gravity through a small turbine at pressure reducing stations to generate electricity. The electricity could then be used or 'stored' on the BC Hydro grid. The CRD Council remains generally supportive of the Design, Build, Finance, Operate (DBFO) project but has put the initiative on hold. Council was unable to approve the project when the DBFO proponent opted out of carrying the required financing. Three operational scenarios were evaluated each averaging about \$2.8 million in capital costs and \$81,000 in annual operating costs. Annual revenues ranged from \$330,000 to \$370,000. Additional information can be obtained by contacting the Capital Regional District: <http://www.crd.bc.ca/contact.htm>

Numerous municipalities and local governments across Canada have upgraded constant speed motors with variable speed models to reduce energy consumption. The **City of Revelstoke** installed the new drives at their Burke Drive and Wales lift stations as well as at their sewage treatment facility.

¹⁸ BC Hydro http://www.bchydro.com/powersmart/technology_tips/buying_guides/motors/adjustable_speed_drives.html

¹⁹ Columbia Mountain Institute of Applied Ecology, 2003. *Climate Change in the Columbia Basin: Proceedings. January 17-18, 2003. Cranbrook, British Columbia. Pg 53.*

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that the Patty Ryan surface water supply would not be sufficient to meet immediate future water demands, the DOI began searching in earnest for a secure ground water source.²⁰ A shallow aquifer found at the Valley bottoms in Athalmer was successfully tapped in 2008 to supplement the Patty Ryan reservoir, which remains in use today.

The Province of British Columbia has set a target to become 33% more water efficient by 2020. The Province has a target to reduce new demand, encourage consumers to reduce their consumption and provide education and enforcement of the Water Act to achieve this goal. Communities across the Province are recognizing the savings (energy and money) associated with reduced water consumption.

Reducing water consumption is an important mitigation and adaptation measure, as it addresses the need to reduce energy use (and therefore lower associated emissions), and the need to conserve water as supply becomes more variable with changes in snow-pack and precipitation.

Recommendations:

- Set a community water conservation target. This can be a combined consumption reduction and efficiency target (i.e. 20% reduction in consumption).
- Implement a community-wide water conservation initiative to address conservation targets, and to reduce emissions from water and sewage operations.
- Expand low-flow water fixture and appliance exchange program to include businesses, schools and other community organizations. Ensure all municipal buildings are retrofitted with low-flow fixtures.
- Amend municipal building bylaw to require all corporate, industrial and residential irrigation systems to be equipped with water efficiency devices.
- Municipal water-use policy to guide development of parks and greenspaces.
- Internal water management policies for existing and future buildings. Low-flow water fixtures and water efficiency education in all District facilities.

Cost Effectiveness: The District is currently conducting water conservation outreach through their partnerships with community groups that deliver on-the-ground water conservation programming and directly through utility bill inserts, local media and the DOI Environmental Calendar distributed annually to each household. The cost of these outreach materials are relatively low. Water conservation resultant of education outreach reduces energy required by water and sewage operations, lowering overall operating costs. Higher cost

programs include the ongoing provision and possible expansion of rebates for low flow water fixtures. Rebates are available through BC Hydro to offset the cost of some low-flow appliances and fixtures. http://www.bchydro.com/rebates_savings/appliance_rebates.html

Rain and soil moisture meters work to automatically shut off controllers when it is raining or when sufficient soil moisture levels are reached. These automatic shut off devices can reduce water consumption by 15-20%.²¹ Avoiding watering during precipitation events is key to demonstrate the Districts commitment to water conservation measures. Pressure regulating devices should be installed in areas of high water pressure. Every 5 psi reduction in water pressure reduces water usage by 6-8%.²²

GHG Emission Reduction Potential: Reducing the energy use for water and sewage operations will directly reduce the greenhouse gas emissions. The estimated energy use for supply and treatment of surface water is 0.375 kWh/m³, and for collection and treatment of sewage is 0.175 kWh/m³ for primary treatment, and 0.320 kWh/m³ for secondary treatment.²³ A target of 20% reduction of water consumption and increased efficiency through low-flow water fixtures (i.e. reduction in waste water) of 15% would be reasonable for the District of Invermere.

Ease of Implementation: Working through partnerships with local organizations already delivering demand management outreach to the public is an easy – and relatively affordable – method to raise awareness of water conservation. It is important however, that the District continue to develop DOI-branded advertisements, publications and events to showcase leadership in commitment to responsible water management. The District should consider dedicating a website, or better yet, a physical location (as described in overall policy and recommendations) that would centralize the information for residents in the community.

Ensuring irrigation systems are run on programmable timers and fitted with water efficiency devices (e.g. moisture meters and pressure regulation devices) takes little effort. Timers, sensors and pressure regulation devices are available locally and can be fitted by District works staff or a local contractor.

Case Studies

There is a wide range of resources available in British Columbia to support the development of water conservation strategies. Furthermore, many communities throughout the Province have begun to implement water conservation initiatives, particularly in the Okanagan, Lower Mainland and coastal regions.

This list is some of the sites for excellent water conservation initiatives and ideas:

<http://www.livingwatersmart.ca>
<http://www.waterbucket.ca/>
<http://www.poliswaterproject.org/>
<http://www.waterbalance.ca/>

Excellent water conservation project development document:<http://www.poliswaterproject.org/publication/243>

²⁰ Upper Columbia Pioneer. 2005. Report Highlights, August 19.

²¹ Rain Bird, http://www.rainbird.com/iuow/tips/tips_turf.htm

²² Rain Bird, http://www.rainbird.com/iuow/tips/tips_turf.htm

²³ Greenhouse Gas Emission Assessment Guide: For British Columbia Local Governments. (2008). Community Energy Association and Ministry of Community Services.

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Initiatives from Local Governments

The **Village of Lumby** has developed a Water Conservation Strategy that guides the implementation of a water metering program, water restriction guidelines, an educational program focussing on current water use, and identify water leaks throughout the distribution system.

http://www.lumby.ca/council/greenhouse_gas_strategy.html

Policies from Local Government

The **District of Lantzville's** Subdivision and Development Bylaw No. 55, 2005, incorporates low impact development standards for roads and storm water management, as well as alternatives for impervious surfaces, etc.,

http://www.lantzville.ca/upload/dcd263_BylawNo55.pdf

The **District of Metchosin** has adapted the Rain Water Bylaw to encourage onsite management of rainwater, establishing a performance target of 90% rainfall being addressed on site. <http://www.district.metchosin.bc.ca/467/467.pdf>

Vehicle Fleet

Total Baseline Emissions: 132.03 t CO₂e

Signs declaring the District of Invermere an idle-free community were posted in the community in early 2008 and an official idle-free bylaw was adopted in the same year. The District also has a policy to reduce idling of staff vehicles, which should continue to be promoted and enforced. Although not committed to through the Community Action on Energy and Emissions grant, the DOI should continue to pursue a fleet rating through E3 Fleets. This process has been initiated through the collection of vehicle fleet information for the inventory, and will continue as once the analysis is completed in coming months.

Municipal Fleet Fuel Efficiency

The District of Invermere has established an Idle Free community bylaw that limits most fleet vehicle idling to 3 minutes or less. Municipal and commercial fleets that have implemented an Idle Free policy have seen reductions of 10-15% in fuel use. Further actions can be taken to reduce the amount of idling occurring such as the use of block heaters, continued education and awareness programs.

Right-sizing for efficient vehicle use refers to the process of identifying the use of a particular vehicle, and determining whether the vehicle suits the needs of the job for which it is used. For example, if the purpose of a vehicle is to transport people between offices, it may

Case Studies

Both the **City of Toronto** and the **City of Hamilton** have implemented Green Fleet action plans. The **City of Toronto** has started to develop a 'bike pool' to encourage City staff to take a bike instead of vehicle for work purposes. City staff are required to turn off their vehicles if idling for more than 10 seconds. They must participate in the City's driver training courses, which include Idle-Free and fuel-efficient driver training.

The **City of Dawson Creek** and the **City of Williams Lake** both have vehicle emissions reduction policies as a first step in reducing fleet GHG emissions:

- **Williams Lake: Idle-Free Policy** - some vehicles saw fuel savings of 50% in the first year, despite a January temperature of -10°C. View the Williams Lake policy: www.idlefreebc.ca/resources/downloads/WilliamsLake.pdf
- **City of Dawson Creek: Green Municipal Vehicle Policy** - guides the behaviours of idling, purchasing, right-sizing and maintenance for the municipal fleet. They have established a target of 20% reduction in emissions from the fleet from 2004 levels by 2016. The new green vehicle purchasing policy has led to a more sustainable municipal fleet that produces eight fewer annual tonnes of greenhouse gases and will save the city over \$15,000 per vehicle every five years. View a copy of the Dawson Creek policy in Appendix E.

Resources for developing a green procurement policy (includes fleet vehicles) are available online through the BC Sustainability Purchasing Network: <http://www.buysmartbc.com/resources.html>

not be necessary to drive a pick-up truck. A more appropriate vehicle may be a small or medium-sized vehicle. The potential for more efficient use of vehicles will result in reduced fuel use, costs and emissions. Right sizing existing vehicles could be done at the same time as the route designation.

Recommendations

- Develop a general Policy for all vehicle and equipment maintenance. Integrate the requirement for regular efficiency maintenance measures (tire pressure, filters, etc.), and Idling Policy, and vehicle use behaviours.
- Explore the option of alternative transportation for summer months. A bike fleet may be feasible where multiple people are required on a job, requiring only one truck-trip for equipment.
- Develop a route-planning system. Determine each morning

²⁴ Natural Resources Canada. <http://oee.nrcan.gc.ca/transportation/idling/wastes.cfm?attr=8>

Appendix B: District of Invermere Municipal GHG Reduction Strategies

where vehicles are needed, and how to most efficiently deliver people and equipment to each site.

- Monitor reductions through the E3 Fleet Program.
- Develop a policy to ensure vehicle replacement considers 'right-sizing' of vehicles. Make internal operational decisions on the vehicles assigned for each job or purpose.
- Develop a Vehicle Purchasing Policy to guide future purchases for the Vehicle Fleet.

Cost Effectiveness: These recommendations are predominately behavioural based, all of which result in a reduction of fuel consumption. Idling for 10 minutes consumes over 1 cup of wasted fuel per 3 litre engine, and over 2 cups for a 5-litre engine. Over the lifetime of a vehicle, this adds up to a considerable amount of fuel, and is financially inefficient. Idling for more than 60 minutes causes more wear on an engine than turning it off and restarting.²⁴ Turning off the engine costs nothing, and results in immediate fuel savings. Purchasing a municipal bike fleet is likely very cost effective, and would encourage sustainability of the environment as well as personal health.

GHG Emission Reduction Potential: Successful idle free campaigns at the municipal level have demonstrated a potential for 10% reduction of GHG emissions associated with idling. Setting a target for further fuel reduction of 5-10% through trip reductions and alternative transportation could result in a total reduction of 1213-2425 t/CO₂e annually. Aggressive participation in the reduction of reduced idling and dedication to designing efficient routes and transportation of people and equipment could further contribute to this reduction.

Ease of Implementation: There are multiple resources and tools available to implement an idle free initiative for municipal vehicles. The challenge and barrier is often implementation of the policy by staff. Involving staff in the development of the policy and monitoring program can help overcome this barrier. Awareness and education can be very effective in helping staff participate in an idle free program. Ensuring efficient use of vehicles must be embraced by both office and works staff, and so involving as many staff as possible in the implementation of route designs, bike fleet maintenance and idle free behaviour is crucial to the success of these recommendations. At only about 11km² in area, Invermere is an ideal municipality for incorporating alternative transportation programs.

