

BC Hydro's Electrification Plan

A clean future powered by water

SEPTEMBER 2021

1. Message from BC Hydro's Chair and President & CEO

There is an important conversation happening around the globe about how we use energy, and the impact our choices have on climate change. And in B.C. we have an opportunity to do things differently by switching from fossil fuels to clean electricity.

B.C. is already a clean-energy powerhouse. Ninety-eight per cent of our electricity is generated from clean or renewable resources, making us western North America's leader in clean electricity generation. We have our hydroelectric resources, which are powered by water, to thank for this. It's this clean advantage that will help us power a greener economy in B.C. and ensure that we can help the Province of B.C. meet its ambitious greenhouse gas reduction targets.

The Province's CleanBC climate plan put B.C. on a path to reduce climate pollution, build a low-carbon economy, and make life more affordable. While almost all the electricity we produce is from clean or renewable resources, when it comes to the energy we consume in our homes and buildings, cars and industrial operations, nearly three-quarters of the energy used still comes from fossil fuels. The CleanBC Plan includes actions to increase the adoption of electric vehicles and switch from fossil fuels to electricity, but to help the Province meet its climate goals, we must increase our use of clean electricity even more. That's why we've developed an Electrification Plan.

Electrification refers to switching from fossil fuels like gasoline, diesel and natural gas to clean electricity. BC Hydro has been supporting electrification initiatives since 2016, but our Electrification Plan aims to increase awareness of existing programs and further address barriers to electrification with new programs. It offers customers the support, tools and incentives to choose clean electricity over the fossil fuels that are currently being used to power homes, businesses, industries and vehicles across the province.

The Electrification Plan will encourage and incentivize residents and business to switch from fossil fuels to clean electricity while encouraging economic development and is expected to result in an additional 3,100 gigawatt hours of load and greenhouse gas emission reductions of 930,000 tonnes per year by the end of fiscal 2026. This is the equivalent of taking about 200,000 cars off the road.

To get there, our \$260 million Electrification Plan focuses on attracting new customers and encouraging existing customers to make the switch from fossil fuels to clean electricity in three key areas: buildings, transportation and industry.

- **Buildings:** Residential and commercial buildings in B.C. represent almost 11 per cent of the province's total emissions —mostly due to heating. We're encouraging a shift towards renewable energy by introducing new heat pump rebates and working with different levels of government and standard-making bodies to increase energy efficiency standards and standards that advance electrification for builders and developers.
- **Transportation:** Cars, trucks and other transportation equipment account for about 40 per cent of B.C.'s greenhouse gas emissions. One way BC Hydro plans to encourage clean transportation is by expanding its fast charging network. BC Hydro's goal is to have 325 charging stations at 145 sites across the province by the end of 2025 as well as introducing new programs to support commercial fleets, including large trucks and buses, to switch from carbon-emitting gasoline and diesel to clean electricity.
- **Industry:** This sector also accounts for about 40 per cent of greenhouse gas emissions, from sources like compressors in the natural gas sector, diesel engines in mining and forestry, and process heat in the forest products industry. Much of this could be powered by clean electricity, and BC Hydro will provide incentives to businesses interested in making the switch. Our Electrification Plan also includes incentives to attract new clean industry to B.C., including hydrogen production, carbon capture, synthetic fuel production and data centres.

BC Hydro's Electrification Plan includes about \$190 million for new incentives, energy studies and other programs to encourage customers to make the switch. This includes incentives of \$60 million for industry, \$30 million for transportation and \$26 million for homes and buildings, including \$13 million in "top-up" offers for residential heat pumps (up to \$3,000 per household) and new incentives for low-income and commercial customers.

Finally, BC Hydro plans to spend about \$50 million to attract new customers that are looking to power their businesses with clean electricity. This includes new clean tech and hydrogen production facilities. And, we will work hard to make connecting to our system easier and more efficient for all of our customers.

We have an important opportunity to help British Columbians make the shift to a cleaner future. But it means changing how we heat our homes and businesses, fuel transportation and power industry. In addition to reducing greenhouse gas emissions, our Electrification Plan offers the added benefit of helping us keep our rates affordable. By selling more electricity, rates will be lower than they would have otherwise been. Overall, electrification will help us ensure our province's future will be cleaner, brighter and full of electricity.



