

City of Prince Rupert Energy and Greenhouse Gas Plan

Final Draft



Prince Rupert City and Regional Archives



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City of Prince Rupert

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Date: September 29, 2008

Plan Summary

The City of Prince Rupert has developed this Community Energy Plan (CEP) to reduce energy consumption and greenhouse gas (GHG) emissions - both throughout the community and from municipal operations. This energy plan is consistent with the City's commitment to the Climate Action Charter (an agreement between the Province and signatory local governments), and supports the Province's goal of achieving a 33% reduction in emissions by 2020.

Prince Rupert's Energy Vision

"Prince Rupert will be a model community of energy conservation and renewable energy generation. Our award winning practices will show the province and the world that a small community can 'walk the talk'. We will capitalize on our natural assets and compact community to create opportunities for energy conservation and renewable energy development.

We will work in partnership with other communities and neighbouring First Nations as stewards of our energy resources. We recognize the socio-economic and cultural diversity of our community and will work to bring the benefits of energy conservation and reduced fossil fuel use to all our residents."

Targets

The plan includes proposed targets for energy reductions in municipal operations and community greenhouse gas emissions. These targets are:

Municipal Operations:

- 10% overall reduction in total municipal energy consumption by 2012

Community GHG Emissions:

- 5 % reduction in total community GHG Emissions by 2012
- 15% reduction by 2016
- 33% reduction by 2020 (the overall Provincial reduction target)

Initiatives and Actions

The plan is structured around six major theme areas. These are:

- Engage the Community
- Transportation
- Existing Buildings

- New Buildings and Development
- Infrastructure & Municipal Buildings
- Local Energy Supply

Within the six areas, a total of 19 actions are identified to be implemented.

The major focus of the actions is to motivate the residents to take action and to seek out ways to improve the energy efficiency of existing buildings. The plan recognizes the systems that are already in place and working for the City of Prince Rupert (e.g., public transportation) and recommends actions that build on these systems to create new opportunities for energy efficiency and long-term sustainability in Prince Rupert.

Implementation

Implementation will require resources of time and disbursements for incentives and promotions. Recognizing the limited staff time available, the efforts of City staff should be directed towards finding funding to initiate action - likely through a contracted energy and climate change coordinator.

Summary of Initiatives and Actions

Initiative 1: Engage the Community

- Action - 1: Establish a reduction target and incorporate it into the City's official community plan (OCP)
- Action - 2: Develop a regional "green" trade show
- Action - 3: Leverage energy efficiency off other community environmental concerns
- Action - 4: Engage residents on the issues of energy conservation and climate change

Initiative 2: Transportation

- Action - 5: Explore idling reduction opportunities
- Action - 6: Improve transit amenities
- Action - 7: Improve transit service opportunistically
- Action - 8: Improve opportunities for alternative transportation and mobility

Initiative 3: Existing Building Stock (non-municipal)

- Action - 9: Promote existing energy efficiency incentive programs
- Action - 10: Provide better access to energy audits for residents
- Action - 11: Provide and install energy retrofit "starter kits" to homeowners

Initiative 4: New Buildings and Development

- Action - 12: Investigate new powers granted to local governments by Bill 27
- Action - 13: Encourage builders to build energy efficient (or green) buildings for rezoning applications

Initiative 5: Infrastructure and Municipal Operations

- Action - 14: Join the E3 fleet program for civic vehicles (CAEE Target #1)
- Action - 15: Evaluate municipal buildings for efficiency opportunities
- Action - 16: Evaluate leveraging opportunities for the City (and other fleets in the community) to use hybrid vehicles
- Action - 17: Commit to building all new municipal buildings to high energy efficiency standards

Initiative 6: Local Energy Supply

- Action - 18: Target to achieve 10% of energy needs from community-based, clean energy resources (as defined by the BC's Clean Electricity guidelines), or renewable heating systems or fuels (CAEE Target #6)
- Action - 19: Engage with regional partners including First Nations and neighboring communities to implement renewable energy supply opportunities.

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Acronyms & Definitions

ASHRAE 90.1 (2004)	A defined criteria for energy performance of a building design (commercial or multifamily unit) established by ASHRAE - the American Society for Heating Refrigeration and Air Conditioning Engineers.
CAEE	Community Action on Energy and Emissions. An initiative of the BC Ministry of Energy Mines and Petroleum resources.
CEP	Community Energy Plan
CO ₂	Carbon dioxide, the major greenhouse gas.
CO ₂ e	Carbon dioxide equivalents - a combined measure of the strength of all the GHGs expressed as the equivalent amount of CO ₂ .
DPA	Development Permit Area
DPG	Development Permit Guidelines
EGH	EnerGuide for Houses
EnerGuide for Houses:	A rating system that evaluates the energy consumption of a home providing a score from 0 (poor performance) to a net zero energy home (score of 100). A score of 80 is considered a very efficient home. An older home might have a rating in the range of 50 to 60.
Energy Star	An accreditation system for appliances and equipment identifying those products that meet high energy efficiency standards.
GHG	Greenhouse gas - the products of combustion that result in climate change.
IPCC	Intergovernmental Panel on Climate Change
IPGP	Infrastructure Planning Grant Program (an initiative of the Ministry of Community Services)
LEED™	Leadership in Energy and Environmental Design. A rating system which rates and awards certification to buildings based on their green features, established by the US Green Building Council.
OCP	Official Community Plan

1 Introduction

1.1 The Issue of Climate Change

For many years, there has been increasing evidence that global climate change resulting from emissions of carbon dioxide and other greenhouse gases (GHGs) is causing, or will soon cause, significant environmental impact on the ecology of the planet. There is a growing impetus for action by all energy consumers to reduce emissions of GHGs. Recent conclusions of the 2007 Intergovernmental Panel on Climate Change (IPCC) on the climate change trends observed to date are that human-caused contributions are “more likely than not” and the expectation is that the human-caused impact in the future is “virtually certain.”

Climate change is a global issue, caused by the daily activities of billions of humans – primarily through the consumption of fossil fuel energy. A solution to the issue will require the activities of billions of humans to conserve energy and reduce GHG emissions. Local governments have a role to play in finding these solutions. It has been estimated that in Canada, up to 50% of GHG emissions occur within municipal boundaries or within some degree of influence of municipal governments.¹

As a starting point, local governments can put their own “houses in order” by implementing proactive measures to reduce emissions from their direct operations (referred to as ‘municipal operations’ in this plan) and identifying actions that can help to reduce emissions from community activities.

1.2 Objectives of the Energy Plan

The City of Prince Rupert (the City) has received funding through the Community Action on Energy and Emissions (CAEE) program to develop a Community Energy Plan (CEP). The CAEE program is an initiative of the Ministry of Energy, Mines, and Petroleum Resources and the Infrastructure Planning Grant Program (IPGP) of the Ministry of Community Services.

The objectives of the CEP are to:

- Define a set of actions for the City to implement (in partnership with others) to reduce energy consumption and GHG emissions.
- Support the overall provincial goal of a 33% reduction in GHG emissions by 2020.
- Meet the CAEE commitments.

Actions to reduce energy consumption and greenhouse gas emissions are frequently divided into:

- **Municipal operations** - those that the local government creates through its activities (and which it has control over) such as municipal building operations, recreation centres,

¹ Federation of Canadian Municipalities, Partners for Climate Protection program website:

<http://www.sustainablecommunities.fcm.ca/Partners-for-Climate-Protection/>

vehicle fleets, and utility services². (NB: These are sometimes called corporate emissions - resulting from the activities of the corporate entity of the municipality.)

- **Community emissions** - those occurring by the residents and businesses in the community, which the local government cannot directly control, but may be able to influence through policy, planning and program activities.

1.3 The Community Action on Energy and Emissions (CAEE) Initiative

The CAEE³ program is part of an initiative to implement the BC Energy Efficient Buildings Plan by encouraging energy efficiency improvements in new and existing buildings. CAEE provides funding to local governments to develop planning and policy changes that will result in long term reductions in energy consumption within the community.

Prince Rupert has committed to several targets as part of their CAEE application. These are:

- Target 1. Join the E3 fleet program for civic vehicles⁴;
- Target 2. Achieve a 15% reduction in energy consumption for existing civic buildings and fleets;
- Target 3. Achieve an EnerGuide for New Houses rating of 80 for all new home construction by 2010;
- Target 4. For all commercial, institutional, and industrial buildings achieve an overall 2% reduction in energy consumption by 2010 and a 25% reduction by 2020, relative to 2007 levels;
- Target 5. Generate 10% of energy needs from community-based, clean energy resources (as defined by the Province's BC Clean Electricity Guidelines), or renewable heating systems or fuels (e.g. bioenergy);
- Target 6. Develop a greenhouse gas action plan.

1.4 The Climate Action Charter

In addition to participation in the CAEE program, Prince Rupert is also a signatory to the Climate Action Charter. The charter commits Prince Rupert to take voluntary action to reduce its energy consumption and GHG emissions, and to achieve 'carbon neutrality' by 2012. It is not possible to operate without some emissions, and so the charter specifies that any emissions which cannot be reduced, can be 'offset' by purchasing carbon offset credits through a new provincial agency called the Pacific Carbon Trust. The cost of these offsets and alternatively, the cost of making reductions, are presently unknown.

² The municipal operations are sometimes called the 'corporate' emissions referring to the corporation of the municipality. This usage originated with the FCM's Partners for Climate Protection (PCP) program

³ The CAEE program was formerly titled "Community Action on Energy Efficiency"

⁴ The E3 program has been developed by the Fraser Basin Council in cooperation with municipal fleets in BC. It provides advice, guidance, and evaluation in ten different areas of fleet operations and the 'rates' the fleet for performance in these areas.

1.5 Provincial Action on Climate Change

In addition to the CAEE and Climate Action Charter initiatives, the Province has been moving forward with a series of ambitious measures to advance energy efficiency in buildings and reduce community consumption. These include changes to provincial regulations, such as the “greening” of the BC Building Code, which mandates requirements for greater energy efficiency in buildings and increased energy efficiency standards for equipment. Bill 10⁵, which makes changes to several key pieces of legislation including the Local Government Act, provides enabling powers for local governments to achieve compliance with the new green provisions of the Building Code.

Provincial GHG Emissions Reduction Target

The Province of BC has set a province-wide GHG emissions reduction target of 33% below 2007 levels by 2020, and interim targets for 2012 and 2016 are expected to be developed.

“Greening” the BC Building Code

Effective September 5, 2008, new Building Code requirements to increase energy and water efficiency of new buildings are in effect. Local governments have the authority to apply the new “green” Building Code provisions, including:

- Single Family Houses and Smaller Multi-Family Residential, Commercial and Industrial Buildings have increased insulation standards. For housing, builders can choose to achieve an EnerGuide rating of 77 (a performance measurement) as an alternative to meeting the insulation requirements (a prescriptive requirement).
- High-Rise Multi-Family Residential Buildings and Larger Industrial, Commercial and Institutional Buildings must meet the ASHRAE 90.1(2004) standard⁶.
- Water Efficiency Requirements: Ultra low-flow toilets and other water-saving plumbing fixtures and fittings are mandatory in new construction and renovations.

Bill 27 – 2008: Local Government (Green Communities) Act

Bill 27 (acclaimed May 2008) includes a requirement for local governments to include GHG emission targets, policies, and actions in their OCP⁷. To achieve this objective, the legislation provides a range of *potential* new powers for local governments⁸. These include:

- using development permits to promote energy and water conservation;
- allowing parking variances to encourage alternative transportation;

⁵ Bill 10 – 2008 Housing Statutes Amendment Act came into effect in May 2008.

⁶ ASHRAE is the American Society of Heating, Refrigeration and Air-Conditioning Engineers. They develop standards and codes for building performance. ASHRAE 90.1 is an internationally recognized standard for energy consumption based on the design of the building.

⁷ It is currently understood that these OCP requirements would have a transitional period and not be fully required until May of 2010.

⁸ Each of these possible powers still requires that the local government develop an enacting bylaw and define the conditions and process for it to apply.

- providing exemptions from development cost charges for small units, and local government powers to waive or reduce these charges for green developments; and
- allowing local governments to develop property tax exemption programs based on energy or water efficiency.

