

2014 Climate & Energy Action Award Applications

Corporate Operations

1. District of Maple Ridge - Maple Ridge Fire Hall No.1 Custom Energy Reduction Campaign

The District of Maple Ridge has made significant investments in the retrofit of Fire Hall No. 1 to take advantage of technologies to reduce the District's energy consumption and carbon footprint. The key to maximizing the potential to realize the full savings from this capital investment is to deal with the most important part of the equation – human behaviour. Our application focuses on the Custom Energy Reduction Campaign that we developed and implemented to change the behaviour of the staff and fire crew who use Fire Hall No.1 and see how far we can go towards achieving the maximum benefits of the infrastructure retrofits.

Some notable infrastructure retrofits include: a closed-loop geo-exchange system which reduces consumption of natural gas, energy efficient lighting fixtures controlled by occupancy sensors which conserves electricity and a roofing system that was designed to increase reflectivity which reduces heat within the building. All the above points contributed towards making Maple Ridge Fire Hall No. 1 a LEED® Gold Certified building.

The campaign that we implemented targeting behaviour change focused on turning off lights and unplugging and turning off appliances. We launched the campaign in June 2013 and the results were significant. Fire Hall No. 1 consumed 443,000 kWh in 2012, the equivalent electricity use of 44 average sized B.C. homes. Over the duration of the campaign, Fire Hall No. 1 saw a 8,760 kWh or 24% decrease in electricity consumption from May 2013 and 19% decrease from June 2012. Once we started achieving savings, the staff and fire crew in the facility started to get a strong emotional investment in the campaign and they shared their best practices with co-workers and family. Staff and fire crew realized how important behaviour can be to achieve energy savings in an already energy efficient facility.

2. City of Nanaimo - Reservoir No 1 Energy Recovery Project

The City of Nanaimo, as part of major upgrades to its drinking water supply system constructed a new reinforced concrete storage reservoir. The new reservoir replaced a 100-year old open-air raw water in order to receive treated water from its new membrane filtration plant, coming on line in 2015. As part of the project, the City incorporated energy recovery equipment to harness the energy of water entering the reservoir, for sale to the BC Hydro grid. The system uses pumps as turbines to reduce the high incoming pressure to fill the reservoir and simultaneously generate electricity, and directly supports the City's climate action goals.

3. City of Richmond - Raising Corporate Building Expectations

The City of Richmond is working towards a future vision, where corporate energy use is as efficient as possible and greenhouse gas (GHG) emissions are reduced to minimal levels. The City believes that this corporate vision and associated actions can help spearhead community transition to more efficient energy use systems and a “low carbon” economy.

In 2012, City of Richmond buildings’ accounted for 72% of its energy use and 67% of its GHG emissions. With anticipated population growth over the next 20+ years and the resulting increased demand for infrastructure and services, it is estimated that corporate building energy use and GHG emissions could increase by approximately 45% by 2030 if no action was taken.

Given these expected pressures, the City adopted an updated Sustainable “High Performance” Building Policy in 2014 that sets LEED® Gold as the construction target, and includes a minimum target of ten points in the Optimized Energy Performance criteria - currently equal to 24% better than building code. In addition, the City embedded overall building targets of no net increase in building energy use and GHG emissions as compared to 2012, and included goals of constructing net zero energy and carbon neutral buildings by 2030.

These clear and measurable targets for corporate buildings help to focus the organization on increasing efficiency, reducing waste and incorporating renewable technology at its facilities, and in conjunction with other initiatives, will allow the City to reduce its overall energy use GHG emissions in the long term.

4. District of Saanich - Saanich's Fuel Efficient Municipal Fleet

Saanich's Fleet Department has initiated a variety of fleet management strategies that have resulted in a 25% decrease in fleet greenhouse gas (GHG) emissions since 2007. These efforts began in 2007 when the Fleet Manager signed Saanich up to participate in the E3 Fleet program and completed a fleet review. As a member of the program, Saanich committed to greening its vehicle fleets through a variety of measures based on the E3 Fleet criteria including increasing vehicle fuel efficiency, reducing harmful emissions, and incorporating new technologies and fuel sources into municipal operations.