Doug Allen
Chair of the Board, BC Hydro



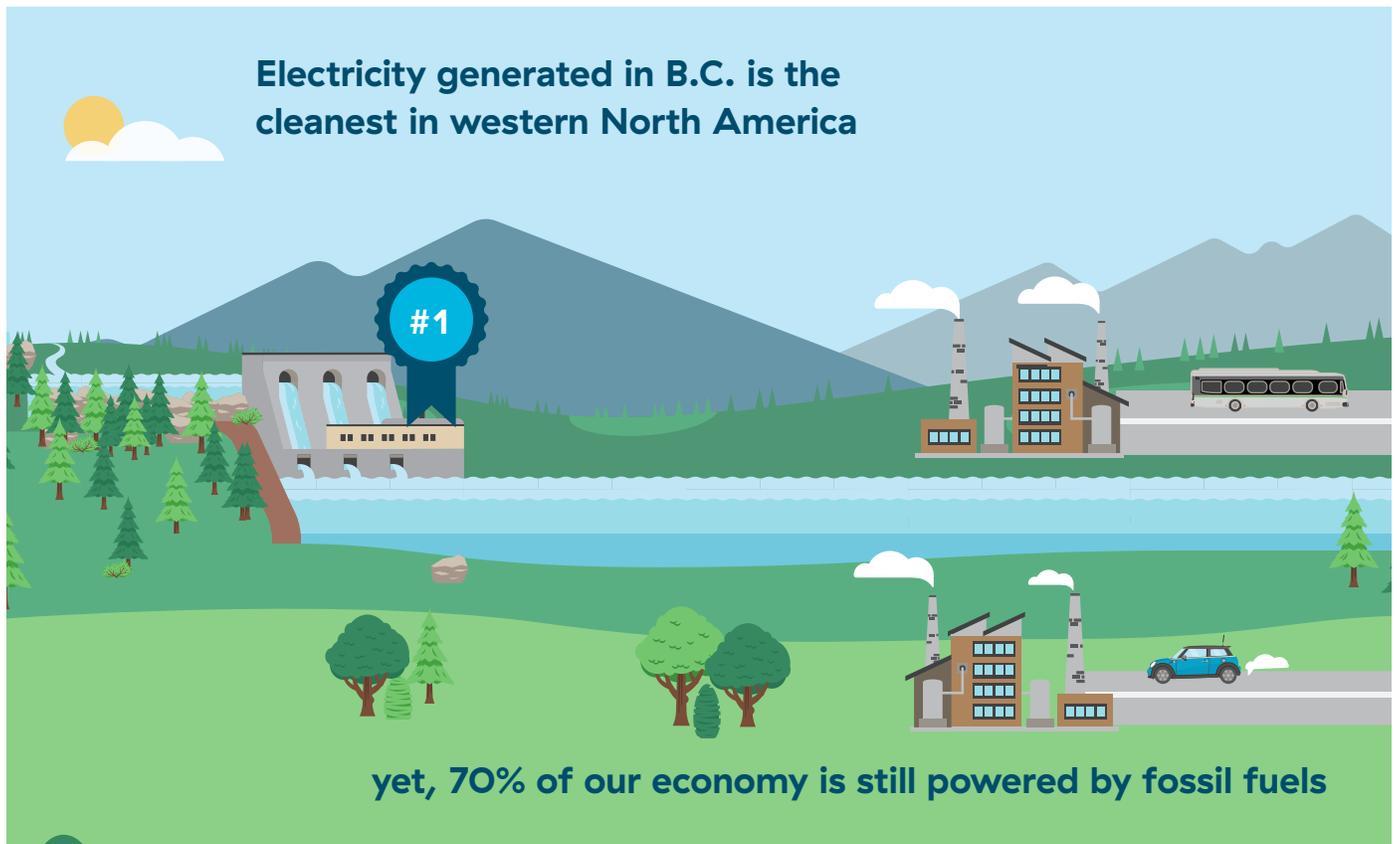
Chris O'Riley
President and CEO, BC Hydro

2. Climate change, a growing concern

From mountain ranges to rainforests, British Columbia is one of the most beautiful and environmentally diverse places on earth. However, climate change—caused by an increase in global greenhouse gases from human activity—is threatening our way of life by causing increasingly extreme weather including storms, drought and heat waves, and causing rising sea levels, melting glaciers and warming oceans. All of this is impacting us—from the communities we live in to the animals and plants that make our province so unique.

Greenhouse gas emissions per person in B.C. have been steadily increasing since 2015.¹ As a result of global emissions, the average temperature in all regions of B.C. has risen by 1.2° Celsius.² Energy use is a key driver of the increase in greenhouse gas emissions. The largest emitting sectors in B.C. are transportation at 37 per cent of emissions, oil and gas production at 22 per cent, and heavy industries (including smelting, cement, and chemicals) at 14 per cent.³

Using clean electricity in place of fossil fuels provides us with an opportunity and a solution to lessen our impact on climate change. Here in British Columbia, we are in a unique and advantageous position given the abundance of clean electricity available. About 98 per cent of the power BC Hydro generates already comes from clean or renewable resources, mostly from our hydroelectric resources that are powered by water. Yet, despite having access to the cleanest electricity, nearly 70 per cent of the energy used by British Columbians is provided by fossil fuels.



To meet the Province’s ambitious climate change goals, we need to use more clean electricity instead of fossil fuels to power our economy and lives. This report will explain how BC Hydro’s Electrification Plan will support the Province’s CleanBC goals, reduce emissions and drive economic development while keeping rates low for customers.

¹ <https://www.env.gov.bc.ca/soe/indicators/sustainability/ghg-emissions.html>

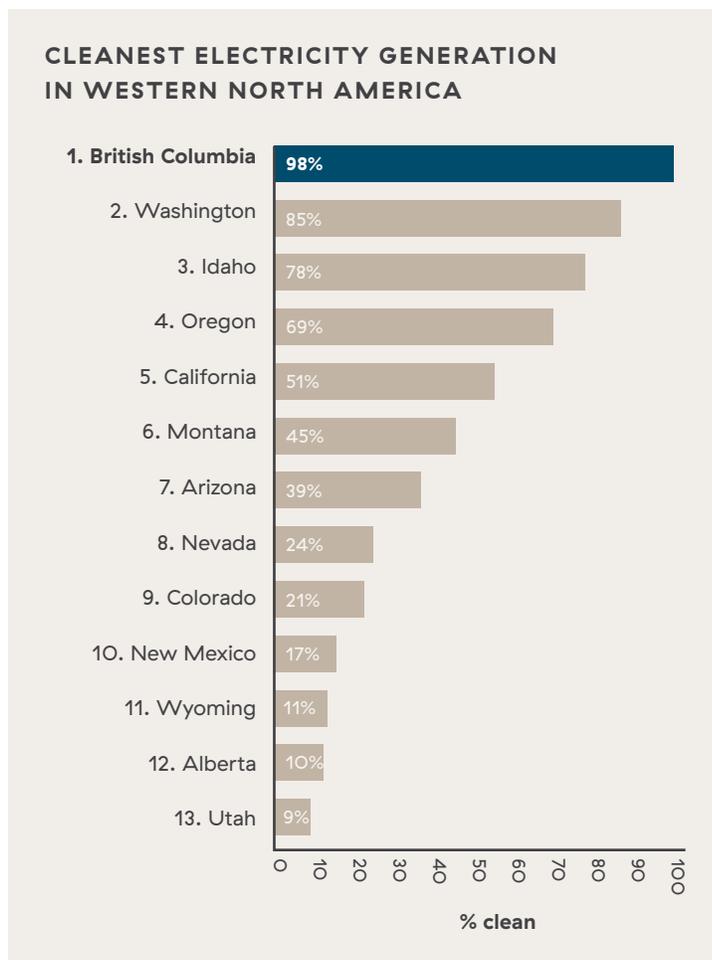
² A regional climate service centre at the University of Victoria that provides practical information on the physical impacts of climate variability and change in the Pacific and Yukon Region of Canada. <https://pacificclimate.org>

