



District of Tumbler Ridge Community Energy Plan

Prepared for
District of Tumbler Ridge
Project Contact:
Kim Isaak, CAO

Prepared by
Stantec Consulting Ltd.
Project Contact:
Cariad Garratt, Project Manager
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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 District of Tumbler Ridge’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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Summary

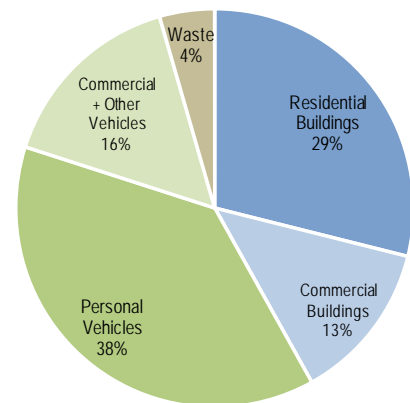
Across the globe people have become dependent on fossil fuels (e.g. oil, gasoline, natural gas, coal) to power our way of life: to get around, to grow our food, to heat our buildings. Due to the finite nature of fossil fuel resources, we are starting to experience more volatility and uncertainty around their price and availability. 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 Peace River region.

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

- Address legislated requirements to establish greenhouse gas (GHG) reduction targets, policies and actions for incorporation into Official Community Plans (OCPs) by May 2010.
- Define the 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 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

In 2007, buildings and transportation in Tumbler Ridge consumed approximately 552,000 gigajoules (GJ) of energy. This energy consumption, combined with emissions from solid waste, translates into total community-wide GHG emissions of **24,000 tonnes of CO₂ equivalents** (excluding industrial and agricultural emissions). These emissions are broken down by sector in the pie chart to the right. Transportation (personal and commercial vehicles) contributes the largest amount to annual GHG emissions.



Goals for Community Energy and GHG Emissions

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

Overarching GHG Emissions Reduction Targets

GHG emissions reduction targets were developed for the community of Tumbler Ridge using a combination of community input and technical analysis. The following reduction targets are proposed for incorporation into the District of Tumbler Ridge's Official Community Plan (OCP):

Target Type	Reduce GHG emissions by 2020 (from 2007 levels)	Reduce GHG emissions by 2030 (from 2007 levels)	Reduce GHG emissions by 2050 (from 2007 levels)
Total Community	15%	25%	80%
<i>Per Capita Reduction</i>	25%	40%	--

Strategies and Actions for Achieving the Goals and Targets

The plan is structured into five **themes**: Buildings, Land Use, Transportation, Alternative Energy and Solid Waste. Several strategies and actions have been identified for each theme area to assist the District in achieving the reduction targets and goals identified. These are summarized here:

	Strategy	Action
Buildings	Education & Leadership	B-1: Develop an education campaign to encourage energy efficient renovations and new buildings.
		B-2: Provide an "Energy Efficiency Checklist" with building permits.
		B-3: Build / retrofit District facilities to high energy efficiency standards and promote this to the public.
	Financing & Incentives	B-4: Provide financial incentives for energy efficiency in homes.
		B-5: Provide tax relief for energy efficient improvements in commercial buildings.
Land Use	Policies & Regulation	LU-1: Accommodate new growth through re-development, increased density and infill of existing lots focused around the Town Centre.
		LU-2: Define Development Permit Guidelines with the objective of reducing energy consumption and GHG emissions.
Transportation	Education & Leadership	T-1: Support development of a region-wide social marketing campaign to reduce fuel consumption from driving.
	Partnerships	T-2: Engage local businesses in the Climate Smart Program by becoming a Climate Smart Host.
	Financing & Incentives	T-3: Continue to install and maintain pedestrian and cycling infrastructure to encourage non-motorized transportation.
	Policies & Regulation	T-4: Work with the Regional District and neighbouring municipalities to reduce idling.
Alternative Energy	Research	AE-1: Conduct an opportunity assessment for district energy in Tumbler Ridge, including potential for use of waste biomass.
	Education & Leadership	AE-2: Develop an alternative energy pilot project and promote this to the public.
	Policies & Regulation	AE-3: Focus new commercial, institutional and services growth in the Town Centre and encourage district energy ready heating systems.
		AE-4: Update bylaws (as necessary) to define allowances for alternative energy systems, based on a model bylaw to be developed regionally.
Solid Waste	Policies & Regulation	SW-1: Work with the Regional District to implement the Regional Solid Waste Management Plan.

Plan Implementation

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

Ten indicators and associated targets were selected to monitor progress towards achieving the targets and goals:

Indicator	Target
1. Total GHG emissions from buildings (residential, commercial and small/medium industrial).	Reduce by 15% from 2007 levels by 2020
	Reduce by 30% from 2007 levels by 2030
2. Percent of new District (corporate) buildings built to <i>high energy efficiency</i> standards.	100% by 2020
3. Percent of existing homes renovated to high efficiency standards (exceeding EnerGuide for Homes, EGH 80).	25% by 2020
	75% by 2030
4. Percent of new developments occurring in the Town Centre.	No target
5. Housing starts by structural type (Single-family, Duplex, Multi-family, Modular).	No target
6. Total transportation emissions (from personal and commercial vehicles).	Reduce by 10% from 2007 by 2020
	Reduce by 20% from 2007 by 2030
7. Percent of residents using alternative transportation to get to work (shuttle bus, walking, cycling).	30% by 2020
8. Percent of energy consumed in buildings derived from alternative energy sources.	10% by 2030
9. Number of alternative energy systems installed (e.g. solar roofs, geo-exchange, small wind).	50 systems by 2020
10. Tonnes of CO ₂ equivalent GHG emissions from solid waste disposed regionally.	35,000 tonnes less GHG emissions by end of RSWMP Phase 2

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1. Introduction

The District of Tumbler Ridge, in collaboration with the Peace River Regional District (PRRD), the District of Taylor, the Village of Pouce Coupe and the District of Chetwynd, has undertaken a project to develop a Community Energy Plan for each community. This document represents the Community Energy Plan for Tumbler Ridge. A separate document, released in December 2009, addresses the 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 10%.

