PURSUING CARBON NEUTRALITY IN NORTHERN BRITISH COLUMBIA:

An Action Plan for Carbon Neutral Operations in the Village of Burns Lake

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January 2013

PURSUING CARBON NEUTRALITY IN NORTHERN BRITISH COLUMBIA: AN ACTION PLAN FOR CARBON NEUTRAL OPERATIONS IN THE VILLAGE OF BURNS LAKE

by

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We accept this project as conforming
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This is only the last step in a journey that benefitted from the collaboration and backing of my wonderful SCARP colleagues, friends and family for which I will always be grateful.

Executive Summary

The Village of Burns Lake recognizes the need to take action on climate change and provide an appropriate strategy for emissions reduction within the local context. The need to act is urgent as experts have predicted a warming of more than 5 degrees Celsius in the later part of this century (Field et al., 2007). The associated impacts on municipal infrastructure, agricultural activities and tourism from a more variable climate are impetus to undertake GHG reductions. In 2009 the Village became a signatory to the B.C. Climate Action Charter (CAC) and committed to being carbon neutral in operations by 2012. The Village does not currently have an action plan detailing how it will reduce and offset corporate emissions. This project addresses this gap by providing a comprehensive corporate emissions inventory, assessment of current climate action initiatives, and recommendations for additional steps to be taken in order to progress towards CAC goals. The findings of this project can be easily adapted to a carbon neutral action plan for the Village of Burns Lake. Recognizing that leadership must begin from a sound understanding of existing operations, this report focused on the Village of Burns Lakes' corporate emissions only; understanding that the findings will have an impact on community-wide emissions in the future. The Village has adopted the Provincial target of reducing community GHG emissions to 33% below 2007 levels by 2020. This target applies to the community emissions profile of Burns Lake and therefore is separate from the CAC commitment to carbon neutrality in corporate operations.

A corporate emissions inventory was completed and analyzed to determine what areas the Village should focus on as the highest emitters. A scan of other similar-sized B.C. local governments with comparable weather conditions was completed to determine actions currently underway and to assess their efficacy in the Burns Lake context. Semi-structured interviews with Village Council and staff, and staff with the Regional District of Bulkley-Nechako (RDBN) were conducted to identify potential GHG reduction actions. The interviews were further used to determine the level of awareness amongst Village staff of the requirements of carbon neutrality and how they align with broader regional and provincial goals.

The corporate emissions inventory includes data from 2009 to 2011 and revealed that GHG emissions for the Village have increased slightly from the 2009 baseline by 60.35 tonnes CO_2e for a total of 380 tonnes CO_2e in 2011. This can be attributed to the addition of two new fleet vehicles, increased programming at some facilities and a change in emissions measurement methodology with the adoption of the SMARTTool. In 2011 the Village realized a 23 tonne CO_2e reduction through the installation of a biomass heating system at the arena. According to inventory data, buildings produced more emissions than fleet vehicles at a ratio of 61% to 39% in 2011. Natural gas continues in all three inventory years to be the fuel most consumed by corporate operations. Fleet fuel consumption and building energy use spike in the winter months (December to February) for all inventory years. Carbon offsets in 2011 would have cost the Village approximately $9,500 and future offset costs can be expected to increase in the future with the construction of an addition to the existing arena and the potential increase in programming.

The GHG reduction actions presented focus on increasing energy efficiency and aligning internal policies with climate action goals to both prepare for future reductions and raise awareness amongst staff. For buildings, conducting an energy audit of all corporate facilities would allow prioritization of funds for equipment replacement and retrofits. There are limited options for right sizing and fuel switching for fleet vehicles; however opportunities exist in replacing equipment that is 15 to 25 years old. Given restricted budgets and human resources, the Village should focus on finding efficiencies within existing operations. Larger capital investments for GHG emissions reductions should be assessed for their applicability to scaling up beyond corporate emissions boundaries in order to contribute to deeper, community-wide reductions. A supportive action which would significantly assist in future GHG reduction projects is the establishment of a dedicated climate action fund. This fund would consist of the annual CARIP rebate with the potential to also include carbon offset costs for corporate operations should Council choose to take the making progress towards carbon neutrality approach.

In its support of this project, the Village was interested in addressing the question of how a small, northern community of 2,385 residents could take proactive steps towards becoming carbon neutral while taking into consideration budget and human resources limitations, extreme climate and a remote location. The actions presented here work towards addressing this concern and a number of further recommendations were developed to further focus on this question. The recommendations drew from interviews with Village Council and staff, a scan of other B.C. municipal climate actions, and analysis of current climate actions and the corporate emissions inventory. They are:

- Demonstrate clear and consistent commitment from Council and managers to achieving GHG reductions to provide staff with the confidence to pursue innovative projects

- Focus efforts on proven technologies that can be maintained with local expertise

- Promote awareness and understanding of climate change mitigation planning with staff through regular reporting on emission inventories and actions

- Develop partnerships with neighbouring local governments, including First Nations, to realize economies of scale in the purchase of high efficiency and clean energy equipment

- Create relationships with educational institutions and other local governments to benefit from shared technical expertise and project experience

Table of Contents

Tables and Figures

1.0 Introduction

The Village of Burns Lake recognizes the need to take action on human driven climate change and provide an appropriate strategy for emissions reduction within the local context. The need to act is urgent and will require commitment from individuals, industry, local government and the Province. The 4th Intergovernmental Panel on Climate Change (IPCC) Assessment Report states that the "warming of the climate system is unequivocal" and that "mainstreaming climate change issues into decision making is a key prerequisite for sustainability" (Field, Mortsch, Brklacich, Forbes, Kovacs, Patz, Running & Scot, 2007). The human factors which contribute to climate change include the production of greenhouse gas (GHG) emissions through energy use, burning fossil fuels and land use changes. The effects of climate change across British Columbia are evident as is the potential for greater risk in northern communities. While in the later part of this century, the rest of Canada can expect a 2 to 3 degree Celsius warming, higher latitudes face a warming of more than 5 degrees (Field et al., 2007). The climate risks faced in particular by northern communities may include more frequent and extreme precipitation and permafrost thaw which will affect the construction and maintenance of municipal infrastructure. Droughts from greater variability in precipitation will negatively affect and tourism and agricultural activities.

Recognizing the importance of taking proactive steps towards reducing GHG emissions, the Province of British Columbia has begun a number of initiatives encouraging local governments to take action on cutting emissions. These initiatives include the 2008 Green Communities Statues Amendment Act (Bill 27) and the introduction of the B.C. Climate Action Charter (CAC). The Province has set ambitious GHG reduction targets and expects local governments to take a leading role in achieving them. It is estimated that local governments control or have influence over approximately 45% of provincial GHG emissions, which makes them a key partner in achieving provincial reduction targets (B.C. Climate Action Toolkit-Local Leadership, 2012). Local governments have the advantage of proximity to the public and in-depth knowledge of local conditions to determine appropriate policies and initiatives to contribute to GHG reductions. However, local governments will also require direction and financial assistance in implementing broad changes, especially with regards to aging and inefficient infrastructure.

In 2009 the Village of Burns Lake became one of 180 local government signatories to the B.C. Climate Action Charter. The Charter commits local governments to being carbon neutral in their operations by 2012, to measure and report on their community's GHG emissions profile and to create complete, compact, energy-efficient communities. Bill 27 further requires Official Community Plans (OCP) to include GHG emissions reduction targets and accompanying policies and actions proposed by the local government to achieve those targets. To date, the CAC is not yet legislated; therefore local governments have control over where they will focus their resources for GHG reductions.

The Village of Burns Lake corporate operations comprise approximately 2% of the total community emissions profile. Village Council has adopted the Provincial GHG reduction target

of a 33% reduction below 2007 levels by 2020 into the OCP. In light of this target, the contribution of corporate emissions is minor, however to demonstrate leadership there is a need for a firm understanding of GHG emissions from existing operations. In the past due to limited staff time and budget, reduction measures have been completed as time and resources allow. A new council and large staff turnover over the past two years has further complicated efforts to coordinate emissions reductions activities.

The Village does not currently have an action plan detailing how they will reduce and offset corporate emissions. This is a necessary step in order to meet CAC commitments and to work towards the long term goal of achieving community-wide GHG reductions. This project will address this gap by producing a comprehensive corporate emissions inventory, analysis and recommended actions for carbon neutral operations for the Village of Burns Lake. This project is intended to provide an accurate picture of current emission levels and sources and practical actions which Council may take to reduce corporate emissions. The project will address the question of how a small northern B.C. local government can take proactive steps towards becoming carbon neutral while taking into consideration budget and human resources limitations, extreme climate and a remote location. This project will have wider implications for future planning activities within the Village. A sound understanding of the corporate emissions profile can be a starting point for exploring community-wide GHG reduction strategies while demonstrating strong leadership to the community by first reducing emissions within local government. This project and the recommended actions are subject to review by staff and Council and will not be mandated unless formally adopted by Council.

2.0 Background of the Project and Problem Statement

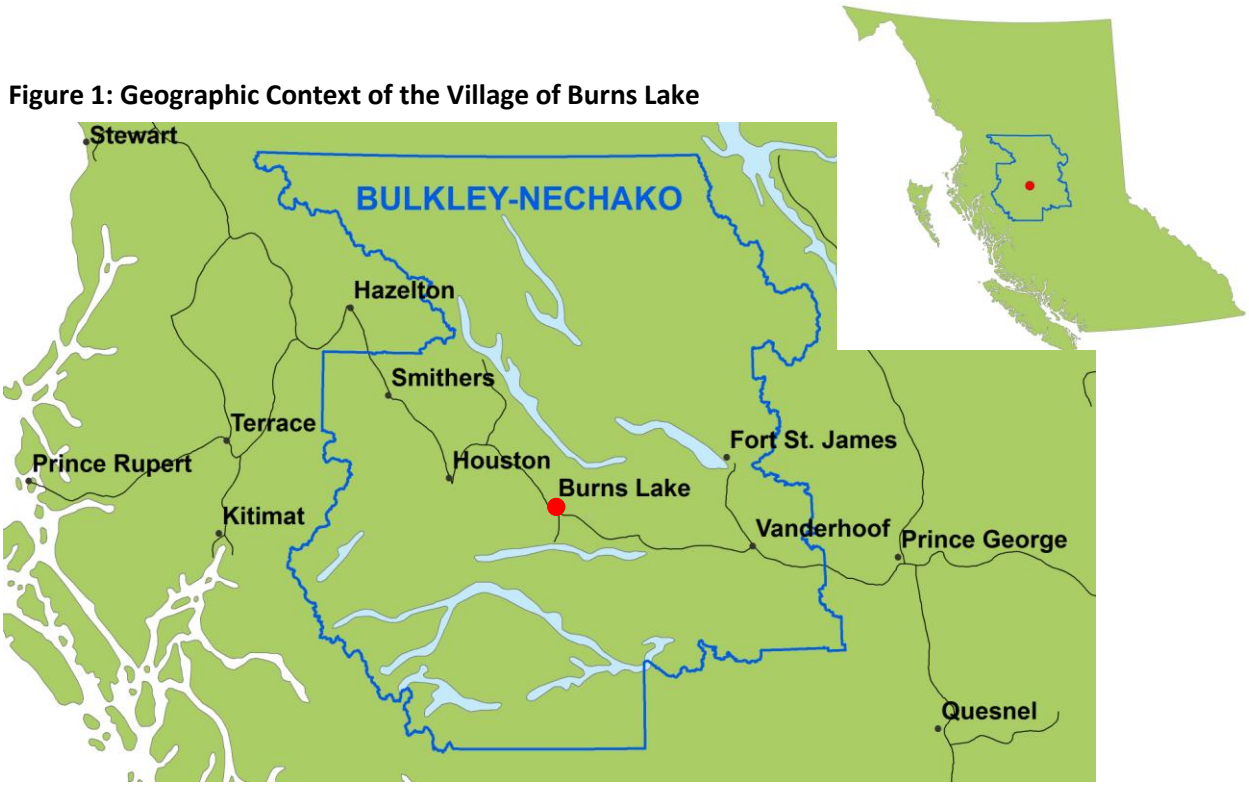
Burns Lake is located in the Regional District of Bulkley-Nechako in Northwest British Columbia, approximately 222km from Prince George along the Highway 16 corridor. The community has a total population of 2,385 residents (Statistics Canada, 2011) and acts as a service centre for neighbouring rural communities and residents of the wider Lakes District. The Lake Babine Nation and Burns Lake Band each have territory within the municipal boundary, with populations of 301 and 55 respectively (Statistics Canada, 2011).

Table 1: Demographic Information for the Village of Burns Lake, Burns Lake 18 IR and Woyenne 27 IR.

Population	
Population in 2011	2,385
Population in 2006	2,778
2006 to 2011 population change (%)	-14
Age breakdown	
0 to 14 years	540
15 to 24 years	365
25 to 34 years	325
35 to 44 years	310
45 to 54 years	345
55 to 64 years	220
65 + years	300
% of the population aged 15 and over	78

Source: Statistics Canada, 2011.

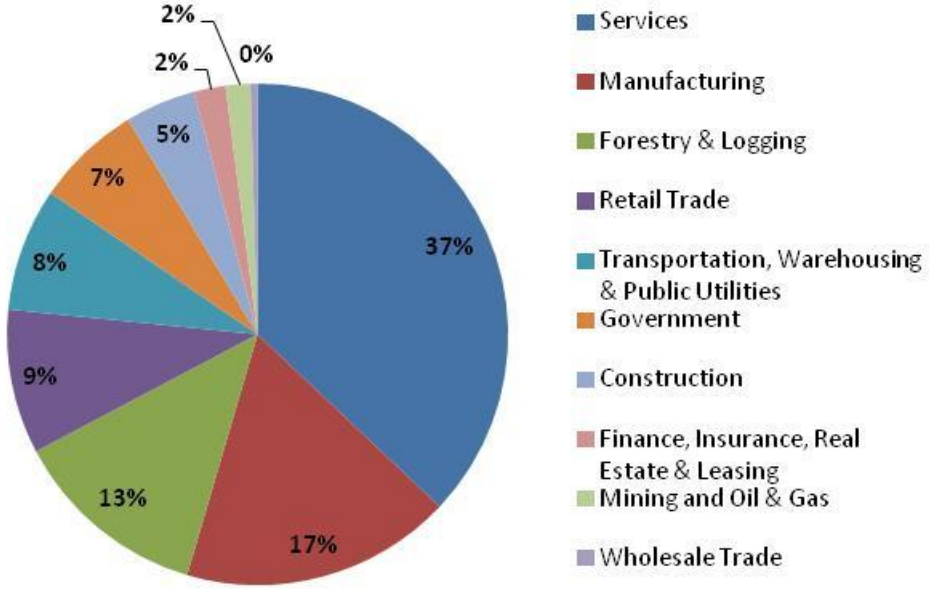
Figure 1: Geographic Context of the Village of Burns Lake



Source: Village of Burns Lake Development Services Department, 2012.

