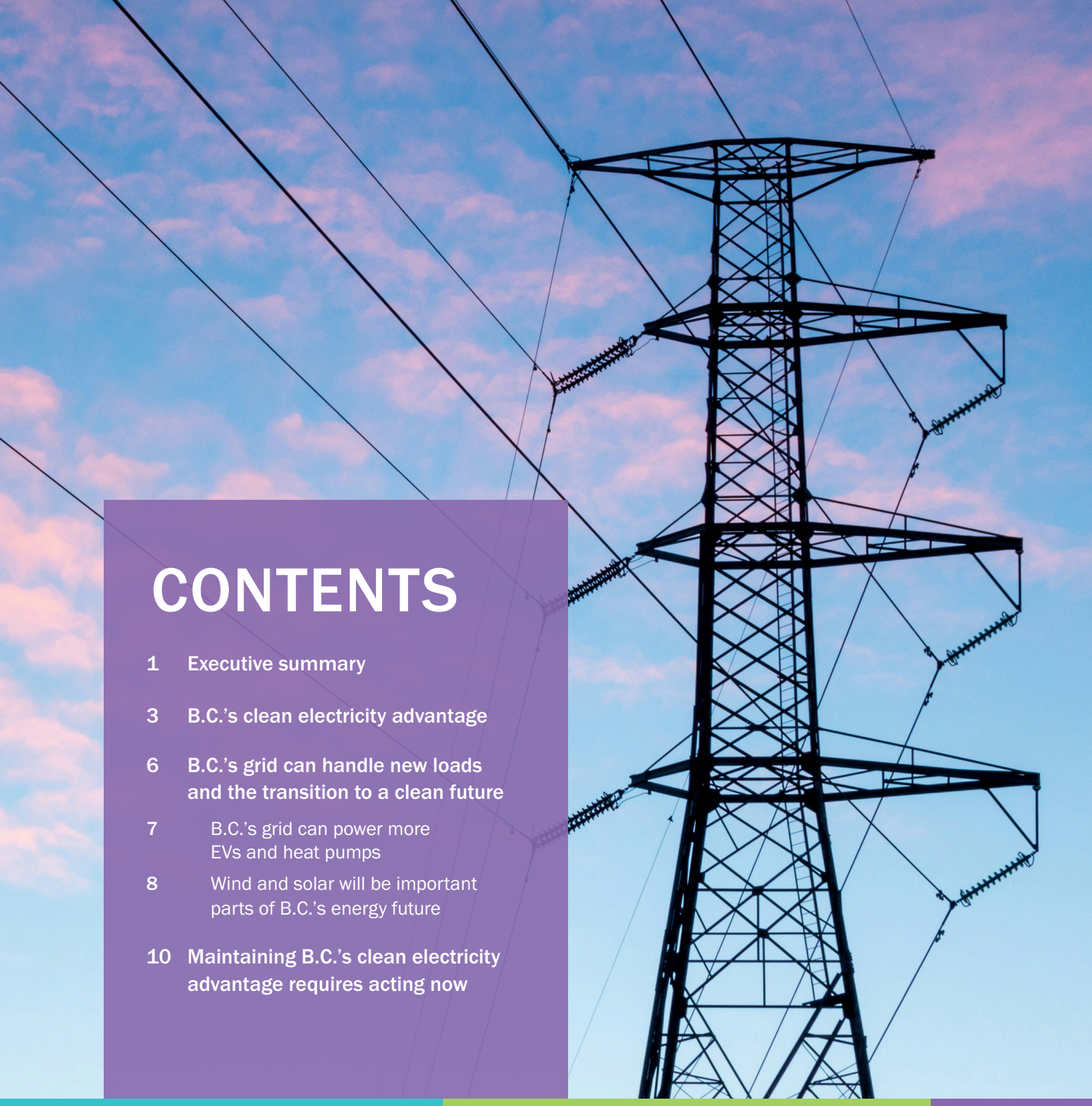
Reality Check

B.C. is ready for an electrified 2030, and it's good news for household energy bills and grid security

February 2025

CLEAN ENERGY CANADA



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Executive summary

Thanks to the province's abundant hydro power, British Columbians' electricity bills are among North America's lowest and half of what an Alberta household pays for power.[1] Thoughtful planning decades ago set the stage for an affordable and reliable electricity system that has underpinned the province's economy and helped keep electricity bills low for B.C. households.[2]