³ Canada Energy Regulator

3. Powered by water —BC Hydro’s clean advantage

To meet B.C.’s climate change targets, our future needs to be built on clean electricity. In B.C., we have a unique advantage when it comes to creating clean power—water. BC Hydro serves more than two million customers and is responsible for most of the power generated in B.C. While British Columbia is already experiencing the serious impacts of climate change, it is in a good position compared to many other places in western North America when it comes to making progress toward a low carbon future, mostly because of abundant natural resources such as water. BC Hydro relies on hydroelectricity—the power of moving or falling water—to produce electrical energy to power B.C., and this energy is both clean and abundant.

With 98 per cent of our power being generated from clean or renewable resources, B.C.’s power generation is the cleanest in western North America. When looking at how other regions compare we have a significant lead, with our neighbours in Washington State ranking second at 85 per cent clean and Idaho in third at 78 per cent clean. However, the lowest ranking jurisdictions are nine and 10 per cent respectively.



B.C. is also one of the cleanest jurisdictions in Canada, falling just one percentage point behind the leaders Quebec and Manitoba.⁵

Opportunities for electrification are possible because of BC Hydro’s abundant supply of clean electricity. We are currently in a surplus position and expect to have more power than we need until about 2029. As a result, there is an opportunity to take advantage of this surplus by encouraging new electricity sales, which will help reduce greenhouse gas emissions and keep rates low. BC Hydro is also preparing for its customers to use more electricity by making system upgrades to ensure its easy and efficient for customers to connect.

4. Our future is electric

Mitigating the effects of climate change means getting as close to zero carbon emissions as possible. However, to get where we need to go, we need to make a big shift. The Province’s CleanBC Plan provides a roadmap to get us to this more sustainable future. It was developed as a pathway to achieve the climate targets of reducing greenhouse gas emissions by 40 per cent by the year 2030, based on 2007 levels. The plan aims to transform the buildings British Columbians work and live in, how they get around, and how to power the economy using cleaner energy.

By 2030, the Province’s CleanBC Plan aims to reduce fossil fuel use for transportation by 20 per cent, and to heat 60 per cent of homes and 40 per cent of commercial buildings with clean electricity. Other goals of the plan include having 30 per cent of car sales and trucks be zero-emission vehicles by 2030 rising to 100 per cent by 2040. There is also a goal to reduce industrial emissions by 2.5 megatonnes per year.

⁴ Data sources:
 • EIA-923 via the **Electricity Data Browser**
 • Statistics Canada Tables 25-10-0015-01 and 25-10-0028-01.
 • BC Hydro

⁵ Statistics Canada

One of the keys to achieving these goals is electrification. Electrification is the process of replacing technologies that are powered by fossil fuels like gasoline, diesel and natural gas with alternatives that use electricity. And British Columbia is the ideal place to do this because of our clean electricity advantage.

There are many opportunities to replace fossil fuels with electricity. For instance, electric vehicles can reduce the use of gasoline and diesel in heavy and light-duty vehicles. Heat pumps can replace natural gas heating in buildings and homes. It also means using more electricity in the industrial sector. For example, electricity can be used to power compressors in the oil and natural gas industry, to run equipment in place of diesel in the mining industry or provide process heating in pulp and paper and other industries.

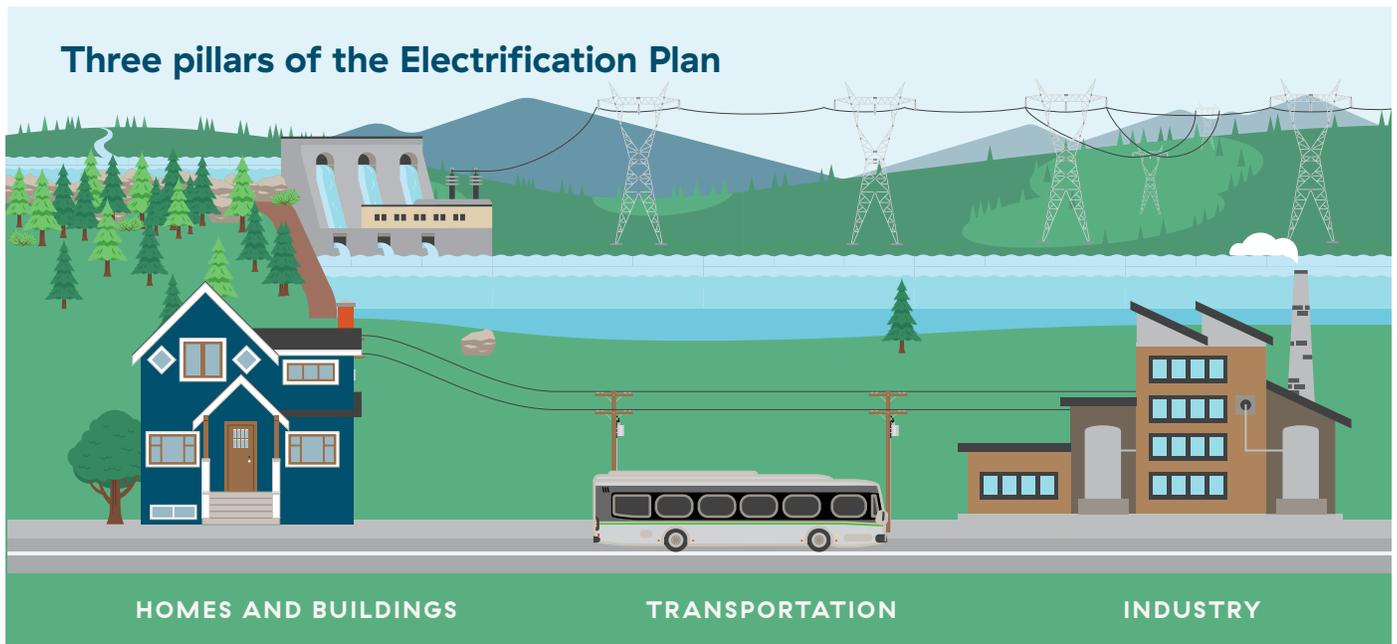
BC Hydro has a long history of conservation, dating back to the creation of our Power Smart program in 1989. Over the past decade, annual savings from BC Hydro’s demand-side management activities are about 5,400 gigawatt hours per year—the equivalent of powering approximately 540,000 homes per year. However, it’s time to evolve. While we need to continue to encourage conservation and the smart use of electricity, we also need to encourage our customers to use more clean electricity to replace aspects of their lives that have been traditionally powered by fossil fuels.