The majority of fleet changes in Saanich focused on vehicle right-sizing which examined what tasks were being completed and selecting the most fuel efficient vehicles to achieve these tasks. The transition into purchasing low-emission transportation options to maximize efficiency and avoid waste was the first step in targeting fleet conversions into high efficiency diesel, hybrid, and electric vehicles. Saanich's Carbon Fund was used to help fund the purchase of fuel efficient fleet vehicles which have an immediate and measured impact on corporate GHG emissions reductions. In addition to changing fleet processes, behavioural changes through staff engagement on fuel efficient driving techniques and efficient route planning have helped to reduce unnecessary fuel consumption.

Saanich's fleet now annually uses 200,000 litres less fuel and emits 700 tonnes less emissions than in 2007. This has resulted in the cumulative reduction of 3,235 tonnes of GHG, saved over 990,000 litres of fuel and over \$1,380,000 over 6 years.

5. District of Sparwood - Sparwood Leisure Centre Energy Retrofit

Sparwood undertook a three year energy retrofit of the Community Leisure Centre. With the Leisure Centre being the highest consumer of energy and emitter of GHG, it was an obvious choice for an energy retrofit. The project would ultimately reduce GHG emissions and energy costs and be a catalyst for reinvesting in the community. Annual energy savings are slated to be reinvested into parks, trails and community programs at the Leisure Centre.

The project entailed the elimination of 25 independent boilers, hot water and industrial heaters with two high efficiency hydronic heating systems that would incorporate solar and waste heat recovery augmented with high efficiency condensing boilers. The new system would provide heat for both the aquatic centre and arena complex at a significant level of savings and reduction of GHG emissions. In addition to the heating systems upgrade, new high efficiency compressors were installed in the arena physical plant replacing the 40 year old compressors, and new LED lighting is being to be installed to replace old metal halide lighting. The project, funded through Federal and Provincial grants, Gas Tax funding and Sparwood reserve funds, cost \$1.5 million of which local tax payers are directly responsible for \$217,000. Sparwood anticipates annual savings of between \$60,000 - \$85,000, a reduction of GHG emissions by 194 tonnes, and over \$20,000 annually in maintenance costs. Additional infrastructure replacement costs that would have been required over the next five years is estimated to be in the neighbourhood of \$250,000.

6. Thompson Nicola Regional District - Full Implementation of Methane Oxidation Bed Technology - Reducing Environmental Impact of Landfill Gas by 21 Times

The Thompson-Nicola Regional District in conjunction with Alberta Innovates – Technology Futures developed an innovative, cost effective, environmentally sound method of passively treating landfill gas emissions at closed landfills. The process involves identifying methane "hotspots", and constructing methane oxidation beds where the "hotspots" are located, which allows landfill methane gas to escape through the beds. The methane is oxidized by the microorganisms present in the bed materials and converted to carbon dioxide, biomass, heat and water. Methane has a global warming potential of 21 times that of carbon dioxide.

Filtering landfill generated methane through biogenic methane beds immediately reduces the global warming impact of landfills. In addition to proven environmental benefits, anticipated is a reduction in costs and requirements for long term monitoring and brownfield remediation. The treatment bed compost provides a beneficial use of organics and bio-solids diverted from landfills, thus using a waste product for beneficial use.

Although they significantly impact the environment, small landfills do not generate enough landfill gas to support traditional methods of treatment like flaring or conversion to other sources of energy, however cumulatively, they have a significant environmental impact. Biogenic methane beds can be installed at a fraction of the cost of traditional landfill gas treatment methods. This innovative technology is directly transferable to landfills in other provincial, federal or international jurisdictions.