The forestry and logging, manufacturing and service industries play a large role in employment for residents (Investment Ready Community Profile, 2012). In January 2012 the community suffered a tragedy when the Babine Forest Products Sawmill, the main employer in town, was destroyed after a major explosion. The blast claimed the lives of two community members and injured a further nineteen. The community is still recovering from the event and efforts are continuing to secure support for displaced workers and economic opportunities for the community. The resulting social issues of increased vandalism and domestic and substance abuse are ongoing challenges. The Village, like many other B.C. local governments, is further struggling with the need to replace infrastructure which is either nearing or beyond its recommended lifespan. The focus on infrastructure replacement creates challenges for prioritizing climate action, though upgrading inefficient infrastructure such as waste water treatment facilities and drinking water distribution systems would play a part in realizing GHG reductions.

Figure 2: Employment by Industry in Burns Lake



Source: Adapted from Investment Ready Community Profile, 2012.

Residents of the Lakes District are familiar with the effects and cost of climate change in a northern climate. Over the last thirteen years the mountain pine beetle (MPB) has affected an estimated 18.1 million hectares of forest land throughout B.C. (Growing Fibre, Growing Value, 2012). It is estimated that MPB will have killed between 50-75% of merchantable pine by 2021 (Growing Fibre, Growing Value, 2012). This acute drop in timber supply will have a significant economic and social effect on forestry-dependent communities and has prompted the Provincial Government to commit $884 million to initiatives to curb the effects (Growing Fibre, Growing Value, 2012). More variable winter temperatures and increased precipitation has put a strain on local government services as increases in road maintenance and snow removal activities are required. The Village of Burns Lake Public Works Director estimates that the Village must now spend an additional $25,000 annually for these activities than was spent ten years ago (personal communication, September 25, 2012).

In recognition of these effects, the Village of Burns Lake has already taken steps to address climate change and to identify the role that it can play in reducing corporate emissions and encouraging low-carbon development in the community. The formal commitments that the Village has made to address climate change are becoming a signatory of the Climate Action Charter in 2009 and adopting a target for GHG reductions in the OCP through a 2010 amendment. The CAC includes a commitment to be carbon neutral in operations by 2012, to measure and report on the community's GHG emissions profile and to create a complete, compact and more energy efficient community. Due to limited knowledge of the existing community emissions profile, the Village chose to adopt the Provincial targets of a 33% GHG reduction below 2007 by 2020 in the OCP.

The Village has measured corporate emissions since 2009 through its participation in the Climate Action Revenue Incentive Program (CARIP), a Provincial carbon tax rebate program. In order to receive the tax rebate, a local government is required to measure corporate emissions through the CARIP reporting template. In 2012 staff began testing the functionality of SMARTTool, a Provincially-developed web-based emissions inventory tool, to measure and report on emissions. Actions which the Village has completed to reduce corporate emissions involve various retrofits and upgrades to municipal buildings. These include a more efficient furnace in the museum, solar lighting installed at the Spirit Square community park, construction of a heat recovery system at the Tom Forsyth Memorial Arena and installation of low-flow toilets in the Village Office. Fleet emissions have been targeted through the adoption of an idle-free policy (for a complete list of sustainability and climate actions undertaken by the Village of Burns Lake, refer to Appendix A). Plans which have been developed to target sustainability and GHG reductions in the entire community include the 2010 Active Transportation Plan and an Integrated Community Sustainability Plan (ICSP) which will be completed in early 2013. Recycling for cans and paper has been available at the Village Office for a number of years in partnership with the adjacent Regional District Office. These activities will continue as the Village progresses towards its GHG reduction goals.

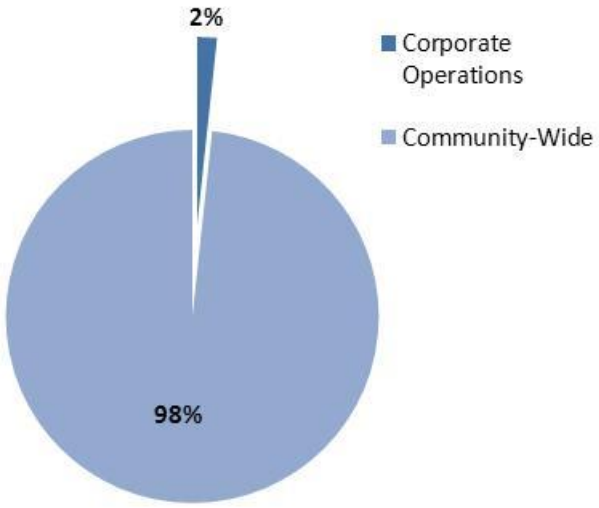
Working towards carbon neutrality is a challenge for all local governments since the introduction of the Climate Action Charter in 2007. In recognition of this, the Provincial Government has taken some steps to provide tools and financial support for local governments to progress in their CAC commitments. These supports include the Climate Action Revenue Incentive Program (CARIP), SMARTTool (a web-based GHG emissions inventory and reporting tool) and the Green Communities Committee (GCC) which has developed a number of toolkits available free of charge to local governments. However the success of these initiatives for small, remote communities has been limited. Burns Lake has been struggling with the question of how a small, northern B.C. local government can take proactive steps towards becoming carbon neutral while taking into consideration budget and human resources limitations, extreme climate and a remote location.

Limited staff and financial resources have played a large role in inconsistent action on climate issues in Burns Lake. The Village had lacked a full time staff person to take on the joint sustainability and climate action portfolio until 2010 when the position of Development Services Coordinator was created. At the 2012 Union of British Columbia Municipalities (UBCM) Convention, the Village of Burns Lake sponsored resolution B121-2012 Carbon Neutral Goals which was endorsed (Union of British Columbia Municipalities, 2012). This resolution stated that while local governments have committed to the Climate Action Charter goals, there are limited Provincial financial assistance programs and loan arrangements to help achieve these goals, especially for small communities. The resolution calls for UBCM to lobby the Provincial Government for more of these assistance programs. Without external financial assistance to implement projects and either expand staff numbers or hire outside consultants to complete

the necessary groundwork for future GHG reductions, it is unlikely the Village will be able to make significant progress towards CAC goals in the short to medium term.

Corporate operations make up approximately 2% of the entire Village of Burns Lake community emissions profile. Though this amount is minor, there is not a clear understanding of where corporate emissions are concentrated and the relationship between corporate and community-wide GHG reduction actions. In order to demonstrate leadership, there needs to be good baseline data and a plan for corporate GHG emissions reductions. This baseline information includes a comprehensive corporate emissions inventory, analysis and research into realistic options for reduction actions.

Figure 3: Breakdown of Corporate vs. Community-Wide emissions in Burns Lake



Source: Draft 2010 CEEI Report, 2012

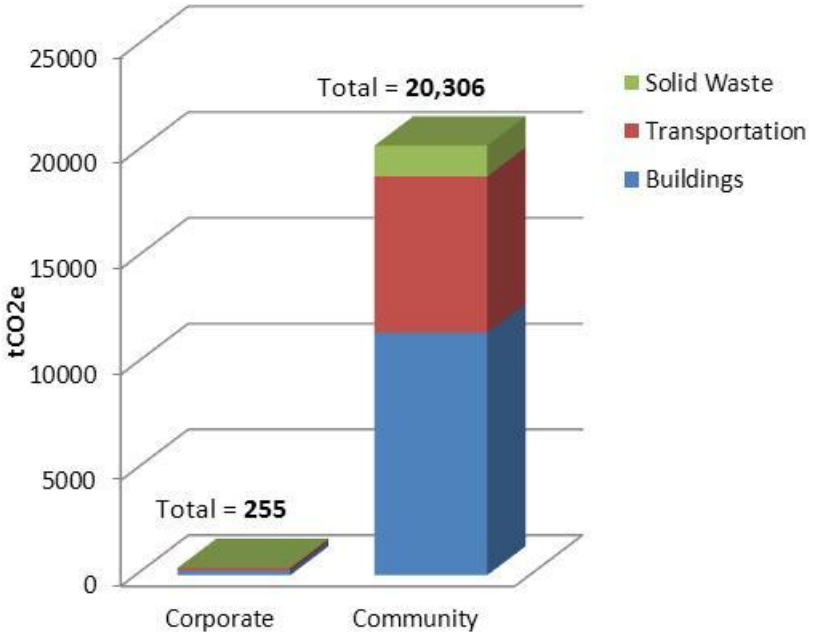
The role of this project is to address these needs by creating a corporate emissions inventory and practical options which the Village may take to reduce GHG emissions and work towards the goal of carbon neutrality. It will take advantage of an internship position which the Village was able to secure through grant funding to complete this work.

3.0 Purpose of the Project: Creating a Carbon Neutral Action Plan

The focus and purpose of this project are as follows; to create a comprehensive corporate emissions inventory, provide analysis of the emissions inventory to identify areas to target for future GHG reductions projects, present corporate emissions data in a format which is easy for staff to understand, recommend options for the Village to reduce its corporate emissions and become carbon neutral and to put forward a discussion of how corporate GHG emissions reductions could relate to community-wide reductions.

This project can be adapted to serve as a carbon neutral action plan for the Village of Burns Lake corporate operations. A carbon neutral action plan provides a map for reducing GHG emissions produced by corporate operations. The plan utilizes baseline emissions levels to allow for measurement against Village GHG reduction targets. A carbon neutral plan is intended to be a living document that may be updated as new data becomes available and reduction activities are implemented.

Figure 4: 2010 Emissions Inventory Profiles, a Corporate Operations and Community-Wide Comparison



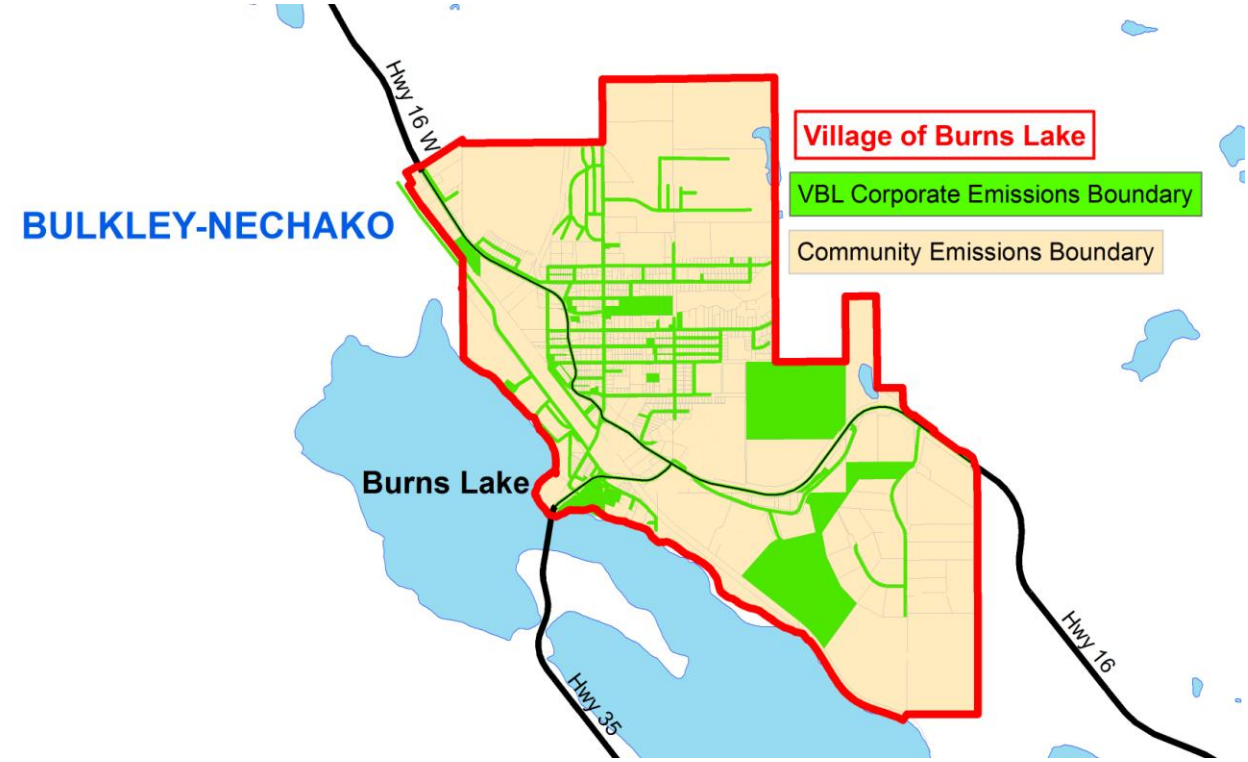
Source: Draft 2010 CEEI Report, 2012
*2010 data is used here as this is the only year for which there is both corporate and community emissions inventories available for comparison

The emissions inventory and reduction actions in this project apply to corporate operations only and not the community emissions profile. Local governments produce GHG emissions through daily operations such as heating buildings, managing waste and water and running vehicles and equipment. The GHG emissions produced through these activities are the local government's corporate emissions and are the emissions which are being targeted through a carbon neutral action plan. Community members and local businesses are also producing GHG emissions through their daily actions such as lighting and heating homes, driving and running appliances. The emissions produced through these activities make up the community emissions profile and are not addressed in this project.

To help local governments understand the extent of their responsibility for corporate emissions, the Province in conjunction with the Union of British Columbia Municipalities has defined a standard corporate emissions boundary for all B.C. local governments. This boundary encompasses all emissions produced through the delivery of "traditional" local government services. These services include fire protection, solid waste management, recreational/ cultural services, road and traffic operations, water and wastewater management, and local government administration (Green Communities Committee, 2011). Therefore for the purposes of carbon neutrality, the Village of Burns Lake is responsible for tracking and reducing emissions

produced through the operation of all corporate buildings and the corporate vehicle fleet. This includes GHG emissions produce through the consumption of energy and fuel such as natural gas and diesel.

Figure 5: Corporate and Community Emissions Boundaries in the Village of Burns Lake



Source: Village of Burns Lake Development Services Department, 2012.
*This visual representation of the Village's corporate emissions boundary highlights the properties that may produce GHG emissions for which the Village is responsible for the purposes of carbon neutrality. Those properties which do not contain buildings or infrastructure do not contribute to the corporate emissions profile. Not directly referenced, though important to note, are the emissions produced by the corporate vehicle fleet which are also included in the corporate emissions boundary.

There are a number of benefits to the Village in creating a carbon neutral action plan. These benefits extend to both tangible and intangible economic, social and environmental gains and may include:

- Increased energy efficiency and reduced energy costs in municipal buildings
- Improved existing infrastructure through the introduction of new technologies
- Community economic development and job creation by generating more energy locally
- Reducing demand on municipal services and consequently reduced need for capital expansion and reduced costs for operation and maintenance
- Protection of fragile ecosystems and productive agricultural land by containing growth

- Demonstration of local leadership in climate action and the creation of a more informed citizenry

Local carbon neutral action plans do not operate in isolation but in conjunction with broader regional and provincial emissions reduction activities. This is particularly true in the context of small, remote communities such as Burns Lake where local governments often share the responsibility for service delivery with the wider region. The Village of Burns Lake currently shares solid waste and building inspection services with the Regional District of Bulkley Nechako (RDBN).

In the interest of efficiency, local governments in the Regional District no longer have individual landfill sites. These sites have been given up in favour of localized "transfer stations" where municipal solid waste and recyclables are given over to the Regional District for collection, handling and transfer to two main landfill sites (RDBN Corporate energy and emissions plan, 2011). The emissions accruing from both the operation of the transfer sites and transportation to the centralized landfills fall in the corporate emissions profile of the Regional District and not individual local governments such as the Village of Burns Lake. The Village further relies on the Provincial Government to take responsibility for emissions originating from infrastructure for which they are responsible for. This includes the streetlights which run the length of the Highway 16 corridor through the downtown core of Burns Lake.

