

# Planning for Greenhouse Gas Reductions

Update to Dawson Creek's Community Energy Plan  
(2008) and Carbon Neutral Plan (2009)



October 2011

# Acknowledgments

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# Executive Summary

As a community we have taken significant strides in addressing the challenges of climate change. Since 2003, we have demonstrated that we have taken the feedback from the community seriously, and that we are committed to taking action to reduce our own emissions to help prevent the most dangerous impacts of climate change. This report helps to integrate the work that we have done on sustainability planning, corporate energy planning and community energy planning, and outlines a clear plan for how we plan to move forward to achieve our targets.

At both the corporate and community scale, we have set targets to reduce our emissions by:

- 14% below 2007 levels by 2012,
- 33% below 2007 levels by 2020,
- 85% below 2007 levels by 2050.<sup>1</sup>

The greenhouse gas reduction targets we have set for ourselves are bold, but achievable. This report provides outlines our total emissions at both the corporate and community scale, and explains how these are changing over time. We also update our completed, ongoing and on-hold actions, and identify potential next steps to help get our emissions on a downward trend. This information is presented in the following chapters of the full report:

- Background and the B.C. context (Chapter 1),
- Dawson Creek's approach to reducing emissions (Chapter 2),
- Emissions, actions and next steps at the corporate scale, including an assessment of the progress towards meeting our corporate targets (Chapter 3),
- Emissions, actions and next steps and the community scale, including an assessment of the progress towards meeting our community targets (Chapter 4),
- Conclusions and recommendations for adoption by Council (Chapter 5).

## Corporate Inventory: Actions, Next Steps and Targets

In 2010, Dawson Creek's emissions were 3,485 tonnes of CO<sub>2</sub>e. This was equivalent to 103,992 GJ of energy, and cost \$1,474,385. Seventy-five percent of Dawson Creek's emissions are attributed to heat (primarily from natural gas), 16% to vehicles and fleet, and 9% to power (from electricity). Compared to the 2007 inventory, total emissions in Dawson Creek increased by 23% between 2007 and 2010. Emissions from electricity increase by 59%, natural gas emissions increased by 27%, and emissions from fuel consumption (for the fleet) *decreased* by 6%.

New processes at the water treatment plant and the addition of the multiplex facility are two key factors that contributed to our increase in emissions. However, we have been actively working to reverse our

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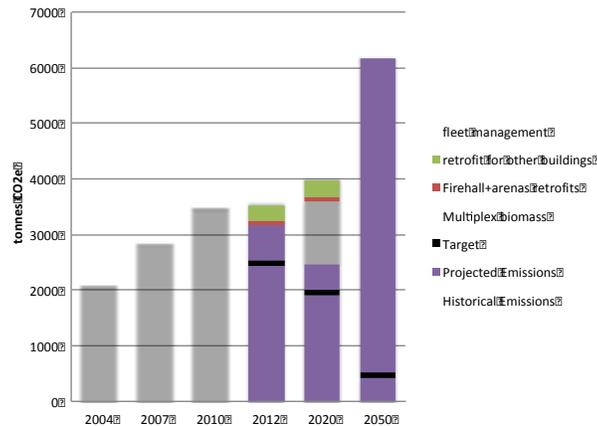
<sup>1</sup> Dawson Creek's original targets used a base year of 2006. This report recommends updating both the corporate and community targets to use a base year of 2007. This will align with the up-to-date inventories completed for this documents, is still in-line with science-based targets, and aligns with the provincial greenhouse gas targets

growing emissions, and have seen some clear success in reducing our overall emissions from our vehicle fleet. Nevertheless, it is clear that we need to renew our commitment, and increase our efforts to meet our targets. The table below provides a summary of actions (categorized as completed, ongoing, and on-hold) that we have been working on since our last carbon neutral plan, and also outlines recommended next steps to get our emissions on a downward trend in the future. The recommended next steps will be evaluated and prioritized as part of our strategic planning process.

**Table 1 – Corporate Inventory: Completed, Ongoing, and On-hold Actions, and Recommended Next Steps**

	<b>Buildings</b>	<b>Transportation</b>	<b>Alternative Energy</b>	<b>Supportive Policies</b>
<b>Completed Actions</b>	Energy efficiency retrofits to City Hall.	Including employee travel in corporate inventory	Installation of solar hot water and solar PV on municipal buildings	Development of a Carbon Fund Policy  Development of an Offset Purchasing Policy
<b>Ongoing Actions</b>	Energy efficiency retrofits for all other municipal facilities.		Biomass project for the multiplex	
<b>Actions On-hold</b>			Wind energy project	
<b>Recommended Next Steps</b>	<p>Re-consider the potential for better roof insulation, for solar air pre-heating and heat reclaim for the two arenas.</p> <p>Consider the possibility of using waste heat as part of a district heating system.</p> <p>Reconsider using infrared gas heaters between garage stalls at fire hall.</p> <p>Complete and update audits for all of Dawson Creek’s municipal buildings and facilities.</p> <p>Explicitly include energy efficiency upgrades and energy costs as a consideration when planning all building upgrades.</p> <p>Implement a monitoring system to track the energy performance of individual buildings (including consideration of energy management software).</p> <p>Review and update the Corporate Green Building Policy.</p>	<p>Assign fleet management responsibility, and potentially pursue E3 fleet designation.</p> <p>Analyze the performance of Dawson Creek’s plug-in hybrid, and consider piloting a full electric vehicle in the municipal fleet.</p> <p>Review and update Corporate Green Vehicles Policy.</p>	<p>Move forward towards the implementation of the biomass project for the multiplex facility.</p> <p>Engage with the PRRD to discuss potential for a community-owned wind project.</p> <p>Install meters to collect data from the already-installed solar hot water and solar PV systems. Develop a system to record and monitor the data to facilitate tracking and reporting.</p> <p>Continue to install additional solar hot water and solar PV systems when appropriate on municipal buildings, facilities and infrastructure (i.e., bus stops, traffic lights, etc.).</p>	<p>Implementation of the Carbon Fund in 2012.</p> <p>Implementation of the Offset Purchasing Policy to select offset purchases for 2012.</p>

The graph below provides illustrates the estimated GHG reductions from the quantifiable recommended next steps identified in the table above and compares this to our emissions reduction targets.



**Figure 1 - Impact of potential GHG reduction opportunities on projected corporate emissions**

Given this assessment, Dawson Creek is not on-track to meet our 2012 target. The biomass project has the most significant future reduction potential, but it will likely not be in operation by 2012. However, if all projects are implemented by 2015, even with the projected growth in corporate emissions, Dawson Creek can achieve about a 25% reduction in emissions relative to 2007 by 2015. This puts Dawson Creek on-track to achieve the 2020 target of 33% below 2007 emissions by 2020. Additional opportunities will still need to be identified and implemented to fully meet the 2020 target.

Under the Climate Action Charter, we are committed to be carbon neutral by 2012. We are reducing our emissions as much as possible, but we will likely need to purchase offsets to meet our commitment in 2012. Under a business-as-usual scenario, without taking any further action to reduce our emissions, our offset liability in 2012 will be \$89,650.<sup>2</sup> If all the opportunities identified above are implement by 2012 (except the biomass project), Dawson Creek’s offset liability can be lowered to \$78,900. This is a yearly saving of more than \$10,000, plus a reduction in our contribution to the carbon fund of \$43,000, and energy cost savings in the range of \$79,000 to \$278,000.

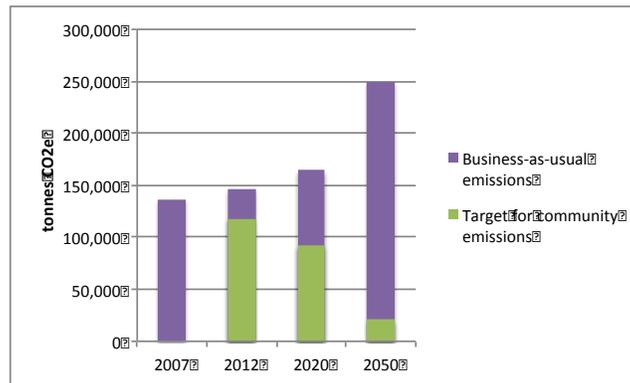
## Community Inventory: Actions, Next Steps and Targets

In 2007, the community of Dawson Creek consumed 2,639,920 GJ of energy and emitted 136,968 tonnes of CO<sub>2</sub>e. Sixty-three percent of Dawson Creek’s community emissions were from transportation, 36% from buildings, and 1% from solid waste. In comparison, the 2005 inventory found that Dawson Creek consumed 2,042,367 GJ of energy and emitted 110,082 tonnes of CO<sub>2</sub>e in 2005. Comparing these two inventories is complicated by the fact that the methodology used to assess community emissions changed significantly between the 2005 pilot and the 2007 CEEL.

Although a more thorough accounting and methodological improvements in 2007 can explain a portion of the increase in emissions, we still believe that a portion of increase in emissions is real. As Dawson Creek’s population and wealth grows, our overall community emissions will also grow if we take a business-as-usual approach. We will collectively need to implement significant emissions reduction actions to counteract the upward pressure on emissions and to get overall community emissions on a

<sup>2</sup> This assumes the cost of offsets will be \$25 per tonne, and that Dawson Creek’s emissions increase by 1.4% per year.

downward trend. The graph below illustrates an estimate of our growth in emissions under a business-as-usual scenario, and shows where our emissions need to be to meet our community targets.



**Figure 2 - Projected community emissions relative to community targets**

To help to reverse the growth of our emissions, the table below provides an overview of the actions we have undertaken, and it also identifies recommended next steps. These next steps will also be evaluated and prioritized as part of our strategic planning process.

**Table 2 - Community Inventory: Completed, Ongoing, and On-hold Actions, and Recommended Next Steps**

	<b>Buildings</b>	<b>Transportation</b>	<b>Alternative Energy</b>
<b>Completed Actions</b>			Wind feasibility study Waste energy pre-feasibility study
<b>Ongoing Actions</b>	Local improvement charges Green Building Leaders: Development of a renewable energy requirement Green Building Leaders: Mandatory building labeling Solar hot water-ready bylaw	Develop a community transportation plan	Support for the development of a provincial feed-in tariff
<b>Actions On-hold</b>	N/A	N/A	N/A
<b>Recommended Next Steps</b>	Continue our leadership role within the Green Building Leaders project to advance provincial policies such as the renewable energy requirement, energy efficiency labeling, and other streams.  Begin enforcement of the solar hot water ready bylaw.  Explore new possibilities to reduce energy consumption from commercial buildings in Dawson Creek; this could include:  Host partner for the first Climate Smart cohort in Dawson Creek  Target the top 5 – 10 energy users in Dawson Creek and facilitate their connection to Power Smart and LiveSmart.	Expand the transportation planning region-wide.  Commuter challenge with City staff and either other municipalities or large employers in Dawson Creek.  Northern electric vehicle network – analyze the feasibility and potential for the use of electric vehicles in northern communities. This could include:  - Analysis of the existing plug-in hybrid.  - Piloting a full EV in the municipal fleet.	Explore the potential of district energy systems in Dawson Creek. Two specific potential next steps include:  <ul style="list-style-type: none"> <li>Consider DE connectivity requirements (i.e., develop a district energy-ready bylaw)</li> <li>Work with the Peace Energy Co-operative to develop a renewable energy compatible district energy system for the Civic Cluster</li> </ul> Develop a passive solar development permit area (DPA) that would require that all new buildings be sited in a way that would maximize the passive solar gain potential of the structure.

## Conclusions and Recommendations:

We recognize that reducing our emissions and achieving our targets will be a significant challenge, and will require a significant shift away from “business-as-usual”. This report clearly shows us where we stand with our emissions, and provides a clear roadmap for future action. This is a significant achievement, and places us in an excellent position to increase our efforts to reduce emissions. To facilitate this shift in our approach, we recognize that there are internal processes and structures that will help to integrate the climate, energy and sustainability planning more seamlessly with the day-to-day operations of the City. Hiring a Community Energy Manager in 2012 will be critical to enabling this integration.

We are continuing to show leadership in the province by enacting innovative policies to support the implementation of emissions reduction project. In particular, the implementation of the Carbon Fund was a key success in 2011. By putting aside \$100 per tonne of GHG from our own operations, we have given ourselves a monetary incentive to reduce emissions, and have also ensured that there are dedicated funds to implement emissions reduction projects.

The recommendations below are for consideration by Council, and will enable Dawson Creek to continue to be a leader on climate, energy and sustainability action in B.C.

### Recommendations: Policies and Procedures

- Use the Sustainability Dashboard to report regularly to council on progress on these initiatives. Consider this tool when doing yearly strategic planning processes to ensure that the objectives, progress and actions articulated in the Sustainability Dashboard align with Dawson Creek’s overall planning and objectives.
- Use the Sustainability Dashboard as an input to existing budget planning processes to ensure actions that are identified as a priority in the Dashboard are appropriately accounted for in the budget.
- Review the current sustainability indicators for suitability and data availability, and design procedure to compile this data on an ongoing basis.
- Outline specific objectives in each sustainability category identified in the sustainability plan (and in the Sustainability Dashboard), and identify specific targets for key indicators.
- Assign specific responsibility and accountability for greenhouse gas reductions. This could include adding this into employee job descriptions and reviews.
- Facilitate the hiring of a Community and Corporate Energy Manager (CEM).