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 and greenhouse gas (GHG) emissions, and in planning for its energy future. The purpose of creating a plan for the District of Tumbler Ridge is to provide guidance for future decision-making for the communities in the Peace 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. Due to the finite nature of fossil fuel resources, we are starting to experience more volatility and uncertainty around their price and availability. 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 levels;
- 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 avoid the significant and potentially dangerous consequences of global climate change.

1.3 Objectives of this plan

The CEP objectives are to:

- Address legislated requirements to establish GHG 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 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 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:

- **Developing a community-wide baseline** inventory of energy consumption and GHG emissions.
- **Aligning with community vision and policy** by reviewing existing community vision, strategy, and policy documents to ensure CEP alignment with these processes.
- **Consulting with local government staff** at the District to identify potential targets and strategies. This included a workshop with representatives from each participating local government, and individual meetings and phone communication.
- **Gathering input from community members through a survey** and information brochure. These 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 plans.

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

- **Conducting meetings with community members.**

In February and March 2010, the Regional District, together with Northern Environmental Action Team (NEAT), organized mini tradeshow in five communities and invited residents and stakeholders to learn about community energy and emissions, talk to practitioners in the region about alternative energy and energy efficiency technologies, and provide input into the development of the CEP. The input obtained is incorporated into Section 5, Goals and Targets.



- **Gathering input from stakeholders** through phone interviews and discussions at the community meetings. Representatives from several organizations in the region were contacted to provide input into the CEP, including:
 - Realtors
 - Developers
 - Educational institutions
 - Chambers of Commerce
 - Non-profit organizations
 - Agricultural associations
 - Alternative energy suppliers / installers
- **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, were 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, requirements for reporting GHG emissions were revised 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 will harmonize with US standards by 2011. If implemented, new vehicles sold in 2016 will 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 emissions reduction targets for 2020 by January 31, 2010. The Canadian federal government has announced a nation-wide GHG emissions reduction target of 17% below 2005 levels by 2020³.

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 emissions 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.

³ <http://www.climatechange.gc.ca/cdp-cop/default.asp?lang=En&n=C4BD2547-1>

- **BC Energy Plan:** This plan sets out a *Vision for Clean Energy Leadership* and aims to include 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.
- **Green Communities Act (Bill 27, 2008):** Bill 27 requires local governments to include GHG emissions reduction targets, policies, and actions in their OCPs. To achieve this objective, the legislation provides a range of potential new powers to 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 District of Tumbler Ridge has signed the 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 landfill gas capture system by 2016.

2.3 Peace River Regional District Initiatives

In February 2009, the Regional 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.

In June 2009, the Board adopted a motion to become a member of the Federation of Canadian Municipalities’ **Partners for Climate Protection Program**,⁴ making a commitment to achieve a series of five milestones, the first three of which are being addressed through this plan.

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

2.4 District of Tumbler Ridge Initiatives

As a signatory to the **Climate Action Charter**, the District is committed to taking voluntary action to reduce its energy consumption and GHG emissions, and to achieve ‘carbon neutrality’ in its operations beginning in 2012. This is addressed in the District’s **Corporate Energy Plan**, completed during the first phase of this project. Furthermore, the Charter is a

⁴ 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/>)

commitment to create “complete, compact, more energy efficient rural and urban communities.”

The following initiatives related to overall community energy and emissions are also occurring in Tumbler Ridge:

- A water bylaw that includes water metering is under development (water conservation is linked to energy conservation),
- A Revitalization Tax Exemption Bylaw that provides property tax exemptions for businesses undertaking energy efficient retrofits in their buildings,
- Opportunities for producing bioenergy from decaying trees that result from pine beetle kill are being investigated (bioenergy can displace carbon-intensive fossil fuel energy sources), and
- A daily commuter bus transports employees between the Town and the coal mine, (reducing vehicle trips needed for commuting to work).

2.5 Other Local Government Initiatives in the Region

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

The three remaining municipalities in the region have already initiated climate action independently. The City 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 community-wide 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 GHG emissions with respect to the community of Tumbler Ridge.

3.1 Location and boundaries

The District of Tumbler Ridge is located in north-eastern British Columbia on the eastern slope foothills of the Rocky Mountains, approximately 100 km southwest of Dawson Creek (see Figure 1). The District was built in 1981 by the provincial government as a new townsite for coal mine employees and their families. Roads connecting Tumbler Ridge to Chetwynd and Dawson Creek were also built at the same time. The land area of the District is over 1,500 square kilometres, and is primarily Crown land.

