sustainable Dawson Creek
BRITISH COLUMBIA

On the Path to Carbon Neutral: Dawson Creek's Strategy

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March 2009

About Dawson Creek

Dawson Creek is a city of about 12,000 people in the center of the Peace River region of northeastern British Columbia. We are Mile 0 of the famous Alaska Highway and historically a farming community, although our economy has diversified to include forestry, oil and gas and transportation.

Our goal, defined and adopted through extensive public discussion, is to be a visionary community that works together for innovative social, cultural, economic and environmental vitality. Currently, much of our effort is focused on reducing the City's environmental impact and enhancing services for youth.

In January of 2005, the City initiated a Community Energy Plan that identified the type of energy consumed, the costs involved and the environmental implications (green house gas emissions).

The move to sustainability is a process. While the City has not reached its goal, we have drafted a clear action plan and have begun the journey. Ultimately, we are doing this for our children and our grandchildren, so generations to come will be able to live, work and play in this place we call home.

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1 Introduction

Dawson Creek is a recognized leader in British Columbia in implementing forward thinking energy efficiency and renewable energy projects and policies. We recognize that taking action to reduce emissions is one of the most significant things a municipality can do to combat climate change, and we are excited to meet this challenge head-on. We have successfully taken some first steps towards fulfilling our commitment to be carbon neutral by 2012, and there is much more to do. This document outlines the projects that will help move us closer to that goal, and explains how we intend to make these and other projects a reality.

In 2007, the provincial government legislated British Columbia's target of reducing greenhouse gas emissions by at least 33 percent below 2007 levels by 2020 and 80 percent by 2050 by passing the Greenhouse Gas Reduction Targets Act.[1] Most greenhouse gas emissions are released by burning fossil fuels such as gasoline, coal, and natural gas. Land-use planning in municipalities can also have a significant effect on overall emissions. These greenhouse gases are building up in the atmosphere, creating an increasingly thick blanket around the earth that traps more and more of the sun's heat, resulting in an overall rise in global temperatures. Many B.C. communities are already feeling the effects of climate change: increasingly frequent water shortages and extreme weather events, increased stress on fisheries and forests (including pine beetle infestations), and higher costs for insurance coverage. By reducing greenhouse gas emissions significantly in B.C. and around the world, humans have the ability to begin stabilizing the concentrations of greenhouse gas emissions in the atmosphere.

As part of the broader strategy to achieve B.C.'s targets, the Climate Action Charter was developed to encourage local governments to make their operations carbon neutral by 2012, to measure and report on their community's emissions, and to work toward creating more compact, complete, energy efficient communities. Dawson Creek signed the Climate Action Charter in 2007 and we are committed to being carbon neutral in our

[1] Local governments are not subject to this legislation, they are required to include targets, policies and actions in their Official Community Plan by 2010 and in their Regional Growth Strategies by 2011.

municipal operations by 2012. Making the commitment to become carbon neutral is one way of demonstrating leadership and kick-starting B.C.'s transition to a climate-friendly future. Dawson Creek is committed to achieving deep reductions in emissions, and we recognize that both provincial and municipal governments have a role to play in reducing greenhouse gas emissions.

Being carbon neutral involves two things: 1) reducing our own emissions as much as possible, and 2) supporting projects that reduce emissions equivalent to our remaining emissions by investing in offsets. This document explains our strategy for making our carbon neutral commitment a reality, and outlines concrete actions to achieve our goal. Please contact us if you have any comments or suggestions, or if you would like more detailed information on any of our efforts.

1.1 Measuring Our Emissions

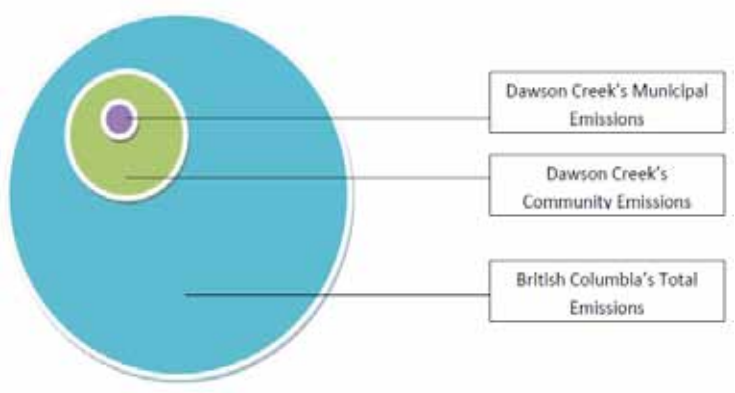
For Dawson Creek to become carbon neutral in our municipal operations, we are doing as much as possible to reduce the greenhouse gas emissions from our own operations and then will invest in high quality emissions offsets projects to bring our net emissions to zero. Our municipal emissions generally come from three sources:

- Heating and powering the City's buildings and infrastructure (with natural gas and electricity).
- Driving municipal vehicles (and the gasoline and diesel we burn to do so).
- Staff air travel (and the jet fuel used by the planes). We haven't tracked staff travel before, but we'll be including this in our carbon neutral calculation in 2009.[2]

We considered including a variety of other measures in our carbon neutral calculations, including employee commuting, paper use, and landfill emissions. Although municipalities and businesses sometimes include the emissions from commuting and paper-use, we have excluded them for now because we did not have enough reliable data to accurately estimate our emissions. We may decide to include these measures in the future. Emissions from our landfill are included under regional efforts and will be regulated by B.C.'s Environmental Management Act.

[2]Under the B.C. Climate Action Charter, municipalities are only responsible for measuring and reporting emissions from facilities, infrastructure and the municipal fleet. Dawson Creek is going above what is required in the Charter by including employee travel. We have begun tracking emissions from staff travel to understand its effect on Dawson Creek's overall emissions.

Figure 1 shows Dawson Creek's municipal emissions in the context of community-wide and province-wide emissions. This diagram is not to scale, but it does show how Dawson Creek's emissions fit in the broader picture.



1.2 How Dawson Creek is Becoming Carbon Neutral

Dawson Creek is following a six step approach to becoming carbon neutral. Our approach started with our Climate Action Charter commitment. From there, we identified the scale and scope of carbon emissions, and are now in the process of identifying and implementing opportunities to reduce emissions. These include opportunities to become more energy efficient, to install more renewable energy systems, and to switch to cleaner fuels.

Dawson Creek strongly prefers striving to become carbon neutral by reducing emissions from our own activities. However, we recognize that, at least initially, we will likely have to purchase carbon offsets to reduce our net carbon emissions to zero. Emission reduction opportunities will continue to be identified, so that over time our reliance on offsets will decrease.