This is where our Electrification Plan comes in. The plan supports CleanBC by laying the foundation for how BC Hydro’s abundant supply of clean, renewable hydroelectricity can be used to power three key sectors—buildings, transportation and industry. As more and more daily activities like driving, heating homes, and producing industrial goods switch from fossil fuels to clean electricity, carbon emissions will be reduced, making the province less polluting.



The CleanBC strategy aims to increase our use of cleaner energy, especially renewable hydroelectricity, in our lives and in key sectors of our economy—shifting away from our reliance on fossil fuels for transportation, industry, and housing. For example, cleaner transportation will be encouraged by bringing down the cost of clean vehicles with incentives so that more British Columbians can make the switch to an electric vehicle.

In the built environment, every building will be made more efficient by improving the BC Building Code and increasing efficiency standards—until every new building is “net-zero energy ready” by the year 2032. Incentives to make heat pumps more affordable and homes more energy-efficient will also be an important step. On the industry side, cutting air pollution through industrial electrification is the key component—this will be achieved in part by providing access to clean electricity for large operations with new transmission lines and interconnectivity to existing lines.



5. Our Electrification Plan

While our Electrification Plan includes new programs and incentives, BC Hydro has been promoting electrification since 2016. We have:

- Implemented the Province’s CleanBC incentive programs for low carbon electrification in residential and commercial buildings.
- Installed public fast charging stations with government funding, implemented the Province’s CleanBC incentive program for electric vehicle chargers at residential buildings and workplaces and provided support to BC Hydro customers on fleet electrification.
- Implemented an incentive program for industrial electrification, introduced CleanBC Industrial Electrification Rates and taken action to attract new, clean industrial load.
- Introduced the CleanBC Facilities Electrification Fund for customers with greenhouse gas reduction projects to help reduce the cost to connect to our clean electricity grid.
- Improved the interconnection process for large customers and constructed new transmission lines in the Peace Region to serve new customers.

However, this is only a start. With a global focus on climate change and the electrification of more devices, homes, businesses, vehicles and industries, BC Hydro is committed to helping customers—both current and future—make the switch to clean electricity that is powered by water. We will advance our Electrification Plan by offering customers incentives, tools and business-to-business support to help them choose clean electricity over fossil fuels to run their homes and businesses. We will help industries shift their operations to high efficiency, clean electricity and we will bring new clean tech industries to B.C. that are looking for clean power to run their businesses.

Over the next five years, BC Hydro plans to invest over \$260 million to advance electrification in B.C. by focussing on three key segments—buildings, transportation and industry. The funding includes more than \$190 million to promote fuel switching in the built environment, transportation and industrial sectors and more than \$50 million to attract new load from customers who have flexibility in which jurisdictions they operate.

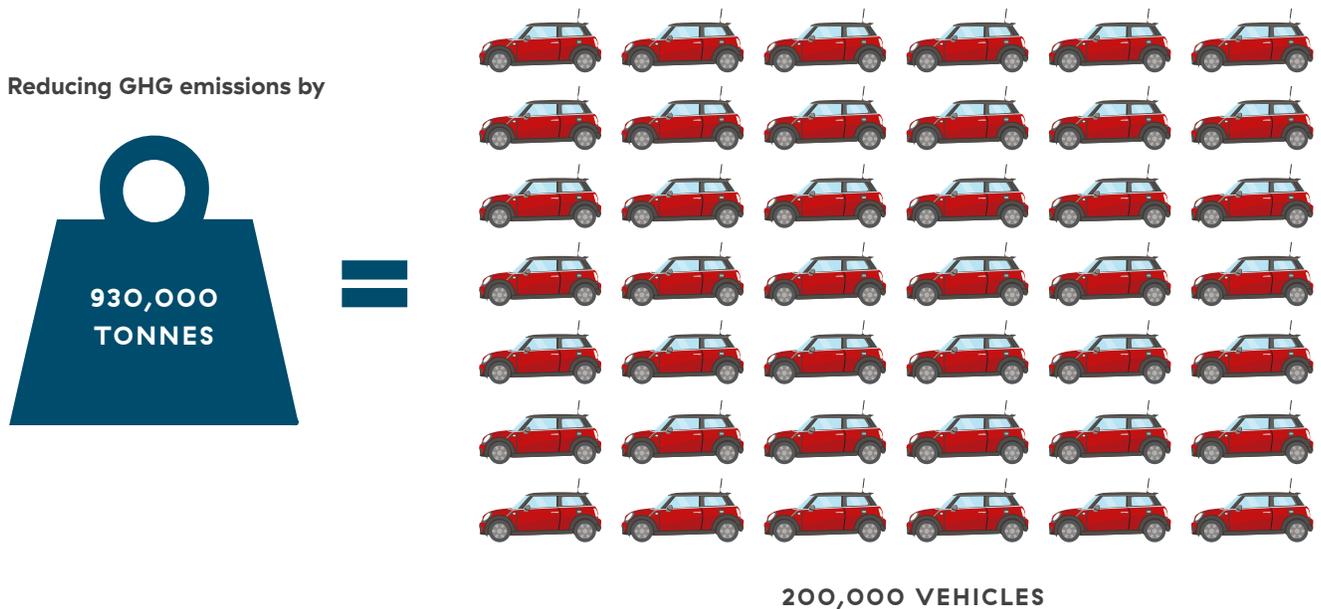
Opportunities to electrify

HOMES AND BUILDINGS	<ul style="list-style-type: none">○ Space heating○ Water heating
TRANSPORTATION	<ul style="list-style-type: none">○ Road: personal vehicles, fleet vehicles, transit○ Non-road: marine, port operations, airports, rail○ Mobile diesel: power tie-ins to replace mobile generators
INDUSTRY	<ul style="list-style-type: none">○ Industrial process: mining operations, forest products○ Natural gas production & pipelines○ Clean technology and innovation (data centres, hydrogen production, and carbon capture sequestration)

