



Peace River Regional District Community Energy Plan

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Date: October 19, 2010

The Peace River Regional Energy and Emissions Project is a collaborative effort between the Peace River Regional District and the municipalities of Chetwynd, Pouce Coupe, Taylor and Tumbler Ridge to develop both corporate and community energy plans for each community and the rural areas in order to meet their voluntary commitments under the Climate Action Charter and the regulatory commitments under the “Green Communities” amendment to the Local Government Act (Bill 27, 2008). This report represents the Peace River Regional District’s community energy plan.

Peace River Regional Energy and Emissions Project Partners:



- Peace River Regional District
- District of Chetwynd
- Village of Pouce Coupe
- District of Taylor
- District of Tumbler Ridge

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The preparation of this sustainable community plan was carried out with assistance from the Green Municipal Fund, a Fund financed by the Government of Canada and administered by the Federation of Canadian Municipalities. Notwithstanding this support, the views expressed are the personal views of the authors, and the Federation of Canadian Municipalities and the Government of Canada accept no responsibility for them.

Executive Summary

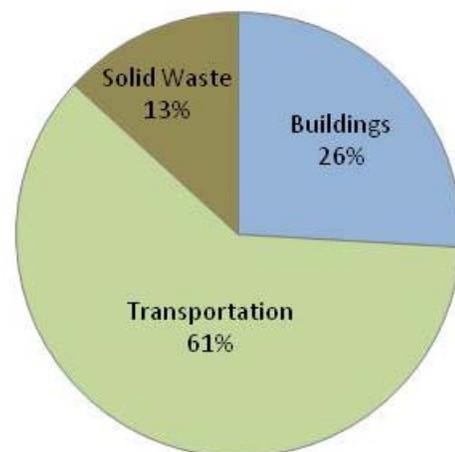
Across the globe people have become dependent on fossil fuels (e.g. oil, gasoline, natural gas, coal) to power our way of life: to get around, to grow our food, to heat our buildings. Because there is a finite resource of fossil fuels, we are starting to experience more volatility and uncertainty around the price and availability of fossil fuels. Reducing our dependence on these energy sources helps to decrease our vulnerability to fluctuating energy supply and pricing and is a key strategy for ensuring long-term sustainability in the region.

The Peace River Regional District (PRRD) in collaboration with the municipalities of Chetwynd, Pouce Coupe, Taylor and Tumbler Ridge, has undertaken this project to create both corporate and community energy plans. This document represents the community energy plan for the unincorporated areas of the Regional District with the following objectives:

- Address legislated requirements to establish greenhouse gas reduction targets, policies and actions for incorporation into Official Community Plans (OCPs) by May 2010.
- Define the Regional District's role in working towards the overall provincial goal of a 33% reduction in GHG emissions by 2020.
- Support community level commitments under the B.C. Climate Action Charter.
- Define actions for the Regional District to implement that will improve energy efficiency, reduce GHG emissions, and diversify the supply of energy for the community as a whole.
- Comply with the Federation of Canadian Municipalities Partners for Climate Protection (PCP) program requirements (Milestones 1-3, "community" stream).

Community Energy and GHG Emissions in 2007 for PRRD Unincorporated areas

In 2007, buildings and transportation in the unincorporated areas of the PRRD consumed approximately 4.4 million gigajoules of energy. This translates into total greenhouse gas (GHG) emissions in 2007 for the unincorporated areas of the PRRD of **240,000 tonnes of CO₂ equivalents** (excluding industrial and agriculture emissions), broken down by sector as shown in the pie chart (right). Transportation (including personal and commercial vehicles) contributes the largest amount to annual greenhouse gas emissions.



Goals for Community Energy and GHG Emissions Planning

1. Our communities have a variety of accessible, energy efficient and comfortable **buildings** to live and work in.
2. Our residents live in compact **rural communities** with access to local amenities where agricultural and natural land is preserved.
3. Our residents use a variety of efficient and healthy **transportation** choices to live, work and play in our communities.
4. Our communities are resilient and use a variety of reliable **energy sources**.
5. Our residents and businesses minimize **waste**.

Overarching GHG Emission Reduction Targets

Greenhouse Gas Emission Reduction Targets were developed for each OCP Area in the PRRD's unincorporated areas using a combination of value assessment from community input and technical analysis. The following reduction targets are proposed for incorporation into each OCP:

OCP Area	Reduce GHG emissions by 2020 (from 2007 levels)	Reduce GHG emissions by 2030 (from 2007 levels)	Reduce GHG emissions by 2050 (from 2007 levels)
North Peace Fringe Total Community Reduction	5%	15%	80%
<i>Per Capita Reduction</i>	30%	50%	--
South Peace Fringe Total Community Reduction	15%	30%	80%
<i>Per Capita Reduction</i>	25%	40%	--
West Peace Fringe Total Community Reduction	20%	40%	80%
<i>Per Capita Reduction</i>	25%	40%	--
Rural Total Community Reduction	5%	15%	80%
<i>Per Capita Reduction</i>	25%	45%	--

Strategies and Actions for Achieving the Goals and Targets

Several strategies and actions have been identified for each Theme area to assist the Regional District in achieving the reduction targets and goals identified. These are summarized here:

	Strategy	Action
Buildings	Education & Leadership	B-1: Develop an education campaign about energy efficient retrofits and new buildings
		B-2: Build / retrofit RD facilities to LEED equivalent standards and promote this to the public
	Financing & Incentives	B-3: Investigate the potential to provide a regional financial incentive program to improve energy efficiency in buildings
	Partnership	B-4: Engage local businesses in the Climate Smart Program by becoming a Climate Smart Host
		B-5: Encourage local education facilities to offer energy efficiency and renewable energy training
Land Use	Research	LU-1: Research potential for reducing minimum lot sizes required by the provincial health authority
	Policies & Education	LU-2: Investigate Development Permit Guidelines in the fringe OCP areas with the objective of reducing energy consumption and GHG emissions
Transportation	Education & Leadership	T-1: Develop a region-wide social marketing campaign to reduce fuel consumption from driving
	Partnership	T-2: Engage local businesses in the Climate Smart Program by becoming a Climate Smart Host
	Financing & Incentives	T-3: Install pedestrian and cycling infrastructure to encourage non-motorized transportation
	Policies & Regulation	T-4: Develop a model bylaw for idling reduction and encourage all municipalities in the Regional District to adopt it
Alternative Energy	Research	AE-1: Conduct an opportunity assessment for district energy in Charlie Lake in conjunction with development of the concept plan
		AE-2: Conduct an opportunity assessment for using waste industrial heat sources
	Education & Leadership	AE-3: Develop a regional community legacy project from energy and resource development
		AE-4: Develop an alternative energy pilot project and promote this to the public
	Policies & Regulation	AE-5: Develop a model bylaw that defines allowances for alternative energy systems and encourage municipalities to adopt it
Solid Waste	Policies & Regulation	SW-1: Continue to implement the Regional Solid Waste Management Plan (RSWMP)
	Research	SW-2: Conduct a feasibility study to build a landfill gas capture system at Bessborough, Dawson Creek and Fort St John landfills and sell offset credits

Plan Implementation

The Regional District will need to dedicate staff time and annual funding to support the implementation of this plan and help the communities reach the identified Goals and Targets. It will also be important to continually monitor, report and review progress on these activities so that they can be adjusted as necessary to improve the outcomes.

Ten outcome indicators, two implementation indicators, and associated targets for each indicator were selected to monitor progress towards achieving the Targets and Goals:

Outcome Indicator	Target
1. Total GHG emissions from buildings (residential, commercial and small/medium industrial).	Reduce by 20% from 2007 levels by 2020
	Reduce by 40% from 2007 levels by 2030
2. Percent of new RD buildings built to LEED equivalent standards.	100% by 2020
3. Percent of existing homes renovated to high efficiency standards (exceeding EGH 75).	5% by 2020
	10% by 2030
4. Percent of existing pre-zoned lots developed and occupied before considering rezoning additional areas.	50%
5. Hectares of ALR land excluded from Class 1-4 & 5C land, for development	0 Ha
6. Total transportation emissions (from personal and commercial vehicles).	Reduce by 5% from 2007 by 2020
	Reduce by 15% from 2007 by 2030
7. Percent of energy consumed in buildings derived from alternative energy sources.	10% by 2030
8. Number of alternative energy systems installed (e.g. solar roofs, geo-exchange, small wind).	500 systems by 2030
9. Number of projects that capture waste industrial heat.	4 by 2030
10. Tonnes of CO ₂ equivalent GHG emissions from solid waste disposed.	35,000 tonnes less GHG emissions by end of RSWMP Phase 2
Implementation Indicator	Target
11. Number of education presentations or events conducted on energy conservation and/or GHG emissions reduction.	To be determined upon design of education program (for example, 4 events or presentations per year for 5 years)
12. Number of partners engaged in plan implementation.	All member municipalities, and at least one from each of these sectors by 2015: secondary education, post-secondary education, non-profit organization, business, industry

Contents

Executive Summary	i
1. Introduction	1
2. Context	7
3. Community Profile	10
4. Energy and GHG Emissions Inventory.....	18
5. Goals and Targets	25
6. Strategies and Actions.....	32
7. Implementation.....	47
Appendix A: Community Survey.....	52
Appendix B: Stakeholder Interviews.....	55
Appendix C: Renewable Energy Opportunities	58
Appendix D: List of Tools & Resources	62

Figures

Figure 1. PRRD OCP and Electoral Areas.....	11
Figure 2. Location of new 9-1-1 numbers (2006-2009) in unincorporated areas.....	12
Figure 3. Vehicles by Type in Peace River Regional District.....	14
Figure 4. Greenhouse Gas Emissions by Sector in the PRRD Unincorporated Areas (2007)	19
Figure 5. North Peace Fringe OCP Area	23
Figure 6. South Peace Fringe OCP Area.....	23
Figure 7. West Peace Fringe OCP Area	23
Figure 8. Rural OCP Area.....	23
Figure 9. Input from Community Members Attending Meetings	26
Figure 10: Reduction Scenarios and Resulting Targets for each OCP Area	28
Figure 11. Micro-Wind Pilot Project in Grande Prairie, AB.....	44

Tables

Table 1. Population by OCP Area in the Peace River Regional District.....	12
Table 2: Annual Heating and Cooling Degree Days	13
Table 3: Community Energy Consumption and GHG Emissions in PRRD OCP Areas (2007)	20
Table 4. Business-As-Usual Forecast of GHG Emissions to 2050 (Summary of 4 OCP Areas)	22
Table 5. Community GHG emissions from select Canadian cities	24
Table 6. Summary of Proposed GHG Reduction Targets by OCP Area	28
Table 7. Timeline for implementing actions.....	48
Table 8: Examples of Program Coordinator and Staff Responsibilities for Implementation	49
Table 9. Summary of Indicators for Monitoring Plan Implementation.....	50

1. Introduction

The Peace River Regional District (PRRD), in collaboration with the District of Chetwynd, the Village of Pouce Coupe, the District of Taylor and the District of Tumbler Ridge, has undertaken a project to develop Community Energy Plans for each of the communities. This document represents the community energy plan for the unincorporated areas of the regional district. A separate document was released in December 2009 that addresses the Regional District's energy and emissions footprint from its corporate operations, including a target to reduce GHG emissions from operations over the next 5 years by approximately 15%.

1.1 What is a Community Energy Plan (CEP)?

A Community Energy Plan (CEP) is a strategic document to assist a community in reducing its energy consumption, reducing its greenhouse gas (GHG) emissions, and planning for its energy future. The purpose of creating a plan for the Peace River Regional District is to provide guidance for future decision-making for the fringe and rural areas of the region. The CEP defines long term targets for energy use and GHG emissions, outlines strategies for meeting those targets and recommends actions to move the strategies forward.

1.2 Why create a CEP?

Across the globe people have become dependent on fossil fuels (e.g. oil, gasoline, natural gas, coal) to power our way of life: to get around, to grow our food, to heat our buildings. Because there is a finite resource of fossil fuels, we are starting to experience more volatility and uncertainty around the price and availability of fossil fuels. Although the Peace region is a source for these conventional energy sources, businesses and residents purchase these fuels from the global market and are subject to global energy prices and fluctuations. Reducing our dependence on these energy sources helps to decrease our vulnerability to fluctuating energy supply and pricing and is a key strategy for ensuring long-term sustainability in the region.

There is also a growing consensus of scientific opinion¹ that:

- Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level;
- Global GHG emissions due to human activities increased 70% between 1970 and 2004;
- Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in human-caused GHG concentrations.

Our impact on the climate system is real and we must go beyond what we are currently doing, both individually and collectively, if we are to withstand the significant and potentially dangerous consequences of global climate change.

1.3 Objectives of this plan

The Energy Plan objectives are to:

- Address legislated requirements to establish greenhouse gas reduction targets, policies and actions for incorporation into Official Community Plans (OCPs) by May 2010, as set out in the Green Communities amendment to the Local Government Act (Bill 27, 2008).
- Define the Regional District's role in working towards the overall provincial goal of a 33% reduction in GHG emissions by 2020.
- Support community level commitments under the B.C. Climate Action Charter.
- Define actions for the Regional District to implement (alone, or in partnership with others) that will improve energy efficiency, reduce GHG emissions, and diversify the supply of energy for the community as a whole.
- Comply with the Federation of Canadian Municipalities Partners for Climate Protection (PCP) program requirements (Milestones 1-3, "community" stream).

¹ Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Report (2007).
http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf

1.4 Guiding principles

The development of this CEP incorporates the following guiding principles for energy planning²:

1. **Increase Efficiency by Avoiding and Reducing Energy Demand.** Reducing the amount of energy we need to undertake our daily activities involves changing our personal habits and using more efficient technologies.
2. **Find Efficiency by Reusing, Recycling and Recovering.** Finding efficiencies involves planning our communities to encourage reuse / recovery of wasted resources, particularly heat.
3. **Find Alternatives.** Renewable energy sources need to be developed in order to provide alternatives to burning fossil fuels for our energy. These sources also increase our self-sufficiency because they are locally-based.

1.5 How was this plan developed?

The CEP was developed through a community-based process that included:

- **Calculating a baseline inventory** of energy consumption and greenhouse gas emissions for each of the Official Community Plan (OCP) areas in the Regional District, based on the Community Energy and Emissions Inventory (CEEI) developed by the provincial government.
- **Aligning with community vision** and policy by reviewing existing community vision, strategy, and policy documents to ensure the community energy plan aligns with these processes.
- **Consulting with local government staff** at the Regional District, and member municipalities, to identify potential targets and strategies. This included a workshop with representatives from each local government, and individual meetings and phone communication.
- **Gathering input from community members** through a survey and information brochure. The survey and brochure were developed, printed and distributed to residents throughout the region in the participating municipalities and unincorporated areas. Seventy-seven surveys were completed over the course of the project, and input from these was incorporated into the development of the plan. Refer to Appendix A for a summary of the survey results. Key findings from the survey are that community members desire:

² Based on BC Hydro's 4Rs of Sustainable Community Energy Planning

- More public education to increase awareness and knowledge about technologies, tools and programs.
 - More access to incentives to improve efficiency and install alternative energies.
 - More public transit or shuttle bus options.
 - Increased access to recycling facilities.
 - Reduced gas flaring (note this is being addressed by the provincial government).
- **Gathering input from stakeholders** through phone interviews and through discussions at the community meetings. Representatives from 21 organizations in the region were contacted to provide input into the CEP, and 14 interviews were conducted. Stakeholder groups contacted include:
 - Real estate boards and realtors
 - Builders and developers
 - Education institutions and school districts
 - Chambers of commerce
 - Non-profit organizations
 - Agricultural associations
 - Alternative energy suppliers / installers

The objectives of these one-on-one phone interviews were to:

- Bring awareness about the CEP project to various stakeholders
- Identify opportunities and challenges for reducing energy use and GHG emissions in the region
- Identify potential strategies for the CEPs
- Identify potential partners for implementation
- Clarify the local government role

The responses are summarized in Appendix B. Key findings from the interviews include:

- Opportunities to build more compact communities with more amenities to reduce travel
- Homeowners need help – incentives, demonstration projects, education campaigns – to move forward with energy retrofits and alternative energy systems
- Local governments need to take a leadership role by building demonstration projects
- Opportunities to build partnerships with education institutions, realtors, utilities to help with public education and implementation of programs
- Opportunities to work with industry and commercial businesses to reduce emissions from transportation

- **Conducting meetings with community members.**

In February and March 2010, the Regional District, together with Northern Environmental Action Team and Stantec Consulting, organized public meetings in six communities and invited residents and stakeholders to learn about community energy and emissions, talk to practitioners in the region about alternative energy and efficiency technologies, and to provide input into the development of the CEP. The table below provides a summary of the attendees and some feedback received at the events. The input obtained is incorporated into Section 5, Goals and Targets.



