BC Hydro 2016 Carbon Neutral Action Report

May 2017

BC Hydro
Power smart

This Carbon Neutral Action Report for the period January 1, 2016 to December 31, 2016 summarizes our emissions profile, the total offsets to reach net–zero emissions, the actions we have taken in 2016 to reduce our greenhouse gas emissions and our plans to continue reducing emissions in 2017 and beyond.

Overview

BC Hydro is one of the largest electric utilities in Canada. We generate and provide electricity to 95% of B.C.'s population and serve over four million people. BC Hydro's mission is to provide our customers with reliable, affordable, clean electricity throughout B.C., safely. Our electricity generation in B.C. is very clean (over 98% in fiscal year 2016), because of our system of large hydroelectric facilities and our important partnership with the independent power sector. BC Hydro is also a leader in conservation, and investments in smart meters and a smart grid are providing our customers with the information they need to be smart about their electricity use and ultimately use less. With continued investment in technology, we will help customers make smart energy management choices by supporting them with rates and programs including opportunities for conservation and efficiency as well as low carbon electrification to reduce greenhouse gas emissions.

This report focuses on BC Hydro carbon neutral activities resulting from the operations of our buildings, fleet and paper consumption. However, it also identifies not only our continuing efforts to reduce carbon emissions, but in addition our ongoing work to understand climate change and its effects on our business and the communities we serve, provide support for energy conservation in the public sector, and deliver upgraded or new energy projects which emphasize clean, renewable, and environmentally mitigated generation production.

Cover photograph—Williston Reservoir looking west from GM Shrum Dam.

2016 Greenhouse gas emissions

In 2016, BC Hydro emitted 29,923 tonnes of carbon dioxide equivalent (CO_2e) from emission sources included in the Carbon Neutral Government Regulation. This is an increase from 2015 of 7%. In 2016, 73% of our emissions came from our vehicle fleet, 27% from buildings (which includes energy use for heating, cooling, lighting and IT equipment), and less than 1% from paper use. Buildings emissions were the source of the observed increase, in part due to Site C's worker accommodations and offices becoming operational.

The Site C camp buildings were designed according to the B.C. building code and incorporated insulation measures, air loss controls, lighting systems, and architectural considerations to reduce energy consumption. The observed increase should be balanced against the project's operating value as a source of clean, renewable and cost-effective electricity for more than 100 years, producing the lowest levels of greenhouse gas emissions per GWh, compared to alternative resources.

As noted in the regulation, some emissions must be reported but do not require offsets. For BC Hydro, emissions exempt from offsets are a result of the renewable fuel content in purchased diesel and gasoline and equalled 788 tonnes CO_2e in 2016. Emissions requiring offsets totalled 29,133 tonnes CO_2e for 2016.

Note:

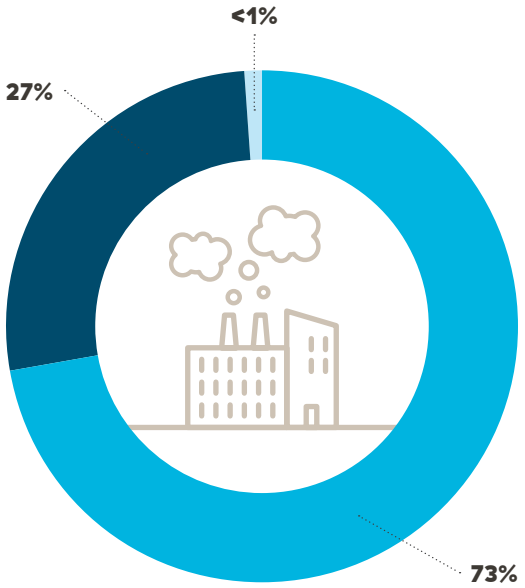
2016 Greenhouse Gas (GHG) Emissions do not include emissions from stationary combustion in crew quarters at remote diesel generating stations, emissions from mobile combustion from boats, snowmobiles or all-terrain vehicles, and fugitive emissions from cooling of buildings or vehicles.