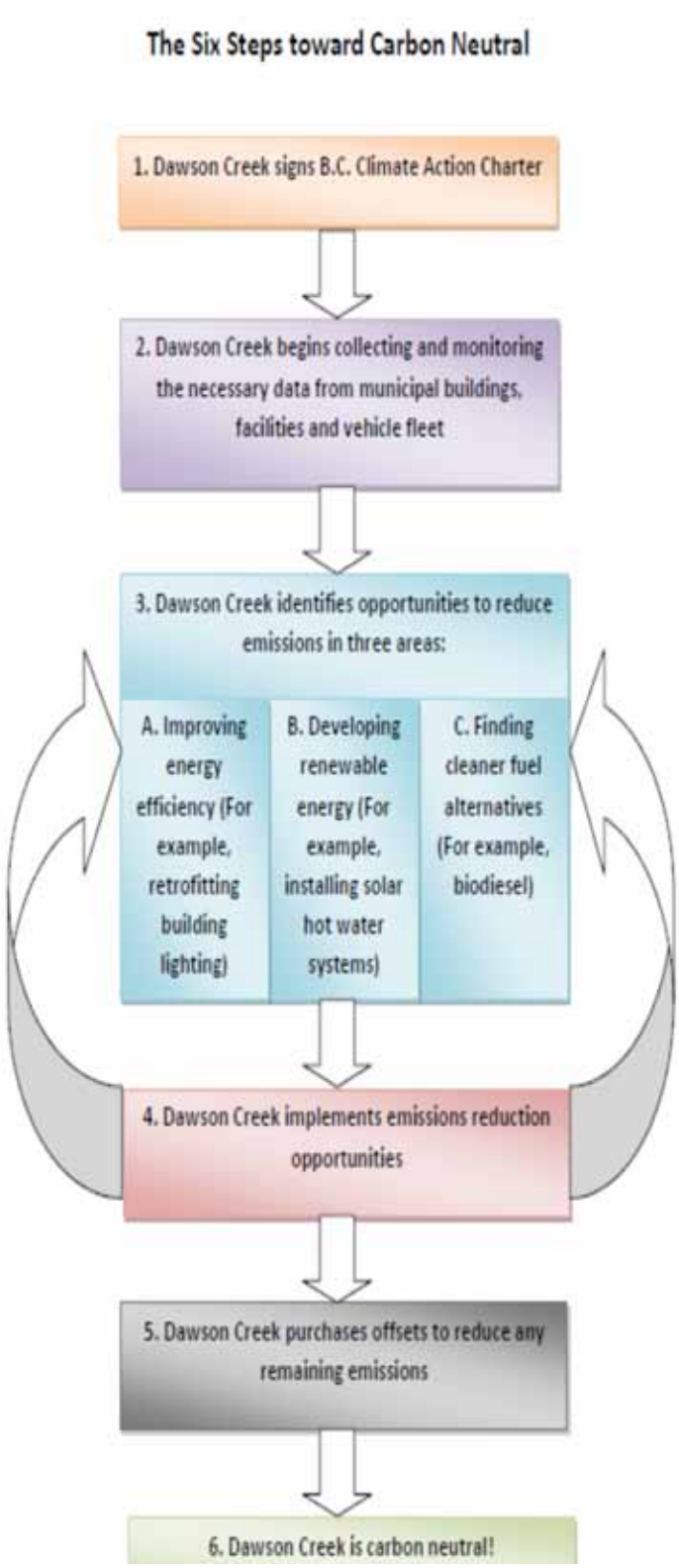


Figure 2 - The Six Steps Toward Carbon Neutral

2 The Challenge

Achieving carbon neutrality is a significant challenge for any municipality because it means reversing the trend of ever-increasing emissions that has typically been the norm in B.C. In Dawson Creek, as shown in Figure 3, our best estimate is that emissions from municipal operations have increased by 34% between 2004 and 2007 to a total of approximately 3,200 tonnes in 2007.[3] This increase is largely due to the construction of the multiplex facility in 2007. Indeed, considering only buildings that existed before 2007, energy consumption has actually decreased by approximately 10% since 2004 due to conservation and energy efficiency improvements. We can't ignore new construction however, and as Dawson Creek grows and municipal services expand, emissions will likely grow (even with our best conservation and efficiency efforts).

Understanding Dawson Creek's Energy Consumption and Emissions

In 2007, 53% of fuel consumption was attributed to natural gas, 36% to electricity, and 6% and 4% to diesel and gasoline respectively. Even though natural gas only accounts for 53% of consumption, it makes up 74% of Dawson Creek's emissions. Conversely, electricity accounts for 36% of consumption but is only responsible for 6% of emissions.

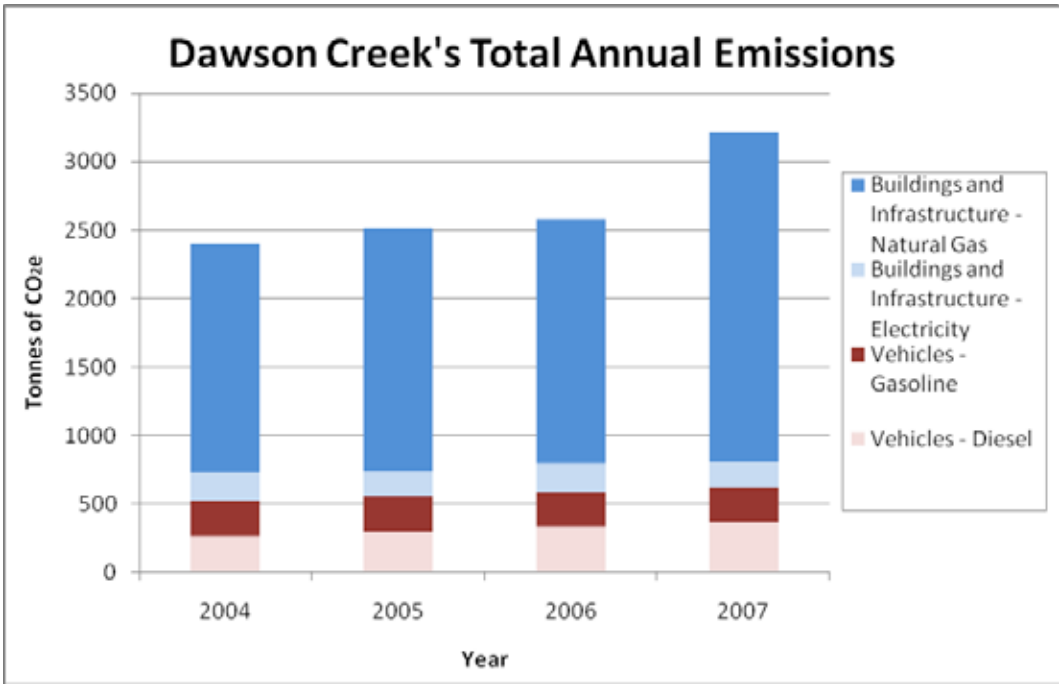


Figure 3 - Total annual emissions (excluding air travel).

[3]The data from 2004 and 2007 were collected using different methodologies. From 2007 on, the data collection should be consistent and will therefore provide a more accurate picture of emissions trends.

Becoming carbon neutral by 2012 will be a big challenge. Figure 4 illustrates how emissions could grow to approximately 3,400 tonnes (a conservative increase of 1% per year) if we took a “do nothing” approach to dealing with climate change. The dotted line illustrates the scale of the challenge; we need to change from a slightly increasing emissions trajectory to a steeply declining emissions trajectory. To become carbon neutral by 2012, we will need to reduce our emissions by 645 tonnes per year.