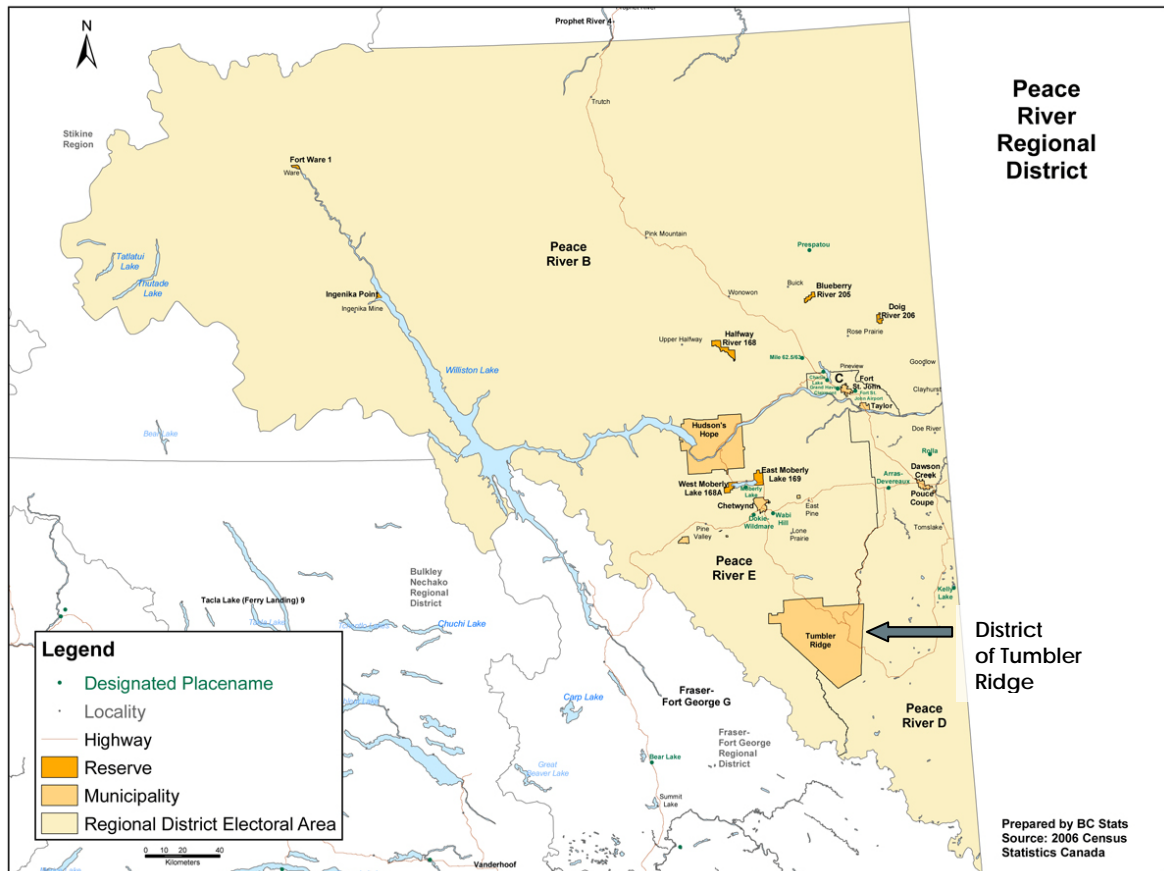


Figure 1. Tumbler Ridge location map

3.2 Population and Development

The population of Tumbler Ridge is 2,454 people⁵. Over the last decade, the population has varied significantly, with an overall decrease of approximately 35%, as shown in Table 1. The distribution of population by age indicates a higher proportion of residents aged 45-64 and a lower proportion of residents aged 75+ compared to the BC average.

Table 1. Tumbler Ridge Population 1996-2006

Census Year	Population	Population change by Census year
2006	2,454	33%
2001	1,851	-51%
1996	3,775	-19%

Source: Statistics Canada, 2006

Building permit data indicates the level of activity in new development over time. There has been continued development over the last 5 years, with a particular increase in residential development in 2008.

Table 2. Building permits Issued in Tumbler Ridge 2005-2009

Year	Residential Value	Commercial Value
2005	\$210,000	\$325,000
2006	\$1,789,000	\$325,000
2007	\$1,995,000	\$1,719,000
2008	\$5,729,000	\$1,512,000
2009	\$2,989,000	\$135,000

Source: BC Stats Building Permits by Type 2001-2009, June 2010

3.3 Climate

Considerable energy is required for heating in the Peace region, as indicated by the high heating degree days⁶ in Table 3 (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 approximately 2,200 sunshine hours throughout the year – one of the highest in BC, which has an average of 2,000 hours per year⁷.

⁵ Statistics Canada, 2006.

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 <http://www.solarbc.ca>

Table 3: Annual Heating and Cooling Degree Days

Location	Heating Degree Days (Annual)	Cooling Degree Days (Annual)
Chetwynd (station nearest to Tumbler Ridge)	5,490	14
Fort St. John	5,847	27
Dawson Creek	5,981	13
Vancouver	2,926	44
Prince George	4,728	40
Whitehorse, YK	6,811	8
Edmonton, AB	5,708	28
Toronto, ON	4,066	252

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

3.4 Dwellings

The predominant dwellings in the District of Tumbler Ridge are single-detached residences, representing 83% of dwellings. "Other" occupied private dwellings listed by Statistics Canada (including mobile homes) account for 17% of dwellings.⁸ Note that there are several apartments under 5 storeys in the community; however these are not classified as such in the Statistics Canada data.

Almost all dwellings in Tumbler Ridge are less than 30 years old, as the town development occurred in the early 1980s. Approximately 81% of homes are owned, and 19% are rented.

3.5 Transportation

Transportation usage by residents in the District of Tumbler Ridge is dominated by private vehicles. Over 78% of vehicle trips are by private vehicle, with 63% as vehicle driver, and 15% as vehicle passengers of trips. Two percent of residents use public transit, and 12% of trips are by walking and cycling. The remaining 8% of trips in Tumbler Ridge are listed as "other"⁹, which may include the bus provided by the coal mine.

Approximately 97% of vehicles registered in Tumbler Ridge are personal vehicles and 3% are for commercial purposes, as shown in Figure 2. About 71% of passenger vehicles are light trucks, vans and SUVs.

⁸ 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, apartments, 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.

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

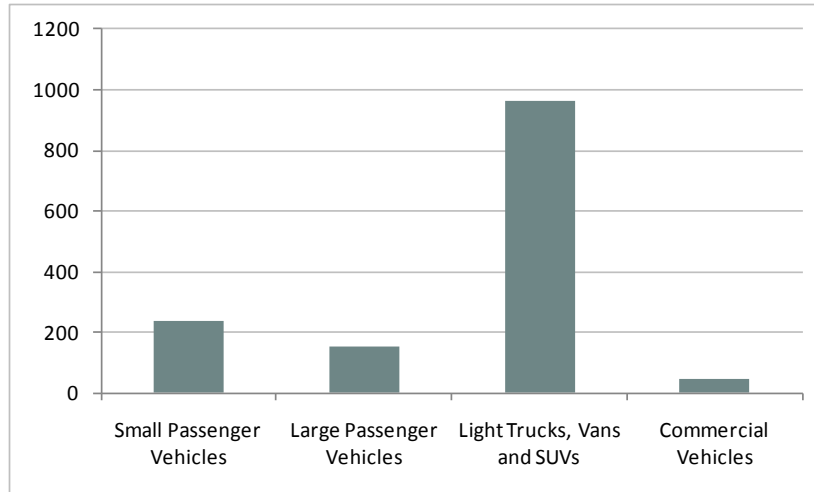


Figure 2. Vehicles by Type in Tumbler Ridge

Source: CEEI Initiative, Ministry of Environment, Province of BC, 2010.