Most of the actions that have been allowed under Bill 27 are directed towards encouraging new development to be energy and water efficient. At the current time in Prince Rupert, new development will only contribute to the occasional building being developed. However, future development will occur, and the City can still take advantage of these provisions by enacting appropriate bylaws in preparation for future development.

1.6 Other Action on Energy Conservation

Other players are also implementing measures to encourage energy conservation. For many years BC Hydro has implemented conservation activities through its PowerSmart initiative. Recently, BC Hydro has received approval for the implementation of “stepped rates” whereby residential customers receive a base amount of power at a set rate. Any consumption above this costs more per unit of electricity. This is designed to encourage conservation in the large users without incurring an excessive burden for consumers that only use their base amount of electricity.

1.7 The Green Advisory Task Force (GATF)

In April 2007, the idea of establishing a Green Advisory Task Force (GATF) to tackle the challenge of reducing GHG emissions within Prince Rupert was brought forward to City Council. Council had identified “green initiatives” as an important goal for the City and proceeded to set up a task force comprised of one Council member, four members of the general public and representatives from various stakeholder organizations within the community, as well as two City staff members to provide administrative support. Members of the GATF are shown in Table 1. The GATF was mandated to develop a GHG Emissions Reduction Plan and to bring it forward to Council along with recommendations for implementation.

Throughout the process of developing this plan (a Community Energy Plan), the GATF has implemented a number of initiatives aimed at building awareness in the community around the importance of reducing energy consumption and GHG emissions, including:

- Conducting a series of consultations with community members in March and April 2008;
- Organizing Prince Rupert’s participation in Earth Hour⁹;
- Participating in a Community Energy Plan development workshop in June 2008.

⁹ Earth Hour, run by the World Wildlife Fund, was created to take a stand against the threat of global warming. On March 29, 2008 at 8:00pm (local time) millions of people around the world united to “Turn It Off” for Earth Hour.

Table 1: Members of the Green Advisory Task Force

GATF Member Name	Affiliation
Joy Thorkelson	Councillor, City of Prince Rupert
Michael Curnes	Staff, City of Prince Rupert
Bill Horne	Staff, City of Prince Rupert
Eric Mercer	School District Superintendent
Brooke Ward	Kaien Environmental Youth Society
Deb Stava	Northwest Community College
Bart Carrigan	Farwest Bus Lines / BC Transit
Devlin Fernandes	B.C. Forest Service
Alora S. Griffin	Architect, MAIBC / MRAIC
Charles Justice	Prince Rupert Environmental Society
Jennifer Rice	World Wildlife Fund Canada
Maynard Angus	Prince Rupert Port Authority

2 Community Profile

The City of Prince Rupert is situated on the north-west coast of Kaien Island, surrounded by the Tsimpsean Peninsula to the north and east. Immediately south of the City is primarily industrial development on Ridley and Watson Islands, while Digby Island (site of the Prince Rupert Airport) and Chatham Sound lie to the west. The City of Prince Rupert was incorporated in 1910 and covers approximately 55 square kilometres.

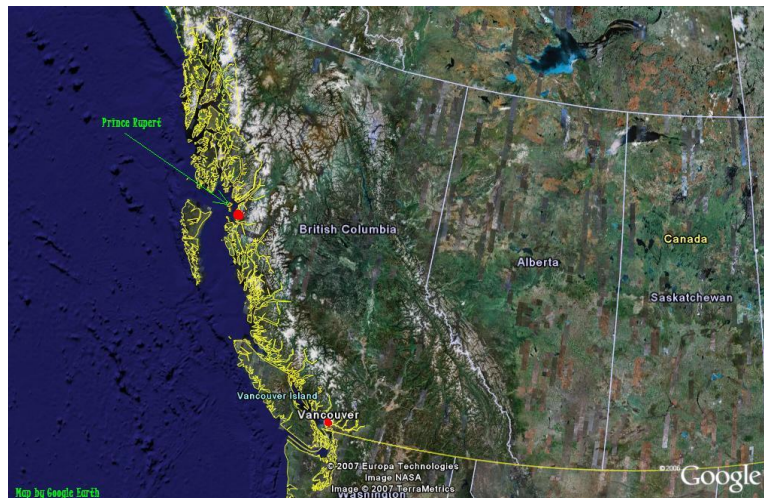


Figure 1: Location of Prince Rupert on BC's North Coast

2.1 Climate

The climate is cool and coastal with moderate heating requirements through nearly two-thirds of the year, and limited cooling requirements in the short summer. A comparison of the heating and cooling requirements (expressed as degree days)¹⁰ is shown in Table 2. The space conditioning is almost exclusively heating demand and not air conditioning. The heating degree days provide an indication of the amount of space heating energy required. Other energy consumption such as water heating and electricity consumption are driven by many factors unrelated to the climate.

¹⁰ A heating degree day is the number of days that the temperature is below 18°C, multiplied by the temperature below 18. For example two days at 10°C is $2 \times (18 - 10) = 16$ degree days. Similarly cooling degree days are the days and temperature above 18°C.

Table 2: Heating and Cooling Requirements in Prince Rupert and Selected Canadian Cities

Location	Heating Degree Days (Annual)	Cooling Degree Days (Annual)
Prince Rupert	3,967	0.3
Vancouver	2,926	44
Prince George	4,728	40
Whitehorse, YK	6,811	8
Edmonton, AB	5,708	28
Toronto, ON	4,066	252

Source: www.climate.weatheroffice.ec.gc.ca/climate_normals/ for the City of Prince Rupert

2.2 Population and Dwellings

In 2006, Prince Rupert had a population of 12,825 residents, an 11% decrease from 2001¹¹. A population breakdown by age (see Figure 2) indicates a similar distribution to the province as a whole. Residents aged 40 years and older represent more than half the population.

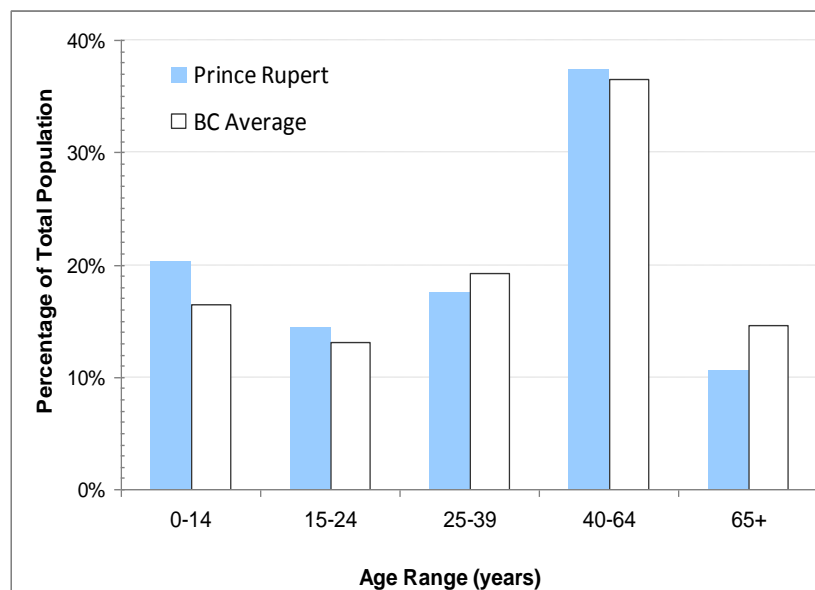


Figure 2: Population by Age Group (2006 Census of Canada)

The 2006 Census recorded 5,065 dwellings in the community. The predominant housing type is detached dwellings (Figure 3), comprising almost 60% of existing buildings. The next most prevalent dwelling types are low-rise apartment buildings and duplexes, representing 15% and 13% of housing, respectively. Approximately 62% (3,130 dwellings) are occupant owned, and 38% (1,935 dwellings) are rented.

¹¹ Source 2006 Census, Statistics Canada.

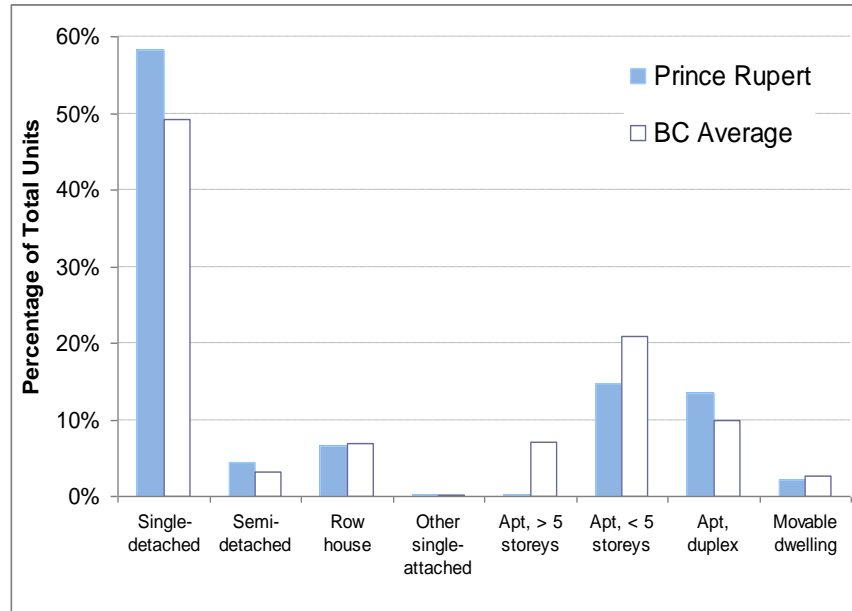


Figure 3: Housing Stock by Type (2006 Census of Canada)

A breakdown of housing by the age grouping (Figure 4) indicates that 81% were built before 1980. Furthermore, 40% of all housing is almost 50 years or older. These older homes, which would have been built to less stringent energy requirements, may have deterioration of air sealing and likely include older furnaces and water heating appliances. As a result, the existing building stock represents an opportunity to conserve energy through upgrades to the building or equipment.

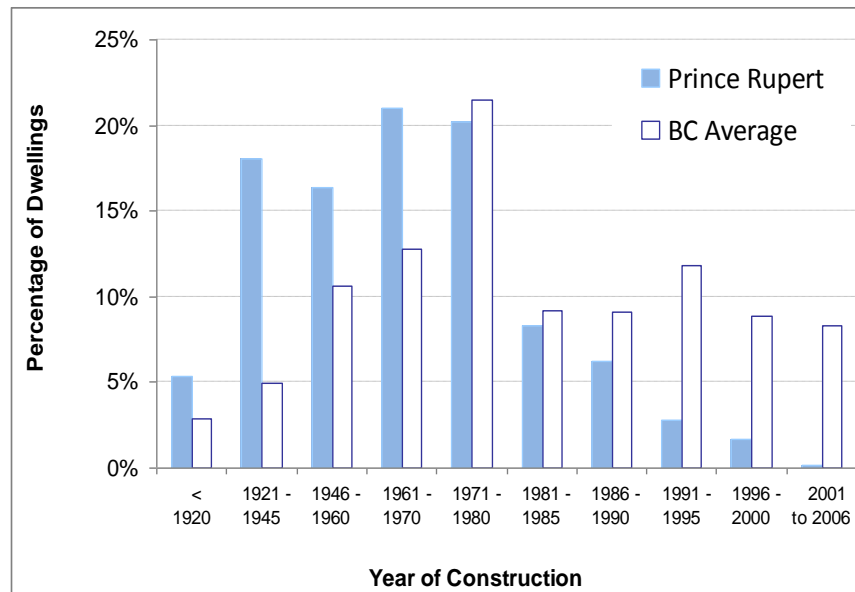


Figure 4: Housing Stock by Age of Building

Table 3: Statistical Summary from Prince Rupert, 2006

Item	Prince Rupert	BC Average
Median household income	\$50,399	\$52,709
Unemployment rate	12.9%	6.0%
Population on social assistance (EI recipients as a percentage of labour force)	23.2%	10.7%
Percent of population renting	38.3%	30.1%
Percent of total employed labour force (15 years or over) that take public transit to work	3.4%	10.3%
Percent of total employed labour force (15 years or over) that walk or bike to work	17.6%	8.9%
Number of passenger vehicles registered per capita	0.31	n/a

Source: Statistics Canada (2006 Census, Community Profiles); BC Stats (2006 Census Profiles); ICBC (actively insured passenger vehicles in Prince Rupert as of December 31, 2006).

