District of Highlands

Greenhouse Gas Emission Reduction Strategy

July, 2012

CENTRE for SUSTAINABILITY WHISTLER

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1 Introduction

1.1 Background

At the same time as communities throughout the world are struggling to prepare for a future without abundant low-cost fossil fuels, the Greenhouse Gases (GHGs) created by the world's current dependence on fossil fuels are creating devastating impacts on global ecosystems and social systems. Such impacts are expected to last for many generations. In British Columbia and Canada, these include: forests ravaged by pine beetle infestations, the pending loss of the Arctic ice pack, and significant losses of salmon stocks and species such as polar bears due to increases in ocean and river water temperatures. Increasing energy efficiency, shifting to alternative and renewable energy sources, and mitigating and adapting to the impacts of Climate Change, are now generally viewed as the greatest challenges of our time.

To address these challenges, provincial legislation requires that Official Community Plans include targets for the reduction of greenhouse gas emissions and policies and actions the local government has proposed for achieving these targets. In 2010 Highlands amended the OCP to comply with the GHG reduction requirements. A GHG Emission Reduction Strategy update to review of targets was anticipated as part of the OCP update following the *Sustainable Highlands* Integrated Community Sustainability Plan (ICSP). The ICSP will be a lens for guiding strategies to reduce emissions.

1.2 Scope

Highlands Greenhouse Gas Emission Strategy will address what the community can do to reduce and minimize Greenhouse Gas (GHG) emissions. Emission sources for Highlands considered under this plan include those from mobile sources, stationary sources and solid waste. It is recognized that resident activities including personal travel and general consumption of products and services such as food also lead to GHG emissions, but these sources are not targeted in this strategy. The timeframe for this strategy stretches out to 2050 with long term targets, to 2030 with targets and a more detailed vision, and policy directed within and beyond the five year timeframe represented by the OCP Update.

> GHGs originate primarily from the decomposition of organic matter and the burning of fossil fuels for heating, electricity and transportation activities.

2 Highlands's Vision

Provincial legislation requires that Official Community Plans include targets for the reduction of greenhouse gas emissions and the policies and actions that the local government has proposed for achieving these targets. Beyond this legislation however, Highlands' Official Community Plan looks toward a broader sustainable future. The OCP vision includes the following statement:

The Highlands will strive to diversify its economy while preserving our natural systems, including the aquifers on which we depend so heavily. Land use decisions will be guided by a community plan, with the ongoing involvement of residents.

2.1 Sustainability Objectives

In addition to this aspirational vision, Highlands has also recently adopted the following sustainability objectives, derived from the Natural Step Framework for Strategic Sustainable Development[1], that will guide Highlands on its journey towards sustainability. The community vision and the sustainability objectives are the "north star" for the community, which provide direction towards a final destination. The four sustainability objectives are:

We will reduce our dependence on the use of materials extracted from the Earth's Crust and the creation of associated wastes. We will work towards the use of renewable low-impact resources, such as solar energy, and not depend on limited resources taken from the earth.

We will reduce our contribution to the progressive build-up of synthetic materials produced by society. We will create or use manufactured products that can be easily absorbed in an environmentally benign way, such as packaging made out of compostable materials.

We will reduce our contribution to the ongoing physical degradation of nature. We will use resources only from well-managed eco-systems, pursuing the most productive and efficient use of those resources. We will exercise caution when modifying the natural environment.

We will reduce our contribution to conditions that undermine people's ability to meet their basic needs. We will support and maintain socio-cultural and economic systems that promote a quality of life for people that include food security, affordable housing, and a living wage.

Greenhouse Gas Emissions primarily relate to issues under the first sustainability objective and ultimately this means that emissions from Highland's activities will over the long-term need to be close to zero, while also supporting the other three sustainability objectives. To be strategic, approaches to reduce GHG's today need to build toward zero emissions without preventing the ability of the community to reach the other sustainability objective.