3.6 Economy

With its inception in the early 1980s, the District of Tumbler Ridge is not quite 30 years old. It was built to house people who worked in the coal mining industry, which was a high-priced commodity in the 1980s. Unfortunately, the two mines that were built in the early 1980s were closed in 2000 and 2003 respectively. Jobs were lost, people moved away and Tumbler Ridge looked for ways to diversify its economy to attract new residents. Two new mines began operation in 2005, and there has since been a resurgence in economic activity.

The community continues to work towards diversifying its economy by promoting Tumbler Ridge as an outdoor tourism destination. Furthermore, the community recently received notice of award of a 20,000 hectare community forest. This may provide an additional source of employment for community members. Very recently there has been significant interest in building large-scale wind farm projects in the area. BC Hydro recently awarded the Tumbler Ridge Wind Farm project to erect 30 wind turbines, which are expected to generate 47 megawatts of electricity (enough to power approximately 14,000 homes).

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 The population of Tumbler Ridge is highly dependent on activity in the local coal mines, as past fluctuations indicate. This makes it difficult to predict growth rates for the community over the long-term.

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

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 B.

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
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

Renewable energy source	Opportunity in PRRD
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 GHG emissions 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"> • If the population grows there is potential for more infill development. 	<ul style="list-style-type: none"> • Population fluctuates significantly, but overall is not large enough to fill available dwellings. Unless population grows significantly, there will be limited opportunities for efficiencies in new construction.
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"> • Compact nature of dwellings and other community buildings may provide an opportunity for a future district energy system. 	<ul style="list-style-type: none"> • Non-resident population can result in lower rate of retrofits by remote owners. • Single-family homes typically require more energy than multi-family units.
Transportation	<ul style="list-style-type: none"> • The community has a compact design with pedestrian connections throughout reducing the need for vehicle trips. • New vehicle technologies becoming more available, and operate in northern climates. • New Federal regulations will require improvements in vehicle efficiency for personal and commercial vehicles. 	<ul style="list-style-type: none"> • Winter driving conditions, leads to a high percentage of large vehicles that consume more fuel. • Tendency to idle vehicles for long periods of time, due to climate, though some idling likely occurs due to driver habit more than climate conditions.
Economy	<ul style="list-style-type: none"> • Opportunities to diversify the economy are opening up, including the new community forest. 	<ul style="list-style-type: none"> • Reliance on resource extraction which can be extremely volatile.
Future Growth	<ul style="list-style-type: none"> • OCPs can promote the development of energy-efficient rural communities, with a focus on compact, nodal development. 	<ul style="list-style-type: none"> • Planning for growth is dependent on attracting business and industry to the area and may happen in "clumps".

4. Energy and GHG Emissions Inventory

This chapter describes the 2007 levels of energy consumption and sources of GHG emissions in the District of Tumbler Ridge. Energy consumption and GHG emissions in the community derive from several sources as described below.

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 and Emissions Inventory (CEEI), a provincial government initiative. CEEI reports are available for Chetwynd, Pouce Coupe, Taylor, Tumbler Ridge, and the PRRD (total including municipalities). They are not available for Electoral Areas.

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

- **Buildings** – The energy to heat and power residential and commercial buildings. Data was obtained through the CEEI initiative from utility records and includes electricity and natural gas consumption. Other sources such as wood, fuel oil, or propane tank heat were not quantified in the CEEI inventory¹¹. Estimates of total residential propane consumption were obtained from local suppliers. For each jurisdiction, estimates of propane use were made based on typical dwelling consumption from the BC Hydro Conservation Potential Review and previously calculated consumption of electricity and natural gas. Remaining consumption was assigned to wood.
- **Transportation** – Vehicular consumption and emissions are based on a count of the vehicles in the community, an estimate of fuel consumption based on type of vehicle, and an estimate of the number of kilometres driven. This data was obtained through the CEEI initiative and includes data sources from ICBC and Natural Resources Canada.
- **Waste** – Waste does not directly consume energy but when deposited into landfills, it decomposes and releases methane gas which is a greenhouse gas stronger than carbon dioxide¹². Solid waste emission estimates are obtained through the CEEI initiative.

¹¹ Industrial energy consumption is not available to preserve confidentiality.

¹² On a unit mass basis, the Global Warming Potential (GWP) of methane traps 23 times more greenhouse gas emissions than carbon dioxide. <http://www.env.gov.bc.ca/epd/bcairquality/glossary/index.html>

The following sectors also lead to 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. Agricultural emissions have been estimated for the PRRD using the methodology employed by the National Inventory Report, with some proration where necessary. This has been included for information only, and is not included in the total reported community emissions. Enteric fermentation, manure management, and agricultural soils are included.
- **Industrial activity** – Industrial processes and activities can 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 Emissions Inventory for 2007

In 2007, buildings and transportation in the District of Tumbler Ridge consumed approximately 552,000 gigajoules of energy. This energy consumption, combined with emissions from solid waste, translates into **total community-wide GHG emissions of 24,000 tonnes of CO₂ equivalents**, or 9.8 tonnes per capita (excluding emissions from large industrial facilities, agricultural activities, rail and off-road sources)¹³. The transportation sector is the major source of greenhouse gas emissions in the community, accounting for 54% of all emissions. Buildings account for 42% and solid waste accounts for 4%, as shown in Figure 3.

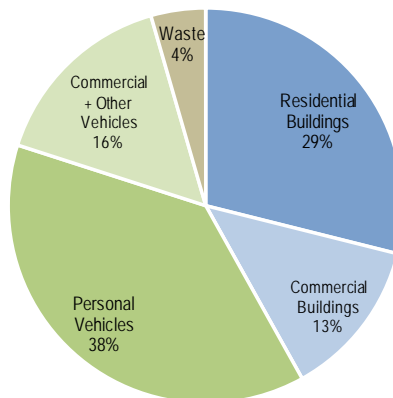


Figure 3. Greenhouse Gas Emissions by Sector in the District of Tumbler Ridge (2007)

¹³ 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. Revised inventories were provided as of June 2010.