1. City of Campbell River - Power Down Campbell River

In January 2013, the City of Campbell River partnered with BC Hydro to implement Power Down Campbell River, a community outreach initiative designed to increase residential home energy conservation. The program was a first step in implementing the City's Community Energy and Emissions Plan (CEEP). Power Down Campbell River featured a reality-TV inspired Energy Challenge, where five families competed head to head for 30 days to conserve energy and teach the community their tips and tricks. The community followed the progress of the five families as their stories were shared through local media outlets and social media, showing people that energy conservation is both good for the environment and fun. A professionally produced film highlighting each family's journey was made to continue to inspire people in Campbell River and beyond, as well as a short video showcasing the top energy conservation tips. Complementing the Energy Challenge, an Energy Rebate Program was introduced, and 115 local residents received a free home energy audit in exchange for making an energy pledge to commit to a specific retrofit or behavior change action in their home. A total of 1% of single family homes in Campbell River participated in this program. BC Hydro's Energy Conservation Assistance Program (ECAP) was also implemented to enable people with low incomes to receive a free home energy audit and free energy saving products. Collectively, these initiatives were an important step in reducing Campbell River's greenhouse gas emissions (GHGs), as buildings account for approximately twenty three percent of all GHGs produced in Campbell River.

2. Capital Regional District - Pedestrian and Cycling Master Plan Implementation Project

The Pedestrian and Cycling Master Plan (PCMP) identifies a series of recommendations under the headings of the 5 E's of sustainable transportation (Engineering, Education, Encouragement, Enforcement and Evaluation) that, if implemented, would result in a significant increase in modal share for active transportation. This year, the CRD identified 9 key actions to undertake as innovative pilot projects as a way to showcase the effects of a cohesive, regional transportation planning approach on active travel.

The development of the PCMP was a 2 year process involving extensive community, stakeholder and municipal engagement. The resulting plan (attached as Appendix A) lays out a set of goals, objectives and action items aimed at significantly increasing the region-wide mode share of cycling to 25% in the denser areas and 15% region-wide (currently, the regional mode share is 3.2%) and walking to 15% (currently the regional mode share is 10%). The 2011 Origin and Destination Study results show the mode share for active transportation to be flat since 2001. In order to gain traction in shifting travel habits towards walking and cycling, the PCMP recommends:

- building facilities that are attractive to the "interested but concerned" cyclist (estimated to be 60% of the population),

- designing facilities for pedestrians to enhance accessibility, safety and connectivity to a regionally, consistent standard, and
- instilling a culture of active travel where cycling is normalized and walking is more common.

3. Township of Langley - Township of Langley's Green Building Permit Rebate Program

The Township of Langley's unique new Green Building Permit Rebate Program rewards builders that successfully demonstrate superior energy performance in their new home construction project. Under the program, builders that achieve measured energy performance beyond what is required by the British Columbia Building Code (BCBC) are rewarded with a direct financial incentive from the municipality.

New single-family homes that achieve an EnerGuide rating of 80 will receive a building permit rebate of \$750 and new multi-family homes that achieve a score of 82 will receive \$150 per unit. In addition, all builders that participate in the program will receive a free consultation with a Certified Energy Advisor to review their plans and complete the EnerGuide pre-construction plan evaluation (additional \$300 value). To receive a rebate, builders must clearly display the EnerGuide label on the homes furnace or electrical panel door making energy labeling a required part of the program. Currently, the performance pathway of the BCBC requires homes to achieve an EnerGuide rating of 77. However, recent studies have shown that the majority of homes built to code using the alternative prescriptive pathway, score closer to EnerGuide 73. Therefore, in addition to builder capacity building and energy labeling, the program is expected to ensure building code compliance and lead to homes that are built to energy performance levels well beyond what is currently standard practice.

The primary funding for the program is the Sustainable Construction Levy, a fee added to all building permits issued by the Township of Langley, ensuring it is supported by a robust and sustainable funding mechanism.

The program is the first of its kind in Metro Vancouver making the Township of Langley a leader in encouraging high quality, energy efficient, and sustainable new home construction.