[1] Founded in 1989 in Sweden by oncologist Dr. Karl-Henrik Robert, the Natural Step is a non-profit organization with offices in 12 countries that work with hundreds of corporations, municipalities, academic institutions and non-profit organizations to help them achieve their sustainability goals, See: http://www.naturalstep.org/en/our-approach.

2.2 GHG Targets – Starting with the end in mind

2.2.1 Global GHG Trends and "Tipping Points"

A discussion about targets requires some contemplation as to where society needs to be in order to be sustainable. An 80% global reduction in GHG emissions is the level of reductions that scientists have agreed are required globally to stabilize atmospheric CO_{2e}[2] concentrations below 400 parts per million (ppm) and the earth's atmosphere from heating by more than 2^{o} Celsius, the point where catastrophic environmental and societal impacts may result. According to the U.S. National Oceanic and Atmospheric Administration (NOAA), we are currently standing at 394 ppm, an increase of 12 ppm in just four years.[3] As the atmosphere knows no boundaries, the source of GHGs is irrelevant: the impacts of higher CO_{2e} concentrations do not discriminate by location.

Needless to say, there is a dramatic gap between the current trend and the required global reductions, even with demand reduced by major price increases. This will necessitate a fundamental change in energy use, energy sources and the management of emissions to address, with corresponding changes to lifestyles and ways of doing business. Urgent action by all partners, locally and globally, will clearly be required in order to avoid the serious predicted global impacts of climate change.

2.2.2 Local GHG Targets

In keeping with the dates set by the Provincial government, Highlands currently has GHG reduction targets for 2020 and 2050.

Current OCP Community Targets. The current targets extend to 2020 and 2050 and are as follows:

Reduce total per capita GHG emissions from the Highlands by the following amounts using the CEEI 2007, and the 2007 District population estimate as the baseline:

1. 20% by 2020
2. 60 % by 2050

Provincial Target. Legislated by Bill 44, the provincial target is the most aggressive in North America, calling for a dramatic reduction in GHG emissions of 33% by 2020 and 80% by 2050 with 2007 as baseline levels. It should be noted that per capita GHG emissions in BC have remained almost constant since 1990 and Bill 44 does not legislate the reductions that are required by specific jurisdictions or the private sector.

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[2] CO_{2e} stands for the equivalent amount of carbon dioxide. Some GHGs, such as methane, are several times more potent than CO_2

[3] http://www.esrl.noaa.gov/gmd/ccgg/trends/ Note that the red line on the graph are actual measurements, which vary according to season, while the black line is the annual average trend.

Recommended Targets

Unlike the Provincial target, Highlands has set intensity-based targets based on population. These types of "per capita" targets are useful for tracking changes in growing areas or translating the reductions into more personal terms but on the downside, per capita targets tend to ignore the fact that total emissions need to drop as well. We recommend that Highlands include additional total emission reduction targets for 2030 in keeping with the ICSP timeline as well as a long-term sustainability target (2050 or 2060) of between 0% and 20% of total emissions compared with 2007. Setting an ultimate target will better align with Provincial initiatives, set clear direction for where the community needs to go and will help the community to make better decisions today.

The translation of total emission reduction targets into per capita targets is premised on a maximum Highlands population that grows at a rate similar to the past 10 years and then reaches 2,360 in 2020. If the community expects to exceed a population amount of 2,360 at any time before 2050, the per capita targets should be revised accordingly to align with the total emission reduction targets.

Current 2020 Target: 20% below 2007 per capita levels to 3.4 tonnes per person from 4.3 tonnes/person. Based on a population projection of 2,350 this translates into 9% below total emissions for 2007.

2030 Target: 35% below 2007 per capita levels to 2.8 tonnes per person from 4.3 tonnes in 2007. Based on the population projection of 2,350 this translates into 26% below total emissions for 2007.

2050 Revised: 80% below 2007 total emissions, which translates to 82% below 2007 per capita emissions to 0.75 tonnes per person living in Highlands.