2.3 Implication of the Prince Rupert Context for the Energy Plan

There are a number of features that are unique to Prince Rupert which will affect the actions in the CEP. Some of these are substantial hurdles to making improvements in energy efficiency. However, the community has a number of opportunities that could be leveraged and preserved. These challenges and opportunities are presented below and include considerations for the plan.

Major challenges include:

Challenge	Energy Plan Considerations
Large rental population	Rental tenants may be reluctant to implement permanent energy efficiency measures because these measures stay with the house and may have long payback periods. Tenants may not be certain of a long residency or have the financial means necessary to implement measures. Additionally, some tenants may not pay for energy directly (e.g. apartment heat may be included in rent). Actions directed to rental population (that pay their own utilities) should be through affordable, quick payback measures. Need to access the landlords and highlight the incentives that are available to them for upgrading.
Low income and social assistance population	“Big ticket” items (windows and wall insulation) may be a hard sell. Measures and incentive packages should be designed in appropriate levels to be affordable to all residents.
Motivational barriers	Energy conservation may not be a top-of-mind concern; motivating citizens to act may be difficult. Additionally, a lack of information and knowledge may prevent some residents from taking action. Some residents may need to have efficiency measures installed for them.
Small community with a limited tax base	The municipality will have limited resources to provide direct action or incentive dollars. However, there are many incentive programs available and the municipality can aim to get greater uptake of these existing programs.

Major opportunities include:

Opportunity	Energy Plan Considerations
Older housing stock	The fact that the housing stock is older provides many 'low hanging fruit' activities that can be implemented at small cost with immediate payoff. These include air leakage sealing and weather stripping, attic insulation, etc. These actions can often be implemented with minimal costs up front. This opportunity extends to heritage buildings owned by the City.
Compact community	The community is already quite compact and does not sprawl outside of the municipal boundaries. Many residents function without owning a car. Any new development, while expected to be limited, should be focused within the existing developed areas.
Walkability	Many residents walk or use transit – either for economic or other reasons. The City can enhance the facilities and capabilities for walking. Special consideration may be required to enhance pedestrian facilities for winter walking.
Well functioning transit system	Capitalize on the existing transit use and work to build ridership through improving amenities. For example, the City has plans to increase the number of bike racks in Prince Rupert.
Community spirit	There is a sense of place and community in Prince Rupert. Many events are organized and executed with minimal resources (e.g. SeaFest) and with the assistance of the community. This willingness to participate may be useful for implementation of the CEP.

3 Energy and GHG Emissions Inventories

3.1 Municipal Operations Inventory

Energy consumption and emissions from municipal operations are those that the local government creates through its activities (and which it has control over) such as municipal building operations, recreation centres, vehicle fleets, and utility services.

Two of the CAEE targets are directed toward emissions from municipal operations. These are:

- Target 1. Join the E3 program for vehicle fleets to improve energy efficiency in fleet operations.¹²
- Target 2. Achieve a 15% reduction in energy consumption for existing civic buildings and fleets.

What's a GJ?

A giga-joule (GJ) is a measure of energy. We buy natural gas in GJ but other energy as kilowatt-hours (electricity) or litres of fuel.

One GJ has the same energy as approximately:

- 25 - 30 litres of diesel or gasoline, or
- Two 20 lb propane tanks
- Ten days of electricity consumption for a typical home.

Energy consumption and GHG emissions in the municipal inventory derive from:

- **Municipal buildings** which include City Hall, the Civic Centre, the pool, the Library, the works yard, and emergency services (Fire and RCMP).¹³
- **Infrastructure** services which include water and sewage pumping, street lighting and traffic lighting, and civic facilities such as parks, etc. In Prince Rupert the City West facilities are also owned by the municipality and so are included.
- **Equipment and Fleet.** The fuel consumed by municipal staff in the execution of their service provision. This is almost exclusively gasoline and diesel fuels, though may occasionally include propane.
- **Waste** - Waste does not directly consume energy, but when deposited into landfills it decomposes and releases methane gas which is a greenhouse gas stronger than carbon dioxide. For the municipal operations inventory, the GHGs referred to are those attributed to waste generated at municipal facilities.

The total energy consumption and GHG emissions from municipal operations are shown in Table 4, with the distribution according to the types of end users shown in Figure 5.

¹² The E3 program has been developed by the Fraser Basin Council in cooperation with municipal fleets in BC. It provides advice, guidance, and evaluation in ten different areas of fleet operations and 'rates' the fleet for performance in these areas.

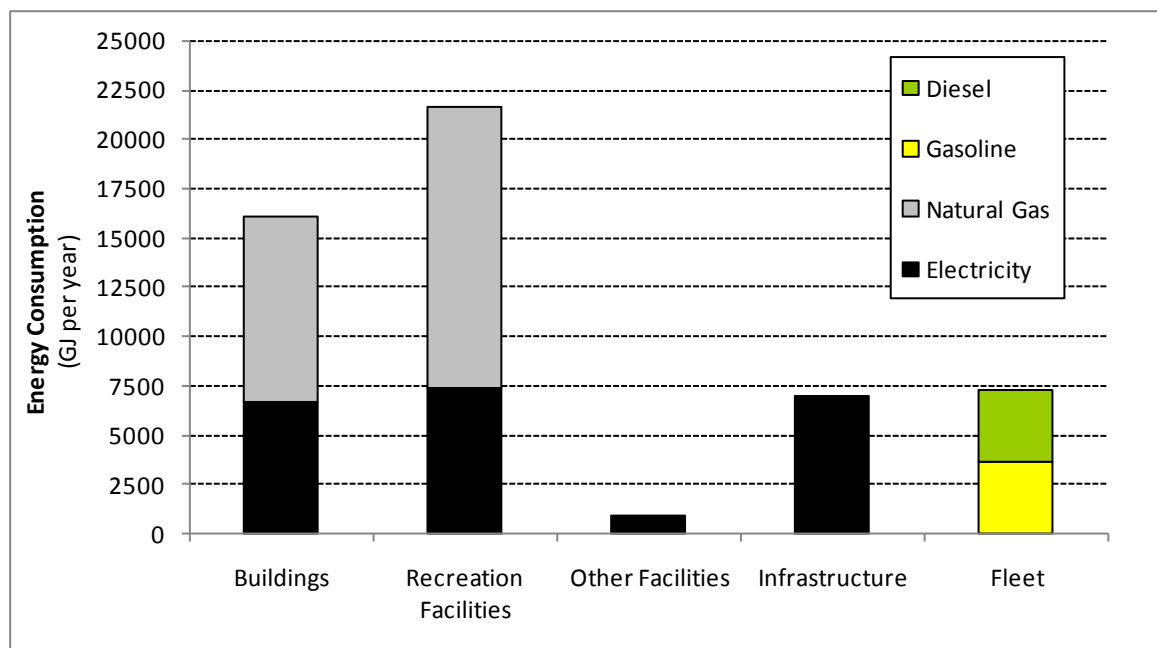
¹³ Formally speaking, municipally owned facilities that are operated by others (where the others pay the utility bills) are also part of the municipal corporate inventory. Where possible and where this does not infringe on account holder privacy, this data may be available.

Table 4: Municipal Operations Energy Consumption and GHG Emissions (2007)

Use	Energy	Units of Purchase	Energy (as Purchased)	Energy (GJ)	GHG Emissions (CO ₂ e)
Buildings	Electricity	kWh	1,848,204	6,654	61
	Natural Gas	GJ	9,349	9,349	458
Recreation Facilities	Electricity	kWh	2,043,720	7,357	67
	Natural Gas	GJ	14,273	14,273	699
Other (parks/parking lots/etc.)	Electricity	kWh	249,844	899	8
	Natural Gas	GJ	0	0	0
Infrastructure (lighting/water/sewage)	Electricity	kWh	1,935,013	6,966	64
	Natural Gas	GJ	0	0	0
Fleet	Gasoline	L	96,709	3,568	230
	Diesel	L	98,406	3,724	275
Total (before solid waste)				52,792	1,863

Notes:

- 1) Does not include the airport island ferry fuel consumption.

**Figure 5: Distribution of Municipal Operations Energy Consumption (2007)**

The distribution of GHG emissions shown in Figure 6 highlights the difference between fuel sources. Although Prince Rupert's infrastructure and fleet use relatively similar amounts of energy, the consumption of fossil fuels produces significantly higher GHG emissions (more than five-fold) than the consumption of electricity. Compared to electricity, natural gas has relatively high GHG emissions per unit of energy consumed (or higher GHG intensity).

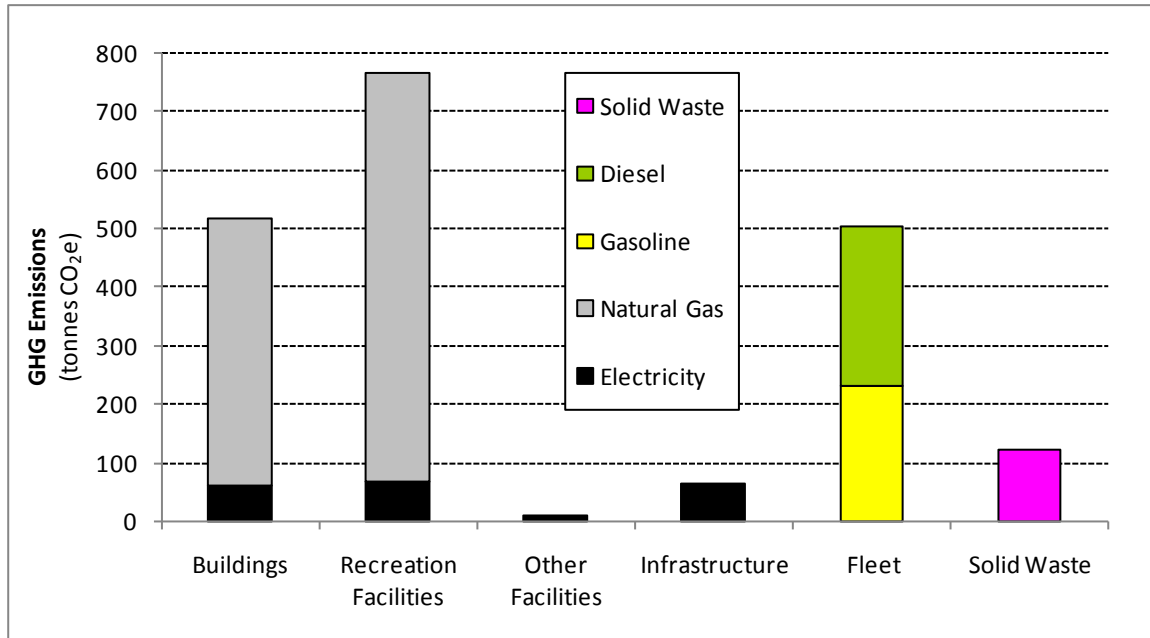


Figure 6: Distribution of Municipal Operations GHG Emissions (2007)

A list of municipal buildings is provided in Table 5 along with their associated energy consumptions and greenhouse gas emissions. These facilities account for 64% of the electricity used by the City of Prince Rupert and all of the natural gas consumed. The Jim Ciccone Civic Centre (including the pool) accounts for 41% of the City's energy usage and 41% of the City's total GHG emissions. The Public Works Yard is the next largest user of energy, representing 11% of the City's total energy consumption, and is responsible for 13% of the City's total GHG emissions.