The Village of Burns Lake context is a good representation of the many overlaps between local, regional and provincial governments with regards to emissions jurisdiction. Assigning responsibility for GHG emissions to various levels of government is a difficult process. Setting the boundaries too wide could be unrealistic to achieve significant reductions whereas setting them too narrow may not be ambitious enough to meet set targets. The corporate emissions boundary which has been determined jointly by the Province and the Union for British Columbia Municipalities (UBCM) is based upon what are seen as the traditional services provided by local government. This includes GHGs produced by corporate buildings and fleets yet does not encompass aspects such as GHG emissions produced from employee travel or commuting or from new construction or maintenance activities. The corporate emissions boundary for the Village is therefore a narrowly defined area of responsibility. Any GHG reductions achieved within this boundary are intended to work in conjunction with efforts from other levels of government and the private sector to achieve overall Provincial reduction targets.

4.0 British Columbia Legislative and Policy Context

The supportive Provincial legislation and policy on climate action and emission reductions forms the context for Burns Lake's efforts to become carbon neutral. Climate change is a problem that requires collective action to address, as any GHG emissions reductions achieved by one actor

can be easily cancelled out if others do not also do their part. Likewise climate action must also take a holistic approach as reductions in one sector will not be enough if other sectors are left to continue with business as usual. This is the challenge facing policy makers in designing effective and equitable strategies for climate action. Determining what responsibilities can be reasonably expected of various levels of government, industry, organizations and individuals is a difficult process and maintaining a high level of commitment an ongoing struggle.

4.1 Provincial Approach to Climate Action

Over the next two decades British Columbia can expect a warming of 1 to 3 degrees Celsius with annual warming rising to 2 to 3 degrees in the lower mainland and more than 5 degrees in the north by late in the century (Field et al., 2007). This significant change in weather pattern has implications for all sectors and geographic areas of the province. Increased and more variable precipitation poses both flood and drought risks which will negatively affect agricultural activities. Rising sea levels will threaten coastal communities while greater numbers of wildfires are a risk in the interior. Increased maintenance and building costs for infrastructure can be expected due to permafrost thaw (Field et al., 2007). Fresh water fisheries, in particular salmon, are likely to be negatively impacted by warmer spawning streams. Faced with these impacts, the Government of British Columbia has taken an approach focused on emissions reduction through a combination of set targets, incentives, emissions trading, renewable energy and fuel and energy efficiency (B.C. Climate Action Plan, 2008, Fergusson, 2010). In 2010 the Province produced an Adaptation Plan; however there are currently no requirements for local governments to develop goals or actions around climate change adaptation (Baynham, 2011).

In 2007 British Columbia began to show strong climate leadership through legislation to reduce GHG emissions. A Speech from the Throne that same year acknowledged the threat which climate change poses to the planet and the urgent need to take action to reduce GHG emissions (Campagnolo, 2007). The Greenhouse Gas Reductions Target Act (Bill 44) was passed which set provincial targets for GHG reductions at a 33% reduction below 2007 levels by 2020 and an 80% reduction by 2050. Interim reduction targets of 6% below 2007 levels by 2012 and 18% by 2016 were incorporated in 2008 through a report by the B.C. Climate Action Team. Bill 44 further required that the B.C. public sector be carbon neutral by 2010. This was achieved through energy retrofits for buildings, increased fuel efficiency and use of wireless communication tools, with the remaining emissions balanced through the purchase of carbon offsets (B.C. Climate Action Plan, 2008).

The publication of the B.C. Climate Action Plan in 2008 outlined a strategy for emissions reductions which encompassed all levels of government, industry and citizens. The Greenhouse Gas Reduction (Cap and Trade) Act (Bill 18) laid a foundation for a market-based cap and trade framework by setting requirements for reporting GHG emissions from large B.C. emitters. This Act works in conjunction with the Pacific Carbon Trust, a crown corporation established to invest in reduction projects in B.C. and provide B.C.-based carbon offsets to assist organizations

in becoming carbon neutral. The Carbon Tax Act passed in 2008 introduced a revenue-neutral tax on fossil fuels set initially at $10 per tonne which would increase by $5 per tonne annually until it reaches $30 per tonne in 2012.

Supporting legislation for reductions in transportation related emissions include the Vehicle Emissions Standards Act (Bill 39) and the Renewable and Low Carbon Fuel Requirements Act. These Acts set emission standards to increase automobile fuel efficiency and benchmarks for the amount of renewable fuel in transportation fuel blends respectively. Clean and renewable energy production is encouraged through the Clean Energy Act (Bill 17) and sets an objective of generating at least 93% of the electricity in B.C. from clean or renewable resources.

4.2 Role of Local Governments and Supports Available

The role of Local Governments in achieving Provincial reduction targets is significant. The 2010 Provincial GHG inventory found province-wide emissions to be 62 megatonnes CO2e, a 4.5% reduction from 2007 levels (B.C. GHG Inventory Report 2010, 2012). The Province estimates that local governments have control or influence over 45% of Provincial emissions, manifested in their control over land use, density, urban form and their ability to influence the attitude and behaviour of their residents (B.C. Climate Action Toolkit-Local Leadership, 2012, Report from Climate Action Team, 2008). Applying this percentage to the 2010 Provincial GHG inventory translates into approximately 28 megatonnes CO_2e which fall under the responsibilities of B.C. municipalities. To spur action on emissions reduction at the local level, the Province introduced the Climate Action Charter in 2007 which committed signatories to become carbon neutral in corporate operations by 2012 and to create complete, compact communities. As an incentive to sign the voluntary Charter, signatories were given the full amount of their carbon tax paid out returned to them through the Climate Action Revenue Incentive Program (CARIP). Local governments access this program by following an annual reporting structure on climate actions undertaken.

This incentive was followed by requirements for local governments set in the Local Government (Green Communities) Statutes Amendment Act passed in 2008. This included the requirement to include GHG reduction targets in an Official Community Plan (OCP) and accompanying policies and actions which a local government would pursue to meet those targets. This act further expanded the authorities for municipalities under the Local Government Act to encourage sustainable development. Included in the new powers is the ability to designate development permit areas to fulfill the objectives of promoting water and energy conservation and GHG reduction. The Housing Statutes Amendment Act (Green Building Code, Bill 10) expanded local government authority further by enabling them to create building bylaws to conserve energy and water and reduce GHG emissions. However local governments are still subject to the building code established by the Province and as such are unable to establish their own, potentially more rigorous building standards (Fergusson, 2010).

In addition to legislation expanding local governments' power to promote sustainable development, the Province committed through the CAC to develop options and actions for local governments to be carbon neutral in their operations. The Provincial Government-UBCM Green Communities Committee was established to fulfill that commitment. Through their working groups, a common framework for carbon neutrality was developed to provide a clear methodology which local governments could follow to achieve carbon neutrality. Workbooks developed alongside the framework define the scope, emissions factors, and reporting methodology required to achieve carbon neutrality.

The Partners for Climate Protection (PCP) program provides local governments with another framework for achieving emissions reductions. The PCP program is a partnership between the Federation of Canadian Municipalities (FCM) and ICLEI-Local Governments for Sustainability. The program receives financial support from FCM's Green Municipal Fund. Participating local governments can follow the PCP five milestone framework, a performance-based model which assists in reducing emissions. Projects developed under these milestones are often eligible to apply for the FCM Green Municipal Fund.

A partnership between the B.C. Ministry of Environment, B.C. Hydro, Terasen and the Ministry of Transportation and Infrastructure has produced for B.C. local governments individual Community Energy and Emissions Inventory (CEEI) Reports (Fergusson, 2010). These reports provide local governments an overview of their community-wide emissions broken down into on-road transportation, buildings and solid waste. Produced first in 2007, the draft 2010 reports are currently available and provide the most up to date data at the time of writing. In subsequent years CEEI reports are expected to be produced every two years and will allow local governments to track their progress over time towards their reduction targets. At the time of writing, there is some discrepancy between the first reporting year and the 2010 draft reports, forcing the CEEI Working Group to delay publication of the final reports while the data is verified.

Provincial commitment to supporting climate action at the local level may be waning. In the B.C. 2012 Budget there are no further commitments to provide funding for emissions reduction projects and the $40 million allocated for "climate action and clean energy initiatives" is discontinued after 2013 (B.C. Budget, 2012). Small, remote communities seeking to pursue climate actions will therefore likely be challenged to find funds to support new projects in the future.

5.0 Methods

This project grew out of a nine month internship with the Village of Burns Lake in the Corporate and Development Services Departments. The Village had prior to 2010 incorporated municipal planning and sustainability initiatives into the workplan of various staff members who were able to complete individual projects, time permitting. In 2010 the Development Services

Department and Coordinator position were created and the Village was able to have a full-time staff member managing the sustainability and climate action portfolio. One of the climate action tasks the Corporate and Development Services Intern was responsible for included completing a comprehensive corporate emissions inventory utilizing SMARTTool. Given the limited staff resources and other large-scale capital projects ongoing in the community, there was a need for further analysis of the inventory results so that staff and Council could have an accurate picture of what reductions activities were feasible to fulfill the Climate Action Charter commitments.

Figure 6: Village of Burns Lake Office

Photo Credit: Jessie Singer

The constraints to any future emissions reduction activities were discussed with staff during the development stage of this project and provided a useful foundation for defining the scope of the project. Given limited financial and staff resources, reduction activities should be practical, low-cost and utilize materials and technology which is regionally available. Activities were to be relevant for a remote, northern community which faces challenges around transport distances and availability of certain equipment and technology. Acknowledging these constraints, a scan of other B.C. local governments was done to determine current initiatives for becoming carbon neutral that may be compatible with Burns Lake. In conducting the scan of municipal actions on climate change, priority was given to sources detailing cases of smaller, northern communities in British Columbia with similar environmental, economic and social contexts to Burns Lake.

Semi-structured interviews with Village Council and staff were used to identify potential reduction activities and to determine the level of awareness of the municipal commitment to carbon neutrality and how that commitment aligns with broader regional and provincial goals. As the implementation of the actions presented here will directly affect the daily work life of all Village staff members, all full time office staff, the Arena Foreman and the Working Foreman for the Public Works Department were interviewed. The Mayor and one Council member were also interviewed as their capacity as decision makers will be instrumental in implementing any of the recommendations outlined in this project. A snowballing technique was utilized in these interviews in order to determine other interview subjects who have direct experience with Village corporate operations and/or are able to speak to specific municipal level emissions reductions experiences. These additional interview participants included staff at the Regional District of Bulkley-Nechako and staff from neighbouring municipalities. Participation and buy in from Village staff will be essential to the successful implementation of GHG reduction actions

and long-term corporate commitment to GHG emissions reductions. For this reason, staff members were invited to review and comment on the draft report to ensure the production of a document which is capable of being implemented.

An updated corporate emissions inventory was created for this project using data from 2011 which was the most recent year with a complete data set on energy and fuel consumption. To complete this inventory, an accurate accounting of all municipal-owned buildings and fleet vehicles were compiled and formatted to align with the SMARTTool reporting template. SMARTTool is a web-based emissions inventory and reporting tool developed by the Province and has the advantage of aligning with all provincially-recognized reporting standards and changes in supporting carbon neutral legislation. The online interface allows for data analysis immediately following data upload. Energy and fuel consumption for individual buildings and fleet vehicles and their corresponding dates were collected and input into the reporting template and then uploaded to the SMARTTool online platform. SMARTTool applies the relevant emissions factors to the consumption data to show the greenhouse gas emission levels associated with each source.

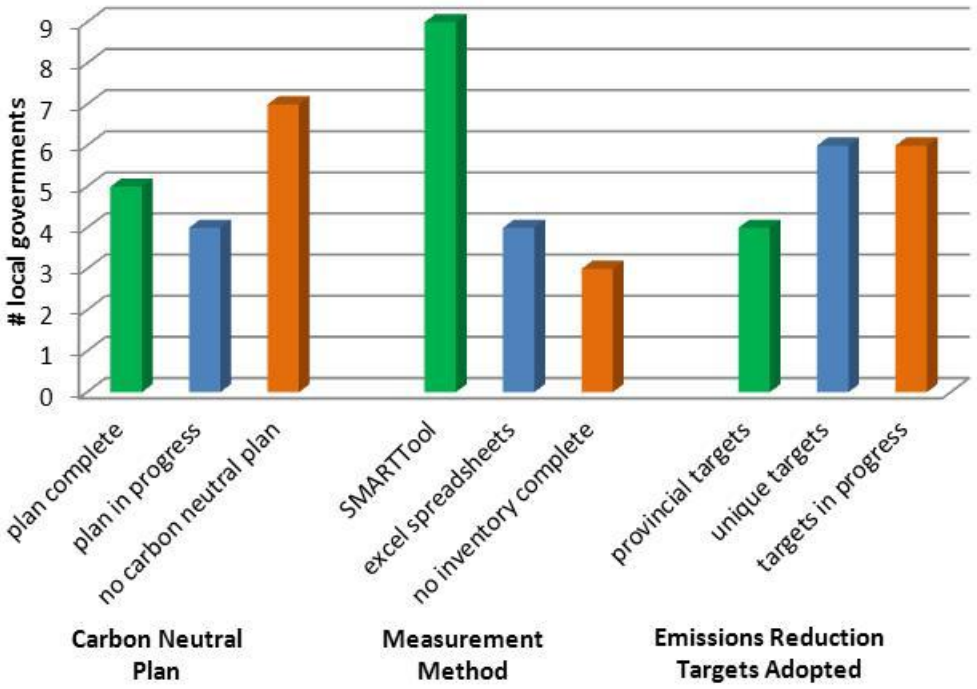
A baseline emissions inventory was also required for comparison with current emissions levels. The Village had been reporting on corporate emissions through CARIP since 2009. As this was the first year where an accurate accounting of corporate emissions was available, 2009 data was utilized as the baseline. In order to consistently compare emissions levels from 2009 to 2011, CARIP data was input into the newly created SMARTTool reporting template. Attempts were made to ensure that all of the data collected was as comprehensive and accurate as possible. Due to administrative changes, it is not possible to confirm that the data collected prior to 2011 was done so using the same assumptions. There may be some discrepancies in earlier data sets due to the fact that the Village may not have had access to the original meter readings and/or invoices for contracted buildings. There is confidence however that the data presented here is up to a standard that can be used for strategic, long-term planning for the Village of Burns Lake.

6.0 Scan of Municipal Climate Actions

A scan of sixteen local governments in B.C. was completed to determine the actions currently being implemented by other local governments to become carbon neutral. All of the municipalities are signatories to the B.C. Climate Action Charter and have a similar population size and/or climate to Burns Lake (for a list of the local governments reviewed, see Appendix B). The main documents reviewed included the most recent CARIP Reports and either a Carbon Neutral Operations Plan or GHG Emissions Reduction Strategy if one was available. Where limited published data was available, personal communication with staff was able to clarify what actions were being undertaken to reduce corporate emissions.