These sources are estimated to emit less than one percent of the BC Hydro total carbon neutral emissions. Efforts to collect or estimate emissions from these sources would be disproportionately onerous. For these reasons, the emissions were deemed to be out-of-scope and are not included in BC Hydro's GHG emissions profile or offset purchase, in accordance with the 2016-2017 B.C. Best Practices Methodology for Quantifying Greenhouse Gas Emissions.

* Tonnes of carbon dioxide equivalent (t CO_2e) is a standard unit of measure in which all types of greenhouse gases are expressed based on their global warming potential relative to carbon dioxide. Due to rounding, numbers may not add up precisely to the totals provided.

** Under the Carbon Neutral Government Regulation of the Greenhouse Gas Reduction Targets Act, all emissions from the sources listed must be reported. As outlined in the regulation however, some emissions do not require offsets.

BC Hydro greenhouse gas emissions by source for the 2016 calendar year (t CO_2e*)



- Mobile fuel combustion (fleet and other mobile equipment)
- Stationary fuel combustion (building heating and generators) and electricity
- Supplies (paper)

Total emissions: 29,923

Total offsets required: 29,133

Emissions which do not require offsets: 788**

Carbon neutral actions taken to reduce emissions

Buildings

BC Hydro has about 200 buildings in more than 60 municipalities across British Columbia. Our capital construction and renovation plans incorporate energy savings opportunities and sustainability design aspects, and life-cycle costing in decision making. Our continued investment in new construction, renovations, and capital upgrades ensures lasting energy performance by incorporating energy efficiency measures.

BUILDING DEVELOPMENT (NEW BUILDINGS AND MAJOR RENOVATIONS)

All new buildings are designed and constructed to meet aggressive energy intensity targets. New construction continues to explore innovative technologies to reduce energy consumption and control carbon emissions, with current projects including air source heating pumps, heat recovery chillers and building automation systems. In 2016, we completed construction of a new district office building in Nanaimo, while offices in Victoria and Vernon continued under construction, and several other offices were in early design stages.

BUILDING IMPROVEMENTS

Energy efficiency opportunities are considered as part of the project scope for building improvements and upgrades. Our interior space renovations are designed to reduce water and energy consumption by up to 30% through controls, lighting, air flow efficiency and other improvements. Projects with energy efficiency benefits delivered in 2016 included:

- Interior renovations and Heating, Ventilation and Air Conditioning upgrades in Hundred Mile House, Qualicum, Smithers, and Powell River buildings;
- Targeted upgrades by floor at headquarters facilities in Vancouver and Burnaby;
- Roof upgrades at the Surrey Service Centre and Hamilton buildings;
- Building envelope upgrades at MacKenzie Service Centre and Dunsmuir headquarters; and
- Additional Heating, Ventilation and Air Conditioning and/or direct digital control upgrades at Surrey (Lower Mainland South), Terrace, Castlegar and Chetwynd.

FACILITIES MANAGEMENT

The day-to-day operations of our larger buildings are outsourced to a facilities management service provider. The service provider is contractually asked to achieve an annual 2% reduction target in building energy consumption through process and/or equipment improvements, and has met this target in four of the last five years of the contract.

Nanaimo District Office entrance.

Interior lighting, Heating, Ventilation and Air Conditioning and direct digital control upgrades.

Vehicle fleet

Our vehicle fleet contains over 2,500 vehicles that are in continual operation throughout the province to support operations and maintain a safe and reliable supply of electricity. We are improving fleet fuel efficiency by regularly replacing vehicles with newer, more efficient models and performing regular maintenance on all of our vehicles. Hybrid and electric vehicles are incorporated into our vehicle fleet as part of the regular vehicle replacement process, where an appropriate comparable lower emission alternative exists, based on the expected vehicle operating context and the available vehicle capabilities and capacities. In 2016, our fleet included over 120 hybrid and electric vehicles.