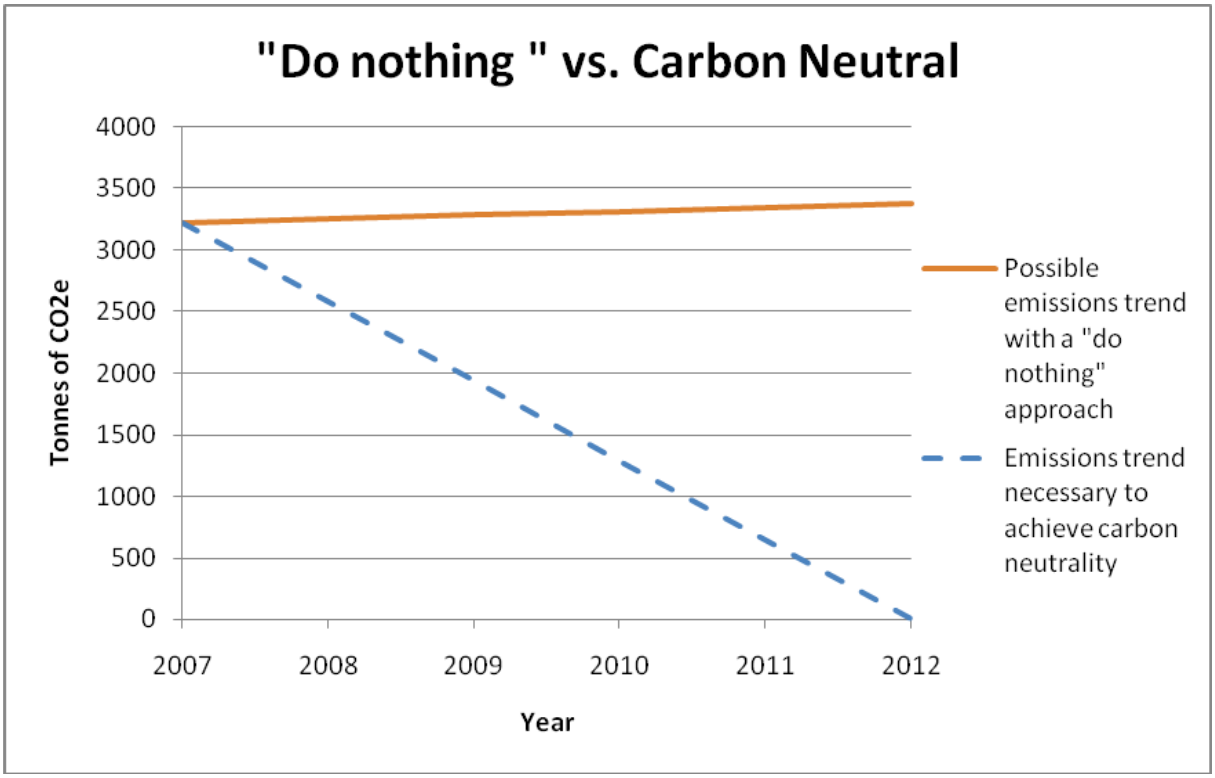


Figure 4 – “Do nothing” vs. “Carbon Neutral” emissions trajectories.

3 Progress to Date

Although emissions have been increasing since at least 2004, the City has begun to take action to slow and reverse that trend. Some of these actions have already prevented even greater increases in emissions and others will begin to show results after 2007. This section highlights these initial successes with our municipal operations.

3.1 Conservation and Energy Efficiency

- Not counting new construction, conservation efforts in municipal buildings have resulted in a 10% reduction in consumption from 2004 to 2007.
- Dawson Creek has conducted energy audits on six municipal buildings to understand how energy consumption could be reduced.
- Dawson Creek replaced over 200 city-owned street lights with more efficient bulbs and ballasts. All city-owned traffic lights have also been replaced with higher-efficiency LED technology.
- Dawson Creek retrofitted lighting systems in the Fire Hall, RCMP station, City Hall, Kin arena, and the mechanics welding shop.

The Success of Energy Conservation in Dawson Creek

In 2007, Dawson Creek participated in BC Hydro's "Turn It Off" campaign. The city was able to reduce its consumption in targeted municipal buildings by 10%. Dawson Creek won 2nd prize for its efforts during the three month program, and is using the $2,500 prize to provide green community workshops for the community. The workshops will relate to not only energy conservation, but also water conservation, recycling, composting, and idling reduction.

3.2 Renewable Energy

- Dawson Creek has installed solar panels to generate electricity across the community, including on traffic signs, pedestrian crossings, bus stops and trail lights.
- Solar hot water heaters have been installed on City Hall, the Fire Hall, the RCMP building, Sudeten Hall, the airport and the public works yard.