Of the sixteen municipalities examined, the majority did not have a Carbon Neutral Action Plan in place though all are signatories to the Climate Action Charter. The majority have cited SMARTTool as the preferred method for creating a corporate emissions inventory. This high uptake can most likely be attributed to Provincial promotion of the tool through pilot projects and the offer of a 50% reduction in cost to local governments who chose to use the tool in their first year. A minority of the local governments chose to adopt Provincial reduction targets with the remaining evenly split between determining individual targets for their local context and being in the process of adopting targets. The low numbers of local governments that have created a carbon neutral plan or adopted emissions reduction targets suggest that there are barriers to and/or ambivalence over fulfilling Charter commitments. This is particularly significant as 2012 is the final year before those commitments are meant to be achieved. The high uptake of the SMARTTool suggests that local governments are seeking both guidance and financial incentives from higher levels of government to work towards their Charter commitments. In this respect, Burns Lake would appear to be in a similar situation to other municipalities.

Figure 7: Overview of B.C. Municipalities' Corporate GHG Reduction Actions



Source: Adapted from scan of sixteen BC municipalities' corporate GHG reduction actions, for full list of municipalities refer to Appendix II.

A GCC Communique released in July 2011 confirmed that a more flexible approach to becoming carbon neutral would be supported as part of the common approach under the Climate Action Charter (GCC Communique, 2011). As a result of this, local governments have been encouraged

to report not only actions which directly reduce emissions but also the supportive actions which are difficult to quantify in terms of GHG reductions but may lay the groundwork for future actions and behaviour changes. Local governments which take this approach will be understood to be "making progress" towards CAC commitments but will not be carbon neutral. The local governments examined for this report demonstrated that a wider range of supportive actions were undertaken than were direct upgrades to physical infrastructure and equipment. The direct actions which local governments have taken centre on moderate building retrofits and long-term fleet replacement schedules. A more detailed breakdown of specific emissions reduction actions are found in the following tables.

Table 2: Overview of Direct Corporate Actions taken for Buildings

Direct Corporate Actions for Buildings (in order of frequency)	
Lighting Upgrades (9)	• Use of compact fluorescent or LED lighting in buildings • Installation of motion sensors for lights • Replacement of street lights with LEDs
Facility Energy Upgrades (5)	• Replacing inefficient building parts and systems with more efficient models (e.g. furnaces, boilers, windows, timers for thermostats)
Solar Panels (4)	• Installation of solar panels to generate electricity at various municipal buildings and facilities (e.g. local government office, park lighting, bus stations)
Heat Recovery (3)	• Waste heat recovery projects (e.g. recovery from sewer treatment plant, sawmill)

Table 3: Overview of Direct Corporate Actions taken for Fleet

Direct Corporate Actions for Fleet (in order of frequency)	
Green Fleet Performance (8)	• Development of a "green" replacement schedule for fleet vehicles focused on downsizing/right-sizing • Participation in the E3 Fleet Program focused on fuel efficiency and emissions reductions in fleets
Hybrid Vehicles (4)	• Purchasing hybrid vehicles when replacement comes due for gasoline vehicles (generally used as a pilot project)
Alternate fuels (2)	• Transitioning fleet vehicles to alternate fuels such as a biodiesel mix or natural gas

Table 4: Overview of Supportive Corporate Actions

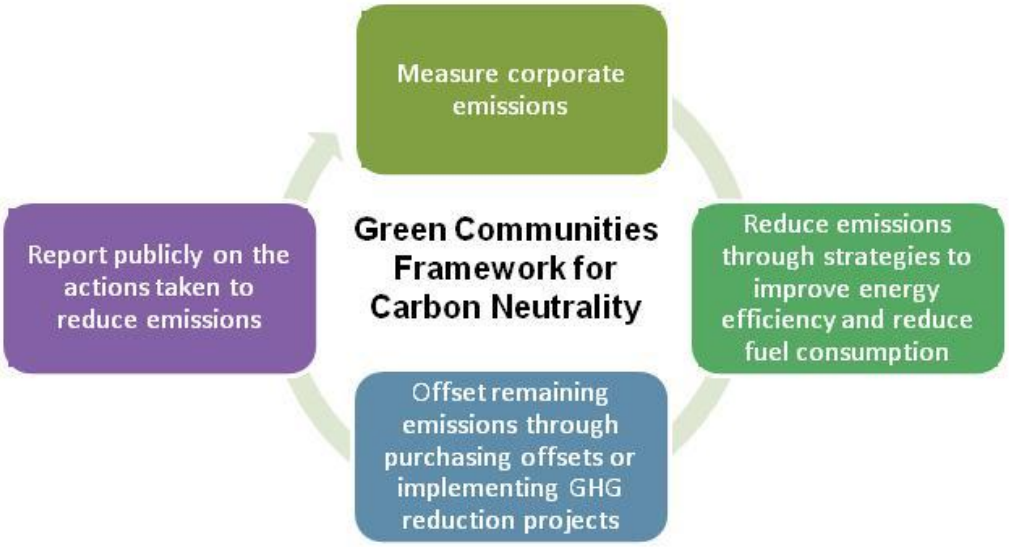
Supportive Corporate Actions (in order of frequency)	
Anti-Idling (6)	• Creation and enforcement of an anti-idling policy
Procurement Policy (5)	• Development of a "green" procurement policy for goods, services and vehicles taking into account life cycle costs of equipment

Alternate Transportation (4)	• Promotion of bike to work week • Development of cycling map for the community • Departments piloting use of a bicycle for short trips
Energy Audits (3)	• Conducting energy audits for municipal buildings to determine opportunities for greater efficiency
Dedicated Fund (3)	• Establishment of a climate action/carbon neutral reserve fund to finance future emissions reduction projects
Carbon Offset Purchasing Policy (2)	• Development of a carbon offset purchasing policy to guide decisions on offset providers and projects
Awareness Raising (2)	• Education and awareness raising initiatives for staff around energy and resource conservation
Data tracking (2)	• Tracking of energy use in municipal buildings (e.g. installation of smart metres)

7.0 Reaching Carbon Neutrality and Carbon Offsets

For local governments becoming carbon neutral means reducing corporate GHG emissions as much as possible and balancing the remaining emissions through the purchase of qualified offsets or through implementing GHG reduction projects (UBCM Workbook 2012). The four steps to carbon neutrality include a) measuring corporate emissions, b) reducing those emissions through strategies to improve energy efficiency and reduce fuel consumption, c) offset the remaining emissions through purchasing offsets or implementing GHG reduction projects, d) report publicly on the actions taken to reduce emissions.

Figure 8: Green Communities Framework for Carbon Neutrality



Source: Adapted from B.C. Climate Action Toolkit: Carbon Neutral Local Government, 2012.

Measuring corporate emissions in the Village of Burns Lake involves tracking fuel and energy consumption from all corporate buildings, streetlights, fleet vehicles and equipment. Included in this are all buildings which are owned by the Village but whose operations are contracted out. The Village has been measuring corporate emissions since 2009, first through the CARIP reporting process and, beginning in 2012, through SMARTTool. The Village has further worked to reduce those emissions through projects such as lighting retrofits in municipal buildings and the installation of a biomass heating system at the Tom Forsyth Memorial Arena (for a complete lists of projects, refer to the Sustainability & Climate Action Timeline in Appendix A).

In order to offset the emissions remaining after various GHG reduction initiatives have been implemented, local governments have three options; 1) Invest in Green Community Committee (GCC)-supported emission reduction projects, 2) Invest in alternate community emission reduction projects or 3) Purchase offsets (GCC Carbon Neutral Guidebook, 2012). Important facts to note are that balancing and/or offsetting must be done on a tonne for tonne basis and investment in emission reduction projects must take place outside corporate boundaries (i.e. cannot work to reduce emissions included in the corporate emissions inventory). This is to avoid double counting emissions reductions; if a project reduces corporate emissions then those same tonnes cannot then be applied again to offset corporate emissions in the GCC framework for carbon neutrality.

For options 1 and 2, the GCC has developed specific criteria which projects must meet in order to count towards balancing a local government's corporate emissions. Purchasing carbon offsets is generally seen as the simplest method to reach carbon neutrality as it does not require extensive staff time or resources to implement whereas the other two options require both. Carbon offsets are a way of compensating for an organization's GHG emissions by funding another organization to undertake a GHG reduction project that would not otherwise have taken place. Some common projects include renewable energy such as biomass or wind, energy efficiency and afforestation. Carbon offsets are bought and sold as part of a carbon market and it is the choice of the local government as to what provider it will buy from. However consideration must be given to ensuring the purchase of high quality offsets which practice robust accounting methods, and include provisions for monitoring, verification, validation and enforcement. It is at the local governments' discretion to decide on additional requirements for purchasing their offsets such as a preference for offsets from locally-based projects.

8.0 Interview Results

For this project, interviews were conducted with all full-time office staff members, the arena foreman and public works foreman, the Mayor and one Councillor. The purpose of these interviews was to assess the level of awareness of GHG reduction actions taken by the Village, to gauge where individuals felt their work could fit into the goal of carbon neutrality and to determine what major challenges and opportunities were perceived in the pursuit of carbon neutrality. This was an essential step as the GHG reduction actions outlined here will require

both Council direction and staff buy-in if they are to be implemented. Corporate emissions make up a small piece of a community's total emissions inventory. However, leadership will need to be demonstrated in this area in order to see deeper emissions reductions beyond the corporate scope (To see the complete interview questions refer to Appendix C).

8.1 Leadership and Ownership

Council and staff had a generally positive view of their role in reducing corporate emissions, demonstrating a desire and willingness to contribute through daily work activities to this goal. There was some confusion over the exact meaning of being carbon neutral in operations and how individuals could contribute to that goal through their daily work. Staff is looking for clear direction and buy in from Council prior to implementing major changes in workplace behaviour or initiating major projects. Having demonstrated support from both Council and senior managers for the goal of GHG reductions is essential to provide staff with the confidence to explore ways in which they can contribute. There are conflicting views that, on the one hand, staff are already overburdened and, on the other, that in order to move the "carbon neutrality agenda" forward there needs to be a staff champion to provide a coordinating role. The potential to partner across departments was presented as a potential solution to this dilemma. This approach would require more communication between departments and a clear implementation plan that includes all staff so that individual roles are communicated clearly.

8.2 Engaging the Wider Community

Respondents were consistent in the idea that the public needed to be engaged in GHG reduction projects that the Village was undertaking, whether it be within or outside the corporate emissions boundary. It is recognized that deeper emissions cuts will be required in the community in the future, yet the level of public awareness and support is limited. Developing a communications strategy for engaging with citizens was cited as an important area to focus on when moving forward with climate action. It is believed that individuals need to understand the impacts their actions have on cross-boundary issues like climate change.

8.3 Opportunities to Achieve Carbon Neutrality and GHG Reductions

Council and staff identified fleet replacement and an updated policy and procedure framework as major opportunities for the Village to become carbon neutral. It was perceived that the Village fleet makes up a large portion of corporate emissions and that replacement of aged equipment could cut emissions dramatically. However there was concern that cost would be a prohibitive factor in implementing that change. Many staff members referenced the lack of an underlying policy framework to support low-carbon decision-making. Interviewees cited the need for developing a sustainable purchasing policy, energy-efficient building guidelines and a green vehicle purchasing policy as potential methods of addressing this gap. The completion of

the Integrated Community Sustainability Plan (ICSP) in January 2013 is seen as a positive step towards clarifying sustainability goals and indicators.

8.4 Challenges to Achieving Carbon Neutrality and GHG Reductions

Council and staff views were consistent around the top three challenges facing the Village in the pursuit of carbon neutrality; 1) Cost, 2) Climate and 3) Awareness and behaviour.

The upfront cost of equipment replacement and adopting new technologies is prohibitive to a local government with a limited tax base; a 1% tax increase yields only $10,000 in revenue for the Village of Burns Lake (Community Energy Presentation, Ragsdale 2010). Burns Lake experiences an average January temperature of -10.5 degrees Celsius which presents challenges for reducing energy use and promoting active transportation. A lack of awareness in the general community was further cited as a challenge as public opinion directly influences policy-decisions. There is a need to increase education for both Council and staff and the public around climate change issues. Limited staff capacity was described as a major challenge. The Village has nine full time office staff, seven public works crew members and 2 full-time arena staff.

8.5 Lessons Learned from Past GHG Reduction Projects

A number of lessons were pulled from past experience with emissions reduction projects. Many interviewees cited the importance of communicating clearly with all staff on the rationale and objectives of new projects in order to create buy in and ensure success. There is a need for a clear understanding of the local context on the part of the project designers and contractors. This is important with regards to accessing local supplies and expertise over the life of a project. Factoring in costs for long term maintenance and operation of new facilities is needed as well as an organizational structure which designates a staff “champion” to ensure a project is completed on time and according to budget.

8.6 Lessons Learned on Criteria for Assessing New Projects

Input from the interviews provided a starting point for assessing the merit of future proposed GHG reduction projects and initiatives. The following draft criteria were drawn from Council and staff:

- Projects should clearly account for the triple bottom line; demonstrating the impacts on the environment, society and the economy
- Projects should show evidence of in-depth research and include expert, technical opinion where appropriate
- Projects should align with Municipal Goals and Objectives as defined by Council

- Priority should be given to projects which have the greatest potential for emission reductions per dollar spent
- Priority should be given to projects which have co-benefits within the community; e.g. achieves additional climate action education and/or awareness goals
- Projects should consider the associated long-term operational and maintenance costs and increased burden on municipal staff
- Priority should be given to projects which include opportunities for public participation

9.0 Corporate Emissions Inventory

The Village of Burns Lake began measuring corporate emissions in 2009 through the CARIP reporting process. 2009 is therefore used as the baseline year for measuring corporate emissions over time. In compiling a corporate emissions inventory the Village must track both direct delivery and contracted services which produce emissions in all "traditional" local government services. Emissions related to new construction, maintenance activities, business travel, employee commuting and materials are not included in this inventory as they fall outside of the corporate scope as defined by the GCC framework for carbon neutrality.

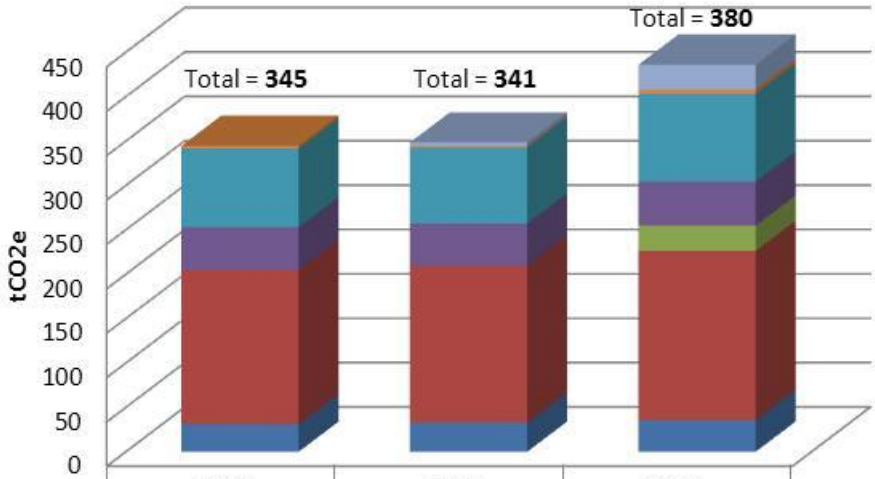
Table 5: In Scope Local Government Service Areas and Emissions Sources

Traditional Local Government Service Areas	Emission Sources Measured
Administration and Governance	Energy consumption from buildings and other structures
Drinking, Storm and Waste Water	
Solid Waste Collection, Transportation and Diversion	
Roads and Traffic Operations	Fuel used for fleet vehicles, machinery and equipment
Arts, Recreation and Cultural Services	
Fire Protection	

Source: Adapted from Green Communities Committee-Becoming Carbon Neutral, 2011.