Table 5: Energy Consumption and GHG Emissions of Municipal Buildings (2007)

Description	Address	Electricity (kWh)	Natural Gas (GJ)	GHG (tonne CO ₂ e)
City Owned / Operated				
Jim Ciccone Civic Centre	1000 McBride St	2,043,720	14,037	755.3
Public Works	221 Wantage Rd	211,500	4,787	241.6
City Hall	424 W 3rd Ave	178,209	1,624	85.5
RCMP	100 W 6th Ave	207,280	1,347	72.8
Fairview ferry terminal	Fairview Airport Ferry Terminal	329,102	533	37.0
Seaplane base	Seal Cove Rd	98,640	283	17.1
City garage	City Garage	229,120	0	7.6
Library	101 W 6th Ave	135,540	0	4.5
Ridley Island maintenance	Ridley Island Rd	104,812	0	3.5
Fire Hall	200 W 1st Ave	71,720	0	2.4
Cemetery	Municipal Cemetery	61,407	0	2.0
Digby Island ferry terminal	Digby Island	7,316	0	0.2
Golf course	523 W 9th Ave	0	0	0.0
Old tax sale property (Seal Cove Circle)	2130 Seal Cove Circle	0	0	0.0
Subtotal		3,678,366	22,612	1,229.4
City Owned / Tenant Operated*				
Transition House	2059 Atlin Avenue			
Racquet Club	525 9th Avenue West			
Skeena Queen Charlotte Regional District	100 1st Avenue East			
Pillsbury Guest House	#1 Pacific Place	228,443	728	43.2
Lester Centre of the Arts	1100 McBride Street			
Old tax sale property (10th Ave)	1040 10th Avenue East			
Falcone Estate	1058 W 3rd Ave			
Subtotal		228,443	728	43.2
Total		3,906,809	23,339	1,272.5

Notes:

- 1) Data for tenant operated facilities have been aggregated for to maintain confidentiality of private information as required by law.

Waste generated at municipal facilities is collected in dumpsters at the Fire Department, Civic Centre/Swim Pool, RCMP, Cemetery, City Hall, and the Public Works yard. Assuming a typical emissions rate from a landfill results in an estimated **123 tonnes** of CO₂ equivalent (CO₂e),¹⁴ the total estimated tonnage is 254 tonnes per year. The GHG emissions generated from waste disposal are not included in the City's commitment to become climate neutral through the Climate Action Charter; however, opportunities to reduce GHG emissions attributed to the decomposition of wastes do exist. For example, the City may wish to partner with local industries to explore opportunities to produce energy from waste.¹⁵ Additionally, the City has begun to develop a Liquid Waste Management Plan, which may provide further ideas or opportunities for reducing emissions generated as a result of waste.

¹⁴ The actual amount of methane generated for each tonne of waste deposited varies depending on the landfill characteristics and the waste composition. A typical values that has been used by the Partners for Climate Protection (PCP) program of the FCM, is a value of 0.484 tonnes of CO₂e per tonne of waste generated.

¹⁵ While waste management typically focuses on the municipal solid waste, there are potential opportunities related to the specific wastes within a community. In Prince Rupert, there can be large amounts of waste generated seasonally in the local fish plants. Ideas have been proposed that perhaps these wastes could be processed to create biogas (50% methane) which could be burned for heat or electricity generation.

Municipal Operations Emissions Inventories versus Community Emissions Inventories

It is important to note the relative scale between the municipal operations and community emissions inventories. Municipal operations account for approximately **50,000 GJ** of energy consumed annually, whereas community-wide activities account for **1,500,000 GJ** of energy consumed annually.

3.2 Community Inventory

The Provincial Ministry of Environment, in support of the CAEE initiative, has provided an inventory of community energy consumption and greenhouse gas (GHG) emissions. This data is based on a prototype inventory compilation that will eventually be used to provide all local governments with inventories of their community-wide emissions.¹⁶

Energy consumption and GHG emissions in the community derive from:

- Buildings – including the energy needed to heat residential, commercial and industrial buildings, as well as the activities that occur within these residences and facilities. This data is obtained from utility records and includes electricity and natural gas consumption. Other sources such as wood, fuel oil, or propane tank heat have not been quantified in the inventory.¹⁷
- Transportation – based upon a count of the vehicles in the community and an estimate of the number of kilometres driven.
- Waste – waste does not directly consume energy, but when deposited into landfills it decomposes and releases methane gas, which is a greenhouse gas stronger than carbon dioxide.

The inventoried energy and associated GHG emissions are tabulated in Table 6. Prince Rupert has total GHG emissions of 4.5 tonnes CO₂e per capita; compared to 4.1 tonnes CO₂e per capita for the Capital Region District and 11.0 tonnes CO₂e per capita for the City of Prince George.¹⁸ Although Prince Rupert's energy consumption is mostly attributable to buildings (71%), the community's GHG emissions are split almost evenly between buildings and transportation sources.

Energy consumption by fuel type and end use are illustrated in Figure 7, with associated GHG emissions shown in Figure 8. A detailed breakdown is provided in Appendix A.

¹⁶ The CEEI initiative is working to develop updates to this inventory for 2006 and 2007 by the end of 2008.

¹⁷ Industrial energy consumption is available only for electricity as confidentiality concerns prevent the release of the natural gas data at present. The industrial electricity consumption amounts to about 20% of the building energy consumption (13% of the community total). Industrial consumption is one of the least accessible by local governments and

¹⁸ This value includes residential, commercial, transportation and waste sourced emissions. Industrial emissions are excluded.

Table 6: Community Building Energy and GHG Emissions (2005)

Sector	Energy Consumption (GJ)	GHG Emissions (tonnes of CO₂e)
Residential	482,585	14,076
Commercial	400,259	11,963
Industrial	188,200	1,244
Transportation	429,960	30,916
Total	1,501,005	58,199
Total per capita	117.1	4.5

Source: Ministry of Environment Community Energy and Emissions Inventory (CEEI) Initiative, via the CAEE program.

Notes:

- 1) Only utility-provided energy is available. Other energy sources such as propane, fuel oil, and wood may be substantial but are not yet estimatable.
- 2) Industrial consumption of natural gas has been withheld by PNG for reasons of confidentiality.
- 3) The GHG emissions associated with electricity consumption are estimated from BC Hydro production averages. This does not include the effects of power imports or exports. The electricity GHG values should be considered tentative pending confirmation from the Climate Action Secretariat - expected in the fall of 2008.
- 4) Transportation numbers are estimated based on vehicle registrations and assumed average travel distances and have not been checked against actual consumption data.

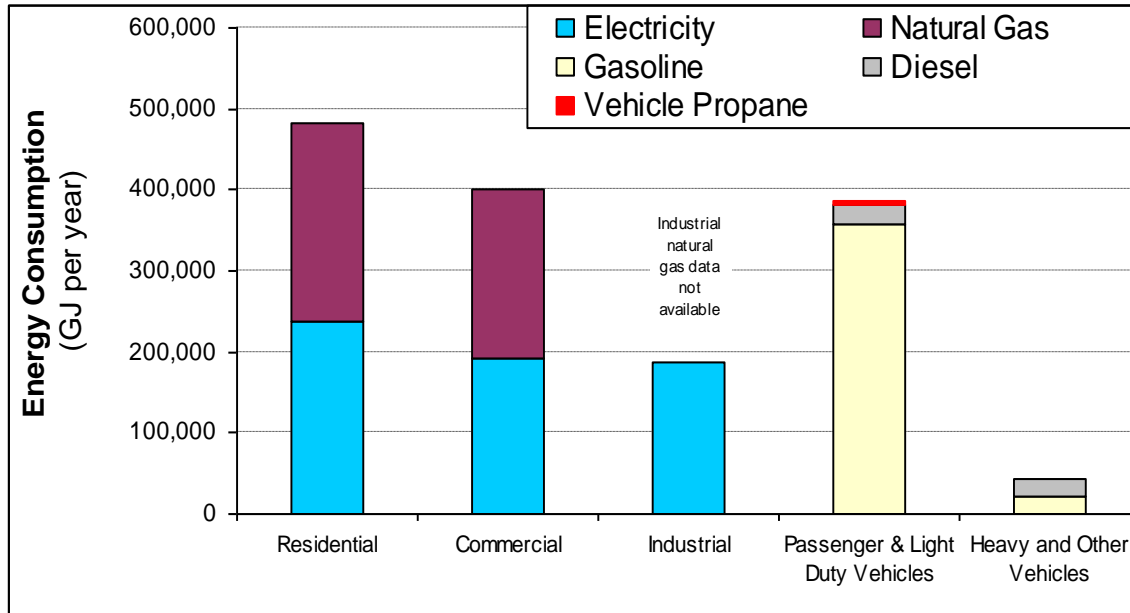


Figure 7: Community Energy Consumption by End use and Fuel Type (2005)

Source: Ministry of Environment Community Energy and Emissions Inventory (CEEI) Initiative, via the CAEE program.

Notes:

- 1) Only utility-provided energy is available. Other energy sources such as propane, fuel oil, and wood may be substantial but are not yet estimatable.
- 2) Industrial consumption of natural gas has been withheld by PNG for reasons of confidentiality.
- 3) Transportation numbers are based on vehicle registrations and assumed average travel distances and have not been checked against actual consumption data.

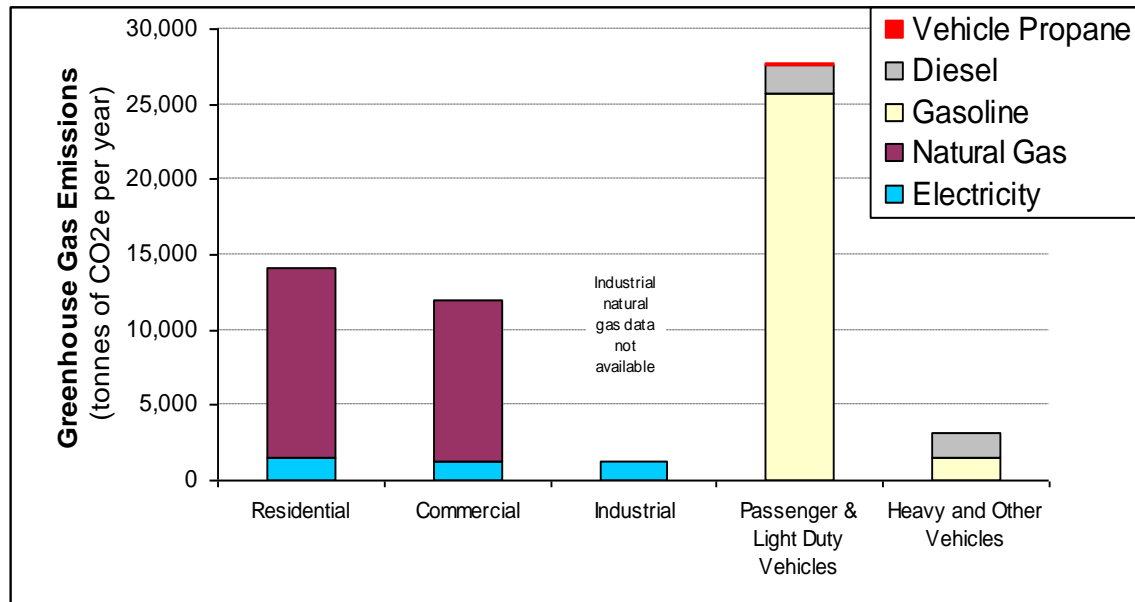


Figure 8: Community GHG Emissions by End use and Fuel Type (2005)

Source: Ministry of Environment Community Energy and Emissions Inventory (CEEI) Initiative, via the CAEE program.

Notes:

- 1) Only utility-provided energy is available. Other energy sources such as propane, fuel oil, and wood may be substantial but are not yet estimatable.
- 2) Industrial consumption of natural gas has been withheld by PNG for reasons of confidentiality.
- 3) Transportation numbers are based on vehicle registrations and assumed average travel distances and have not been checked against actual fuel sales data.

4 Plan Framework

A pyramid structure is useful for thinking about the plan structure. It starts with a vision and works through to actions. The components are:

The Vision	This paints the picture of where the community would like to go in the long term. The vision is not an easily, or swiftly attainable goal. However, it provides direction and points to the key features of the energy plan.
Areas or Action	The areas of action are the corporate operations, community energy consumption and local energy supply.
Initiatives and Actions	These are the specific areas for the plan to address.
Targets	Numerical objectives to be achieved.
Implementation	The day-to-day activities that are required to implement the plan.