4. Metro Vancouver - Charging up our region: How Metro Vancouver and its member municipalities are planning for the electric car

The age of the electric car has (finally) dawned! Mainstream auto manufacturers are now marketing commercially-available plug-in electric vehicles. With no tailpipes and a hydro-electric-based power grid, electric vehicles are superior in terms of air quality, greenhouse gases and performance. Increased uptake of electric vehicles support regional and local climate change objectives, so how can local governments support this technology?

In 2012, Metro Vancouver and 14 of its member municipalities participated in a provincially-funded project to increase the availability of public electric vehicle charging stations throughout the region. This innovative project involved region-wide collaboration, planning, outreach and implementation, and

was successfully carried out in the span of less than three months. The elements of this unique initiative included:

- 1) Identification of optimal locations for public charging stations, using spatial analysis incorporating local knowledge of which businesses/organizations would be ideal hosts;
- 2) An intense recruitment campaign targeting businesses and property owners within the identified high impact areas, supported by custom materials and branding; and
- 3) Direct on-the-ground support for prospective hosts including free site visits and assistance in applying for Provincial funding grants.

This project successfully added 67 new public charge-points to the regional network in less than 3 months. In 2013-2014, an outreach campaign (entitled "emotive") was developed to increase public awareness of electric vehicles. This campaign draws on existing research to target prospective buyers. The outreach strategy is centred on the tactile experience of driving electric. Designed to be "open-source", the campaign is made available to communities across BC.

5. City of New Westminister - Energy Save New West

Energy Save New West (ESNW) provides a tangible, on-the-ground and personal dimension to the policies and objectives targeting energy efficiency in existing buildings, as reflected in New Westminister's Official Community Plan and Community Energy & Emissions Plan.

Working in partnership with BC Hydro and FortisBC, ESNW is designed, managed and mobilized by the City of New Westminister. Primary funding contributions for ESNW include City of New Westminister, BC Hydro and FortisBC.

At a high-level, ESNW is a community energy program designed to improve energy efficiency and reduce GHG emissions from low-rise and multi-residential homes and businesses in New Westminister. This comprehensive program includes energy audits, post-audit consultation and support to encourage energy improvements. ESNW is designed to make it easier for local residents and businesses to undertake an energy efficiency retrofit and take advantage of incentives and rebates available from BC Hydro and FortisBC.

Key program elements include:

1. High-impact, highly visible and locally-focused initiative targeting energy conservation and energy efficiency improvements for homes and local businesses.
2. A comprehensive multi-year approach that provides a strong, recognizable program brand for the community, bridging the inevitable shifts and changes in the provincial energy efficiency landscape that occur from year to year.
3. Providing a full continuum of program support and guidance to local homeowners and businesses for a straightforward and enjoyable customer journey from initial energy assessment to eventual energy retrofit.

With over 300 active participants in the program through the first-year, ESNW has shown the benefits of building collaborative and supportive partnerships and taking a replicable, multi-year approach to program design and execution to generate strong results.

6. City of North Vancouver - Energy Efficiency Design Verification Documentation for Complex Buildings

In December 2013, the energy efficiency regulations in the British Columbia Building Code (BCBC) were updated to reference both the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) 90.1-2010 and the National Energy Code for Buildings (NECB) 2011. While this is a significant step towards community energy efficiency improvements and GHG emissions reductions, the implementation of these energy regulations is currently lacking; as the requirements in these regulations rely on input from many design professionals across multiple disciplines, coordination issues often limit the level of compliance realized in the finished building.

The City of North Vancouver's Energy Efficiency Design Verification Documentation directly addresses these frequent coordination and clarification of responsibility issues, while not significantly adding to the bureaucratic complexity of obtaining a Building Permit for construction. Consisting of a single Design Verification Report and accompanying Design Intent Letters, the CNV verification documentation encourage the early recruitment of - and collaboration between - design professionals for energy efficiency regulation compliance. Pathways to compliance within the regulation are declared and responsibilities assigned and accepted. Through this, the project is set up for success in complying with either NECB 2011 or ASHRAE 90.1-2010.