Event Location	Attendees (approximate)
Tumbler Ridge	15
Chetwynd	30
Pouce Coupe	25
Taylor	10
Charlie Lake	30
Cecil Lake	2



Key input from the community sessions are organized by sector as follows:

TRANSPORTATION

- o Reduce idling: start with local government employees – lead by example
- o Add FSJ transit stop in Taylor
- o Reduce commuting emissions through employers (bussing, car pooling)
- o Increase work-at-home opportunities through tele-communications network
- o Provide incentives and/or rebates for reducing emissions – particular request to subsidize eco-energy inspection

LAND USE

- o Emphasize walkability opportunities; seniors population
- o Get all employees that work at industry to live locally

BUILDINGS

- o Improve insulation in homes – need help, incentives
- o Incentives from the local government would help for homes.
- o Promote wood as a carbon-neutral energy source for home heating
- o Partner with trades programs and schools
- o Provide more information about existing incentive programs
- o Increase availability of energy / building audit professionals
- o Use clothesline for laundry

ALTERNATIVE ENERGY

- Alternative energy back-up system: biomass, wind, waste-to-energy
- Interest in more use of solar energy
- Lots of wind potential in area
- Using waste heat from sewage?
- Blue fuel
- Solar-powered street lights
- Capture waste heat
- Re-allocate waste wood from industry towards energy production (rather than just burning it all)
- Increase knowledge in region with respect to alternative energy through demonstration projects
- Increase understanding of business cases and payback periods specific to region
- Desire for more practical information on residential-scale options.
- Interest in learning more about new technologies for homes – e.g. wind generation and geothermal.

WASTE

- Have a swap and shop linked to the garbage dump - lots of things that don't need to be thrown away
- Increase access to recycling facilities – bins in rural areas and more depots in FSJ.

OTHER

- Discussion about oil and gas industry: desire to see reduced flaring and improved practices to reduce emissions [note: this is being addressed at the provincial government level].
 - High transient worker population and remote owners
-
- **Incorporating technical expertise** and experience on renewable and alternative energy practices in other areas, and identifying opportunities specific to the Peace region. Expertise and experience from energy planning in other municipalities, particularly in British Columbia and the north, was also incorporated.
 - **Integrating the elements** to define targets, goals and strategies appropriate for this plan.

2. Context

2.1 Federal legislation and initiatives

Federally, the **Canadian Environmental Protection Act (CEPA)** regulates environmental contaminants and includes specific provisions that control the fuels and engine emissions of vehicles and equipment. In 2009, the threshold for reporting greenhouse gas emissions were reduced by half to include all facilities emitting 50,000 tonnes or greater.

In April 2010, the federal government announced proposed Passenger Vehicle and Light Truck Greenhouse Gas Emission Regulations under CEPA to create national vehicle efficiency standards that harmonize with the US standards by 2011. If implemented, new vehicles sold in 2016 are expected to be 40% more efficient than vehicles sold in 2008.

In May 2010, the federal government announced upcoming Heavy Duty Vehicle regulations. These are not yet defined, but the initial announcement anticipates approximately 20% improvement in efficiency by 2018 model years.

The **Copenhagen Accord** was developed during the United Nations Framework Convention on Climate Change Conference on the Parties (COP 15) held in Copenhagen, Denmark in December, 2009. The Accord required industrialized countries to set greenhouse gas emission reduction targets for 2020 by January 31, 2010. The Canadian federal government has announced a nation-wide GHG emission reduction target of 20% below 2006 levels by 2020.

2.2 Provincial legislation and initiatives

The Province has been moving forward with a series of ambitious measures to advance energy efficiency and reduce community consumption. These include:

- **GHG Emissions Reduction Target Act (Bill 44, 2007):** The Province of BC has set a province-wide GHG emission reduction target of 33% below 2007 levels by 2020. The Act also sets requirements for Public Sector Organizations (PSOs) to be carbon neutral by 2010.
- **BC Climate Action Plan:** After setting the reduction target, the province created a plan that outlines strategies and initiatives that will take the province 73% of the way to reaching its target. These initiatives include LiveSmart BC (rebates for energy efficiency upgrades) and a carbon tax on fuels, among others.
- **BC Energy Plan:** This plan sets out a “Vision for Clean Energy Leadership” and aims to have more green and alternative energies feeding into the grid. Furthermore, it includes new policies for oil and gas, such as the goal to eliminate all routine flaring at oil and gas producing wells and production facilities by 2016 with an interim goal to reduce flaring by 50 per cent by 2011.

- **“Greening” the BC Building Code (Bill 10, 2008):** Building Code requirements to increase energy and water efficiency are in effect. Further requirements for efficiency in housing are expected in 2011, including achievement of the equivalent of EnerGuide for Homes (EGH) 80.
- **Green Communities Act (Bill 27, 2008):** Bill 27 requires local governments include GHG emission targets, policies, and actions in their OCPs. To achieve this objective, the legislation provides a range of potential new powers for local governments.
- **BC Climate Action Charter:** A provincial initiative introduced in September 2007 to encourage local governments to become carbon neutral in their local government operations by 2012. The Peace River Regional District has signed this charter.
- **Landfill Gas Management Regulation (2008):** The Ministry of Environment requires all landfills with 100,000 tonnes or more waste in place, or with more than 10,000 tonnes of annual waste disposed to install a gas capture system by 2016.

2.3 Peace River Regional District initiatives

In February 2009, the Board adopted Terms of Reference for a **Peace Region Climate Action Task Group**. The Task Group has representatives from each municipality and the Regional District and is the basis for a strong collaborative and integrated approach to sustainable energy planning. Upon completion of these community energy plans, the Task Group will continue to move forward with implementation of the plans in order to meet longer term goals.

As a signatory to the **Climate Action Charter**, the Regional District is committed to take voluntary action to reduce its energy consumption and GHG emissions, and to achieve ‘carbon neutrality’ beginning in 2012 in its operations. This is addressed in the Regional District’s **Corporate Energy Plan**, completed during the first phase of this project. Furthermore, the Charter is a commitment to create “complete, compact, more energy efficient rural and urban communities.”

In June 2009, the Board adopted a motion to become a member of the Federation of Canadian Municipalities’ **Partners for Climate Protection Program**,³ making a commitment to achieve a series of 5 milestones, the first 3 of which are being addressed through this plan.

The Regional District revised its **Regional Solid Waste Management Plan** in 2008 that supports Zero Waste as a long-term, overarching vision.

³ The Federation of Canadian Municipalities’ Partners for Climate Protection Program is a five-milestone framework that guides municipalities to reduce greenhouse gas emissions (<http://www.sustainablecommunities.fcm.ca/Partners-for-Climate-Protection/>)

2.4 Other local government initiatives in the region

Four municipalities in the region are working collaboratively with the Regional District on this project: the District of Chetwynd, the Village of Pouce Coupe, the District of Taylor and the District of Tumbler Ridge. Upon completion of this project, each of these four municipalities will have completed Corporate and Community Energy Plans.

The three remaining municipalities in the region have already initiated climate action independently. The District of Hudson's Hope completed a corporate plan and is planning to develop a community plan in 2010. The City of Dawson Creek and the City of Fort St John have set reduction targets as follows:

City	2020	2030	2050
Dawson Creek	33% below 2006 levels	--	85% below 2006 levels
Fort St John	1% below 2007 levels	12% below 2007 levels	--

3. Community Profile

In order to develop a community energy plan, it is important to understand some of the challenges and opportunities that are presented by the location, climate, population, economy, housing, transportation, and projected growth for the region. This chapter outlines the key factors that influence energy consumption and greenhouse gas emissions with respect to the Peace River Regional District unincorporated areas.

3.1 Location and boundaries

The Peace River Regional District is located in the North-eastern portion of British Columbia, south of the 58th parallel and east of the Rocky Mountains to the Alberta border. Its boundaries encompass approximately 12 million hectares. The population resides in seven incorporated municipalities and four rural electoral areas.

The Peace River Regional District is the local government authority for Electoral Areas B, C, D and E. There are four Official Community Plans (OCPs) in the Regional District either in place, or under development. These include the: Rural, West Peace Fringe, North Peace Fringe, and South Peace Fringe OCP areas, as shown in Figure 1. Note that the OCP boundaries are different than the Electoral Areas.

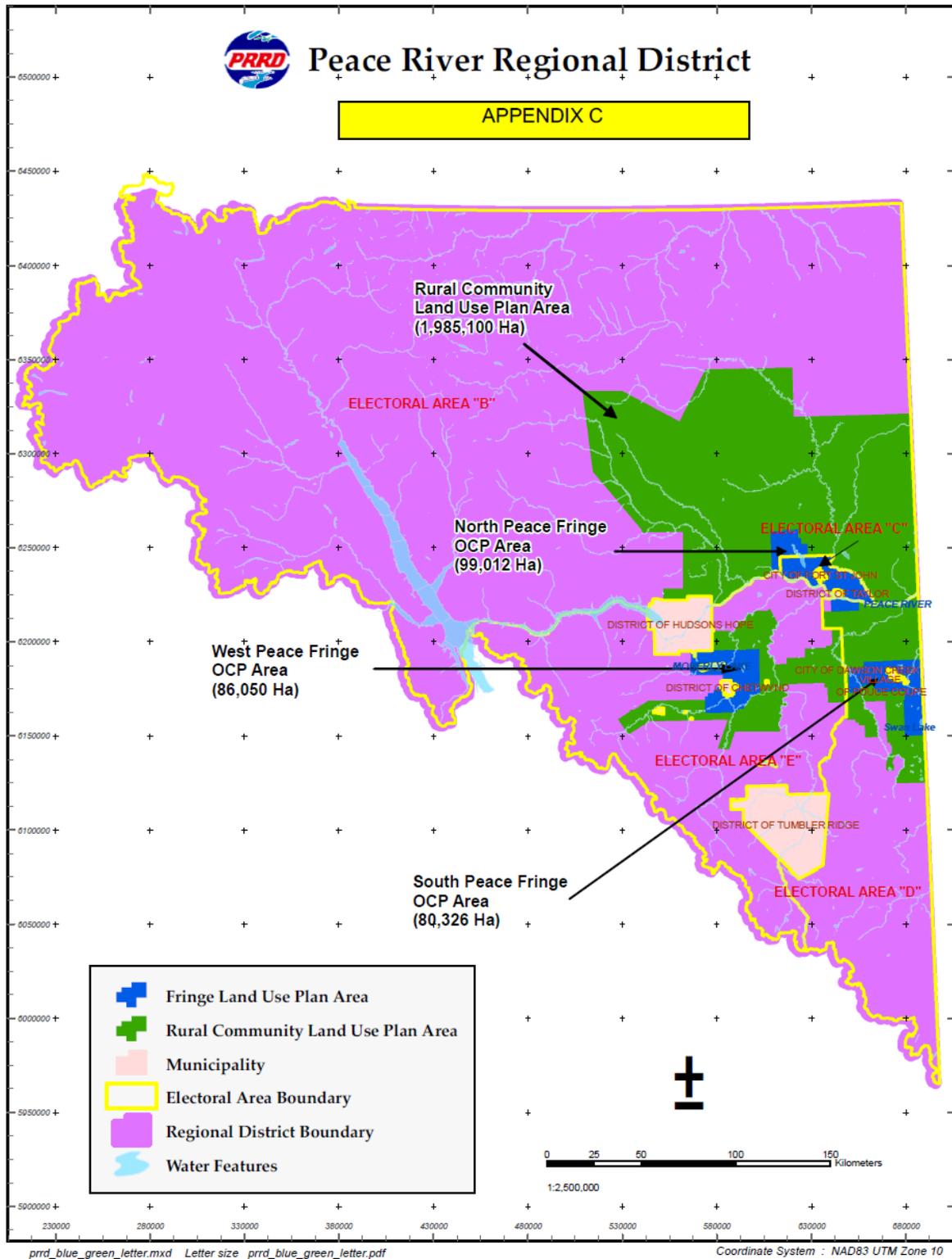


Figure 1. PRRD OCP and Electoral Areas

3.2 Population and development

The total population of the unincorporated areas in the Regional District is 20,668⁴. The population is broken down by OCP area in Table 1 (note that OCP boundaries are different than Electoral Area boundaries). There are some nodes of development within these OCP areas, however, population densities are very low and the majority of dwellings are dispersed.

OCP Area	Population (2006)	Population Change in Area (1996 to 2006)
North Peace Fringe	7,586	Increased Electoral Area B (10%) Electoral Area C (21%)
South Peace Fringe	3,549	Decreased Electoral Area D (-5%)
West Peace Fringe	1,957	Decreased Electoral Area E (-8%)
Rural	7,576	Varies by area Electoral Area B (10%) Electoral Area D (-5%) Electoral Area E (-8%)

Table 1. Population by OCP Area in the Peace River Regional District

Sources: PRRD, 2009 and Statistics Canada, 2006.

Approximately 600 new buildings were developed from 2006 to 2009, based on new 9-1-1 numbers registered⁵. Figure 2 indicates that the majority of new 9-1-1 numbers since 2006 are in the area surrounding Fort St John and northward, as well as the area surrounding Dawson Creek.

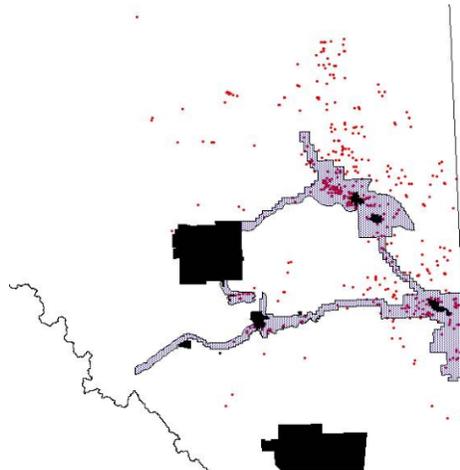


Figure 2. Location of new 9-1-1 numbers (2006-2009) in unincorporated areas

Source: PRRD, 2009

⁴ Statistics Canada, 2006.

⁵ The Peace River Regional District has both mandatory and voluntary building permit areas. Therefore, new 9-1-1 numbers are used instead of building permits to indicate areas of new growth.

3.3 Climate

Considerable energy is required for heating in the Peace region, as indicated by the high heating degree days⁶ in Table 2 (approximately twice as many as Vancouver). There is limited energy required for cooling, as temperatures remain moderate in the summer. Despite the cold temperatures, the Peace region has a large number of sunshine hours throughout the year – one of the highest in BC.

Location	Heating Degree Days (Annual)	Cooling Degree Days (Annual)
Fort St. John (station for Electoral Areas B & C)	5,847	27
Chetwynd (station for Electoral Areas D & E)	5,490	14
Vancouver	2,926	44
Prince George	4,728	40
Whitehorse, YK	6,811	8
Edmonton, AB	5,708	28
Toronto, ON	4,066	252

Table 2: Annual Heating and Cooling Degree Days

Source: Climate Normals 1971-2000; <http://climate.weatheroffice.ec.gc.ca>

3.4 Dwellings

Dwellings in all unincorporated areas of the Peace region are dominated by single-detached residences, representing between 77% and 91% of dwellings. “Other” occupied private dwellings (including mobile homes) account for most of the remaining residences. A small percentage of dwellings (up to 4%) are multi-family homes.⁷

Approximately 50% of homes in the unincorporated areas are more than 30 years old. Following a boom of new housing in the 1960s and 1970s, growth slowed until a slight resurgence in the late 1990s⁸.

⁶ A heating degree day is the number of days that the temperature is below 18°C, multiplied by the temperature below 18. For example 5 days at 12°C is $5 \times (18 - 12) = 30$ degree days. The use of 18°C as the defining temperature for heating degree days is a common benchmark in heating and air conditioning analysis

⁷ Source: Statistics Canada, 2006: Community Profiles: <http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E>. ‘Other occupied private dwellings’ includes semi-detached, row houses, apts, duplex, apartments less than five storeys, apartments greater than four storeys, and other single attached houses and movable dwellings such as mobile homes and other movable dwellings such as houseboats and railroad cars.

⁸ Source: Statistics Canada, 2006: Community Profiles: <http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E>.

3.5 Transportation

Residents in the PRRD primarily use private vehicles to commute to work (approximately 90% of trips). Walking and cycling account for approximately 2 to 3% of trips in most electoral areas⁹.

Almost half (47%) of the vehicles driven in the PRRD are for commercial use, versus 53% for private passenger vehicles as shown in Figure 3. The majority of passenger vehicles are light trucks, vans and SUVs (about 60% of passenger vehicles).