The pyramid presented in Figure 9, offers an adaptive approach to developing the Plan. The vision is at the top, offering high level, strategic guidance to the Plan. Each lower level of the pyramid has items that directly align to the level higher. From the vision there are a number of subject areas and objectives which, if accomplished, will fulfill the vision. The objectives are met through various initiatives and actions, which are measured by defining targets. By implementing the initiatives and actions and measuring progress against targets, the City will be able to determine whether or not they are moving towards their vision. Moving from the top of the pyramid to the bottom also represents increasing timelines. As the Plan is implemented, the City will go through a learning process that will lead them to continuously improve and adapt measures in order to move closer to the vision. This adaptive approach generally results in increased timelines moving from the top of the pyramid to the bottom.



Figure 9: A Pyramid Framework for Compiling a Plan

4.1 A Vision

A proposed energy vision for Prince Rupert’s future is:

Prince Rupert’s Energy Vision

Prince Rupert will be a model community of energy conservation and renewable energy generation. Our award winning practices will show the province and the world that a small community can ‘walk the talk’. We will capitalize on our natural assets and compact community to create opportunities for energy conservation and renewable energy development.

We will work in partnership with other communities and neighbouring First Nations as stewards of our energy resources. We recognize the socio-economic and cultural diversity of our community and will work to bring the benefits of energy conservation and reduced fossil fuel use to all our residents.

4.2 Identifying the Issue Areas (Goals / Objectives / Issues)

During a CEP workshop with the GATF a discussion was held to identify the major areas for action that the community could pursue. The identified areas are:

- Engage the Community
- Transportation
- Existing Buildings
- New Buildings and Development
- Infrastructure & Municipal Buildings
- Local Energy Supply

These initiative areas and the actions defined for each will be reviewed in the next section. Targets and implementation are then reviewed.

5 Initiative Areas and Actions

Initiative 1: Engage the Community

Objectives:

- To mobilize and provide resources for individuals and groups to take action on energy efficiency.
- To raise the awareness of energy efficiency and climate change amongst the environmental concerns of residents.

Background:

Climate change is one of many issues that may be of concern. Recent community consultations by the Green Advisory Task Force identified a number of environmental issues. The issue of climate change is often abstract and hard to communicate compared with other more obvious issues such as garbage, litter, or recycling that have more obvious visual reminders.

Motivating people to make lifestyle changes to address climate change is going to be a long process requiring continual reinforcement and reminders.

Strategy:

- Leverage energy efficiency off other community environmental concerns.
- Help residents understand the benefits of energy efficiency.
- Work with the regional business community to develop 'green' practices which include energy efficient products.

Actions:

Action - 1: Establish a reduction target and incorporate it into the City's official community plan (OCP)

Bill 27 requires all local governments to establish reduction targets within their OCP documents and to define strategies to meet those targets. In this action the municipality will define a reduction target and communicate it to the community. See Section 6 for proposed targets.

Action - 2: Develop a regional “green” trade show

Business promotion of energy efficient and other green products and services can enhance awareness of these products and the issue as well as contribute to local economic development.

One avenue is to develop a “green” trade show at which businesses from around the region can showcase their products. Similar to a “home show,” this could target retail customers, as well as distributors and retailers.

Green Trade Shows in BC

EPIC (Ethical, Progressive, Intelligent Consumer) is a Sustainable Living Expo held in Vancouver and put on by the GLOBE Foundation that showcases ecologically and socially sustainable companies and products. <http://www.epicvancouver.com/about.cfm>

The Bulkley Valley Fair in Smithers recently hosted a Green Building Trade Show where professionals and enthusiasts came out to discuss everything from natural building techniques to renewable energy systems. http://www.onesky.ca/news/archive/green_building_trade_show/

Action - 3: Leverage energy efficiency off other community environmental concerns

Surveys and consultation performed by the GATF indicate that there is a strong desire from local residents for action on a range of environmental issues (e.g., waste, litter, etc). These residents are motivated and willing to make changes in their behaviours and actions. Actions that target these residents may have a better chance of being successful.

The City, in partnership with the GATF member organizations, will consider offering a “dialogue series” that would invite local residents to:

- Listen to insightful presentations linking other areas of environmental concern to issues related to energy and climate change (e.g., material consumption, waste reduction, water conservation, transportation, etc);
- Engage in discussions around questions proposed by the speaker(s)/presenter(s). These discussions could be jointly facilitated by the City and GATF member organizations in turn;
- Share in learning and networking opportunities with fellow residents interested in sustainability issues, and;
- Partake in an ongoing forum that will allow the City to solicit input from the public in a way that provides value to both the City and its citizens.

The purpose of the dialogue series is to come up with ideas for action that would further the implementation of the Community Energy Plan; engage a wider variety of community members in creating change within the community; and strengthen relationships between the City and residents to foster collaboration on energy issues.

Action - 4: Engage residents on the issues of energy conservation and climate change

The City will look for opportunities to participate in awareness-raising activities and promote these activities to Prince Rupert residents.

Examples of possible activities (some of which the City has been involved with in the past) include:

- Earth Hour;
- Earth Day;
- Clean Air Days;
- The Good Life¹⁹;
- Working with schools on implementing programs like “The Walking School Bus”²⁰;
- Plant a Tree Day;
- Buy Nothing Day²¹;
- The Commuter Challenge, and;
- Bike to Work Week.

¹⁹ The Good Life is an online community for concerned Canadians who want to stop talking about climate change and start taking personal action to reduce their GHG emissions (<http://thegoodlife.wwf.ca/Home.cfm>)

²⁰ <http://www.walkingschoolbus.org/>

²¹ A day to detox from consumerism and live without shopping (<http://www.buynothingday.co.uk/>)

Initiative 2: Transportation

Objective:

- To enhance the opportunities for residents to be mobile in the community, regardless of their access to a personal vehicle.

Background:

The City has a high degree of transit ridership and walkability. Some of this is due to economic circumstances, but it is also the result of an efficient bus service (one of the highest cost recovery systems in BC) and the compact nature of the community. Enhancing these features can help to further reduce fuel consumption in the community.

Funding for transit services is shared between the City of Prince Rupert, the District of Port Edward and BC Transit. For the most part, bus routes adequately service major destinations within the City; buses run frequently, Monday through Saturday, during daytime hours; accessibility concerns are addressed through low floor buses and door-to-door handyDART services; and fares, routes, schedules and other incentive programs are communicated via the website.

Walking and cycling are certainly viable transportation modes in good weather. However, these become less attractive in poor conditions as snowfall and snow clearing activities can make some sidewalks difficult to navigate. In this initiative the City will endeavour to identify the most problematic areas for pedestrians to navigate through snow and find ways to improve these amenities (e.g. alternative snow disposal or sidewalk clearing, etc.)

Strategy:

The City will work to enhance the comfort and accessibility of the bus service and the attractiveness of all season walking.

Actions:

Action - 5: Explore idling reduction opportunities

In this action the City will investigate various opportunities to promote and encourage a reduction in vehicle idling throughout Prince Rupert. The following steps should be considered for this action:

- Define idle free zones throughout the City;
- Pass an idling reduction bylaw;
- Consider ways to reduce idling by tourist buses;

- Prepare and distribute an educational brochure to businesses that have fleets or that provide transportation services.²²

Action - 6: Improve transit amenities

To further improve public transit and encourage ridership within Prince Rupert, the City will invest in other related amenities and services, such as:

- Improvements to bus shelters²³;
- Sidewalk maintenance;
- Bicycle racks²⁴;
- Lighting and seating around bus stops (to provide greater year-round comfort and accessibility to public transit users).

Action - 7: Improve transit service opportunistically

The City will explore opportunities to increase transit availability in Prince Rupert. This action focuses on making improvements to existing transit services (rather than reallocating services) and looks to add services strategically as opportunities arise. The City is currently working with the Federal government and the Province to develop innovative funding models to support transit service. Current funding programs typically provide support for capital investments, rather than for operational initiatives.

Action - 8: Improve opportunities for alternative transportation and mobility

The City will work to improve opportunities for alternative (and active) forms of transportation and mobility. This could be accomplished through the following activities:

- Adding new bike lanes to the road network;
- Improving the bike and trail system;
- Enhancing services that increase pedestrian mobility in the winter (e.g. snow removal from sidewalks);
- Communicating the lifestyle and financial benefits of public transit and active transportation;

²² The City may wish to target businesses that indirectly encourage idling, such as those with drive-thru windows. As a symbolic measure, council could consider not allowing future developments that include drive through windows, unless specifically designed to minimize idling.

²³ City staff acknowledged that the provision of bus shelters is dependent on the bus route itself and the location of the bus stops, but also felt that a reasonable target would be to have shelters at 1 in 3 bus stops.

²⁴ The City has plans to install additional bike racks around Prince Rupert.

- Promoting programs such as the “Commuter Challenge” and “Bike to Work Week.”

The City of Prince Rupert has already applied for financial support through the provincial Local Motion program. The program provides local governments with support for capital projects that encourage people to get out and be more active, support a reduction in car dependency and greenhouse gas emissions, and meet the mobility needs of seniors and people with disabilities. Additional funding to support the development of cycling infrastructure was recently announced by the Province of BC.²⁵

²⁵ Bike BC is a \$31 million program to be awarded over the next three years in support of building important cycling corridors of regional and provincial significance. Some possible projects are new bike trails and cycling lanes, improvements to existing cycling infrastructure, and providing for bike lockers and other equipment that makes cycling a safer and more convenient option for travellers.

Initiative 3: Existing Building Stock (non-municipal)

Objectives:

To improve the energy efficiency of existing buildings by:

- Increasing home-owner awareness of energy efficiency incentives.
- Target efficiency measures towards rental and low-income residents.
- Encourage property owners who rent their properties to make energy efficiency upgrades to properties.
- Increase uptake of commercial incentive programs by operators and building owners.

Background:

There are over 5000 existing dwellings in the community. These consume about 1/3 of the energy in the community. While many are owner occupied, there is also a substantial stock of residential properties that are renter occupied. The landlords may be local or from out-of town. These represent a large opportunity to implement upgrades and improvements. Major barriers would be residents' time, finances, and whether they are renter- or owner-occupied dwellings.

Many programs exist that provide incentives for energy efficiency upgrades, including the federal ecoENERGY program, BC Hydro's Power Smart program and the provincial LiveSmart BC program. It may be a challenge for the City (and its residents) to navigate these programs as the incentives are complex, offered by many organizations, and may change periodically. A brief summary of these incentive programs is presented below.

The Government of Canada's ecoENERGY program provides financial incentives for a range of energy efficiency activities, including energy retrofits for existing and new homes (available to renters), multi-unit residential buildings (with a common entrance and at least four storeys or a footprint of 600 square metres or more) and mixed-use commercial/residential buildings, including those owned by not-for-profit and religious organizations. Additionally, ecoENERGY programs exist for Aboriginal and Northern communities, fleets, personal vehicles, industry, biofuels, and other renewable energy technologies.²⁶

BC Hydro offers complimentary incentives through their Power Smart Product Incentive program. These incentives apply to homeowners, residential strata and business owners and encourage the replacement of old, inefficient appliances with energy efficient products.²⁷

LiveSmart BC, a program of the Province of British Columbia, offers a comprehensive list of energy efficiency and incentive opportunities for at home, at work and on the road (vehicles).²⁸ BC Hydro and LiveSmart BC have partnered to provide free assessments to help identify money

²⁶ Natural Resources Canada, Office of Energy Efficiency website: <http://www.ecoaction.gc.ca/ecoenergy-ecoenergie/index-eng.cfm>

²⁷ BC Hydro Power Smart Product Incentive Program: <http://www.bchydro.com/business/incentive/incentive8821.html>

²⁸ LiveSmart BC website: <http://www.livesmartbc.ca/rebates/index.html>

and energy saving opportunities for small business, non-profit, community group, and faith community buildings. Through this program, businesses are eligible to receive up to \$50,000 to implement energy efficient measures in their buildings.

Finally, the Community Energy Association provides a guide to funding and resources for local governments entitled, "Funding Your Community Energy Initiatives." This guide provides an overview of how municipal governments can finance energy efficiency initiatives in the community through joint ventures (e.g., public-private partnerships), fees and taxes (e.g., development cost charges).²⁹

Strategy:

- Promote existing incentive programs to property owners and renters.
- Find funding to provide outreach programs and incentives for energy audits.
- Develop a program to provide 'low hanging fruit' upgrades to residents.