Municipal Waste

Total Baseline Emissions: 18.85 t CO₂e

As the small amount of waste generated by the District of Invermere is collected along with the community waste, the inventoried corporate waste amount is a best estimate. Developing and adhering to a Corporate Waste policy can significantly reduce waste generation by guiding the behaviour and expectations of staff and administration. Implementing the simple initiatives of recycling and composting can help divert a large portion of any waste that is produced despite the Corporate Waste Policy. As a starting point, it is advised that the District conduct a waste-audit to determine a more precise figure of

corporate waste production.

Recommendations

- Implement a comprehensive recycling program at all municipal buildings.
- Set up a composting system for municipal buildings, such as a vermicomposting system.
- Develop a Corporate Waste Policy to encourage behavioural change to reduce waste coming into buildings (i.e. waste-free lunches, no plastic water bottles, etc.) and waste generated by operations (i.e. printing/copying guidelines, re-using paper, etc.)
- Reduce excessive use of paper by adjusting printers, etc. to double-sided function.

Cost Effectiveness: Most DOI facilities are conveniently located to the large yellow community recycling bins. To help encourage recycling in all municipal buildings, consider installing multi-product separating bins (\$50-\$200). The cost of developing and implementing a Corporate Waste Policy program is likely minimal given that recycling is already available within the community. Composting in municipal buildings could be implemented using vermicomposting, the implementation of which is approximately \$60/bin.

Funding:

- Green Municipal Funds has a waste-diversion funding stream. This may be desirable in combination with a broader community waste reduction initiative.

<http://www.sustainablecommunities.fcm.ca/GMF/GMF-2009-call-for-applications/Waste-2009-call-for-application.asp>

GHG Emission Reduction Potential: Approximately 30-40% of the waste stream is paper or paper products that have a potential to reduce the total amount of waste going to the landfill. Additional recyclables include cans, bottles, glasses, e-waste and printer cartridges. Providing opportunity for alternative waste disposal of old electronics, batteries, cartridges, lightbulbs, etc. will allow for significant reduction of waste ending up in the landfill. Reducing waste by 30% annually by 2020 will reduce the emissions from this sector by approximately 6 tonnes.

Ease of Implementation: The initial barrier of implementation will be dedicating a small amount of money to the purchase of appropriate recycling bins. General awareness and education will be required to ensure participation by staff. The City may wish to implement a waste diversion target, and develop a method for monitoring waste at each municipal facility. The implementation of a waste-monitoring program would be essential for tracking purposes, and could potentially be completed by Staff. Potentially significant barriers to composting at Municipal facilities include: A perception that vermi- or backyard composters require large amounts of work; Finding staff willing to manage and tend the composters; Making the composter accessible so that staff will use it (e.g. public works staff out in the field all day will not be near the composter, etc).

Appendix C: Community of Invermere GHG Emission Reduction Strategies

Appendix C: Community of Invermere GHG Emission Reduction Strategies

This section details key reduction opportunities for buildings, transportation and waste as summarized in Table 19. Where possible, expected emission reductions have been quantified and case studies provided. Strategies that focus on public education and engagement are difficult to quantify, but it is expected that emission reduction will result through successful implementation. For many initiatives, once momentum is gained and the community is aware and involved, significant change is possible. It is important that outreach efforts be coordinated, consistent and long enough in duration to reach the intended audience.

Engaging second homeowners will be key in Invermere, as DOI planning staff estimate 40% of expected new homes will be owned built as vacation properties. During the summer months, upwards of 40,000 second-homeowners and tourists flood the Columbia Valley and many of them stay in and around Invermere to enjoy the area's largest commercial centre and Windermere Lake.

Residential Buildings

Total Baseline Emissions: 2609 t CO₂e

Ensuring housing affordability and availability are longstanding concerns within the District of Invermere. Staff and Council members mentioned housing affordability as the priority focus of their efforts during the corporate engagement sessions held earlier this year. While there are 'green' building premiums associated with the initial designing and construction of energy- and water-efficient dwellings, such costs are generally small when compared to the reduced operating costs. Building with the environment in mind can be done affordably. Further, the definition of affordable housing should not stop at the cost of construction or rent. The cost of utilities can be reduced drastically with efficient construction. Affordable housing should extend to the affordability of heating and lighting. Simple measures can be taken to ensure optimal energy efficiency.

As mentioned, Invermere does not have natural gas, and so the main source of emissions for residential buildings within the District of Invermere is propane. Because the electricity emissions factor is relatively low, reducing electricity use does not significantly lower emissions, but does contribute to Provincial energy reduction targets, and reduces bills for the homeowner.

New Home Construction Standard

District staff encourage developers to implement responsible lighting, provide public greenspace, maximize densities and utilize water-efficient hardware. Implementing a complete minimum home construction standard for new developments will bring such efforts

together into a single policy to significantly reduce forecasted emissions. Examples of programs that rate new home construction according to level of efficiency are Built Green™, US Green Building Council's Leadership in Energy and Environmental Design (LEED) program and Natural Resource Canada's EnerGuide program. Each of these programs can provide standards to improve efficiency of buildings without greatly increasing construction costs.

Communities can also create Development Permit Areas (DPA) to further encourage efficient development. Recent amendments to the Local Government Act extend the ability of local governments to establish Development Permit Areas that facilitate the reduction of greenhouse gas emissions and encourage energy and water conservation. The amended Local Government Act can be found at: http://www.leg.bc.ca/38th4th/3rd_read/gov27-3.htm.

Furthermore, the interest and technology is well understood within the development industry, and so implementation of high efficient home construction is not a barrier.

Case Studies

The City of Nelson recently produced a Sustainability Checklist based on environmental, social, economic, and cultural indicators. The checklist is distributed to developers and property owners applying for Major and Minor Development Permits, Development Variance Permits, Amendments to the Land Use Regulation Bylaw and Official Community Plan, and for Preliminary Layout Approval of Subdivisions to encourage developments that are inline with Nelson's community vision.

Recommendations:

- Implement development guidelines or policy that encourages or requires all new residential homes to meet minimum energy efficient standards. Consider setting a standard of EnerGuide 77 or 80 (Built Green™ Gold or Platinum, respectively) for new buildings.
- Develop sustainability or energy efficiency guidelines or checklists for new developments.
- Amend existing bylaws, policies or building codes to encourage sustainable and low impact development strategies.

Cost Effectiveness: Green buildings can be constructed using a number of methods to meet varying levels of efficiency. In general, the 'greener' a building, the higher the capital costs.²⁵ In August 2007, Built Green™ BC estimated green homes to cost 4-6% more to build than conventional homes.²⁶ It should be noted that these green construction premiums will vary from building to building as different

²⁵ Lucik, M., P.Eng., Report: A Business Case for Green Buildings in Canada. Green Canada Buildings Council. March 2005. Pg 19

²⁶ British Columbia Real Estate Association: Green Tool Box <http://www.greentoolkit.ca/product-benefits.asp>

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site and structure types offer different opportunities to achieve efficiency principles. For the homeowner, the green construction premiums are recouped through lowered operational costs.

EnerGuide is Natural Resource Canada's rating system that uses a scale of zero to 100 to rank efficiency of homes. A rating of zero represents a home with major air leakage, no insulation and extremely high energy consumption. A rating of 100 represents a house that is airtight, well insulated, sufficiently ventilated and requires no purchased energy. A home built to EnerGuide 80 standards will consume approximately 30% less energy than a house built to minimum building standards. The operational costs of the home are therefore drastically reduced.

Funding:

- Several options are available at Green Buildings BC <http://www.greenbuildingsbc.com/Home/NewBuildings/HowtoBuildGreen/FundingAssistanceResources.aspx>
- Affordability and Choice Today (ACT) Program designed to facilitate changes in residential approval process, planning regulations and building regulations. Grants are awarded up to \$20,000.
- Community Action on Energy and Emissions (CAEE) provides funding to advance energy efficiency in buildings through Local Government policy and planning tools. Their 'Gold Award' funds are awarded to communities presenting the most innovative policies and tools. CAEE grants cap at \$20,000 and CAEE 'Gold Award' grants at \$50,000.

GHG Emission Reduction Potential: Implementing a new home construction standard to require all future residential buildings rated to EnerGuide 80 would reduce energy demands of this sector by 30%. If implemented for all new residential homes, the forecasted emissions could be reduced by approximately 235 t CO₂e. This estimation should be monitored and re-evaluated as homes are developed. The reduction opportunities may be improved as technology improves.

Ease of Implementation: To offset costs required to service new developments, the District applies Development Cost Charges (DCCs) to every new house, commercial building, and industrial building built within Invermere. For low-density residential developments (<15 units/ha), developers must pay \$16,304.27 per unit. To encourage efficient land use, DCCs for higher density residential developments (15+ units/ha) are reduced by 25% to \$12,228.20 per unit. The District uses the DCC income to supplement infrastructure and service costs and DOI staff have expressed concern that requiring developers to meet higher building standards may encourage them to move their projects to outlying areas to save money. Developing a policy to support energy efficient construction may not be difficult, however enforcing it and requiring all developers to become recognized by Built Green or EnerGuide for New Homes may be a barrier to implementation. Developers incur costs and require training to be recognized as 'certified' by Built Green and EnerGuide and greener homes may cost more to construct than their conventional counterparts, however, builders are often able to charge a premium for energy efficient homes. Appropriate outreach efforts and open communication

between developers and the District will help ease the implementation of new standards.

Appendix F of the main document provides an example of a Sustainability Checklist used by the City of Port Coquitlam on which proposed developments are 'marked' for their sustainability and energy efficient design standards.

Residential Building Retrofits

Like most residential buildings across the Province, census data indicates the majority of Invermere houses were built between 1971 and 1980. Of these buildings, 24% require minor repairs and over 7% are in need of major repairs. With residential buildings being the third largest source of GHG emissions in the community, there is significant opportunity for improved efficiency through home repair and retrofitting programs. It should be noted that the commercial sector is second, only due to the slightly higher consumption of propane. The residential sector consumes significantly more electricity than the commercial sector and has a higher emissions forecast, so it is certainly worth implementing strategies to reduce energy consumption in this sector by encouraging retrofits and energy efficiency.

The joint District of Invermere/Wildsight 'Toilet Exchange Program' and 'Wood Stove Exchange Program' are examples of programs designed to encourage improved efficiency and reduced GHG emissions through retrofits. Government agencies and non-profit organizations are offering resources such as funding, support and outreach materials that the District can use to expand current rebate programs into a comprehensive home retrofit program.

There are two potential applications of a residential home retrofit program:

1. Encourage homeowners to take simple steps to improve the efficiency of their homes through purchasing of low-energy appliances, changing showerheads, lightbulbs, etc. This would be a low-cost opportunity for homeowners to make small, but important changes in their homes.
2. Promote the Federal ecoEnergy audit and retrofit program. This requires initial costs by the homeowner to perform and audit, but also provides significant opportunity for grants and incentives to fund retrofits. This could be implemented through the District. Similar to the Wood Stove Exchange program, the District can bolster retrofit incentives by waiving permit application and/or building inspection fees upon successful implementation of retrofits.

To simplify the learning process, a local home retrofit workshop could be hosted providing homeowners with resources required to begin a retrofit project including: information on different types of retrofits; cost data; funding opportunities; payback timelines and material/technology suppliers.

Recommendations:

- Provide local residents with the tools and resources necessary

Appendix C: Community of Invermere GHG Emission Reduction Strategies

to facilitate residential retrofit programs such as: website of audit links, funding sources, a community directory of local contractors.

- Consider providing incentives for energy audits (i.e. financial incentives or provision of energy efficient fixtures), and promotion of ecoEnergy audits and retrofits.
- Develop an incentive program for homeowners that choose to renovate 'green' (i.e. waived or reduced building inspection fees).

LiveSmartBC Program Concludes

Until recently, numerous grants were available through the Provincial **LiveSmart** program to offset energy audit and retrofit costs. This program is no longer accepting new participants however, homeowners already engaged in the process have until March 31, 2011 to conduct the final audit of completed retrofits.