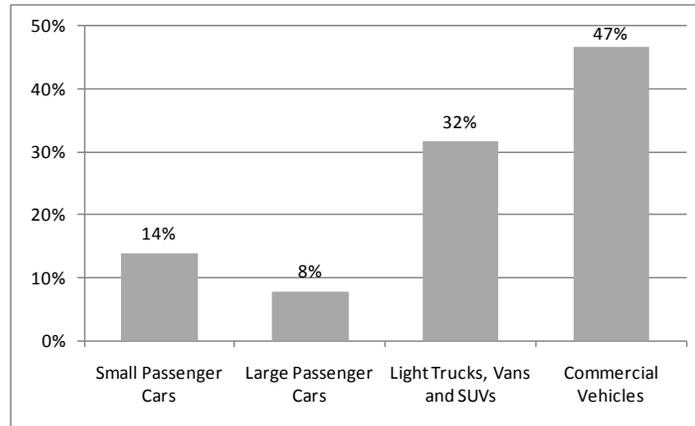


Figure 3. Vehicles by Type in Peace River Regional District

Source: CEEL Initiative, Ministry of Environment, Province of BC, 2008.

3.6 Economy

The economy of the Peace Region is dependent on primary resources, including agriculture, energy, forestry, and mining. While the oil and gas sector dominates in the City of Fort St. John, and the North Peace Fringe OCP area, agriculture also plays an important role. Both oil and gas and agriculture are mainstays in the Dawson Creek and South Peace Fringe OCP area. In the West Peace Fringe OCP area, the mainstays are both agriculture (over 94% of the land base is dedicated to agricultural use) and resource extraction in the form of oil and gas, mining and forestry. The Rural OCP area is dominated by agriculture, primarily cattle ranching and grain production.

Recently there has been a new focus on large-scale wind production in the region, particularly with the completion of the first fully-operational wind farm in BC on Bear Mountain (in the South Peace). Several other sites throughout the region are either under development, undergoing the environmental assessment process, or under investigation.

⁹ Source: Statistics Canada, 2006: Community Profiles: <http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E>.

3.7 Future growth

The total population of the PRRD is expected to grow from approximately 60,000 people to 80,000 people over the next 30 years (approximately 30%).¹⁰ Over time, it is expected that there will be a modest net in-migration to the area as oil and gas exploration and construction provide employment in the region.¹¹

Particular areas of growth in the PRRD include:

- Fort St. John area, especially Charlie Lake
- Dawson Creek area
- Bear Mountain
- Chetwynd

3.8 Renewable energy

There is increasing interest in the development of renewable energy resources to reduce GHG emissions and improve energy security. The cost of renewable energy technologies has been dropping, making these systems more attractive, but they still tend to be considerably more expensive than conventional energy sources. In BC, low energy prices (particularly in northern BC where natural gas prices are lower), large transportation distances, and cold climates can make renewable energy a challenge. However, there are some promising opportunities for renewable energy in the Peace region. These are summarized in the following table, with more details available in Appendix C.

Renewable energy source	Opportunity in PRRD
Solar thermal and photovoltaics	<ul style="list-style-type: none"> • Very good solar resource, one of the best in BC • Passive solar is something that local governments have control over through the use of development permit guidelines.
Wind	<ul style="list-style-type: none"> • Peace region has proven to be viable for wind power with the opening of the Bear Mountain wind project • Area between Dawson Creek and the Rocky Mountains has the best wind potential • Opportunities likely limited to large turbines feeding power into the grid
Micro-hydro	<ul style="list-style-type: none"> • Peace region does not generally have good micro-hydro potential, although areas in the Rocky Mountains are identified as moderate potential • No potential sites over 2 MW have been identified by BC Hydro
Biomass	<ul style="list-style-type: none"> • Most common form of renewable energy, used mostly in fireplaces and wood stoves in homes • Can be used at a much larger scale, for heating buildings, supplying district energy systems, or generating power • Several mills in the Peace region may provide sources of wood waste • Another possibility for biomass in the Peace region is the use of agricultural waste

¹⁰ BC Stats, 2009, PEOPLE 34 Projections from 2008 to 2036.

¹¹ BC Stats, 2008. PEOPLE 34 Regional Migration Assumptions. Retrieved from: <http://www.bcstats.gov.bc.ca/DATA/POP/pop/Project/p34notes.PDF>

Renewable energy source	Opportunity in PRRD
Landfill gas	<ul style="list-style-type: none"> Collected landfill gas can be used to generate electricity or it can be cleaned and injected into the PNG gas system If there are nearby buildings the landfill gas can be used for heating, or in a cogeneration system
Geothermal	<ul style="list-style-type: none"> High potential geothermal areas around Hudsons Hope and Chetwynd
Geo-exchange	<ul style="list-style-type: none"> Most areas are likely good candidates for geo-exchange Commercial/institutional buildings are generally more cost effective than homes due to larger size, but economics will vary from project to project
Industrial waste heat	<ul style="list-style-type: none"> Many industries in the Peace, and some may have waste heat available To justify the cost of piping, the industry must be located reasonably close to where the heat will be used
Cogenerations	<ul style="list-style-type: none"> To be cost effective, cogeneration plants need to be located where there is a use for the heat Facilities with large year round heating loads (such as hospitals, recreation centres, or industry) are preferred. BC Hydro's new firm purchase rates for plants under 5MW has made it easier to plan cogeneration plants, while low gas rates would increase potential viability in the Peace. Cogeneration can also be used with a district heating system
District heating	<ul style="list-style-type: none"> Municipal planning should support a district heating system by focusing development around the system distribution Civic facilities or other institutional buildings can be core customers Facilities that may be sources of waste heat (e.g. sewage treatment plants or ice rinks) should be located nearby

3.9 Challenges and opportunities

There are a variety of Challenges and Opportunities for improving energy efficiency and reducing greenhouse gases based on the context of the Peace River region. These are summarized here:

Factor	Opportunities	Challenges
Population and Development	<ul style="list-style-type: none"> Potential for more nodal development in high growth areas (especially in the North Peace Fringe Area). 	<ul style="list-style-type: none"> Low density settlements leads to greater reliance on automobiles. Areas with declining population do not have opportunities for compact development and new amenities. Building codes are not currently enforced in the rural areas.
Climate	<ul style="list-style-type: none"> Potential for faster payback periods for retrofitting or building new homes to high energy-efficiency standards. High solar potential in the region. 	<ul style="list-style-type: none"> Large energy demand for heating and powering homes due to northern climate.
Dwellings	<ul style="list-style-type: none"> Many older homes may provide opportunity for conservation through 	<ul style="list-style-type: none"> Financial barriers to retrofits for lower income homeowners.

Factor	Opportunities	Challenges
	retrofit program.	<ul style="list-style-type: none"> Single-family homes typically require more energy than multi-family units.
Transportation	<ul style="list-style-type: none"> New vehicle technologies becoming more available, and operate in northern climates. Expected new Federal regulations will require improvements in vehicle efficiency for personal and commercial vehicles. 	<ul style="list-style-type: none"> Heavy reliance on private vehicles to access employment and amenities. Winter driving conditions in a resource based economy, leads to a high percentage of large vehicles that consume more fuel.
Economy	<ul style="list-style-type: none"> Industry could help to support a transition to alternative energy (e.g., biomass from agriculture, wood waste, waste heat from industrial plants, etc) and keep more of the income in the community. 	<ul style="list-style-type: none"> Reliance on resource extraction which can be volatile. High temporary resident population can reduce investment in longer-term improvements. Majority of the wealth generated typically does not stay in the region.
Future Growth	<ul style="list-style-type: none"> OCPs can promote the development of energy-efficient rural communities, with a focus on nodal development where possible. 	<ul style="list-style-type: none"> Planning for growth is dependent on volatile resource-based industries and tends to happen in "clumps".
Renewable Energy	<ul style="list-style-type: none"> Several opportunities identified above 	<ul style="list-style-type: none"> Cost effectiveness of building the systems and potential impact of the systems need to be evaluated on case-by-case basis.

4. Energy and GHG Emissions Inventory

This chapter describes the 2007 levels of energy consumption and sources of greenhouse gas (GHG) emissions in the four OCP areas of the Peace River Regional District. Energy consumption and GHG emissions in the community derive from several sources.

4.1 What is a community energy and GHG emissions inventory?

A community energy and GHG emissions inventory calculates the total amount of energy consumed in one year to do our daily activities in the community (heating our buildings, driving our vehicles, etc.) and the amount of GHGs that are emitted into the atmosphere as a result of this energy use. Inventory reports are provided for most local governments by the Community Energy & Emissions Inventory (CEEI), a provincial government initiative. CEEI reports are available for Chetwynd, Pouce Coupe, Taylor, Tumbler Ridge, and the PRRD (total including municipalities). There is also one report that covers all of the unincorporated areas combined.

The following sectors are included in this community energy and GHG emissions inventory:

- **Buildings** – The energy to heat and power residential, commercial and small/medium industrial buildings.
- **Transportation** – Vehicular consumption and emissions is based on a count of the vehicles registered in the community, an estimate of fuel consumption based on type of vehicle, and an estimate of the number of kilometres driven that is specific to average travel distances in the Peace River Regional District.
- **Waste** – Waste does not directly consume energy but when deposited into landfills it decomposes and releases methane gas which is a greenhouse gas that has approximately 20 times more impact on global warming than carbon dioxide. Solid waste emission estimates are obtained through the CEEI initiative at the regional and municipal levels.

The following sectors also generate GHG emissions and are typically regulated by higher levels of government. These sectors are not included in this community energy and GHG emissions inventory:

- **Agriculture** – Fertilizer application and manure management practices can lead to emissions of methane or nitrous oxide (N₂O) – both potent greenhouse gases.
- **Industrial activity** – Energy consumed in large industrial facilities is reported at the regional level for information only. Industrial processes and activities can also emit greenhouse gases in various forms (e.g. flaring of gas wells).

- **Rail and Off-Road sources** – Rail transportation and off-road mobile equipment (including lawn and garden equipment, off-road recreation vehicles etc.) can emit greenhouse gases from use of diesel, gasoline and other fossil fuels.

4.2 Energy consumption and GHG emission inventory for 2007

In 2007, buildings and transportation in the unincorporated areas of the PRRD consumed approximately 4.4 million gigajoules of energy. This, plus emissions from solid waste, translates into **total Greenhouse Gas emissions in 2007** for the unincorporated areas of the PRRD of **240,000 tonnes of CO₂ equivalents**, or 12 tonnes per capita (excludes large industrial and agriculture emissions)¹². The transportation sector is the major source of greenhouse gas emissions in the community, accounting for 61% of all emissions. Buildings account for 26% and solid waste accounts for 13%, as shown in Figure 4.

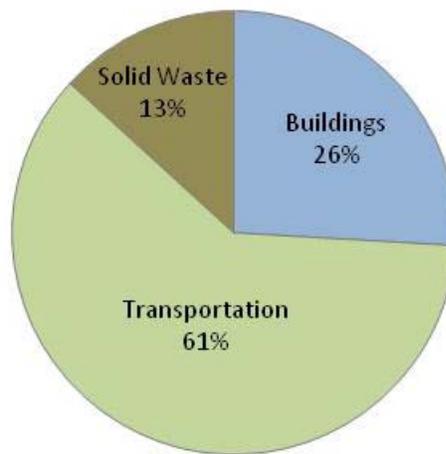


Figure 4. Greenhouse Gas Emissions by Sector in the PRRD Unincorporated Areas (2007)

For information only, agricultural GHG emissions from enteric fermentation have been estimated for the entire PRRD (including municipalities) to be 219,000 tonnes of CO₂ equivalents for 2007 (data for manure management and agricultural soils is not sufficient enough to provide a reasonable estimate). GHG emissions resulting from energy consumed in large industrial buildings are approximately 150,000 tonnes of CO₂ equivalents for the entire PRRD in 2007.¹³

¹² The Provincial Ministry of Environment, as part of the Community Energy and Emissions Inventory (CEEI) initiative has provided an inventory of community energy consumption and greenhouse gas (GHG) emissions. This initiative has provided each community in the province with standardized greenhouse gas inventories as of March 2009. As part of this project, these inventories were revised to understand the energy consumption and GHG emissions within each OCP area.

¹³ A Technical Methods and Guidance Document for 2007 CEEI Reports is available and explains the methodology for calculating these emissions:
http://www.env.gov.bc.ca/cas/mitigation/ceei/CEEI_TechMethods_Guidance_final.pdf

Table 3 provides a summary of each OCP area's energy consumption and associated GHG emissions. Transportation accounts for the largest source of GHG emissions in all OCP areas.

Table 3: Community Energy Consumption and GHG Emissions in PRRD OCP Areas (2007)

Use	Energy (as GJs)	GHG Emissions (tonnes of CO ₂ e) ²	GHG Emissions %
North Peace Fringe OCP Area			
Residential	460,000	15,000	15%
Commercial	740,000	24,000	23%
Transportation ¹	780,000	54,000	51%
Solid Waste	-	12,000	11%
Total	1,980,000	105,000	100%
Total per capita	260	14	-
South Peace Fringe OCP Area			
Residential	240,000	7,000	16%
Commercial	110,000	4,000	11%
Transportation ¹	360,000	25,000	60%
Solid Waste	-	5,000	13%
Total	720,000	42,000	100%
Total per capita	200	12	-
West Peace Fringe OCP Area			
Residential	140,000	2,000	12%
Commercial	32,000	400	2%
Transportation ¹	200,000	14,000	71%
Solid Waste	-	3,000	15%
Total	370,000	20,000	100%
Total per capita	190	10	-
Rural OCP Area			
Residential	490,000	8,000	10%
Commercial	70,000	1,000	2%
Transportation ¹	780,000	54,000	72%
Solid Waste	-	12,000	16%
Total	1,340,000	75,000	100%
Total per capita	180	10	-

Table notes:

- 1) Transportation emissions are estimated from vehicle counts and assumed annual average travel distances.
- 2) Energy and GHG emissions from large industrial and agricultural sources are not included in the community inventory.

4.3 Inventory methodology

The Community Energy and Emissions Inventory (CEEI) initiative provided reports to most BC local governments that contain community-wide energy and emissions data for the buildings, on-road transportation, and solid waste sectors. Although CEEI provides a consistent methodology for developing inventories across the province, there are errors with the CEEI reports with respect to communities in the PRRD, including:

- Data is not broken down by electoral area or OCP area.
- Energy consumption data from large industrial buildings is withheld.

For this project, the CEEI inventories were adjusted according to the following steps:

Buildings

Regional and municipal level data was obtained through the CEEI initiative from utility records and includes electricity and natural gas consumption^[14].

For electoral areas and OCP areas, residential electricity was split based on dwellings. Commercial electricity was split based on commercial property assessed values. Natural gas was already identifiable by electoral area but was adjusted by number of connections between the North Peace Fringe and Rural OCP areas.

Other energy sources such as wood, fuel oil, or propane tank heat were estimated based on number and type of dwellings and average consumption estimates from the BC Hydro Conservation Potential Review. This information was refined to the level of OCP areas by splitting: residential electricity based on dwellings; commercial electricity based on assessed property values; and natural gas based on number of connections^[15].

Transportation

This data was obtained at the regional and municipal levels through the CEEI initiative and includes data sources from ICBC and Natural Resources Canada.

For electoral areas and OCP areas, vehicle consumption data was split based on population.

Solid Waste

For electoral areas and OCP areas, solid waste consumption was split based on population.

Agriculture

Agricultural emissions were estimated for the PRRD using the methodology employed by the National Inventory Report and are included for information only. The estimate includes GHG emissions from enteric fermentation only, as data for manure management and agricultural soils are not sufficient enough to include.

¹⁴ 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 approximately 53% of the total reported building energy consumption.

¹⁵ Refer to the CEEI Technical Methods and Guidance Document for 2007 CEEI Reports for more information about the data collection:
http://www.env.gov.bc.ca/cas/mitigation/ceei/CEEI_TechMethods_Guidance_final.pdf

4.4 Energy and GHG emissions BAU forecast

A business-as-usual forecast was developed for each OCP Area to 2050. The forecasts are driven by projected population growth, but take into consideration expected improvements in efficiency that will result from senior government regulations that will occur regardless of action taken by the local government. The assumed efficiency improvements include:

- Reduce residential building energy demand by 20% by 2020¹⁶ (e.g. building code improvements, appliance / equipment improvements, etc.)
- Reduce commercial building energy demand by 9% by 2020 (e.g. building code improvements, appliance / equipment improvements, etc.)
- Reduce passenger vehicle energy use by 40% by 2030¹⁷ (e.g. general fleet turnover and improved efficiencies in vehicle design from existing policy initiatives)
- Reduce commercial vehicle energy use by 15% by 2030

The results of the forecasts for each OCP area are outlined in Table 4 and Figure 5 to 8. Note that no further efficiency improvements are calculated beyond 2030, as these are yet to be defined.

