



# BC Hydro 2017 Carbon Neutral Action Report

May 2018

 **BC Hydro**  
Power smart

This Carbon Neutral Action Report for the period January 1, 2017 to December 31, 2017 summarizes our emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2017 to reduce our greenhouse gas emissions and our plans to continue reducing emissions in 2018 and beyond.

## Overview

BC Hydro's mission is to safely provide our customers with reliable, affordable and clean electricity throughout British Columbia. We are one of the largest energy suppliers in Canada, generating and delivering electricity to 95% of the population of British Columbia. We operate an integrated system of generation, transmission and distribution infrastructure to deliver electricity to our four million customers. In 2017, 98.4% of BC Hydro's electricity generated in B.C. came from clean and renewable sources. The independent power sector with more than 120 projects across the province including biomass, hydro, wind and solar were an important contributor.

As an organization, we recognize that we have an impact on the lives of the people in B.C. and with that role comes a responsibility to maintain the trust and respect of our customers and stakeholders. BC Hydro has consistently had some of the lowest greenhouse gas emissions in the North American electricity industry and we have developed a legacy of stewardship by embedding environmental considerations in our business. We are building on our strong conservation programs, which help our customers reduce their greenhouse gas emissions. We continue to help our customers make smart energy choices through our conservation and energy management programs and through tools like smart meters, which provide customers with detailed information about their electricity use. And we seek to provide leadership in advancing climate action strategies including fuel switching and electrification initiatives, low carbon fuel transportation initiatives and programs to increase building energy efficiency.

This report outlines BC Hydro's carbon neutral activities resulting from the operations of our buildings and fleet and our use of paper. It also identifies our ongoing efforts to reduce carbon emissions, our continued work to understand climate change and its effects on our business and the communities we serve, our support for energy conservation in the public sector, and our new and upgraded energy projects which emphasize clean, renewable, and environmentally mitigated generation.

Cover photograph—Seton Lake reservoir.

## 2017 Greenhouse gas emissions

In 2017, BC Hydro emitted 31,099 tonnes of carbon dioxide equivalent (CO<sub>2</sub>e) from emission sources included in the Carbon Neutral Government Regulation. This is a 4% increase from 2016. In 2017, 68% of our emissions came from our vehicle fleet, 32% from buildings (which includes energy use for heating, cooling, lighting and IT equipment), and less than 1% from paper use. Building emissions were the source of the observed increase, and increased use of the Site C Clean Energy Project worker accommodations were among contributors. This 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 life-cycle greenhouse gas emissions per GWh compared to alternative sources. 2017 fleet emissions decreased by 3% compared with 2016, and paper use emissions showed a similar 11% reduction from 2016.

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, B5 biodiesel, gasoline and light fuel oil and equalled 740 tonnes CO<sub>2</sub>e in 2017. Emissions requiring offsets totalled 30,359 tonnes CO<sub>2</sub>e for 2017.

### Note:

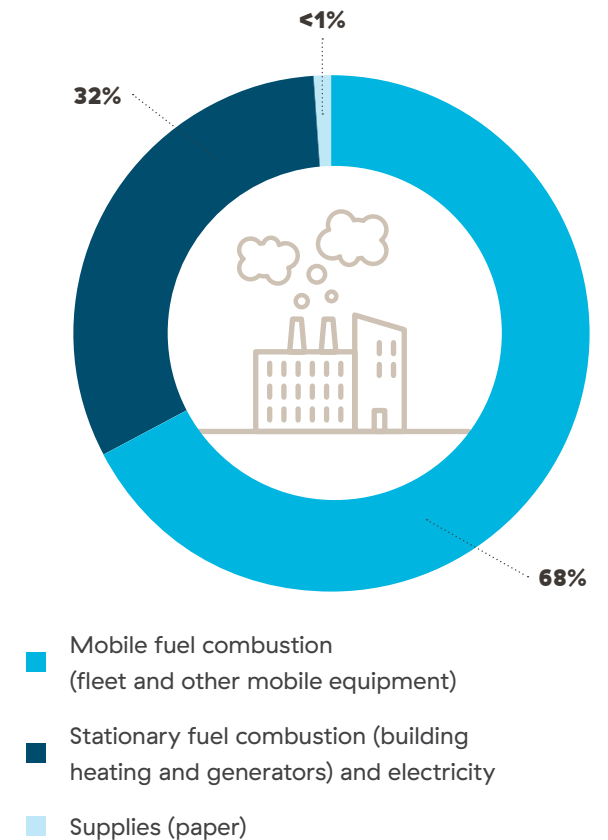
2017 Greenhouse Gas Emissions do not include emissions from stationary combustion in crew quarters at remote diesel generating stations, emissions from mobile combustion from boats snowmobiles or all-terrain vehicles, and fugitive emissions from cooling of buildings or vehicles.