### Recommendations: Corporate Inventory

- Update Dawson Creek’s corporate emissions reduction targets to have a baseline year of 2007. This will align with the up-to-date inventories completed for this documents, and will align with the provincial greenhouse gas targets. The new updated targets at both the corporate and community level would be:
  - 14% below 2007 levels by 2012
  - 33% below 2007 levels by 2020
  - 85% below 2007 levels by 2050

- Require (as part of any new service agreement or contract) that contractors report the fuel used to deliver any traditional service included in Dawson Creek’s corporate inventory. This information must be included in Dawson Creek’s corporate inventory (and reported to the provincial government) going forward.
- Implement a process to monitor and track energy consumption for individual buildings and vehicles. This may include implementing energy management software. By tracking individual buildings, vehicles and the performance of renewable energy installations, the impact of specific emissions reduction actions will be much easier to quantify. As well, significant increases or decreases in energy consumption will be flagged (and addressed if necessary) much more quickly.
- Consider the potential next steps identified by this report (and captured in the Sustainability Dashboard) as part of Dawson Creek’s Strategic Planning process, and prioritize the actions moving forward.

## **Recommendations: Community Inventory**

- Update Dawson Creek’s community emissions reduction target to have a baseline year of 2007. This will align with the up-to-date inventories completed for this documents, and will align with the provincial greenhouse gas targets. The new updated targets at both the corporate and community level would be:
  - 14% below 2007 levels by 2012
  - 33% below 2007 levels by 2020
  - 85% below 2007 levels by 2050
- Consider the potential next steps identified by this report (and captured in the Sustainability Dashboard) as part of Dawson Creek’s Strategic Planning process, and prioritize the actions moving forward.

# Planning for Greenhouse Gas Reductions

## Update to Dawson Creek’s Community Energy Plan (2008) and Carbon Neutral Plan (2009)

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# 1. Introduction

Dawson Creek is a recognized leader in B.C. for taking action on climate change. We have completed plans at both the community and the corporate scale to outline greenhouse gas (GHG) inventories and reduction plans. Dawson Creek's Community Energy Plan<sup>3</sup> was one of the first Community Energy Plans completed in the province. The community energy plan compiled our first community greenhouse gas inventory, and identified potential opportunities for reductions. In early 2009, we adopted our Carbon Neutral Plan<sup>4</sup>, which outlined how we planned to meet our carbon neutral commitment under the Climate Action Charter. In the few years that have passed since originally publishing these plans there has been a great deal of progress at both the local and provincial level. This document consolidates our work on climate, energy and sustainability issues, and serves as an update to the previous corporate and community energy plans.

## 1.1 B.C Context

Most greenhouse gas emissions are released by burning fossil fuels such as gasoline, coal, and natural gas. Buildings, vehicles, waste and land-use planning in municipalities can have a significant effect on a community's overall emissions. 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.

In 2007, to begin to address the challenge posed by climate change, the provincial government passed the Greenhouse Gas Reduction Act. This act set a province-wide target to reduce GHG emissions by at least 33 percent by 2020, and 80 percent by 2050 (compared to 2007 levels). As part of this legislation, local governments were required to include targets and policies to reduce their community's greenhouse gas emissions in their Official Community Plans. Local governments were not required to adopt the same targets as the provincial government; however, actions at the local level will contribute to achieving B.C. overall GHG reduction target.

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<sup>3</sup> Horne, Matt; Doukas, Alex; *Dawson Creek and Climate Change: Current Emissions, Projected Growth and Needed Reductions*; April 2008: Dawson Creek, [http://planningforpeople.ca/is/sustainability\\_planning/energy/community\\_energy\\_planning/documents/Dawson%20Creek%20and%20Climate%20Change.pdf](http://planningforpeople.ca/is/sustainability_planning/energy/community_energy_planning/documents/Dawson%20Creek%20and%20Climate%20Change.pdf), (accessed August 8, 2011).

<sup>4</sup> Beckstead, Claire; Horne, Matt; *On the Path to Carbon Neutral: Dawson Creek's Strategy*; March 2009: Dawson Creek, <http://planningforpeople.ca/documents/Dawson-Creek-action-plan.pdf>, (accessed August 8, 2011).

As part of the broader strategy to achieve B.C.'s reduction targets, the Climate Action Charter was developed to encourage local governments to make their own 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 thus we committed to being carbon neutral in our corporate operation by 2012.

The Greenhouse Gas Reduction Act requires targets to be set at the community-scale (i.e., all emissions within Dawson Creek city limits), and the Climate Action Charter requires carbon neutrality at the corporate scale (i.e., within municipal operations only). Emissions from Dawson Creek's corporate operations will be included as a small portion of the community GHG inventory, and therefore any actions taken at the corporate scale will also have a small impact at the community scale. Because many actions taken to reduce emissions will have an impact at both the corporate and community scale, this document addresses both the corporate and the community scale.

The full report contains an updated inventory at both the corporate and community scales, and provides an updated summary of completed and ongoing actions and next steps. These actions are reported as *Completed Action* (for actions completed since our last reports), *Ongoing Action* (for actions identified in previous plans, and are still ongoing projects), and *Action On-hold* (for actions identified in previous plans but have been delayed or stopped). New ideas for consideration are identified as recommended next steps, and these new ideas will be considered and prioritized as part of Dawson Creek's strategic planning processes. This report then provides an overview of Dawson Creek's progress towards meeting our emissions reduction targets.

The information in the report will be presented as follows:

- Dawson Creek's approach to reducing emissions (Chapter 2),
- Emissions, actions and next steps at the corporate scale, including an assessment of the progress towards meeting our corporate targets (Chapter 3),
- Emissions, actions and next steps and the community scale, including an assessment of the progress towards meeting our community targets (Chapter 4),
- Conclusions, and recommendations for adoption by Council (Chapter 5).

# 2. Our Approach to Reducing Emissions

Dawson Creek has been taking action on climate change since 2003, when greening the community was identified as a key priority during a community visioning process. Our current approach to reducing emissions is based on our previous Community Energy Plan and Carbon Neutral Plan. Dawson Creek is committed to working with the community to reduce our collective emissions, and to show leadership by doing as much as possible to minimize emissions from our own municipal operations. We do this by pursuing our own reduction projects and by implementing innovative policies to support and reinforce our actions. We are committed to reducing emissions from our operations as much as possible first, and then (if necessary) purchasing high quality offsets to meet our commitment under the Climate Action Charter.

Starting in 2012, we will also set aside \$100 for each tonne of GHG emissions from our operations (before purchasing offsets) into an internal carbon fund. This fund will help to finance future reduction projects, and will also serve as an internal incentive to further reduce emissions.

To set the context of the work we have been doing, Appendix 1 captures the main actions and events that have marked our climate action journey since the community visioning process. Along with the key events captured in the timeline, many studies and reports have been produced to support our progress towards reducing emissions. Appendix 2 summarizes the inventory of past documents and plans related to energy and climate action.

## 2.1 Connection to Sustainability Planning

In 2007, Dawson Creek began a sustainability planning process. Through this process we selected ten sustainability categories, and chose key indicators to track our progress in each category.

Our sustainability categories, objectives and indicators are outlined in Table 1 below.

**Table 3 - Sustainability Categories and Indicators**

Sustainability Category	Description	Indicators
Land Use	Compact and complete communities are perhaps the	<ul style="list-style-type: none"><li>Density</li><li>Mix of land uses</li></ul>

	greatest contributor to community sustainability; they encourage more walking and cycling, facilitate higher quality transit options, make alternative energy and district energy technologies more financially viable and efficient, lower infrastructure costs, and preserve land for other use such as employment lands (agricultural, commercial and industrial), parks, and environmentally sensitive areas.	
<b>Transportation</b>	An environmentally friendly, community-oriented transportation is primarily focused on addressing mobility needs through a range of strategies that respond to local issues and ensure access for all. Vehicle sizing, maintenance and driving practices also influence emissions.	<ul style="list-style-type: none"> <li>• Public transit ridership</li> <li>• Municipal fleet fuel consumption</li> <li>• Modal breakdown: ride alone</li> <li>• Modal breakdown: carpool</li> <li>• Modal breakdown: bus</li> <li>• Modal breakdown: walk/bike</li> <li>• GHG: (community transportation)</li> <li>• GHG: municipal fleet</li> </ul>
<b>Alternative Energy</b>	By promoting clean and renewable energies, we can reduce our GHG footprint, increase our energy self-sufficiency, and situate DC as a leader in a growing clean tech sector. Wind power, Solar power, solar water heaters, biomass heat, and the development of district energy systems are some of the renewable resources available in the region, which we can develop to create jobs and a sustainable energy base.	<ul style="list-style-type: none"> <li>• Percentage of locally-produced energy from renewable sources</li> <li>• Percentage of jobs in the renewable energy sector</li> <li>• Percentage of municipal building energy needs met by renewable energy</li> </ul>
<b>Buildings</b>	Green building is the practice of increasing the efficiency of buildings and their use of energy, water, and materials, and reducing building impacts on human health and the environment, through better siting, design, construction, operation, maintenance, and removal.	<ul style="list-style-type: none"> <li>• GHG: community residential buildings</li> <li>• GHG: community commercial buildings</li> <li>• GHG: community industrial buildings</li> <li>• GHG: municipal buildings</li> <li>• Electricity use: municipal buildings</li> <li>• Natural gas use: municipal buildings</li> </ul>
<b>Water</b>	By reducing water demand, we protect stream ecosystems, water reservoirs for future use, and decrease the energy used in water pumping. By ensuring retention, reuse, and treatment through natural systems of storm water, we minimize runoff, flood risk, and stream contamination.	<ul style="list-style-type: none"> <li>• Turbidity</li> <li>• River level</li> <li>• Storage capacity</li> <li>• Daily usage</li> <li>• Precipitation levels</li> <li>• Per capita water consumption</li> <li>• Per capita grey water consumption</li> </ul>
<b>Social Planning</b>	Issues related to citizen and community health are integrally linked with the level and quality of person to person interactions: the design and effective use of the	<ul style="list-style-type: none"> <li>• Housing affordability: ratio of average cost to average income</li> <li>• Vacancy rate</li> </ul>

**Our Approach to Reducing Emissions**

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	urban environment; the interconnections between crime and other social factors (income, gender, race, etc.); the extent in which basic needs are met (food, shelter, etc.); opportunity for expression (cultural, spiritual, etc.); and the overall physical health of individuals.	<ul style="list-style-type: none"> <li>• Number of farmers' markets and community gardens</li> <li>• Crimes per 100,000 people</li> <li>• Number of childcare spaces</li> <li>• Percentage of 18-year-olds that did not graduate</li> </ul>
<b>Governance</b>	It is very important that a wide range of agencies and citizens have a meaningful role in decision-making. Ensuring the decisions that are made reflect the needs and desires of citizens requires engaged, active citizens who want to help create and participate in being a part of solution development for pressing issues and the long term well being of the community.	<ul style="list-style-type: none"> <li>• Percentage voter turnout</li> <li>• NQI index</li> </ul>
<b>Open Space Strategy</b>	Key environmental areas such as riparian corridors, important natural features, groves and forested areas should be protected where possible and integrated into broader circulation systems such as walking trails and surface stormwater management systems. Health, social networks and fun in the community should be enhanced through the provision of active and passive recreation opportunities throughout neighbourhoods.	<ul style="list-style-type: none"> <li>• Percentage of green space</li> <li>• Percentage of forest cover</li> <li>• kms of walking trails</li> <li>• Percentage participation in recreation activities</li> </ul>
<b>Economic Development</b>	A sustainable community offers many economic opportunities for investment, business and employment that support a diverse and prosperous community. Local serving commercial or village areas offer a range of commercial facilities to maximize working and shopping opportunities within close walking distance to homes. Community economic development (CED) and cooperatives can also offer hope for revitalizing and economic activity.	<ul style="list-style-type: none"> <li>• Number of new business licences and renewals</li> <li>• Employment/unemployment</li> </ul>
<b>Waste</b>	The ultimate goal is for sustainability best practices to become business as usual. This is enabled by the adoption of green policies at the municipal level, and by working with allies to encourage supportive provincial and federal policies. It also require that system be put in place to track indicators, monitor progress towards set targets, and assess the effectiveness of actions taken.	<ul style="list-style-type: none"> <li>• GHG: community solid waste</li> </ul>

In 2011, to create greater integration between our sustainability, climate and energy planning at the corporate and community-level, we developed an internal tracking and communications tool called the Sustainability Dashboard. The Sustainability Dashboard gives a summary of each of the sustainability categories, the indicators, and trends for each of the indicators, as well as an at-a-glance snapshot of initiatives underway.

To further integrate sustainability, energy and climate change planning into Dawson Creek's existing strategic planning process, the Sustainability Dashboard will be used to report to Council on the progress on sustainability initiatives, and will be used to propose potential

initiatives to be considered as part of Dawson Creek’s annual strategic planning process. Thus, initiatives listed as “future opportunities” on the Dashboard are suggested actions that have yet to be endorsed by Council.

The Sustainability Dashboard is a living document that is updated as projects progress and as Council priorities are refined and changed. The Sustainability Dashboard is attached to this report as a separate document.

This report focuses on the categories that will directly impact Dawson Creek’s greenhouse gas inventories at the corporate and community scales, namely: transportation, buildings, and alternative energy. The categories of water, waste and land-use also relate to energy and greenhouse gas reduction, but will not be directly addressed by this report.

# 3. Corporate Emissions

This chapter provides an overview of Dawson Creek’s 2010 corporate inventory and compares this inventory to that of 2004 and 2007 to assess trends in our emissions. We provide a summary of completed, ongoing and potential actions to reduce emissions, and assess our progress towards meeting our emissions reduction targets. The first section of this chapter will first provide an overview of the scope for reporting our corporate emissions to the provincial government.

## 3.1 A Refresher: Provincial Scope for Carbon Neutral GHG Inventories

The Ministry of Community, Sport and Cultural Development (MCSCD) outlined a specific scope for local governments for completing their annual GHG inventory. The MCSCD scope standardizes what activities are in-scope for carbon neutral inventory reporting for all local governments in BC. Figure 3 outlines all activities that are in-scope for the annual carbon neutral GHG inventories.