Actions:

Action - 9: Promote existing energy efficiency incentive programs

In this action the City will promote the programs described above to:

- Homeowners and tenants of rental properties;
- Landlords and property managers of residential buildings, as well as to residential strata, and;
- Owners and property managers of commercial buildings.

The approach to promoting these incentive programs may differ depending on the audience. For example, if a renter's utilities are included in the cost of rent, the City may get better results by approaching a landlord or property owner about incentives, versus the tenant themselves. An avenue for reaching out to commercial property owners, would be through the local Chamber of Commerce or through City staff that deal directly with commercial properties (e.g., through the permitting process).

Overall, the City might consider the following activities for broad promotion of these incentive programs:

- Providing brochures and information at municipal counters;
- Tasking building inspectors to be conversant and knowledgeable about these programs;
- Including information with tax assessments or other mail-outs to property owners, and;
- Working with plumbing and heating contractors to increase uptake of these incentives.

²⁹ Community Energy Association website: <http://www.communityenergy.bc.ca/news/funding-your-community-energy-and-climate-change-initiatives>

Action - 10: Provide better access to energy audits for residents

In this action the City (alone or in concert with funding partners) will:

- Provide a cash incentive for an energy audit where possible;³⁰
- Work with outside auditors to enlist a number of customers at one time in order to improve the efficiency of an auditor's visit (e.g. perhaps through a promotion), and;
- Seek out ways to assist local trades-people to become certified as energy auditors.

Home energy audits cost in the range of \$300. This cost is no longer subsidized by the ecoENERGY incentive program and may represent a substantial barrier to owners conducting energy audits. As well, there is no local certified auditor in the City at present. Since the federal ecoENERGY program rollout (almost one year after the EnerGuide program was cancelled) there has been a delay in servicing the entire province³¹.

Action - 11: Provide and install energy retrofit “starter kits” to homeowners

The City will work with service agencies, the local community college, civic organizations and local businesses to provide home energy retrofit starter kits to residents at a discounted cost. The starter kit might consist of:

- A low flow shower head;
- Water tank wrap;
- Piping insulation;
- Weather caulking /weather stripping, and;
- An educational brochure to promote energy efficiency opportunities and incentive programs available to homeowners.

Simply providing the starter kits to residents may not be sufficient. For example SaskEnergy's Share the Warmth™ Home Energy Efficiency Project (see text box below), used a local college to spearhead a pilot program that engaged students and trained volunteers in the installation of energy efficient home improvements. A similar program could be developed with Northwest Community College,³² in conjunction with the City and various other local organizations.

³⁰ For example, Banff has offered a \$150 rebate to any resident that conducts an audit on their home. At present the LiveSmart BC program (announced May 2008) will also provide a partial subsidy of the cost of an energy audit.

³¹ Information obtained by phoning Building Insight Technologies (www.homeperformance.com).

³² For example, Northwest Community College offers a program in residential building maintenance (www.nwcc.bc.ca/Programs/rbmw.cfm). This is currently offered in Kispiox Village (near Hazelton), but might be offered in Prince Rupert if demand was present, or perhaps a special training session using NW College instructors to train a team to conduct energy education and retrofits through a local NGO.

Example: SaskEnergy's Share the Warmth™ Home Energy Efficiency Project

The project was developed with funding from SaskEnergy and the Office of Energy Conservation, the Saskatchewan Institute for Applied Science and Technology (SIASST), the Salvation Army, the Moose Jaw Fire Department and Fire Fighters Union, and the Moose Jaw Canadian Tire. The community partnership involved teams of students and specialized community volunteers going out into the community of Moose Jaw to assist 100 households in conducting "retrofits" with \$200 worth of simple home improvements, such as preparing windows and doors for winter, replacing furnace filters, installing gaskets around light switches and plugs, replacing standard light bulbs with compact fluorescent lights, putting in low-flow shower heads and faucets, and installing programmable thermostats. After the projects' initial success, the Government of Saskatchewan and SaskEnergy announced that they would expand the project to other communities as part of Saskatchewan Energy Share, the province's plan to help homeowners deal with volatile energy costs. The commitment involves retrofitting 2,500 homes by 2010.³³

³³Climate Change Saskatchewan website:
http://www.climatechangesask.ca/html/learn_more/Saskatchewan/Success_Stories/success_1/index.cfm

Initiative 4: New Buildings and Development

Objective:

- To encourage the most energy efficient new construction in the community.

Background:

Economic conditions have meant that only a few new buildings have been constructed in the past few years. While new building construction is expected to be minimal in the near future, the City wants to take a proactive approach and consider opportunities to encourage energy efficiency wherever possible. The new (green) BC Building Code (in effect September 2008) helps to encourage this as a result of the requirements for higher energy efficiency standards. A current “built to code” detached dwelling home would achieve an EnerGuide for Houses (EGH) rating of about 77.³⁴ The CAEE program aims to achieve higher than this with new homes being built to EnerGuide 80 or better by 2010.

The new Bill 27 (acclaimed May 2008) provides local governments with a set of tools that can be used to encourage energy efficiency (see section 1.5). These tools are directed towards new developments and growth, and so may not be applicable to Prince Rupert in the short term. However, in the future these may become more useful as new development occurs. With the adoption of Bill 27 (Local Government Statutes Amendment Act), local governments can now designate development permit areas (DPAs) in the Official Community Plan for the purpose of promoting reductions in GHG emissions. In addition to DPAs, there are a number of policy and governance tools available to local governments to encourage energy efficiency in new buildings and developments, including:

What are other communities doing?

Many other communities are encouraging green new development. Some examples include:

- The District of Maple Ridge has used revitalization tax exemptions to encourage energy efficient and LEED™ certified green buildings.
- The District of Central Saanich gives priority to housing projects using energy-efficient components and provides those builders with reduced permit fees (of up to 30%).
- A number of municipalities use development permit checklists, including: the Town of Gibsons, City of Kelowna, City of Kamloops, City of New Westminster, City of Port Coquitlam, District of Saanich and the City of Vernon. Proponents must state how they intend to address each item on the checklist. These are typically voluntary.
- Comprehensive development zones have been used by the City of Victoria (for Docks Green) and the City of Langford (for Westhills) to enable site development to be tailored in a more detailed way than through other zoning bylaws.
- Bowen Island Municipality has enacted a rezoning policy that sets expectations for efficiency standards in new residential developments.

³⁴ EnerGuide is an energy consumption rating scale for detached dwellings. An EnerGuide rating of 80 is considered very efficient. Older homes have EnerGuide ratings in the range from 40 to 70.

- Revitalization tax exemptions;
- Development cost charge exemptions;
- Development permitting or rezoning checklists;
- Expedited approvals;
- Comprehensive development zoning;
- Phased development agreements;
- Rezoning policies;
- Density bonuses
- Reduced permit fees;
- Local service area bylaws, and;
- Local improvement charges.³⁵

Prince Rupert has already incorporated an indication of these measures into its planning documents. The official community plan “Quality of Life”³⁶ states that for new development:

“Proposed neighbourhood plans are to include consideration of...Environmentally sound development practices that focus on sustainability with an emphasis on walkability, reduction of impermeable areas, energy conservation and adaptation to local site conditions.”

Taking actions to encourage the most energy efficient new buildings is supported by these OCP statements.

Strategy:

The City will encourage all new builders to achieve the highest energy efficiency possible. Any rezoning applications will be expected to specifically address energy efficiency.

Actions:

Action - 12: Investigate new powers granted to local governments by Bill 27

The City will explore the new powers granted to local governments by Bill 27 and ascertain which policy and governance tools would be most applicable to the Prince Rupert context. While many of these provisions pertain to new developments, these should not be neglected because at present time, there are not new development proposals underway. Preparing the appropriate bylaws to enact these powers takes time, and the City can work to establish some of these expectations, in advance of major new development proposals. As well, this provides the City an opportunity to learn from other community’s experiences.

³⁵ Renewable Energy Guide (September 2008). Community Energy Association website: <http://www.communityenergy.bc.ca/sites/default/files/Policy&GovernanceTools.pdf>

³⁶ http://www.princerupert.ca/page.php?id_page=138&id_section=4

Action - 13: Encourage builders to build energy efficient (or green) buildings for rezoning applications

The City will define a policy statement that rezoning applications for development should address energy conservation and make efforts to attain the highest level of energy efficiency that is practical.³⁷

Energy efficient buildings can be achieved through a combination of technology and design considerations that maximise natural features such as seasonal sun exposure and shade as well as high performance components (for example energy efficient windows, advanced insulation and air tightness). Many of these technologies are quickly moving into complete commercialization and are quickly becoming the norm in building design. Developers would also be encouraged to assess the applicability of alternative energy system such as heat pumps and geexchange systems³⁸.

³⁷ For example, the District of Saanich is the first B.C. municipality to provide rebates using the Canadian Home Builders' Association's Built Green program standards. Saanich gives priority to applications for housing projects using energy-efficient components and provide those builders with rebates of up to 30 per cent on building-permit fees.

³⁸ Heat pump technologies include a range of systems such as air source (like an air conditioner) and ground source (sometimes called geexchange) systems. For a large new development located close to the shore it might even be possible to use the ocean as a heat sink or source. For more information on geexchange systems see www.geo-exchange.ca.

Initiative 5: Infrastructure and Municipal Operations

Objectives:

- To show leadership to the community that the municipal government is taking action.
- To achieve a 15% reduction in energy consumption for existing civic buildings (CAEE Target #2).
- To leverage municipal action to encourage action by residents.

Background:

Municipal activities are a small part of the total energy consumption in the community. For example the energy consumption from municipal operations is about 52,000 GJ, while the community total is estimated at 1,500,000 GJ annually. Reducing municipal consumption has a small direct effect on the community's energy budget. However, it is fiscally prudent and can have a catalyzing effect by demonstrating leadership in the community.

Strategy:

The City will work to achieve its CAEE commitments, and highlight the actions it has taken to the community.

Actions:

Action - 14: Join the E3 fleet program for civic vehicles (CAEE Target #1)

The City will join the E3 fleet program. This requires that they download, complete and submit a registration form from the E3 website and pay a membership fee, scaled to the City's fleet size. In order to become an E3 Rated Fleet, the City must complete the E3 Fleet Rating Checklist, which includes requirements in each of the following areas:

- Green Fleet Action Plan
- Training and Awareness
- Idling Reduction
- Vehicle Purchasing
- Fuel Data Management
- Operations and Maintenance
- Trip and Route Planning
- Utilisation Management
- Fuel Efficiency
- GHG Reductions

The E3 Fleet Rating program is an initiative of the Fraser Basin Council (FBC) and is North America's first green rating program for vehicle fleets. The program is designed to evaluate performance, using a point-based rating system checklist that awards points for fleet management practices and energy and emissions performance, recognizing achievement at the Bronze, Silver and Gold levels.

All fleets with all types of vehicles can join E3. A fleet can choose to become a member to access program resources and later decide to take the next step by having a detailed review of its fleet operations. After a review has been conducted, a fleet can apply for a "green rating" in which an independent auditor will conduct an in-depth review of a fleet's operations against the E3 rating guidelines.³⁹

Action - 15: Evaluate municipal buildings for efficiency opportunities

In this action the City will review its buildings and evaluate the opportunities for retrofit. Commonly, there are substantial energy savings opportunities with the large energy users like recreation centers. Most buildings are not operated at their design or optimal performance. Opportunities for energy efficiency can be accomplished through one or more of:

i) Retrofitting (which might include lighting replacements, equipment replacements, etc.). Typically, performing exterior wall insulation upgrades, and even window upgrades can be expensive and have long pay back periods. Smaller retrofit activities, such as lighting retrofits, and furnace replacements may have acceptable payback periods (e.g. 3 - 7 years). These require staff time for budgeting, and implementing, as well as funds for audits and capital funds for implementation.⁴⁰

Examples include: i) evaluating the opportunity to link the ice rink refrigeration system to the pool heating system to capture the chiller 'reject' heat; ii) replacing older boilers and furnaces with heat pump systems. This can have a long term positive payback, even though the upfront costs might be greater⁴¹; or iii) installing a hybrid system to use both heat pumps (to provide the majority of the heating) and small high efficiency boilers (to provide peak load and back-up heating).

ii) 'Recommissioning' in which the building mechanical systems are reviewed and reset to proper performance characteristics. For buildings that have not been reviewed in several years, or that have had layout or occupation changes, there may be value in reviewing these buildings.

iii) Maintenance of buildings to ensure that systems are operating properly. This is an important part of ensuring that the building energy (and other) systems are functioning.