These sources are estimated to emit less than 1% 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 Greenhouse Gas emissions profile or offset purchase, in accordance with the 2016 B.C. Best Practices Methodology for Quantifying Greenhouse Gas Emissions.

\* Tonnes of carbon dioxide equivalent (t CO<sub>2</sub>e) 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 2017 calendar year (t CO<sub>2</sub>e\*)



**Total emissions: 31,099 t CO<sub>2</sub>e**

**Total offsets required: 30,359 t CO<sub>2</sub>e**

**Emissions which do not require offsets: 740 t CO<sub>2</sub>e\*\***

# Carbon neutral actions taken to reduce emissions

## Buildings

BC Hydro owns or leases 200 buildings in more than 80 municipalities across British Columbia, covering more than 340,000 square metres of floor space. To achieve lasting energy performance, we incorporate energy savings opportunities and sustainable design aspects in our capital construction and renovation plans, and life-cycle costing in our project decision-making.

### BUILDING DEVELOPMENT (NEW BUILDINGS AND MAJOR RENOVATIONS)

We design and construct new buildings to meet aggressive energy intensity targets. Our project designs incorporate innovative technologies to reduce energy use and control greenhouse gas emissions in new construction, including air source heating pumps, heat recovery chillers and building automation systems. In 2017, we completed construction of a new district office building in Vernon, while offices in Victoria and Whistler are currently under construction, and several other offices were in early design stages.

### BUILDING IMPROVEMENTS

We consider energy efficiency opportunities as part of the project scope for building improvements and upgrades. In 2017, we completed retrofits of 13 buildings. Our interior space renovations are designed to reduce water and energy use by up to 30% through controls, lighting, air flow efficiency and other improvements. In 2017, we delivered the following projects with energy efficiency benefits:

- Interior renovations and heating, ventilation and air conditioning upgrades in Cache Creek, Westbank, Duncan and Courtenay district offices;
- Targeted upgrades by floor at our Edmonds campus;
- Roof upgrades at the Courtenay, Quesnel, and New Hazelton district offices and the non-integrated area office in Surrey;
- Building envelope upgrades at our Terrace and Abbotsford district offices; and
- Lighting upgrades to LED lamps at our Surrey and Dunsmuir campuses.



Vernon District Office entrance.



Office renovation at Edmonds campus.



## Vehicle fleet

At the end of 2017, BC Hydro had a vehicle fleet of more than 2,800 vehicles to enable the supply of electricity to communities around the province. We are improving fleet fuel efficiency by regularly replacing vehicles with newer, more efficient models and performing regular maintenance on all of our vehicles. During 2017, our operational fleet increased by 250 vehicles, but even with this growth, our emissions reduced by 3% from the previous year.

When available and compatible with work requirements, hybrid and electric vehicles are incorporated into our vehicle fleet as part of the regular vehicle replacement process. At the end of fiscal year 2018, our fleet included seven electric vehicles and 203 hybrid vehicles. We also operated a fleet of 30 mobile off-road electric equipment, including man lifts, forklifts, stock carriers, sweepers and skid steers.

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. Since 2012, BC Hydro has deployed more than 50 Direct Current Fast Charger stations across the province, designed to make intercity electric vehicle travel practical, and is continuing to work with partners on the charge station infrastructure to support the growth of clean transportation in B.C.

In addition, our subsidiary Powertech designs and constructs fuelling stations for hydrogen fuel cell vehicles, tests high-pressure hydrogen components, provides fuelling protocols, and operates a fast-fill hydrogen fuelling station at their headquarters in Surrey.



GMC Volt electric vehicle.



Clark electric forklift.

# Paper


Since 2010, we have reduced our office paper use by 36%. To keep our paper use low, all network printers and photocopiers are set to double-sided printing by default. We preferentially order recycled stock paper and in 2017, 81% of all paper used at BC Hydro was 100% recycled.

BC Hydro has implemented a process to scan invoices and other support documents for expense claims, so that claims can be submitted electronically. Further software applications are being explored that could eliminate paper claim submissions entirely in the next fiscal year. We are also exploring other paperless processes that use 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 50% have now chosen this option. We now have the highest adoption rate for paperless billing among surveyed Canadian Electricity Association utilities. In fiscal year 2018, about 7.5 million electronic invoices were delivered to customers, which translate into avoiding the use of more than 15 million sheets of paper. Paperless billing allows electronic notification of a customer’s bill details, including amount, due date and electricity usage.