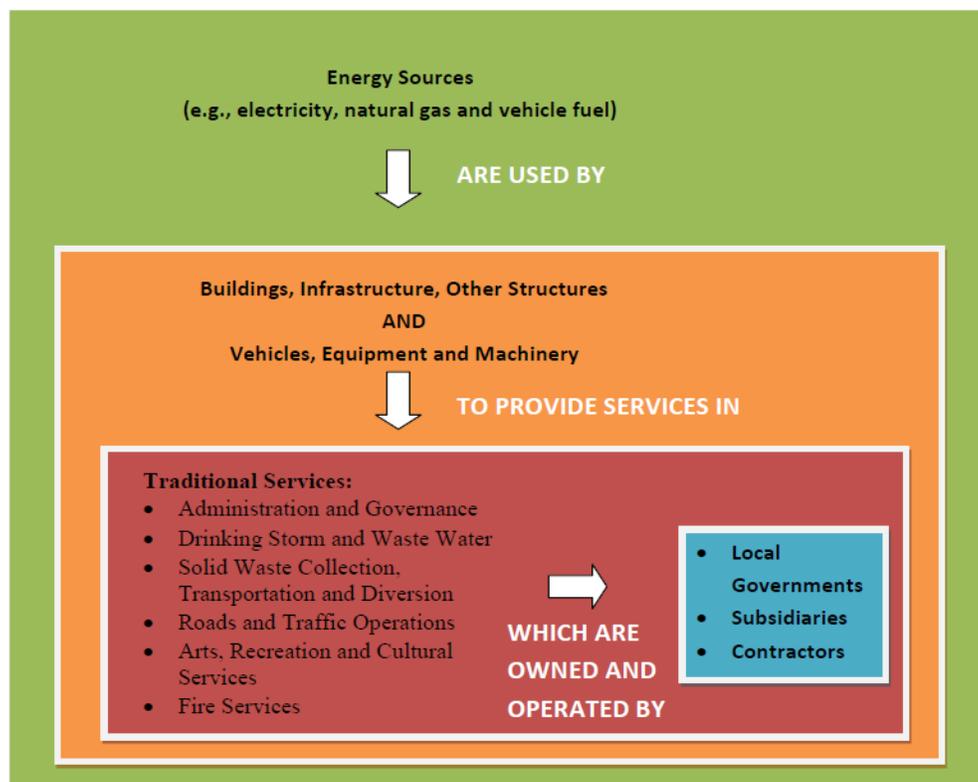


Figure 3 - In-scope activities for annual GHG reporting to the Province

MCSCD has subdivided the local government's energy use into two categories: *buildings, infrastructure and other structures* and *vehicles, equipment and machinery*. Any energy used in either of these two categories that produces GHGs should be included in a local government's annual GHG inventory.

MCRD has also identified six traditional service areas that define the in-scope activities for carbon neutral reporting:

- Administration and Governance
- Drinking, Storm and Waste Water
- Solid Waste Collection
- Roads and Traffic Operations
- Art, Recreation and Cultural Services
- Fire Services;

Any service provided by BC local governments that fall within these six categories are considered in-scope for carbon neutrality. The inventory must include emissions from these activities whether the activities are carried out by the local government, by contractors or by local government subsidiaries. To put municipalities across the province on equal footing, certain activities are excluded from corporate inventories. Specifically, emissions from the following sources do not have to be reported:

- Landfill
- Transit services
- Police services
- New construction (facilities, roads, etc.)
- Primary power generation
- Social housing
- Tree farms
- Community sources (e.g., residential or commercial emissions)

For more details, see the MCSCD's carbon neutral scope summary table in Appendix 3.

### **3.1.1 Differences in scope from previous Dawson Creek plans**

The 2004 and 2007 inventories presented in previous corporate emissions plans were produced before the provincial government published the scope boundaries explained above. Therefore, these plans considered different scopes. The major difference is that contracted services were not included in the inventories completed for previous reports. We have updated the 2004 and 2007 inventories to bring them in-line with current scope requirements and to ensure that the emissions factors used were consistent in 2004. We also took out the emissions from corporate emissions that are now considered out of scope. This data is kept as it can still be analyzed to

find opportunities for energy savings, but it is not considered as part of the inventory reported to the provincial government.

It should be noted that some contractor data was missing in each of the 2004, 2007 and 2010 inventories. To ensure that this data is available for inclusion in future inventories, we recommend that reporting this information to the City be added as a condition in any new or future contracts signed in Dawson Creek.

### 3.2 Corporate Targets: Where do we want to go?

In 2007, council passed a resolution to set internal targets for the reduction of our corporate emissions. These targets are in line with our community targets, with the provincial target, and with what science tells us is required to avoid dangerous climate change:

- 14% below 2006 levels by 2012,
- 33% below 2006 levels by 2020,
- 85% below 2006 levels by 2050.<sup>5</sup>

Our targets are ambitious, but achievable given Dawson Creek’s relatively high capacity to enact significant emissions reduction opportunities.

See Figure 4 below for an illustration of projected business-as-usual emissions trends, and what level of reductions is necessary to achieve our GHG reduction targets in 2012, 2020 and 2050.

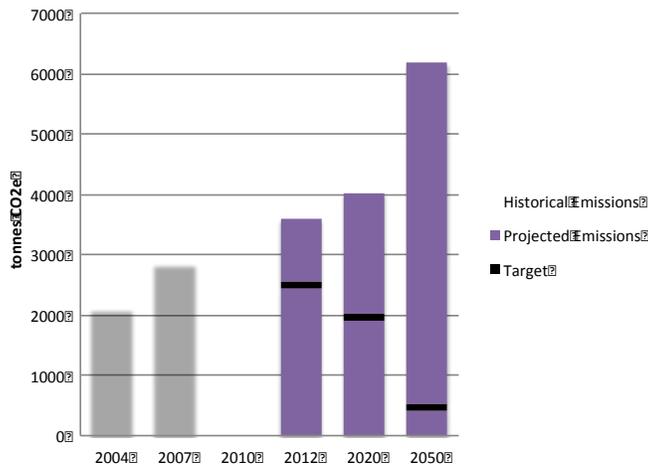


Figure 4 - Business-as-usual GHG projections (with targets), 2004 - 2050

<sup>5</sup> This target was selected to be in line with the community-based target, which also had a base year of 2006. However, Dawson Creek does not currently have a completed inventory for 2006. The 2004 inventory can be extrapolated to provide an estimate for total GHGs in 2006. However, for clarity, it is recommended that Dawson Creek amend their corporate targets to reflect a base year of 2007.

### 3.3 2010 Corporate Inventory: Where are we now?

In 2010, Dawson Creek used 103,992 GJ of energy, at a cost of \$1,474,385, which produced emissions of 3,485 tonnes of CO<sub>2</sub>e. This was equivalent to 103,992 GJ of energy, and cost \$1,474,385. Seventy-five percent of Dawson Creek’s 2010 emissions are attributed to heat (from natural gas, propane and fleet), 16% to vehicles and fleet, and 9% to electricity use. Please see Figure 5 and Table 4 below for emissions, energy consumptions and cost, broken down by fuel type.

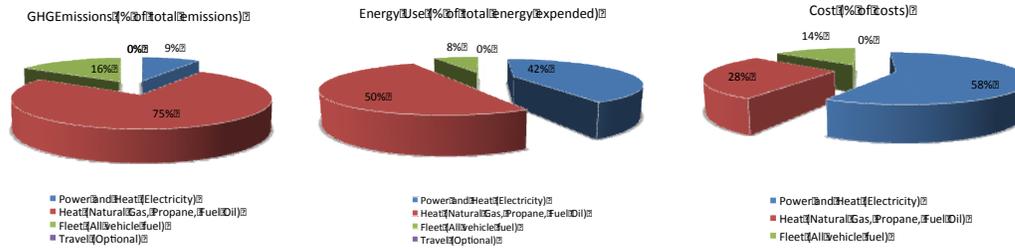


Figure 5 - Total emissions, total energy consumed and total cost, 2010

Table 4 – Inventory Summary Table, 2010

#### Inventory Summary Table

	GHG Emissions (t CO <sub>2</sub> e)	Energy Use (GJ)	Cost (\$ CDN)
Power and Heat (Electricity)	305	43,859	856,328
Heat (Natural Gas, Propane, Fuel Oil)	2,626	52,130	413,012
Fleet (All vehicle fuel)	554	8,003	205,045
Travel (Optional)	0	0	0
Miscellaneous	0	n/a	n/a
<b>Total</b>	<b>3,485</b>	<b>103,992</b>	<b>1,474,385</b>

#### 3.3.1 Emissions and Energy Use Trends, 2007 – 2010

As discussed above, we recompiled the 2007 inventory to ensure that the scope matched the carbon neutral reporting requirements used for the 2010 inventory. Given the new scope, the total emissions in 2007 were 2,842 tonnes of CO<sub>2</sub>e; 79,384 GJ of energy were consumed at a total cost of \$1,027,040.

Our corporate emissions have increased by 23% between 2007 and 2010. Electricity consumption increased by 47%, natural gas consumption increased by 27%, and fuel consumption from the fleet decreased by 6%. The graph below illustrates the measured greenhouse gases in 2004, 2007, and 2010, and again illustrates the projected emissions under a business-as-usual scenario.

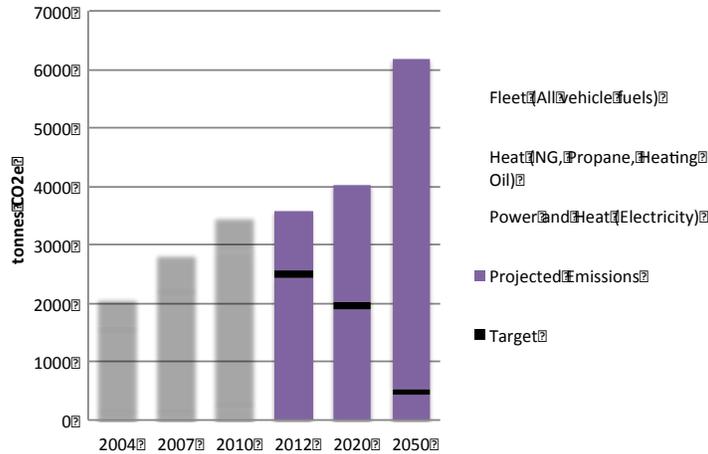


Figure 6 - Dawson Creek's corporate greenhouse gas emissions and energy use, 2004 – 2010

So where did the increase in emissions come from? Of the additional 643 tonnes of CO<sub>2</sub>e, 551 tonnes can be attributed to our new multiplex center.<sup>6</sup> While it added much value to our community, this building has also significantly increased our carbon footprint. Even without this new building, our emissions would have increased by 92 tonnes, or about 4%, and our electricity use increased by 27%. New processes at the water treatment plant also accounted for the significant increase in electricity consumption.

Looking at the 2004 emission and energy use profile, we can see that this is not a new trend. As our population and wealth grows, so does our energy use. We have actively worked to reverse that trend, and some of these initiatives will require more time to show their full potential. Nevertheless, it is clear that we need to renew our commitment, and increase our efforts to meet our targets. Section 3.4 below outlines some of the projects we are considering to help us do just that.

### 3.4 Actions and Next Steps: What are we doing?

Although emissions have been increasing since at least 2004, the City has been actively trying to slow and reverse that trend. Some of these actions have already prevented even greater increases in emissions. This section gives an update on the status of the actions identified in the 2008 Carbon Neutral Plan, and identifies potential next steps to further reduce emissions. The selection and prioritization of the potential next steps ideas will occur as part of our annual strategic planning process and be reflected on the Sustainability Dashboard.

<sup>6</sup> The multiplex was built in 2007 but was in operation for only part of that year (leading to emissions of 301 tCO<sub>2</sub>e). In 2010, over a full year of operation, it was responsible for 852 tonnes of CO<sub>2</sub> emissions (which therefore explains 551 tCO<sub>2</sub> of the observed increase between 2007 and 2010).

### 3.4.1 Buildings

#### Ongoing Action: Energy Efficiency Retrofits

In September 2006, a series of energy audits were performed on six municipal buildings. These audits helped identify opportunities to reduce emissions by making the buildings more efficient. The audits on the six buildings were not exhaustive, but they did identify enough opportunities to reduce our emissions by approximately 170 tonnes.

See Table 5 below for the status of the identified retrofits.

**Table 5 - Status of Energy Efficiency Retrofits**

Building	Audit Recommendations	Complete (Y/N)	Potential Reductions (tonnes)
City Hall	Install higher efficiency lighting (incandescent bulbs to CFLs for example)	Y	28
	Reduce fan operation in the heating system	Y	
	Begin heat recovery of exhaust in HVAC system	Y	
	When re-roofing, add insulation	Y	
Curling Rink <sup>7</sup>	Install a low-e <sup>8</sup> ceiling over the ice rink	N/A	23
	Install solar pre-heating for ventilation air	N/A	
Chamber of Commerce <sup>9</sup>	Install triple-glazed, low-e, energy efficient windows for the second floor	N/A	4
	Upgrade heating system (to condensing furnaces)	N/A	
	Install heat recovery ventilator on exhaust system	N/A	
	Retrofit the lighting system with electronic ballasts	N/A	
Fire Hall	Upgrade wooden garage doors to insulated metal	2012 pending approval	53
	Remove unit heaters and install infrared gas heaters between garage stalls	N	
	When re-roofing, increase roof insulation	Roof has another 10 + years before replacement.	
	Retrofit the lighting system with electronic ballasts	Y	
Kin Arena	Install low-e ceiling over the ice rink	N	17
	Install a pony motor for brine pump	N/A <sup>10</sup>	
	Install solar air pre-heating for ventilation air	N	
	Heat reclaim from ice plant to preheat for ice rink flooding	N	
	Install vending machine sensors on machines in lobby	N/A	
Memorial	Install a low-e ceiling over the ice rink	N	45

<sup>7</sup> While we own the building, the city does not pay the bills for the curling rink – which reduces the economic incentive for doing the retrofits.