³⁹ E3 Fleet website: <http://www.e3fleet.com/mc/page.do?sitePageId=38616>

⁴⁰ In the past, there been some high-level (walk through) energy audits performed on municipal buildings. Resources have prevented any major retrofits from being implemented and the City has not been able to capitalize on some of the incentives provided by BC Hydro through their PowerSmart program.

⁴¹ Replacing a functioning boiler or furnace with a heat pump may not be economical in the short term; however, when a boiler is at the end of its service life and must be replaced (i.e. some spending is required), then there is often a strong business case for spending a little more for a heat pump system to obtain the long term energy savings.

Some evaluations may be available at little or no cost (e.g. BC Hydro will offer walk through audits for free, however these focus on electricity savings). In large buildings, costs for an audit and evaluation can typically be \$0.10 per square foot. In smaller buildings the costs per square foot can be greater.

Action - 16: Evaluate leveraging opportunities for the City (and other fleets in the community) to use hybrid vehicles

The City will explore opportunities to leverage their buying power to encourage greater uptake of hybrid vehicle ownership in Prince Rupert.

If the municipality, and other fleets (the port, the hospital) were to simultaneously purchase several hybrid vehicles, it would form a sufficient customer base to encourage mechanics (outside of dealerships) to become trained in hybrid technology. Once one or two mechanics are available in the City, other citizens may be more willing to purchase a hybrid. To further encourage this behaviour, the City could promote relevant programs and incentives to its citizens.⁴²

Gasoline-electric vehicles are fuel efficient, and in recent years have been developed in a range of vehicle types - including trucks which may be suitable for municipal operations. These cost more than traditional vehicles, however current high (and future higher) prices for petroleum will offset this increased purchase cost with long term operating savings.

At present there are few hybrid vehicles in the community. Until recently, this may have been attributed to the limited availability of hybrid vehicles through local auto dealerships and the limited number of qualified mechanics to service and repair these vehicles in Prince Rupert. However, more recently the local General Motors and Ford dealerships have begun to offer hybrids cars, trucks and SUVs and along with that, specially trained mechanics to service and repair these vehicles.⁴³

Action - 17: Commit to building all new municipal buildings to high energy efficiency standards

In this action, the City commits as policy that all new civic buildings will be built to a high energy efficiency standard. This action aligns with the City's Official Community Plan, which states:

⁴² The Government of Canada's ecoAUTO program offers rebates to encourage Canadians to purchase new fuel efficient vehicles. The Province of BC offers a PST rebate for hybrid electric vehicles of 100% of the tax payable up to a maximum of \$2,000 (as well as a number of other rebates for fuel efficient vehicles), while the provincial Scrap-It program offers incentives to encourage vehicle owners to scrap their older, inefficient vehicles.

⁴³ Several local mechanics and auto dealerships were contacted regarding their expertise with hybrid vehicles. Almost all pointed out that, being relatively new to the market, hybrid vehicles are generally serviced under warranty by dealerships. To date, the majority of hybrid cars are Toyotas & the nearest dealership is in Terrace. This is seen as a barrier to hybrid ownership in Prince Rupert. However, GM and Ford both have dealerships in Prince Rupert, which sell and service hybrid vehicles, and indicated that they have at least one specially trained mechanic onsite to service and repair hybrid vehicles and that a number of hybrids have been sold to various organizations in the region (including Border Services, Child and Family Services, Ministry of Forests and Alcan).

The City encourages the development of buildings which consider social, economic and environmental sustainability. In particular, all publicly funded buildings meet LEED's (Leadership in Energy and Environmental Design) or equivalent standards.⁴⁴

As part of this action, the City should also ensure that for all new construction or retrofits of civic buildings, opportunities for air source and ground source heat pumps are considered for inclusion.

Energy efficiency can also be included with other features in a 'green building'. Additional features of a green building might include water conserving fixtures, sustainably harvested wood products, minimal construction waste, low VOC ("gas off") paints, carpets and varnishes etc. Today, the LEED™ rating system is the primary standard that organizations tend to follow or strive towards (e.g., the federal government has committed to building new facilities to the LEED standard, the Federation of Canadian Municipalities provides loans and grants to municipalities undertaking new building construction to the LEED Silver standard, etc).⁴⁵

The City of Prince Rupert recently proposed development of a new safety building to house RCMP, fire and ambulance services; however, this is not yet under development. This proposed building presents the City with the opportunity to explore energy efficiency or green development standards for their civic buildings.

⁴⁴ City of Prince Rupert, Official Community Plan, Section 1.5 Health and Safety, Item 3.

⁴⁵ LEED stand for Leadership in Energy and Environmental Design. It is an initiative of the US and Canadian Green Building Councils to improve the design and construction of buildings. It is a rating system, wherein a building is awarded points in many categories for the different features included. At the end the building is rated as 'Certified', 'Silver', 'Gold', or 'Platinum'. Current LEED standards are available for commercial buildings and apply to offices and other facilities as well as multi-family housing developments.

Initiative 6: Local Energy Supply

Objective:

- To promote and encourage the use of renewable energy technologies, and renewable electricity generation in the community.

Background:

Renewable energy sources are going to be increasingly part of our energy supply in the future. Securing these sources locally can help to maintain jobs and wealth in the region. Renewable energy typically is thought of as wind power, small hydro or even tidal system (currently somewhat experimental). However, renewable energy systems could also use heat pumps driven by electricity to replace fossil fuels for heating. Similarly, waste heat (e.g. biomass fibre) could be deployed to make electricity or heat for distribution.

Some municipal infrastructure has energy potential that might be tapped (e.g. water supply pressures might be sufficient for a micro-turbine, or landfill gas might be suitable for generating heat or electricity).

Strategy:

- The City will explore opportunities to develop renewable energy sources within the community.

Actions:

Action - 18: Target to achieve 10% of energy needs from community-based, clean energy resources (as defined by the BC's Clean Electricity guidelines), or renewable heating systems or fuels (CAEE Target #6)

The community energy inventory (see Section 3.2) indicates that total quantified building energy consumption (residential, commercial, and some industrial energy) is in the range of 1 million GJ per year - or 280 million kWh if it were all purchased as electricity. Achieving 10% of this energy from renewable sources would be about 100,000 GJ or about 28 million kWh. This is equivalent to a 3.5 MW generator operating 90% of the time⁴⁶. Even factoring in the estimated transportation energy (another half million GJ) implies that 10% of community energy is equivalent to a 6 MW generator. This is the size of many micro-hydro installations being installed around the Province and is certainly reasonable if suitable micro-hydro or wind turbine locations are available.

In this action, the municipality will seek out opportunities to develop or promote renewable energy sources. Steps on this path could include:

⁴⁶ Watts are the measure of how fast energy can be produced (not the total amount of energy consumed). A megawatt (MW or million Watts) is enough electricity to power about 1000 homes on average. For scale, small hydro facilities are often in the range of a few up to 20 or so MW, wind turbines are about 1 to 2 MW each, natural gas generator turbines are 150 to 250 MW, and large thermal coal plants are in the range of 250 to 500 MW. Costs for power installations vary but are measured from are "a few" to "several" million dollars for each MW of capacity.

- Conduct an evaluation of the potential energy resources available in or near the community including micro-hydro (electricity), wind power (electricity), and biomass (heat or electricity).
- If substantial resources are available, develop a municipal policy for encouraging suitable partnerships for the development of renewable resources.
- Promote the use of heat pump technology for heating applications.

It is unlikely that the municipality would have the resources to execute these activities themselves; however, the BC Clean Electricity Guidelines⁴⁷ may be a source for support from both a political and economic perspective.

Action - 19: Engage with regional partners including First Nations and neighboring communities to implement renewable energy supply opportunities.

The City will explore partnership opportunities to assist with implementation of renewable energy supply in the community. Recently, a protocol agreement was developed and signed by the City and surrounding First Nations. This agreement provides the framework for all parties to work together on a variety of issues, including the development of renewable or alternative energy sources.

⁴⁷ The BC Clean Electricity Guidelines state that Electricity acquired or generated by electricity distributors in British Columbia may be reported as BC Clean Electricity if it meets the following requirements: (1) The electricity is generated from a new facility that started commercial production in British Columbia after November 25, 2002; or (2) The electricity is generated as a result of the installation of a supplemental process and/or equipment that alters and/or adds to the processes of an existing British Columbia facility specifically to generate electricity. Further detail can be found at: http://www.llbc.leg.bc.ca/public/PubDocs/bcdocs/378337/Clean_Energy_2005.pdf

6 Reduction Targets

6.1 Municipal Operations

The City has committed in Target 2 of the CAEE to achieving a 15% reduction in energy consumption for its existing civic buildings and fleets. Reviewing and implementing retrofits at municipal buildings requires time to conduct audits, find resources for implementation, and so on. Similarly, other fleets involved in the E3 program have found that one to three years of effort are required to implement all of the activities.

In addition to the fleet and buildings there are a number of public works activities - street lighting, water and sewage pumping and civic facility operations which consume energy but have lesser opportunities for energy savings. Combined these will mean that the total savings from all municipal operations may take several years to total 15%.

Proposed Municipal Operations Target: Achieve a 10% overall reduction in total municipal energy consumption by 2012.

6.2 Community Energy and GHG Emissions

Bill 27 will require the City to define a reduction target in its OCP. Moreover the provincial government has set a reduction target of 33% from 2007 levels by 2020 for the province overall. While it is not certain how that 33% reduction will be shared amongst citizens, industry, and governments, it is reasonable that the City aim to match the provincial target.

Proposed Community Reduction Target: The City will work through the actions in this plan, with the intent to achieve:

- a 5 % reduction in total community GHG Emissions by 2012,
- a 15% reduction by 2016, and
- a 33% reduction by 2020 (the provincial reduction target).

7 Implementation

7.1 The Challenge of Implementation

The primary challenge of an energy plan is to find the resources to implement it. Without a commitment of staff time and resources, it will be challenging to move actions ahead

To assist the implementation, it is proposed that there be an oversight committee and an implementing agency/staff person. These are described below.

7.2 Establish an Energy and Climate Change Committee

A committee - perhaps similar to the GATF, would be created. This will serve to support CEP initiatives, provide strategic guidance, and assist the Energy Coordinator/delivery agent in securing additional resources for CEP implementation. The mandate and activities would be to:

- seek out funding for implementation actions
- direct the implementing agent for executing plan actions
- coordinate between the staff actions (corporate operations) and the delivery agent's actions
- report to council on progress and financial considerations
- be a clearing house for new ideas and new program opportunities

7.3 Identify a Delivery Agent for the Community Actions

Without a dedicated staff person to champion the CEP both internally (within the City) and externally (in the community), implementation of the recommended actions within the CEP will be difficult. A key challenge for the City will be to secure funding to support an Energy Coordinator position or delivery agent for the CEP. With this role fulfilled, the day-to-day measures necessary to further CEP implementation will rest in the hands of this key individual or group.

A lack of local environmental non-government organizations (ENGOS)⁴⁸ with a mandate related to energy and climate change points to an opportunity for the City (perhaps through the Energy Committee) to develop a volunteer organization that would act as the delivery agent for the

⁴⁸ A conversation with a GATF member revealed that there are only two ENGOS in Prince Rupert – WWF and the T. Buck Suzuki Foundation. Both of these ENGOS have mandates related to the conservation of marine ecosystems and aquatic species.

CEP. Such an organization would have access to foundation grants and funding opportunities that may not be available to local governments. A partnership between the City and this volunteer organization would assist in securing the necessary funds to support CEP implementation and provide an opportunity for a broader spectrum of community members to get involved in energy issues within Prince Rupert.