The future is electric. Not only is electricity a much more efficient power source than fossil fuels, going electric saves households and businesses money. For example, a Metro Vancouver family that adopts clean energy solutions—including EVs and heat pumps—could knock more than $700 off its average monthly energy bill compared to one largely reliant on fossil fuels (and that includes the upfront costs of equipment).[3]

Despite this, some groups have argued that B.C.'s electricity grid isn't up to the task, using these concerns to call for the rollback of key climate policies—like regulations to increase EV supply—that would impact electricity demand.[4–6]

But these concerns are often not grounded in fact. The reality is that B.C.'s grid is well positioned for the demands of electrification, thanks in large part to the build-out of renewables and more-often-than-not advantageous power trading with our neighbours. In this report, we explore some of the most common misconceptions about B.C.'s electricity supply. We also unpack how and why the energy transition can, in fact, keep our energy bills enviably low.

How electrification saves energy

Switching from an internal combustion car to an electric one saves energy thanks to the far greater efficiency of electric vehicles. An electric Hyundai Kona, for example, uses 27% of the energy of the equivalent-sized gas-powered Kona while also reducing operating emissions by 100%.

As one example, meeting B.C.'s robust 2030 EV sales targets (that would see EVs make up 90% of car sales in 2030) would only increase electricity demand in the province by 2%. Heat pumps, meanwhile, have a nominal impact on the grid.[2] Given that 42% of B.C. households use electric baseboard heating, moving these dwellings to heat pumps could save households around $500 per year on operational costs along with reducing overall provincial electricity demand by 5%.[7] A heat pump is also three to five times more energy efficient than a natural gas furnace, resulting in less electricity demand than some commenters have assumed.[8,9]

What's more, because our grid is connected to the U.S. and Alberta, it is well set up to manage future power demand and even makes the province money. In fact, since 2019, the value of the province's electricity exports was 35% higher than all of its imports. This profitable arrangement equates to lower bills for consumers. Electricity bills will be 10% lower in 2025 than they would otherwise be thanks to power trading, while similar benefits are forecasted for the years ahead—a mutually beneficial arrangement for B.C. and its neighbours.[10,11] Case in point: Last January's cold snap almost overwhelmed Alberta's electricity grid, until B.C.'s power exports saved the day.[12]

Finally, B.C. has a clear plan to meet future demand by building more low-cost renewable power, recently finalizing agreements to add 8% of supply from renewables to the grid, with all projects operational by 2032.[13] With the Site C dam coming online this year and adding another 8% of supply, plus energy efficiency investments freeing up an additional 3% of supply, B.C. is on track to meeting a projected 15% increase in electricity demand by 2030, a number that will bring the province closer to achieving its climate and electrification goals this decade.[2,13,14]

Renewables, like wind and solar, are now the cheapest sources of electricity globally and have been shown to help drive down power bills. The U.S. states with the highest shares of solar and wind (Iowa leads with 55%) also have electricity rates that are 25% lower than the U.S. average.[15,16] Even Texas, which ranks eighth in wind and solar renewable share (35%), has average retail power prices around 25% below the U.S. average.

A look at other countries around the world offers plenty of examples of high wind and solar shares, such as 67% in Denmark, around 40% in Germany and the Netherlands, and 28% in Australia.[17] In a scenario where Canada achieves a net-zero economy by 2050, wind and solar would be responsible for only 30% to 40% of required electricity production, which is less than some countries already produce today.[18]