OCP Area	Population Growth assumed (annual)	2007 GHG Emissions (tonnes of CO ₂ e)	2020 GHG Emissions (tonnes of CO ₂ e)	2050 GHG Emissions (tonnes of CO ₂ e)
North Peace Fringe	2.0%	105,300	119,100	200,000
Change from 2007		--	13%	90%
South Peace Fringe	1.0%	42,000	41,500	51,000
Change from 2007		--	-1%	22%
West Peace Fringe	0.5%	19,800	18,500	19,200
Change from 2007		--	-7%	3%
Rural	1.9%	57,200	64,000	124,900
Change from 2007		--	12%	118%

Table 4. Business-As-Usual Forecast of GHG Emissions to 2050 (Summary of 4 OCP Areas)

¹⁶ Residential and commercial building targets from the BC Energy Efficient Buildings strategy

¹⁷ Passenger and commercial vehicle efficiency improvements expected based on the federal government announcements to increase fuel efficiency requirements by 2016 (light duty) and 2018 (heavy duty).

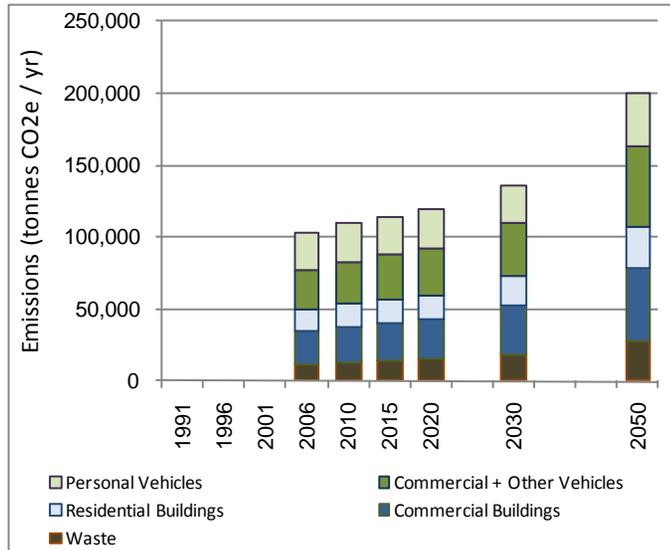


Figure 5. North Peace Fringe OCP Area

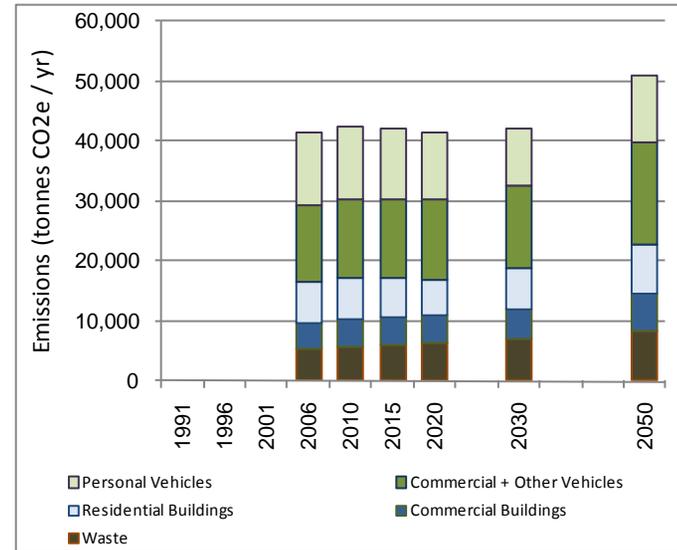


Figure 6. South Peace Fringe OCP Area

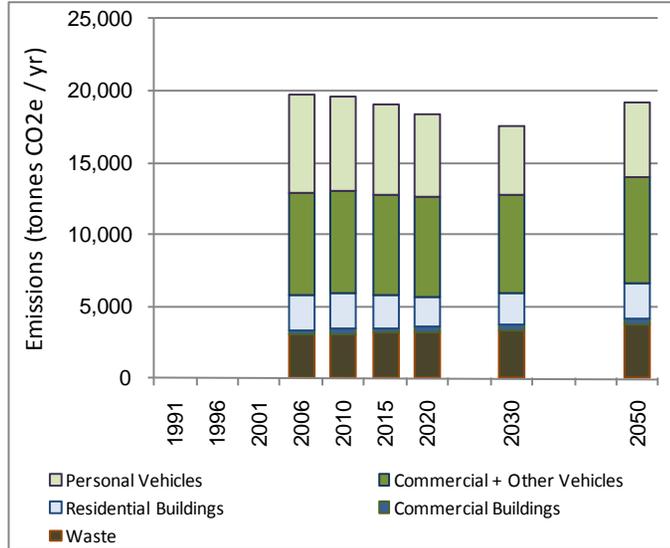


Figure 7. West Peace Fringe OCP Area

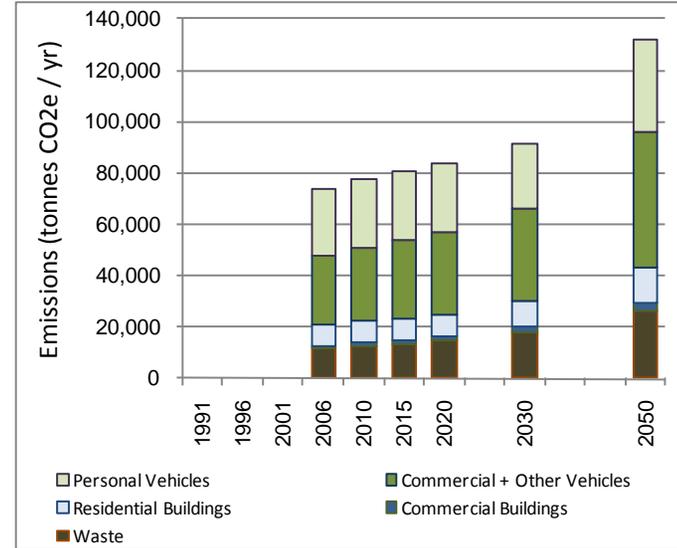


Figure 8. Rural OCP Area

4.5 Benchmarks for community GHG emissions

Benchmarks can provide a context for the current state of GHG emissions from community activities, and provide a sense of the level of emissions per capita relative to other communities. The challenge with benchmarks for GHG emissions is that there are significant variations in climate, population, density and energy sources, as well as variations in methodology for measuring and reporting community GHG emission making it difficult to draw meaningful comparisons. However, they can provide an indication of the level of emissions between different areas. Table 5 provides a list of select Canadian cities for interest.

Table 5. Community GHG emissions from select Canadian cities

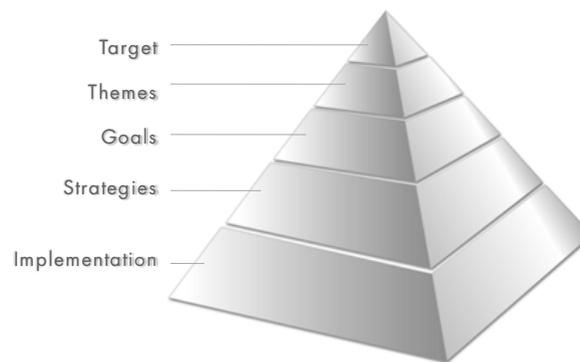
Community	Year	GHG emissions (per capita) ¹⁸
Peace River Regional District	2007	14.4
Prince George	2007	9.3
Toronto (metropolitan area)	2005	11.6
Calgary	2003	17.7
Vancouver	2006	4.9

¹⁸ PRRD data is based on the CEEI data for the whole regional district; Prince George data is based on 2007 CEEI data and StatsCan 2006 population data. Toronto, Calgary and Vancouver data are from the UNEP report of "Representative GHG Baselines for Cities and their Respective Countries" at http://www.unep.org/urban_environment/PDFs/Representative-GHGBaselines.pdf.

5. Goals and Targets

5.1 Adaptive management approach

This community energy plan adopts an adaptive management approach that ensures alignment between all the plan elements in reaching a defined target. This framework also allows incorporation of new information, approaches and policies that continue to align with the targets and goals defined in the plan.



A **Target** is a measurable value that defines “Where we want to be” in a specified time period regarding energy consumption, greenhouse gas emissions, or related activities. This provides a measurable goal that the community can collectively work towards achieving.

The plan is structured into five **Themes**: Buildings and Development, Transportation, Land Use, Alternative Energy, and Solid Waste. These are the key areas of activity that will lead the community towards its target.

Within each theme areas, one **Goal** is identified that states “What we want to achieve” for that theme.

Strategies define one or more types of approaches that define “How we are going to achieve our goals”. There are four types of strategies: Research, Education, Financing and Incentives, and Regulation.

Implementation of the plan will involve undertaking activities in each of the theme areas, monitoring progress toward the target over time, and adjusting strategies and activities to ensure success.

5.2 Community GHG reduction targets

The Provincial government has set a reduction target of 33% from 2007 levels by 2020 for the province overall, and 80% from 2007 levels by 2050. Each local government in BC has been legislated to develop greenhouse gas emission reduction targets, policies and actions for inclusion in its OCP.

Target-setting is a challenging process that requires values tradeoffs, local knowledge, and technical analysis. Staff, stakeholders and the general public were engaged, through surveys, discussions and community meetings, in the development of GHG emissions reduction targets for the four fringe and rural OCP areas in the Regional District.

Input from Community Members

During the development of the Community Energy Plan, input was gathered from residents and stakeholders to understand the desire for having the Regional District take action to reduce energy use and GHG emissions in the community, and to increase the use of alternative energy. The results of this input, as shown in Figure 9, indicate there is a moderate to high level of support for action by the Regional District to undertake initiatives regarding energy efficiency and alternative energy in the community.

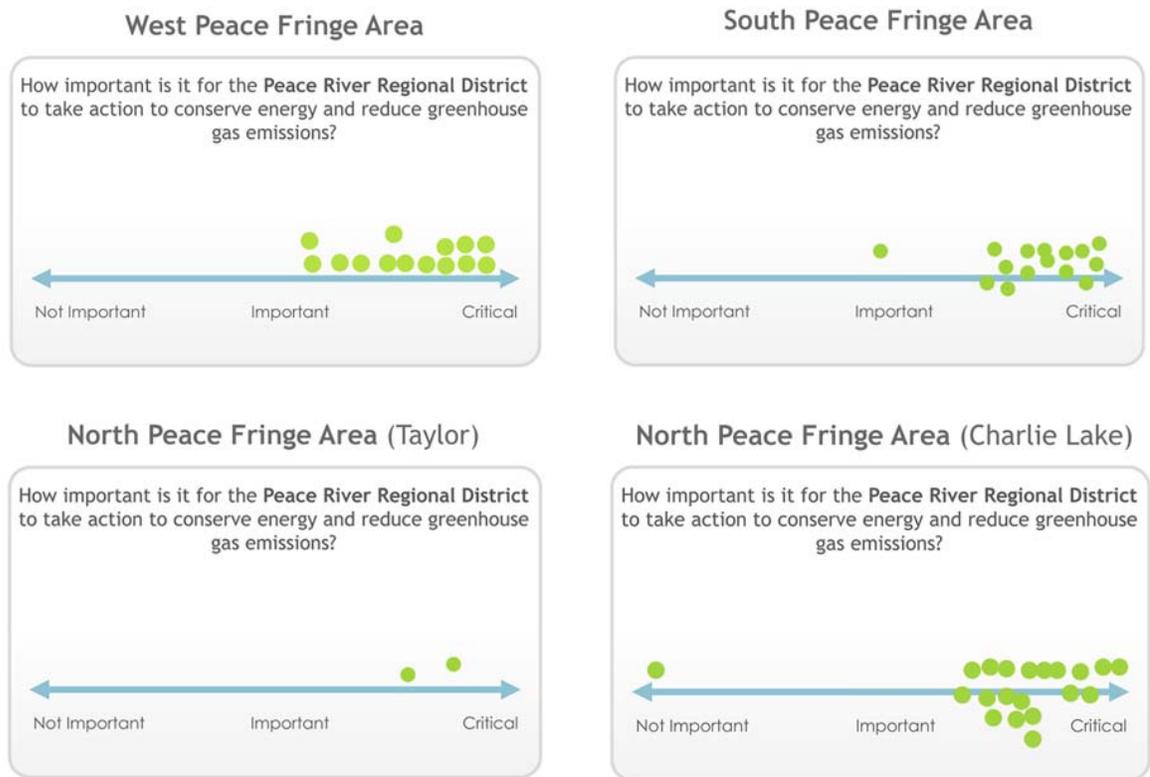


Figure 9. Input from Community Members Attending Meetings

Scenario Analysis

This section describes a scoping-level analysis of the possible results and GHG reductions from the actions defined in the plan relative to the Business As Usual forecast (described in Section 4). Four reduction scenarios were developed (one for each fringe and rural OCP area) to scope the general impact of the measures described in this action plan. This is not intended as a precise forecast, but rather an attempt to quantify “what could the future look like if these initiatives are pursued?” and “what is the GHG impact?”.

The scenarios are developed in three steps:

STEP 1: Performing a **scoping-level technical research and analysis** of the proposed measure. This involves identifying research and benchmarks of the direct impact assuming the measure is fully implemented.

For example, if a new commercial building meets LEED Gold standards, it is expected that the building will consume 40% less energy than a new commercial building that meets current building code.

STEP 2: Determining the **expected proportion of the population** or activity area (“level of uptake”) that will be impacted by implementing the measure. For the scenarios developed, we combined expected level of uptake for implementing different program types¹⁹, with knowledge of the local situation in the Peace Region, and input from the community about how aggressively they would be willing to pursue the activities to determine the expected level of uptake for each measure.

Continuing with the LEED Gold example from above, if the Regional District embarks on an education campaign with a financial incentive to encourage building to LEED Gold standards, it is assumed approximately 30% of new buildings will participate.

STEP 3: Combining the first two steps to determine the **total expected impact of the measure** and calculate an expected reduction in GHG emissions for the affected sector.

For the above example, the total expected impact would be a 12% reduction in GHG emissions from the new commercial building sector, relative to the BAU forecast.

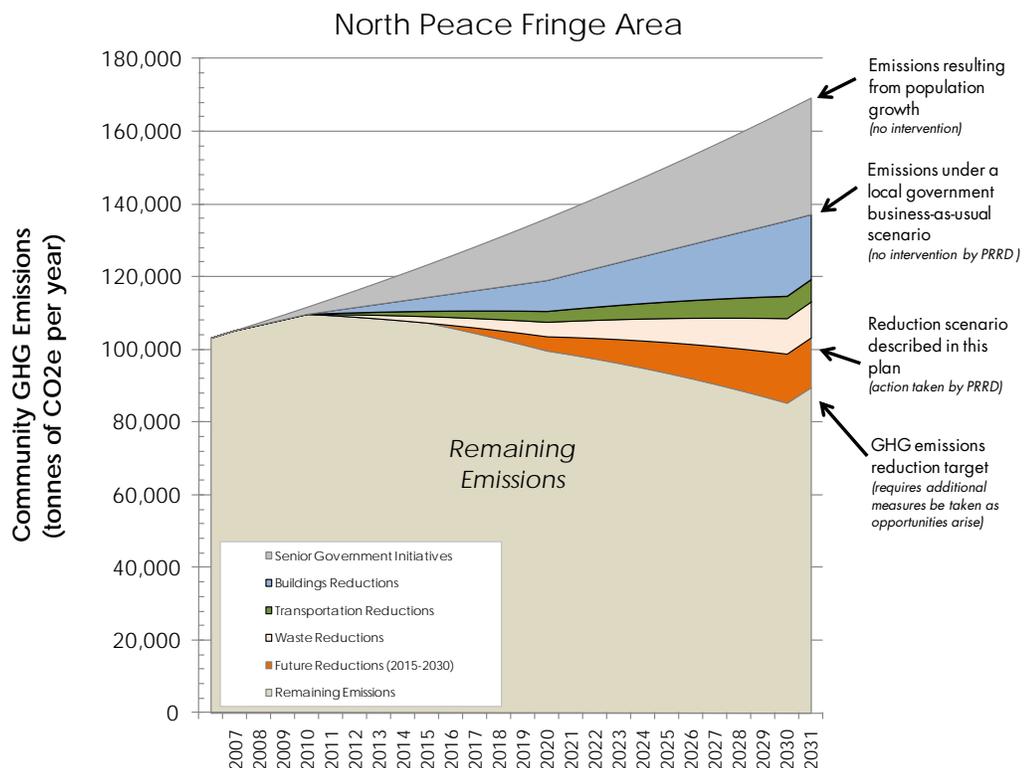
¹⁹ Research indicates that different levels of uptake are expected for the different strategies. For example, Information & Education campaigns may result in 5-10% uptake; Financing & Incentive programs may result in 20 - 50% uptake (depends on level of incentive); and Regulation is likely to lead to 90% or more uptake.

The results of the scenario analyses are outlined in Table 6 and displayed in Figure 10.