To help encourage British Columbians and businesses make the switch, the plan includes more than \$190 million to promote electrification, \$140 million of which will fund programs, incentives, studies and energy management initiatives including:

- Up to \$13 million in “top-up” offers for residential heat pumps (up to \$3,000 per household).
- Up to \$8 million in support for low income customers.
- Over \$5 million in incentives and other support for commercial building retrofits and electrification of new buildings.
- Up to \$30 million in incentives for the electrification of transportation (busses, ferries and fleets).
- Over \$60 million in incentives for industrial fuel switching.
- \$19 million for energy studies.
- \$50 million in incentives and programs to attract new energy-intensive industry to B.C. including \$20 million to support the production of hydrogen.
- The remainder of the funding will be used to mobilize the resources necessary to educate the public and deliver the plan.

And, through our plan, we’ve set ambitious targets for ourselves. Our goals include encouraging and incentivizing residents and businesses to switch from fossil fuels to clean electricity—adding 3,100 gigawatt hours of load and reducing greenhouse gas emissions by 930,000 tonnes per year by the end of fiscal 2026.



Achieving these targets is also an important way for us to continue to keep our rates affordable. By selling more electricity, rates will be 1.6 per cent lower than what they would have otherwise been over the next five years. Attracting new business will also support growing our green economy in B.C, and help the Province meet its economic development goals.

The Electrification Plan will help keep rates lower than they would have otherwise been. In fact, by 2026 rates are expected to be 1.6 per cent lower as a result.

Because BC Hydro currently has a surplus of power—and is expected to for many years to come, encouraging customers to make the switch or attracting new business helps to keep rates low. There are currently over 4,800 megawatts of new potential projects and fuel switching opportunities at various stages of development.

6. Reconsidering how we power our homes and businesses

Most buildings still run on multiple fuels. While electricity is used to power the lights, appliances and electronics, it's not used for everything inside our homes and the places we work. In fact, electricity is only used to heat about 40 per cent of homes and 50 per cent of buildings, as most rely on fossil fuels like natural gas. And, many still consume fossil fuels to heat their water as well.

Space and water (e.g. hot water tanks) heating represents the majority of a home or building's total energy consumption. That is the major reason why they represent 11 per cent of B.C.'s greenhouse gas emissions—or about 6.9 million tonnes. Our goal with building electrification is to help our customers move away from homes and buildings heated by fossil fuels to those that are powered by clean electricity.

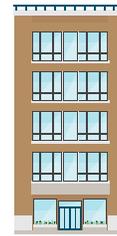
Our homes and businesses are currently powered by

HOMES



- 41%** heated by electricity
- 54%** heated by fossil fuels
- 33%** of water heated by electricity
- 42%** of water heated by fossil fuels

BUSINESSES



- 49%** heated by electricity
- 38%** heated by fossil fuels
- 48%** of water heated by electricity
- 30%** of water heated by fossil fuels

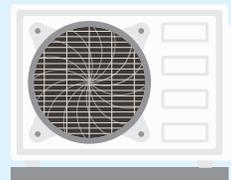
Building the future—homes

Advancing electrification in residential homes will require a significant shift in how space and water are heated. This would mean B.C. homes converting from natural gas to electricity by largely utilizing air source heat pumps. However, barriers still exist that are preventing British Columbians from widely adopting heat pump technology, including affordability, awareness and accessibility.

When it comes to affordability, the upfront costs of switching heating systems can be a barrier. There is also a lack of understanding when it comes to heat pumps, as many are not aware of their environmental and home comfort benefits. Finally, accessibility can be a challenge. The choice of suitable product types can be limited and the market is natural gas furnace dominant. Furnace installers are more likely to promote the simpler retrofit of “like for like” replacing an existing natural gas furnace with a new one than encourage a shift to heat pump technologies.

These barriers could be why only 10 per cent of B.C. households were using heat pumps as their primary or secondary heating source in 2019.⁶ However, heat pumps are expected to play an important role in electrification. Unlike furnaces and boilers that burn fuel to produce heat, heat pumps use electricity to send heat where it's needed or to remove it, much like a refrigerator.

Heat pumps are much more efficient than the natural gas equipment they replace. They are up to 300 per cent more energy efficient. Plus, they offer the 2-in-1 benefit of heating and air conditioning.



HEAT PUMP BENEFITS

- Increased efficiency
- 2 for 1 heating and cooling
- Long-lasting

⁶ Source: <https://news.gov.bc.ca/releases/2020EMLI0068-002140>

BC Hydro will combat these barriers and encourage electrification by working in partnership with manufactures, distributors and contractors to increase the accessibility of heat pumps. Current programs already in place to support the transition are the CleanBC Better Homes program, which includes customer rebates for electric space and water heating with heat pumps, energy coaching and home energy advisor support and evaluations. BC Hydro will also offer further rebates for residential customers by combining CleanBC funding from the Province with new BC Hydro funding to offer increased incentives for implementation of fuel switching measures in retrofit and new construction.

Through existing incentives and the new “top-up incentive” that’s part of the Electrification Plan, customers can save more on the purchase and installation of a heat pump if they are switching from natural gas. The top up amount will be up to \$3,000 per household. When combined with the provincial CleanBC rebate and the federal and potential local government rebates, customers could receive up to \$11,000 in rebates in total.