Table 4 provides a summary of the community's energy consumption and associated GHG emissions. Transportation accounts for the largest source of GHG emissions.

Table 4: Community Energy Consumption and GHG Emissions in Tumbler Ridge (2007)

Use	Energy (as GJs)	GHG Emissions (tonnes of CO ₂ e) ²	GHG Emissions %
Residential	237,500	6,900	29%
Commercial	128,000	3,100	13%
Transportation ¹	186,500	12,900	54%
Solid Waste	-	1,100	4%
Total	552,000	24,000	--
Total per capita	225	9.8	--

Table notes:

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

For information only, agricultural GHG emissions have been estimated for the entire PRRD (including municipalities) to be 525,000 tonnes of CO₂ equivalents for 2007. This includes GHG emissions from enteric fermentation, manure management and agricultural soils.

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 sectors¹⁴. 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 industrial buildings is withheld.
- No data is included for wood, heating oil, or propane.

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

¹⁴ For details on data sources, emissions factors, and methodologies employed by CEEI, see the 2007 CEEI Reports User Guide: <http://www.env.gov.bc.ca/epd/climate/ceei/resources.htm>. Note that the Ministry updated methodologies and released revised inventories for 2007 on May 31st, 2010. A revised User Guide is expected to be released to reflect the updated methodologies, but is not available at this time.

Buildings

- 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.
- Estimates of total residential propane consumption were obtained from local suppliers. This was split into each jurisdiction based on typical dwelling consumption from the BC Hydro Conservation Potential Review and previously calculated consumption of electricity and natural gas. Remaining consumption was assigned to wood.

Transportation

- 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, with some proration where necessary. This has been included as an information item. Enteric fermentation, manure management, and agricultural soils are included.

4.4 Energy and GHG Emissions BAU Forecast

A business-as-usual (BAU) Forecast was developed for each OCP Area to 2050. The forecasts are driven by 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 2020¹⁵ (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 2030¹⁶ (e.g. general fleet turnover and improved efficiencies in vehicle design from existing policy initiatives)
- Reduce commercial vehicle energy use by 15% by 2030

¹⁵ Residential and commercial building targets from the BC Energy Efficient Buildings strategy

¹⁶ 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).

The result of the forecast for Tumbler Ridge is outlined in Table 5 and Figure 4. Note that no further efficiency improvements are calculated beyond 2030, as these are yet to be defined.

Table 5. BAU Forecast of GHG Emissions to 2050

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)
Community Total	1.0%	24,000	22,800	27,800
Change from 2007	--	--	-5%	16%

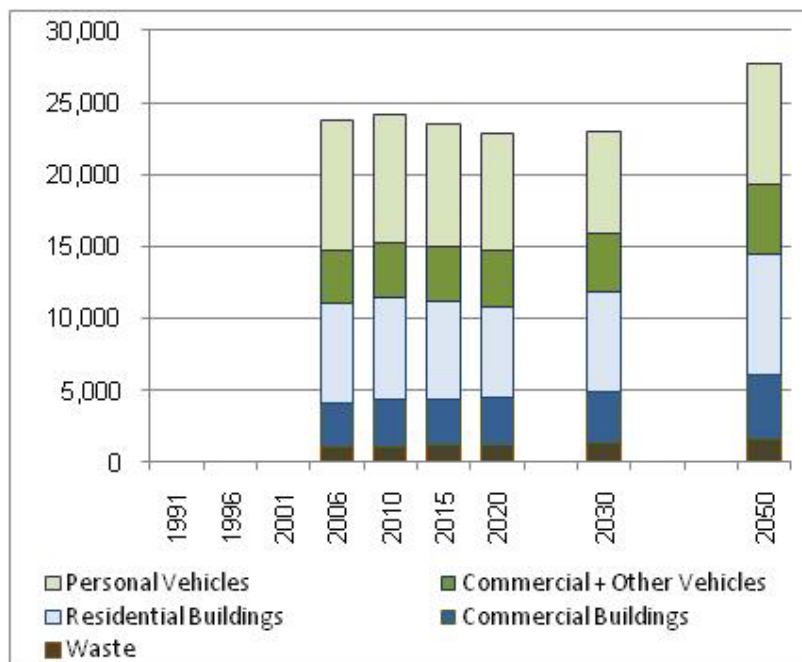
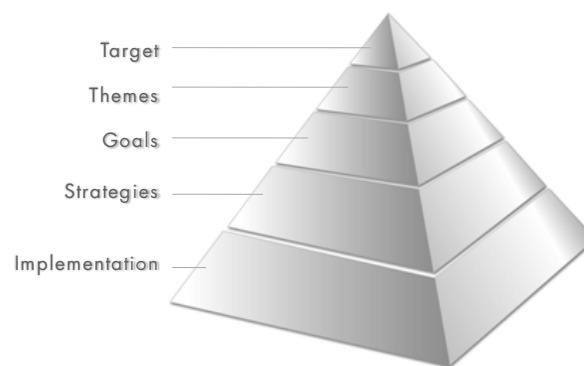


Figure 4. BAU Forecast of GHG Emissions to 2050

5. Goals and Targets

5.1 Adaptive Management Approach

The CEP 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, Land Use, Transportation, 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 include 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 targets 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 GHG emissions 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 participating municipalities, including Tumbler Ridge, and each of the 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 local governments in the Peace River region take action to reduce energy use and GHG emissions in the communities, and to increase the use of alternative energy. Community members in Tumbler Ridge expressed interest in seeing the District take action, in particular:

- The District should **demonstrate leadership** in the community, for example, by implementing and adhering to anti-idling policies.
- There is a need to **build a stable power back-up system** to reduce safety concerns during power outages.
- Continue to **emphasize compact growth** to ensure the community stays walkable and accessible.
- There is significant interest in alternative energy and improving efficiency in homes, but **improved information and incentives** are needed.

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 BAU forecast (described in Section 4). One reduction scenario was developed 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 impact on GHG emissions?”