Greenhouse gases include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulphur hexafluoride (SF_6), perflurocarbons (PFCs) and hydrofluorocarbons (HFCs). The simplest method for measuring emissions is to track energy consumption data and convert it into emissions. For ease of reporting, inventory data is presented in CO_2e (carbon dioxide equivalent), a measurement developed to enable comparison of the ability of different GHGs to trap heat in the atmosphere. This inventory includes emissions from all Village of Burns Lake corporate buildings and fleet. The emissions totals represent total tonnes of carbon offsets for which the Village is responsible for offsetting. SMARTTool subtracts offset exempt emissions from renewable fuels and clean energy.

Figure 9.1: Breakdown of Village of Burns Lake Corporate Emissions by Fuel and Energy Type

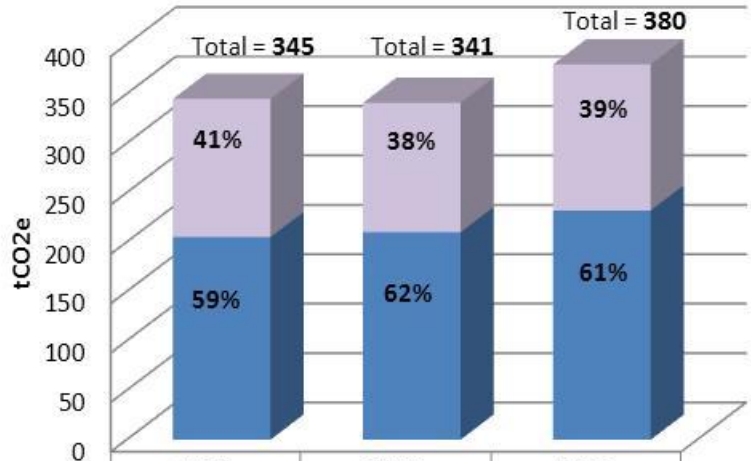


	2009	2010	2011
Offset exempt	0	4	28
Propane	2.85	1.78	4.87
Diesel	88.89	85.47	98.91
Gasoline	47.97	47.34	49.5
Wood fuel	0	0	28.51
Natural Gas	173.8	176.9	190.44
Electricity	31.17	32.88	35.77

Source: Energy and fuel consumption data taken from Village of Burns Lake Accounting Department, 2009-2011.

*Emissions from biomass combustion are considered carbon neutral for the purposes of the Climate Action Charter commitments as wood fuel produces less CO_2 emissions than fossil fuels and is part of the natural carbon cycle. Wood fuel still produces emissions however, therefore SMARTTool allows for a small portion of the total GHGs produced by woodfuel to remain in the corporate emissions profile. For this reason, offset exempt emissions from woodfuel for 2001 are 23 tCO2e and not the full 28.51 tCO2e.

Figure 9.2: Breakdown of Village of Burns Lake Corporate Emissions by Sector



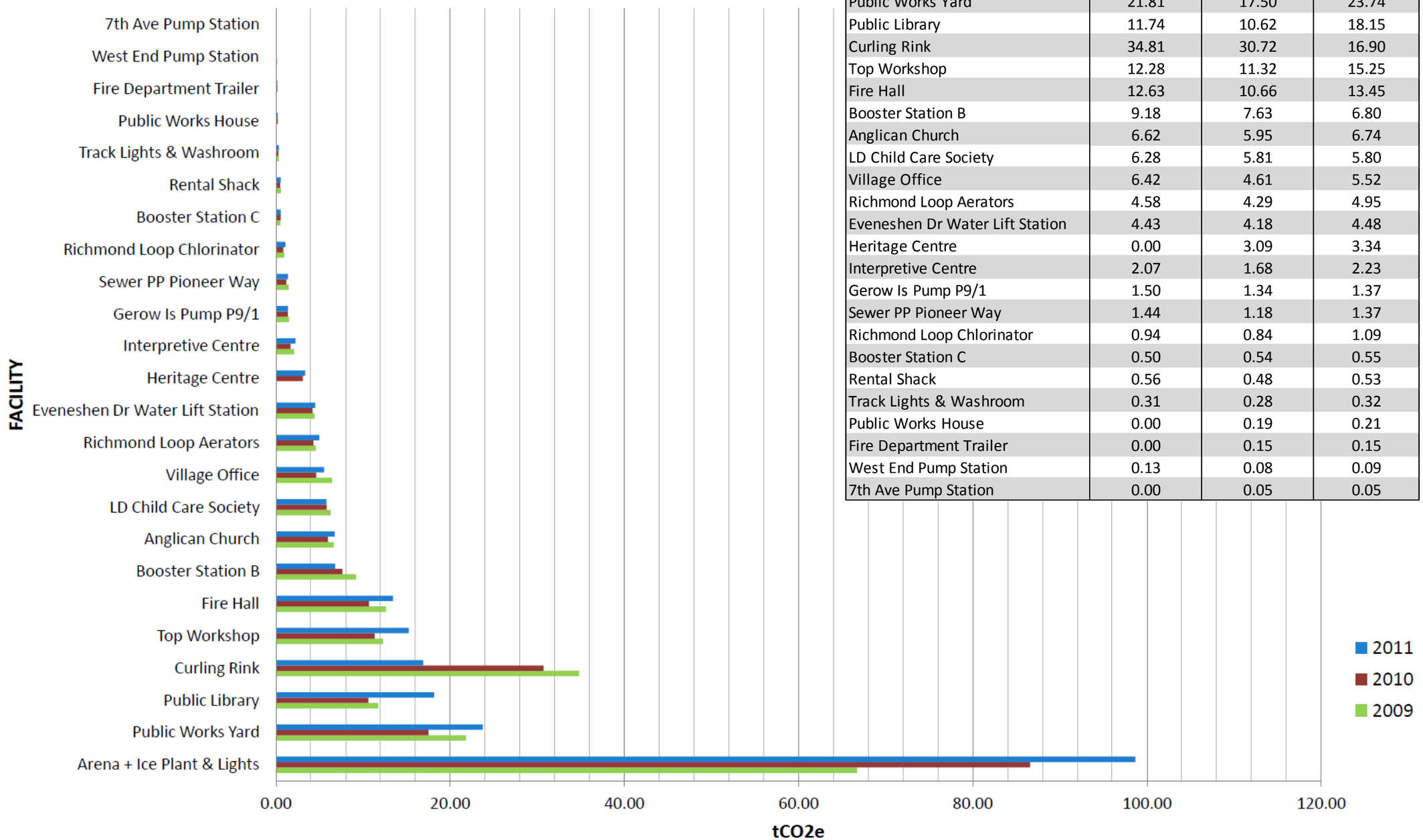
	2009	2010	2011
Fleet	140	131	148
Buildings	205	210	232

Source: Energy and fuel consumption data taken from Village of Burns Lake Accounting Department, 2009-2011.

Since 2009, total corporate emissions have increased slightly by 60.35 tonnes CO_2e. This increase can be attributed to three main factors, the addition of two new fleet vehicles, increased programming at various facilities and a switch in measurement methodology. The change over to the SMARTTool required a review of emissions sources and resulted in a broadening of measurement scope. This reassessment resulted in additional contracted buildings and certain pieces of equipment being added to the corporate inventory in order to ensure a comprehensive inventory.

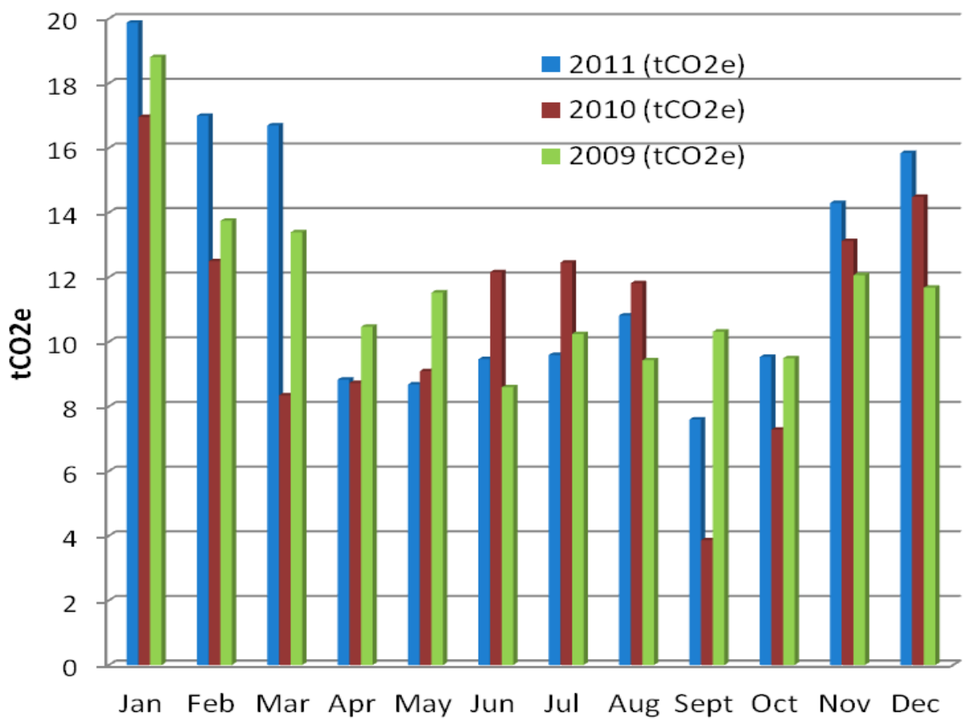
The largest emissions increase in 2011 over the base year occurred at the Tom Forsyth Memorial Arena followed by the Public Library and Public Works Yard. The Curling Rink saw the most dramatic decrease in emissions. In 2011 natural gas continued to be the fuel most consumed by corporate operations. In October 2011 a biomass heating system was installed at the Tom Forsyth Memorial arena which has contributed to the drop in natural gas use over the baseline year. Fleet fuel consumption and building energy use spikes in the winter months (December to February) for all inventory years.

9.1 Village of Burns Lake Corporate Buildings Detailed Emissions Inventory



FACILITY	tCO2e		
	2009	2010	2011
Arena + Ice Plant & Lights	66.70	86.58	98.66
Public Works Yard	21.81	17.50	23.74
Public Library	11.74	10.62	18.15
Curling Rink	34.81	30.72	16.90
Top Workshop	12.28	11.32	15.25
Fire Hall	12.63	10.66	13.45
Booster Station B	9.18	7.63	6.80
Anglican Church	6.62	5.95	6.74
LD Child Care Society	6.28	5.81	5.80
Village Office	6.42	4.61	5.52
Richmond Loop Aerators	4.58	4.29	4.95
Eveneshen Dr Water Lift Station	4.43	4.18	4.48
Heritage Centre	0.00	3.09	3.34
Interpretive Centre	2.07	1.68	2.23
Gerow Is Pump P9/1	1.50	1.34	1.37
Sewer PP Pioneer Way	1.44	1.18	1.37
Richmond Loop Chlorinator	0.94	0.84	1.09
Booster Station C	0.50	0.54	0.55
Rental Shack	0.56	0.48	0.53
Track Lights & Washroom	0.31	0.28	0.32
Public Works House	0.00	0.19	0.21
Fire Department Trailer	0.00	0.15	0.15
West End Pump Station	0.13	0.08	0.09
7th Ave Pump Station	0.00	0.05	0.05

9.2 Village of Burns Lake Fleet Detailed Emissions Inventory



MONTH	tCO2e		
	2009	2010	2011
Jan	18.81	16.95	19.87
Feb	13.74	12.49	16.99
Mar	13.39	8.34	16.69
Apr	10.46	8.72	8.83
May	11.52	9.09	8.68
Jun	8.59	12.15	9.46
Jul	10.24	12.45	9.589
Aug	9.43	11.81	10.81
Sept	10.31	3.86	7.59
Oct	9.49	7.28	9.53
Nov	12.06	13.12	14.29
Dec	11.67	14.48	15.84

REPORTING CODE	FUEL	VEHICLE CLASS	VEHICLE MAKE
VBL-UNIT-001	Diesel	Heavy Duty Truck	2001 FREIGHT LINER GARB. TRUCK
VBL-UNIT-002	Gasoline	Light Duty Truck	2010 CHEV 4X4-PICKUP-SILVERADO
VBL-UNIT-003	Gasoline	Light Duty Truck	1997 GMC PICKUP - 1500
VBL-UNIT-004	Gasoline	Light Duty Truck	2011 CHEV 4X4
VBL-UNIT-005	Gasoline	Light Duty Truck	1997 GMC 4X4 W/PLOW
VBL-UNIT-006	Gasoline	Light Duty Truck	2003 FORD PICKUP F150
VBL-UNIT-007	Gasoline	Light Duty Truck	2002 FORD PICKUP - F150
VBL-UNIT-008	Diesel	Heavy Duty Truck	1997 GMC CRANE TRUCK -C7500 (HIAB)
VBL-UNIT-009	Diesel	Heavy Duty Truck	1999 I H C S4700 CAB & CHASIS
VBL-UNIT-010	Diesel	Heavy Duty Truck	2001 FRIEGHTLINER
VBL-UNIT-011	Gasoline	Light Duty Truck	1992 FORD PICKUP
VBL-UNIT-012	Diesel	Heavy Duty Truck	2012 SPARTAN FIRE TRUCK
VBL-UNIT-013	Gasoline	Light Duty Truck	1994 FORD PICKUP/LOW 4X4-F250
VBL-UNIT-014	Diesel	Off Road Vehicle	1991 CAT 416 BACKHOE
VBL-UNIT-016	Gasoline	Light Duty Truck	2000 FORD F150 4 X 2
VBL-UNIT-017	Diesel	Heavy Duty Truck	CAT 140 G GRADER
VBL-UNIT-018	Diesel	Off Road Vehicle	1996 JOHN DEERE (SIDEWALK)
VBL-UNIT-020	Diesel	Off Road Vehicle	2001 CAT 420 (BACKHOE)
VBL-UNIT-021	Gasoline	Light Duty Truck	1997 DODGE CARAVAN
VBL-UNIT-023	Diesel	Off Road Vehicle	2011 DOOSAN AIR COMPRESSOR
VBL-UNIT-024	Diesel	Off Road Vehicle	2002 KUBOTA-TRACTOR
VBL-UNIT-025	Diesel	Off Road Vehicle	2006 JOHN DEERE 444 J
VBL-UNIT-026	Diesel	Heavy Duty Truck	2001 FORD F550
VBL-UNIT-027	Gasoline	Off Road Vehicle	2012 LANDA 3500PSI PRESSURE WASHER
VBL-UNIT-028	Gasoline	Heavy Duty Truck	1987 CHEV FLATDECK - 30 - 1 TON
VBL-UNIT-034	Diesel	Heavy Duty Truck	1993 SWEEPER-ELGIN
VBL-UNIT-035	Gasoline	Light Duty Truck	2004 CHEV 4X4-SILVERADO
VBL-UNIT-037	Diesel	Heavy Duty Truck	2009 FREIGHTLINER DUMP/SANDER TRUCK
VBL-UNIT-038	Diesel	Heavy Duty Truck	2009 FREIGHTLINER DUMP/SANDER TRUCK
VBL-UNIT-039	Diesel	Off Road Vehicle	2009 BOBCAT/SKIDSTEER
VBL-UNIT-040	Diesel	Heavy Duty Truck	2011 FREIGHTLINER GARBAGE TRUCK
VBL-UNIT-041	Propane	Off Road Vehicle	1962 ZAMBONI

10.0 Financial Considerations

The financial implications of corporate emissions derive from two sources, the B.C. carbon tax, payments for carbon offsets and/or investment in community emissions reductions projects.