Cost Effectiveness: To encourage residents to undertake retrofits, the District may consider providing financial incentives as mentioned above. Coupled with waiving/reducing permit and inspection fees, offering financial incentives to those who successfully complete qualifying projects is a cost the District will have to consider. Developing a soft retrofit program as described under Option 1 above would incur relatively small costs and may result in lowered energy bills for participants. Option 2 above, requires homeowners to pay for audit services upfront. Funding for home and business retrofits are readily available to homeowners from a variety of government, businesses and not for profit organizations making generally expensive retrofits more affordable. The District can access funding to implement community-wide retrofit and education programs through ecoEnergy, BC Hydro, Solar BC, Southern Interior Development Initiative Trust and regionally through the Columbia Basin Trust.

GHG Emission Reduction Potential: The potential for emission reductions from residential building retrofits is difficult to quantify given that the scale and scope of individual projects cannot be predicted. Smaller projects such as bulb replacement from incandescent to CFL are affordable and easily done. For every household that changes their most frequently used bulbs to CFL the expected saving is 0.227 t CO₂e per year. If only 300 homes in Invermere changed their most frequently used bulbs to CFLs the community could expect a reduction of approximately 68 t CO₂e.

Ease of Implementation: Combining and expanding upon the individual retrofit programs currently underway by the District would not be difficult. Outreach materials could be prepared internally and housed in the fore mentioned community 'green resource centre' (online or physical). If the District opts to offer financial incentives, research, grant writing and community partnerships may be considered.

Promoting the Installation of Solar Hot Water Heaters

Receiving ample annual sunlight hours, Invermere is an ideal location for solar powered hot water systems. Solar water heaters can be installed as generally uncomplicated retrofits or designed into new residential units both creating good opportunities to offset residential propane and hydro demand. Furthermore, the return on investment for such systems is increasing with rebates and rising energy costs.

The BC Sustainable Energy Association's SolarBC program offers resources and financial incentives to homeowners and municipalities interested in developing solar hot water projects. Information on solar water systems, certified installers, pricing and financial incentives can be found on the SolarBC website at www.solarbc.ca. Financial incentives available to all British Columbians who have their systems installed under the SolarBC program include a \$1000 discount on individual systems at the point of sale and a \$1375 discount on each system when 20 or more systems are ordered together. Low-interest financing options are also made available through SolarBC.

Become a SolarBC Community

In early 2010, SolarBC will accept applications from municipalities wishing to be granted SolarBC Community status.

Communities successful in their application can receive up to \$20,000 plus assistance for marketing, training and solar policy development. Interested communities should contact SolarBC in January 2010 to determine their eligibility.

Recommendations:

- Provide local residents with the tools and resources necessary to facilitate residential solar hot water systems.
- Consider providing incentives for installation of systems such as rebates on materials or tax credits.
- Inclusion of solar harvesting for energy production in new building policies.

Cost Effectiveness: As conventional energy costs increase and solar technology becomes more accessible, solar hot water systems will become more affordable and help residents reduce their energy bills. The average cost for an installed solar hot water system under the SolarBC program is approximately \$6,800. Invermere customers who install their systems through the SolarBC program are eligible for rebates ranging from \$2250 to \$3425. To receive the point of sale discount from SolarBC, systems need to be installed by SolarBC-approved contractors/companies. No local installers are SolarBC-certified however, there are six companies located in both B.C. and Alberta serving the East Kootenay area. Invermere residents may be subject to travel fees incurred by certified installers.

Appendix C: Community of Invermere GHG Emission Reduction Strategies

GHG Reduction Potential: Solar hot water systems produces zero GHG emissions and can supplement up to 60% of the energy required to heat water for a family of four. When used at capacity, 2 tCO₂e can be saved per household. If 50 systems were installed within Invermere, 100 tCO₂e could be saved from the 3392 t CO₂e created by residential buildings.

Ease of Implementation: Its is an ideal time to encourage residents to install solar water heaters as there are many financial incentives available and there are local businesses who provide qualifying systems. Installing a system on one or more of the municipal buildings would provide a great opportunity to showcase the efficiency and simplicity of this “free” energy source. SolarBC provides print and electronic materials that can be adapted to develop a District-led initiative.

The U.S. Department of Energy has developed a comprehensive resource guide to assist local governments and stakeholders in building sustainable local solar markets. Solar Powering Your Community: A Guide for Local Governments introduces a range of policy and program options that have been successfully field tested in cities around the US. A full copy of this guide can be found online at: <http://www.solarbc.ca/blog/liz-kelly/2009/11/05/solar-powering-your-community-guide-local-governments>

Solar Community Case Study

Tofino is known for its winter storms and year round rain. However, this community was selected by Solar BC to be one of 7 Solar Communities throughout the province. The designation of a Solar Community will begin laying the foundation for the larger Community Energy Plan. The District hopes to demonstrate to other communities throughout BC that a small community can have a large impact when it comes to energy saving. They will begin by installing solar heating on their community centre and hope to in the near future convert their ‘stump dump’ (a dump for organic construction waste) into a solar farm (www.tofino.ca).

Encourage Participation in BCHydro’s Team Power Smart Program

Invermere has 282 BC Hydro customers who have pledged to reduce their electricity consumption by 10% through the Team Power Smart program. The individual and community-based program was developed to reduce electricity demand thus helping make BC an electricity self sufficient province by 2016 - a key goal set out in the government’s 2007 BC Energy Plan. To reach their target of 210,000 participants in the Team Power Smart program, BC Hydro offers rebates, cash-back offers, incentives, a wide range of information and interactive tools through the program website: <http://www.bchydro.com/powersmart/>. Participants can monitor their electricity use and savings online, compare their use against the provincial average, receive a custom analysis of their household energy use as well as

custom recommendations to help reduce energy use.

Recommendation:

Increase participation in the Team Power Smart program in Invermere. Encourage 25% of the population to join and reduce their energy consumption by 10%.

Cost Effectiveness: This program is available to all BC Hydro customers and communities. There are no registration fees or charges to participate. There are no penalties or consequences to falling short of set targets. Customers participating in the program can choose to implement recommendations that have upfront cost but all customers who reduce their electricity consumption through this program will enjoy lower BC Hydro bills. Team Power Smart members also receive exclusive discounts and incentives that further savings.

GHG Emission Reduction Potential: As decreased energy use under this recommendation is limited to hydro electricity, the GHG reduction potential of this action is low. It should be noted that encouraging residents to actively monitor and adjust electricity consumption can help create a conservation ethic important to overall environmental awareness within the community.

Ease of Implementation: With just under 10% of the Invermere population already participating in the program, encouraging an additional 15% would see 469 additional residents curbing their electricity demand. BC Hydro is strongly marketing the program provincially through both television and print media however, having the District feature local success stories and examples of savings through Invermere media can help promote participation.

Accessible Savings

Lower-income customers in Invermere can now apply for free home energy savings kits that contains a number of simple, easy-to-install energy saving products

Currently offered to Lower Mainland customers only, BC Hydro plans to expand their Energy Conservation Assistance Program to other regions in 2010. This program provides qualified low-income BC Hydro residential account holders with a home energy evaluation, the installation of energy saving products, and personalized energy efficiency advice all free of charge to the participant.

General Opportunities for Residential GHG Reduction

Policies, programs and activities that safeguard and enhance Invermere’s environmental quality help create a conservation ethic and build community pride. If people are made aware of the financial and ecological benefits of energy conservation on a routine basis, it can be easier for them to make behavioural changes in their

Appendix C: Community of Invermere GHG Emission Reduction Strategies

own lifestyles to reduce GHG emissions. The following points are education-based recommendations that although not quantifiable, will assist in facilitating change in the community, and ensure access to the information and resources necessary for individuals to take action in their own homes.

- Partner with local organizations and businesses to establish a resource centre, located at a municipal building or other centrally located space, where materials, grant applications and other 'green home' resources are available.

The **City of Ottawa** has established a resource centre in their City Hall, which is managed by a local non-profit organization. The centre provides resources, including an EnviroBoutique where energy and water efficient products and fixtures are available for purchase. <http://www.envirocentre.ca/>

- Dedicate a webpage or link to tracking participation in the various programs offered to the community. Provide on-line resources and links to facilitate individual action, and to provide a centralized location for all residential-related reduction opportunities.
- Partner with the RDEK to help shadow populations (i.e. second homeowners, vacationers/tourists etc.) reduce their energy consumption by providing educational outreach and opportunities for their participation in local GHG reduction strategies and programs. Creating a "While You Are Away" guide for second homeowners and a "While You Stay" guide for tourists that outline community expectations, ethics and opportunities can help engage non-permanent residents in Invermere and area initiatives. Guides can be distributed through community associations, tourist outlets and the Chamber of Commerce.
- Offer incentives to builders who build to higher energy efficient standards.

The **City of Calgary** offers rebates on building permits of 10%, 20% or 30% respectively for homes built to bronze, silver and gold standards under the Built Green program.

Commercial Buildings

Total Baseline Emissions: 3055 t CO₂e

It can be assumed that behavioural changes at home will be transferred over to the workplace, and visa versa. There are programs geared specifically towards commercial buildings that provide incentive for minor retrofits. Facilitating many of these initiatives through a single organization, such as the Chamber of Commerce, will ensure that information is being dispersed to all businesses in the

community. The following section identifies some of the opportunities that exist for commercial GHG emission reduction.

Encourage participation in Green Awards at local lodging facilities

Although there are currently few commercial lodging options in the community, there are large-scale hotel accommodations planned in the District core as well as new resort accommodations now under construction. To foster a community conservation ethic and to help the local lodging industry curb emissions, participation in nationally recognized 'green' lodging programs should be encouraged for all Invermere hotel and bigger lodging facilities. Additional benefits of participation include access to information and recommendations for curbing environmental impacts, access to new markets and promotion opportunities, and opportunities to cut operating expenses through conservation. Below are details of two Canadian 'green' lodging programs that can be encouraged:

- **Green Key Eco-Rating Program:** Offered by the Hotel Association of Canada (HAC), this voluntary graduated rating system open to all lodging facilities in Canada regardless of membership in HAC. The program is designed to recognize hotels, motels, and resorts that are committed to improving their fiscal and environmental performance. Lodgings complete the Green Leaf self-administered audit on-line and are awarded a rating of 1 to 5 'Keys' indicating their environmental performance. Along with their achieved rating, participants receive recommendations on how they can reduce operating costs and environmental impacts through reduced utility consumption, employee training, and supply chain management. Travellers can easily locate participating accommodations across North America along with their associated Key rating on-line.

Calgary Marriott, Calgary, Alberta

The **Calgary Marriott** was awarded a **Green Leaf Eco-Rating** of 3 for implementing the recommendations listed in their audit analysis. Staff testimonials indicate that the rating process was straightforward, comprehensive and integral to setting future environmental goals by highlighting their successes and areas needing improvement. Within the first year of program participation, the hotel achieved cut energy costs by 12%.

- **Audubon Green Leaf Program:** This joint initiative between Audubon International and TerraChoice Environmental Marketing is two-step program designed to help lodging facilities improve their bottom line with reducing environmental impacts. Any lodging facility can enrol into the program at a rate of \$200.00 per year to gain access to materials and information to help make improvements to their facility. Within three years of initial enrolment, the facility must complete the Eco-Rating

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process. The graduated rating system leads participants through an environmental efficiency indicator survey and awards a Green Leaf Eco-Rating of 1 through 5; 1 for a minimum of committing to a set of environmental principles and 2 through 5 for results in applying those principles. Participants are provided with guidance for improving their environmental performance and reducing operation expenditures.

Recommendation:

At least 50% of existing lodgings in Invermere participate in an energy or environmental rating program. All future lodgings required to participate in rating programs to foster community conservation ethic.