The scenarios are developed in three steps:

STEP 1: Performing **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 types¹⁷, 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 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.

These three steps are applied to each measure defined in this plan, resulting in a cumulative impact assessment of undertaking the proposed measures. The result of the scenario analysis is summarized as follows:

- A series of short, medium and long term GHG emission reduction targets (for 2020, 2030 and 2050), as outlined in Table 6, and
- An estimate of anticipated reductions by sector (Buildings, Transportation, and Waste) if the proposed measures are implemented, as graphically displayed in Figure 5.

¹⁷ 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.

Table 6. Summary of Proposed GHG Reduction Targets for Tumbler Ridge

Target Type	Reduce GHG emissions by 2020 (from 2007 levels)	Reduce GHG emissions by 2030 (from 2007 levels)	Reduce GHG emissions by 2050 (from 2007 levels)
Total Community	15%	25%	80%
Per Capita Reduction	25%	40%	--

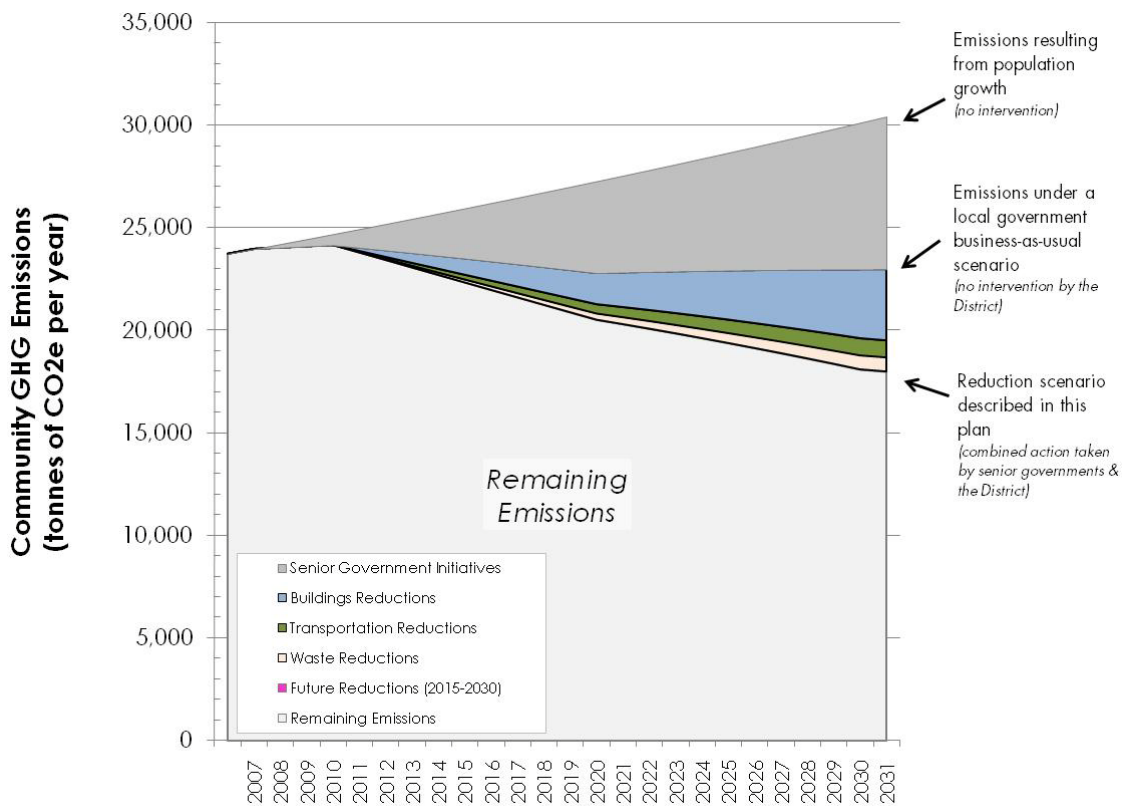


Figure 5. Reduction Scenarios and Resulting Targets for Tumbler Ridge

5.3 Goals for Energy and GHG Emissions

One goal was defined for each theme area as follows:

Buildings:

Our community has a variety of accessible, energy efficient and comfortable **buildings** to live and work in.

Land Use:

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

Transportation:

Our residents use a variety of efficient and active **transportation** choices to live, work and play in our community.

Alternative Energy:

Our community is resilient and uses a diversity of reliable, renewable **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 (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 16 actions that use a combination of strategies are identified to help the 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 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

Theme 1: Buildings

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

State: Buildings account for 42% of GHG emissions from community activities.



Indicators & Targets:

Indicator-1: Total GHG emissions from buildings (residential and commercial).

Target-1A: Reduce by 15% from 2007 levels by 2020.

Target-1B: Reduce by 30% from 2007 levels by 2020.

Indicator-2: Percent of new District (corporate) buildings built to high energy efficiency standards.

Target-2: 100% by 2020.

Indicator-3: Percent of existing homes renovated to high efficiency standards¹⁸ (exceeding EnerGuide for Homes (EGH) 80).

Target-3A: 25% by 2020.

Target-3B: 75% by 2030.

Actions:

Strategy: Education & Leadership

Action B-1: *Develop an education campaign to encourage energy efficient renovations 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 District of Tumbler Ridge and 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 in the Peace region. This directory may also include guidelines for new buildings to aspire to in order to minimize GHG emissions. As part of the education campaign, the District will work with the local real estate agents to increase knowledge of energy efficiency and alternative energy technologies among agents and potential buyers.

¹⁸ EGH refers to the EnerGuide Home energy rating system.

Action B-2: Provide an “Energy Efficiency Checklist” with building permits.

The District will develop an energy efficiency renovation checklist and distribute a copy with each permit application. Checklists that have been developed by other municipalities can be used as a starting point¹⁹. The District may also consider:

- Requiring completion of the checklist in order to obtain the permit (although action would not be mandatory), or
- Linking the completion of items on the checklist to a permit rebate system.

Building inspectors with the District may also benefit from additional training about energy efficiency technologies and opportunities as these are continually evolving.

Action B-3: Build / retrofit District facilities to high energy efficiency standards²⁰ and promote this to the public.