<sup>8</sup> A low-emissivity (low-e) material has a very low potential to transfer radiant energy from one surface to another.

<sup>9</sup> The Chamber of Commerce operates the building on a “rent to own” lease. The city will no longer own the building in 3 to 4 years, which reduces incentive for doing the retrofits.

<sup>10</sup> A pony motor is a smaller motor that can be used during times of lower load. Given that the pump are already on variable drive motor, replacing them by pony motors would not improve efficiency.

## Corporate Emissions

<b>Arena</b>	Install a pony motor for brine pump	N/A <sup>9</sup>	
	Install solar air pre-heating for ventilation	N	
	Heat reclaim from ice plant to preheat for ice rink flooding	N	
<b>TOTAL POTENTIAL REDUCTIONS</b>			<b>170</b>

Since 2007, the retrofits identified for City Hall have been completed. However, the retrofits for the other buildings have not yet been completed; line items marked with a N/A have been identified as no longer appropriate.

### Recommended Next Steps

- Re-consider the potential for better roof insulation, for solar air pre-heating and heat reclaim for the two arenas. Consider the possibility of using waste heat as part of a district heating system.
- Reconsider using infrared gas heaters between garage stalls at fire hall.
- Complete and update audits for all of Dawson Creek’s municipal buildings and facilities to identify new opportunities for reductions.
- Explicitly include energy efficiency upgrades and energy costs as a consideration when planning all building upgrades.
- Implement a monitoring system to track the energy performance of individual buildings. This could potentially include the implementation of energy management software. This will ensure the continuous optimization of energy use in our buildings, by ensuring that buildings systems are functioning properly. This would also allow us to measure the impact of retrofits we conduct, and allow us to continuously learn about what works and what doesn’t.
- Review and update Dawson Creek’s Corporate Green Building Policy. This policy was originally implemented in 2006, and it is important to assess the implementation and efficacy of the policy. Changes and improvements will be made to the policy if necessary.

### 3.4.2 Transportation

#### **Completed Action: Include employee travel in corporate inventory**

In the 2008 carbon neutral plan, we identified that including employee business travel in subsequent inventories was a key next step. Data on employee travel was included in the 2010 inventory, and will be included in subsequent inventories. This data is not included as part of the carbon neutral inventory that we will report to the provincial governments (employee travel is out of scope); however, tracking this data will be very useful in reducing our overall emissions from travel over time.

In 2010, employee travel (including flights and vehicle use) resulted in 32 tonnes of greenhouse gas emissions.

### **Recommended Next Steps**

- Assign fleet management responsibility, and potentially pursue E3 fleet designation. Sixteen percent of our GHG emissions come from the fleet of vehicles we operate. Although the emissions from our fleet have decreased by 6% between 2007 and 2010, we believe much greater reductions can be gained. The E3 program, run by the Fraser Basin Council, proposes a rating system and a structure to improve fleet management. Participating in this program could be a useful catalyst, and bring recognition to Dawson Creek for the step we have already taken to improve our fleet.
- Analyze the performance of Dawson Creek's plug-in hybrid, and consider piloting a full electric vehicle in the municipal fleet.
- Review and update Dawson Creek's Corporate Green Vehicles Policy. This policy was originally implemented in 2006, and it is important to assess the implementation and efficacy of the policy. Changes and improvements will be made to the policy if necessary.

### **3.4.3 Alternative Energy**

#### **Completed Action: Solar Hot Water and Solar PV**

Dawson Creek has installed solar hot water systems on all municipal buildings, including a new system on the seniors' centre (installed in 2009). Dawson Creek has also installed a solar PV system on City Hall in 2010.

#### **Ongoing Action: Biomass Project**

In the 2008 plan, a biomass project was identified as having significant potential for reducing greenhouse gas emissions. The City has proceeded cautiously on this project to ensure that there are no unintended social, economic or environmental impacts of a biomass project. However, the City has decided to pursue a biomass project for the multiplex facility, and the project is currently in the permitting stage.<sup>11</sup>

#### **Action On-hold: Wind**

Prefeasibility studies completed by the City identified that there is potential for an economically viable wind project near Dawson Creek. In 2010, Dawson Creek completed a feasibility study to identify the best locations to site a wind project. The study identified that the most promising sites for a wind project were on sites outside Dawson Creek boundaries, and were within the

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<sup>11</sup> Timmenga and Associates completed the analysis for a specific technology and project configuration. This analysis would have to be revised if other technologies or project configurations are to be considered.

Peace River Regional District areas. The wind project is currently on hold; however, there is some potential to collaborate with the regional district to continue to move this project forward.

### **Recommended Next Steps**

- Move forward towards the implementation of the biomass project for the multiplex facility.
- Engage with the PRRD to discuss potential for a community-owned wind project.
- Install meters to collect data from the already-installed solar hot water and solar PV systems. Develop a system to record and monitor the data to facilitate tracking and reporting.
- Continue to install additional solar hot water and solar PV systems when appropriate on municipal buildings, facilities and infrastructure (i.e., bus stops, traffic lights, etc.).

### **3.4.4 Supportive Policies**

#### **Carbon Fund Policy**

In 2010 and 2011, Dawson Creek and the Pembina Institute designed and implemented a Carbon Fund policy. This policy allocates \$100 per tonne of greenhouse gas emissions from our corporate operation to a carbon fund. This fund will be used to provide funding for emissions reduction project like those outlined above. At the 2011 Union of BC Municipalities conference, this policy was recognized for its transformational potential, as Dawson Creek was awarded the 2011 Climate and Energy Action Award for our Carbon Fund.

#### **Offset Purchasing Policy**

In 2010 and 2011, with the assistance of the Pembina Institute, we also designed an Offset Purchasing policy. This policy will guide what offsets we purchase to achieve carbon neutrality, to ensure that Dawson Creek is only purchasing high-quality offsets. Of course, our first goal is to reduce our own emissions first before resorting to offsets to achieve carbon neutrality.

### **Recommended Next Steps**

- Implementation of the Carbon Fund in 2012.
- Implementation of the Offset Purchasing Policy to select offset purchases for 2012.

## **3.5 Corporate Targets: How will we meet our targets?**

It is good news that Dawson Creek has been able to limit the increase in emissions, and decrease its emissions from the vehicle fleet. However, to get its emissions from all sources on a downward trend, Dawson Creek will need to ramp-up its efforts to implement new emissions reduction projects at the corporate scale.

The first target is a reduction of 14% below 2007 levels by 2012, which is a reduction of 398 tonnes from the 2007 inventory.<sup>12</sup>

To assess Dawson Creek’s potential to meet the 2012 target, some of the identified next steps have been quantified to identify the emissions reduction potential for each action. These are estimates of the reduction potential, and actual reductions may vary; however, this provides an order-of-magnitude estimate of the potential of each action to reduce Dawson Creek’s emissions.

**Table 6 - Estimated cost and GHG savings from new potential actions**

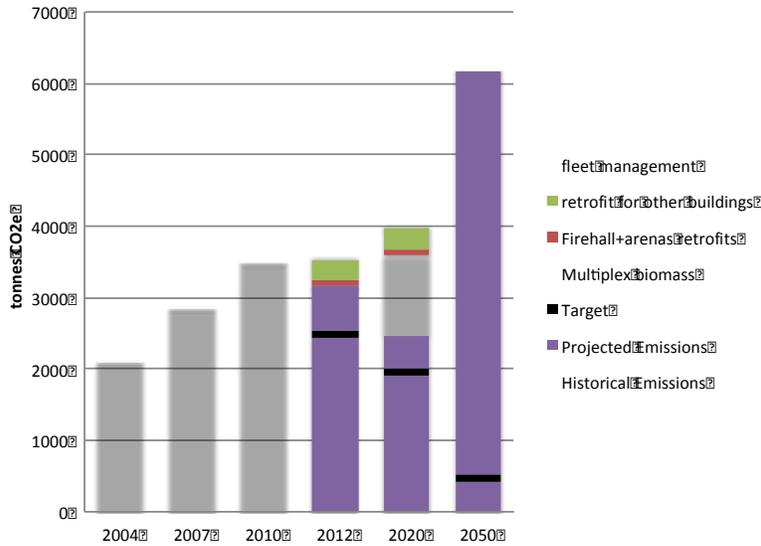
Potential Action	Potential GHG reduction in 2012 (tonnes CO2e)	Estimated Yearly Cost Savings <sup>13</sup>	Possible implementation by 2012? (Y/N)
Fleet management	58	\$21,000	Y
Fire hall and arena retrofits	91	\$14,000 to \$63,000	Y
Retrofits for other buildings	281	\$44,000 to \$194,000	Y
Multiplex biomass	1135	up to \$175,000	N

Figure 7 below illustrates the estimated GHG reductions from the new potential actions identified in Table 6, and compares this to our emissions reduction targets.

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<sup>12</sup> If the target base year is amended as per the recommendation of this report, the target will be in reference to 2007. If Dawson Creek elects to maintain the base year of 2006, this calculation will be adjusted.

<sup>13</sup> We cannot make a direct relation from GHG emissions to cost saving, because different fuels have different emissions, and different costs. Using our cost and emission data, we estimate that for each tonne of CO2e we avoid by decreasing our energy use we will save ~\$160 if the fuel was natural gas, ~\$370 if the fuel was gasoline/diesel, ~\$2,800 if the energy source was electricity, and ~\$690 if the reduction comes from a 80% decrease in natural gas use and 20% decrease in electricity use.



**Figure 7 - Impact of potential GHG reduction opportunities on projected corporate targets**

Given this assessment, Dawson Creek is not on-track to meet the 2012 target. The biomass project has the most significant reduction potential, however, it will likely not be in operation by 2012. However, if all projects are implemented by 2015, even with the projected growth in corporate emissions, Dawson Creek can achieve about a 25% reduction in emissions relative to 2007 by 2015. This puts Dawson Creek on-track to achieve the 2020 target of 33% below 2007 emissions by 2020. Additional opportunities will still need to be identified to fully meet the 2020 target.

### 3.6 Offset Liability: What will it cost?

To meet our commitment under the Climate Action Charter to be carbon neutral by 2012, we will need to reduce our emissions, and then buy offsets. Under a business as usual scenario, without taking any further action to reduce our emissions, our offset liability in 2012 would be \$89,650.<sup>14</sup> This investment would need to be made every year to maintain carbon neutrality. If all the opportunities identified above are implement by 2012 (except the biomass project), Dawson Creek’s offset liability can be lowered to \$78,900.

This is a yearly saving of more than \$10,000, to be accompanied by a reduction in our contribution to the carbon fund of \$43,000, and to energy cost savings in the range of \$79,000 to \$278,000. As we can see, with total savings of \$132,000 to \$331,000, these actions not only show our environmental leadership, but also our fiscal responsibility.

<sup>14</sup> This assumes the cost of offsets will be \$25 per tonne, and that Dawson Creek’s emissions increase by 1.4% per year.

# 4. Community Emissions

This chapter is an update to the 2008 reports *Dawson Creek and Climate Change: Current Emissions, Projected Growth and Needed Reductions* and *Dawson Creek's Climate Action Plan*.

The Ministry of Environment's Community Energy and Emissions Inventory (CEEI) initiative provides a provincial framework for tracking and reporting energy and greenhouse gas (GHG) emission indicators at a community-wide scale for all local governments in B.C.<sup>15</sup> The CEEI reports help local governments fulfill one of the requirements of the Climate Action Charter that requires signatory local governments to measure and report on their community's GHG profile. The inventory completed as part of the two reports above was a pilot of the CEEI reports that today are created for all BC communities. At present, a CEEI inventory report is only available for 2007. However, because Dawson Creek is one of only a few BC communities that participated in the CEEI inventory pilot, Dawson Creek has an inventory for both 2005 and 2007. The Ministry of Environment has indicated that they intend to prepare reports for every even year following 2007 (e.g., 2008, 2010, 2012, etc.).

## 4.1 A Refresher: Scope for community-wide inventories

CEEI Reports for B.C. local governments cover energy and GHG estimates in three primary sectors: buildings, on-road transportation and solid waste.<sup>16</sup> They include GHG emissions from these sources:

1. Direct emissions from the burning of fossil fuels;
2. Indirect emissions from the production of electricity from electricity generation plants; and
3. The decomposition of biomass to greenhouse gases (including methane and CO<sub>2</sub>) in landfills (i.e., "landfill gas").<sup>17</sup>

The CEEI reports also include five supporting indicators: housing type, residential density; commute to work; commute distance; and green space. These indicators are included because

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<sup>15</sup> Ministry of the Environment, *Community Energy and Emissions Inventory*, 2011, <http://www.env.gov.bc.ca/cas/mitigation/ceei/index.html> (accessed October 17, 2011).

<sup>16</sup> Ministry of the Environment, *Technical Methods and Guidance Document for the 2007 CEEI Reports: Community Energy and Emissions Inventory (CEEI) Initiative*, May 2010, [http://www.env.gov.bc.ca/cas/mitigation/ceei/CEEI\\_TechMethods\\_Guidance\\_final.pdf](http://www.env.gov.bc.ca/cas/mitigation/ceei/CEEI_TechMethods_Guidance_final.pdf) (accessed September 27, 2011).