Passed in 2008, the Carbon Tax Act is a tax on fossil fuels initially set at $10 per tonne of CO_2e in 2008 and increasing by $5 per tonne annually until it reaches $12 per tonne in 2012. The Village is eligible for the Climate Action Revenue Incentive Program (CARIP), a conditional grant program equivalent to 100 percent of the carbon taxes paid by local governments. Additional CARIP reporting methods beginning in 2012 will require the Village to include specific tonnes of CO_2e reductions achieved alongside demonstrating the progress made towards becoming carbon neutral in corporate operations.

The 2008 Provincial Carbon Tax Act on fuel is currently $30/tonne which results in the following financial implications.

Table 6: 2012 Carbon Tax Rates by Fuel Type

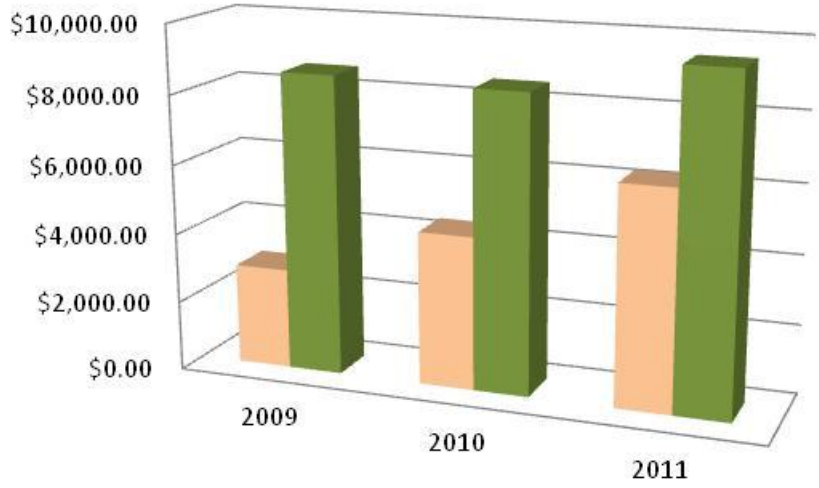
	Gasoline	Diesel	Propane	Natural Gas
$30/tonne conversion to cost per L/GJ	6.67 cents/L	7.67 cents/L	4.62 cents/L	$1.49/GJ

Source: How the Carbon Tax Works, 2012.

These tax amounts are applied to Village building and fleet fuel consumption in the carbon tax calculation form which is then submitted through the CARIP reporting process in order to receive the tax rebate. An advantage of the SMARTTool is that once consumption data is loaded, the calculation form is generated automatically and can be downloaded directly from the tool without the need for further staff time.

The Village has also committed through the CAC to either purchase carbon offsets and/or invest in community emissions reductions projects. A local government is responsible for the costs associated with developing, implementing and, in some cases, hiring external consultants to verify a community emissions reduction project. These additional costs and the staff time required to complete a project will likely mean that the purchasing of offsets will be the most cost effective method of reaching carbon neutrality for the Village. This is not to preclude the potential of investing in community-based projects. The GCC has a list of supported projects which have minimal cost for validation as they are largely pre-established. Required staff time is also less as the project profiles have already been developed, though implementation and reporting costs and time may still be significant depending on the type of project.

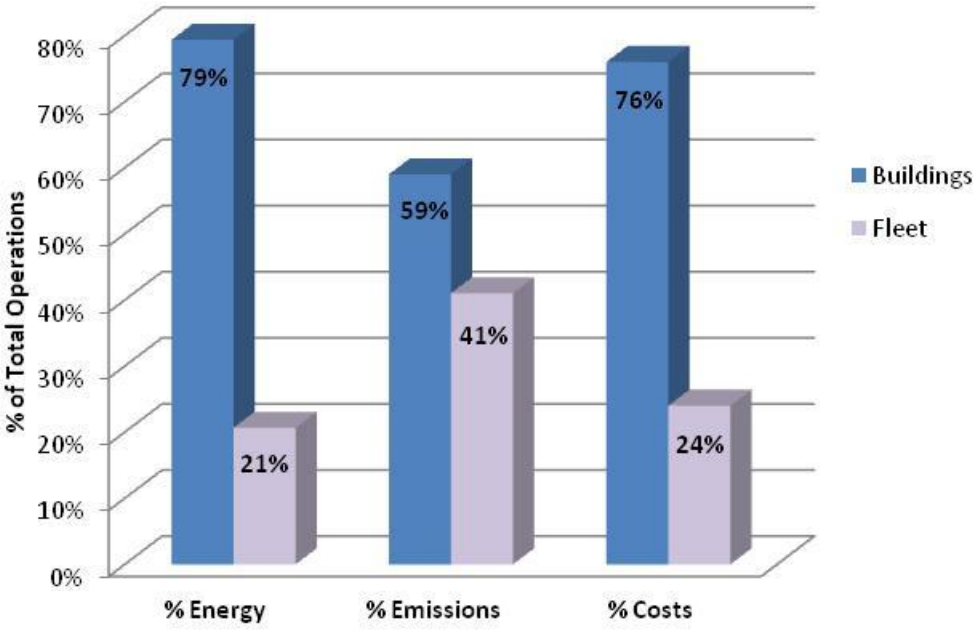
Figure 11: Annual Village of Burns Lake Carbon Tax Rates and Carbon Offset Costs



	2009	2010	2011
Carbon Tax	$2,903.32	$4,416.75	$6,280.56
Carbon Offsets	$8,625.00	$8,525.00	$9,500.00

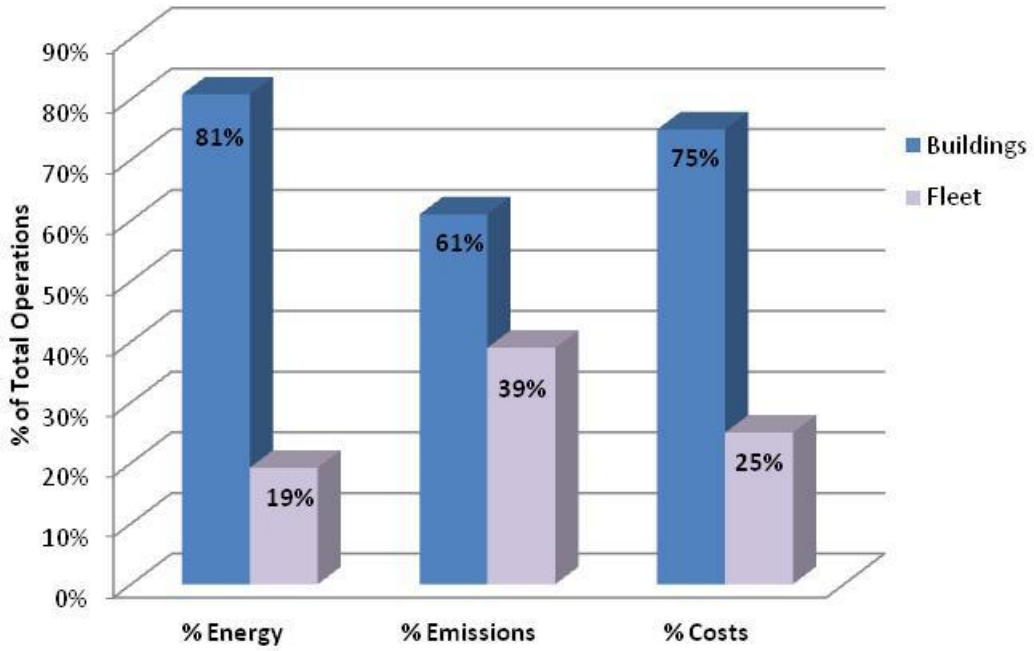
Source: Village of Burns Lake Accounting Department, 2009-2011.

Figure 12: Comparison of Village of Burns Lake 2009 Corporate Energy Costs, Consumption and Emissions Levels for Buildings and Fleet



Source: Data taken from the Village of Burns Lake Accounting and Development Services Departments, 2009.

Figure 13. Comparison of Village of Burns Lake 2011 Corporate Energy Costs, Consumption and Emissions Levels for Buildings and Fleet



Source: Data taken from the Village of Burns Lake Accounting and Development Services Departments, 2011.

Since the baseline year, the percentage split between building and fleet energy consumption, GHG emissions and costs has remained fairly constant. The introduction of the Renewable and Low Carbon Fuel Requirements in 2010 most likely contributed to the decrease in fleet contribution to overall emissions levels. Buildings make up the largest portion of energy consumption, GHG emissions and corporate costs therefore this sector should be examined first for future GHG reduction actions.

11.0 GHG Reduction Actions and Recommendations

The following actions are intended to provide Council and staff with a way forward to achieve GHG reductions within the corporate emissions boundary and work towards carbon neutrality. The actions were selected following analysis of the corporate emissions inventory, a scan of other B.C. local governments, a review of internal Village of Burns Lake strategic planning and policy documents and one-on-one interviews with staff and Council. Actions are focused on achievable, low-cost options utilizing proven technology. The actions matrix includes a high-level analysis of the potential GHG reductions and energy savings that could be achieved, cost, potential for scaling up and risk level.

11.1 Buildings Summary

Buildings produce 61% of corporate emissions, 82% of which are from the use of natural gas for heating. There is a need to understand what opportunities there are for specific upgrades and retrofits to each building. This could be achieved through an energy audit of each facility. Given the limited number of staff and need for external expertise, a contractor would have to be hired to complete this work. Should the cost prove prohibitive, a low-cost walk through by staff of targeted buildings could identify older equipment that could be replaced and lighting retrofits that could be undertaken in the short term. The top six buildings which make up approximately 80% of all buildings emissions should be prioritized are as follows in order of emissions produced:

1. Tom Forsyth Memorial Arena
2. Public Works Yard
3. Public Library
4. Curling Rink
5. Top Workshop
6. Fire Hall

11.2 Fleet Summary

The fleet produces 39% of corporate emissions, 67% of which are from burning diesel. Community location and climate provide specific challenges for reducing fleet emissions. Through the interview process it was identified that the current fleet size and vehicle type meet the requirements for the provision of essential municipal services such as infrastructure maintenance, snow removal and landscaping. Currently there is no availability of higher blends of biodiesel in the region due to concerns over extreme cold temperatures, though this does not preclude future opportunities for fuel switching should suppliers reconsider their business models. Given the limited options for right sizing the fleet and fuel switching, future projects targeted at reducing emissions in this sector should focus on replacement of aged equipment with more efficient models and policy direction to pursue efficiencies within existing operations.

11.3 Supportive Actions

The Village of Burns Lake has relatively small corporate operations both in terms of staff and its carbon footprint relative to the wider community. Working to set aside funding for future community based emissions reduction projects should be a priority in order to focus on initiatives which have the potential to create the greatest GHG reductions. Increased staff awareness on the opportunities and challenges of emissions reductions will assist in identifying future opportunities and encourage staff champions for those projects. Integrating

considerations for energy savings and emissions reductions into existing policies and procedures will assist decision making on future developments and equipment purchases.

11.4 Recommendations

Drawing from the actions presented here and interviews with Village of Burns Lake Council and staff, the following are recommendations in moving forward with corporate GHG reduction actions in a small, remote northern community:

- Demonstrate clear and consistent commitment from Council and managers to achieving GHG reductions to provide staff with the confidence to pursue innovative projects

- Focus efforts on proven technologies that can be maintained with local expertise

- Promote awareness and understanding of climate change mitigation planning with staff through regular reporting on emission inventories and actions

- Develop partnerships with neighbouring local governments, including First Nations, to realize economies of scale in the purchase of high efficiency and clean energy equipment

- Create relationships with educational institutions and other local governments to benefit from shared technical expertise and project experience

11.5 Actions Matrix

REPORTING UNIT	DEPT	ACTION	CAPITAL COST	ANNUAL OPERATING COST	GHG REDUCTION POTENTIAL	ENERGY SAVINGS POTENTIAL	SCALING UP POTENTIAL	RISK	DESCRIPTION	STAFF REQUIREMENT	TOTAL ESTIMATED COST
Buildings	Development Services and Public Works	Conduct energy audits for all corporate buildings & implement suggested retrofits	L-H	L-H	M	M	H	L	An energy audit can identify where a building is losing the most heat and what actions can be taken to improve its efficiency. The Village qualifies for BC Hydro's *Product Incentive Program* which provide financial incentives to replace old inefficient technologies with new energy efficient products.	Will require contracting a qualified building auditor. Options are limited in the northwest for government and commercial facilities, most likely will require hiring from outside the regional district.	Depends on number of retrofits implemented & technology chosen. There are anticipated operational cost savings through reduced energy use.
Contracted Buildings	Development Services	Partner with building operators to coordinate energy saving and emissions reduction actions	L	L	M	M	N/A	L	Establishing communication channels and knowledge sharing with contracted service partners will raise awareness that emissions reductions is a Village priority. Emissions reductions and energy savings may be achieved by encouraging partners to implement building retrofits and energy conservation programs.	Moderate amount of staff time to establish relationships with contracted service partners to find out current inititaives and identify potential future projects.	$1,000 - $3,000
Fleet	All	Village Office Bike Share Pilot Project	L	L	L	L	M	L	One bicycle available for municipal staff for short trips within the Village during summer months and Village Office bike rack. Potential benefits include promoting awareness of reduction activities and alternative modes of transportation in the wider community. Will reduce the number of short distance vehicle trips.	Will require staff buy-in and support to make the program successful.	$1,000 - $1,200
Fleet	Public Works	Develop a Green Vehicle Replacement Schedule & Green Vehicle Purchasing Policy	L	L	L	L	N/A	L	Priority given to the cleanest-burning and most fuel-efficient vehicles available that also meet the needs of municipal operations.	Minimal staff time to create policy and staff time during purchasing process to source additional tenders.	Less than $1,000 in staff time
Fleet	Public Works	Explore potential of sharing equipment and heavy duty vehicles with neighbouring municipalities	M	M	M	M	M	M	Sharing the cost of equipment and vehicles with other local governments could reduce operating costs and fleet emissions. Potential to gain access to technologies that may be outside the budget scope of the Village.	Significant staff time required to create and maintain partnerships, develop contracts, conduct research into similar programs, source equipment and work out logistics.	$2,500-$4,000
Administrative	Finance	Purchase of carbon offsets	H	N/A	H	N/A	N/A	L	Payments will be made annually based on SMARTTool calculations of number of tCO2e eligible for offset purchase.	Minimal staff time required to secure contract with a qualified carbon offset provider in the first year. In subsequent years, offset payments can be factored into annual budgets depending on the number of offsets requried (supplied by SMARTTool calculations).	$9,500 - $10,500