7.4 Implementation Funding Opportunities

A number of programs exist to provide support to energy conservation activities. These provide different resources, ranging from direct incentives to homeowners (e.g. ecoEnergy) to those that provide institutional support (e.g. BC Hydro's PowerSmart program has partially-funded energy coordinator positions within municipalities). The range of initiatives is complex, and is bound to get even more so as new Provincial initiatives are launched and refined. A selection of current funding initiatives is provided in Table 7.

Table 7: Selected Funding Opportunities for CEP Implementation

Program	Key Features
BC Hydro: Energy Coordinator Funding	BC Hydro has provided partial funding to some municipalities to fund an energy coordinator for the municipal operations. Recently, in a pilot project, BC Hydro has funded an energy coordinator position directed towards community activities in Prince George.
LiveSmart BC	Rebates and incentives to help British Columbians reduce their carbon footprint at home, on the road, and at work.
BC Hydro Power Smart	Rebates and incentives to encourage energy efficiency in new construction and the installation of energy efficient products and appliances in existing facilities.
BC Housing – Housing Endowment Fund	\$10 million annually to support housing initiatives that are consistent with the provincial housing strategy and address the needs of households with low to moderate incomes. Projects must have strong partnership contributions from local government, community organizations, private and non-profit sectors, and other government agencies.
FCM Green Municipal Fund	Grants and loans available to support capital projects that reduce energy and GHG emissions. Competitive process with RFPs launched annually to fund projects related to brownfield redevelopment, energy, planning, transportation, waste and water.
BC Green Ports Initiative	\$30 million over three years to implement emission reducing practices for short-haul commercial trucks servicing BC ports, and to fund port electrification to allow ships to turn off their engines while in port.

An additional opportunity that could assist in funding CEP implementation in Prince Rupert relates to the Province's recent announcement that it will offset the carbon tax for local governments who have committed to become carbon neutral by 2012. As a signatory to the Climate Action Charter, Prince Rupert is eligible to receive a grant equal to 100 per cent of their carbon tax costs. Subject to legislative approval in February 2009, the new Climate Action Revenue Incentive will provide a grant to local governments by March 31, 2009. For 2008, the carbon emissions tax municipalities pay will be estimated. For 2009 and future years, the Province will provide grants based on the previous year's actual costs so that local governments can recover the carbon tax, without adding any burden to the property tax. Table 8 provides an

estimate of the revenue that will be generated for Prince Rupert through the Climate Action Revenue Incentive program.

Table 8: Estimated Climate Action Revenue Incentive for Prince Rupert

Energy Source	2007 Taxable Emissions	Year				
		2008*	2009	2010	2011	2012
Tax (\$/tonne CO₂e)		\$10	\$15	\$20	\$25	\$30
Natural Gas	1,158	\$5,800	\$17,400	\$23,200	\$28,900	\$34,700
Gasoline	230	\$1,200	\$3,500	\$4,600	\$5,800	\$6,900
Diesel	275	\$1,400	\$4,100	\$5,500	\$6,900	\$8,200
Total	1,662	\$8,400	\$25,000	\$33,300	\$41,600	\$49,800

*For 2008, the Climate Action Revenue Incentive is estimated based on a half year (as a result of the program having just been announced).

Note: Estimates are based on 2007 taxable emissions.

Source: Province of BC Climate Action Secretariat.

City Council might consider putting their Climate Action Revenue Incentive into a 'municipal energy fund', which would provide the seed funding needed for CEP implementation. In future, savings realized through energy efficiency measures could further contribute to the 'municipal energy fund', thus providing a reliable stream of funding to support energy efficiency and GHG emission reductions in the City of Prince Rupert.

Appendices

Appendix A – Municipal Operations Inventory Detail

Appendix B – Community Inventory Detail

Appendix C – Municipal Operations Inventory Spreadsheets

Appendix A - Detailed Municipal Operations Inventory

A-1 Municipal Operations

Results for the municipal operations energy and greenhouse gas inventory for the 2007 year are summarized in Table 4, Figure 5 and Figure 6 in Section 3.1 and Table A-1 below. Key findings include:

- Total energy consumption by *municipal facilities and operations* in 2007 was 5.85 million kWh of electricity, 23,600 GJ of natural gas, and 195,000 L of vehicle fuels for a total energy consumption of 52,000 GJ.
- Solid waste collected from municipal facilities is estimated at 254 tonnes per year.
- Total GHG emissions applicable to the carbon neutrality commitment are estimated at 1855 tonnes CO₂e in 2007.⁴⁹
- GHG emissions related to corporate waste generation are estimated at 123 tonnes.

⁴⁹ These GHG emissions assume an estimated BC Hydro average 'intensity factor' for estimating the amount GHGs produced from electricity consumption. Clarification of the precise intensity values is expected from the province in late 2007.

Table A-1: City of Prince Rupert Municipal Operations Energy Consumption and GHG Emissions (2001- to 2007)

	Units of Purchase	Energy Consumption (as purchased)						
		2001	2002	2003	2004	2005	2006	2007
Electricity	kWh	6,546,552	6,389,633	6,519,134	6,898,889	6,593,859	5,782,610	6,076,781
Natural Gas (*)	GJ	20,767	23,883	26,707	25,192	22,938	6,798	23,623
Gasoline	L	98,012	93,204	100,293	84,270	86,836	97,179	96,709
Diesel	L	101,515	111,512	105,170	98,748	84,668	84,458	98,406

		Energy Consumption (converted to GJ)						
		2001	2002	2003	2004	2005	2006	2007
Electricity	GJ	23,568	23,003	23,469	24,836	23,738	20,817	21,876
Natural Gas (*)	GJ	20,767	23,883	26,707	25,192	22,938	6,798	23,623
Gasoline	GJ	3,568	3,365	3,160	2,709	2,703	2,841	3,095
Diesel	GJ	3,724	3,542	3,811	3,202	3,300	3,693	3,739
Total (GJ)		51,627	53,793	57,147	55,939	52,678	34,150	52,333

		GHG Emissions (tonnes of CO ₂ e)						
		2001	2002	2003	2004	2005	2006	2007
Electricity	t CO ₂ e	216	211	215	228	218	191	201
Natural Gas (*)	t CO ₂ e	1,018	1,170	1,309	1,234	1,124	333	1,158
Gasoline	t CO ₂ e	265	250	235	202	201	211	230
Diesel	t CO ₂ e	273	260	280	235	242	271	275
Total (tonnes CO₂e)		1,772	1,891	2,039	1,899	1,785	1,006	1,863

Notes:

- 1) There was a 9 month period in 2006 when there was no natural gas reported for the Jim Ciccone Civic Centre and Earl Mah Aquatic Centre.

Electricity Consumption

Electricity consumption in 2007 was 6.08 million kWh. The Jim Ciccone Civic Centre and Earl Mah Aquatic Centre combined use a total of 2.1 million kWh, approximately 1/3 of the City's total electricity consumption. The Department of Engineering and Public Works used 1.6 million kWh, of which almost 500,000 kWh was related to activities at Shawatlan Lake.

Natural Gas Consumption

Total natural gas consumption in 2007 was 23,600 GJ in 2007. The Jim Ciccone Civic Center is the largest single natural gas user.

Fleet

The City of Prince Rupert consumed 97,000 L of gasoline and 98,000 L of diesel in 2007. The fuel usage corresponds to 3,095 GJ and 3,739 GJ of energy from gasoline and diesel, respectively.

Solid Waste

Total estimated tonnage of solid waste generated by the municipal operations is 254 tonnes per year resulting in an estimated 123 tonnes of CO₂e of landfill GHG emissions. The GHG emissions generated from waste disposal are not included in the City's commitment to become climate neutral through the Climate Action Charter.

Greenhouse Gas Emissions

Greenhouse Gas emissions for each source of energy are derived by multiplying the energy consumption by the appropriate emissions factor. For example, the combustion of one GJ of natural gas results in approximately 0.05 tonnes of CO₂e.

For electricity consumption the conversion is more complex. GHG emissions are not created at the point of consumption of electricity, but rather upstream at the place of generation. While most electricity in BC is generated from hydro power, a component of it is generated from fossil fuels (natural gas turbines or coal fired thermal plants).

Emission Factors

Table A - 1 Emission Factors

Source	GHG Emission Factor	Units
Electricity ¹	33	tonne CO ₂ e / GWh
Natural Gas	0.049	tonne CO ₂ e / GJ
Gasoline ²	0.073	tonne CO ₂ e / GJ
Diesel ²	0.068	tonne CO ₂ e / GJ
Solid Waste (SW)	0.484	tonne CO ₂ e / tonne SW

Table Notes:

- 1) All emissions factors from Canada's GHG inventory (Aug 2003) except for electricity which is calculated from BC Hydro's historical electricity emission factors.
- 2) Jaques, A. (1992). Canada's Greenhouse Gas Emissions: Estimates for 1990. Environmental Protection, Conservation and Protection, Environment Canada. EPS 5/AP/4, December.

Appendix B - Detailed Community Inventory

The inventoried energy and associated GHG emissions are tabulated in Table B-1 for buildings and in Table B-2 for transportation. Waste inventory data has not yet been provided by the provincial inventories. However, province-wide it is expected that waste-generated methane adds another several percent to the total GHG inventory.⁵⁰

Key features to note from this information are that:

- Total (inventoried and estimated) energy consumption is about 1.1 million GJ for buildings, and 0.4 million GJ for transportation.
- The overall energy consumption is about 1/3 residential, 1/3 commercial and industrial, and 1/3 transportation.
- GHG emissions originate about ½ from buildings and ½ from transportation.
- Electricity is a large component (about 40%) of the community's energy consumption, but only results in about 7% of the community's GHG emissions. This is because of the largely hydro powered electricity which is mostly carbon-free.

Table B-1: Community Building Energy and GHG Emissions (2005)

	Energy Consumption			GHG Emissions (tonnes of CO ₂ e)	
	Units of Purchase	In units of Purchase	(as GJ)	By Fuel Type	Sector Total
Residential	kWh	66,163,656	482,585	1,575	14,076
	GJ	244,396		12,501	
Commercial	kWh	53,074,303	400,259	1,263	11,963
	GJ	209,192		10,700	
Industrial	kWh	52,277,911	188,200	1,244	1,244
	GJ	n/a		n/a	
Total			1,071,045		27,283

Source: Ministry of Environment Community Energy and Emissions Inventory (CEEI) Initiative, via the CAEE program.

Notes:

- 1) Only utility-provided energy is available. Other energy sources such as propane, fuel oil, and wood may be substantial but are not yet estimatable.
- 2) Industrial consumption of natural gas has been withheld by PNG for reasons of confidentiality.
- 3) The GHG emissions associated with electricity consumption are estimated from BC Hydro production averages. This does not include the effects of power imports or exports. The electricity GHG values should be considered tentative pending confirmation from the Climate Action Secretariat - expected in the fall of 2008.

⁵⁰ The Province is addressing landfill methane generation through a new set of landfill regulations which will require the capture and utilization of landfill gas at most landfills in the province.

Table B-2: Estimated Community Transportation (2005)

	Energy Consumption		GHG Emissions	
	(in Litres)	(as GJ)	By Fuel Type	Sector Total
Passenger, Light Duty, Medium Duty Vehicles				
Gasoline	10,295,090	356,827	25,710	27,785
Diesel	661,568	25,590	1,839	
Propane	155,604	3,939	236	
Heavy Vehicles, Other, and Specialized Vehicles				
Gasoline	597,116	20,697	1,492	3,131
Diesel	576,834	22,311	1,603	
Propane	23,557	596	36	
Totals				
Gasoline	10,892,206	377,524	27202	30,916
Diesel	1,238,402	47,901	3442	
Propane	179,161	4,535	272	

Source: Ministry of Environment Community Energy and Emissions Inventory (CEEI) Initiative, via the CAEE program.

Note: Transportation numbers are estimated based on vehicle registrations and assumed average travel distances and have not been checked against actual consumption data.

Appendix C - Municipal Operations Inventory Spreadsheets

Provided in electronic format with the Final Draft Report.