<sup>17</sup> Ministry of the Environment, *Technical Methods and Guidance Document for the 2007 CEEI Reports: Community Energy and Emissions Inventory (CEEI) Initiative*, May 2010, [http://www.env.gov.bc.ca/cas/mitigation/ceei/CEEI\\_TechMethods\\_Guidance\\_final.pdf](http://www.env.gov.bc.ca/cas/mitigation/ceei/CEEI_TechMethods_Guidance_final.pdf) (accessed September 27, 2011).

they are key factors driving emissions from the transportation and building sector. These supporting indicators are meant to inform local and provincial government climate action policy and decision-making, however, they do not directly factor in the calculation of the GHG emission estimates made in the CEEL.

## 4.2 Community Targets: Where do we want to go?

In 2008, Dawson Creek adopted the following targets for reducing community-wide emissions<sup>18</sup>:

- 14% below 2006 levels by 2012,
- 33% below 2006 levels by 2020,
- 85% below 2006 levels by 2050.

Just as with our corporate targets, these targets were set to be inline with the provincial targets, and with what science tells us is required to prevent catastrophic climate change. These targets are ambitious, but achievable.

## 4.3 2005 and 2007 Community Inventories: Where are we now?

In 2007, the community of Dawson Creek consumed 2,639,920 GJ of energy and emitted 136,968 tonnes of CO<sub>2</sub>e. Sixty-three percent of Dawson Creek's community emissions were from transportation, 36% from buildings, and 1% from solid waste. Figure 8 below illustrates this breakdown by sector and by fuel type.

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<sup>18</sup> Similar to our corporate targets, we recommend amending our targets to use 2007 as a baseline. The assumption when the targets were set was that an emissions inventory would be created for every year after 2005 (which is why the 2006 base-year was chosen originally). Since then, the provincial government created the 2007 emissions inventories and has committed to creating inventories for all BC communities for every even year after 2007. We are still awaiting the release of the 2008 inventory.

Community Emissions

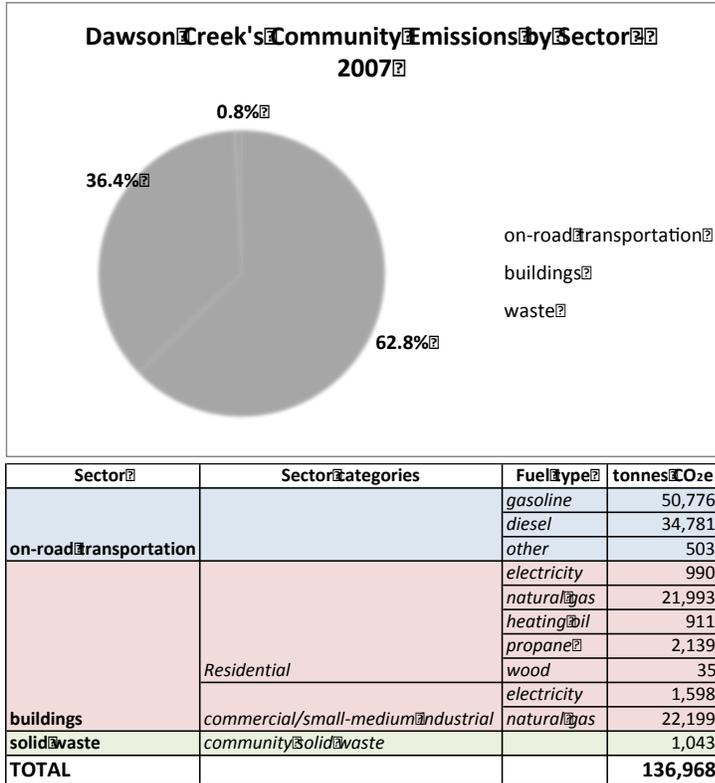
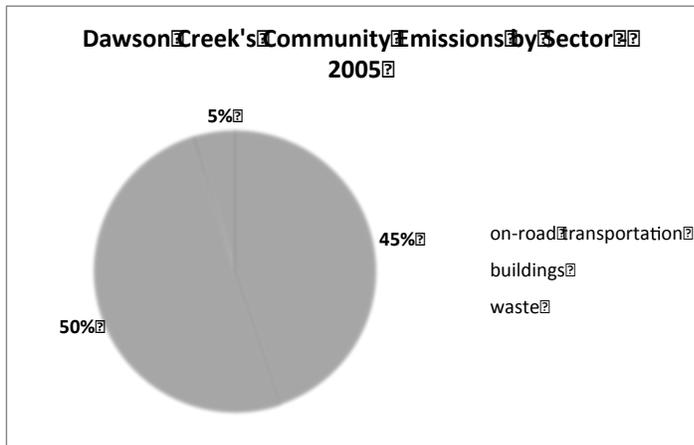


Figure 8 - Dawson Creek Community Emissions by Sector and Fuel Type, 2007

In comparison, the 2005 inventory found that Dawson Creek consumed 2,042,367 GJ of energy and emitted 110,082 tonnes of CO<sub>2</sub>e in 2005. See Figure 9 below for the breakdown by sector and fuel type.



## Community Emissions

2005 Inventory			
Sector	Sector Categories	Fuel Type	tonnes CO <sub>2</sub> e
on-road transportation		gasoline	37,361
		diesel	10,655
		propane	1,302
buildings	Residential	electricity	1,252
		natural gas	24,714
		heating oil	no data
		propane	no data
		wood	no data
		commercial/small-medium industrial	electricity
solid waste	community solid waste	natural gas	27,859
			5,189
<b>TOTAL</b>			<b>110,082</b>

**Figure 9 - Dawson Creek Community Emissions by Sector and Fuel Type, 2005**

### 4.3.1 Emissions and Energy Use Trends, 2005 – 2007

Comparing these two inventories is complicated by the fact that the methodology used to assess community emissions changed significantly between the 2005 pilot and the 2007 CEEL. Comparing the results for Dawson Creek, we note a significant drop in emissions from solid waste between 2005 and 2007. Since there was no substantial change made in the waste management system, we suspect that this apparent decrease was likely due to the change in methodology, rather than real reduction.

Similarly, the 2007 inventory shows a significant increase in on-road transportation emissions. While the possibility of an increase is real, the magnitude of the change detected here is surprising. This again leads us to believe that some of this apparent increase is due to a more exhaustive data compilation process in 2007. Because of these methodological differences, it is necessary to wait for the release of the 2008 and 2010 inventories to assess any trends in the data.

Although a portion of the increase in emissions can be explained by a more thorough accounting in 2007, we still believe that a portion of that increase is real. As Dawson Creek's population and wealth grows, our overall community emissions will also grow if we take a business-as-usual approach. We will collectively need to implement significant emissions reduction actions to counteract the upward pressure on emissions and to get overall community emissions on a downward trend. Section 4.4 highlights some of the actions undertaken to do so, and present some new initiatives that are under consideration by city staff.

## 4.4 Actions and Next Steps: What are we doing?

The 2008 report *Dawson Creek's Climate Action Plan* identified key actions and potential next steps for community-wide emissions reduction opportunities. This section provides an update on the actions identified in that report, an overview of completed and ongoing actions, as well as new ideas and next steps for consideration. The selection and prioritization of the potential next steps ideas will occur as part of Dawson Creek's annual strategic planning process. As projects are prioritized, moved forward and are completed, Dawson Creek's Sustainability Dashboard will be the living document that is updated to track this progress.

The actions have been categorized under buildings, transportation, alternate energy and waste.

## 4.4.1 Buildings

### **Ongoing Action: Local Improvement Charges**

In 2008 and 2009 Dawson Creek designed a program to pilot local improvement charges in the community to help homeowners finance energy efficiency and renewable energy upgrades on their homes. To run this pilot, Dawson Creek needs explicit permission from the provincial government. This project is currently on hold because the provincial government did not grant the permission to run the pilot. However, Dawson Creek has continued to participate in provincial and national discussions on innovative financing mechanisms for home retrofits. We are monitoring this discussion and will continue to engage on the issue. The province recently passed enabling legislation that allows utilities to implement on-bill financing for energy efficiency and renewable energy upgrades. We will continue to monitor this program development as it progresses.

### **Ongoing Action: Green Building Leaders – Development of Renewable Energy Requirement for BC**

The Green Building Leaders project is a group of leading local governments that have come together to collaborate on improving the energy efficiency and use of renewable energy in new and existing buildings in BC. Dawson Creek was one of the founding partners of this group, and continues to support these initiatives. In Phase 1 of the project, research was conducted in four streams: innovative financing programs, higher energy efficiency standards for new buildings, minimum energy efficiency standards for existing buildings (including labeling), and minimum renewable energy requirements. In Phase 2, we were one of two local governments to sponsor and support the design of a province-wide renewable energy requirement for BC. In-depth consultation was conducted with staff, Council and other key stakeholders in the community, and in collaboration with Campbell River and the Pembina Institute, a regulation design was proposed. This fall, we sponsored a UBCM resolution to call on the provincial government to work with BC local governments to design a renewable energy requirement for BC. This project is ongoing.

### **Ongoing Action: Green Building Leaders – Mandatory Building Labelling**

Mandatory building labels allow consumers to assess the energy performance of a building when buying or selling a property. As a second stream of the Green Building Leaders project (described above), Dawson Creek is continuing to research the potential for designing and implementing a mandatory building labeling pilot. This project is ongoing.

### **Ongoing Action: Solar Hot Water-Ready Bylaw**

Dawson Creek opted into the province-wide solar ready bylaw in 2011. This bylaw requires that all new homes in Dawson Creek be built “solar-ready”. This will save homeowners time and money if they should choose to install a solar hot water system on their homes. Dawson Creek was directly involved in the development of this bylaw.

### **Recommended Next Steps**

- Continue our leadership role within the Green Building Leaders project to advance provincial policies such as the renewable energy requirement, energy efficiency labeling, and other streams.

- Begin enforcement of the solar hot water ready bylaw.
- Explore new possibilities to reduce energy consumption from commercial buildings in Dawson Creek; this could include:
  - Participate as a host partner for the first Climate Smart cohort in Dawson Creek
  - Target the top 5 – 10 energy users in Dawson Creek, and facilitate their connection to Power Smart and LiveSmart incentive programs to encourage energy conservation, energy efficiency and the use of renewable energy.

#### 4.4.2 Transportation

##### **Ongoing Action: Develop a Community Transportation Plan**

The City is developing a Community Transportation Plan to identify opportunities to improve the transportation system in Dawson Creek, including encouraging alternative forms of transportation and commuting. This project is currently underway and will be presented to Council in 2012.

##### **Recommended Next Steps**

- Expand the transportation planning region-wide.
- Commuter challenge – engage with Dawson Creek staff and challenge either other local governments in B.C. or other major employers in Dawson Creek to try to reduce greenhouse gas emissions from commuting.
- Northern electric vehicle network – analyze the feasibility and potential for the use of electric vehicles in northern communities. As part of this project, Dawson Creek will potentially analyze performance of Dawson Creek’s plug-in hybrid and/or pilot a full electric vehicle in the municipal fleet

#### 4.4.3 Alternative Energy

##### **Completed Action: Wind Feasibility Study**

The city completed a wind feasibility study, and has identified the best sites in the region to locate a wind energy project. See Section 3.4.3 for the status of this project.

##### **Ongoing Action: Support for the Development of Provincial Feed-in Tariffs**

Dawson Creek has continued to engage with the provincial government on the development of a provincial feed-in tariff. In 2010, we provided comments as part of the provincial government’s engagement process. We will continue to engage and support the development of a provincial feed-in tariff.

##### **Completed Action: Potential of Waste Energy**

In 2007, the city commissioned a study to assess the potential for capturing waste heat from the sewage system as a potential source of energy. The study indicated that there was not a strong

business case for this technology at the time. However, we believe it would be appropriate to revisit this project when we consider the potential for district energy systems.

### Recommended Next Steps

- Explore the potential of district energy systems in Dawson Creek. Two specific potential next steps include:
  - Consider DE connectivity requirements (i.e., develop a district energy-ready bylaw)
  - Work with the Peace Energy Co-operative to develop a renewable energy compatible district energy system for the Civic Cluster
- Develop a passive solar development permit area (DPA) that would require that all new buildings be sited in a way that would maximize the passive solar gain potential of the structure.

## 4.5 Community Target: How will we meet our targets?

To meet Dawson Creek’s emissions reduction targets at the community level, Dawson Creek will need to reduce emissions to approximately 117,792 tonnes by 2012; 91,769 tonnes by 2020; and 20,545 by 2050. See Figure 10 below.

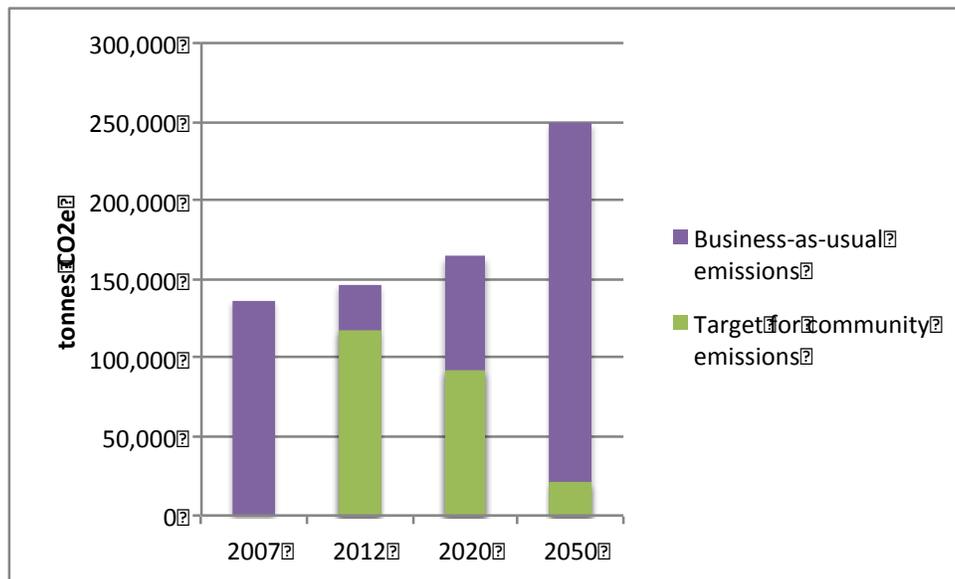


Figure 10 - Dawson Creek's Projected Community Emissions, 2007 - 2050

Figure 10 assumes that Dawson Creek's emissions will grow at approximately 1.4% per year under a business-as-usual scenario.<sup>19</sup> The green bars on the graph illustrate what level of reductions we will need to achieve to meet our community targets. This graph illustrates the significant challenge we, and most B.C. communities, face. In order to meet the set targets, Dawson Creek will have to reduce overall emissions as well as counteract the effect of population growth.