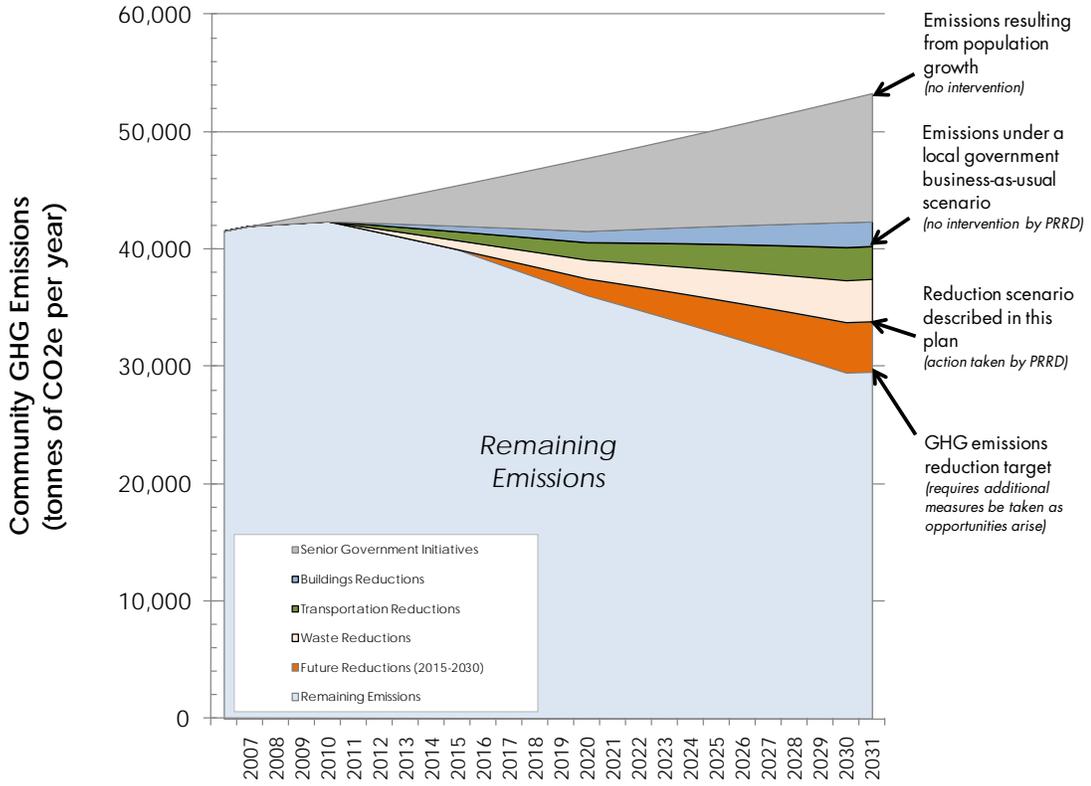
Table 6. Summary of Proposed GHG Reduction Targets by OCP Area

OCP Area	Reduce GHG emissions by 2020 (from 2007 levels)	Reduce GHG emissions by 2030 (from 2007 levels)	Reduce GHG emissions by 2050 (from 2007 levels)
North Peace Fringe Total Community Reduction	5%	15%	80%
<i>Per Capita Reduction</i>	30%	50%	--
South Peace Fringe Total Community Reduction	15%	30%	80%
<i>Per Capita Reduction</i>	25%	40%	--
West Peace Fringe Total Community Reduction	20%	40%	80%
<i>Per Capita Reduction</i>	25%	40%	--
Rural Total Community Reduction	5%	15%	80%
<i>Per Capita Reduction</i>	25%	45%	--

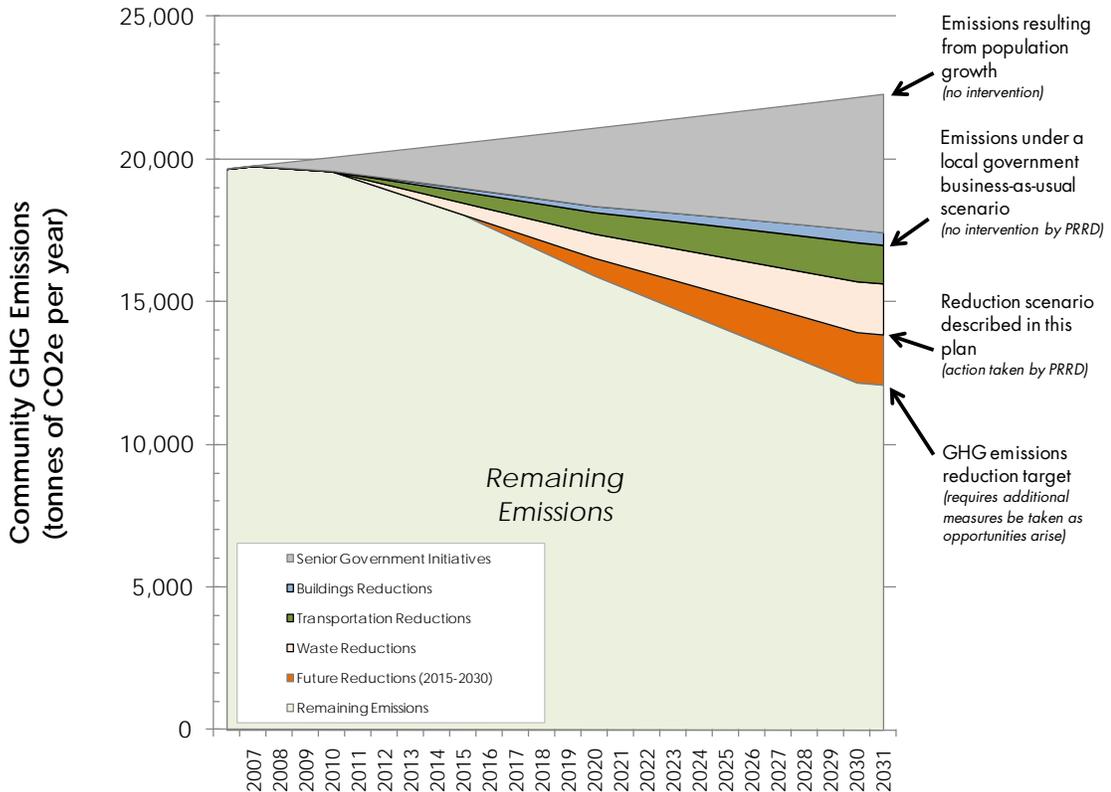
Figure 10: Reduction Scenarios and Resulting Targets for each OCP Area



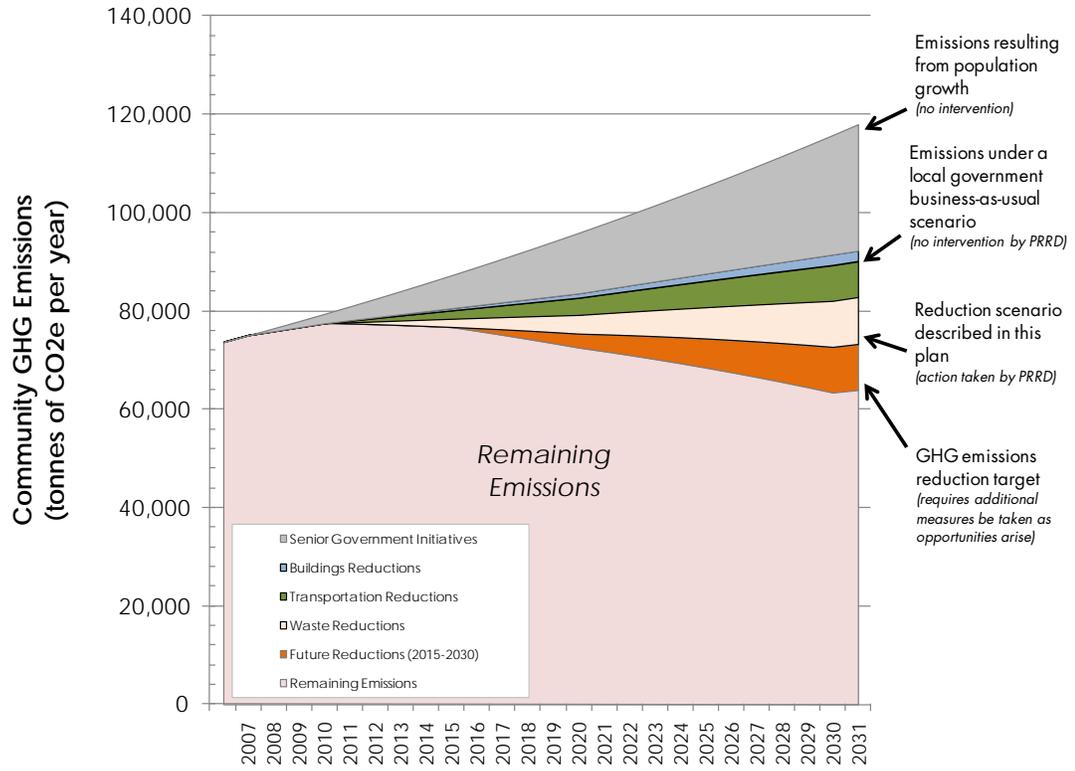
South Peace Fringe Area



West Peace Fringe Area



Rural Area



5.3 Goals for energy and GHG emissions

One goal was defined for each theme area as follows:

Buildings:

Our communities have a variety of accessible, energy efficient and comfortable buildings to live and work in.

Land Use:

Our residents live in compact rural communities with access to local amenities where agricultural and natural land is preserved.

Transportation:

Our residents use a variety of efficient and healthy transportation choices to live, work and play in our communities.

Alternative Energy:

Our communities are resilient and use a variety of reliable energy sources.

Solid Waste:

Our residents and businesses minimize waste.

6. Strategies and Actions

The area of local government management of community GHG emissions is a new activity. Traditional local government service areas (solid waste management, water, sewers, infrastructure, planning and land use) are generally within the local government's authority to address. In contrast, GHG management is only under the general 'influence' of local governments. Additionally, local governments need to understand how to bring about desired behavioural changes in community members and stakeholders (developers, homebuyers, residents, etc). Which combination of strategies (education, incentive and/or regulation) will affect change in the community, and obtain the desired GHG reduction outcomes?

A series of 18 actions that use a combination of strategies are identified to help the Regional District understand how to reach the targets and goals defined in Section 5. Actions range from one-time activities to longer-term program development activities or planning requirements which require bylaws to be enacted. These represent an excellent starting point for implementing the CEP; however, it is not an exhaustive list of opportunities. Over time, new opportunities will arise that may move the community towards its goals and targets more effectively, and may add to or even replace actions defined below.

The strategies and actions are presented according to five theme areas:

Theme 1: Buildings

Theme 2: Land use

Theme 3: Transportation

Theme 4: Alternative energy

Theme 5: Solid waste

Each theme presents a goal, a description of the current state, a list of indicators that will help with monitoring progress towards the goals, suggested targets for each of the indicators and a series of strategies and actions to help reach the goals and targets. The GHG emission reduction targets within each sector are based on the technical scenario analysis described in Section 5.2.

Communities throughout BC are beginning to take action to reduce energy consumption and mitigate climate change. Several toolkits and resources have been developed by the provincial government, non-profit organizations, and utilities to support local governments in taking action. A list of these resources, along with some potential funding sources, is compiled in Appendix D to support the Regional District in implementing the identified actions.

Theme 1: Buildings

Goal: Our communities have a variety of accessible, energy efficient and comfortable buildings to live and work in.

State: Buildings account for 26% of greenhouse gas emissions from community activities in the PRRD unincorporated areas.



Indicators & Targets:

- Indicator-1: Total GHG emissions from buildings.
 Target-1A: Reduce by 20% from 2007 levels by 2020.
 Target-1B: Reduce by 40% from 2007 levels by 2030.
- Indicator-2: Percent of new RD buildings built to LEED equivalent standards.
 Target-2: 100% by 2020.
- Indicator-3: Percent of existing homes renovated to high efficiency standards (exceeding EGH 75).
 Target-3A: 5% by 2020.
 Target-3B: 10% by 2030.

Actions:

Five actions are described with the intent of moving the community towards the buildings goal and targets by focusing on these strategies:

- **EDUCATION:** Increasing knowledge of energy efficiency opportunities and programs for buildings among community members,
- **LEADERSHIP:** Providing examples of technologies that are suitable to buildings in the region,
- **FINANCIAL INCENTIVES:** Reducing financial barriers to energy efficiency improvements,
- **PARTNERSHIPS:** Working with businesses to encourage energy efficiency in the commercial industry, and
 Working with education institutions to facilitate an increase in skilled trades in energy efficiency and renewable energy.

Strategy: Education & Leadership

Action B-1: *Develop an education campaign about energy efficient retrofits and new buildings*

Throughout consultation in the Peace region, residents continually identified the need for more education about the types of actions and technologies that are most suitable for buildings in this region, and furthermore, the need for finding local contractors that can support these technologies (installation and maintenance).

The PRRD will partner with a community organization to develop a directory of technologies and/or local contractors that can provide services for improving building efficiency and installing alternative energy systems. This directory may also include guidelines for new buildings to aspire to and energy efficiency checklists for existing buildings.

The PRRD will also engage the utility providers (Pacific Northern Gas, Terasen, and/or BC Hydro) and/or real estate organizations to distribute educational materials and information about available programs to residents.

Action B-2: Build / retrofit RD facilities to LEED equivalent standards²⁰ and promote this to the public

The PRRD will demonstrate leadership by building all RD facilities to LEED equivalent standards and encouraging other community facilities to use the same standards. After building or retrofitting RD facilities, the PRRD will promote the efficiency / alternative energy improvements with prominent information signs in the facility, on the RD's website, and in local media.

Strategy: Financing & Incentives

Action B-3: Investigate the potential to provide a regional financial incentive program to improve energy efficiency in buildings.

Undertaking energy efficiency and renewable energy upgrades can be difficult for some homeowners as these upgrades often require significant expenditures upfront, with payback gradually occurring over several years. Incentive programs can support these homeowners in achieving energy efficiency and comfort in homes, and local governments in BC are beginning to look at this option to increase the energy efficiency of buildings in their communities. The idea of incentives was generally supported by community member responses during plan development.

Local governments have the authority to provide assistance in the form of a grant, benefit, or tax exemption to residents under the *Local Government Act* and the *Community Charter*. Depending on the approach employed, the program may be available to residential buildings only, or more broadly to commercial buildings as well. The incentive program would require a stable source of funding for a set number of years to ensure objectives of improving energy efficiency and encouraging alternative energies are achieved. Funding options that can be investigated include:

- Levying an energy or climate property tax;

²⁰ There are several building rating systems with different approaches to measuring energy efficiency, including LEED, ASHRAE 90.1 and the NMECB. The LEED rating system evaluates the design and construction of buildings in a number of categories – one of which is energy consumption. Beyond a minimum requirement it does not mandate a number of 'points' to be attained in the energy category. Some policies require "LEED with a minimum number of points in the energy and atmosphere category. The NMECB was developed by the Federal Government. Ashrae is the American society for heating, refrigeration, and air conditioning and they define performance standards. The 90.1 standard is for energy efficiency.

- Securing grant funding from senior governments or utilities; and
- Setting up the program as a “carbon offset project” where measurable reductions in community carbon emissions are sold as offsets. In this case there may be potential for local governments to purchase offsets from the program in order to meet their carbon neutrality commitments under the Climate Action Charter.

Local governments have provided financial incentives to residents and businesses in BC for various purposes, including energy efficiency, water conservation, heritage conservation, and revitalization purposes. By implementing the program on a regional scale, smaller communities can have access to the program that would not individually have sufficient resources. Some examples of other incentive programs in BC include:

- Capital Regional District Water Efficient Rebate Program: Over 15 years, the CRD provided rebates to residents throughout the region for the purchase of appliances and fixtures that reduce water use.
- District of Saanich Green Home Building Rebate Program: The District will rebate building permit fees for attaining various energy efficiency standards, or for installing solar hot water systems²¹.

The PRRD will investigate the potential for implementing a regional incentive program to increase the energy efficiency of existing buildings.

Strategy: Partnerships

Action B-4: *Engage local businesses in the Climate Smart Program by becoming a Climate Smart Host*

Local businesses are often interested in taking on climate change initiatives when it is easy and means saving money. Climate Smart is a BC based enterprising non-profit organization that helps companies, governments and organizations lead the change to a local, conservation-based economy.

The PRRD will join Climate Smart as a Host Partner to help market, recruit and deliver training to the business community, suppliers, clients and franchises. This will provide an opportunity to local businesses to learn how to measure, reduce, and leverage energy savings in the marketplace.

Action B-5: *Encourage local education facilities to offer energy efficiency and renewable energy training*

The PRRD will work with Northern Lights College, municipalities and school districts to increase energy efficiency training and awareness in building design, development and trades. Examples of involvement from PRRD could include student bursaries, education travel grants, project grants, competitions, promotions, etc.