The Success of Solar Hot Water Systems in Dawson Creek

Solar hot water systems use the sun's heat to pre-heat a building's water supply so that less natural gas is needed to heat the water. To date, Dawson Creek has installed systems on six of its municipal buildings, with plans to do more. Dawson Creek has been named a Solar Community by SolarBC, and is working with the West Moberly First Nation to advance the market for solar hot water systems in both communities.

3.3 Better Vehicles

- As a result of our Green Vehicles policy, Dawson Creek purchased five compact SUVs and two hybrid vehicles. These vehicles are smaller and more efficient, and were selected specifically to help reduce the overall emissions of the vehicle fleet.
- Dawson Creek is participating in a provincial pilot to explore the use of hybrid electric vehicles in municipalities in Canada. Dawson Creek is also working with Northern Lights College to increase B.C. capacity by helping to train local mechanics as certified hybrid installers. Progress has been delayed unfortunately, but we remain committed to the project.

3.4 Improving our Policies

Dawson Creek has made significant changes to municipal policies to facilitate conservation, energy efficiency, and renewable energy improvements. These changes include:

- Our *Green Buildings Policy* guides us to reduce energy use, ensure green procurement, improve health, and pursue renewable energy options in existing buildings.
- Our *Green Vehicle Policy* helps us choose the most efficient vehicles and cleanest fuels, and guides us to keep our fleet well maintained. We have also developed a vehicle purchasing tool, which helps us evaluate the life-cycle costs of new vehicles. This helps us account for the cost of carbon emissions, and to select the most efficient vehicle for the job.

Taking Action in the Community

In addition to our focus on reducing emissions from municipal operations, we have several community-wide initiatives, including:

- ***Community Sustainability Planning:***
  This includes developing and monitoring community sustainability indicators. This process will help reduce Dawson Creek's overall community emissions, and ensure that development in Dawson Creek takes into account environmental, economic, social and cultural considerations.

- ***Community-wide Energy Planning:***
  In addition to looking at our own operations, we are developing policies and strategies to reduce community-wide emissions. This includes developing new policies to encourage and facilitate energy efficiency and renewable energy in the community.

4 New Opportunities

The actions Dawson Creek has taken so far to reduce emissions are positive first steps on the road to achieving our carbon neutral commitment. However, these actions alone will not be enough to achieve carbon neutrality, and Dawson Creek is committed to continuously identifying emissions reductions opportunities. In particular, we've looked at opportunities to reduce emissions by making our buildings more efficient, replacing natural gas heating with biomass fuel, and generating our electricity from the wind.

Figure 5 shows the potential impact of these opportunities. The three shaded green bars show the emissions reduction potential from each opportunity. In total, they could cut our emissions to 1,546 tonnes by 2012 – a 54% reduction from the projected 2012 emissions.[4] The blue areas on the graph represent the anticipated carbon emissions after all three reduction opportunities have been implemented. This is the amount of emissions that Dawson Creek would need to purchase offsets for in 2012 unless additional emissions reduction opportunities are identified. The next sections provide more information on the specific emissions reductions opportunities.