The actions identified in this report will help to reverse the trend of emissions growth, and will move us towards meeting our community target. The GHG impact of these actions is difficult to quantify, because many of them require implementation by the provincial government. We will continue to work towards reducing our community emissions, and will reassess our growth or reduction trend when the new CEEI inventory is available.

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<sup>19</sup> This is based on the population growth rate in Dawson Creek between 2001 and 2006 based on the Canadian census.

# 5. Conclusions and Recommendations

As a community we have taken significant strides in addressing the challenges of climate change. Since 2003, we have demonstrated that we have taken the feedback from the community seriously, and that we are committed to taking action to reduce our own emissions to help prevent the most dangerous impacts of climate change. This report helps to integrate the work that we have done on sustainability planning, corporate energy planning and community energy planning, and outlines a clear plan for how we plan to move forward to achieve our targets.

The greenhouse gas reduction targets we have set for ourselves are bold, but achievable. At both the corporate and the community scale we now have a clear sense of our total emissions and how these are changing over time. This report provides an update on completed and ongoing actions, and also identifies potential next steps to help get our emissions on a downward trend. We recognize that this will be a significant challenge, and will require a significant shift away from “business-as-usual”. This report clearly shows us where we stand with our emissions, and provides a clear roadmap for future action. This is a significant achievement, and places us in an excellent position to increase our efforts to reduce emissions. To facilitate this shift, we recognize that there are internal processes and structures that will help to integrate the climate, energy and sustainability planning more seamlessly with the day-to-day operations of the City. Hiring a Community Energy Manager in 2012 will be critical to enabling this integration.

We are continuing to show leadership in the province by enacting innovative policies to support the implementation of emissions reduction project. In particular, the implementation of the Carbon Fund was a key success in 2011. By putting aside \$100 per tonne of GHG from our own operations, we have given ourselves a monetary incentive to reduce emissions, and have also ensured that there are dedicated funds to implement emissions reduction projects.

The recommendations below are for consideration by council, and will enable Dawson Creek to continue to be a leader on climate, energy and sustainability action in B.C.

## Recommendations: Policies and Procedures

- Use the Sustainability Dashboard to report regularly to council on progress on these initiatives. Consider this tool when doing yearly strategic planning processes to ensure that the objectives, progress and actions articulated in the Sustainability Dashboard align with Dawson Creek’s overall planning and objectives.
- Utilize the Sustainability Dashboard as an input to existing budget planning processes to ensure actions that are identified as a priority in the Dashboard are appropriately accounted for in the budget.

- Review the current sustainability indicators for suitability and data availability, and design procedure to compile this data on an ongoing basis.
- Outline specific objectives in each sustainability category identified in the sustainability plan (and in the Sustainability Dashboard), and identify specific targets for key indicators.
- Assign specific responsibility and accountability for greenhouse gas reductions. This could include adding this into employee job descriptions and reviews.
- Facilitate the hiring of a Community and Corporate Energy Manager (CEM).

## **Recommendations: Corporate Inventory**

- Update Dawson Creek’s corporate emissions reduction targets to have a baseline year of 2007. This will align with the up-to-date inventories completed for this documents, and will align with the provincial greenhouse gas targets. The new updated targets at both the corporate and community level would be:
  - 14% below 2007 levels by 2012
  - 33% below 2007 levels by 2020
  - 85% below 2007 levels by 2050
- Require (as part of any new service agreement or contract) that contractors report the fuel used to deliver any traditional service included in Dawson Creek’s corporate inventory. This information must be included in Dawson Creek’s corporate inventory (and reported to the provincial government) going forward.
- Implement a process to monitor and track energy consumption for individual buildings and vehicles. This may include implementing energy management software. By tracking individual buildings, vehicles and the performance of renewable energy installations, the impact of specific emissions reduction actions will be much easier to quantify. As well, significant increases or decreases in energy consumption will be flagged (and addressed if necessary) much more quickly.
- Consider the recommended next steps identified in Chapter 2 of this report (and captured in the Sustainability Dashboard) as part of Dawson Creek’s Strategic Planning process, and prioritize the actions moving forward. Recommended next steps include:

<b>Buildings</b>	<b>Transportation</b>	<b>Alternative Energy</b>	<b>Supportive Policies</b>
Re-consider the potential for better roof insulation, for solar air pre-heating and heat reclaim for the two arenas.  Consider the possibility of using waste heat as part of a district heating system.  Reconsider using infrared gas heaters between garage stalls at fire hall.	Assign fleet management responsibility, and potentially pursue E3 fleet designation.  Analyze the performance of Dawson Creek’s plug-in hybrid, and consider piloting a full electric	Move forward towards the implementation of the biomass project for the multiplex facility.  Engage with the PRRD to discuss potential for a community-owned wind project.  Install meters to collect data	Implementation of the Carbon Fund in 2012.  Implementation of the Offset Purchasing Policy to select offset purchases for 2012.

## Conclusions and Recommendations

<p>Complete and update audits for all of Dawson Creek’s municipal buildings and facilities.</p> <p>Explicitly include energy efficiency upgrades and energy costs as a consideration when planning all building upgrades.</p> <p>Implement a monitoring system to track the energy performance of individual buildings (including consideration of energy management software).</p> <p>Review and update the Corporate Green Building Policy.</p>	<p>vehicle in the municipal fleet.</p> <p>Review and update Corporate Green Vehicles Policy.</p>	<p>from the already-installed solar hot water and solar PV systems. Develop a system to record and monitor the data to facilitate tracking and reporting.</p> <p>Continue to install additional solar hot water and solar PV systems when appropriate on municipal buildings, facilities and infrastructure (i.e., bus stops, traffic lights, etc.).</p>	
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## Recommendations: Community Inventory

- Update Dawson Creek’s community emissions reduction target to have a baseline year of 2007. This will align with the up-to-date inventories completed for this documents, and will align with the provincial greenhouse gas targets. The new updated targets at both the corporate and community level would be:
  - 14% below 2007 levels by 2012
  - 33% below 2007 levels by 2020
  - 85% below 2007 levels by 2050
- Consider the potential next steps identified by this report (and captured in the Sustainability Dashboard) as part of Dawson Creek’s Strategic Planning process, and prioritize the actions moving forward. Recommended next steps include:

Buildings	Transportation	Alternative Energy
<p>Continue our leadership role within the Green Building Leaders project to advance provincial policies such as the renewable energy requirement, energy efficiency labeling, and other streams.</p> <p>Begin enforcement of the solar hot water ready bylaw.</p> <p>Explore new possibilities to reduce energy consumption from commercial buildings in Dawson Creek; this could include:</p> <p>Participate as a host partner for the first Climate Smart cohort in Dawson Creek Target the top 5 – 10 energy users in Dawson Creek, and facilitate their connection to Power Smart and LiveSmart.</p>	<p>Expand the transportation planning region-wide.</p> <p>Commuter challenge with City staff and either other municipalities or large employers in Dawson Creek.</p> <p>Northern electric vehicle network – analyze the feasibility and potential for the use of electric vehicles in northern communities. This could include:</p> <ul style="list-style-type: none"> <li>• Analysis of the existing plug-in hybrid.</li> <li>• Piloting a full EV in the municipal fleet.</li> </ul>	<p>Explore the potential of district energy systems in Dawson Creek. Two specific potential next steps include:</p> <ul style="list-style-type: none"> <li>• Consider DE connectivity requirements (i.e., develop a district energy-ready bylaw)</li> <li>• Work with the Peace Energy Co-operative to develop a renewable energy compatible district energy system for the Civic Cluster</li> </ul> <p>Develop a passive solar development permit area (DPA) that would require that all new buildings be sited in a way that would maximize the passive solar gain potential of the structure.</p>

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## Appendix 1 – Energy and Climate Action Timeline

Year	Milestone	Note
2003	Community Visioning Process	In 2003, the City engaged a large segment of the population to create a common vision for the community. That vision included a series of social, economic and environmental goals, including sustainability, renewable energy and waste reduction.
100Aug 2005	DC completes its first <b>corporate energy baseline study</b> and energy plan	The Corporate energy plan looked at how the City used energy to run the public infrastructure and what were the costs and environmental impacts such as GHG emissions. At the time, Dawson Creek spent nearly 1.4 million dollars on energy, which translated into 3,400 tonnes of GHG emissions.
Sept 2005	NEAT conducts a waste assessment of the main municipal building	This assessment identified opportunities to reduce waste in municipal buildings.
2005	Council passes a resolution for staff to pursue <b>RE opportunities</b>	This direction was a catalyst to the initial scoping of renewables such as solar, wind, geothermal and biomass opportunities.
Oct 2005	DC Wins first award: <b>Energy Aware Award</b> , from Community Energy Association, co-sponsored by the Province and UBCM	Between 2005 and 2011, DC won 13 provincial and national awards for its sustainability leadership
Mar 2006	<b>Solar Hot Water</b> System installed at City Hall	This installation serves as an example of the renewable energy opportunities available in DC
2006	DC conducts <b>energy audit</b> of major municipal buildings	The audit identified opportunities to increase energy efficiency and reduce energy costs and emissions of the 8 largest municipal buildings
May 2006	DC Council adopts <b>Green Vehicle Policy</b>	This policy is now regarded as best practice for fleet management, and has served as a template for several other municipalities as it considered greenhouse gas emissions as part of life-cycle cost analysis.
June	Streetlights are changed to 'dark	Partnered with BC Hydro to replace over 200

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2006	sky friendly' high pressure sodium bulb	inefficient mercury vapour street lights. 4 year simple payback and reduction in maintenance costs.
2006	UBCM Community Excellence award for leadership and innovation	
Fall 2006	Mayor invited to <b>co- chair the solar technology provincial Task Team</b> that will prepare a roadmap to fast track the adoption of solar technology in BC.	Earlier in the year, the City hosted a very successful solar gathering in Vancouver, during Globe 2006, where Minister Barry Penner announces provincial support for solar industry in BC, which lead to the creation of Solar BC.
Oct 2006	The Natural Step Canada holds workshop in DC	Over 2 days the Natural Step framework for sustainability is introduced to City council/staff and partnering organizations to provide a common understanding of sustainability
2006	DC adopts new <b>vision</b> and <b>mission</b> , based on sustainability principles	Earlier Vision Statement was mostly an economic statement. New one is more encompassing and includes social, environmental and cultural considerations
2007	DC launches <b>website</b> PlanningforPeople.ca	Won UBCM Community Excellence Award for website innovation
2007	DC signs the <b>Climate Action Charter</b>	And therefore commits to setting community reduction targets, and to be carbon neutral in corporate operations by 2012
Oct 2007	UBCM 2007 Green City Awards	This program ran for 2 years. DC won as the greenest community in BC under 25,000 people.
Nov 2007	Mayor Calvin Kruk wins CanSIA Solar Leader of the Year Award	Canadian Solar Industry Association recognized DC for its leading role in the creation of Solar BC
2007	DC completes its first <b>sustainability baseline</b>	The extensive baseline looked at 10 different areas of focus from culture to transportation and tried to answer the following questions: Whys is it important? Where are we now? And What do we need to do to be more sustainable?
2007	Solar Potential report, prepared by the Pembina Institute, confirms the Dawson Creek area has close to 1200 hours of solar potential a year.	This innovative report was also prepared for the City of Vancouver to be used at the Athletes Village site.
June 2007	DC wins first Federal award: FCM's <b>Sustainable Community Award</b> for its Community Energy Plan	
Dec	DC Climate and Energy advisory committee was formed with	The 12 members of the committee advise the City on sustainability, climate and energy issues and

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2007	representatives from various groups in the community	projects
2008	Completion of <b>Wind</b> and <b>Bio Mass</b> energy baseline studies	With funding from the Northern Development Initiative (NDI) and the South Peace Economic Development Commission, these two studies confirmed the potential to use wind and biomass as renewable energy sources.
Apr 2008	The City, in partnership with three local developers, engages the community in a land use Charrette to create a conceptual site plan for DC's first sustainable neighbourhood	This was the first time that a participatory planning process was used in Dawson Creek. It provided an opportunity to test innovative practices in storm water management, energy efficient buildings, solar orientation, walkability, etc. Lessons learned were then applied to the updated Official Community Plan in 2009.
Apr 2008	DC releases its first <b>Community Climate Action Plan</b> , and a new Corporate emission baseline and reduction plan.	Action suggested in these areas: <ol style="list-style-type: none"> <li>1. Energy efficiency and renewable energy in homes</li> <li>2. Solar energy in commercial buildings</li> <li>3. Biomass heat and power</li> <li>4. Wind energy</li> <li>5. Community engagement</li> <li>6. Engagement on Provincial Policy</li> </ol>
May 2008	DC adopts its <b>Green Building Policy</b>	This policy covers energy use, water, accessibility, and procurement in municipal buildings.
May 2008	DC's Toyota Prius is converted to a plug-in electric, DC's first electric car	This project was part of a Provincial initiative in partnership with BC Hydro, Ministry of Energy and Mines and City of Vancouver.
Sept 2008	UBCM Green City Award	For the second year in a row DC was elected greenest City in BC under 25,000, which came with a \$50,000 cash award.
Nov 2008	DC co-hosts "Live Green" Workshop with NEAT and BC Hydro Powersmart	These series of workshops addresses energy efficiency, recycling, composting, and water conservation and were delivered to City staff and community at large.
June 2009	DC is founding partner of the <b>Green Building Leaders</b> project	The Green Building Leaders Project brings together local governments, developers, home owners, real estate agents, contractors, utilities, environmental organizations, and the provincial government to work collaboratively on the design and implementation of new green building policies.
2009	DC develops <b>Solar-ready requirements</b>	DC was the leading proponent in a building code change initiative requiring that all new residential construction be built solar-ready.