²¹ <http://www.saanich.ca/living/natural/greenrebate.html>

Theme 2: Land use

Goal: Our residents live in compact rural communities with access to local amenities where agricultural and natural land is preserved.

State: The OCP areas in the unincorporated areas of PRRD are primarily rural in nature with dispersed settlements and large lots. There are some settlement nodes that provide basic amenities.



Indicators & Targets:

Indicator-4: Percent of existing pre-zoned lots developed and occupied before considering rezoning additional areas.

Target-4: 50%

Indicator-5: Hectares of ALR land excluded from Class 1-4 & 5C land, for development²².

Target-5: 0 Ha

Actions:

Two actions are described with the intent of moving the community towards the land use goal and targets by focusing on these strategies:

- **RESEARCH:** Conducting research to facilitate more compact development in nodal areas by reducing lot sizes, and
- **REGULATION:** Investigating the use of regulatory tools of the Regional District to promote or require efficiency and alternative energy use in new developments.

Strategy: Research

Action LU-1: Research potential for reducing minimum lot sizes required by the provincial health authority

Reducing minimum lot sizes allows existing developed areas to accommodate more residents, while preserving productive agricultural land and natural areas. More compact development also increases future opportunities for provision of some local services and amenities.

New technologies for on-site sewage treatment and water infrastructure may enable smaller lot sizes in a safe, healthy manner. The Regional District is currently researching this topic, with the hopes of reducing minimum lot size from 4 acres to 2 acres.

²² The goal of this indicator is to minimize the exclusion of high quality agricultural land for development, therefore, the target a smaller number is desirable.

The PRRD will report findings to the provincial Ministry of Health and request appropriate changes to the Standard Practice Manual (SPM), a source of "standard practice" for onsite sewerage systems. If this is approved, the RD can encourage infill of those existing properties.

Developing more compact nodal settlements is supported by the OCPs, as follows:

SPFA OCP (Draft only):

- Guiding Principle 1: The South Peace Fringe Area is experiencing a period of growth and development. Directing this growth into existing communities ensures that land and infrastructure are used efficiently and that the rural character of the area is maintained.

NPFA OCP (Bylaw No. 1870, 2009):

- Goal 1.4.17: To ensure future development is managed with consideration for minimizing impacts on the natural environment.
- Goal 5.1: To recognize areas that are geographically defined as established community centres, offering a range of amenities, inclusive of community facilities and services to the surrounding area residents.
- Goal 1.4.1.5: ...emphasize preservation of highest productive agricultural land, having a CLI soil rating of 1-4 and 5C.
- Policy 1.5.2.9: To reduce sprawl and encourage compact development

WP OCP (1997):

- 5.2.D: The preferred development pattern is clustered growth which is to take place on non-agricultural land reserve dedicated areas.

Strategy: Policies & Regulation

Action LU-2: Investigate Development Permit Guidelines in the fringe OCP areas with the objective of reducing energy consumption and GHG emissions

New powers were given to local governments in BC with the "Green Communities" amendment to the *Local Government Act* (Bill 27, 2008); including the ability to designate a development permit area (DPA) for the purpose of reducing greenhouse gas emissions²³. For example, the City of Dawson Creek OCP (2009) includes a development permit system with sustainability guidelines for energy conservation and renewable energy. A range of criteria is to be applied including, but not limited to, guidelines for passive solar design, green roofs, orientation, landscaping, renewable energy generation, solar hot water readiness, and district energy readiness.

The PRRD will investigate a set of guidelines with for a DPA within residential, commercial and industrial designations in the fringe area OCPs, as these are expected to be areas with significant development in the coming years. These guidelines could address:

- Building orientation for optimal sun energy (passive solar),
- Landscaping for energy conservation,
- Exterior building design features (colours, higher windows, deep overhangs, etc),

²³ For a description of this new opportunity, refer to <http://www.toolkit.bc.ca/resource/bill-27-opportunities-and-strategies-green-action>, p.7.

- District energy readiness,
- Water conservation measures,
- An evaluation of alternative energy options, and/or
- An objective of GHG emissions reduction to be achieved in the DPA.

Theme 3: Transportation

Goal: Our residents use a variety of efficient and healthy transportation choices to live, work and play in our communities.



State: Transportation accounts for 61% of greenhouse gas emissions from community activities in the PRRD unincorporated areas.

Indicators & Targets:

Indicator-6: Total transportation emissions (from personal and commercial vehicles).
 Target-6A: Reduce by 5% from 2007 by 2020.
 Target-6B: Reduce by 15% from 2007 by 2030.

Actions:

Four actions are described with the intent of moving the community towards the transportation goal and targets by focusing on these strategies:

- **EDUCATION:** Increasing knowledge of techniques for reducing fuel consumption among community members,
- **PARTNERSHIPS:** Partnering with businesses to encourage energy efficiency in the commercial industry,
- **NON-FINANCIAL INCENTIVES:** Providing infrastructure for energy efficient transportation and lifestyles, and
- **REGULATION:** Using regulatory tools of the Regional District to reduce fuel consumption from idling.

Strategy: Education & Leadership

Action T-1: *Develop a region-wide social marketing campaign to reduce fuel consumption from driving*

Fostering a culture of efficient driving will involve leadership from the PRRD, and appropriately designed programs and awareness campaigns. The RD can demonstrate visible leadership by employing energy-efficient fleet management (including vehicle right-sizing and anti-idling policies) and promoting these to the public through the RD's website, on notice boards at RD offices and community facilities, and stickers on fleet vehicles. These activities will begin to raise awareness about fuel saving behaviours, particularly if the RD reports the fuel savings that result from these activities.

The PRRD will facilitate the development of a region-wide social marketing campaign that identifies and addresses barriers to behaviour change. Programs to support idle free zones, local shopping trends, and combined trip planning can be developed. Developing a partnership

with local non-profit organizations and schools can help with campaign implementation. Idle Free BC and Idle Free Zone are two examples of tools that help communities initiate an idle-free campaign. The provincial Ministry of Environment also has run an Idle Free Ambassador program in the past that supports local governments in hiring youth to implement idle reduction campaigns in communities throughout BC.

Strategy: Partnerships

Action T-2: *Engage local businesses in the Climate Smart Program by becoming a Climate Smart Host*

Local businesses are often interested in taking on climate change initiatives when it is easy and means saving money. As described previously in the Buildings actions, Climate Smart is a BC based enterprising non-profit organization that helps companies, governments and organizations lead the change to a local, conservation-based economy.

The PRRD will join Climate Smart as a Host Partner to help market, recruit and deliver training to the business community, suppliers, clients and franchises. This will provide an opportunity to local businesses to learn how to measure, reduce, and leverage energy savings in the marketplace.

Strategy: Financing & Incentives

Action T-3: *Install pedestrian and cycling infrastructure to encourage non-motorized transportation*

Safety and accessibility are key considerations when deciding whether to use active transportation. *The PRRD will encourage residents to choose non-motorized transportation options (walking, cycling, using electric scooters, etc) by installing infrastructure that improves safety and accessibility for these modes where feasible. Infrastructure improvements may include: sidewalks and safe crossings, separated paths and cycling lanes, and enhanced cycling signage. Developing year-round maintenance of recreational and commuter trails, including snow removal of sidewalks, with appropriate amenities (way-finding, benches, and bike racks) will create an attractive environment for non-motorized transportation.*

Strategy: Policies & Regulation

Action T-4: *Develop a model bylaw for idling reduction and encourage all municipalities in the Regional District to adopt it*

After a region-wide campaign to reduce vehicle emissions is well established (see T-1), the PRRD will work with member municipalities to develop a model bylaw that prohibits idling (with appropriate allowances for safety in cold weather). This would be most effective if implemented across the region (i.e. in every member municipality), and after rolling out the public education campaign and developing partnerships with businesses. Each local government should dedicate some bylaw enforcement and education resources to ensure the bylaw is upheld. Several communities in BC have developed bylaws for anti-idling.²⁴

²⁴ See <http://www.idlefreebc.ca> for a list of communities with bylaws.

Theme 4: Alternative energy



Goal: Our communities are resilient and use a variety of reliable energy sources.

State: Our communities currently rely on electricity from BC Hydro (primarily hydro-electric), heating from natural gas, wood, propane and heating oil. Some residents have installed geo-exchange systems.

Indicators & Targets:

Indicator-7: Percent of energy consumed in buildings derived from alternative energy sources.

Target-7: 10% by 2030.

Indicator-8: Number of alternative energy systems installed (e.g. solar roofs, geo-exchange, small wind).

Target-8: 500 systems by 2030.

Indicator-9: Number of projects built that capture waste industrial heat.

Target-9: 4 projects by 2030.

Actions:

Five actions are described with the intent of moving the community towards the alternative energy goal and targets by focusing on these strategies:

- **RESEARCH:** Conducting research to identify opportunities for local energy sources, including capturing waste heat,
- **LEADERSHIP:** Working to develop an assured legacy from energy and resource development,
- **EDUCATION:** Providing an example of technologies that are suitable to buildings in the region and sharing lessons learned with the community, and
- **REGULATION:** Using regulatory tools of the Regional District to promote alternative energy.

Strategy: Research

Action AE-1: Conduct an opportunity assessment for district energy in Charlie Lake in conjunction with development of the neighbourhood concept plan

The Charlie Lake area is experiencing significant growth, and this is expected to continue. The Regional District plans to develop a neighbourhood concept plan (NCP) for the area. The concept plan will be a process under the more general North Peace Fringe Area Plan framework. An NCP is at a finer scale and establishes the concepts for form and character, water and sewer servicing for a designated area. It also establishes amenities such as schools,

parks, and the location of commercial areas. This is an excellent opportunity to evaluate the potential for a district energy system for the neighbourhood. Depending on the location of certain amenities such as schools, civic buildings, and commercial development, a district energy system could play an important role as the community develops.

The PRRD will include an opportunity assessment for district energy in Charlie Lake in conjunction with the development of the NCP. Where opportunities arise in other fringe areas to develop a neighbourhood concept plan, the PRRD will include an opportunity assessment for district energy in those areas as well.

Action AE-2: Conduct an opportunity assessment for using waste industrial heat sources

With significant industrial activity being undertaken in the Peace region, there is also an opportunity to capture waste heat from these activities. In 2008, an evaluation of opportunities to recover energy and water from industrial and community waste streams for the municipality of Quesnel, BC. One year later, the City received a grant to fund a community electricity and heating system that was the top recommendation in the initial assessment.

The PRRD, in coordination with member municipalities, will conduct an opportunity assessment to capture waste heat and energy throughout the Peace region.

Strategy: Education & Leadership

Action AE-3: Develop a regional community legacy project from energy and resource development

The Peace region contains abundant energy resources that have led to rapid economic and population growth in parts of the region. However, many rural residents are concerned that the economic benefits of natural gas extraction primarily leave the region, but the impacts are felt in their backyards.

To ensure the community retains long-term benefits from this activity, *the PRRD will work with member municipalities, provincial ministries and industries to develop an assured legacy from energy and resource development. The Columbia Basin Trust is one example of such a legacy project, with a mission to “support efforts by the people of the Basin to create a legacy of social, economic and environmental well-being and to achieve greater self-sufficiency for present and future generations”*.²⁵

²⁵ <http://www.cbt.org>

Action AE-4: *Develop an alternative energy pilot project and promote this to the public*

There are many opportunities for harnessing alternative energy throughout the Peace region. Opportunities include heat recovery from waste sources (e.g. industrial), heat and electricity generation from wind, biomass, geothermal and solar, and distribution through district energy systems. *The PRRD can take a leadership role by leading a pilot project on a local government facility or in partnership with a community organization to demonstrate that alternative energy systems are feasible in the region. These projects can act as catalyst for local economic development, fostering trust in new technologies and ways of doing business.*

An example of an alternative energy demonstration project is the City of Grande Prairie's Micro-Wind Pilot Project. A small residential-sized turbine will generate 800 to 1,200 kW hours of energy per month during peak conditions. This project will demonstrate that while installation costs may seem high (\$28,000), a payback period in electricity savings would be about 8 to 13 years for the average Grande Prairie house.



Figure 11. Micro-Wind Pilot Project in Grande Prairie, AB

Source: Golden Sheep Manufacturing Inc.

Policies & Regulation

Action AE-5: *Develop a model bylaw that defines allowances for alternative energy systems and encourage municipalities to adopt it*

Bylaws that explicitly allow alternative energy can reduce unnecessary barriers to building these systems. These bylaws allow the local government to define appropriate size, scale, setbacks, development standards, zoning etc for the systems. Several municipalities in Alberta have undertaken efforts to define "wind ready" land use bylaws, including Cardston, AB. In the Cardston bylaw "Wind Energy Systems" are defined and split into two categories (Type A and B). For each land use type, the appropriate wind system category is defined as a Discretionary Land Use.²⁶ The Village of Pouce Coupe recently incorporated a "Sustainable Design" section into its Zoning Bylaw (section 1.30) that addresses energy-related issues such as siting, landscaping, water conservation, etc. and these may also be incorporated into a model bylaw.

The PRRD will develop a model bylaw that defines allowances for these systems in the context of the Peace region. Each municipality can then modify the bylaw as necessary.

²⁶ http://www.town.cardston.ab.ca/_data/docs/CardstonTownLUB1581July2009maps.pdf

Theme 5: Solid waste



Goal: Our residents and businesses minimize waste.

State: Solid waste accounts for 13% of GHG emissions from community activities in the PRRD unincorporated areas. In 2007, over 71,000 tonnes of waste was disposed at PRRD landfills.

Indicators & Targets:

Indicator-10: Tonnes of CO₂ equivalent GHG emissions from solid waste disposed.
 Target-10: 35,000 tonnes less GHG emissions by end of RSWMP Phase 2 (expected to be 2014).

Actions:

Two actions are described with the intent of moving the community towards the solid waste goal and target by focusing on these strategies:

- **POLICY:** Working in partnership with member municipalities to implement the Regional Solid Waste Management Plan, and
- **RESEARCH:** Identifying opportunities for capturing GHG emissions that result from decomposing waste in landfills.

Strategy: Policies & Regulation

Action SW-1: Continue to implement the Regional Solid Waste Management Plan

The Regional District developed and adopted a Regional Solid Waste Management Plan (RSWMP) in 2008. Key objectives of the RSWMP also support the Community Energy Plan goals to minimize waste and reduce greenhouse gas emissions. These objectives include:

Phase	RSWMP Objectives
1 (first 2 yrs)	1: Establish a baseline set of practices with respect to the existing waste management system. 2: Establish levels of service for both rural and urban areas of the region, supported through the transfer station and landfill network. 3: Establish a policy platform or foundation for changes in later phases. 4: Support and/or expand existing programs and services, including education and awareness-building. 5: Enhance product stewardship program access. 6: Initiate greater outreach to and partnership with the ICI (Industrial, Commercial, Institutional) and agricultural sector stakeholders.
2 (3 to 5 yrs)	1: Increase reuse and recycling opportunities for residents. 2: Focus on the business and construction/demolition sectors. 3: Address landfill and transfer station capacity needs.

Phase	RSWMP Objectives
3 (5 to 10 yrs)	1: Continue to improve existing programs and waste management system infrastructure. 2: Investigate long-term waste management facility options.

The PRRD will continue to implement the RSWMP and will work with member municipalities to support implementation in those communities.

Strategy: Research

Action SW-2: *Conduct a feasibility study to build a landfill gas capture system at Bessborough, Dawson Creek and Fort St John landfills and sell offset credits*

The provincial Landfill Gas Management Regulation (2008) requires all landfills with more than 100,000 tonnes of waste in place, or annual disposal of at least 10,000 tonnes to install a gas capture system by 2016. Landfills that meet these requirements may install gas capture systems earlier and claim offset credits for all operational years until 2016. For smaller landfills, offset credits may continue to be claimed after 2016 until the landfill reaches a size where the regulation applies.

The PRRD will investigate the potential to build a landfill gas capture system at the Bessborough, Dawson Creek and Fort St John landfills.

7. Implementation

The Regional District will need to dedicate staff time and annual funding to support the implementation of this plan and help the communities reach the identified Goals and Targets. It will also be important to build partnerships with community organizations, businesses and industry to implement programs and activities throughout the community. During implementation of the plan, the PRRD should continually monitor, report and review progress on these activities so that they can be adjusted as necessary to improve the outcomes.

7.1 Prioritizing actions

An initial set of actions that employ various strategies (education, leadership, incentives, partnerships, policy and regulation) have been identified to begin implementation of this CEP. Over time, actions may become more or less relevant with changing conditions, such as new technologies, availability of funding, development of new partnerships, council priorities etc. Therefore, actions will need to be re-evaluated on an annual basis and re-prioritized in an opportunistic manner.

