

Low Carbon Path to 2040

Community Energy and Emissions Action Plan

August 2011



CITY OF NELSON

Acknowledgements

Development of *Low Carbon Path to 2040* was a City of Nelson initiative. The Plan's vision, strategies and actions have been strongly shaped by input from Council, staff, community stakeholders and the broader public. See Appendix F: Engagement Attendees for a list of those that contributed to the Plan.



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Steering Committee

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Executive Summary

Nelson has a long tradition of conscientious community building from the economic vitality of our downtown to our 100 year old hydro-electric utility and the vibrant diversity of community organizations. Today, our community is vulnerable to the twin risks of global warming and steadily rising, volatile energy prices.

Low Carbon Path to 2040 is a Plan to strengthen the resilience of our community by minimizing these threats. This Plan builds on the City's complete, compact, highly-liveable character and heritage building preservation. It is informed by and will help shape existing municipal priorities including implementation of the community's Path to 2040 sustainability strategy. Designing and implementing the Plan relies on the community's most critical resource – its enterprising residents, businesses, workforce, community organizations, municipal staff and Council. This path leads to more resilient land use, transportation, buildings, energy supply, and waste systems. It has also helped strengthen the vibrancy, prosperity, and liveability of Nelson.

Goals

This Plan provides a vision and a clear path that builds on the community's priorities, foremostly the Sustainability Strategy, with strategies in all major energy and emission sectors:

- Land use
- Transportation
- Buildings
- Energy Supply
- Solid Waste
- Community Wide municipal implementation priorities

Defensible targets underpin these strategies and can be used to guide implementation, monitoring and evaluation, as well as meet the City's legislative requirement to the Province to include greenhouse gas reduction targets, policies and actions in its Official Community Plan. The Plan includes a framework for implementing short-term priority actions.

Energy and Emissions Profile

Community Energy Use: As with most BC communities, Buildings use a majority of community energy, followed by Transportation.



Community Emissions: As with Energy Use, Transportation and Buildings are the largest sources of emissions. Solid Waste sent to landfill is responsible for a relatively small share of emissions.



The Energy and Emissions profile in Nelson looks very similar to most communities in British Columbia, with Transportation as the largest source of emissions, and Buildings the largest source of energy use.¹ In

¹ Emissions reflect a combination of the quantity of energy used and the type of fuel. As electricity is a low-emissions source of energy in Nelson, Buildings are responsible for a smaller share of emissions than of energy, while transportation is responsible for a larger share of emissions than of energy. In either sector, emissions can be

2007, Nelson used 1,421,072 gigajoules of energy and was responsible for 66,753 tonnes of CO₂e. Emissions **in 2007 were approximately 7 tonnes CO₂e per person**. This is fairly good performance relative to other BC Interior communities.

These energy and emission consumption figures miss some of the underlying trends within the Community. Nelson, for example, has a stock of vehicles and buildings that are older and less efficient than the stock of many other communities. This drives up energy use and emissions despite the behaviour of Nelson's citizens, who drive significantly less than comparable communities and live in smaller buildings.

Energy Spending and Economic Development

In 2007, Nelson **residents and businesses spent more than \$30 million on energy, or approximately \$3,200 per person per year.**² The \$21.4 million in residential energy expenditures works out to an average of **\$5,150 per household**. Energy expenditures for small and medium sized business totalled \$6.6 million, or **\$6,940 per business**.

The vast majority of this spending leaves town. With rising electricity and oil costs, these expenditures – along with the economic vulnerability of many people – will dramatically increase. **The conservation, efficiency and renewable energy strategies in this Plan are intended to keep a larger portion of these expenditures in the community, stimulating the local economy.**

Investing in renewable energy creates twice as many jobs as equivalent investments in new supply; and investing in conservation and efficiency creates four times as many jobs. Some of this spending is in local hardware and lumber or green building jobs for the construction trades, entry level employment in weatherization, and engineers in renewable energy system design. An even greater portion is the re-spending effect from reduced energy spending redirected towards other local economic activity such as recreation and leisure, retail and restaurants.

Strategies & Targets Overview

The Low Carbon Path to 2040 will enable Nelson to achieve the following targets over a 2007 baseline by 2040:

- **57% reduction in per capita GHG emissions** (from 7 to 3 tonnes per year)
- **43% reduction in community-wide GHG emissions**
- **26% reduction in community-wide energy use**

The strategies and key targets are summarized below by sector.

improved either through increased energy efficiency or through switching to low-carbon fuel sources, or a combination of the two.

² These figures are based on energy consumption from the 2007 Ministry of Environment Community Energy and Emissions Inventory and average 2007 energy expenditures from Nelson Hydro, FortisBC gas rates, transportation fuel costs, and fuel oil costs.

Land Use determines where residents live, work, shop, and play, and influences how they get there. Land-use policies strongly influence energy use and emission from transportation and buildings. The Path to 2040 Sustainability Strategy, along with specific strategies and actions provided below, can inform the Downtown and Waterfront planning processes.