2.3 Highland's Emissions Strategy Area Descriptions of Success

2.3.1 Strategy Areas

In addition to being guided by the communities Vision and Sustainability Objectives this GHG Reduction Strategy is aligned more deeply within Highlands's Integrated Community Sustainability Plan, in which six of the nine Strategy Areas are more directly related to emissions. Each one of the Strategy Areas describes Descriptions of Success for Highlands in 2030. Below is a list of these Strategy areas and the GHG related outcomes.

2.3.2 Descriptions of Success

By the year 2030, when Highlands has succeeded in achieving its emissions vision, the descriptions of future success that will guide emissions planning in each of the six related strategy areas are:

2.3.2.1 Buildings and Sites

1. New and renovated **buildings use water and energy conservation measures**, have **low-impact design** and are mostly built with sustainable materials.

2. Ornamental landscaped areas consist of non-invasive plant species that **minimize the need for use of potable water for irrigation** and of **chemical pesticides and fertilizers**.
3. *Buildings energy comes from by grid based renewable energy or onsite renewable energy systems.*

2.3.2.2 Energy

1. Community members and local businesses are knowledgeable about energy and understand principles of conservation, efficiency, generation, storage and transmittance.
2. Homes use significantly less energy. Conservation of energy is achieved through increased efficiency and life style choices.
3. "Net-zero" energy, water and zero-waste is the standard for all developments.
4. Energy systems are based on renewable sources and are efficient, clean and integrated.

2.3.2.3 Economy and Work

1. An increased proportion of income is generated through business and employment **opportunities located in the community**.
2. Business licensing is subject to an **appraisal to determine suitability based on the environmental, social, economic impacts and sustainability principles**.
3. **Learning activities help develop local economies** and a skilled workforce for the local and regional economy.
4. There is **appropriate development of commercial and industrial lands** to help diversify the local economy.

2.3.2.4 Land Use and Natural Areas

1. All land use and design decisions seek to prevent unplanned growth, **minimize impacts on the environment**, and are based on an **analysis of impacts on the social, human, financial, natural** and manufactured capital of the community.

2.3.2.5 Transportation and Mobility

5. Roads are safe for **pedestrians and cyclists**.
6. There is an **inter-modal transportation system to reduce the use of automobiles**.
7. A variety of transportation nodes and corridors that are safe, attractive, convenient, and well used by community members and visitors **link the Highlands to regional transportation networks.**
8. An **expanded network of non-motorized trails exists.**
9. There are a **greater number of accessible and energy efficient transportation** options available.

10. **Social and support networks help reduce the number of daily car trips** through carpooling and assisting with errands.
11. *Transportation energy systems are increasingly efficient and* ***powered by renewable energy****.*

2.3.2.6 Water and Waste (Infrastructure)

12. Water is conserved through minimizing use, enhancing water retention, rain water harvesting and use of grey water.
13. The use of composting toilets is increasing and bio-solids are composted.
14. Solid waste is minimized through reduced consumption, backyard composting, and recycling.

3 The Current Reality

The best available source of data for energy and emissions in Highlands is the province's Community Energy and Emissions Inventory (CEEI), which is attached as Appendix 2.

Several key factors stand out from the available data, which should be kept in mind when considering the emissions strategy:

- The majority of the community's emissions are from transportation related activities at 81%, compared to just 18% from buildings and other stationary uses.
- Solid waste emissions make up just 0.6% of the inventory.
- The focus of emission reductions over the foreseeable future needs to be primarily targeted at preventing an increase in transportation related and buildings related emissions, and reducing the emissions from current sources.