As a starting point, each action is categorized by expected duration of the activity and by the recommended time line for initiating the action, as shown in Table 7. The duration of activity provides an approximation of the time span for implementing the activity, though staff may only need to be engaged at key points during that time (for example, if a consulting study is undertaken, or if a partner is carrying out some or all of the duties). The time line for initiation indicates the recommended year for beginning the action between one and five years. Two activities are currently underway (LU-1 and SW-1), and four have been identified for initiation in year one: B-1 – building education campaign, B-3 – regional financial incentive program, T-1 – transportation social marketing campaign, and SW-2 – feasibility study for landfill gas capture. The latter action is a priority because the PRRD may be able to generate carbon offsets for landfill gas captured prior to legislation coming into force (2016). The majority of actions should be initiated in the two to three year phase of implementation, and two longer-term projects are identified for the four to five year phase of implementation.

Table 7. Timeline for implementing actions

Action	Duration of activity	Time line for initiation
B-1: Develop an education campaign about energy efficient retrofits and new buildings	Ongoing	1
B-2: Build / retrofit RD facilities to LEED equivalent standards and promote this to the public	As needed	As needed
B-3: Investigate the potential to provide a regional financial incentive program to improve energy efficiency in buildings.	1 year	1
B-4: Engage local businesses in the Climate Smart Program by becoming a Climate Smart Host	2 years	2-3
B-5: Encourage local education facilities to offer energy efficiency and renewable energy training	1 year	2-3
LU-1: Research potential for reducing minimum lot sizes required by the provincial health authority	1 year	Current
LU-2: Investigate Development Permit Guidelines in the fringe OCP areas with the objective of reducing energy consumption and GHG emissions	6 months	2-3
T-1: Develop a region-wide social marketing campaign to reduce fuel consumption from driving	2 years	1
T-2: Engage local businesses in the Climate Smart Program by becoming a Climate Smart Host	2 years	2-3
T-3: Install pedestrian and cycling infrastructure to encourage non-motorized transportation	Ongoing	4-5
T-4: Develop a model bylaw for idling reduction and encourage all municipalities in the Regional District to adopt it	6 months	2-3
AE-1: Conduct an opportunity assessment for district energy in Charlie Lake in conjunction with development of the concept plan	6 months	2-3
AE-2: Conduct an opportunity assessment for using waste industrial heat sources	6 months	2-3
AE-3: Develop a regional community legacy project from energy and resource development	3 years	4-5
AE-4: Develop an alternative energy pilot project and promote this to the public	1 year	2-3
AE-5: Develop a model bylaw that defines allowances for alternative energy systems and encourage municipalities to adopt it	6 months	2-3
SW-1: Continue to implement the Regional Solid Waste Management Plan (RSWMP)	Ongoing	Current
SW-2: Conduct a feasibility study to build a landfill gas capture system at Bessborough, Dawson Creek and Fort St John landfills and sell offset credits	6 months	1

7.2 Personnel requirements

Dedicated staff time will be required to prioritize, initiate, carry out and monitor the plan's activities. It is recommended that a staff member be designated as the "Energy Program Coordinator". This person would be responsible for working with staff from each department to initiate activities and ensure that the annual work plan is progressing. The champion may also seek out funding and key partnerships for larger, longer-term activities. A sample break-down of responsibilities for the program coordinator and other staff are listed in Table 8.

Table 8: Examples of Program Coordinator and Staff Responsibilities for Implementation

Typical Responsibilities of Program Coordinator	Typical Responsibilities of Other Department Staff
Establish annual work plan (in consultation with representatives on the Peace Region Climate Action Task Group to align activities regionally)	Implement education campaigns, planning and other programs that are consistent with this plan
Develop or oversee development of internal awareness programs	Budget to participate and implement identified improvements
Publicize activities to staff through internal communications and to the broader community	Monitor and report on activities
Define data collection requirements for monitoring; Oversee collection and reporting on data	Act as ambassadors in the community regarding energy and GHG emission reductions
Make contact with other partners to promote the plan and find areas for local government involvement	
Apply for funding through various provincial and federal programs to meet the plan objectives	
Promote energy awareness in the community	

7.3 Funding commitment

Plan implementation also requires a commitment of sufficient funds for disbursements, such as planning studies, legal services, and consultant fees, in addition to dedicated staff time discussed above. Several external funding sources exist that the Regional District may pursue to share some of these costs. Appendix D provides a list of selected funding opportunities for implementing CEPs.

7.4 Monitor, report, re-evaluate

By applying an adaptive management approach to plan implementation, it is important to monitor changes in energy use and greenhouse gas emissions over time to gauge the effectiveness of activities being undertaken. To accomplish this, a monitoring program needs to be developed that tracks specific indicators of progress. Proposed outcome indicators for this plan are outlined in section 6 and summarized in Table 9. Suggested data sources are also described, including several indicators that the PRRD would need to start tracking internally (for

example, at time of issuing building and development permits, with provision of incentives, or through a survey with property tax collection).

In addition to the outcome targets identified in the previous section, two additional targets are recommended to help with monitoring performance of implementation of this plan. These are included in the table (see indicators 11 and 12).

Table 9. Summary of Indicators for Monitoring Plan Implementation

Outcome Indicator	Data Source	Target
1. Total GHG emissions from buildings (residential, commercial and small/medium industrial).	CEEI updates (to be provided by MOE every 2 years 2010 and beyond)	Reduce by 20% from 2007 levels by 2020
		Reduce by 40% from 2007 levels by 2020
2. Percent of new RD buildings built to LEED equivalent standards.	PRRD records	100% by 2020
3. Percent of existing homes renovated to high efficiency standards (exceeding EGH 75).	Currently not tracked. PRRD will need to track this at time of issuing building permits, OR with provision of incentives if a program is developed, OR in a survey as part of property tax collection process	5% by 2020
		10% by 2030
4. Percent of existing pre-zoned lots developed and occupied before considering rezoning additional areas.	Currently not tracked. PRRD will need to track this through issuance of development permits and re-zoning application process	50%
5. Hectares of ALR land excluded from Class 1-4 & 5C land, for development	PRRD can track through ALR exclusion application process	0 Ha
6. Total transportation emissions (from personal and commercial vehicles).	CEEI updates (to be provided by MOE every 2 years 2010 and beyond)	Reduce by 5% from 2007 by 2020
		Reduce by 15% from 2007 by 2030
7. Percent of energy consumed in buildings derived from alternative energy sources.	Unknown at this time.	10% by 2030
8. Number of alternative energy systems installed (e.g. solar roofs, geo-exchange, small wind).	Currently not tracked. PRRD will need to track this at time of issuing building permits, OR with provision of incentives if a program is developed, OR in a survey as part of property tax collection process	500 systems by 2030
9. Number of projects that capture waste industrial heat.	PRRD to track this at time of issuing applicable permits AND through survey of member municipalities	4 by 2030
10. Tonnes of CO ₂ equivalent GHG emissions from solid waste disposed.	PRRD to track through RSWMP implementation	35,000 tonnes less GHG emissions by end of RSWMP Phase 2

Implementation Indicator	Data Source	Target
11. Number of education presentations or events conducted on energy conservation and/or GHG emissions reduction.	PRRD Energy Program Coordinator to track this during plan implementation process – may include promotions executed by a partner agency	To be determined upon design of education program (for example, 4 events or presentations per year for 5 years)
12. Number of partners engaged in plan implementation.	PRRD Energy Program Coordinator to track this during plan implementation process	All member municipalities, and at least one from each of these sectors by 2015: secondary education, post-secondary education, non-profit organization, business, industry

As implementation progresses, the list of actions will be re-evaluated and modified to ensure the community is moving towards the Goals and Targets. Corrective action may need to be taken if indicators show the community is not progressing towards the goals and targets.

A: Community Survey

There were 77 responses from residents to the community energy plan survey. The survey questions and responses are included below.

Community Action: Individuals and Organizations

Question 1: As individuals and organizations there are many actions we can take to reduce energy consumption and GHG emissions. Please review the list of actions and fill in the check boxes as appropriate.

Actions	I'm already doing this!	I'm willing to do this on my own	I'm willing to do this with support	I'm not willing to do this	Not applicable/ possible
Make energy efficiency improvements to your home or office	65%	11%	21%	0%	3%
Turn down the temperature in your home or office	76%	8%	0%	8%	8%
Install programmable thermostat at home/work	26%	24%	15%	10%	25%
Replace your furnace	33%	6%	33%	9%	20%
Replace your boiler	3%	3%	8%	2%	85%
Have an energy assessment	9%	2%	22%	8%	60%
Set your water	51%	32%	4%	9%	4%
Install solar panels	3%	13%	60%	15%	9%
Wash your clothes	62%	11%	3%	22%	3%
Install low flow	59%	15%	15%	10%	0%
Turn off your car	72%	20%	2%	6%	0%
Scrap your old car	32%	4%	15%	35%	13%
Telecommute to work	18%	0%	0%	11%	71%
Schedule or perform	88%	9%	1%	0%	1%
Grow some of your own food	76%	15%	3%	1%	4%
Compost organic wastes	64%	19%	7%	5%	5%
Reuse products wherever possible	90%	8%	1%	0%	0%
Buy good quality, long lasting	86%	12%	1%	0%	1%
Buy products with minimal	67%	30%	3%	0%	0%
Buy local	73%	20%	4%	0%	3%

Community Action: Local Government

Question 2: The Community Energy Plans will outline measures that local governments in the Peace can implement, either individually, collectively, or in partnership with other agencies to reduce energy use and GHG emissions. What types of activities do you think your local government should focus on in order to reduce energy consumption and GHG emissions?

We do not have enough information and knowledge about the workings of our local government (Pouce Coupe) to make an informed comment.
Education - more info on Geothermal, other housing options (strawbale, etc), info on other forms of renewable energy sources (solar, wind, etc).
Eliminate flaring in oil patch Find an alternative to site c dam possibility
Government incentive (provincial + federal) for geothermal, wind + solar power on private properties for personal use. (Tax incentives, rebates)
Schools - education and practical hands on opportunity Water Conservation - particularly those who use publically treated water Block heater timers for winter - potential subsidy? Or at least promotion - Efficient / active transportation corridors - like a bike trail from Charlie Lake to FSJ and expansion of current active transportation routes - they will be used.
Invest in alternate energy (solar, wind, geothermal) and subsidize individuals and businesses to help retrofit their homes and businesses.
Cut out any flaring at well sites
Encourage and support off the grid energy producing projects. Recycling facilities in rural communities
Where does our community's energy come from? - should come from alternative energy sources as much as possible Try to make it easier to get inspections - encourage inspections at all commercial buildings. Encourages or give incentives for alternative energy.
Use more but smaller efficient shuttle buses Private transportation is a huge energy user. Programs are required to encourage public transit, to make the routes more user friendly and responsive to user needs. - shuttle bus back and forth between Charlie Lake - FSJ - Taylor - internet interaction from transportation needs - make a website people can log in to, to modify routes and schedules "interactive"
Wind/solar in resident applications
Subsidize in whole or part individual energy saving innovations
Eliminate flaring at leases and plants. Reinvest in rail for transport of goods
Implement regular curbside pick up (more people recycle if they don't have to put so much effort into it. Subsidize solar hot water heaters installation or offer an incentive such as lower taxes to a household that implements alternative energy practices
Put sand on roads and not gravel. Will save tons of glass
Need to help with financial support to make changes. We are charged a carbon tax we do need to have fuel for farming, to get to town. We should be compensated for carbon excess that our land produces - trees and vegetation
House is very old and is to be torn down when the new house is built
Less reliance on natural gas for heating
Get the industrial plants under control. Reduce trucking - quit using air travel for government business. How much energy is wasted by this constant flaring by Spectra, etc. in Taylor?
Maximize use of solar/wind/geothermal where cost benefit shows it to be of value in redrawing total costs, including capital and operating, over the life of the project.
As far as packaging is concerned, I am constantly infuriated about how hard it is to get (buy) anything that isn't inside hard plastic bubbles which are very hard to open. I tried writing to Revlon cosmetics once but didn't even get a response. Something should be done in my opinion.
Build renewable energy facilities
Pursue alternative energy sources
Heat & light reduction in homes and workplace
Energy efficiency of new buildings - complete with landscaping that benefits environment i.e. wind breaks (helps with

heat loss and provides shade in summer & mitigates GHG emissions). Focus on local government , local regional provincial buildings 1st - set examples. Do not focus on subsidies for those individuals / businesses who have done nothing to date - recognize those who have already shown good practices and paid for them on their own

Question 3: Please provide any further comments about the Community Energy Plans.

The community needs natural gas
Maybe incentives for people to make their homes more efficient
Continue rebates for homeowners to upgrade to energy efficient furnaces, etc.
These questions in the survey seem contradictory: re-use products and scrap old car. Encouraging people to buy new cars will be good for the economy but the overall GHG emissions are greatly increased by buying new vehicles in most cases. It is better to encourage people to get all the practical usability they can out of a vehicle and then help them make efficient, good quality, lasting product once a replacement is necessary.
Funds could be made available if BC Hydro instead of building dams (Site C) would invest our taxpayer's money in helping with this retrofitting to greener energy, and quit using their pockets and [] people. A dam is nothing but a bank for Hydro and a destroyer of the environment
I do all I can such as shutting off lights and drying clothes outside when possible. Never leave the car running.
No Site C.
One of our biggest needs is natural gas
Need proven technologies for this area
The carbon tax goes into general revenue. This is not leadership, just a tax grab - negative. Taxing to reduce activities that are harmful to people or the environment is only acceptable if the same taxes encourage, promote and subsidize the positive activities that heal or help people and the environment.
No carbon tax. Solar farms, wind farms Solar Wind & Geothermal rebates Wood burning stove
There is no real community here, just scattered farms and businesses - no local recycling. No help to install solar or other forms of energy.
Would like to see stores replace Styrofoam with something we could recycle
Need agriculture plastic recycling or stockpiling to reduce the temperature to reduce it.
I would like to see the recycling depot start taking glass again___ too much glass is needlessly entering our landfill sites.
While I appreciate the suggestion to select products that contain a minimal amount of packaging, I do have to question why the onus is placed on the consumer rather than the manufacturer. Surely more responsibility can be placed on those who can make a far greater impact; the manufacturer. Ban Styrofoam and plastic grocery bags
We are on a fixed income. These changes should have been done 4-5 years ago. Due to economic down turn in the beef prices, we can't afford these changes that need to be done
Building a new house. Ship is done heating a 24x28 shop using only about 1000 W of power at about 15 degrees Celsius.
Good to have one!
Not aware of what plans they have at the present time
Put our dump back so we don't have to haul garbage 50 miles or more. That wastes energy.
A lot of this may not apply as we're both retired seniors
Taxes to all should not be increased as those demonstrating good practices (and paying for them) are charged for those who do not - and do not intend to show good practices or commitment to energy savings. Hopefully focus will be placed on O&G industry for their excessive use of energy and excessive GHG emissions along with harmful pollutants - mitigation should be part and parcel of every individual agreement for land use - temporary or more permanent on a site specific - use specific case! DO not focus on wind energy (small for farm/ranch? cost prohibitive! - being a solution for public - public benefit? Public pays for it! Why single out farms and ranches? How about explore opportunities for every house in DC?

B: Stakeholder Interviews

Each stakeholder interview consisted of five questions as follows:

1. What are some opportunities and challenges for reducing GHG emissions in the Peace region?
2. What are some potential strategies for the Community Energy Plans for each of the following categories?
 - a. Transportation and equipment
 - b. Buildings and infrastructure
 - c. New development
 - d. Solid waste
 - e. Energy supply
 - f. Other
3. What can the Regional District / municipality do to support the community in reducing energy consumption and/or GHG emissions?
4. Can you identify any potential partners for implementation of the CEPs?
5. Do you have any other comments?