REPORTING UNIT	DEPT	ACTION	CAPITAL COST	ANNUAL OPERATING COST	GHG REDUCTION POTENTIAL	ENERGY SAVINGS POTENTIAL	SCALING UP POTENTIAL	RISK	DESCRIPTION	STAFF REQUIREMENT	TOTAL ESTIMATED COST
Administrative	Finance and Development Services	Develop a carbon offset purchasing policy	L	N/A	H	N/A	N/A	L	The policy will outline criteria for purchasing high quality offsets that align with Village and community priorities (e.g. purchasing local offsets only)	Moderate amount of staff time to develop policy which may invovle a public process.	$1,500 -$2,500
Administrative	Finance	Contribute CARIP funds annually to a climate action fund and make funds available for future emissions reduction projects	L	M	M	M	H	M	Fund to be used for future climate action projects, can be within or outside the corporate emissions boundary, depending on the objectives set by Council.	Minimal staff time required to implement reserve fund in standard accounting proceedure.	Less than $500 in staff time
Administrative	Finance and Development Services	Develop supporting guidelines for the newly established climate action reserve fund	M	N/A	M	M	H	L	Before funds can be applied to projects, the Village must define the criteria which proposed projects and applicants must meet, reporting format and reduction measurement methodology.	Significant staff time required to create guidelines which may involve a public process.	$2,500-$4,000
Administrative	Finance and Development Services	Inclusion of a climate action contract specification in Requests for Proposals	L	N/A	M	M	N/A	L	The inclusion of requirements for energy efficiency, and consideration of emissions for new projects will make carbon neutrality a priority for contractors	Moderate amount of staff time to develop specifications which make sense in the local context (i.e. align with current buy local preferences in RFPs)	$1,500 -$2,500
Administrative	Corporate Services	Incorporation of Village Climate Action Charter goals in orientation material for new employees	L	N/A	L	L	N/A	L	Measure will raise staff awareness of carbon neutrality and emissions reduciton as a Village goal. Materials may also serve as reference point for existing employees.	Moderate amount of staff time to develop orientation materials which may include background on the Climate Action Charter, past and future Village projects and familiarity with SMARTTool data	$1,500 -$2,500

RANKINGS
L = low impact/cost/likelihood
M = medium impact/cost/likelihood
H = high impact/cost/likelihood

11.6 Tom Forsyth Memorial Arena & Rental Shack

The Tom Forsyth Memorial Arena is the largest single source of corporate emissions, comprising 26% of the total inventory. Therefore continued focus on the arena for new energy efficiency projects is advisable. The addition of the rental shack in 2012 contributed a minor increase in emissions; 0.14% of the total corporate inventory.

Actions Completed

In 2009 a Code and Maintenance Upgrades Feasibility Study for the arena was completed and identified a number of actions which would make the lighting systems more efficient. As of 2012, this list has been largely addressed by the Arena Foreman. In 2011 a biomass system was installed to supply heat to portions of the arena using pellet boilers. At the time of writing, this system has removed 23 tCO_2e from the corporate emissions inventory since it's installation to July 2012. In 2011 a heat recovery system was also installed at the arena which captures waste heat from the ice plant to be used to preheat water for Zamboni operations.

Actions Planned

The Multi-Use Facility Expansion Project will join the existing arena and curling rink together by constructing a 6,000 square foot addition to provide multi-use space to community members. This new facility can be expected to increase emissions from the arena. Upgrades will be made to the existing arena during this project which will include the installation of a more efficient electrical system. The Village is further exploring the potential of expanding the existing biomass system into the Multi-Use Facility which could mitigate a portion of the emissions increase.

11.7 Fire Hall & Trailer

The Fire Department contributes 4% to total corporate emissions with the Fire Hall making up 99% of that amount. There was a noticeable increase in emissions from this building in 2011 and a closer examination as to the causes is warranted.

Actions Completed

The Fire Hall remains empty for much of the day and is utilized primarily in the evenings and on weekends for volunteer firefighter training and equipment maintenance. In recognition of this use pattern, an on-demand hot water heater was installed to ensure that energy use is kept to a minimum when the facility is not in use.

Actions Planned

There are currently no GHG reduction actions planned for this facility.

11.8 Village Office

The Village Office is responsible for approximately 1.5% of corporate emissions. While it is not a major source of emissions, this facility is the primary point of contact for members of the public. The promotion of energy saving measures in this building could therefore work towards broader goals of raising public awareness and interest in emissions reductions.

Actions Completed

The Village Office is designated as an idle-free zone and in 2011 all bathrooms were upgraded to low flow toilets, cutting water consumption by 50% (from 19L to 9.5L per use). At the time of writing, the Village Office is one of five buildings participating in a water metering program which includes three residential units, a daycare and a low income housing development. This program will provide data on water consumption for different building types and assist in creating water policy for increased conservation in the future.

Actions Planned

The Village is planning to reduce energy use by replacing the office furnace in the 2013 budget with a more efficient model.

11.9 Public Works Buildings and Infrastructure

The Public Works Department buildings account for 16% of corporate emissions and are inclusive of the booster stations, water pumps and sewage system infrastructure. Within the department, the largest emitter is the Public Works Yard which contributes 39% of total emissions for the department. The yard houses the municipal dog impound facility, wood shop, vehicle repair shop and staff lunchroom. The high lift station and public works house are also located on site however their emissions are measured separately from the yard.

Actions Completed

It was recognized that the thermostats in pumping stations were set unnecessarily high and were lowered to reduce energy use while still allowing for functioning of the equipment. Solar lights were installed at Spirit Square in 2011 to provide overhead lighting for the park, outdoor fitness equipment and Radley Beach.

Actions Planned

The Downtown Revitalization Project began in 2012 in partnership with the Ministry of Transportation and Infrastructure. This project will upgrade a portion of the overhead street lighting along the Highway 16 corridor to more efficient bulbs; this accounts for approximately 10% of the total street lights within the Village (personal communication-Village of Burns Lake Director of Public Works, September 25, 2012). Included in the 2013 capital budget are funds for an engineering study to upgrade the sewage lift station which will likely involve replacement with a high efficiency motor.

11.10 Contracted Services

For the purpose of this project, contracted services refer to those buildings the Village owns and which provide municipal services, however whose operation is contracted to an external body. All contracted services buildings make up 14% of total corporate emissions. Within this group, the Public Library is the largest emitter accounting for 34% followed by the Curling Rink, Anglican Church and Lakes District Child Care Society at 32%, 13% and 11% respectively.

Actions Completed

A building energy audit was conducted for the Heritage Centre in 2007 which resulted in a number of retrofits including a more efficient furnace and upgraded insulation. Once emissions data had been collected for the Anglican Church it was recognized that the heating requirements for the facility were much less than what was currently being used. As a result, the base heat was turned off to reduce natural gas consumption.

Actions Planned

Included in the 2013 Draft Capital Budget are plans to replace the Chamber of Commerce (a part of the Heritage Centre) roof as it has been leaking with each thaw causing damage to the interior drywall and bathroom tiles.

11.11 Corporate Vehicle Fleet

The Village fleet uses 25% of the total annual energy costs and comprises 39% of total corporate emissions. Since the baseline year, two new light duty pickup trucks have been added to the fleet and five vehicles have been replaced with newer models, including one heavy duty truck.

Actions Completed

In 2009 the Village developed an anti-idling policy for municipal vehicles and designated the Village Office as an “idle-free zone.” Averaged over the entire fleet, this policy has the potential

to realize significant savings. For the Village, Idling one light duty pickup for one hour every working day for a year translates into approximately $771.14 in annual fuel costs at idle and $589.49 in annual maintenance costs associated with idling (e3 Fleet Idling Calculator). Six older vehicles and equipment have been replaced with newer, more efficient models. This includes two major purchases of a 2012 fire truck and 2011 garbage truck. Tracking and reporting of fleet fuel consumption will continue utilizing the SMARTTool in order to assess the impact of future GHG reduction projects targeted at fleet vehicles. In 2012, regular gasoline and diesel fuel used in all fleet vehicles will contain a 5% biodiesel mix as mandated by the B.C. Renewable and Low Carbon Fuel Requirements Act. In 2011, the application of this biodiesel mix requirement removed 5 tCO_2e from the corporate emissions inventory.

Actions Planned

There are currently no projects planned to target GHG reductions in the corporate fleet.

12.0 Monitoring and Reporting for Public/Civic Education

A significant part of the Village's efforts to become carbon neutral and reduce corporate emissions should be the communication of these activities to the public. It has been illustrated through Council and staff interviews and analysis of current budgets that there are limited resources to devote to large, administration-heavy capital projects. As such, there is a need to promote what smaller initiatives can be achieved and ensure they are highly visible to the public in an effort to induce behaviour change and get buy-in for potentially scaling up corporate efforts. One of the criteria identified through the interviews for future GHG reduction projects was that priority should be given to projects which include opportunities for public participation. The Burns Lake Energy Forum, a group formed in 2009 to lead a drive for energy self-sufficiency in the community, is an example of public involvement in climate action and could serve as a model for future groups.

In moving forward, the Village will continue to publicly report on its corporate emissions inventory through an annual CARIP report which will be made available to the public both in paper form and through the Villages' online presence. Monitoring of GHG reductions and corporate emissions inventory updates will be completed through ongoing energy and fuel consumption tracking utilizing SMARTTool. Energy and GHG emissions reductions will be captured through this process with data being uploaded to the online tool on a quarterly basis through the Finance Department. The Development Services Coordinator will be responsible for data analysis to evaluate the impact which various GHG reductions projects are having on the overall corporate inventory.

The SMARTTool's ability to process emissions data in real time and provide for detailed breakdowns of emissions for individual facilities is a useful addition to the Village's capabilities for producing information for public consumption. Providing the public access to a visual

breakdown of emissions can help to foster behaviour change by connecting individuals' actions directly with specific tonnes of CO_2e emitted. There is an opportunity to liaise with managers of contracted services and share emissions data to assist contractors to assess their internal processes to find way of reducing energy and fuel use.

The Village of Burns Lake relies heavily on word of mouth and social media to raise awareness of new initiatives. The current project to update and make more user-friendly the municipal website provides opportunities to promote GHG reduction actions through a dedicated page. The Village is further completing an Integrated Community Sustainability Plan (ICSP) which is expected to be adopted in January 2013. This plan will involve regular reporting on progress made towards sustainability goals and objectives. Combining both sustainability reporting and actions to become carbon neutral and reduce emissions will lessen the workload on staff while still sharing information with the public. This could be achieved through a joint sustainability and climate action annual "report card" that is produced in conjunction with the CARIP report.

An essential part of working towards civic education on climate actions is an informed and proactive staff. Through the interviews conducted for this project, it was made clear that there is some confusion on the part of staff as to what their role can be in working towards carbon neutrality. Council and managers providing clear direction and demonstrating commitment to GHG reductions will encourage staff to take ownership of future reduction projects. Providing for a short training or workshop session to familiarize all staff with SMARTTool functions, Climate Action Charter commitments and what actions the Village will take to reduce emissions will be necessary to get staff on the same page. The actions matrix included in this project may be used to track progress on GHG reductions projects internally and could be a useful tool to keep all staff informed on any progress made.

13.0 Implications for Community-Wide GHG Reductions

Demonstrating leadership in climate action by addressing the carbon footprint of corporate operations is an important step towards realizing deeper, community-wide reductions. However, corporate emissions in Burns Lake comprise a mere two percent of the total community emissions inventory. Therefore scaling up reduction efforts in the future will be essential in order to meet the Village target for community-wide GHG reductions. According to Provincial data, Burns Lake has the highest per capita emissions levels compared to other similar-sized municipalities in the RDBN (see table 7). There is a need to improve both resident awareness of climate change issues and energy and fuel

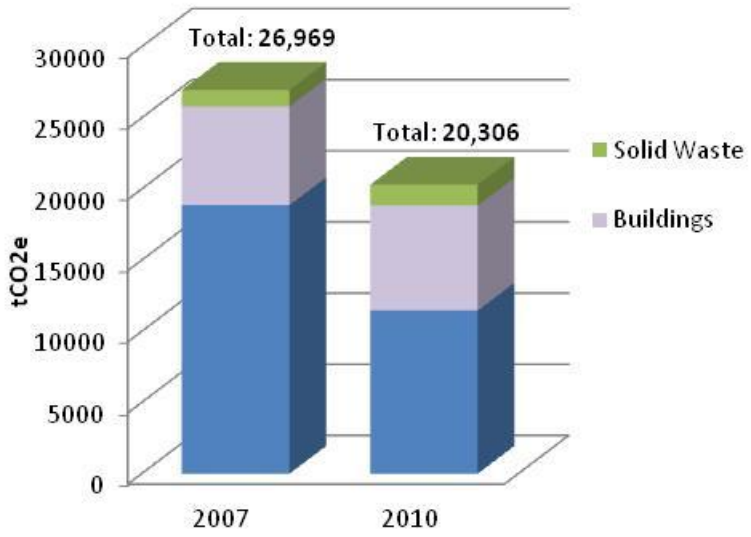
Table 7 - Per Capita Emissions (tCO2e) for Select North-Central British Columbia Municipalities

Municipality	Per capita emissions (tCO_2e)	
	2007	2010
Village of Burns Lake	12.46	9.48
Town of Smithers	8.96	5.82
District of Houston	9.20	4.59

Source: 2010 Draft CEEI Reports – Village of Burns Lake, Town of Smithers and District of Houston, 2012.

efficiency within the community. Given limited municipal budgets and human resources, decisions on future reduction projects should always be made with the impacts to community emissions in mind. Smaller communities such as Burns Lake often cannot dedicate finances to multiple medium sized projects and are better off focusing efforts on one or two large projects for which grants can be obtained.

Figure 14: Village of Burns Lake Community Energy and Emissions Inventory Data Breakdown



Source: 2010 Draft CEEI Report Village of Burns Lake, 2012.

The Village has adopted the provincial target of reducing GHG emissions to 33% below 2007 levels by 2020. This target applies to the community emissions profile of Burns Lake and therefore is separate from the CAC commitment to carbon neutrality in corporate operations. According to the 2010 Draft Community Energy and Emissions Inventory (CEEI) Report, community wide emissions in Burns Lake have decreased by approximately 25% from 2007 levels (2010 Draft CEEI Report). While this is encouraging, there have been some discrepancies in data province-wide and the 2010 reports have not been finalized pending data verification at the time of writing. There is cause for scepticism over the numbers in Burns Lake as no significant reduction projects have been implemented to account for the dramatic decrease in emissions. The B.C. Ministry of Environment qualifies that this data is only in draft form therefore stakeholders can expect changes in the figures before the final reports are published. This is important to note when planning for future GHG reduction actions.

The challenges of implementing emissions reductions actions in the broader community were recognized by Village staff early in the process of planning for climate change mitigation. In reports from 2007 when the Village first began to target energy planning and efficiency as a priority, it was recognized that the two major challenges were the limited staff capacity of a small local government and access to funding. These same challenges were identified in the interviews completed for this project. Council and staff further noted through the interviews that communicating with the public to raise awareness and initiate behaviour change is another issue which requires attention. A Community Energy Plan was completed in 2008 which provided for an energy baseline and identified areas to focus on to reduce community-wide energy use. Though it requires an update, this plan is a good starting point for moving forward

with community GHG reductions and the lessons learned from corporate actions to reduce emissions can be applied to community-wide initiatives in the future.