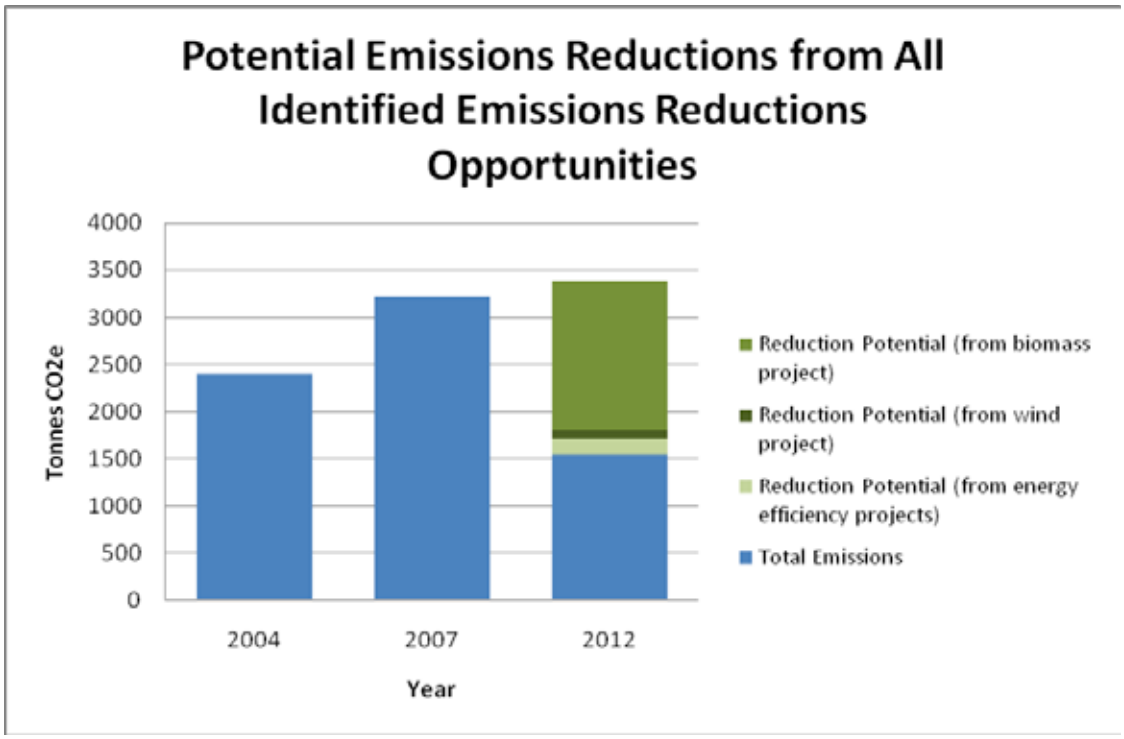


Figure 5 - Potential emissions reductions from identified opportunities.

[4]All percentage reductions are relative to the projected 2012 levels.

4.1 Energy Efficiency Retrofits

In September 2006, a series of energy audits were performed on six Dawson Creek municipal buildings. These audits helped identify opportunities to reduce emissions simply by making the buildings more efficient (see Table 1). The audits on the six buildings were not exhaustive, but they did identify enough opportunities to reduce Dawson Creek's emissions by approximately 170 tonnes (a 5% reduction from projected 2012 levels).

Building	Audit Recommendations	Reductions (tonnes)
City Hall	Install higher efficiency lighting (incandescent bulbs to CFLs for example)	28
	Reduce fan operation in the heating system	
	Begin heat recovery of exhaust in HVAC system	
	When re-roofing, add insulation	
Curling Rink	Install a low-e[5] ceiling over the ice rink	23
	Install solar pre-heating for ventilation air	
Chamber of Commerce	Install triple-glazed, low-e, energy efficient windows for the second floor	4
	Upgrade heating system (to condensing furnaces)	
	Install heat recovery ventilator on exhaust system	
	Retrofit the lighting system with electronic ballasts	
Fire Hall	Upgrade wooden garage doors to insulated metal	53
	Remove unit heaters and install infrared gas heaters between garage stalls	
	When re-roofing, increase roof insulation	
	Retrofit the lighting system with electronic ballasts	
Kin Arena	Install low-e ceiling over the ice rink	17
	Install a pony motor for brine pump[6]	
	Install solar air pre-heating for ventilation air	
	Heat reclaim from ice plant to preheat for ice rink flooding	
	Install vending machine sensors on machines in lobby	
Memorial Arena	Install a low-e ceiling over the ice rink	45
	Install a pony motor for brine pump	
	Install solar air pre-heating for ventilation	
	Heat reclaim from ice plant to preheat for ice rink flooding	
	TOTAL REDUCTIONS	**170**

Table 1 - Potential emissions reductions from identified opportunities.

4.2 Biomass Energy

Biomass resources such as wood chips, straw pellets and manure can be burned to produce heat and/or electricity. Biomass options have been investigated as a potential way to replace natural gas as the heating fuel for several of Dawson Creek's municipal buildings. With the installation of three biomass burners and distribution systems, the City

[5]A low-emissivity (low-e) material has a very low potential to transfer radiant energy from one surface to another.
[6]A pony motor is a smaller motor that can be used during times of lower load.

could save between $177,000 and $250,000 in heating costs annually as compared to heating with natural gas. This would result in a reduction of approximately 1,581 tonnes per year (a 47% reduction from projected 2012 levels).

Although the suggested biomass facilities offer considerable promise, the City is proceeding cautiously. We want to make sure that any project is a good investment from a climate perspective, and that it won't have any unintended environmental impacts.

4.3 Wind Energy

Dawson Creek has been pursuing opportunities for a wind energy project near the community, which could be used to provide electricity for municipal facilities and the broader community. Based on a 2008 study, there is potential for an economically viable wind project near Dawson Creek. The report estimated that a 1.5 megawatt (MW) turbine installed near the site of the data collection tower would have an annual electricity production of approximately 3,900,000 kilowatt hours (kWh) (this is approximately 1% of what will be produced by Bear Mountain). If this production was used exclusively to offset Dawson Creek's electricity consumption, a 1.5 MW wind turbine could have the potential to reduce annual emissions by approximately 86 tonnes (a 3% reduction from projected 2012 levels).

Over time, as future energy efficiency projects reduce our demand for electricity, the wind project may supply all the electricity necessary for our municipal operations. Any excess electricity could be used for other uses, such as for broader community electricity demand. It is also possible that the City could consider putting up multiple wind turbines to generate more power.