Figure 1 –Highlands 2007 CEEI GHG Emissions Profile Compared to BC

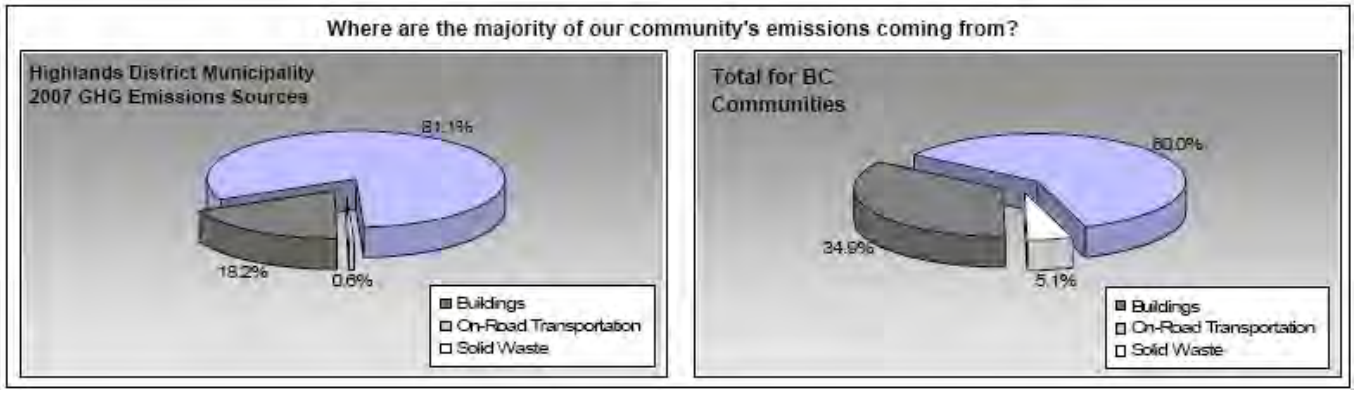
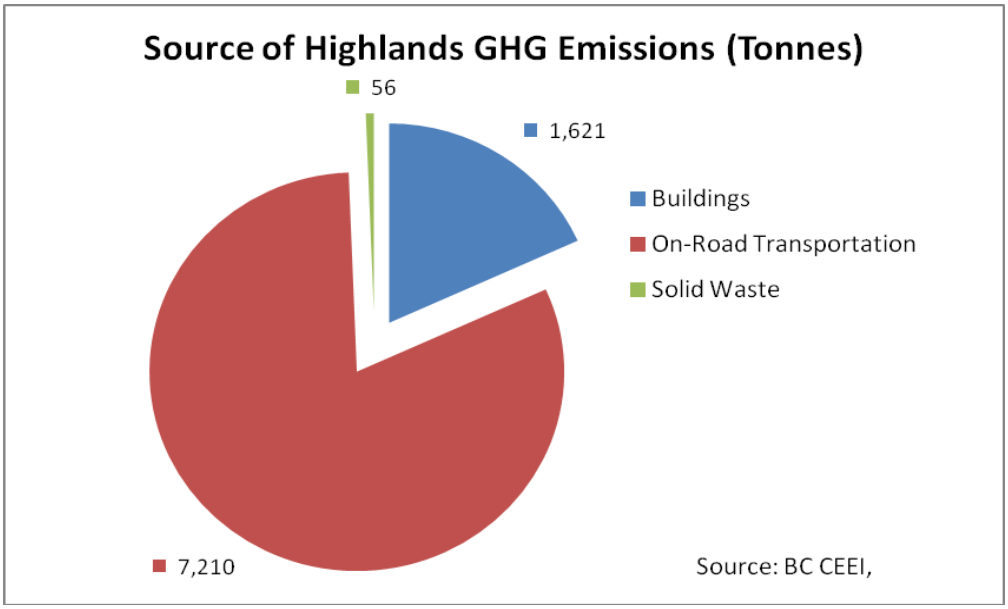
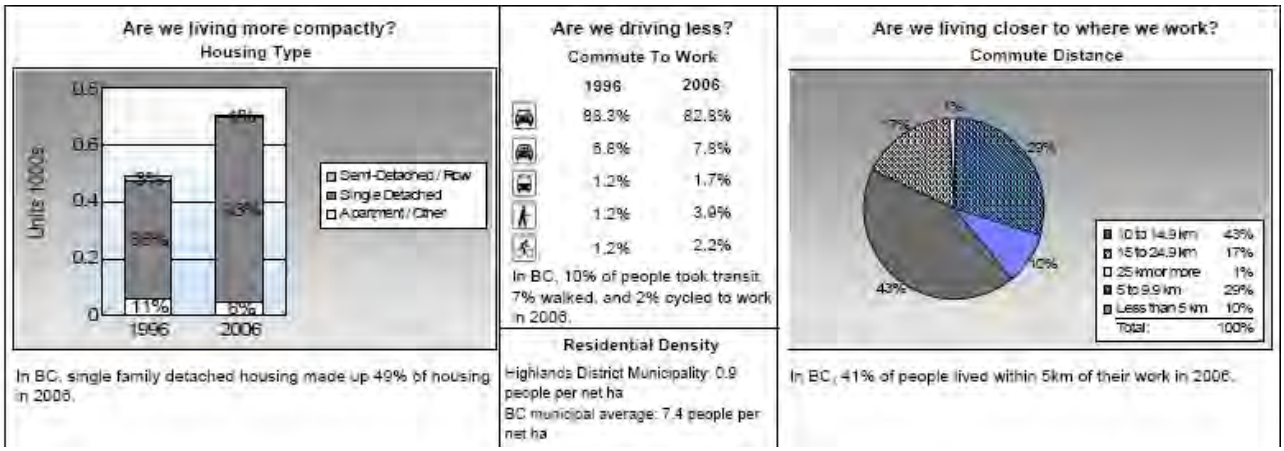