Electronic billing reduces paper consumption.

<b>Bill details</b>		 Power smart
Nov 10, 2017 to Jan 10, 2018		
<b>PREVIOUS BILLING PERIOD</b>		
Previous bill.....	\$99.08	
Payment received Dec 8, 2017.....	\$99.08	
<b>BALANCE FORWARD</b>	<b>\$0.00</b>	
<b>ELECTRICITY CHARGES</b>		
Based on Residential Conservation Rate 1101		
Nov 10, 2017 to Jan 10, 2018 (1,467 kWh used)		
<b>Basic Charge</b> 62 days @ \$0.18990 /day.....	\$11.77*	
<b>ENERGY CHARGES</b>		
Step 1: 1,376 kWh @ \$0.08580 /kWh.....	\$118.06*	
Step 2: 91 kWh @ \$0.12870 /kWh.....	\$11.71*	
<b>Rate rider 5%</b> .....	\$7.08*	
Regional transit levy: 62 days @ \$0.06240 /day.....	\$3.87*	
<b>TAXES ON ELECTRICITY CHARGES</b>		
* GST 5% (GST Registration #R121454151).....	\$7.62	
<b>ELECTRICITY CHARGES SUBTOTAL</b>	<b>\$160.11</b>	
<b>TOTAL DUE</b>	<b>\$160.11</b>	

Paperless customer billing app entry screen.

## Future actions to reduce emissions

BC Hydro will continue to seek opportunities for energy use reduction in existing buildings, and will continue to construct new buildings according to energy efficiency targets to reduce carbon emissions. Our efforts to increase building energy efficiency will 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.

We are increasingly tracking building use of electricity, natural gas, steam and propane using RealEnergy, a proprietary energy management system provided by our facilities management service provider, as part of our goal of reducing energy use.

BC Hydro plans to expand our enterprise electronic billing project by introducing the option of paperless billing to consolidated billing customers in fiscal year 2019, which should further reduce paper consumption.

Newer vehicle technologies, including hybrid and electric vehicles, will be incorporated into our vehicle fleet. For 2018, we have purchased six new electric vehicles and two hybrid heavy trucks (Bucket trucks with hybrid Jump systems) as part of our replacement program. We have created an electric vehicle working group to oversee efficient deployment of our pool of vehicles across the province along with the necessary infrastructure, and we are actively exploring increased vehicle sharing through development and availability of vehicle pools. We have also initiated a project to develop a telematics program that will provide operational data related to fuel use and driver behaviour to further motivate reductions in fuel use and emissions.

BC Hydro recently completed a survey to better understand misconceptions about electric vehicles that are blocking broader adoption of lower emission vehicles in B.C. The results show a combination of concerns affecting electric vehicle purchase with vehicle range, charger station availability and vehicle size and equipment options behind societal views.

BC Hydro encourages broader electric vehicle acceptance by partnering to expand the Direct Current Fast Charger station network across the province. Starting in 2012, we initiated the Electric Vehicle Smart Infrastructure Project which resulted in the deployment of 30 stations in southwest B.C. A second phase of the program will deliver an additional 22 stations located at 20 unique sites by May 2018. We are also partnering with government and other utilities on the Accelerate Kootenays project which will deliver an additional 13 Direct Current Fast Charger stations as well as 40 Level 2 charger stations across the Kootenay region of southeast B.C. BC Hydro will be responsible for six of these Direct Current Fast Charger stations. With advances in fast-charger technology expected to increase charging speeds by more than six times by 2020, electric vehicle drivers will find it increasingly convenient to travel longer distances in B.C.



Hybrid Heavy Bucket truck.



DC Fast Charge Station.



# Adaptation to climate change

BC Hydro infrastructure and operations are resilient to current climate variability and we are increasingly prepared for severe weather events. We continue to assess potential effects of climate change in our planning, design, and operations, to better ensure our ability to continue to provide reliable, affordable and clean electricity throughout B.C. Ongoing collaboration and information exchange with researchers and industry groups helps to advance our collective understanding of climate change in British Columbia. BC Hydro maintains a Climate Change Adaptation Working Group to discuss potential risks and responses for climate change adaptation and climate resiliency across the company. The group will update the BC Hydro Adaptation Plan in 2018.