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

Strategy: Financing & Incentives**Action B-4:** Provide financial incentives for energy efficiency in homes.

Undertaking energy efficiency and renewable energy upgrades can be difficult for some homeowners as they often require significant expenditures upfront, with payback gradually occurring over several years. The District can support these homeowners in achieving energy efficiency and comfort in homes through a financial incentive program. This was supported by community member responses during plan development.

The District will work with the Regional District to develop an incentive program for residents to increase the energy efficiency of existing homes. Municipalities have the authority to provide assistance in the form of a grant, benefit, or tax exemption to residents under the *Community Charter*. As part of the program, the District can provide rebates on permits

¹⁹ Municipalities in BC that have developed checklists include: Town of Smithers, City of Kelowna, District of 100 Mile House, District of Central Saanich, District of Vanderhoof, and several more.

²⁰ There are several building rating systems with different approaches to measuring energy efficiency, including LEED, ASHRAE 90.1 and the MNECB. 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 MNECB 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.

where energy efficiency retrofits were performed and an energy performance label is acquired. An alternative incentive program may be partner with a local bank to provide low interest loans, or to buy-down interest, for energy retrofits.

Action B-5: *Provide tax relief for energy efficient improvements in commercial buildings.*

Municipalities can provide property tax relief to businesses for energy efficient renovations through a Revitalization Tax Exemption, with authority provided under the *Community Charter*.

The District will create a bylaw that allows businesses to apply for a Revitalization Tax Exemption for completing energy efficiency improvements and/or installation of alternative energy systems. The City of Victoria enacted such a bylaw in 2009²¹.

²¹ <http://www.victoria.ca/common/pdfs/bylaw09-040.pdf>

Theme 2: Land Use

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

State: Tumbler Ridge is a remote rural community that was built in a compact manner, with a focused Town Centre that has well connected pedestrian access.



Indicators & Targets:

Indicator-4: Percent of new development occurring in the Town Centre²².
(Describes how compactly the community is developing)

Indicator-5: Housing starts by structural type (Single-family, Duplex, Multi-family, Modular).
(Describes the diversity of new housing types)

Actions:

Strategy: Policies & Regulation

Action LU-1: Accommodate new growth through re-development, increased density and infill of existing lots focused around the Town Centre.

By encouraging new development and re-development near the Town Centre, the District can promote a centre that attracts and maintains core businesses and services, improves accessibility for seniors, and preserves natural lands surrounding the centre. The existing OCP (2005) includes the following objectives for encouraging infill development:

- 6.2.2: Designate sufficient land for alternative housing forms providing affordable housing alternatives.
- 6.3.2: Promote infill of existing low density parcels rather than new development in undeveloped areas.
- 6.8.2: Encourage medium density developments to locate close to the Town Centre and recreational and shopping facilities.
- 7.7.3: Ensure that the Town Centre serves as the vibrant focal point of the community.

The District will encourage new development as infill in existing lots by:

- Encouraging mixed commercial and multi-family developments in the Town Centre,

²² "Town Centre" refers to the terminology in the District of Tumbler Ridge OCP (2005).

- Implementing higher Development Cost Charges for development occurring outside the current service area (new lots),
- Requiring an evaluation of alternative energy options for development occurring on new lots (see action LU-2), and/or
- Requiring overall GHG emissions reductions be achieved in the area. This is a non-prescriptive method of achieving a combination of efficiency and alternative energy (e.g. may employ several techniques to achieve the objective, including building orientation, landscaping, solar hot water, geo-exchange, water conservation measures). This requires defining a Development Permit Area and associated guidelines.

Action LU-2: Define Development Permit Guidelines 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 District will consider incorporating guidelines for DPAs inside the current service area (existing lots) that address:

- Building orientation for optimal sun energy (passive solar),
- Landscaping for energy conservation,
- Exterior building design features (colours, higher windows, deep overhangs, etc),
- District energy readiness, and/or
- Water conservation measures.

For developments occurring outside the current service area, *the District will* consider defining a separate DPA with further requirements, including:

- An evaluation of alternative energy options,
- An objective of GHG emissions reduction to be achieved in the DPA, and
- All objectives stated above.

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.

This is supported by the District's OCP (2005):

- *6.3.8: Encourage environmental sensitivity, energy conservation and human-scaled design when contemplating expansion of general residential areas.*

Theme 3: Transportation



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

State: Transportation accounts for 54% of GHG emissions from community activities (including commercial and personal vehicles). Currently 22% of trips to work are by alternative transportation (walking, cycling, transit or other).

Indicators & Targets:

Indicator-6: Total transportation emissions (from personal and commercial vehicles).

Target-6A: Reduce by 10% from 2007 by 2020.

Target-6B: Reduce by 20% from 2007 by 2030.

Indicator-7: Percent of residents using alternative transportation to get to work (shuttle bus, walking, cycling).

Target-7: 30% by 2020.

Actions:

Strategy: Education & Leadership

Action T-1: Support development of a region-wide social marketing campaign to reduce fuel consumption from driving.

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

The District will support 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. 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 District 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: *Continue to install and maintain pedestrian and cycling infrastructure to encourage non-motorized transportation.*

Safety and accessibility are key considerations when deciding whether to use active transportation. The District 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. Continuing year-round maintenance of recreational and commuter trails, including snow removal of sidewalks, will help encourage their use. Installing appropriate amenities (way-finding, benches, and bike racks) will also create an attractive environment for non-motorized transportation.

The District will continue to install and maintain a year-round network of walking and cycling paths that are accessible and provide links between residents and commercial and recreational services.

Strategy: Policies & Regulation

Action T-4: *Work with the Regional District and neighbouring municipalities to reduce idling.*

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 will need to dedicate some bylaw enforcement time 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 community is resilient and uses a diversity of reliable, renewable energy sources.

State: Our community currently relies on electricity from BC Hydro (primarily hydro-electric), and heating primarily from natural gas, supplemented by wood, propane and heating oil.



Indicators & Targets:

Indicator-8: Percent of energy consumed in buildings derived from alternative energy sources.