5 Next Steps

The long-term success of our strategy to become carbon neutral with minimal reliance on offsets will be judged in part on the actions we take between now and 2012. Although we will still need to purchase some offsets in 2012, the actions we take between now and then will determine if we're on a course towards significant cuts in our emissions.

We have started to put into place the projects and policies that will help drive a successful transition to a low-emissions community, and we are committed to taking the next steps. These include acting on the information we already have, collecting better information where it's needed, developing better policy, and further exploring the option to purchase carbon offsets.

Highlights for 2009

Building Retrofits

- Completing the major retrofit of City Hall, including the installation of high efficiency lighting, heat recovery in the HVAC system, improved roof insulation, and solar PV panels.
- Completing building audits on all remaining municipal buildings.

Renewable Energy

- Continuing to explore the potential of biomass heating for our buildings by engaging with the community and testing technology options.
- Continuing to explore the potential for wind turbines in our community by beginning detailed wind monitoring by mid-2009.
- Completing the installation of solar PV systems on municipal bus stops.

Vehicles

- Designating a fleet manager.
- Pursuing E3 Fleet designation.
- Completing a comprehensive review of opportunties to reduce emissions from vehicles.

Employee Travel

- Beginning to track emissions from staff flights.

Offsets

- Establishing a Carbon Neutral Investment Fund.
- Beginning to develop an Offset Purchase Policy (to be completed in 2010).

5.1 Acting on the Information We Have

Dawson Creek is committed to taking action on all of the energy efficiency opportunities in our facilities and infrastructure that have been identified to date. We are undertaking a major energy retrofit of City Hall, which is a direct result of the energy audits we have completed. As part of this retrofit we are installing higher efficiency lighting, implementing heat recovery in the HVAC systems, and adding insulation in the roof. We are also adding a solar PV system to City Hall as part of the backup system. In addition, Dawson Creek is committed to installing solar hot water heaters on the remaining municipal buildings, and in 2009 we will complete the installation of solar PV systems on Dawson Creek's bus stops.

Dawson Creek has also committed to taking action to further green its municipal fleet. In 2009, Dawson Creek will designate a fleet manager who will be tasked with finding ways to reduce emissions from our fleet. As part of our commitment to reduce emissions from our fleet, we will also be pursuing E3 Fleet designation in 2009. Finally, as part of a provincial pilot project, we will continue testing the viability of plug-in hybrids in our community.

5.2 Collecting Better Information

In too many cases, Dawson Creek still doesn't have enough information to implement certain solutions. A key component of our next steps will be eliminating those gaps in information so that we're capable of making informed decisions sooner rather than later. Specifically, we are committed to:

- Completing energy audits on buildings that have not yet been investigated.
- Implementing a process to track employee air travel emissions starting in January 2009.
- Adding meters to existing solar hot water installations.
- Completing a detailed study that explores options to reduce emissions from our fleet (plug-in hybrid vehicles and bio-diesel opportunities for example).
- Continuing to move forward with the possible wind project. We will have a wind site selected with a detailed monitoring plan underway by mid-2009.
- Continuing to move forward with the possible biomass project. The next step is to engage with project stakeholders to secure sources of pelletized waste, and to begin the community consultation process. We will also begin testing the biomass technology options, particularly to identify any potential effects on local air quality.

Consulting the Community

As part of our strategy to collect the best information, Dawson Creek has engaged broadly with constituencies inside and outside of the community. These have included City staff and council, the interested public, local business, environmental groups, utilities, and the provincial government.

We also established a Climate Change Advisory Committee to help guide our actions on climate change. We recognize the importance of ongoing consultation with the community and other relevant stakeholders .

5.3 Implementing Better Policy

It is important to develop city policies that reflect and facilitate Dawson Creek's efforts to become carbon neutral by 2012. This will include:

- Establishing the Carbon Neutral Fund: The City will set aside $100 per tonne for all municipal emissions. These funds will be used to invest in projects that reduce municipal emissions. The $100 per tonne is more than we will likely have to pay for offsets in 2012, but by investing our dollars locally now, we will reduce our overall emissions and therefore will reduce the number of offsets we will be required to buy. By investing in emissions reduction projects now, we will also be insulating ourselves from the future risk of fluctuating energy and offset prices.
- Developing our Offset Purchase Policy: We recognize that we will likely need to purchase offsets to meet our carbon neutral commitment, so it will be important to set guidelines on the types of offsets the City is willing purchase. This policy development will be informed by international offset standards and by provincial regulations. In particular, this policy will be informed by how the B.C. government defines offsets for the Pacific Carbon Trust. We expect our policy to be complete by 2010.

As with all of our municipal policies, we are committed to continually revisiting our policies to ensure that they are providing effective guidance.