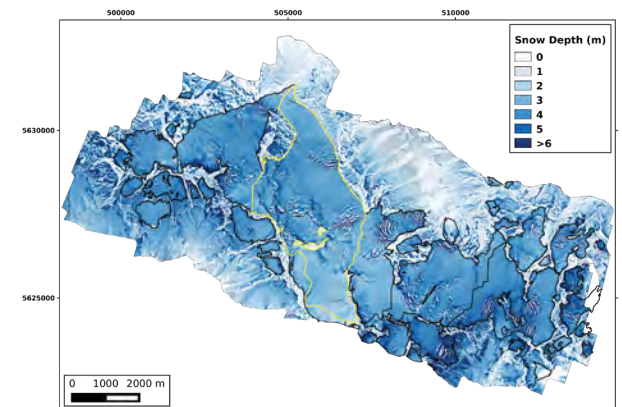
BC Hydro has partnered with the Pacific Climate Impacts Consortium to update projected future climate and hydrologic scenarios over the next century. These projections will allow our planners and engineers to anticipate potential future climate changes during decision-making. This work will continue into 2018. BC Hydro further maintains its technical knowledge of climate change effects and response alternatives by regularly consulting climate change websites, webinars, and online tools and attending relevant symposia. We also partner on climate change adaptation with other public sector organizations and various non-governmental organizations in the watersheds in which we operate.

BC Hydro has expanded its climate, snow and hydrologic monitoring network in the province, and renewed our partnership with the Climate-Related Monitoring Program in B.C. We are partnering with the University of Northern British Columbia on using Light Detection and Ranging remote sensing imagery in the Bridge River watershed to better understand changes to the glacier and distribution of snow in the basin, and continue our involvement with the Canadian Columbia Basin Glacier and Snow Research Program.

We have included information about future projections of climate change in recent water licence renewal applications and also incorporated climate change information in the environmental assessments for the Site C Clean Energy Project and the Revelstoke Unit 6 project. In addition, we have provided regional presentations to stakeholders and Indigenous groups on climate change in the Bridge, Columbia and Peace watersheds.



Fraser Valley 2018 New Year's ice storm.



Airborne laser altimetry of the Conrad Glacier in the Columbia Basin.



# Support for energy conservation in the public sector

BC Hydro supports energy management within the public sector through a variety of energy conservation programs and initiatives that enable carbon emissions reductions in the public sector. In fiscal year 2018, we helped fund 36 energy managers in public sector organizations and also supported 12 municipalities with a funded energy manager.

Our public sector support covers schools, hospitals, colleges and universities, municipalities and government, who are eligible to benefit from a variety of BC Hydro programs designed to help address obstacles to adopting strategic energy management best practices, or to provide for energy-efficient products and processes.

In fiscal year 2018, BC Hydro invested about \$12.5 million in public sector energy efficiency. Examples of projects we helped fund include:

## MUNICIPALITIES

A major lighting upgrade was completed in 2017 at the Richmond Oval in the City of Richmond. The Vancouver 2010 Olympic and Paralympic Winter Games provided an opportunity for BC Hydro to demonstrate its leadership in clean energy and promote energy efficiency and conservation. The Oval was a key venue that received our support on the design and implementation of energy efficient technologies, and continues to practice energy conservation with the upgrade, which saves an estimated 930,000 kWh per year.

## HEALTHCARE

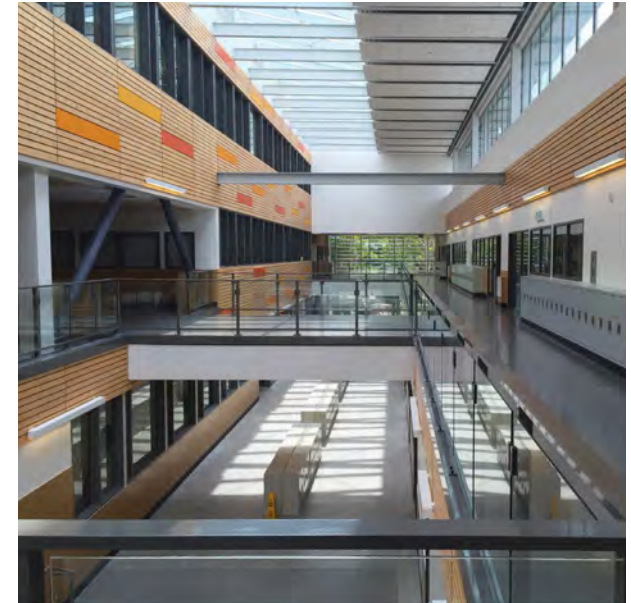
The Teck Acute Care Centre at the BC Children's and BC Women's Hospital campus was opened. Energy conservation measures included the use of various water-to-water and air-to-water waste heat recovery techniques, efficient interior and exterior lighting and controls, improved glazing and improved roof insulation. The measures are estimated to save about 2.0 GWh of electricity per year.