Help for low income customers

There is an important segment within the built environment—low-income housing—that BC Hydro will look to provide further support for electrification. Customer affordability activities have been a focus of BC Hydro’s conservation efforts with both our Low-Income program and the Social Housing Retrofit Support Program. We have included funding in our Electrification Plan to support this sector; however, the specific programs have not yet been designed. We will work collaboratively with BC Housing and other organizations within the sector to determine how best to support low carbon electrification in the context of existing and new government funded programs.

Building the future—commercial buildings

Within commercial and institutional buildings in B.C., approximately 40 per cent of space heat and about 30 per cent of hot water is fueled by natural gas. From a technological standpoint, there are many options available for the electrification of buildings, including electric heat pumps and electric hot water heaters. However, from an economic standpoint it can be difficult for some to make the switch. That’s why BC Hydro, in partnership with various levels of government, is leading the way with funding for emissions reductions and fuel switching programs for businesses and other operators of commercial buildings.

Making it easier for businesses to switch from fossil fuels to electricity is fundamental to our Electrification Plan. The CleanBC Better Buildings program for commercial customers includes financial incentives for electrification measures, energy study funding, energy coaching and other resources for both commercial renovations and new construction designed to work with the CleanBC funding.

To support electrification in the commercial building sector, BC Hydro will provide customer incentives for fuel switching measures in retrofit and new construction, as well as expand BC Hydro’s Energy Manager program. The Energy Manager program provides funding support to large commercial customers to hire an Energy Manager for their organization. An Energy Manager is a dedicated resource who helps identify and implement energy and greenhouse gas emissions savings solutions within the customer’s operations and incorporates an integrated culture of energy management into their business. BC Hydro will also work to support local government efforts on policies and initiatives that drive electrification in commercial buildings.

Highlights

What we're proposing: Move away from homes and buildings powered by fossil fuels, particularly natural gas, and move to those that are powered by clean electricity.

How we will get there:

- Build understanding and raise awareness of heat pump technologies
- Make heat pumps more affordable through new “top-up” rebates
- Support existing CleanBC programs like Better Homes and Better Buildings programs
- Support low-income housing sector
- Expand Energy Manager program for commercial customers
- Increase study funding and implementation funding for commercial customers
- New BC Hydro activities that complement government efforts to support changes to policies, codes and standards

TOTAL VALUE OF NEW INCENTIVES: \$26 MILLION

- Up to \$13 million in “top-up” offers for residential heat pumps up to \$3,000 per household.
- Up to \$8 million in support for low income customers.
- Over \$5 million in incentives and other support for commercial building retrofits and electrification of new buildings.

LOAD GROWTH: 200 GIGAWATT HOURS

Greenhouse gas reduction target: 200,000 tonnes in the next five years—the equivalent of nearly 25,000 homes.

7. Driving a change in transportation

Transportation is one of the biggest contributors to pollution in B.C. It totals about 40 per cent of provincial greenhouse gas emissions. Currently, most light-duty passenger vehicles such as cars and SUVs in B.C. run on gasoline, while most heavy-duty vehicles such as large trucks and buses run on diesel. In order to significantly reduce emissions, fuel switching from carbon-emitting gasoline and diesel to clean electricity is essential. Government has set ambitious targets through the Zero-Emission Vehicles Act that requires that 10 per cent of new cars and trucks sold in B.C. will be clean by 2025, 30 per cent by 2030, 100 per cent by 2040. There are currently over 50,000 light duty electric vehicles on the road in B.C. (as of end 2020), and that is expected to rise to about 635,000 by 2030.

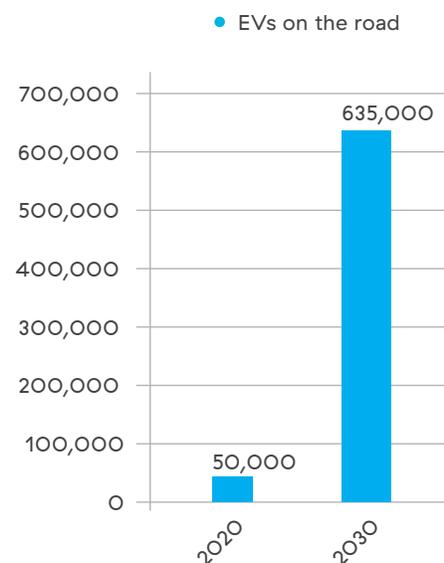


Table 1: Increase of EVs on the road over a decade.

For British Columbians, the economics of electric vehicles are generally positive over the life of the vehicle. While the purchase cost may be higher (although this continues to narrow), there are government grants to offset this. In addition, electric vehicle drivers save about 80 per cent in fuel costs and about \$100 a month in maintenance costs. As a result, the typical total ownership savings over the lifetime of an electric vehicle ranges from about \$6,000 to \$10,000.⁷

BC Hydro's Electrification Plan is further supporting vehicle fuel switching by encouraging adoption of electric vehicles and expanding transportation electrification including medium and heavy-duty on-and-off-road electric vehicles including trucks, buses, forklifts, mining conveyance, commercial fleets as well as ferries and other marine equipment. If all goes according to plan, BC Hydro will reduce or avoid 90,000 tonnes of incremental greenhouse gas emissions from the transportation sector by 2026.

When it comes to light-duty electric vehicles, there has already been significant growth: B.C. saw the highest number of light-duty new car sales for electric vehicles in all of North America last year at almost 10 per cent. This is in part due to federal and provincial support for electrification through CleanBC such as funding vehicle purchase rebates and charging infrastructure.