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Mar 2009	DC releases its <b>Carbon Neutral plans</b>	A new inventory is made of corporate emissions, and DC commits to decrease corporate emissions by 14% (compared to 2007) by 2012, 33% by 2020, and %85 by 2050, and offset the remaining emissions.
2009	<b>Solar Hot Water systems</b> installed in all major municipal buildings	These systems are now installed in nearly all municipal buildings to heat domestic hot water.
2009	<b>Wind project</b> site selected	The City hired Natural Power to conduct wind energy analysis on various sites. The site with the greatest potential was identified.
Sept 2009	DC wins silver in “Energetic Olympics” sponsored by One Sky	Community members asked to register their energy saving activities at home, at work, and in the community.
Jan 2010	DC hosts Reclaimed Water information sessions for the public, industry, farmers, and business	
March 2010	PICS presentation on the Carbon tax and responses to climate change	Executive director of Pacific Institute for Climate Solutions addresses DC community about climate change and carbon tax
Sept 2010	City wins UBCM 2010 Community Excellence <b>Award</b> for Leadership & Innovation for Mid-Size Community. Dawson Creek Reclaimed Water Projects wins award at UBCM	
Oct 2010	The Quality Urban Energy Systems of Tomorrow (QUEST) does a study of 4 communities, including DC	DC was chosen as the Canadian Model city for small communities to test the benefits of integrating energy, water, transportation, buildings and waste.
March 2011	<b>“Biomass Project”</b> Dawson Creek on a path to reducing carbon footprints. Info mailed out to landowners, First Nations, and government agencies for input.	Fact sheets and letters were mailed out to all property owners within 2km of the Multiplex. This location for the Biomass was determined by the Biomass Feasibility Study that stated that the Multiplex was the best suitable site for this project.
2011	Dawson Creek participates in <b>“Earth Hour”</b>	Residents and the surrounding community were invited to participate in “Earth Hour” by turning off lights for 1 hour. BC Hydro was able to track and Dawson Creek reduced its consumption by 3.6%.
2011	DC co-hosts <b>“World Water Day”</b> water-awareness open house in partnership with PRRD, NLC, and government groups	The City and PRRD partnered in this event that focused on water awareness and educating both urban and rural residents. Displays and presentations with other groups were also held.
April	Public Open House held for <b>“Draft</b>	The public was invited to give input on the proposed

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2011	<b>Zoning Bylaw</b>	new Zoning Bylaw that was developed with an “age-friendly” view to promoting livability in Dawson Creek for people of all ages.
May 2011	<b>“Drinking Water Week”</b> Water Treatment Plant promotes water conservation	The community was invited to take a tour of the Water Treatment Plant to learn how our water is treated educated on our water source.
June 2011	<b>“Solar Days” Event</b> – City partners with NLC in hosting event	DC has worked in collaboration with Northern Lights College since 2005 to create a training program for solar energy installers and wind turbine technicians. The Energy House continues this partnership, to showcase energy efficiency and renewables and offer a living laboratory for NLC to learn about green buildings. Courses on solar PV and geothermal technology are under development. Success of this event also included participation from BCSEA, Solar BC, and BC Transit.
2011	<b>Dawson Creek’s Carbon Fund and Offset Purchasing</b> Policies are passed by Council	The Carbon Fund allocates \$100 per tonne (based on Dawson Creek’s corporate GHG inventory) into a fund to support energy and greenhouse gas reduction projects in Dawson Creek. The Offset Purchasing Policy outlines high-quality offset criteria for Dawson Creek’s offset purchases.
August 2011	<b>“Rain Barrel &amp; Composter” Project</b> – great success	Over 700 + rain barrels and composters were purchased by residences and surrounding community at a reduced rate. Residences from other communities participated – FSJ, Chetwynd, Pouce Coupe and surrounding rural areas.
2011	City of Dawson Creek’s Water Treatment Plant issues a <b>“Water Use Challenge”</b> to residents, businesses and institutions	A brochure was developed encouraging the opportunity to reduce water consumption. Community rallied with competition.
2011	City wins CEA (Community Energy Association) <b>“Climate &amp; Energy Action” Award</b>	Awarded for leadership in GHG emission reduction project financing and recognition of the creation of an Internal Carbon Fund to finance future local greenhouse gas emission reduction projects. This fund creates a tangible way to recognize the value of saving energy and reducing the City’s emissions.
October 2011	Sustainable Dawson Creek, Tourism Dawson Creek and BC Hydro bring <b>“Candlelight Conservation Dinner”</b> to Dawson Creek	13 restaurants signed up to participate. BC Hydro provided participating restaurants free energy audits and water conserving devise for kitchens. 590 patrons participated in draw packages, donations from local hotels, restaurants and a few electrical businesses.

## Appendix 2 – Inventory of Dawson Creek Energy and Climate Change Documents

In white: milestone reports

In green: key provincial legislations

In grey: technical reports

*All reports by Pembina unless specified otherwise.*

Date	Report	Purpose	Key Outcomes	Identified Next Steps
08-2005	<a href="#">City of Dawson Creek-Community Energy Planning: Municipal Operations Energy Baseline Report</a>	Get a baseline of Corporate Emissions (2004)	Inventory of corporate energy use, cost, and GHG emissions from buildings, infrastructure, transportation and mobile equipment (NOT included: public transit, public schools). 2004: <ul style="list-style-type: none"> <li>• Energy use: 18 MWh (~20MWh/yr)</li> <li>• Energy costs: \$920K (~\$1M/yr)</li> <li>• GHG: 2.3 ktCO<sub>2</sub> (~2 ktCO<sub>2</sub>/yr; ¾ buildings, ¼ fleet, 1/16 other).</li> </ul>	<ul style="list-style-type: none"> <li>• Data mgmt systems: Link individual buildings and facilities with individual meters and get data from BCH/PNG.</li> <li>✓ Implement a vehicle purchasing policy .</li> <li>• Secure NRCan EII financing for retrofit studies and develop further funding models.</li> <li>✓ Investigate cost benefit of wind energy purchases</li> <li>• Refine economic analysis of City Hall Solar Hot Water Heating and seek funding.</li> <li>• Apply to FCM fund for community engagement.</li> </ul>
05-2006	<a href="#">Dawson Creek Green Vehicle Policy</a>	Guide vehicle purchasing decisions and operating practice.	<ul style="list-style-type: none"> <li>• Guidelines on: Right-sizing, Life cycle cost, Fuel Choice, operation, maintenance in monitoring.</li> <li>• Goal: reduce emissions from fleet to 20% below 2004 levels by 2016.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Adopt policy.</li> <li>• Implement &amp; embed in internal operations.</li> <li>• Use <a href="#">Spreadsheet tool</a> to facilitate life cost analysis and decision-making (Updated in 2009)</li> </ul>
08-	<a href="#">Recommend</a>	Suggest emission	Recommended community-wide	<ul style="list-style-type: none"> <li>• Make targets absolute when next carbon</li> </ul>

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Date	Report	Purpose	Key Outcomes	Identified Next Steps
2007	<a href="#">ed Greenhouse Gas Reduction Targets for DC (memo)</a>	targets for approval by council	targets: <ul style="list-style-type: none"> <li>• 85% below 2006 levels by 2050</li> <li>• 33% below 2006 levels by 2020</li> <li>• 14% below 2006 levels by 2012</li> </ul>	inventory is available. <ul style="list-style-type: none"> <li>• Communicate to public + stakeholders and make a plan to meet these targets public?</li> </ul>
12-2007	<a href="#">Sustainability Baseline Assessment</a> (by HB Lanarc)	Identify sustainability best practices and survey relevant existing policies	General recommendations for next steps in each of 10 sustainability areas.  Suggestion of sustainability indexes (but not quantified).	<ul style="list-style-type: none"> <li>• Design and implement monitoring system.</li> </ul>
01-2008	<a href="#">Green Operating Practices Policy for Municipal Buildings</a>	Policy to green the operations of municipally owned buildings	<ul style="list-style-type: none"> <li>• An <i>energy management strategy</i> to increase conservation, efficiency, and renewables.</li> <li>• A <i>procurement strategy</i> to phase out the purchase of toxic products.</li> <li>• An <i>healthy environment strategy</i> to reduce impacts to water, land, and indoor air quality.</li> <li>• An <i>investment strategy</i> to ensure the provision of finance for these projects.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Adopt policy.</li> <li>• Implement &amp; embed in internal operations.</li> </ul>
??'07	<i>Dawson Creek signs Climate Charter (requirement to inventory, report and offset corporate emissions to achieve carbon neutrality by 2012)</i>			

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Date	Report	Purpose	Key Outcomes	Identified Next Steps
04-2008	<a href="#">DC and Climate Change</a>	Get a community emission baseline (2005), forecast future emissions, and set reduction targets.	2005 GHG emissions: 110 ktCO <sub>2</sub> /yr (~ ¼ residential, ¼ commercial, ¼ light vehicles, 1/8 heavy vehicles, and 1/8 for industrial uses and waste)  Reduction targets as suggested above.	<i>Detailed in 2008 Climate Action Plan (see below)</i>
05-2008	<a href="#">DC's Climate Action Plan: First steps towards deep reductions in global warming pollution</a>	Overview possible strategies for GHG reductions (referencing technical studies below) and outline programs and policies for implementation	Summary of suggested policies on:  7. EE&RE in homes 8. Solar energy in commercial bldgs. 9. Biomass heat and power 10. Wind energy 11. Energy from sewer system 12. Air Show emissions  (See below for details of associated technical reports)	<ul style="list-style-type: none"> <li>• Design LIC program to finance EE-RE in homes</li> <li>• Move beyond pre-feasibility on wind studies (find potential sites + record wind data at 80 m)</li> <li>• Support development of provincial feed-in-tariffs</li> <li>• Offset airshow emissions</li> <li>• Partner with Northern Lights College on Energy House demo</li> <li>• Engage the community (contractors, trades program, teachers, community groups) on climate action plan</li> <li>• Work with other communities and the province to advance local and provincial policies for EE/RE</li> </ul>
#1 06-2007	<a href="#">Energy Efficiency and Renewable Energy Improveme</a>	Analyze impacts of possible EE-RE policies and a roadmap for implementation	<ul style="list-style-type: none"> <li>• Decision to require all new housing to achieve EnerGuide 80 (or equivalent) &amp; be built solar-ready.</li> <li>• Preference for performance-based over prescription-based requirements</li> </ul>	<ul style="list-style-type: none"> <li>✓ Select the improvements that are desired to be standard practice in new homes</li> <li>✓ Consider how those improvements will be specified to builders and homeowners</li> </ul>

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Date	Report	Purpose	Key Outcomes	Identified Next Steps
	<a href="#">nts for New Homes in Dawson Creek V3</a>		<ul style="list-style-type: none"> <li>• Preference for broader sustainability requirements (e.g. BuiltGreen) over focusing solely on energy.</li> <li>• Local developers supportive of direction, and already apply many of these recommendations</li> </ul>	<ul style="list-style-type: none"> <li>✓ Consider strategies to achieve desired changes in building practices</li> <li>✓ Engage with local developers</li> <li>• Engage with local suppliers</li> <li>• Engage with homeowner associations &amp; realtors</li> <li>✓ Engage with other municipalities</li> <li>• Engage with Provincial Government</li> <li>• Implement final policy</li> </ul>
#1 02-2008	<a href="#">Residential Solar Opportunities in DC: Solar Hot Water and Electricity Generation</a>	Assess energy, GHG and cost opportunities for solar hot water and PV electric generation.	<ul style="list-style-type: none"> <li>• &gt;60% of homes in DC could install solar hot water systems; this would reduce emissions by &gt;2000 tCO<sub>2eq</sub> per year.</li> <li>• Potential residential uptake for solar PV is ~ 6.4-21.7 MW; this would reduce emissions by 241 to 714 tonnes per year.</li> <li>• life cycle costs are still higher than conventional options; this will require incentives or regulation.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Investigate options for solar hot water &amp; PV incentives and regulation.</li> </ul>
#2 08-2007	<a href="#">An Assessment of the Potential for Solar Water Heating for</a>	Investigate opportunities for solar water heating in hotels and apartment buildings.	<ul style="list-style-type: none"> <li>• Solar water heater could be installed for George Dawson Inn with a Return on investment of ~14% and a payback period of 12 years, reducing GHG emissions by 31 tCO<sub>2</sub> / yr.</li> <li>• Solar water heating system is economic for buildings with a large</li> </ul>	N/A