In Burns Lake the preferred approach articulated by staff and other similar-sized local governments is to concentrate on small scale projects which rely on proven technologies to reduce emissions. There are opportunities to initiate pilot projects within the corporate emissions sphere which can then be scaled up to the community level. In the future the Village could take advantage of GCC qualifying projects for community based emissions reductions. This would work towards both reducing overall community emissions and reduce the amount spent on carbon offsets for corporate carbon neutrality. For these initiatives, the associated administrative and capital costs would have to be examined against the reductions which the project is anticipated to achieve before they are acted upon.

The materials developed by the Village through monitoring and reporting on corporate emissions will contribute to advancing public education and awareness activities. The ability to track definitive emissions and dollars through the corporate emissions inventory is a valuable tool to demonstrate tangible successes in reduction projects. This data can also provide the public with a better understanding of where corporate emissions come from and how their individual actions influence those levels.

14.0 Conclusion

The Village of Burns Lake is interested in pursuing GHG reductions both within corporate operations to progress with its Climate Action Charter commitments as well as in the wider community to meet the targets it has set in the 2007 OCP. The Village is just beginning to seriously consider how it can practically and efficiently approach emissions reductions in a comprehensive manner. Recognizing that leadership must begin from a sound understanding of existing operations, this report focused on the Village of Burns Lakes' corporate emissions only; understanding that the findings would have an impact on community-wide emissions in the future. A corporate emissions inventory was completed and analyzed to determine what areas the Village should focus on as the highest emitters and where the opportunities were for immediate action. A scan of other similar-sized B.C. local governments with comparable weather conditions was completed to determine actions currently underway and to assess their efficacy in Burns Lake's context.

The actions which emerged focused on increasing energy efficiency and aligning internal policies with climate action goals to both prepare for future reductions actions and raise awareness amongst staff. For buildings, conducting an energy audit of all remaining corporate facilities would allow prioritization of funds for equipment replacement and retrofits. It was determined that in the short and medium term current fleet vehicles met the needs of the Village therefore initiatives to downsize or right-size would likely be a wasted effort. Rather,

updating vehicle and equipment purchasing policies to reflect a consideration of high efficiency and alternate fuels would prepare the Village for future replacements. A supportive action which would assist in future GHG reduction projects is the establishment of a dedicated climate action fund. This fund would consist of the annual CARIP rebate and potentially the costs for annual carbon offsets should Council choose to take the “making progress” approach towards carbon neutrality.

This report further addressed the question of how a small, northern BC local government can take proactive steps towards becoming carbon neutral while taking into consideration budget and human resources limitations, extreme climate and a remote location. Analysis of existing operations and potential future actions revealed that many of the efficiencies to be realized would come from upgrading aged equipment and providing needed retrofits for buildings. Financial limitations exist for purchasing the most cutting-edge green technology and challenges in sourcing this technology in rural and remote areas in Northern B.C. add to this cost. Remote communities do not have the advantage of easy access to technical expertise for innovative equipment when it comes to ongoing maintenance costs and so must look to accessible and proven technologies. Extreme winter climate does provide a barrier; however there are opportunities to target education and behaviour change as a way of overcoming some of those barriers. Efficient snow plowing services in winter and safe and accessible pathways can encourage residents to take advantage of walking opportunities in the small urban centre where many services are proximate to each other.

As with many B.C. local governments, Burns Lake is challenged with aging infrastructure which in many cases is past its recommended lifespan. This issue affects smaller communities more acutely as their limited tax bases make replacement impossible without significant loans or grants which are scarce. It is likely that this issue will preoccupy small communities over the next decade and make climate action difficult to realize without additional funding opportunities or incentives.

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Glossary

Balance and/or offset	A way to meet carbon neutrality under the Carbon Neutral Framework by finding reductions in GHG emissions either through purchase of offsets and/or achieving reductions in community emissions, such that they make up for a local government's corporate GHG emissions (Green Communities Committee, 2011).
B.C. Climate Action Charter	A voluntary agreement signed by local governments in British Columbia. Signatories commit to working to achieve three goals: becoming carbon neutral in respect of their operations; measuring and reporting on community GHG emissions; and creating compact, complete and energy-efficient communities (Green Communities Committee, 2011).
Carbon dioxide (CO_2)	A naturally occurring gas (1.13% of atmosphere) that is also a by-product of burning fossil fuels and biomass and other industrial processes. It is the principal anthropogenic greenhouse gas. It is the reference gas against which other greenhouse gases are measured and therefore has a Global Warming Potential of 1 (Field et al., 2007).
Carbon dioxide equivalent (CO_2e)	A unit that expresses any greenhouse gas in terms of its global warming potential, using carbon dioxide as the baseline measure. This is usually expressed as tonnes of CO_2e (Green Communities Committee, 2011).
Carbon neutral local government	For the purposes of the Climate Action Charter, a local government is carbon neutral if it has a) calculated the total emissions for which it is responsible, b) pursued actions to minimize those emissions, c) balanced and/or offset all remaining emissions, and d) reported publicly on their results (Green Communities Committee, 2011).
Carbon offset	A reduction in GHG emissions for which the ownership of those verifiable GHG emission reductions can be transferred and used to meet an emission reduction obligation elsewhere. Usually measured in tonnes CO_2e (Green Communities Committee, 2011).
Carbon market	A market-based approach to achieve reductions in greenhouse gas emissions, through the purchase and sale of offset credits resulting

	from greenhouse gas emission reduction projects and supply-limited permits to emit. The carbon market establishes a price on carbon that results from the intersection of the supply of offsets and permits and the demand and cost for emitters to reduce their emissions (Green Communities Committee, 2011).
Climate Action Revenue Incentive Program (CARIP)	A grant program available to local governments who have signed the B.C. Climate Action Charter that provides a grant equal to one hundred percent of the carbon tax paid by local governments as a direct expenditure. Local governments are required to make their CARIP reports public (Green Communities Committee, 2011).
Corporate emissions	GHG emissions generated though local government operations; for the purposes of carbon neutrality emissions produced as a result of the delivery of "traditional services" are included – i.e. fire protection, solid waste management, recreational/cultural services, road and traffic operations, water and wastewater management, and local government administration (Green Communities Committee, 2011).
Emissions	The release of substances (e.g. greenhouse gases) into the atmosphere.
Green Communities Committee (GCC)	A committee of the Province of British Columbia and Union of British Columbia Municipalities (UBCM) that provides tools and supports to assist local governments meet their Climate Action Charter goals (Green Communities Committee, 2011).
Green Communities Carbon Neutral Framework	A B.C.-specific Carbon Neutral Framework developed by the Green Communities Committee to enable local governments to meet their Climate Action Charter goal of carbon neutrality. The framework includes four steps; 1) Measure, 2) Reduce, 3) Balance and/or offset and 4) Report. (BC Climate Action Toolkit: Carbon Neutral Local Government, 2012)

Greenhouse gases (GHGs)	A gas emitted to the atmosphere from natural sources and as a result of human activity. Greenhouse gases include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride (Green Communities Committee, 2011).
Intergovernmental Panel on Climate Change (IPCC)	An intergovernmental organization established by the United Nations in 1988 to provide the world with a scientific view of the current state of knowledge in climate change and its potential environmental and socio-economic impacts.
Inventory	An accounting of the amount of greenhouse gases emitted to or removed from the atmosphere over a specific period of time.
Net emission reduction	The amount of reduction in GHG emissions when comparing the baseline emissions with project emissions. *Baseline emissions:* The GHG emissions that would have occurred in the absence of the emission reduction project. *Project emissions:* The GHG emissions resulting from a community project designed to reduce GHG emissions when compared to conventional activities (Green Communities Committee, 2011).
SMARTTool	A web-based GHG emissions inventory and reporting tool which provides a standardized approach to calculating and reporting an organization's corporate GHG emissions (Green Communities Committee, 2011).

Appendix

A. Village of Burns Lake Sustainability and Climate Action Timeline

B. List of Local Governments Reviewed in Actions Scan

C. Interview Questions – Generic Staff and Council

Appendix A

VILLAGE OF BURNS LAKE SUSTIANABILITY AND CLIMATE ACTION TIMELINE

YEAR	ACTION
2004	Free composting service is made available to residents and the resulting compost is set aside for use in public works landscaping projects
2007	Creation of a community garden on municipal land with seventeen plots available to the public
2007	Recycling program is implemented in the Village Office building in partnership with the Regional District: *A partnership with the Lakes District Christian Supportive Society provides some income through recycling for adults with mental illness*
2007	Building energy audit conducted for the Museum and Legacy Complex: *Using a Towns For Tomorrow Grant, this audit resulted in building retrofits including a more efficient furnace and upgraded insulation to reduce the energy use of the buildings and save money*
2008	Community Energy Plan completed: *In partnership with One Sky consultants, this plan created a baseline energy inventory for Burns Lake and made recommendations to move forward with lowering energy use and realising savings in the community*
2009	Village of Burns Lake becomes one of 180 local governments to sign the B.C. Climate Action Charter
2009	Village begins tracking corporate emissions inventory through the Climate Action Revenue Incentive Program (CARIP)
2009	Idle-free policy developed for municipal vehicles and the Village Office is designated an "idle-free zone"
2009	Climate Action Bootcamp completed by 30 community members: *Over two days participants were introduced to how they can take action on climate change*
2009	Formation of the Burns Lake Energy Forum: *Vision Statement - Burns Lake is a leader in community energy self sufficiency using local renewable energy sources. In operation until 2011, this group was key in initiating district energy and biomass projects*

2009	Mayor of Burns Lake become a part of the UBCM BC Mayors Climate Action Leadership Council
2010	Community Energy and Emissions Plan (CEEP) Quickstart Workshop completed by staff and community members: *Facilitated by BC Hydro and funded by grants from the Fraser Basin Council and Ministry of Sport and Cultural Development, this workshop allowed for an introduction to emissions planning and resulted in a conceptual timeline for action*
2010	Burns Lake is the Earth Hour Champion of BC: *After participating in this worldwide campaign to turn off lights for 1 hours in recognition of the effects of climate change, Burns Lake is named provincial champion for reducing power use by 7% (Provincial average: 1.4%)*
2010	MOU signed with Lake Babine Nation, Burns Lake Band, Northern Health Authority, School District #91, Regional District of Bulkley Nechako, College of New Caledonia, Province of British Columbia, Burns Lake Native Development Corporation, Burns Lake Community Forest and the Lakes District Film Appreciation Society to complete a Community Heating Network feasibility study
2010	Active Transportation Plan completed: *This plan outlines future actions to enhance the active transportation network in the Village*
2010	Official Community Plan is amended to include a greenhouse gas reduction target for the community
2011	Biomass system is installed at the Tom Forsyth Memorial Arena: *This system supplied heat to change rooms and stadium seats using pellet boilers, there is an expected 80% reduction in natural gas use as a result of this project and annual energy savings of $8,000/year*
2011	On-demand hot water heaters are installed in the fire hall
2011	District Heating Feasibility Study completed: *The Village is in the process of sourcing funding for the implementation of this project.*
2011	Paperless Council agendas are implemented to reduce paper and energy use
2011	Thermostats in pumping stations are lowered to reduce energy use

2011	Solar lighting installed at the Spirit Square community park
2011	Tom Forsyth Memorial Arena lights switched from T5 to more efficient T8
2011	Heat recovery system installed at the Tom Forsyth Memorial Arena: *Waste heat from the ice plant is recaptured to preheat water for Zamboni operations*
2011	Low-flow toilets are installed in the Village Office
2011	Water metering program initiated at low income housing, corporate and residential facilities: *This program will provide data on water consumption for different type of buildings and assist in creating policy for water conservation*
2011	Tract and Neighbourhood Data Modelling Project: *This project monitored energy consumption data for local buildings to predict and improve building energy performance*
2011	Triple bottom line accounting methodology adopted in corporate procedures
2012	Integrated Community Sustainability Planning process initiated: *This process included a public engagement campaign to increase local awareness of climate issues and opportunities for creating a more sustainable Burns Lake*
2012	Village begins utilizing SMARTTool to track corporate emissions
2012	Downtown Revitalization Project initiated: *Phase I of this project will upgrade lighting along Highway 16 to a more efficient system while creating more pedestrian infrastructure to promote walkability*
2013	Proposed creation of a Climate Action Reserve Fund to finance future GHG emissions reduction projects
2013	Proposed upgrades to sewage treatment plant to reduce energy use and improve safety
2013	Proposed energy efficient furnace for the Village Office
2013	Proposed partnership with the Regional District to implement a blue box recycling program in the community

Appendix B

LOCAL GOVERNMENTS REVIEWED IN ACTIONS SCAN

LOCAL GOVERNMENT	POPULATION	LOCATION
Village of Granisle	450	Northwest British Columbia
Village of Telkwa	1,300	Northwest British Columbia
District of Clearwater	2,483	South central British Columbia
District of Elkford	4,263	Southeast British Columbia
District of Houston	3,600	Northwest British Columbia
District of Fort St. James	4,757	Northwest British Columbia
Town of Smithers	5,217	Northwest British Columbia
City of Merritt	7,000	South central British Columbia
City of Nelson	9,258	Southeast British Columbia
City of Williams Lake	11,150	Central British Columbia
City of Terrace	11,486	Northwest British Columbia
District of Lake Country	11,708	South central British Columbia
City of Dawson Creek	12,000	Northeast British Columbia
City of Prince Rupert	12,815	Northwest British Columbia
City of Quesnel	25,000	Central British Columbia
City of Prince George	75,000	Central British Columbia

Appendix C

Generic interview guide for staff and council. For interviews with staff who had in-depth knowledge of certain projects and initiatives, additional questions were included related to their specific experiences.

GENERIC STAFF & COUNCIL INTERVIEW GUIDE

1. What is your role with the Village of Burns Lake and how long have you been in your position?

2. When you hear "carbon neutrality" what is your understanding of the term and how significant do you think it is to your daily work life/position with the Village?

3. Are you aware of any commitments, plans or strategies which the Village has to reduce greenhouse gas emissions in Village operations or the community as a whole?

4. How do you feel your work is related to efforts and actions for the Village to become carbon neutral and/or reduce emissions, if at all?

5. What are some of the opportunities you see through your work for the Village to achieve carbon neutrality and/or reduce emissions?

    a. Follow up: What are some of the initiatives you would like to see take place?

6. What are some of the challenges you see for achieving carbon neutrality and/or emissions reductions in your work or in Burns Lake as a whole?

7. In working towards becoming carbon neutral and reducing corporate emissions, what criteria do you think should be considered when developing specific actions and projects?

8. What would help you to integrate sustainability/emissions reduction actions into your daily work tasks? (prompt: training, tools, resources etc.)

9. Have you been involved in any actions or projects which work towards carbon neutrality or emissions reductions in general? If yes, how did you find the experience and what lessons did you take away?

   a. Follow up: How effective do you find initiatives the Village has already implemented and what lessons do you think can be taken from these initiatives?

10. Is there anything you feel was missed during this interview or is there anything that needs to be clarified?