Target-8: 10% by 2030.

Indicator-9: Number of alternative energy systems installed (e.g. solar roofs, geo-exchange, and micro wind turbines).

Target-9: 50 systems installed by 2020.

Actions:

Strategy: Research

Action AE-1: Conduct an opportunity assessment for district energy in Tumbler Ridge, including potential for use of waste biomass.

District energy systems connect 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, captured waste heat, 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. There are no specific criteria for assessing viability, but if buildings are more than 200 to 300 metres apart, the piping costs may become excessive. Given that the Town Centre in Tumbler Ridge is relatively compact and includes a number of large buildings, there may be potential to install a district energy system. Furthermore, there may be sources of waste biomass in the region that can be used for this system (e.g. from the recently approved community forest or removal of pine beetle damaged trees).

The District will conduct an opportunity assessment to build a district energy system in Tumbler Ridge.

Strategy: Education & Leadership

Action AE-2: *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 District will take a leadership role by leading a pilot project on a local government facility 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 6. Micro-Wind Pilot Project in Grande Prairie, AB

Source: Golden Sheep Manufacturing Inc.

Policies & Regulation

Action AE-3: *Focus new commercial, institutional and services growth in the Town Centre and encourage district energy ready heating systems.*

As discussed in Action AE-1, district energy systems need a number of significant heating loads within a short distance of each other. As new commercial or institutional buildings are developed in the Town Centre, these should be encouraged to use district energy ready heating systems (e.g. hot water piping). If a district energy system is established, the District should create a bylaw requiring connection in the service area.

The District will focus new commercial and services growth adjacent to the existing core municipal facilities. New facilities will be encouraged to use hydronic heating systems for tying into a future district energy system through use of development permit guidelines (as described in Action LU-2).

For example, the Dawson Creek OCP (2009) includes:

Guideline 16.54: District Energy-Ready – All buildings are encouraged to be built with a hydronic heating system to facilitate future connection to a district heating system. Mechanical rooms should be located closest to the street, where possible, to accommodate access to equipment to facilitate conversion to a district energy at some point in the future.

Action AE-4: Update bylaws (as necessary) to define allowances for alternative energy systems, based on a model bylaw to be developed regionally.

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.²⁵

The PRRD will develop a model bylaw that defines allowances for these systems in the context of the Peace region.

The District will modify the model bylaw as necessary or incorporate the allowances into the District’s existing bylaws.

²⁵ http://www.town.cardston.ab.ca/_data/docs/CardstonTownLUB1581July2009maps.pdf

Theme 5: Solid Waste



Goal: Our residents and businesses minimize waste.

State: In 2007, almost 71,000 tonnes of waste was disposed at PRRD landfills.

Indicators & Targets:

Indicator-10: Tonnes of CO₂ equivalent GHG emissions from solid waste disposed regionally.

Target-10: 35,000 tonnes less GHG emissions by end of RSWMP Phase 2
(Note: this indicator will be monitored by the Regional District)

Actions:

Strategy: Policies & Regulation

Action SW-1: Work with the Regional District 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 GHG 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.
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 District will continue to support the RSWMP Objectives and implement necessary programs, as defined in the RSWMP.

7. Implementation

The District will need to dedicate staff time and annual funding to support the implementation of this plan and help the community 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.

7.1 Personnel Requirements

Dedicated staff time will be required to prioritize, initiate, carry out and monitor the plan's activities. It is likely these activities will need to be incorporated into existing staff roles. Staff responsibilities will include:

- Continue participation on the Peace Region Climate Action Task Group to align activities regionally.
- Champion implementation of activities by communicating with staff and community partners.
- Monitor and report on activities internally and externally.
- Make connections with community partners to promote the plan and find areas for local government involvement.
- Develop internal awareness.
- Act as ambassadors in the community regarding energy and GHG emission reductions.
- Apply for funding through various provincial and federal programs to meet the plan objectives.

7.2 Funding Commitment

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

7.3 Monitor, Report, Re-evaluate

In applying an adaptive management approach to plan implementation, it is important to monitor changes in energy use and GHG emissions over time to gauge the effectiveness of activities being undertaken. To accomplish this, a monitoring program needs to be developed

that tracks specific indicators of progress. Proposed indicators for this plan are outlined in Section 6 and summarized in Table 7. Suggested data sources are also described, including three indicators that the District would need to start tracking at time of issuing building and development permits (see indicators 3, 4, and 9).

Table 7. Summary of Indicators for Monitoring Plan Implementation

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 15% from 2007 levels by 2020
		Reduce by 30% from 2007 levels by 2030
2. Percent of new District (corporate) buildings built to high energy efficiency standards.	District records	100% by 2020
3. Percent of existing homes renovated to high efficiency standards (exceeding EGH 80).	District to track this at time of issuing building permits	25% by 2020
		75% by 2030
4. Percent of new developments occurring in the Town Centre.	District to track this at time of issuing residential development permits	No target
5. Housing starts by structural type (Single-family, Duplex, Multi-family, Modular).	Statistics Canada	No target
6. Total transportation emissions (from personal and commercial vehicles).	CEEI updates (to be provided by MOE every 2 years 2010 and beyond)	Reduce by 10% from 2007 by 2020
		Reduce by 20% from 2007 by 2030
7. Percent of residents using alternative transportation to get to work (shuttle bus, walking, cycling).	Statistics Canada	30% by 2020
8. Percent of energy consumed in buildings derived from alternative energy sources.	Unknown at this time	10% by 2030
9. Number of alternative energy systems installed (e.g. solar roofs, geo-exchange, small wind).	District to track this at time of issuing building permits	50 systems by 2020
10. Tonnes of CO ₂ equivalent GHG emissions from solid waste disposed regionally.	Regional District to track and report	35,000 tonnes less GHG emissions by end of RSWMP Phase 2

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: List of Tools and 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%93-opportunities-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_f_or_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

Category	Source / agency	Example program, toolkit or resource
		annually to fund projects related to brownfield redevelopment, 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 Village may elect to use its annual CARIP grant to support both community and corporate (operational) climate action initiatives.

B: 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.

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. 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 to 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.