5.4 Purchasing Offsets

Dawson Creek is attempting to achieve carbon neutrality primarily by identifying and implementing projects that reduce emissions. Between now and 2012 however, we're unlikely to reduce carbon emissions to zero. To become carbon neutral, we'll likely have to purchase some carbon offsets.

The overall cost of those offsets will depend on the cost-per-tonne for carbon offsets, and how successful we are in reducing

What is a Carbon Offset?

A carbon offset allows a government, individual, or business to cancel out, or 'offset,' emissions. By paying for the offset, the purchaser provides investment money for a project that will reduce emissions, and which wouldn't have happened without that investment.

The B.C. government has set up the Pacific Carbon Trust to acquire high quality carbon offsets to help the public sector become carbon neutral by 2010. Municipalities will also likely be able to purchase offsets from the Pacific Carbon Trust, but the details of this program are still being determined.

emissions. Figure 6 illustrates how the overall cost could vary. The four scenarios represent different levels of success in reducing emissions and the corresponding offset liability. In Scenario A, we would act on all of the identified emission reduction opportunities. In Scenarios B, C and D, our emissions reductions would range from acting on none of the identified reduction opportunities (Scenario B) to doing 20% more than we have currently identified (Scenario D). If offsets are assumed to cost $50 per tonne in 2012, the overall cost would range between $169,134 and $58,914 for the four scenarios.

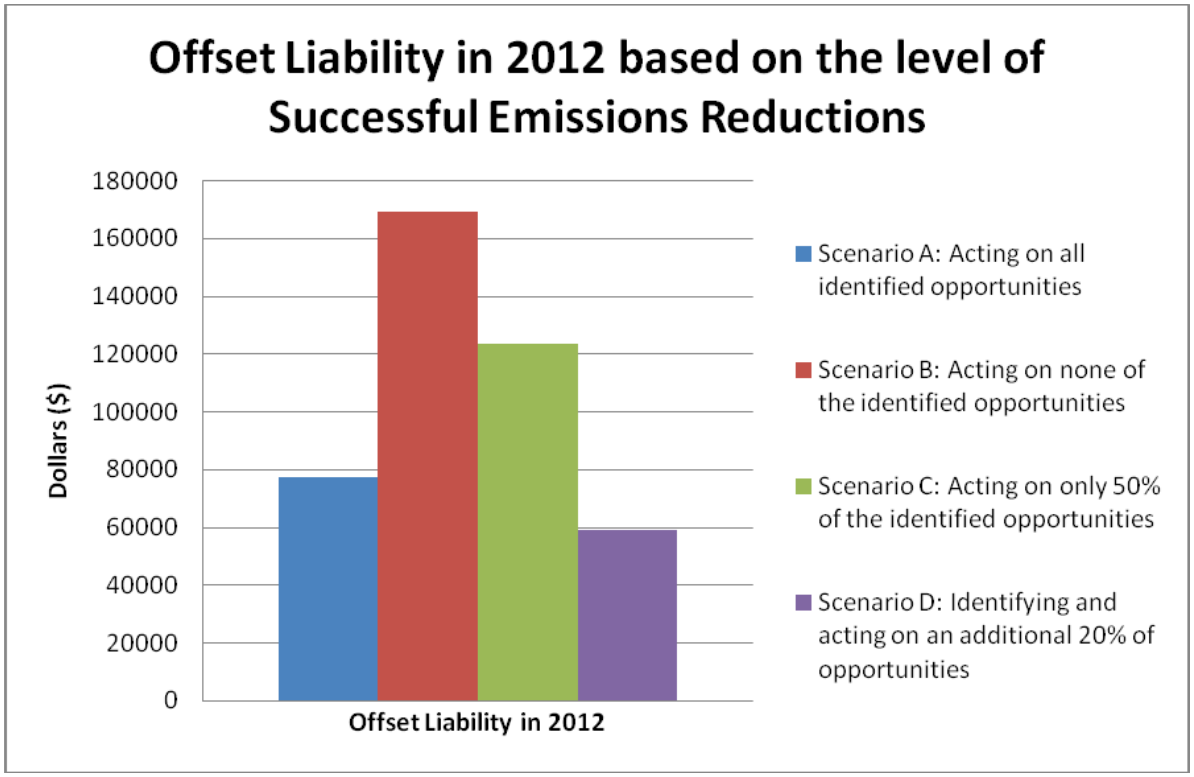


Figure 6 - Offsets liability in 2012 based on Emissions Reduction Scenarios

One certainty in this analysis is that taking stronger action to reduce our emissions will reduce the amount we pay for offsets and keep more of our dollars in the community. The City is committed to purchasing enough offsets to become carbon neutral, but our strong preference is to prioritize improvements to our own facilities, infrastructure and fleets.

Acknowledgements

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