Figure 2 –Highlands 2007 CEEI GHG Emissions profile by Tonnes



- As noted earlier, the rural nature of Highlands includes the significant proportion of single detached dwellings in the community, almost double the BC average. This type of dwelling tends to use more energy.
- While Highlanders have only slightly more people than the BC average commuting to work via single occupancy vehicles, significantly more than the BC average have a work commute of more than 5km. The long vehicle commutes contribute to the current need for fossil fuel energy and the associated GHG emissions.

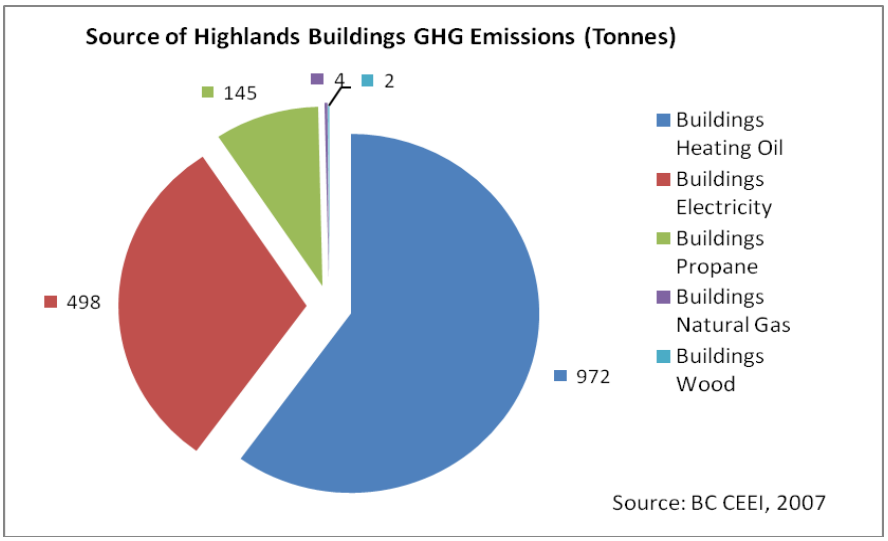
Figure 3–Highlands 2007 CEEI Housing Type and Commuting Patterns



- Electricity mostly from hydro power is the primary source of energy used for buildings, which has a lower than average GHG association compared to other fuels. Electricity is estimated to make up about 1/3 of building related emissions. Other energy sources for buildings include some natural gas, and likely some heating oil, propane and wood. While hydropower has very

little associated GHGs, increasing demand for electricity may lead to new fossil fuelled power plants or more hydro, which has its own associated environmental impacts.