BC Hydro is exploring the potential impact of electric vehicles on the electric grid as well as ways to remove barriers to their adoption in B.C. To date, we have partnered in the deployment of 31 fast charging stations across the province, designed to make intercity electric vehicle travel practical, and are evaluating rate structures to help electric vehicle owners save money by scheduling vehicle charging to off–peak hours. We continue to provide public charging options to customers who don't have access to charging facilities at home or at work. In addition, our subsidiary Powertech designs and constructs fuelling stations for hydrogen fuel cell electric vehicles, tests high–pressure hydrogen components, provides fuelling protocols, and operates a fast–fill hydrogen fuelling station at their headquarters in Surrey.

Powertech Fast–fill hydrogen fuelling station.

BC Hydro Hybrid SUV fleet vehicles.

Paper

We continue to reduce our office paper use and since 2010 have now reduced office paper consumption by 34%. To continue to reduce paper consumption, all network printers and photocopiers are set to double-sided printing by default.

BC Hydro promotes the preferential ordering of recycled paper (100% post-consumer recycled content), and continues to use on average four packages of 100% recycled paper out of every five packages of paper purchased. We recently implemented a pilot process to scan invoices and other support documents for expense claims, so that claims can be submitted entirely electronically. The process was soft-launched in 2016 and will be more actively promoted this coming year. BC Hydro is exploring various other paperless processes that utilize electronic platforms to provide field instructions and for data collection and record maintenance.

We continue to promote paperless billing to our customers, and more than 47% have now chosen this option. We are making it easier for customers to pay their bills by providing the option of detailed bill notifications by email, including the bill amount, due date and a summary of electricity usage.

Electronic billing reduces paper consumption.

Paperless customer billing app entry screen.

Future actions to reduce emissions

BC Hydro continues to seek opportunities for energy use reduction in existing buildings. Our efforts to increase building energy efficiency include:

- Replacement of chillers and boilers in our largest buildings with more energy-efficient alternatives, coupled with optimization of building automation systems;
- Replacement of existing interior and exterior lighting with energy efficient lighting; and
- Continued investments in replacing buildings at the end of their service life.

Newer vehicle technologies, including hybrid and electric vehicles, are incorporated into our vehicle fleet as part of the regular vehicle replacement process where cost-effective and appropriate. For 2017, we have already purchased 55 new lower emission vehicles, mainly hybrids in the compact and mid-sized SUV segments, as part of our replacement program.

Looking ahead and in collaboration with other suppliers, governments and regional stakeholders, BC Hydro is contributing to the Accelerate Kootenays project which will see 50 additional public electric vehicle charge stations (including 10 fast charge and 40 level 2 stations) installed in the Columbia-Kootenay region. Fast charging stations allow vehicles to charge from 0% to 80% in approximately 20 minutes and level 2 charging stations take four to six hours for an 80% charge. By March 2019, communities from Sparwood to Greenwood and Revelstoke to Field will be connected in the first rural electric vehicle support infrastructure system in Canada.

Fast charging station in the Columbia Valley.

Support for energy conservation in the public sector

BC Hydro supports efficient energy management within the public sector through a variety of demand side management programs and initiatives, and in so doing encourages carbon neutrality in the public sector. In fiscal year 2017, we helped fund 35 energy managers in public sector organizations and also supported 11 municipalities with a funded energy manager. Our support for low-carbon electrification of buildings and fleets extends to those owned/operated by other public service organizations and sectors of the economy, and BC Hydro is developing low-carbon electrification programs that will provide incentives and tools to further help organizations use clean electricity efficiently to displace fossil fuel emissions.

The public sector including schools, hospitals, colleges and universities, municipalities and government is eligible to benefit from a variety of BC Hydro energy management and conservation programs designed to help address obstacles to adopting strategic conservation approaches, or obtaining energy efficient products or processes. In fiscal year 2017, BC Hydro invested more than $20 million in public sector energy efficiency. Examples of projects BC Hydro helped fund included:

- The construction of the new Royal Bay Secondary School (School District 62 Sooke) designed with a higher-performance building enveloping, high efficient heat pump, and efficient lighting system that saved approximately 190,000 kWh a year;
- A retrofit to the lighting system of the Lake City Secondary School (School District 27 Cariboo-Chilcotin) that saved approximately 200,000 kWh a year; and
- Haida Gwaii Hospital and Health Centre (Xaayda Gwaay Ngaaysdll Naay) designed with high-performance building envelope, high efficiency Heating, Ventilation and Air Conditioning and LED lighting that will save 200,000 kWh each year.