## ADVANCED EDUCATION FACILITIES

Multiple buildings at the University of Northern British Columbia Prince George campus—including a daycare, library, conference rooms, and the Sports Complex—were retrofitted with new LED lighting and controls resulting in estimated savings of more than 400,000 kWh per year.

## K-12 SCHOOL DISTRICTS

The Vancouver School District completed its Kitsilano Secondary School project through BC Hydro's Commercial New Construction program. Construction of the new school will result in estimated energy savings of more than 700,000 kWh per year. The facility implemented greater insulation in the roof, higher efficiency glazing, as well as more efficient lighting and mechanical systems.



Kitsilano Secondary School interior.



State of the art light controls.

# Building clean, renewable generation

BC Hydro is committed to investing in renewable and clean energy projects that involve upgrading of large hydroelectric dams and building new infrastructure. Aging infrastructure, a growing population, and a need for more capacity in our system as demand for electricity increases are the main drivers behind our investments. Our investments also recognize and take advantage of opportunities to improve reliability, address safety concerns and mitigate environmental effects.

We recently completed the Ruskin Dam and Powerhouse upgrade, and the John Hart Generating Station Replacement near Campbell River is scheduled for completion in 2018. These projects will result in improved seismic safety, environmental benefits and more efficient power generation. Projects undergoing planning and installation include the Cheakamus Generating Station project where the generators will be replaced and upgraded by 2020 to provide higher efficiency, reliability and additional capacity. The project will result in an increase of about 105 GWh per year more than current generation. BC Hydro is also upgrading and expanding transmission lines, substations and distribution capabilities to assure improved service and reliability from clean energy power sources.

The Site C Clean Energy Project is scheduled to be in service in 2024, and will provide clean, renewable and cost-effective energy for more than 100 years. The project will be the third dam and hydroelectric generating station on the Peace River and will optimize power generation within the watershed. The facility's six 183 MW generating units have a total capacity of 1,100 MW and will produce 5,100 GWh of electricity annually, which will power the equivalent of 450,000 B.C. homes.

The independent power sector is an important partner and supplier to B.C.'s clean energy mix. The sector provides power through more than 120 electricity purchase agreements across a wide range of projects such as hydro, biomass, wind and solar. Currently, independent power producers provide about 25% of B.C.'s electricity and will continue to help meet B.C.'s electricity needs.

In addition to project upgrades, we are also working on mitigating sources of greenhouse gas in our operating system. Sulphur hexafluoride ( $\text{SF}_6$ ) and carbon tetrafluoride ( $\text{CF}_4$ ) are potent greenhouse gases used as insulation in electrical equipment worldwide that unfortunately can be leaked to the atmosphere. In 2017, BC Hydro developed a new environmental standard to manage these gases. Over time, BC Hydro intends to minimize the introduction of new equipment using these gases by pursuing more environmentally friendly alternatives where viable. We have also developed and piloted a software application that will improve the tracking of gas canisters in the system to better ensure accurate reporting of possible gas releases. BC Hydro has a target to reduce  $\text{SF}_6$  and  $\text{CF}_4$  releases by 25% below 2015 levels by 2020.



Last of the Ruskin Dam Spillways placed into service.



Site C Clean Energy Project powerhouse rendering.

# Emissions and offset summary table

BC Hydro greenhouse gas emissions and offsets for 2017	
<b>Greenhouse gas emissions created in calendar year 2017</b>	
Total emissions (t CO <sub>2</sub> e)	31,099 t CO <sub>2</sub> e
Total offsets (t CO <sub>2</sub> e)	30,359 t CO <sub>2</sub> e
<b>Adjustments to greenhouse gas emissions reported in prior years</b>	
Total emissions (t CO <sub>2</sub> e)	+1 t CO <sub>2</sub> e
Total offsets (t CO <sub>2</sub> e)	+1 t CO <sub>2</sub> e
<b>Grand total offsets for the 2017 reporting year</b>	
Grand total offsets (t CO <sub>2</sub> e)	30,360 t CO <sub>2</sub> e

## 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 2017 calendar year, together with any adjustments reported for past calendar years. The Organization hereby agrees that, in exchange for the Ministry of Environment and Climate Change Strategy 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.

## Executive sign-off:

May 31, 2018



Chris O'Riley, President & COO