Appendices

Date	Report	Purpose	Key Outcomes	Identified Next Steps
	<a href="#">Buildings in Dawson Creek</a>		hot water load.	
#3 05- 20 08	<a href="#">Potential for Bio Energy in the DC Area</a>  (by Timmenga & Associates Inc.)	Quantify regional bio-fuel supplies and economic opportunities for power generation and wood pellet manufacturing.	<ul style="list-style-type: none"> <li>• Inventory of agricultural and forestry residues in the South Peace.</li> <li>• Energy needs for three central heating clusters (civic, recreations, multiplex), are ~35PJ/yr, equivalent to ~2.5k tonnes of bio-fuel/yr.</li> <li>• Local sources of seed grass straw and dry wood can meet the demand, offering potential natural gas savings of: 175-250k\$/yr and reducing emissions by 1.5ktCO<sub>2</sub>e/yr</li> </ul>	N/A
#4 05- 20 08	<a href="#">Wind Power Potential in DC</a>	Technical assessment of wind energy resources at Leer site and economic assessment of community owned wind energy	<ul style="list-style-type: none"> <li>• Estimated average wind speeds are near threshold necessary for commercial wind project</li> <li>• Economic feasibility will require better wind monitoring to be evaluated, and could be improved by better feed-in-tariffs.</li> </ul>	<ul style="list-style-type: none"> <li>• Coordinate with PRRD to establish monitoring station at Leer site.</li> </ul>
#5 01-	<a href="#">Energy from DC's Sewage</a>	Evaluate need and prepare for a pre-feasibility study on	<ul style="list-style-type: none"> <li>• Options are: to generate energy from waste biosolids, from waste heat recovery, or to use sludge as fertilizer</li> </ul>	<ul style="list-style-type: none"> <li>• Seek programs/companies that may be interested in piloting emerging technologies suited to smaller</li> </ul>

Appendices

Date	Report	Purpose	Key Outcomes	Identified Next Steps
2007	<a href="#">System</a>	energy generated from sewage.	(no local energy gain, but reduce energy from fertilizer production). <ul style="list-style-type: none"> <li>Opportunity to generate useful energy in Dawson Creek is marginal at this time, but could still warrant prefeasibility study to investigate further.</li> </ul>	communities. <ul style="list-style-type: none"> <li>Contact providers of waste heat recovery technologies to assess potential in DC.</li> <li>Conduct study of potential for land application of sewage lagoons sludge.</li> </ul>
#606-2007	<a href="#">DC Air Show: An Estimate of the Associated GHG Emissions</a>	Evaluate impact of Air show on community emissions.	<ul style="list-style-type: none"> <li>Plane related emissions are ~26 tCO<sub>2</sub>e per show (equivalent to ~1% of corporate emissions)</li> </ul>	<ul style="list-style-type: none"> <li>Offset airshow emissions</li> <li>Encourage spectators to take transit, bike or carpool to the event.</li> </ul>
05'08	<i>Bill 27: Green Communities Act; requirement to include community GHG reductions target in OCP (see <a href="#">West Coast Law report</a> or <a href="#">full text</a>)</i>			
09'08	<i>Bill 10: Housing Statutes Amendment Act (building code) Introduces energy and water efficiency requirements for houses (Energuide 77) and high-rises (ASHRAE 90.1, 2004) (see <a href="#">news release</a>, or <a href="#">full text</a>)</i>			
03-2009	<a href="#">On the Path to Carbon Neutral: Dawson Creek's</a>	New corporate emissions inventory (with different scope than 2004) and plan for carbon	<ul style="list-style-type: none"> <li>2007 emissions: 3.2 ktCO<sub>2</sub>e (34% increase from 2004)</li> <li>10% reduction from conservation and energy efficiency in buildings.</li> <li>Quantified reduction possibilities</li> </ul>	<ul style="list-style-type: none"> <li>Act on identified opportunities for EE and RE; particularly:</li> <li>Implement retrofits and conduct audits on remaining bldgs.</li> <li>Install solar hot water on remaining bldgs.</li> </ul>

Appendices

Date	Report	Purpose	Key Outcomes	Identified Next Steps
	<a href="#">Strategy</a>	neutrality	<p>from biomass, wind, and bldg efficiency): 54% from 2012 projections.</p> <ul style="list-style-type: none"> <li>• Offset liability for 2012: between \$60-170k</li> <li>•</li> </ul>	<p>and PV on bus stops</p> <ul style="list-style-type: none"> <li>• Select wind site and collect data</li> <li>• Engage community on biomass project</li> <li>• Improve data collection (energy audits, track air travel, fleet audit)</li> <li>• Establish a carbon fund and develop a carbon offset policy</li> <li>•</li> </ul>
??'10	<i>Opt-In Solar Hot Water Regulation (see <a href="#">overview</a>)</i>			
06'10	<i>Bill 17: BC Clean Energy Act (see <a href="#">press release</a>, or <a href="#">full text</a>)</i>			
07-2010	<p><a href="#">Feasibility Study of a Biomass Burner fired with Fescue Straw for the Multiplex Facility in Dawson Creek</a></p> <p><a href="#">(by Timmenga &amp; Associates Inc)</a></p>	<p>Assess potential environmental effects of biomass burner at the Multiplex Facility, for permitting purposes.</p>	<ul style="list-style-type: none"> <li>• Biomass boiler at Multiplex appears to be technically and economically feasible.</li> <li>• Impacts: lower City natural gas bill by ~ 50%, reducing its GHG footprint by ~50%, saving ~ \$48k/yr on Carbon Tax.</li> <li>• Fuel switch would not increase the current particulate emissions.</li> <li>• Ash produced is suitable as a potassium fertilizer.</li> </ul>	N/A

Appendices

Date	Report	Purpose	Key Outcomes	Identified Next Steps
12-2010	<a href="#">DC Carbon Fund and Offset Policies (draft)</a>	<ul style="list-style-type: none"> <li>• Suggests Carbon Fund Policy to finance community emissions reduction projects.</li> <li>• Suggests Offset Policy to ensure purchase of the highest-possible quality offsets.</li> </ul>	<ul style="list-style-type: none"> <li>• Earmark \$100/tCO<sub>2</sub> for emissions reduction projects (from CARIP rebate + general funds).</li> <li>• Projects to be selected based on GHG reduction, environmental, social, and financial criteria.</li> <li>• Carbon Fund will NOT be used to purchase offsets.</li> <li>• Prioritize investing in projects that minimize corporate emissions.</li> <li>• Offset providers and projects will be selected yearly based on key selection criteria.</li> <li>• Reductions projects in the community will be considered as offset only if they can meet highest quality standards, be verified, and are NOT counted in community reductions.</li> </ul>	<ul style="list-style-type: none"> <li>• Policies to be reviewed and endorsed by council.</li> </ul>

# Appendix 3 – Provincial Carbon Neutral Inventory Scope

## CARBON NEUTRAL LOCAL GOVERNMENT

Scope Document – 2010-5-07

<b>1. GREENHOUSE GAS COVERAGE</b>	
IN SCOPE	OUT OF SCOPE
<p><b>Six gases:</b></p> <ul style="list-style-type: none"> <li>• Carbon dioxide – CO<sub>2</sub></li> <li>• Methane – CH<sub>4</sub></li> <li>• Nitrous oxide – N<sub>2</sub>O</li> <li>• Sulphur Hexafluoride – SF<sub>6</sub></li> <li>• Per fluorocarbons – PFCs</li> <li>• Hydro fluorocarbons – HFCs</li> </ul>	<p><b>All other gases not considered GHGs</b></p>
<b>2. GEOGRAPHIC BOUNDARIES</b>	
IN SCOPE	OUT OF SCOPE
<p>Emissions from Local Government (LG) operations located in British Columbia.</p>	<p>Emissions from LG operations outside of British Columbia.</p>
<b>3. ORGANIZATIONAL BOUNDARIES</b>	
IN SCOPE	OUT OF SCOPE
<p><b>a) Traditional Local Government Services</b></p> <p>Emissions from LGs that:</p> <ul style="list-style-type: none"> <li>• are parties to the Climate Action Charter; and</li> <li>• provide any of the following traditional services:               <ul style="list-style-type: none"> <li>○ Administration and Governance</li> <li>○ Drinking, Storm and Waste Water</li> <li>○ Solid Waste Collection, Transportation and Diversion</li> <li>○ Roads and Traffic Operations/Maintenance</li> <li>○ Arts, Recreation and Cultural Services</li> <li>○ Fire Protection</li> </ul> </li> </ul>	<p><b>a) Other Local Government Services</b></p> <p>Emissions from LGs that are not parties to the Climate Action Charter.</p> <p>Emissions from:</p> <ul style="list-style-type: none"> <li>○ Landfill</li> <li>○ Transit services</li> <li>○ Police Services</li> <li>○ New construction (facilities, roads, etc.)</li> <li>○ Primary power generation</li> <li>○ Social housing</li> <li>○ Tree farms</li> <li>○ Community Sources (e.g., residential sources)</li> </ul>

2010-5-07

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<b>4. ORGANIZATIONAL BOUNDARIES (cont'd)</b>	
IN SCOPE	OUT OF SCOPE
<p><b>b) Subsidiary Organizations and Shared Services:</b></p> <ul style="list-style-type: none"> <li>• Emissions related to a traditional service provided by a subsidiary organization or through a shared service agreement that is either fully consolidated or consolidated on a modified equity basis, are included in the local government's carbon neutral operations.</li> <li>• For those organizations that are included in the financial statements on a proportional consolidation basis, the local government can include a proportionate share of the emissions related to a traditional service operated by the organization, using the same proportion for emissions as are used for financial statement purposes, or as otherwise agreed to by the parties who share a proportional responsibility for the service.</li> </ul>	
<b>5. OPERATIONAL BOUNDARIES</b>	
<b>5.1 STATIONARY SOURCES (buildings, structures, and related equipment/machinery)</b>	
IN SCOPE	OUT OF SCOPE
<p>a) Direct emissions or indirect energy emissions from stationary sources used to provide traditional services.</p> <ul style="list-style-type: none"> <li>• Direct emissions include those from the use of fossil fuels (e.g., natural gas, heating oil, propane) for heating space and water or producing steam.</li> <li>• Indirect energy emissions include those from electricity, hot water, steam etc. purchased from a third party (e.g., BC Hydro).</li> </ul>	<p>a) Direct or indirect energy emissions from stationary sources owned by the Province of BC or a public sector organization who would be required to include the building's emissions as part of its carbon neutral requirement. For example, the Province is responsible for the emissions from the Vancouver Art Gallery and as such the City of Vancouver will not include those emissions in its corporate footprint.</p>
<p>b) Direct emissions released unintentionally (fugitive emissions) from stationary sources used to provide traditional services. For example: HFCs from cooling units in arenas.</p>	<p>b) Fugitive emissions from transmission lines.</p>

<b>5.3 MOBILE SOURCES (vehicle, park maintenance equipment, etc.)</b>	
IN SCOPE	OUT OF SCOPE
<p>c) Direct emissions from:</p> <ul style="list-style-type: none"> <li>• fleet vehicles and other mobile combustion sources used to provide traditional services; and</li> <li>• employee use of personal vehicles in the provision of traditional services (e.g., building inspection).</li> </ul> <p>These emissions generally involve the mobile combustion of gasoline, diesel, propane, biofuel blends, etc.</p>	<p>c) Emissions from:</p> <ul style="list-style-type: none"> <li>• transit buses</li> <li>• vehicle air conditioning (i.e., fugitive HFC emissions)</li> <li>• employee use of commercial transport (e.g., intercity air/train/bus; vehicle rentals; taxi).</li> </ul>
<b>5.4 CONTRACTED SERVICES</b>	
IN SCOPE	OUT OF SCOPE
<p>d) Direct emissions from mobile sources which are used by contractors to provide traditional services.</p>	<p>d) Emissions associated with:</p> <ul style="list-style-type: none"> <li>• a contractor's corporate offices</li> <li>• travel to and from the contractor's offices</li> </ul>
<b>5.5 PROCUREMENT</b>	
IN SCOPE	OUT OF SCOPE
	<p>e) Indirect emissions associated with purchased office paper.</p>

# Appendix 4 – Emissions Factors for Corporate Inventory

## 1. Transportation

g CO2e/L fuel	Gasoline	Diesel	Propane	Compressed Natural Gas	Ethanol 10	Ethanol 85	Methanol 85	B5	B10	B20
Heating Values (MJ/L)	34.69	38.65	25.47	0.03909	33.58	25.25	25.25	38.56	38.48	38.31
Pass Vehicles	2341.12	2732.271	1532.12	2,959.04	2262.120	397	1298	2585.1	2437.8	2143.3
Pass Trucks/Vans/SUVs	2369.23	2732.628	1532.12	2,959.04	2290.230	414	1305	2585.4	2438.1	2143.6
Comm Vehicle (<8000 lbs)	2369	2733	1580	2,025.00	2088.000	414.000	1305.000	2585.8	2438.5	2144.0
Comm Vehicle (8000-33,000 lbs)	2352	2691	1334	1,690.00	Not avail	Not avail	Not avail	2543.8	2396.5	2102.0
Bus	2352	2691	1334	1,690.00	Not avail	Not avail	Not avail	2543.8	2396.5	2102.0
Machinery	2339	2691	1326	1695	Not avail	Not avail	Not avail	2543.8	2396.5	2102.0
Equipment	2359	2790	1544	Not avail	Not avail	Not avail	Not avail	2543.8	2396.5	2102.0

## 2. Heat

	CO2 (g/L)	CH4 (g/L)	N2O (g/L)	CO2e (g/L)	CO2e (kg/L)	Energy Content (GJ/m3)	CO2e (kg / GJ)
diesel	2663	0.133	0.4	2790	2.79	38.30	72.8
kerosene	2534	0.026	0.031	2544	2.54	37.68	67.5
light fuel oil	2725	0.026	0.031	2735	2.74	38.80	70.5
heavy fuel oil	3124	0.057	0.064	3145	3.15	42.50	74.0
natural gas	1.916	0.000037	0.000035	2	0.00	0.04	50.4
ethane	976	n/a	n/a	976	0.98	17.22	56.7
propane	1510	0.024	0.108	1544	1.54	25.31	61.0
butane	1730	0.024	0.108	1764	1.76	28.44	62.0

## 3. Power

BC Grid Factor (g CO2e/kWh)

25