Cost Effectiveness: Annual membership fees to participate in the HAC's Green Key Program are \$600 per property regardless of size. A discount is available to members registering 10 or more properties at once.

To participate in the Audubon Green Leaf Program, participants can access materials and information to improve the performance of their facilities for \$200 per annum up to a maximum of three years. Within three years of enrolment in the Green Leaf program, participants must complete the Eco-Rating process at a cost of \$200 to \$800 per year based on lodging size. Participants are required to repeat the Eco-Rating process every three years to ensure ratings match facility conditions.

Additional costs to implement facility/operational improvement recommendations will vary and should be considered when enrolling in any rating program. The District may consider funding a portion of the annual membership fees to encourage greater participation by the smaller lodging facilities.

GHG Emission Reduction Potential: There is potential for small greenhouse gas reductions through having Invermere lodgings enrol in green-rating programs. Implementation of this recommendation can help local accommodation providers reduce their operating costs, access industry-specific information and support to improve their facilities and feel proud that they are contributing to the reduction of Invermere's GHG emissions. Seemingly small actions can go a long way towards encouraging a community conservation ethic and community pride.

Ease of Implementation: The fore mentioned eco-rating systems for lodgings are well established, national programs with a host of resources and industry-specific expertise. Enrolment in either program is straightforward for lodging facilities. The main barrier is a local champion or leader to spearhead a campaign to encourage further involvement in the programs. This role could possibly be taken on by the Chamber of Commerce and through policies developed through District planning staff (i.e. for future developments).

Commercial and Industrial GHG Energy Efficiency Program

Commercial and industrial buildings produce only a small percentage

of GHG emissions in Invermere. Despite this, businesses can achieve large cost savings and help realize local emission reduction targets by improving their environmental performance. BC Hydro's Power Smart Business Solutions programs provide a range of incentives for both big and small commercial and industrial customers. Resources include the Product Incentive Program, which provides financial incentives to customers replacing inefficient technologies with new energy efficient products. BC Hydro is currently providing a complementary energy audit walk-through program to businesses located in the Lower Mainland and Victoria, however, recent communication with BC Hydro has determined that if a minimum of 7 businesses were to participate in the assessment within a 100 km radius of each other, an auditor could travel to Invermere to conduct the assessments within several days. The Chamber of Commerce could facilitate this program by advertising it to its members and encouraging businesses to participate in this free energy assessment.

Recommendations:

- Engage commercial, retail and small businesses in an energy audit and assessment of energy reduction opportunities, delivered by BC Hydro.
- Provide the tools and resources necessary for the commercial sector to access incentives and rebates for energy retrofits through the Chamber of Commerce.
- Develop a reward system to recognize environmental stewardship at local businesses.
- Set reduction targets for energy reduction among commercial businesses of a 10% reduction by 2015 and 20% by 2020.

Cost Effectiveness: BC Hydro does not charge customers for their walk-through audit or the customized recommendations provided following the audit. BC Hydro also conducts full, detailed energy studies of commercial operations and provides funding for up to 100% of the cost of the study. Detailed study costs are based on the size and complexity of the operation under review. The cost of hiring a private consultant or engineer can range from a couple of hundred dollars to more than \$1000. If more than one business is interested in having a private company conduct the energy audit, there may be opportunity to reduce the overall fee.

For businesses ready to undertake energy-efficient retrofits, BC Hydro offers extensive resources and purchasing incentives at no cost via their website: <http://www.bchydro.com/ecatalog/>.

GHG Emission Reduction Potential: The easiest things to change in an office or commercial setting are lights, exit signs and use of electronic equipment. Retrofits of this nature will reduce the energy use of the building or office space, but will not significantly reduce GHG emissions, because of the low emission factor for electricity in British Columbia. Consequently, reduction targets could be created separately for electricity and propane. A target of 50% reduction in electricity from baseline values would be 227.5 t CO₂e which is an achievable target. A propane reduction of 10% would be 254 t CO₂e which could be achieved through various reduction strategies including programmable thermostats.

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Ease of Implementation: BC Hydro has The Power Smart program for commercial businesses is already set up by BC Hydro. Local promotion of the program would be quite simple, as the information and marketing materials are available from BC Hydro. If BC Hydro is unable to provide the complementary building walk-through, this may be a barrier, and any audits would have to be paid for by the businesses.

Transportation

Total Baseline Emissions: 20,215 t CO₂e

Transportation accounts for the majority of GHG emissions in Invermere. The distant proximity of the community to major city centres, infrequent public transportation, and variable road and weather conditions are contributing factors for public reliance on larger, personal vehicles to move in and out of the community. One challenge in the transportation sector is the difficulty of capturing the emissions from non-residents. The CEEI protocol does not consider the emissions from vehicles that are not registered in Invermere. Reductions to vehicle emissions from tourists will therefore not be captured in future inventories, however the co-benefits of improved air quality, walkability of the community and alternative transportation contribute to a generally more sustainable community.

Being contained to an area of just over 10km² however, there is significant potential to reduce public dependence on personal vehicles for trips within the District boundary. There are also a number of opportunities to reduce emissions by modifying driving behaviours and expectations. The District of Invermere launched a community-wide Idle Free campaign in early 2008 in partnership with Wildsight, Rocky Mountain School District 6 and two local schools. Within the year, an idle free bylaw was adopted, two schools declared their properties 'idle-free zones', educational and promotional materials were sent to every resident and distributed throughout the community while banners were displayed declaring Invermere as an 'idle free community'. The initial outreach of this program helped raise awareness of the impacts of idling and promoted positive behavioural change to curb emissions. The following section identifies strategies to reduce greenhouse gas emissions in the transportation sector.

Recommendations:

- Further promote Invermere as an Idle Free community.
- Work with local residents and organizations to deliver information through workshops, local media, schools and businesses.
- Monitor (through surveys, observation, data collection) the successes and behavioural change as a result of Idle Free signage and awareness initiatives.
- Install highly visible Idle Free signage on or adjacent to Invermere on the Lake welcome signs and notification boards, Athalmer area, downtown zones and key parking stalls, parking lots, parks, beaches and idling hot spots around local businesses/services (e.g. both grocery store parking lots, Invermere Hospital, gas stations, etc.) Similar to engine brake

restrictions within town, commercial transport/delivery trucks, vans and buses should be discouraged from idling during deliveries and pickups.

- Investigate limiting drive-thru windows in future developments to curb unnecessary idling and vehicle use.

Cost Effectiveness: There are very little costs involved in the implementation of this program. Sign generation, wages and public awareness are the only aspects of the project that involve costs. Outreach materials, campaign information and ready-made signage are available at no cost through Natural Resources Canada's Idle-Free Zone website: <http://oee.nrcan.gc.ca/transportation/personal/idling.cfm?attr=8>. NRCan provides to help communities cover the cost of sign production and can be contacted when their next funding cycle opens in 2010.

Additional free-of-charge resources and materials can be found through the provincial Idle-FreeBC site: <http://www.idlefreebc.ca/>.

GHG Emission Reduction Potential: If each Canadian who drives a light duty vehicle, avoided idling for just three minutes every day in the calendar year, then we would reduce our carbon dioxide emissions by 1.4 million tonnes per annum. In addition, we would be saving 630 million litres of fuel per year. Consequently, this program offers good opportunity for reducing our greenhouse gas emissions and may take a couple of years to notice results. Potential emission reduction upon successful implementation in Invermere is 2425 tonnes GHG emissions based on reduced fuel consumption by approximately 10%.

Drive-thru windows limited with new bylaw, Comox, BC

In October 2009, Comox Council passed a bylaw that limits drive-thru windows to businesses already established or approved. Drive-thru windows will not be permitted on any future commercial developments within the town although businesses can still apply to rezone their properties to allow a drive-thru.

Ease of Implementation: The Idle-Free Invermere (IFI) campaign has already achieved significant success with the adoption of a community-wide idle free bylaw and two schools declaring their grounds as permanent idle free zones all in 2008. The program has not been promoted recently and temporary IFI signage has since been removed without being replaced by permanent signage reminding the community that they are entering an idle-free zone or parking stall. There is great opportunity to implement an expanded IFI program using signs, monitoring and reporting activities to help re-engage the public to curb transportation emissions. Print and signage materials are already designed and available and the public is aware of the initiative from previous outreach efforts. Reminding residents of financial, health and environmental benefits associated with reduced idling and promotion of Invermere as a proud idle-free community would not be difficult.

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Invermere currently has two drive-thru windows operated by 'fast-food' restaurants. Drive-thru windows can be idling hotspots when customers move slowly from menu board to order box to pickup window. At the pickup window, customers likely leave their vehicle idling while they then wait for their order. To limit drive-thru windows in Invermere, public input is required and policy and planning tools may require revisions that District staff, Council and Mayor would need to undertake. Consulting with the general business community and specific businesses that currently operate drive-thru windows would also be necessary.

Alternative Transportation:

Increased bike trail system and biking infrastructure

Cycling is perhaps the fastest way to make a trip of less than 5 km. Providing easily accessed, well-maintained bicycle lanes/trails that connect key areas of the community can help reduce GHG emissions attributed to transportation by encouraging residents to leave their cars at home. During the public engagement sessions in June 2009, residents expressed strong interest in improving and expanding bike infrastructure and ridership incentives. To facilitate this, the District was recently successful in securing a grant from the Provincial Government's LocalMotion fund to develop the Westside Pathway System. This trailway will connect all three Invermere schools as well as several residential areas making alternative transportation more convenient for residents. For every person that reduces their vehicle use by 10%, CO₂ emissions are reduced by 0.2 to 0.8 tonnes annually depending on vehicle.²⁸ If 500 Invermere residents committed to reduce driving by 10%, transportation emissions would be reduced an average of 250 tonnes annually. Ridership can be further increased into the future by requiring new developments to tie into existing trail facilities where their development is within close proximity. This is an excellent policy that should be formally integrated into the development bylaws to ensure that all new developments have access to trails that connect with the main systems throughout the community.

Recommendations:

- Amend Road Design Standards to include bike lane development on major roads within the District.
- Provide bike facilities (i.e. racks, storage rooms at businesses, etc.) to encourage bike commuters and local bike transportation.
- Encourage alternative transportation through the continued education and promotion of existing programs such as Commuter Challenge, Walk to Work Week and Bike BC.
- Integrate trail connections into Policy for all new developments.

The **Provincial BikeBC** program offers funding to develop, improve and expand cycling networks and infrastructure. Municipalities and regional districts can apply for up to \$250,000. Applications and additional information available online at: <http://www.th.gov.bc.ca/BikeBC/CIPP.html>



Cost Effectiveness: The District has secured two key Provincial grants that will be used to begin improving and expanding Invermere's bike trail systems and infrastructure. Approximately \$200,000 was awarded from LocalMotion for the Westside Pathways System. Additional monies provided through the Built Environment & Active Transportation fund have been used to develop community enhancement plans that include improved cycling infrastructure.

Building, improving and maintaining cycling infrastructure can be a large expenditure for many small communities however, It costs as much as twenty times more to support a passenger kilometre of automobile traffic compared to the same distance of bicycle traffic.²⁹

GHG Emission Reduction Potential: BC's 42% growth in greenhouse gas emissions in transportation since 1990 can be attributed largely to more vehicles, higher sales in lower efficiency light trucks over conventional cars, and an increase in total kilometres driven.³⁰ This program has the capacity to reduce fuel consumption by an additional 10% as with the Idle Free program. The possibility for even greater reduction exists if the program is successful for more residents in the community. Promotion and education will increase the participation in the initiative, and result in increased GHG emission reduction, improved air quality and general improved health and fitness of the community.