The answers have been compiled into a list of opportunities by sector:

Transportation & Equipment
More development closer to town centres in Taylor, PC, Chetwynd could make towns more walkable
PC - many residents commute to DC - any opportunity for shuttles?
Work with big companies to right-size fleet and reduce idling. Many workers in region expense all fuel costs and don't "care" about conserving - no direct incentives to do so.
Anything possible with reducing emissions from huge commercial trucks? Major part of transportation.
Trip combination, car pooling, trip reduction
Buildings & Infrastructure
Need council-level decision to proceed with alternative energy projects (mostly for corporate) - especially for large facilities to change marketplace
Increase awareness / understanding of benefits of geothermal with builders and developers - currently only reactively including these systems
Increase training of qualified trades people in alternative energy installation
If implementing residential program - market & sell to realtors
Real estate buyers not aware of alternative energy systems, but realtors are - perhaps a campaign to raise more awareness of the options
Taylor: a lot of old homes, many mobile homes, some very efficient. Government needs to provide incentive programs to help people (esp lower income) upgrade the efficiency of homes. E.g. new furnaces; windows; adding peaked roof with R-40 insulation; possibly poly-sio insulation membrane on flat roofs (like commercial bldgs, but use on mobile

homes).
Incentive programs to build above building code standards for efficiency - e.g. solar situation; higher insulation; solar hot water heating systems; 3-pane windows...
Energy audit program for agricultural operations - check into program run in Chilliwack with BC Hydro
Set up development fund to implement components of the LiveSmart program: the building assessment component, cited the Get Green program in Dawson Creek as a positive example of this
Homes / buildings typically need improved insulation before alternative energy supply gets installed. So first priority should be improving efficiency.
New Development
Set up designated "geothermal" area in muni where all new development must use geothermal system (e.g. restrictive covenants)
Looking at Revitalization Tax Exemption in Tumbler Ridge - have funding, but nothing yet
Really need criteria, need to know how/what to measure, need guidance, toolkits very helpful
Taylor, PC, Chet all quite spread out, but have opportunity for more development closer to town centre to create more walkable towns
Northern Lights College program builds a new house every year that gets put on the market - opportunity to showcase green technologies
Taylor: muni needs to remove obstacles and start encouraging new businesses to set up in core. E.g. could use a bank. Residential devt closer to core could happen too.
Property tax reduction for energy efficient building / sustainable building - especially b/c materials for these houses cost more, so would be nice to have taxes on "even playing ground"
Program with a local bank to have reduced interest rates on mortgages for energy efficient homes
Solid Waste
Capture of landfill gas; investigate potential for portable unit for pyrolysis to generate electricity and feed into grid?
Opportunity (?) to divert cattle waste to generate energy from SRM = Specified Risk Materials that now go to Bessborough Landfill. SRMs are parts of the animal that may contain BSE protein and cannot ever enter food stream.
Energy Supply
Reduce barriers to applications for wind turbines - bring in bylaw (amend zoning bylaw?) to enable wind in appropriate sizes, locations, forms etc. Can work with non-profit (e.g. Canadian Wind Energy Association) or private firm to help develop this.
Improve incentives for passive solar and micro-gen wind turbines for residential applications. BC currently provides up to 50% rebate for micro-gen installation (???what program is this??? - apparently Ontario has even better program - http://news.ontario.ca/mei/en/2009/09/green-energy-for-ontario-communities.html). Solar can get some rebates through Federal ecoEnergy program.
Very strong ethic for self-sufficiency - work with this to encourage more alternative energy development / installation.
Passive solar opportunities are excellent for individual / small operations - direct heating of air, water, ... - smaller initial investment, opportunity to expand over time. Incentives help!
Pyrolysis excellent developing technology - wood/pulp waste from mills; muni solid waste; agric waste. Anaerobic, efficient, end result is high quality fertilizer product. Can get portable units that can be shared by a region and moved to from landfill to landfill etc. Potential to investigate further for PRRD and member munis?
Some (low level) interest from ranchers to invest in mid-size wind to feed back into grid. Uncertainty over set-up costs, sourcing, pay-back.
Install alternative energy backup systems. E.g. in Dawson Creek, currently working to get wind/solar backup system installed on fire hall for 911 emergency backup. While not needed, feeds into grid; also kicks in to supply power when grid is down. (Taylor expressed interest in this?)
Moberley Lake pilot project for solar hot water (not sure of details...could call back to ask for more)
Small wind may not be that viable b/c a lot of turbulence in wind - payback may not be as good. Larger projects okay in right places.

Cost is biggest barrier to individuals installing alternative energy systems - more grants would help; also education needed.
Peace Energy Cooperative is considering developing Renewable Energy Packages for homeowners - i.e. kits to simplify installation of solar; maybe wind too.
Municipalities can ensure bylaws are in place for: appropriate placement / guidelines for wind turbines, solar panels, etc.
Definite interest and awareness, however, upfront capital cost is huge barrier
Generally not supportive of large-scale wind projects if they are in proximity to ranching operations and residences (e.g. Bear Mountain project). High level of impact / disruption on residents and on animals from: Noise, Lights, and Increased traffic.
Huge concern that cereal straws and fescue straw will be used for energy production – these are currently used as bedding and supplementary livestock feed. If new market develops for these straws and drives up prices, it would have a direct impact on ability of ranchers to continue operating. Conversion of some fields to canola production for biofuels is already reducing availability of these straws to cattle industry. These straws are sometimes also used as soil conditioners, by grain producers to improve soil quality, which would be lost.
Education
More education needed, needs to be enforced, collective presence is required to put solutions forward
Taylor: involve residents more in discussions about where the town should go - surveys, input sessions, etc.
Wind turbine applications - set up pilot projects to demonstrate that they are feasible, not too noisy, etc. when done properly (understand when / where appropriate to use). Can be done in cities too.
Education must be presented in positive ways; negative is not effective, incentives presented rather than regulations
More connections need to be made with energy use and the climate change implications, lack of understanding of the linkages
Municipalities need to take lead in education & promotion - through demonstration projects; workshops; leadership
Need to get alternative energy technologies into curriculum for engineers and architects who are designing and developing buildings in the region. (Note: Northern Lights College has good programs - or are developing them - for training installation of these systems)
Centennial Green project in Dawson Creek - may become a resource for energy efficiency / alternative energy for region...being developed now with Peace Energy Cooperative & City.
Partnerships
Chamber of Commerce(s) very supportive of NEAT (Northern Environmental Action Team)
Work with industry to develop partnerships
Need to identify champions within each community (preferably not muni staff) to take leadership and work with muni to promote the issue / opportunities
Other
Ranchers are concerned that government will require them to further reduce emissions or pay a penalty if unable to do so. Ranchers already do as much as possible to conserve energy to reduce operating costs, as they are barely scraping by and this is a necessity.
Ranchers already practice carbon sequestration techniques, but no credit is given to these practices. E.g. no or low-till practices; manure put back into soil
Have always supplied local food system – good connections to local farmer's market; have local abattoir

C: Renewable Energy Opportunities

The potential for developing renewable energy resources in the Peace River area is discussed by energy source:

Solar thermal

The Peace River region has a very good solar resource, one of the best in BC. Solar thermal is the use of solar energy for hot water and space heating. While this is the most cost effective use of solar energy, it is still a fairly long payback in most cases. The best applications for solar thermal are those that have a consistent year round heating requirement and relatively low temperature requirements. The best application is usually for heating swimming pools, while buildings with large water heating loads (e.g. hotels or hospitals) are also potential candidates. In residential applications it is usually used for water heating. Although solar can be used for space heating, it is not an ideal application as the highest loads occur in the winter, when there is the least solar energy available.

While most solar energy systems use hot water panels mounted on the roof of a building, passive solar is another means of using the sun's energy. Orienting houses or buildings to the south, minimizing windows on the east, west, and north sides, and incorporating appropriate shading can all significantly reduce heating requirements. Passive solar is something that local governments have control over through the use of development permit guidelines.

Within the Peace Region, areas further away from the mountains have the best solar potential, although the solar resource is still quite good in Chetwynd and Tumbler Ridge. The low cost of natural gas in the Peace will reduce the dollar savings from solar energy and contribute to longer paybacks. Some of the best residential applications may be for homes in remote communities that are not on the natural gas grid, where solar could offset the use of more expensive propane or electricity.

Solar photovoltaics

Solar photovoltaics (PV) is the generation of electricity from solar panels. While the price of PV has come down recently, it is still a very expensive technology. PV will generally not be cost effective versus electricity from BC Hydro. It may be cost effective for applications that require significant lengths of distribution wiring (e.g. streetlights, remote signage) or for homes that are off the BC Hydro grid.

Wind

The Peace region has proven to be viable for wind power with the opening of the Bear Mountain wind project – the first in BC. Although the best wind resources are usually in mountainous areas that are difficult to access, the Peace is one of the few areas in BC that has good wind in relatively flat terrain. However, wind power is generally only viable in large scale wind farms such as Bear Mountain. Although small wind turbines are available for use on buildings, they are much more expensive per kW than large wind turbines. Their relatively low mounting height and obstructions from surrounding buildings also reduce the effectiveness of small turbines. Therefore wind power opportunities are likely to be limited to large turbines feeding power into the grid. These projects are usually developed by specialty wind power companies with the technical expertise and financial backing to undertake large projects.

Based on BC Hydro's wind resource maps, the area between Dawson Creek and the Rocky Mountains has the best wind potential, with relatively flat terrain. There is good wind resource shown in the Rocky Mountains, but this is likely to be too difficult to access.

Micro-hydro

Micro-hydro is the most common form of renewable power generation in BC, with dozens of small run-of-river power projects operational and many more planned. The best sites for micro-hydro tend to be near the coast, where there are high precipitation rates, moderate winter temperatures, and large elevation changes. The Peace region does not generally have good micro-hydro potential, although areas in the Rocky Mountains are identified as moderate potential. No potential sites over 2 MW have been identified by BC Hydro. Although micro-hydro can be developed at a scale smaller than this, they benefit from economies of scale and very small projects are not likely to be cost effective. There may be some potential to use the municipal water supply in Tumbler Ridge for electricity generation, which is discussed in the corporate plan.

Biomass

Biomass is the most common form of renewable energy, used mostly in fireplaces and wood stoves in homes. But it can also be used at a much larger scale, for heating buildings, supplying district energy systems, or generating power. Biomass can include wood waste from mills or logging operations, manufactured wood pellets, wood waste from construction, garbage, animal by-products, or plant crops. Whatever form of biomass is used, it needs to be located fairly close (within 50 – 100 km) to the plant in order to be cost effective.

There are several mills in the Peace region that may provide sources of wood waste. While wood waste from mills was once freely available, in recent years there has been an increased demand for it, with prices rising accordingly. But if there are no competing buyers for it, wood waste may still be available at low or no cost. A consideration in using wood waste from mills is the stability of the mill, as a long term stable supply of wood waste is essential to the viability of a biomass energy project. Air quality impacts also need to be considered, as there may be public resistance to wood burning plants.

Another possibility for biomass in the Peace region is the use of agricultural waste. Dawson Creek has been investigating the use of seed grass straw as a fuel source, which appears to be viable. There is apparently a large volume of this available, and it would be worthwhile to follow-up further with Dawson Creek. However, an assessment of the potential impact on other uses of the

“waste” material may be needed as well. For example, cattle ranchers use waste straw as bedding and introducing a competing buyer of the straw could negatively impact the ranching industry.

Although general municipal solid waste can be used for energy, this is usually only viable at a very large scale, and the population of the Peace region would not support it. Wood waste from construction or green waste is a possibility for producing energy, utilizing some newer digestion technologies (e.g. Nexterra). Again, the relatively small population of the Peace will make this a challenge.

Any consideration of biomass for energy must include potential negative impacts. These can include impacts on air quality, food crops, or the financial well-being of other industries that rely on wood waste (e.g. pulp mills, OSB plants) and straw (e.g. cattle ranchers).

Landfill gas

Both the Ft. St. John landfill and Bessborough landfill will be required to install landfill gas collection systems by 2016 under new provincial legislation. While collecting landfill gas for energy has not been cost effective for small landfills in the past, it likely would be once the gas collection system is put in place. The collected gas can be used to generate electricity or it can be cleaned and injected into the PNG gas system. If there are nearby buildings the landfill gas can be used for heating, or in a cogeneration system.

Geothermal

Geothermal is the use of high temperature hot springs to supply heat or generate power (although the term is often used for geo-exchange or ground source heat pumps – see below). The Peace does have some high potential geothermal areas around Hudsons Hope and Chetwynd. However, it should be noted that no geothermal resources have been developed in BC, and is unlikely to be viable at this time.

Geo-exchange

Geo-exchange is extraction of low temperature heat within the ground through the use of heat pumps. The use of this technology has been growing rapidly in BC. Most geo-exchange systems have been installed in individual homes or buildings, but larger systems serving multiple buildings are now being developed. Almost any ground can be used for geo-exchange, but the type of soil will impact the cost and effectiveness of the ground field. Other similar heat sources, such as groundwater or water from wastewater treatment can also be used with heat pumps.

The prairies have historically been leaders in the use of geo-exchange systems, due to good soil conditions, underground aquifers, and low cost electricity. The Peace has similar soil conditions and most areas are probably good candidates for geo-exchange. Commercial/institutional buildings are generally more cost effective than homes due to larger size, but economics will vary from project to project.

Industrial waste heat

Industry often has a lot of wasted heat which is too low temperature for their needs, but could possibly be used to heat other buildings, perhaps through a district heating system. There are many industries in the Peace, and some may have waste heat available. To justify the cost of piping, the industry must be located reasonably close to where the heat will be used. There has been some interest expressed by the mill in Taylor in providing waste heat. However, the mill is a considerable distance from the main civic facilities and may be too far away.

Cogeneration

Cogeneration is the simultaneous production of electric power and heat. The fuel used is often natural gas, but other renewable fuels such as biomass or landfill gas can be used. To be cost effective, cogeneration plants need to be located where there is a use for the heat. Facilities with large year round heating loads (such as hospitals, recreation centres, or industry) are preferred. BC Hydro's new firm purchase rates for plants under 5MW has made it easier to plan cogeneration plants, while low gas rates would increase potential viability in the Peace. Cogeneration can also be used with a district heating system.

District heating

District heating is not a renewable energy technology. But it is a means by which renewable energy can be distributed to multiple buildings and there has been a lot of interest in district heating systems recently. District heating connects multiple buildings to a central heating plant. The heat is usually distributed to the buildings by means of hot water. The central heating plant could heat the water with a number of renewable technologies, including biomass, solar thermal, or geo-exchange.

The key factor in establishing a district heating plant is to have a number of significant heating loads within a short distance of each other. A source of low cost heat is also desirable. Generally one or more large core buildings would be desirable in establishing a district heating system, while smaller or more distant buildings can be added later. There are no specific criteria for assessing viability, but if buildings are more than 200 - 300 metres apart the piping costs may become excessive.

Municipal planning should support a district heating system by focusing development around the system distribution. Civic facilities or other institutional buildings can be core customers. And facilities that may be sources of waste heat (e.g. sewage treatment plants or ice rinks) should be located nearby.

Of the Peace River municipalities, Tumbler Ridge probably has the best potential for a district heating system, with a relatively compact town centre that includes a number of larger buildings. Whether a district heating system would be viable would depend on the heating loads and systems within those buildings and any available heat sources. The other municipalities are either too spread out or the buildings are too small to make good candidates for district heating, although local governments could focus development in certain areas with the intention of supporting district heating in the future.

D: List of Tools & Resources

Category	Source / agency	Example program, toolkit or resource
Resources and guides for local governments	UBCM, Smart Planning for Communities & Provincial government	Toolkit with a collection of actions, case studies, and resources to support local government action: http://toolkit.bc.ca/
	Non-profit (West Coast Environmental Law)	BILL 27: Opportunities and Strategies for Green Action by BC Local Governments: http://wcel.org/resources/publication/bill-27-%E2%80%93opportunities-and-strategies-green-action-bc-local-governments
	Provincial government (MCRD)	A Guide to Green Choices: Ideas & Practical Advice for Land Use Decisions in British Columbia Communities: http://www.cd.gov.bc.ca/lgd/planning/greenchoices.htm
	Provincial government (MAL)	Reducing Agricultural GHG Emissions in Your Community: http://www.agf.gov.bc.ca/resmgmt/ClimateActionPlan/toolkit_for_local_govt/How_toolkit.htm
Incentive programs for residents and businesses	Provincial government	LiveSmart BC: Rebates and incentives to help British Columbians reduce their carbon footprint at home, on the road, and at work.
	Utility (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.
Funding sources for local governments	Non-profit (Community Energy Association)	Funding your community Energy and Climate Change Initiatives: a guide to funding and resources for local governments. http://www.communityenergy.bc.ca/sites/default/files/CEA%20Funding%20Guide%202009-May.pdf
	Utility (BC Hydro)	Energy Manager Funding: BC Hydro has provided partial funding to some municipalities for an Energy Manager position.
	Provincial government	LocalMotion: Cost-sharing (50/50) between provincial and local governments for capital projects that make communities greener, healthier and more active and accessible places in which to live.
	Provincial government (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.
	Federation of Canadian Municipalities (FCM)	Green Municipal Fund: Grants available to support sustainability and climate action planning efforts. Low-interest 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,

Category	Source / agency	Example program, toolkit or resource
		energy, planning, transportation, waste and water.
	Provincial government	Innovative Clean Energy (ICE) Fund: \$25 million per year is currently allocated by the provincial government to assist with funding of clean energy and technologies to help support local economies and livelihoods in communities across BC.
	Provincial government	Climate Action Revenue Incentive Program (CARIP): The Regional District may elect to use its annual CARIP grant to support both community and corporate (operational) climate action initiatives.