Strategies

- A. Build on the Community’s Complete, Compact and Centered Form to maximize low carbon transportation options and district energy
- B. Encourage Secondary Suites and Infill Cottages for their inherent superior energy performance.
- C. Climate Protection Design Guidelines to encourage buildings, landscapes and activity patterns that are both low-carbon and resilient to climate change

Key Targets

- By 2040, 80% of dwellings are within a 10 minute walk from local services

Transportation produces a majority of Nelsons’ emissions. The strategies in this sector and the Land Use sector will complement those that have already been identified in the Active Transportation Plan.



Strategies

- A. Mainstream Low Carbon Transportation throughout the community
- B. Build Kootenay Rideshare Capacity
- C. Enhance Public Transit Locally and Regionally
- D. Implement the Nelson Active Transportation Plan
- E. Low Carbon Transportation Education and Outreach to strengthen citizen and employer action

Key Targets

- By 2020, household Vehicle Kilometres Traveled (VKT) is reduced 12% from 2007
- By 2040, household VKT is reduced 33% from 2007

Buildings Most GHG emissions from buildings result from natural gas used for space and water heating. Nelson’s building stock is significantly older than the Provincial average. Some of the most effective measures to reduce energy use and emissions are improvements to building envelopes (insulation) and more efficient appliances for both new construction and existing buildings.



Strategies

- A. Establish a Home and Business Energy Retrofit Program
- B. Increase efficiency in New Buildings
- C. Encourage Secondary Suites and Infill Cottages
- D. Advance Building-scale Renewable Heat
- E. Capacity Building and Social Marketing to Program to ensure success of Buildings sector strategies

Key Targets

- Increase building energy retrofit rate for existing buildings to 2% by 2020
- Renewable energy is installed in 75% of buildings constructed annually by 2020

Energy Supply the source and type of energy supply influences emissions in the buildings sector. Nelson is already exploring the potential for District Energy and renewable heat. Due to steep terrain, there may also be micro-hydro opportunities in Nelson.



Strategies

- A. Establish District Energy Systems in Lakefront and Selkirk-Davies
- B. Maintain Near-Zero Emissions for Electricity
- C. Explore Sustainable Wood for High Efficiency Heating

Key Targets

- Maintain emissions from electricity at 2007 levels
- Connect 70,000 square meters of floor space to District Energy by 2040

Solid Waste Diverting organic materials from landfill can reduce greenhouse gas emissions. There is substantial local interest in using organic waste for compost and gardening.

Strategies

- A. Advance Zero Waste Education through Collaboration with the Regional District
- B. Increase Recycling and Organics Diversion with Improved Local Services
- C. Implement a Comprehensive Building Demolition Waste Management Program to divert waste from landfill
- D. Reduce Solid Waste Generation through targeted local and regional policy

Key Targets

- By 2020, Increase organics diversion rate to 50%
- By 2040, Increase organics diversion rate to 80%



Community Wide measures cross traditional energy and emission sectors and municipal line departments and extend out into the community. These measures help ensure the municipality's ongoing business activity supports a low carbon agenda.



Strategies

- A. Build City staff's capacity to support low carbon community development
- B. Engage with Citizens, Businesses, Non-Profits, and Public Sector Organizations to move down the Low Carbon Path
- C. Support regional food and agriculture systems to reduce greenhouse gases and vulnerability to rising food prices.

Key Targets

- By 2015, all City departments have integrated qualitative assessment of greenhouse gas emissions into their planning and budgeting processes.

Priority Actions

For each strategy, priority actions were developed in order to provide short term implementation guidance. In addition, the priority actions were assigned scores in each of five categories: greenhouse gas reduction potential, cost, profile (potential for community and public interest) and ease of implementation. Based on the average score of each priority action a priority ranking of “high, medium or low” was assigned. The priority actions and their rankings, in parentheses, follow below.

Land Use

- Integrate land use strategies into an OCP (Official Community Plan) Update and Land Use Regulation Bylaw (Medium)
- Infill home pilot project (Medium)
- Update OCP and Land Use Regulation Bylaw with infill home provisions (High)
- Climate Protection Design Guidelines (Medium)

Transportation

- Low carbon transportation policy (Medium)
- Requirement for Transportation Master Plan for new commercial developments (Medium)
- Collaborate with Kootenay Rideshare to explore enhancements to service (Medium)
- Integrated Low Carbon Transportation Study (Medium)
- Identify and address barriers to implementing the Active Transportation Plan (Medium)
- Social marketing and education (Medium)

Buildings

- Building retrofit pilot (Medium)
- Put in place one or more policy tools that will move developers to construct buildings that exceed BC Building Code energy performance requirements (High)

Energy Supply

- Strategic plan for district energy (Low)
- Pressure reducing valve micro-hydro monitoring and assessment (Low)
- Run-of-river micro-hydro monitoring and assessment (Low)
- Incorporate Biomass Recommendations into District Energy (DE) Phase 2 Study (High)
- Develop a Solar Ready Bylaw (Medium)