Since enactment in June 2013, the CNV Design Verification Documentation has been adopted by the City of Richmond, and is currently in the process of being adopted at the Cities of New Westminster, Port Moody, and the Township of Langley.

7. City of Richmond - Alexandra District Energy Utility

The City of Richmond has taken a leadership role to shift towards sustainable energy systems which reduce dependency on non-renewable energy sources and reduce GHG emissions. The Alexandra District Energy Utility (ADEU) is a system that centralizes energy production for heating and cooling that is servicing residential and commercial customers in the West Cambie neighbourhood, a major growth area in the City. This utility uses ground source heat pump technology to extract heat (geothermal energy) from the ground via a network of vertical pipe loops. In cooling mode the energy flow is reversed and heat is pumped into the ground. The ADEU was put in operation in July, 2012. Today, the ADEU provides renewable energy to over 600 residential units, which results in the reduction of up to 1,125 tonnes of GHG annually. It is estimated that at build out, ADEU will service approximately 3,200,000 sq. Ft of new development, and will result in a reduction of up to 6,000 tonnes of greenhouse gasses annually.

Sustainable energy systems such as this new utility provide a number of benefits for the community including using renewable sources of energy, increasing energy security by reducing reliance on external

power sources, and substantially reducing greenhouse gas emissions. The ADEU technology is proven and reliable as it has built in backup systems and performance is monitored continuously. The utility provides an ongoing new revenue source for the City and affordable energy for its customers.

8. City of Surrey - Community Climate Action Strategy

The City of Surrey's Community Climate Action Strategy (CCAS) is comprised of two complementary and integrated plans: a Community Energy and Emissions Plan to mitigate greenhouse gas (GHG) emissions and reduce energy costs, and a Climate Adaptation Strategy to build resilience to projected climate change impacts. Together, these two plans reinforce the City's broader efforts at establishing a prosperous and resilient 21st century.

The Community Energy and Emissions Plan (CEEP) is Surrey's blueprint for reducing community-wide GHG emissions. The CEEP includes a vision, goals and actions to achieve ambitious GHG reduction targets, and establishes Surrey as a model community in the areas of energy supply, reliability, sustainability, and climate responsibility. The actions in the CEEP encourage local job creation and community investment, and will protect residents and businesses against rising energy costs. The CEEP identifies total and per capita GHG emissions reductions by sector, energy demand reductions, and energy savings.

The Climate Adaptation Strategy (CAS) aims to build Surrey's resilience to projected climate change impacts. Following ICLEI-Canada's five milestone process, staff assessed projected climate impacts in terms of risk, and goals and actions were then developed for Utilities, Flood Management and Drainage; Ecosystems; Urban Trees; Human Health and Safety; and Agriculture and Food Security.

Both plans identify linkages between mitigation and adaptation actions, and how these actions can be mutually supportive for ecosystem protection and health, heat management, and community energy self-sufficiency. Priorities for implementation are identified in each plan, along with proposed sectoral indicators for monitoring success.

Public Sector Collaboration

1. Village of Telkwa - Hankin District Heating Collaboration

The Village of Telkwa is a small community in Northern BC; the village proactively researched, funded and established a significant district energy system in their municipally owned Hankin Corner commercial building. The district heating system presently services the municipal Hankin Corner Building, five private residential homes, one business and the Telkwa Elementary School. The municipality partnered with School District 54 (SD 54) in northern BC to supply heat to the Telkwa Elementary School.



The district heating project was part of a larger initiative that also retrofitted the exterior of the Hankin Corner Building. The retrofit, coupled with this district heating collaborative project resulted in a CO₂ reduction of 150 to 200 tonnes annually.

The Village of Telkwa has appreciated the support that SD 54 has provided in project preparation and research, district energy system installation at the school and the ongoing positive business relationship between our municipality and the school district. The school is a significant consumer of our district energy system and an important project partner. The school boiler acts as a back-up in times when the municipal system is down and also acts as a supplement to the heating system in times of extreme cold. The Village of Telkwa and the Telkwa Elementary School/SD 54 have an ongoing positive partnership in this municipal district energy system.