Ease of Implementation: Over the past two years, the District has been taking steps toward improving the accessibility and convenience of cycling in Invermere. Grants have been awarded to the District, infrastructure plans drafted and construction has started on the expansion of the Westside Pathway System. Additional infrastructure is required to make active transportation convenient and accessible. Work remains to connect commercial, industrial and core retail areas with many residential areas of the community. To encourage residents to get out of their cars and access the new/improved trails and pathways will require ongoing outreach efforts that promote the benefits of active transportation.

²⁸ Government of Canada, *Climate Action Plan for Canada: Climate Change, Achieving our Commitments Together*, Nov 2002., pp. 46.

²⁹ Sorensen, 2008. *Fact Sheet – the Bicycle, from Seven Wonders for a Cool Planet*, Sierra Club Books, <http://www.sightline.org/publications/books/seven-wonders-for-a-cool-planet/fact-sheet-the-bicycle>

³⁰ B.C. Ministry of Environment. 2007. *Environmental Trends in British Columbia: 2007. State of Environment Reporting*. Victoria, B.C. <http://www.env.gov.bc.ca/soe/et07/> pp. 152-156

Appendix C: Community of Invermere GHG Emission Reduction Strategies

Case Study

The City of Quesnel (pop. 9,915) is a forestry-based community that is the commercial centre of the North Cariboo. The City wanted to build a trail from downtown to a key industrial area. This required working around a busy provincial highway, an active railway, private industrial lands and steep banks leading to a river. It also meant overcoming budget and funding constraints.

In the past, the favoured bicycle route was slated to negotiate a logical routing along the riverbank and through an industrial complex, but this route was never completed due to environmental constraints. A consultant was hired to review alternative routes. Public input as part of the Built Environmental & Active Transportation funded project found that the public favoured redirecting the trail to a less busy alignment and expanding the scope of the project to include other areas of the city. Public support gave the trail project a renewed focus. The City of Quesnel and the Ministry of Transportation and Infrastructure now have to conclude design details on the new trail alignment. In the consultation process, significant public support was expressed for other new multi-use trails, which are now being planned. The project has demonstrated that it is beneficial to engage the public as early on in a trail planning process as possible. This ensures that a variety of trail options are considered and that public support will carry a trail project to completion.

Additional Resources: The Fraser Basin Council document Transportation Demand Management: A Small and Mid-Size Communities Toolkit provides additional case studies and information on active transportation. The document can be viewed online at: www.fraserbasin.bc.ca/programs/documents/FBC_TDM_toolkit_web.pdf

Become a Walking Community

For many Invermere residents, walking from home to another destination within the District will take just minutes and yet vehicular transportation is the community's largest source of GHG emissions. Encouraging residents to take up walking as an alternative to using their cars will promote better health for residents and the environment.

Recommendations:

- Extend sidewalks and pathways throughout the community to make walking a safe and convenient mode of active transportation. Enforce snow removal during winter months.
- Foster a walking-friendly community by trialing designated

'Pedestrian Zones' that prohibit vehicles from portions of the downtown core during peak pedestrian traffic.

- Create designated 'Park & Cruise' areas at key town traffic inflows. Provide safe and clearly marked pathways and bike lanes that connect 'Park & Cruise' areas to the rest of the community.

Cost Effectiveness: Residents must often use roadways, walking alongside cars and bicycles, when walking within the District. Absent and/or poorly maintained sidewalks and pathways are barriers to making walking a convenient alternative to vehicle use. Building new walkways while improving and maintaining the existing infrastructure, requires large amounts of funding. Upgrades and expansions can be completed in stages to reduce one-time lump sums or as funding is received.

During the community engagement session, there was widespread support for closing a portion of 7th Avenue in the downtown core off to motorized vehicles during events that draw significant pedestrian traffic. There was consensus among attendees that closing 7th Avenue anywhere between Ag Valley Foods (6th St.) and CIBC (13th St.) to vehicles during the hours of the Invermere Farmer's Market on summer Saturday mornings would be an ideal situation to trial. Public consultation and feedback would require collection. District would have to conduct the closure or instruct event operators on the protocol.

A recommendation to create a 'Park & Cruise' network in Invermere also drew significant support from those attending the community engagement session. Initiating this recommendation necessitates public consultation, possible revision of community plans and zoning, determination of parking areas and improvements to the pathways leading to and from parking areas may be required. Routes could be created, mapped and displayed at each parking area. Signage would be required.

GHG Emission Reduction Potential: When people collectively elect active transportation over vehicular transportation, there is significant opportunity to reduce greenhouse gas emissions. In general, the capacity for walking to reduce emissions is similar to that of other modes of active transportation – about 10%. This figure is dependent upon the number of residents and tourists electing to walk rather than drive.

Ease of Implementation: Barriers to expanding and improving sidewalks and walkways throughout Invermere are likely financial. Infrastructure that supports cycling, walking and transit costs less than infrastructure to accommodate transportation by car.³¹ Boosting multi-modal transit infrastructure can relieve pressure on local government budgets. For funding opportunities, see the box at the end of this section labelled Active Transportation Funding Opportunities.

³¹ UBCM, 2009. BC Climate Action ToolKit: Transportation Plans. <http://www.toolkit.bc.ca/tool/transportation-plan>

Appendix C: Community of Invermere GHG Emission Reduction Strategies

Case Study

The **City of Vernon**, OCP policies include Prioritizing new sidewalk construction, especially in high-demand areas such as schools, seniors' centres, downtown and neighbourhood centers to help reach their goal of doubling walking trips by 2031.

To promote active, healthy living and encourage residents and visitors to discover their city by foot, the **City of Richmond** developed The Walking Guide Book. The Guide details 14 'Walk Richmond' walking routes and information about directions, parking, washrooms and access. Also included in the Guide are 6 urban scavenger hunts and the Walking Handbook (provided by the BC Recreation and Parks Association). The City has placed signage along routes to help keep walkers on track.

Develop Invermere-Branded Local Transit Service

Residents who attended the community engagement session offered positive reviews of the Health Connections BC Transit route. The service enables residents within the Columbia Valley to access medical facilities from Golden to Cranbrook at a low cost of \$2.50 per one-way trip. Session attendees expressed a strong desire for convenient public transit that would provide service within the District. BC Transit's Columbia Valley routes enable residents to move from Invermere to Windermere, Akisqnuq Village, Fairmont, Canal Flats, Radium Hot Springs and Edgewater twice daily. The service has a very small route within Invermere and riders can request additional trips between Invermere and Radium weekdays from 10:30 am to 2:30 pm 24 hours before they wish to travel.

It was suggested that convenient and well-branded local transit could be an important solution to personal vehicle use in Invermere. It was felt that employing small, ultra-efficient fuel, hybrid or fully electric vehicles that operate hourly (during peak visitor season) to all areas of the community during daytime and evening hours at a minimal cost to riders would encourage a large number of people to use public transit for commuting, running errands and moving to and from key community destinations. The current local transit route does not include major residential areas and operates at hours that do not easily allow Invermere residents who work locally to commute. Having 'Invermere Ambassadors' who are knowledgeable about the community drive the shuttles, posting complete routes and pick up times at each stop as well as centrally located promotional map will help make the service well-known to visitors.

Recommendations:

Investigate feasibility of creating an Invermere-branded local shuttle service of ultra-fuel efficient/electric vehicles that would allow residents to hop on and off at key locations across the community.



Active Transportation Funding Opportunities

Below are a number of potential funding sources for transportation demand management projects including active transportation initiatives. Contact the agency of interest to determine eligibility, application deadlines and timelines as funding cycles, requirements and granting periods vary.

Federal Funding

- Green Municipal Fund: <http://gmf.fcm.ca/GMF>
- Gas Tax Agreement: <http://www.buildingcanada-chantierscanada.gc.ca/regions/bc/gtf-fte-eng.html>
- Infrastructure Stimulus Fund: <http://www.buildingcanada-chantierscanada.gc.ca/creating-creation/isf-fsi-eng.html>
- The Climate Action Revenue Incentive Program: <http://www.cd.gov.bc.ca/lgd/greencommunities/carip.htm>

Provincial Funding

- Building Canada Fund - Communities Component: <http://www.th.gov.bc.ca/BCFCC/about.htm>
- The Strategic Community Investment Fund: <http://www.cd.gov.bc.ca/ministry/whatsnew/scif.htm>
- Cycling Infrastructure Partnerships Program (CIPP): <http://www.th.gov.bc.ca/BikeBC/CIPP.html>
- Infrastructure Planning Grant Program: http://www.cd.gov.bc.ca/lgd/infra/infrastructure_grants/infrastructure_planning_grant.htm
- LocalMotion: <http://www.localmotion.gov.bc.ca/>
- Towns for Tomorrow: <http://www.townsfortomorrow.gov.bc.ca/>

Other Funding

- Everybody Active Grants: <http://www.physicalactivitystrategy.ca/index.php/everybody-active/>
- Walk BC Grant: <http://www.walkbc.ca/walk-bc-grants>
- Built Environment & Active Transportation Grant: <http://www.physicalactivitystrategy.ca/index.php/beat/>
- Community Based Awareness Grant: <http://www.physicalactivitystrategy.ca/index.php/beat/help-keep-walkers-on-track>

Appendix C: Community of Invermere GHG Emission Reduction Strategies

Cost Effectiveness: Cost of transit feasibility studies can range from hundreds up to several thousand dollars, as the District is aware from other projects. Public consultation would be required to determine the amount residents would be prepared to pay for the service as well as the type of service they would demand in order to forego using their personal vehicle.

To implement the shuttle service, public consultation is necessary to determine routes and fees. Initial upfront charges would include vehicle purchases, insurance, shuttle operator wages, signage and outreach materials. To reduce costs, it may be possible to utilize the BC Transit bus already operating in the area if an agreement could be established with other communities who also rely on the vehicle. As this service would help move employees and tourists around the entire community, there is a possibility that local businesses could provide seed funds or sponsor vehicle costs. The Chamber of Commerce may be a candidate to champion this program.

GHG Reduction Potential: Establishing a reliable, convenient, accessible and affordable community transit system in Invermere would create significant opportunity to reduce local greenhouse gas emissions. If residents reduced personal vehicle use by 30% gas emissions from transportation could be reduced as much as 7000 tonnes over the next 10 years.

Ease of Implementation: After due public process, feasibility studies and financial constraints, the work required to implement a local shuttle service includes: Determining routes; Setting up operating protocols; Hiring, training and retaining reliable, knowledgeable staff; Purchasing and maintaining fleet vehicles; Monitoring ridership and adjusting service and costs accordingly; Installing signage; Marketing and promoting the service. The local shuttle could further encourage active transportation by linking 'Park & Cruise' areas, greenways and local recreation areas.

Gas Lawnmower Trade In Program

A recent Ipsos Reid poll indicates that more than half of all Canadians with small-sized lots use a gas powered mower to cut their lawns. Operating a gas powered lawn mower for only one hour emits the same amount of harmful air pollutants as 40 new cars running for an hour. Although not a 'vehicle', the opportunity to reduce greenhouse gas emissions through the reduction of gas lawnmower use is significant, and relatively easy to implement, and so is included in the community reduction strategy.

Summerhill's Mow Down Pollution program engages Canadians to reduce emissions by providing instant rebates of up to \$100 when they bring in their old gas powered lawn care equipment for permanent retirement and recycling. Summerhill's corporate partner for Mow Down Pollution is The Home Depot [Canada]. The large home-improvement chain collects old equipment, provides an outlet for Summerhill staff to help customers choose the most efficient equipment and issues the rebates that must be used to purchase environmentally preferred lawn care equipment.

Case Study

Although public engagement session attendees felt a locally branded, highly-visible, frequent shuttle operating within the District would be an ideal means of getting tourists and locals alike out of their vehicles, there are steps that can be taken to improve the existing public transit system in the interim. Increasing the route to cover all residential and commercial areas (including 7th Ave downtown core) and increasing the frequency of stops to allow for business hour commuters are examples. **Salt Spring Island** provides local transportation through BC Transit. The service provides a 'local route' that connects residential areas to core commercial and medical facilities and then, similar to the Columbia Valley Route, also links the local system to surrounding amenities and communities.