Lighting system retrofit in Lake City Secondary classroom.

Lighting system retrofit at Lake City Secondary school.

Building clean, renewable generation

BC Hydro also supports carbon neutrality in the public sector through its investments in renewable and clean energy projects that involve upgrading and building new infrastructure. Aging infrastructure, a growing population, and a need for more capacity in our system are the main drivers behind our investments. Our investments recognize and take advantage of opportunities to improve reliability, address safety concerns and mitigate environmental effects Examples include:

- Scheduled for completion in 2017, the Ruskin dam and powerhouse upgrades will allow the facility to withstand an earthquake and generate power more efficiently;
- The John Hart generating station (GS) near Campbell River is undergoing replacement which will address seismic safety expectations and help to protect fish habitat, and will be completed by 2018;
- The Site C Clean Energy Project that will provide 1,100 MW capacity of clean, renewable and cost-effective energy for more than 100 years is scheduled for completion by 2024; and
- A new standard for SF_6 (sulfur hexafluoride), a potent greenhouse gas used in electrical equipment nationwide, will minimize new SF_6 equipment added to the system by using viable and more environmentally friendly alternatives, and reduce releases by 25% below 2015 levels by 2020.

The independent power sector is an important partner and supplier to B.C.'s clean energy mix. The sector provides power through more than 100 electricity purchase agreements across a wide range of resource types including hydro, biomass, wind and solar. Currently, independent power projects provide about 25% of B.C.'s electricity and will continue to play a vital role in meeting the province's growing energy needs.

John Hart GS camp and underground access.

John Hart GS turbines under construction.

Adaptation to climate change

BC Hydro is focused on climate change effects on our assets and operations. We continue our collaboration and information exchange with researchers and industry groups to help predict climate change developments. We are expanding monitoring of current weather and climate to better detect extreme events as they occur, and are exploring new monitoring technologies, such as remote sensing of spatial and temporal variation of key hydro-climate parameters (for example, snow-load and glaciers). We have completed improvements to our weather and hydrologic forecasting tools to better characterize uncertainty and variability in weather and corresponding improvements to short and medium-range planning tools to incorporate this variability. And we have expanded weather forecasting support for regional storm response planning and enhanced response to power outages.

Operationally, we have completed preliminary assessments of future climate impacts to electrical demand and of the magnitude of potential changes to annual water supply for hydropower generation. Further, we are exploring more storm-resilient designs for expanding our transmission system.

BC Hydro is also engaging with communities to help prepare for climate change. We participated in regional infrastructure resilience planning exercises in Metro Vancouver and Victoria that looked at potential local effects of climate change and sea level rise across heavily populated areas and in areas of potential increased risk to infrastructure, such as flood plains.

Remote sensing snow-load station.

Meteorological weather forecasting tools.

Emissions and offset summary table

BC Hydro GHG emissions and offset for 2016 (t CO_2e)	
GHG emissions created in calendar year 2016	
Total emissions (t CO_2e)	29,923 t CO_2e
Total offsets (t CO_2e)	29,135 t CO_2e
Adjustments to GHG emissions reported in prior years	
Total emissions (t CO_2e)	−2 t CO_2e
Total offsets (t CO_2e)	−2 t CO_2e
Grand total offsets for the 2016 reporting year	
Grand total offsets (t CO_2e)	29,133 t CO_2e

Retirement of offsets:

In accordance with the requirements of the Greenhouse Gas Reduction Targets Act and Carbon Neutral Government Regulation, BC Hydro (the Organization) is responsible for arranging for the retirement of the offsets obligation reported above for the 2016 calendar year, together with any adjustments reported for past calendar years. The Organization hereby agrees that, in exchange for the Ministry of Environment ensuring that these offsets are retired on the Organization's behalf, the Organization will pay within 30 days, the associated invoice to be issued by the Ministry in an amount equal to $25 per tonne of offsets retired on its behalf plus GST.

Jessica McDonald, President & CEO

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