Figure 4–Highlands 2007 CEEI Source of Building GHG Emissions



- Many current buildings are either older (pre-1986) or have likely been built to the minimum building code, which until last year had minimum energy efficiency requirements. The majority of the buildings have been built between 1986 and 2006 (Census, 2006), and are likely not set to be rebuilt in the near future. While proposed actions to improve energy efficiency will reduce energy and emissions from new building stock, the many of the buildings that will be here at the end of the planning horizon for this GHG Strategy are already here. We cannot lose sight of the fact that to achieve deep cuts in emissions; we must introduce effective measures tailored for both existing and new buildings.
- Large vehicles (large cars, SUVs, vans and light trucks) are the preferred modes of personal travel in the community as are gasoline fuelled drive trains. Both these characteristics make for inefficient mobility when compared to smaller diesel vehicles.

4 Recommended Objectives and Policies to Reduce GHG Emissions

As the main purpose of this strategy is to feed into the OCP update, we have structured the Objectives, and Policies by those chapters. The bulk of the policy direction however is contained in the Energy and GHG Reduction Chapter.

Due to the significant amount of emissions from transportation and then buildings, the focus of emission reductions over the foreseeable future needs to be primarily targeted at preventing an increase in transportation related and buildings related emissions, and reducing the emissions from those current sources.

4.1 Energy and GHG Reduction

4.1.1 Objectives

Due to the significant amount of emissions from transportation and then buildings, the focus of emission reductions over the foreseeable future needs to be primarily targeted at preventing an increase in transportation related and buildings related emissions, and reducing the emissions from those current sources. Using this knowledge with direction from the community vision, sustainability objectives and descriptions of success, we suggest the following objectives for this strategy.

Overall Objectives

- Substantially reduce GHG emissions from **stationary sources** through requiring **less energy** and shifting to **less carbon intensive energy systems**.
- Substantially reduce GHG emissions from **mobile/transportation sources** requiring **less energy** and shifting to **less carbon intensive** energy sources
- Substantially reduce GHG emissions from **solid waste management** activities through **reducing the need for materials** and through **less GHG intensive management of solid waste**.

4.1.2 Stationary Emission Source Policies

1. Establish the entire municipality as a Development Permit Area (Chapter 11) for the purposes of promoting energy and water conservation as well as the reduction of GHG emissions.
2. Encourage increased uptake of building energy efficiency, water conservation and renewable energy retrofit programs (provincial, federal and utility-based).
3. Explore and remove any barriers to higher building envelope insulation standards from local regulations and standards.
4. Create an incentive structure to encourage energy-efficient, low-carbon construction and development practices.
    - Create and deploy incentives to facilitate upgrades of existing infrastructure and buildings that improve energy efficiency.

- Work to structure municipal fees and charges on development to reflect energy efficiency and lower environmental-impact development.
- Work to structure permitting practices that prioritize development that reflects energy efficiency and lower environmental-impact development.

5. Create a "Smart Zone" (with a goal of net zero energy, water and waste)
6. Support provincial building code building efficiency extensions and other tools that maximize the extent that local building regulation can require or support renewable energy systems in local development and construction.
7. Support and encourage on-site, local and regional low-carbon energy production that includes a careful assessment of potential negative impacts on ecosystem function, air quality, community character and visual aesthetics.
8. Work with utility partners to conduct a feasibility study of potential areas or future areas within Highlands that are suitable for District Energy Systems. In those areas identified as suitable for district energy, consider the development of an energy utility and development permit guidelines to develop this resource.
9. The District will explore pilot projects that demonstrate the benefit of alternative energy systems.

4.1.3 Mobile Emission Sources Policies

1. Focus development in the Regional Urban Containment and Servicing Policy Area as a means of reducing automobile trip distances.
2. Proposals for new development or significant redevelopment should be required to quantify future GHG emissions and energy consumption and incorporate measures to minimize and/or mitigate projected increases.
3. Create cluster styled development opportunities in central areas that can be well served by transit, pedestrian and cycling routes, and some amenities and services.
4. Consider approval of new development or significant redevelopment only in such as way that can be well served by transit, active transportation, amenities and services.
5. Investigate opportunities to improve live-work use designations within existing zones where this inclusion would not have adverse impacts on the Highlands rural character.
6. Investigate opportunities to create a multimodal transportation hub with connections to the region, that supports the use of the most efficient and renewably fuel transportation options.
7. Encourage the development of locally based economies, jobs and workspaces in order to reduce the number of work commuting trips to other communities.
8. Reduce regional transportation emissions by supporting appropriate opportunities for increasing local food production.