Salt Spring Island began offering local and regional public transit in January 2008. BC Transit operates two 20 passenger mini-buses on routes that are tailored to local needs. Similar to Invermere's system, the buses operate on fixed routes and schedules but drivers will detour to pick-up and drop-off passengers where and when possible. Service levels and fares were established based on consultation and input from Island residents.

The budget for the first year of operation was \$180,000, with 15% of this to come from the fare box. The balance comes from local service tax and core funding provided by BC Transit. Ridership for the service has greatly exceeded expectations, with the number of trips an estimated 2.6 times more than originally projected. The estimated annual fare revenue for 2008 is about three times the projected revenue of \$23,000.

Actual GHG emission reductions resulting from the service have not yet been calculated. However, it is reasonable to suggest that they will be significant. Using a conservative assumption that 75% of the trips taken on the bus would have otherwise been taken in another vehicle, the bus service has replaced about 31,000 auto trips. Additional realized benefits include:

- Better access for those without vehicles to island services and shopping
- Reduced parking demand in the villages, particularly in the busy summer months and on "Saturday Market" day
- Reduced summer congestion at ferry terminals
- New jobs created

View the Capital District's bylaw establishing a community transit and transportation service on Salt Spring Island online at: http://www.crd.bc.ca/_search/Search.aspx?queryText=CRD+Bylaw+No.+3438+&number=10&html=on&pdf=on

View the accompanying bylaw to establish the advisory Salt Spring Island Community Transit and Transportation Commission online at: http://www.crd.bc.ca/_search/Search.aspx?queryText=CRD+Bylaw+No.+3450&number=10&html=on&pdf=on

Appendix C: Community of Invermere GHG Emission Reduction Strategies

Recommendation:

- Implement a lawnmower exchange program, in coordination with local retailers, or through the municipal government to encourage the use of reel or high-efficiency electric mowers.
- Provide 'loan' mowers at District office, or a resource centre to allow interested homeowners test a reel, or push mower.

Cost Effectiveness: Costs of implement the above recommendations are minimal and opportunities exist for funding support. It would be ideal to partner with local retailers that supply lawn care equipment as the alternative requires people to haul their equipment approximately 130km to the nearest Home Depot [Cranbrook]. To put the mower loan program into effect, the District would need to collect or purchase two to three push mowers and perhaps a high-efficiency electric mower for public use. Mowers will require routine maintenance and eventual replacement.

GHG Emission Reduction Potential: Environment Canada estimates that 10% of Canada's greenhouse gas emissions are generated from off road gasoline powered engines, including lawn mowers and trimmers. Annually, each gas-powered lawn mower creates 48kg of GHG emissions. Consequently, this program provides good opportunity for greenhouse gas emission reduction, despite the fact that it may take a few years to notice a result.

Ease of Implementation: The Mow Down Pollution program has proven extremely successful across Canada, collecting more than 34,000 pieces of gas powered lawn equipment for permanent retirement and recycling over the past eight years. Removing this equipment from operation has prevented 1,100 tonnes of GHG emissions. Invermere residents are eligible to participate in the MDP program but as mentioned, they will need to bring their mowers, trimmers, blowers and chainsaws to a Home Depot during the 10 or so days the program occurs each spring. To develop a local mower exchange, the District may wish to partner with local retailers who can manage the rebates and equipment. A recycler will need to be sourced and either the retailer or the District will have to arrange for the transportation of collected equipment to the recyclers. Farbrook Auto Recycling in Cranbrook is a member of the BC Auto Recyclers Association and will recycle old lawn equipment year round.

Summerhill Impact Program: Mow Down Pollution

Information on lawn equipment emissions and developing mower exchange programs can be accessed online at: <http://www.summerhillgroup.ca/eng/impact/programs/mow-down-pollution.php>

To implement a mower loan program, the District would need to purchase and maintain a small collection of reel and/or electric mowers for loan to residents as needed. District staff hours would be required to coordinate the program. The District could provide a real-time registration page on their website to allow potential users to check equipment availability and book use of desired machines. For residents without vehicles, the District may consider equipment deliveries by public works staff that work throughout the community daily. The program could be coupled with an information sessions highlighting the significant emissions produced by gas powered lawn mowers, and it could provide residents with information maintaining their lawn equipment to ensure that they are running as clean as possible. Not only would this program contribute to GHG emission reductions but it would also promote active living and a sense of community sharing.

Community Waste

Total Baseline Emissions: 808 t CO₂e

Solid waste management is a growing concern as Invermere's population and tourism numbers continue to increase. The RDEK is taking steps to prolong waste collection at the Windermere Valley Landfill as it nears capacity. In addition to these techniques, communities must employ waste service demand management by encouraging residents to produce less waste and by diverting recyclables and compostables from the waste stream. Declaring Invermere a 'zero-waste' community can help motivate and educate residents to throw away less, recycle more and compost as possible. Providing a local reuse centre will help divert useful items from ending up in the landfill.

The District of Invermere provides weekly residential curbside waste collection and bi-weekly curbside recycling pickup. In addition, the District supplies and manages yard bins placed throughout the community to collect both waste and recyclables. Keeping the yard bins at major locations within the District while a residential curbside program is in place enables part-time residents and visitors to recycle waste that may otherwise have ended up in the Windermere Valley Landfill. During the engagements sessions held in May and June 2009, District of Invermere staff, Council and the public expressed great interest in taking community waste reduction a step further by establishing an area composting facility and curbside organic waste collection. District staff were also interested in exploring the possibility of a local waste incinerator fitted with a co-generation system to manage solid waste disposal.

Organic Waste Collection

On average, each British Columbian generates over 600 kilograms of waste annually. By diverting organics through composting, each of us has the opportunity to remove approximately 200 kilograms from the solid waste stream every year.³² The quantity of potential reductions

³² Recycling Council of British Columbia. Fact Sheet: Diverting Compostable Organics. July 2008.

Appendix C: Community of Invermere GHG Emission Reduction Strategies

in GHG emissions is varying between studies. If 50% of Invermere's permanent population (approximately 1500 people) composted their organic waste routinely, local GHG emissions would be reduced by 300 t CO₂e annually. [1500 x 200 = 300,000 kg /1000 = 300t]

Recommendations:

- Conduct a feasibility study for the implementation of a curbside composting program.
- Encourage the composting of yard waste. Consider banning organic yard waste from the landfill (i.e. household organic waste pile at the Transfer Station).
- Promote RDEK's subsidized backyard composter program or develop a similar District-led program to encourage more Invermere residents to compost. Provide education and awareness around safe backyard composting and vermicomposting opportunities.

Cost Effectiveness: Establishing and operating a composting facility with curbside collection would involve extensive costs. To reduce costs and curb regional emissions, the District of Invermere could consider partnering with surrounding communities and the Regional District to develop a larger, local facility. Public consultation and a feasibility study would be required to determine the scope and specific costs of the project. The composting method selected will help determine construction costs. Funding to develop facilities can be sourced from Federal and Provincial programs that waste diversions including FCM's Green Municipal Fund: <http://gmf.fcm.ca/GMF/GMF-2009-call-for-applications/Waste-2009-call-for-application.asp>. Once a facility is selected and composting method determined, additional costs would include household and community compost receptacles as well as District staff hours and vehicles to collect organic waste and operate the facility.

The RDEK provides backyard composters (the Earth Machine) to Invermere and other East Kootenay residents 'at cost' through their Columbia Valley office. The vessels cost \$50 each and come with information about composting techniques and benefits. To encourage more residents to compost, the District could further promote the RDEK's program at little expense or develop a similar program that would have the District providing subsidized vessels to Invermere residents. In the past, the Ministry of Environment has provided the vessels to local and regional governments at a reduced cost. Partnering with retail businesses or the manufacturer can also reduce the cost of obtaining composters.

GHG Emissions Reduction Potential: Providing residents with materials needed to compost and possibly even collecting and composting their organic waste for them will encourage Invermere residents to participate in the waste diversion program. Greenhouse gas reduction potential depends upon the level of participation in the program. If 50% of Invermere's permanent population (approximately 1500 people) composted their organic waste routinely, local GHG emissions would be reduced by 300 t CO₂e annually. If 75% of the population participated, community waste emissions could be reduced as much as 450 t CO₂e each year. Bringing restaurants,

grocery stores and other businesses with food and beverage services on board with composting could increase GHG reduction estimates. Highly visible promotions and community receptacles may help to engage part-time residents and visitors.

Ease of Implementation: The feasibility study and public input sessions will guide the District (and any potential partners) towards a preferred method of composting. Determining a suitable project site and developing infrastructure to account for peak loads well into

Case Study

In January 2006, **Ladysmith** became the first municipality in B.C. to provide residential curbside collection of organic waste. The diversion of almost 33 tonnes of organic waste from the landfill weekly significantly reduces the production of methane gas and leachate in the area. Commercial companies on contract with the municipality collect organic waste weekly and transport it to a commercial in-vessel composting facility. Non-organic waste and other recyclables are collected bi-weekly on an alternating schedule similar to Invermere's curbside recycling schedule. Forty percent of what was at one time destined for the landfill is now composted in Ladysmith.

The **Regional District of Nanaimo** developed an Organics Diversion Strategy that barred commercial organic waste from the regional landfill and piloted a residential food waste collection pilot program in 2007 and 2008. The Strategy can be viewed online at: <http://www.rdn.bc.ca/cms.asp?wpID=942>

During the pilot program, organic waste was collected weekly from 700 households and sent to a commercial composting facility. Results of the trial revealed that 50 per cent of household waste (93 tonnes) was diverted from landfills annually during the pilot. A permanent program will be phased in as required vehicles are received and as capacity of the composting plant permits. To facilitate collection, the Regional District of Nanaimo plans to replace four aging conventional garbage trucks with split packer trucks that allow for waste separation if desired. Each new truck costs about \$265,000 or about 10% more than a conventional garbage truck. The Regional District purchased its first split packer truck at the end of 2008 and it is expected to arrive in early 2010.

Nanaimo homeowners will be required to make a one-time payment of approximately \$30 above the annual \$105.25 for recycling and garbage pick-up service and to cover bin fees and outreach materials. That said, the District expects the program to be cost neutral as the Nanaimo pays \$105 per tonne of material taken to the landfill and \$85 per tonne for compostables.

Appendix C: Community of Invermere GHG Emission Reduction Strategies

the future will help ensure the longevity of the facility. The City of Guelph, Ontario, pioneered municipal composting with their WetDry system. With 98% compliance, the program diverts about 70% of household waste from reaching the landfill. Unfortunately, the local composting facility was forced to cease operations in 2006 due to odour and infrastructure concerns. As a result of the closure, organic waste is shipped south for incineration. The City of Guelph has since redesigned the compost plant to be a water-starved, in-vessel style and expects to resume operation in 2011.

The District may opt for an in-vessel system similar to the one proposed for Guelph or the windrow style system, a common alternative that may have a lower initial cost. Windrow systems must be enclosed with electric/barbed wire fences embedded several feet into the ground to keep wildlife from gaining access to the compost. Potential sites for housing windrow facilities will be limited with the District as odour and possible ground water issues may cause concern among residents. In-vessel composting is generally more expensive than windrow methods and involves storing organic waste in large containers. Two major benefits of in-vessel systems over windrow programs for the Invermere area include the fact that no water is needed for in-vessel systems and odour is eliminated.

An in-vessel system would reduce the risk of a large compost facility being a wildlife attractant, however backyard composters, when operated properly, will not attract wildlife. With proper education and implementation, an effective and successful composting program is possible.