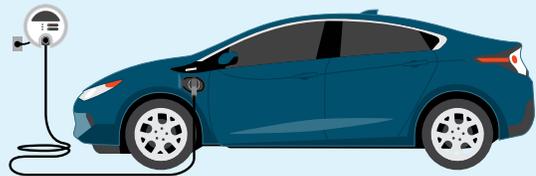
In fact, a recent BC Hydro report shows evidence that 2021 is going to be another record year for electric vehicle adoption. About two-thirds of British Columbians indicate that they are considering purchasing an electric vehicle within the next several years—and the majority of those are hoping to secure an electric vehicle within the next year or two, which could drive demand up significantly.⁸

BC Hydro has encouraged adoption of electric vehicles through installing and expanding public charging infrastructure and offering home charger rebates, while raising public awareness for the benefits of passenger electric vehicles. For example, since 2013, BC Hydro has deployed 98 fast chargers at 72 sites across the province in collaboration with government, and it is currently implementing charging pilots to evaluate how electric vehicle charging can enable grid management and support future electric vehicle time of use rates. It has also provided rebates in partnership with various levels of government towards the purchase and installation of at-home charging equipment.

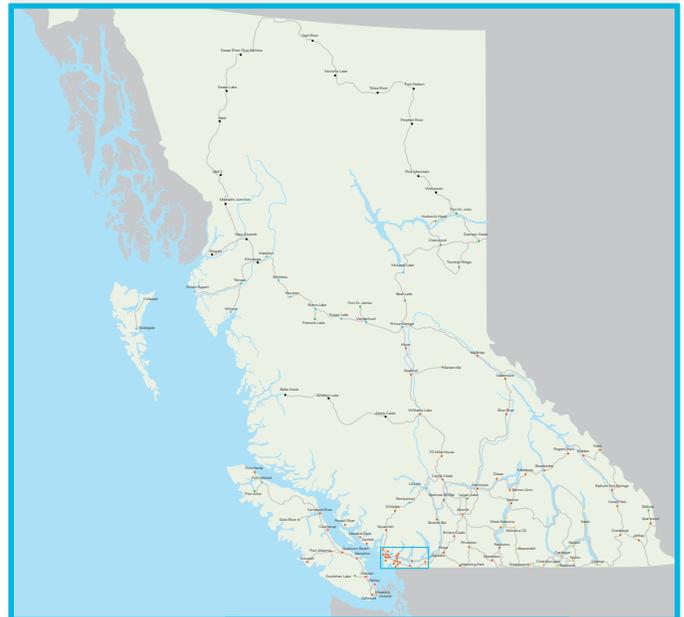
The next step in BC Hydro's Electrification Plan for passenger electric vehicles is to expand public charging infrastructure even further. Over the next five years, BC Hydro is set to expand its fast charging network to 325 charging stations and will twin all single charging stations. Twinning stations at 145 sites provides a higher level of reliability and reduces congestion at charging sites. It will also densify public charging in urban areas as a substitution for home charging.

EV BENEFITS

- Reduce emissions
- Save 80% in fuel costs
- Save about \$100 in maintenance costs per month



BY 2026, BC HYDRO WILL HAVE 325 FAST CHARGING STATIONS ACROSS THE PROVINCE.



⁷ Consumer reports

⁸ Online survey conducted by Majid Khoury of 800 British Columbians from May 17–19, 2021. Margin of error is +/- 3.5%, 19 times out of 20.

While B.C. is leading North America in passenger electric vehicles sales, electrifying medium and heavy-duty vehicles such as buses, ferries and commercial fleets is an important next step in meeting government's climate targets and reducing carbon emissions. There are more than 225,000 fleet vehicles across B.C., of which 1,350 are electric, and the number of medium and heavy-duty vehicle models is expected to increase significantly in the B.C. market from 2022. Market forecasts for medium and heavy-duty electric vehicles show new models becoming available in the next two to three years, with models like the Ford E-Transit delivery van and electric F150 pickup truck planned for 2022, and Daimler class 6 and 8 electric trucks starting production in 2022.

This year, the BC Utilities Commission approved two optional fleet electrification rates intended to address the barriers of high initial electricity costs for new fleets. These rates will encourage the use of clean electricity to fuel heavy-duty fleet vehicles that may otherwise be fueled by diesel or other greenhouse gas intensive fuels. And, not only are there huge environmental benefits to fuel switching for fleet vehicles, there are financial ones too. For example, the monthly cost to fuel a diesel bus is around \$14,000, compared to around \$4,000 to power an electric bus.

BC Hydro's Electrification Plan for the transportation sector will further promote fleet fuel switching by introducing a new medium and heavy-duty commercial on-road fleet program that offers fleet electrification advisory services, infrastructure assessment funding, project pilot and infrastructure funding. BC Hydro will also offer continued support of medium and heavy duty off-road large custom applications for transportation electrification including installing permanent power tie-ins in certain municipality hot spots to eliminate the use of mobile diesel generators.

On the public transit front, BC Hydro has collaborated with large customers on the development of electrification roadmaps which will set the stage for future electrification projects. We continue to work with TransLink and BC Transit on the deployment of a battery bus pilot, and to date 15 school districts have deployed electric school buses with the support of BC Hydro, and we are also working with BC Ferries to electrify some of their vessels.

Highlights

What we're proposing: CleanBC programs will be augmented by new and expanded action from BC Hydro to address the key barriers to EV adoption, including affordability, accessibility and availability, and awareness.

How we will get there:

- Raise public awareness about the benefits of driving an EV in B.C., including lower fuel and maintenance costs and significantly reduced greenhouse gas emissions.
- Expand BC Hydro's fast charging network to 325 stations at 145 sites by 2025.
- Support existing CleanBC programs like Go Electric program.
- Support commercial fleet and mobile diesel electrification by providing advisory services and funding for vehicles and infrastructure assessments, pilot projects and charging infrastructure.
- Study funding and project incentives for mid and heavy-duty fleets.

TOTAL VALUE OF NEW INCENTIVES: \$30 MILLION

- Up to \$30 million in incentives for the electrification of transportation (busses, ferries and fleets).

LOAD GROWTH: 100 GIGAWATT HOURS

Greenhouse gas reduction target: 90,000 tonnes in the next five years—the equivalent of 364 million kilometres driven in passenger vehicle.