Solid Waste

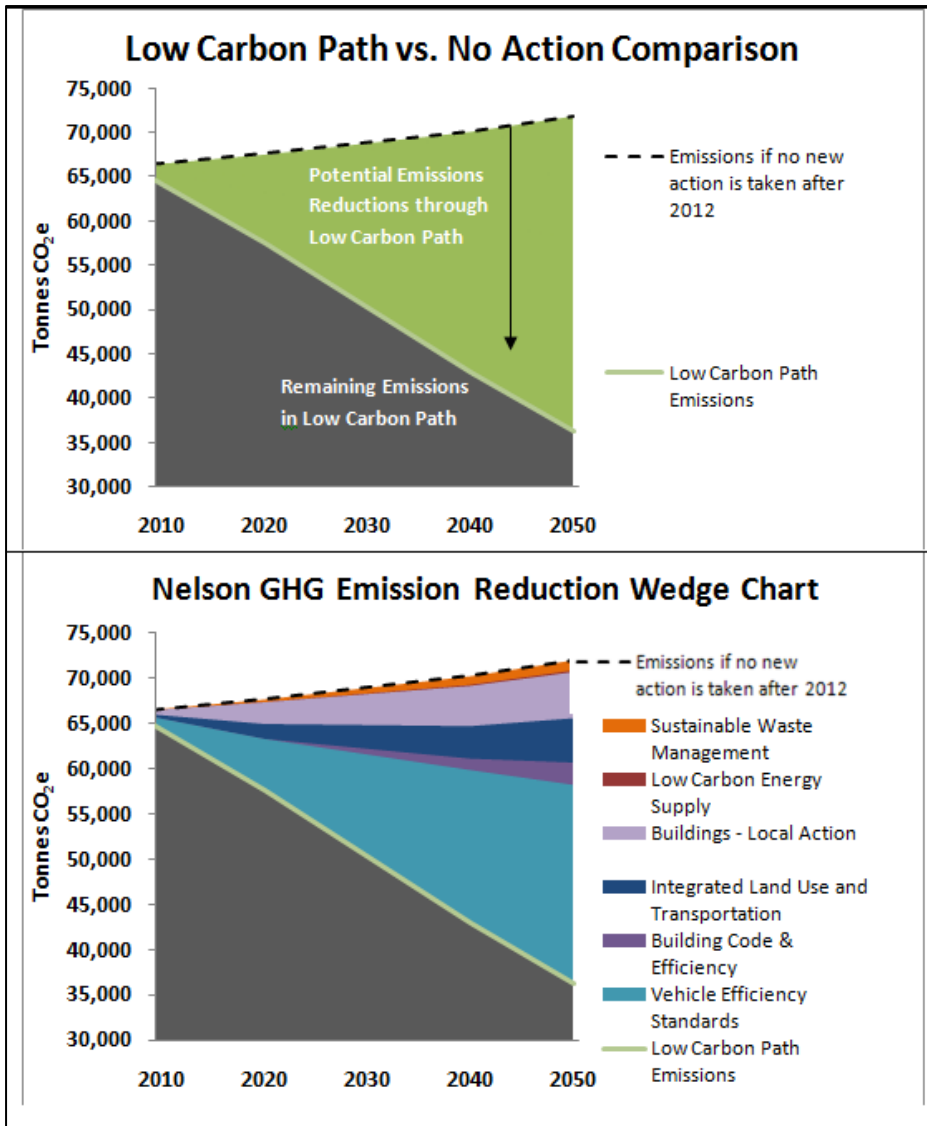
- Additional recycling and composting drop-off sites (Medium)
- Reduction of corporate carbon liability through community composting (Medium)
- Construction, deconstruction and demolition pilot project (Low)
- Letter of support to provincial and federal government to extend producer responsibility (High)

Community Wide

- Put in place a Community Carbon Offset Framework (High)
- Municipal finance carbon accounting analysis policy (Medium)
- Low carbon local business advising (High)
- Low carbon community pledge (High)
- Education and outreach hub (Medium)
- Energy and emissions economic development (High)

Low Carbon Path – Modeled Results

The Low Carbon Path is comprised of sector-specific objectives, strategies and priority actions that will result in significant GHG emission reductions and strengthen local energy sustainability. To ensure the strategies result in an emissions path that is both achievable and ambitious, modeling techniques were used to forecast future energy and emissions levels based on assumptions developed through consultations with staff, Council and community stakeholders (see Appendix A for more details) and informed by a critical appreciation of related strategies in North America. Performance assumptions labelled as “outputs” are generated through this modeling process and are reflected in many of the maps and graphs, notably those projecting GHG implications.



These charts reflect annual emissions in Nelson under two possible emissions futures: the Low Carbon Path, and a “no action” scenario.

The top line represents potential GHG emissions if no additional policies or actions are undertaken after 2012. Existing building and vehicle stock are still replaced with more efficient units, but only to the point where they meet 2012 standards.

The Low Carbon Path Emissions line represents projected emissions if all policies in this Plan are implemented at both local and senior government levels. Even if all policies are implemented, a significant amount of emissions remain.

The Greenhouse Gas Emissions Reduction Wedge Chart provides a more detailed analysis of emissions reductions in the Low Carbon Path. Each wedge represents a bundle of closely related policies and actions. Wedges are divided by local and senior government based on which has the most direct ability to influence outcomes.