General Waste Reduction Strategies

Further to the recommendations above, there are various other lower-cost strategies that can help reduce emissions from community waste including:

- Retrofit all public garbage bins to include recycling bins. If organic waste composting is adopted, consider including placing organic waste receptacles alongside waste/recycling bins. These bins are an excellent opportunity to promote a community conservation ethic in both residents and visitors alike. It was noted during the community engagement session that there was a strong need to have a great deal more of waste bins placed throughout the community. It was felt that garbage often litters the sidewalks along key pedestrian routes and during peak visitor season, downtown garbage bins are often overflowing onto the sidewalks, and often contain a great deal of recyclables. Input from the public consultation also indicated a desire for making glass easier to recycle by adding it to the curbside program and making receptacles available throughout town.
- Ban the burning of yard waste to reduce emissions and curb poor air quality. As an alternative to burning, encourage residents to choose backyard composting. Combining this strategy with other air quality improvement actions (like the Wood Stove Exchange Program Encourage) into a local 'Clean Airshed' program can help residents understand the value in

reducing emissions.

- Engage local businesses to reduce the use of plastic bags. There are numerous examples of plastic-bag free communities across Canada and even examples of entire countries aiming to eliminate the use of plastic retail bags. With trillions of them being produced annually and very few of them being recycled, plastic bags are a serious environmental concern. Consider a voluntary ban on plastic bags in Invermere.

The community of **Leaf Rapids, Manitoba** was the first community in Canada to develop a bylaw banning the use of disposable plastic bags. The bylaw came into effect in 2007. See Appendix G for the Leaf Rapids bylaw.

- Engage local food and beverage businesses to develop and promote a reusable container program. Many Invermere restaurants serve customers Styrofoam cups and takeaway containers all destined for the landfill or to be strewn as litter within hours. A very small number of businesses offer compostable takeaway containers. Other establishments may feel they are offering a responsible alternative in providing recyclable paper options however, once that paper is covered in food stuffs, it is not acceptable at regional recycling facilities and so will be tossed in the garbage. Paper products will compost in time but they require oxygen to do so. Soiled paper takeaway containers stuffed into garbage bags and compacted in the landfill will not readily biodegrade. Offering discounts to customers who bring in their own travel mugs or charging a premium for takeaway cups, containers and utensils will encourage residents and visitors to bring their own containers.

Appendix D: District of Saanich: Energy Conservation Policy

Appendix D: District of Saanich: Energy Conservation Policy

Council Policy

Subject: Energy Conservation Policy for the Municipality of Saanich

Date: November 4, 1985

Reference: 85/CW

The Energy Conservation Policy of the Municipality of Saanich is: to increase the energy efficiency of new and existing structures, equipment, and transportation systems in the Municipality, through activities and programs which encourage conservation of energy resources, while maintaining the Municipality as an attractive place to live and do business.

Towards this end, the Municipality will work towards these goals:

1. Refitting Existing Buildings

All buildings, and particularly residential buildings, in the Municipality shall be made as energy efficient as is economically possible. This will be determined on the basis of the costs of the conservation measures versus current and predicted energy prices. These refitting programs shall initially be implemented through voluntary actions. However, they may be assisted by incentive grants from senior governments or advice from the Municipality or from the Conservation Energy Society of British Columbia. A guiding principle of these programs will be that residential property owners who implement energy conservation measures pay no more for their combined fuel and weatherproofing costs than they previously paid for heating fuel alone.

2. Land Use Policies

The Municipality will encourage building designs and configurations that reduce energy requirements and take advantage of solar energy. In addition, the Municipality will encourage land use policies that increase access to public transit, reduce the need for travel and generally are in accord with the Community Plan.

3. Renewable Energy

The Municipality shall encourage the application of various renewable energy technologies and alternate energy systems to reduce consumption of nonrenewable energy resources in the residential and commercial sectors. The Municipality shall facilitate the use of such systems by removing administrative barriers and encouraging solar-oriented residential development. In addition, the Municipality shall increase public awareness of various energy saving alternative technologies, such as composting and recycling, that will reduce the overall energy consumption by the Municipality and its citizens.

4. Transportation Systems

The Municipality shall support reduced consumption of nonrenewable fuels by taking measures to increase the efficiency of the various

transportation and traffic regulation systems operating within the Municipality. These measures will encourage individuals to choose the most fuel-efficient methods of travel appropriate to their needs, promote the energy efficient movements of goods, and provide examples for the use of fuel-efficient vehicles.

5. Municipal Programs

The Municipality shall endeavor to reduce energy consumption in its own buildings and equipment by implementing the most energy efficient conservation measures and changing operational procedures.

6. Role of the Municipality

The role of the Municipality is to support this Energy Conservation Policy and its implementation. The Municipality shall therefore set an example by introducing energy conservation measures directly within its own areas of responsibility. It shall also encourage similar efforts from the private sector through education and incentive programs. For example, fact sheets or brochures on energy conservation could be handed out by the Planning or Development Departments as guides to builders or other applicants when refitting or new buildings are being considered.

The Municipality's efforts shall include an ongoing campaign to promote energy conservation by informing all sectors of available programs and conservation techniques, developing financial incentives, seeking out support for the Municipality's conservation program from regional, Provincial and Federal governments, and regulating conservation actions where appropriate.

7. Conservation Committee

To assure the proper review and evaluation of the Municipality's energy conservation program, a Conservation Committee may be appointed by the Mayor and confirmed by Council.

This Committee will advocate conservation actions, monitor the progress of implementation, and propose appropriate changes to the policy as they see fit. The Committee will make periodic reports to Council on its activities, and will issue an in-depth analysis of policy implementation activities and effects not later than three years from the time the policy is formally adopted.

Appendix E: City of Dawson Creek: Green Municipal Fleet Policy

Appendix E: City of Dawson Creek: Green Municipal Fleet Policy Green Vehicle Policy

Background

In 2004, Dawson Creek completed a baseline study on its municipal energy consumption. One of the study's recommendations was the creation of a green vehicle policy that would guide vehicle purchasing decisions and operating practice in order to help reduce energy consumption. An overview of the different components and options for a green vehicle policy was prepared and presented to Dawson Creek in February, 2006. The policy that follows reflects the goals and direction that Dawson Creek chose from these options. For background information on each section, please see the Dawson Creek Green Vehicle Policy Working Paper.

Rationale

- Gasoline and diesel fuels used for transportation produce greenhouse gas (GHG) emissions that contribute to climate change, and local air emissions (Criteria Air Contaminants – CACs) that degrade local air quality. This policy will help to reduce vehicle emissions.
- New vehicles will be an ongoing expense in Dawson Creek. This policy will ensure that life cycle costs are considered for new vehicle purchases and that vehicle efficiencies are maximized.
- Many of the policy options described here can be adapted and expanded to the community level. This policy provides a starting point to engage on other transportation issues throughout the municipality.

Goals and Objectives

The goals and objectives of this policy are:

- To reduce emissions from the municipal vehicle fleet to levels that are 20% below 2004 levels by 2016 by:
 - Reducing idling
 - Reducing single occupancy trips
 - Purchasing more efficient vehicles and fuels
 - Right-sizing vehicles
- To consider the life cycle costs of municipal vehicle operations when purchasing vehicles.
- To maximize vehicle efficiency.
- To provide a framework for lessening the environmental impact of vehicle operations that can be expanded to the larger community.

Guidelines

1. Purchasing

1.1. Right-sizing

Vehicles should be purchased according to the average or usual anticipated use of the vehicle. Occasional vehicle needs that exceed the capacity of the vehicle purchased should be met through vehicle sharing or renting. The following use requirements should be considered when purchasing a vehicle:

- engine size
- vehicle weight
- average carrying capacity
- average passenger capacity
- average terrain

These use requirements should accompany and form part of any recommendation made to the Chief Administrative Officer and Chief Financial Officer under the Purchase of Capital Equipment Policy.

1.2. Life cycle cost

Life cycle costs should be considered for all vehicle purchases. Life cycle costs should include: capital costs, maintenance costs, fuel costs, and resale costs.

2. Fuel Choice

2.1. Fuel choice

The lowest GHG emission fuel possible should be purchased for all vehicles in the fleet. Consideration of fuels should include:

- Purchasing low emission fuel for the whole fleet (i.e. low-sulphur gasoline or biodiesel)
- Purchasing vehicles that run on alternative fuel sources

3. Operating

3.1. Idling

Idling should be reduced among all municipal vehicles where possible. The following guidelines should be followed by all municipal vehicle operators:

- Reduce warm-up idling (no more than 30 seconds as long as windows are clear)
- It takes more gas to idle for more than 10 seconds than it does to restart your vehicle. If stopped for more than 10 seconds, vehicles should be turned off, except in the following circumstances:
 - In traffic
 - In the course of performing a specific duty that requires that the vehicle be left running
 - If the temperature is below -10C
 - If doing so would compromise human safety or the mechanical integrity of the vehicle of performing

3.2. Vehicle sharing

Single occupancy vehicle trips should be minimized. Vehicles should be shared



Appendix E: City of Dawson Creek: Green Municipal Fleet Policy

between departments to ensure maximum efficiency for vehicle use.

3.3. Driver education

Driving procedures to increase the efficiency of vehicle operations, including anti- idling, should be included in driver training programs that municipal staff are required to take.

4. Maintenance and monitoring

4.1. Maintenance

Maintenance on municipal vehicles should continue to ensure that preventative maintenance continues to maximize the efficiency of all vehicle operations.

4.2. Monitoring

All vehicles should be monitored to track fuel consumption, fuel costs, mileage, and maintenance costs.

5. Evaluation

5.1. Monitoring objectives

The objectives in this policy should be measured at regular intervals to ensure that the policy is effectively moving Dawson Creek towards its goals.

5.2. Policy evaluation

This policy should undergo regular evaluation to ensure that it is enabling Dawson Creek to move towards its goals.

Approved by Council

Date: May 29, 2006

OUR VISION

Port Coquitlam will aspire to be a complete community, unique because of its small town atmosphere, its strong sense of pride and where:

- Citizens have a collective sense of belonging, and contribute to the quality of life in the community.
- The community celebrates a vibrant culture and heritage.
- The environment is nurtured for present and future generations.
- A dynamic economy contributes to prosperity and the opportunity to work close to home.
- Planned development strengthens the character of the community, helping to create safe and affordable neighbourhoods.

– Port Coquitlam Official Community Plan (OCP), 2005

USING TRIPLE BOTTOM LINE ASSESSMENT TO ACHIEVE SUSTAINABILITY GOALS

The City of Port Coquitlam is committed to fiscally, socially and environmentally responsible land use development. Sustainable development integrates the three systems that support us – the economy, the environment and our society. Each of these systems must be functioning and healthy for us to survive and enjoy a high quality of life. To be sustainable, we must understand how these systems interact, and make sure our activities do not compromise the ability of any of the systems to function currently and in the future.

New development is essential to achieve a complete community in which to live, work and play. The location, composition, density, and design of new development projects can have an immense, cumulative impact on our community's ability to: sustain a healthy economy and reasonable cost of living; to provide effective and accessible public services; to secure adequate choice and opportunity for present and future generations of residents; to protect our environment; and to ensure we all continue to enjoy a high quality of life.

***Sustainability:** To improve the social, environmental and economic well being of the community through good planning and land use management (OCP, 2005)*

Developers and their consultants are important partners in maintaining and improving our community's high quality of life. By providing sustainability criteria at the earliest development stage, the City enables developers and their consultants to create the most sustainable project possible. The Sustainability Checklist provides a comprehensive assessment of a development project's contribution to sustainability by balanced scoring of environmental, economic and social criteria. The balanced scoring of 1/3 environmental, 1/3 economic and 1/3 social is called triple bottom line assessment.