9. Encourage residents to utilize low or zero-emission vehicles as their principle vehicle.
10. Encourage residents to utilize low or zero-emissions land and yard maintenance devices.
11. Work to integrate more efficient and low impact renewable powered vehicle technologies for the community through increasing access to the infrastructure (e.g. electric charging station stations) and fuels to support them.

4.1.4 Corporate decision making and policies

1. Apply the principles of avoid emissions, reduce emissions, replace and offset emissions when considering GHG reductions in corporate operations.
2. Increase the efficiency of fleet vehicles and proportion of renewable energy used for the vehicles, based on consideration of all season safety and availability at a reasonable cost.
3. Save energy by using low impact, renewable energy sources in new or upgraded District facilities and other assets.
4. Support community marketing and outreach programs that raise awareness of the benefits of reducing personal energy use and decreasing our collective GHG emissions.
5. Assemble and maintain community inventories (e.g. CEEI) on energy and emissions and reduction opportunities (e.g. LiveSmart BC) in a central location and through easily navigated links on the District web site.
6. Continue to use a Sustainability Task Force of key community stakeholders and interested individuals to review emission reduction progress and to develop action planning for the coming year.

4.2 Transportation

4.2.1 Policies

1. Create engineering systems and supporting systems that make preferred modes of transportation attractive by being affordable, convenient, safe and enjoyable throughout the year, while minimizing environmental impacts.
2. Encourage residents to shift from personal motor vehicles towards active modes of transportation, car sharing and transit through supportive land use, education and awareness.
3. Work with regional passenger carriers and provincial regulatory bodies to encourage greater frequency and more affordable choices for regional mass travel.
4. Work with local employers and other partners, such as rideshare organizations and other jurisdictions with trip reduction programs (TRPs), to design and implement a District employee TRP.
5. Work with other regional partners to create a network of regional intermodal nodes to facilitate improved connections within and between communities

4.3 Land Use

1. Encourage all new buildings and renovations to be built with energy efficient standards and technologies representing best practices.
2. Proposals for new development or significant redevelopment should be required to quantify future GHG emissions and energy consumption and incorporate measures to minimize and/or mitigate projected increases.

4.4 Social Wellbeing

4.4.1 Housing Polices

1. Encourage all new housing buildings and renovations to be built with energy efficient and low carbon standards and technologies representing best practices.

4.5 Economic Diversification

4.5.1 Objectives and Targets

To help reduce Highlands contribution to the build-up of GHG emissions in the atmosphere.

4.5.2 Policies

1. Encourage opportunities for a Highlands based economy that services both residents and non-residents.
2. Investigate how business licensing and regulations can help to further reductions in GHG emissions.
3. Create opportunities for residents to learn about the benefits of local economies.
4. Support opportunities to improve communications services in the area to encourage telecommuting.

4.6 Services and Utilities

4.6.1 Water Polices

1. Work with regional partners to develop, expand and promote programs and infrastructure that increases local recycling diversion rates especially of organic material.
2. Encourage the adoption of on-site organic composting opportunities that adhere to approaches that reduce animal attraction.
3. Encourage community residents toward purchasing habits that prioritize the least GHG intensive products and services. (e.g. could be reduced packaging, minimal use of fossil fuel fertilizers for food, and local based)

4.6.2 Materials and Solid Waste Polices

4. Work with regional partners to develop, expand and promote programs and infrastructure that increases local recycling diversion rates especially of organic material.
5. Encourage the adoption of on-site organic composting opportunities that adhere to approaches that reduce animal attraction.
6. Encourage community residents toward purchasing habits that prioritize the least GHG intensive products and services. (e.g. could be reduced packaging, minimal use of fossil fuel fertilizers for food, and local based)