8. Industrial strength electricity

B.C.'s industrial sector is comprised of over 47,000 customer sites, ranging from large mining operations to sawmills. However, the same industries that play such an important role in our economy also account for 40 per cent of B.C. greenhouse gas emissions mostly due to compressors in the natural gas sector, diesel engines in mining and forestry, and process heat in the forest products industry. With such high greenhouse gas emissions, industry represents the largest electrification opportunity.

More of the energy used to power industry could be supplied by electricity—both by switching from diesel and natural gas to electricity at existing facilities and by choosing to use electricity in new facilities instead of fossil fuels. Sectors with significant opportunity in industrial fuel switching programs include natural gas production and pipelines, liquified natural gas (LNG) production, mining, forest products, and pulp and paper. Large district energy projects are also included in the target market for this program.

Natural gas production is one of the largest and most rapidly growing contributors to provincial greenhouse gas emissions, accounting for 9.3 million tonnes of greenhouse gases or 12 per cent of total provincial emissions in 2018, the year of the most recent inventory report. New LNG facilities could add significantly to provincial emissions. Gas and LNG production is energy-intensive, with significant compression requirements at gas processing plants, for pipelines, and for liquefaction. Gas processing facilities in most parts of North America typically use gas driven compressors, with fuel drawn from the gas already available on-site. Supplying these plants with electricity would allow them to use electric drive compressors rather than gas. There are several existing (brownfield) gas plants that are grid-ready, in that they use electric compressors supplied by on-site generation and only require a connection to the grid to be electrified, but there is also potential to supply those not currently grid-ready as well as new greenfield projects with electricity. The power requirements of upstream natural gas and LNG projects are very large relative to most other industrial fuel-switching opportunities. Gas processing facilities typically require 15 to 50 megawatts. E-drive LNG facilities can require well in excess of 100 megawatts.

Recognizing that the cost of electrification can be a barrier to choosing clean electricity, both the provincial government and BC Hydro already offer a variety of capital incentives to encourage electrification and support fuel switching projects. The CleanBC Program for Industry directs a portion of the carbon taxes paid by industry into two CleanBC initiatives that work together to support cleaner industry, reduce emissions and increase technological innovation. The Province also offers carbon offsets and royalty deductions for greenhouse gas emissions reduction projects.

BC Hydro offers both rates and capital incentives to encourage electrification among industrial customers. The CleanBC Industrial Electrification Rates—Fuel Switching, introduced earlier this year, offers a discount to our standard transmission-service rate for a period of seven years. The rate is designed to encourage existing and new industrial customers to electrify their operations by connecting into BC Hydro's grid instead of relying on fossil fuels. On the capital side, the CleanBC Facilities Electrification Fund helps reduce the cost to connect to our clean electricity grid. Customers with greenhouse gas reduction projects can receive up to 50 per cent of their interconnection cost to a maximum of \$15 million.

Through its Electrification Plan, BC Hydro will support further electrification of the industrial sector. The Strategic Energy Management Industrial Energy Manager offer provides funding to industrial customers to embed strategic energy management practices into their organizations. BC Hydro will provide funding for an Industrial Energy Manager who will receive specialized training and knowledge on developing and implementing a Strategic Energy Management plan. The initiative includes energy assessments to assist customers to gain energy insights, build executive support for energy efficiency and define the energy opportunity and value proposition for their company.

Electrification in the industrial sector also includes attracting new clean industry to B.C., including hydrogen production, carbon capture, synthetic fuel production and data centres. Unlike historical industrial development in B.C.—based on natural resource development, many of these new industries could locate in many jurisdictions. Globally, companies are seeking to improve their environmental, social and governance profile and respond to customers that are increasingly demanding green products. With its strong climate policies and programs, technical expertise and clean hydroelectricity, B.C. is well-positioned to attract new energy intensive companies that are focused on their environmental position.

To attract new load, BC Hydro will target new transmission and distribution customers from data centres and clean technology to green hydrogen. Key program components include business-to-business marketing and promotional activities, opportunity assessments/pre-screening, studies and incentives. BC Hydro will also work with underutilized brownfield site owners (previously developed land that is not currently in use) looking to lease or sell facilities to new customers and look to direct new customers to locations where BC Hydro has regional capacity to serve new customers without significant new infrastructure.

Highlights

What we're proposing: BC Hydro will continue and expand on existing industrial programs that support fuel switching as well as attract new customers from other Canadian and international businesses who are interested in using clean electricity.

How we will get there:

- Provide incentives to fuel switch or attract new customers to B.C.
- Promote industrial electrification by funding assessments, studies, electrification road maps, research and pilots.
- Provides funding to support industrial customers to hire an energy manager.
- Attract new customers by targeting new transmission and distribution customers from data centres and clean technology to green hydrogen.
- Targeting underutilized brownfield site owners looking to lease/sell facilities to new customers and areas where BC Hydro can easily connect a new customer with minimal new infrastructure.
- Improvements to our interconnections process.
- Ensuring adequate resources to support connecting customers in the timelines required.

TOTAL VALUE OF NEW PROGRAM INCENTIVES: \$105 MILLION

- Over \$60 million in incentives for industrial fuel switching.
- Up to \$25 million in incentives and study funding for new customers.
- Up to \$20 million in incentives and study funding to support the production of hydrogen.

LOAD GROWTH: 2,200 GIGAWATT HOURS

Greenhouse gas reduction target: 630,000 in the next five years—the equivalent of avoiding consuming 269 million litres of gasoline.

9. The future: cleaner, greener and powered by water

Tackling climate change is complicated. However, avoiding climate change means looking to get our carbon emissions as close to zero as we can. And one of the best ways we can reduce our greenhouse gas emissions in B.C. is by replacing technology that uses fossil fuels with those that use the clean electricity BC Hydro generates primarily with water.

By attracting new customers, we can also encourage economic development, which will help to keep our rates low. We can grow our green economy with the help of all British Columbians, and we are here to help make greener energy choices easier. From driving electric vehicles to living in electrically heated homes, as we power through the electrification process, we will be offering incentives and drivers for growth that will ensure a cleaner, brighter future powered by our most precious resource—water.