Please note, in total, the checklist describes an *ideal* – it is highly unlikely that any one project will earn maximum points in all sections, and no pass/fail standard has been set. Different types of development will result in a range of scores, and some sections may not be applicable to all development, which will be noted in the assessment. The checklist assessment will indicate how well a proposed application performs relative to the sustainability and complete community goals contained in our OCP and Corporate Strategic Plan, and help identify any areas where improvement is desirable and possible. It will inform decisions in the development approval process as to how well a proposed development achieves community sustainability.

INSTRUCTIONS

All Rezoning and Development Permit applicants are required to complete the Sustainability Checklist, as follows:

1. **Self-Scoring** – Applicants are to review and complete the checklist, as an initial assessment. The criteria are weighted differently so the maximum score for each criterion reflects its importance to sustainability goals. To calculate the score, multiply the points for a given answer by the criteria's weight and enter it into the designated TBL column. The first page divides the weighting score into 50% for the economic and social columns. The second page directs the scores to be placed in the unshaded column.
2. **Supplementary Information** – Statistical data indicated by an asterisk (*) is to be provided (e.g. the number of permanent employees, floor area ratio, property tax base increase) as well as a completed copy of the LEED Canada-NC 1.0 Project Checklist or best practice checklist for each application. Consultation with City staff may be of assistance in estimating this data. If needed, provide any additional description of how the proposed development incorporates the sustainability criteria.
3. **Submit Application** – Submit the completed checklist, data and supplementary information as part of the rezoning or development permit application.
4. **Final Assessment** – City staff will review the checklist and discuss with the applicant. Following the consultation with the applicant, a final checklist will be completed by staff for review by the Community and Economic Development Committee and Council, as part of the application process.

OTHER RESOURCE MATERIALS

- Official Community Plan – www.portcoquitlam.ca
- 2002 Strategic Plan – www.portcoquitlam.ca
- Zoning Bylaw – available at City Hall
- Downtown Plan – available at City Hall
- Canada Green Building Council website – www.cagbc.org
- SmartGrowthBC website – www.smartgrowth.bc.ca

FOR MORE INFORMATION, CONTACT:

Planning Division
2nd Floor, City Hall, 2580 Shaughnessy Street
Port Coquitlam, BC V3C 2A8
Tel 604.927.5410
Fax 604.927.5331
Email planning@portcoquitlam.ca
www.portcoquitlam.ca



SUSTAINABILITY CHECKLIST

REZONING AND DEVELOPMENT PERMIT APPLICATIONS

	<i>Points</i>	<i>Wt</i>	<i>Total</i>	<i>Soc</i>	<i>Env</i>	<i>Eco</i>
1. Land Use						
<ul style="list-style-type: none"> Mix of uses provided or uses consistent with OCP Adds to the diversity of uses within an existing neighbourhood, such as employment, housing, retail, civic, educational, cultural, recreational 	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	1	/5	(50%)		(50%)
2. Housing						
<ul style="list-style-type: none"> Offers or adds a mix of housing types, sizes and tenure, including special needs¹ Provides units with a wide-range of pricing options that will be sold or leased 	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	2	/10	(50%)		(50%)
<ul style="list-style-type: none"> Provides subsidized or rental housing² 	No – 0 Yes – 5	1	/5	(50%)		(50%)
3. Community character and design						
<p><i>a) Design</i></p> <ul style="list-style-type: none"> Building design follows required architectural style and demonstrates innovation Building orientation towards open space, views and/or daylight Treatment of façade breaks down massing and articulates depth, verticality & street edge Scale and massing of buildings relate to neighbourhood structures Provides crime prevention through environmental design Incorporates enhanced durability/longevity of construction materials. 	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	2	/10	(50%)		(50%)
<p><i>b) Public Space</i></p> <ul style="list-style-type: none"> Creates or enhances community spaces, such as plazas, squares, parks & streets Strong connections to adjacent natural features, parks and open space Builds or improves pedestrian amenities, such as sidewalks, transit shelters, bike racks and connections to civic, cultural, school and retail/service uses 	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	2	/10	(50%)		(50%)
<p><i>c) Density & Infill</i></p> <ul style="list-style-type: none"> Maximizes FAR or dwelling unit/acre density¹ Results in infill/redevelopment and enhanced community fabric² 	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	1	/5	(50%)		(50%)
<p><i>d) Transportation</i></p> <ul style="list-style-type: none"> Accessible by multiple modes of transport, emphasizing public transit including future planned Parking does not visually dominate the street view & allows easy, safe pedestrian building access Interconnected road system with direct street connections, short block lengths, no cul-de-sacs Provides traffic speed & demand management 	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	1	/5	(50%)		(50%)

	Points	Wt	Total	Soc	Env	Eco	
4. Environmental Protection & Enhancement							
<i>a) Lands</i> <ul style="list-style-type: none"> Does not intrude on ALR or designated open lands Protects riparian areas and other designated environmentally sensitive areas Provides for native species habitat restoration/improvement Redevelops environmentally contaminated site 	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	2	/10				
<i>b) Servicing</i> <ul style="list-style-type: none"> Does not require extension of existing municipal infrastructure (e.g. roads, water and sewer) Located in existing commercial and transportation nodes 	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	1	/5				
<i>c) Construction/Design</i> <ul style="list-style-type: none"> Provides LEED certification (certified, silver, gold, platinum) or accepted green building best practices (e.g. Built Green BC, Green Globes)³ 	None – 0 Certified – 2 Silver – 3 Gold – 4 Platinum – 5	4	/20				
5. Social Equity							
<ul style="list-style-type: none"> Contains elements of community pride and local character, such as public art Provides affordable space for needed community services Conducts public consultation, including documenting concerns & providing project visuals 	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	2	/10				
6. Economic Development							
<i>a) Employment</i> <ul style="list-style-type: none"> Provides permanent employment opportunities¹ Increases community opportunities for training, education, entertainment or recreation 	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	1	/5				
<i>b) Diversification and Enhancement</i> <ul style="list-style-type: none"> Net increase to property tax base¹ Promotes diversification of the local economy via business type and size Improves opportunities for new and existing businesses, including eco-industrial and value-added Developer demonstrates experience with similar projects 	None – 0 Poor – 1 Good – 2 to 3 Excellent – 4 to 5	1	/5				
TRIPLE BOTTOM LINE SUMMARY				Social/Environmental/Economic	/35 (%)	/35 (%)	/35 (%)
				Application Total	/105 (%)		

¹ Per the instructions, please provide statistical data for these indicators, such as floor area ratio, estimated number of employees, number of housing types, sizes and tenures.

² Subsidized Housing encompasses all types of housing for which some type of subsidy or rental assistance is provided, including public, non-profit and co-operative housing, as well as rent supplements for people living in private market housing. It also includes emergency housing and short-term shelters.
Enhanced community fabric includes multiculturalism, mobility accessibility, integration with neighbourhoods and crime prevention through environmental design.

³ Please provide a copy of the green building checklist chosen. For example: LEED Canada-NC 1.0 Project Checklist can be obtained at: <http://www.cagbc.org/uploads/LEED%20Canada-NC%20Project%20Checklist.xls>
Green Globes at: http://www.greenlobes.com/design/Green_Globes_Design_Summary.pdf



LEED Canada-NC 1.0 Project Checklist

Project Name

City, Province

Yes ? No

Sustainable Sites 14 Points

Y	Prereq 1	Erosion & Sedimentation Control	Required
	Credit 1	Site Selection	1
	Credit 2	Development Density	1
	Credit 3	Redevelopment of Contaminated Site	1
	Credit 4.1	Alternative Transportation , Public Transportation Access	1
	Credit 4.2	Alternative Transportation , Bicycle Storage & Changing Rooms	1
	Credit 4.3	Alternative Transportation , Alternative Fuel Vehicles	1
	Credit 4.4	Alternative Transportation , Parking Capacity	1
	Credit 5.1	Reduced Site Disturbance , Protect or Restore Open Space	1
	Credit 5.2	Reduced Site Disturbance , Development Footprint	1
	Credit 6.1	Stormwater Management , Rate and Quantity	1
	Credit 6.2	Stormwater Management , Treatment	1
	Credit 7.1	Heat Island Effect , Non-Roof	1
	Credit 7.2	Heat Island Effect , Roof	1
	Credit 8	Light Pollution Reduction	1

Yes ? No

Water Efficiency 5 Points

	Credit 1.1	Water Efficient Landscaping , Reduce by 50%	1
	Credit 1.2	Water Efficient Landscaping , No Potable Use or No Irrigation	1
	Credit 2	Innovative Wastewater Technologies	1
	Credit 3.1	Water Use Reduction , 20% Reduction	1
	Credit 3.2	Water Use Reduction , 30% Reduction	1

Yes ? No

Energy & Atmosphere 17 Points

Y	Prereq 1	Fundamental Building Systems Commissioning	Required
Y	Prereq 2	Minimum Energy Performance	Required
Y	Prereq 3	CFC Reduction in HVAC&R Equipment	Required
	Credit 1	Optimize Energy Performance	1 to 10
	Credit 2.1	Renewable Energy , 5%	1
	Credit 2.2	Renewable Energy , 10%	1
	Credit 2.3	Renewable Energy , 20%	1
	Credit 3	Best Practice Commissioning	1
	Credit 4	Ozone Protection	1
	Credit 5	Measurement & Verification	1
	Credit 6	Green Power	1



Project Totals (pre-certification estimates)

70 Points

Certified 26-32 points **Silver** 33-38 points **Gold** 39-51 points **Platinum** 52-70 points

Appendix G: Town of Leaf Rapids Plastic Bag Bylaw

Appendix G: Town of Leaf Rapids Plastic Bag Bylaw

Town of Leaf Rapids By-Law No. 462

Being a By-Law of the Town of Leaf Rapids for the establishment of Single Use Plastic Shopping Bags.

WHEREAS Single Use Plastic Shopping Bags are a very visible component of litter throughout the Town of Leaf Rapids, lakeside, trails, roadside and the nuisance grounds;

AND WHEREAS Single Use Plastic Shopping Bags have a negative impact on our wildlife habitat and are not environmentally friendly;

AND WHEREAS the Town of Leaf Rapids incurs a significant cost to clean up the Single Use Plastic Shopping Bags each year;

AND WHEREAS local businesses can reduce merchandise cost by not having to purchase Single Use Plastic Shopping Bags;

AND WHEREAS the Town of Leaf Rapids has provided education to shoppers and school children about the environmental advantages and reduced cost of using reusable shopping bags;

AND WHEREAS by using a multi-use shopping bag, residents are reminded of the positive impact of recycling;

NOW THEREFORE upon passing this By-Law, the Council of the Town of Leaf Rapids, enacts as follows:

1. THAT the Town of Leaf Rapids will be Single Use Plastic Shopping Bag free effective April 2, 2007.
2. THAT retailers in the Town of Leaf Rapids will not be permitted to give away or sell plastic shopping bags that are intended for single use.
3. THAT a person who contravenes this By-Law of the Town of Leaf Rapids is guilty of an offence and is liable on summary conviction of a fine of not more than \$1000.00.
4. THAT where a contravention continues for more than one day, the person is guilty of a separate offence for each day it continues.
5. THAT on passing of this By-Law, By-Law No. 457 is hereby rescinded.
6. DONE AND PASSED as a By-Law of the Town of Leaf Rapids at the Townsite of Leaf Rapids, in the Province of Manitoba, this 22nd day of March, 2007, A.D.

EXEMPTIONS TO THE BY-LAW

Small plastic bags that are used to store non-packaged goods such as: a) Dairy products b) Fruit, vegetables or nuts c) Confectionery d) Cooked foods, hot or cold e) Ice f) Smaller bags for fresh meat, fish, candy and poultry g) Bags that cost more than \$1.50

Mayor

Chief Administrative Officer

Read a first time this 21st Day of March, 2007, A.D.

Read this second time this 21st Day of March, 2007, A.D.

Read this third time this 22nd Day of March, 2007, A.D.

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