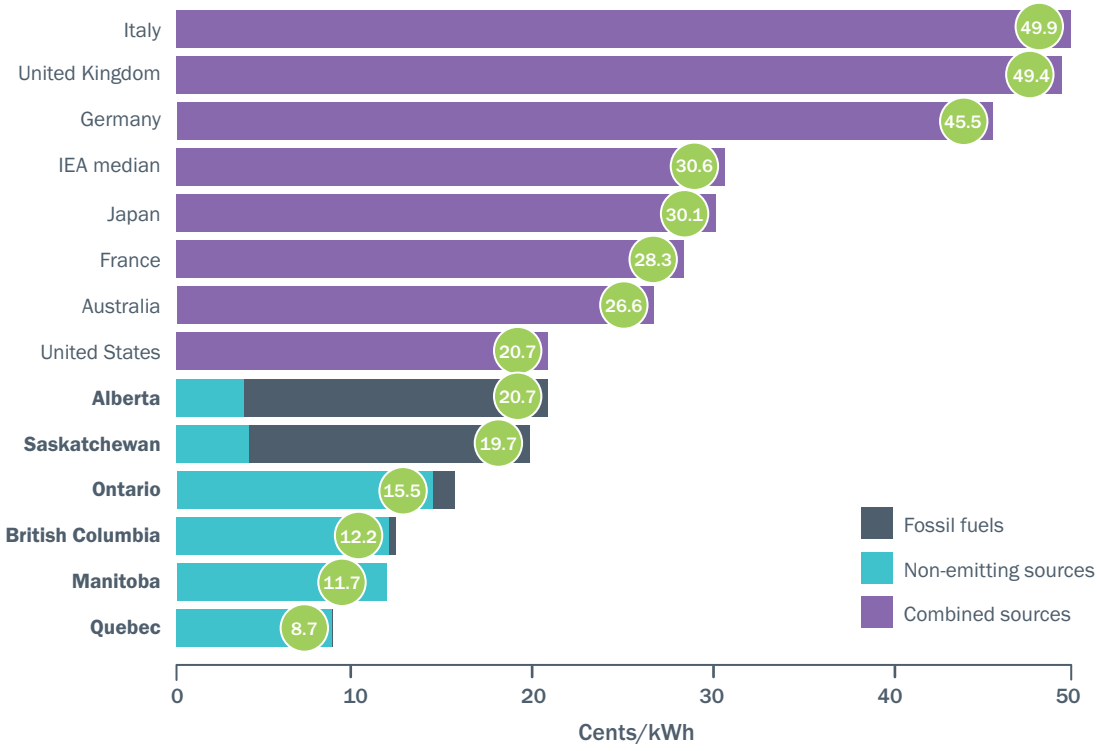
An electrified future is affordable, reliable, and the backbone of B.C.'s economy. With the right planning and investments now, British Columbian families and businesses can enjoy affordable and reliable electricity in the decades to come.

At the time of writing, the Trump administration has been contemplating tariffs on goods imported from Canada that could include electricity. The application of tariffs is expected to increase U.S. consumer prices, including for electricity. Should tariffs be enacted, B.C.'s hydro reservoirs would still allow the province to buy power from the U.S. and Alberta when it is cheapest and sell power when prices are high. In addition, increasing electricity trade with and through Alberta to other provinces is another opportunity to grow new, non-U.S. markets.

B.C.’s clean electricity advantage

Cheap, clean electricity has been the backbone of B.C.’s economy for many decades. While Canada has the lowest electricity rates among G7 countries, B.C. does even better with the third-lowest electricity bills in North America (after Quebec and Manitoba).

Household electricity prices by selected countries and provinces (2022)



Notes: Provincial data based on major cities and for a monthly consumption of 1,000 kWh; rates in effect April 1, 2022. Data for Japan and Australia is for 2021 (was not reported for 2022). Exchange rate from Bank of Canada.

Sources: Hydro-Québec, Government of the United Kingdom (based on data from the International Energy Agency), Government of Canada.

B.C.'s grid is also among Canada's most reliable systems when compared against those in other provinces, even accounting for increased wildfires and service disruptions in recent years.[2]

The province's clean electricity is an economic advantage in a number of ways. The first is the ability for B.C. to use its large hydro reservoirs to provide power when it's needed and when prices outside of the province are high. This flexibility has allowed B.C. to benefit from a net gain from electricity trade of over $1.5 billion since 2019, reducing residential electricity bills by 10% from what they would otherwise be this year. Electricity exports exceed imports on average across these years, and trading keeps rates lower for ratepayers.[10]

Between January 2019 and November 2024 (the most-recent month available), B.C. imported 16% more power than it exported. However, the value of the province's exports was 35% higher than all of its imports. In short, B.C. is buying when the price of electricity is low and selling when it's high.

Growing solar and wind capacity in the U.S. Southwest provides a unique opportunity for B.C. During the day and in months like April and May where Southwest temperatures are moderate, B.C. utilities can buy inexpensive power as U.S. renewables produce more electricity than is needed.[19] This allows our utilities to hold water back in B.C. reservoirs for when electricity demand, and therefore the price, is high. This approach also provides redundancy during emergencies. For example, during the cold snap of January 2024, BC Hydro was able to not only meet record demand in B.C. but also export electricity to Alberta when it was under emergency grid alerts.[20]

Electricity trading with the U.S. will lower B.C. electricity bills by 10% from what they would otherwise be in 2025.

Clean energy pays

Average hourly wage rate (2024)

*Forestry, fishing, mining, quarrying, oil and gas

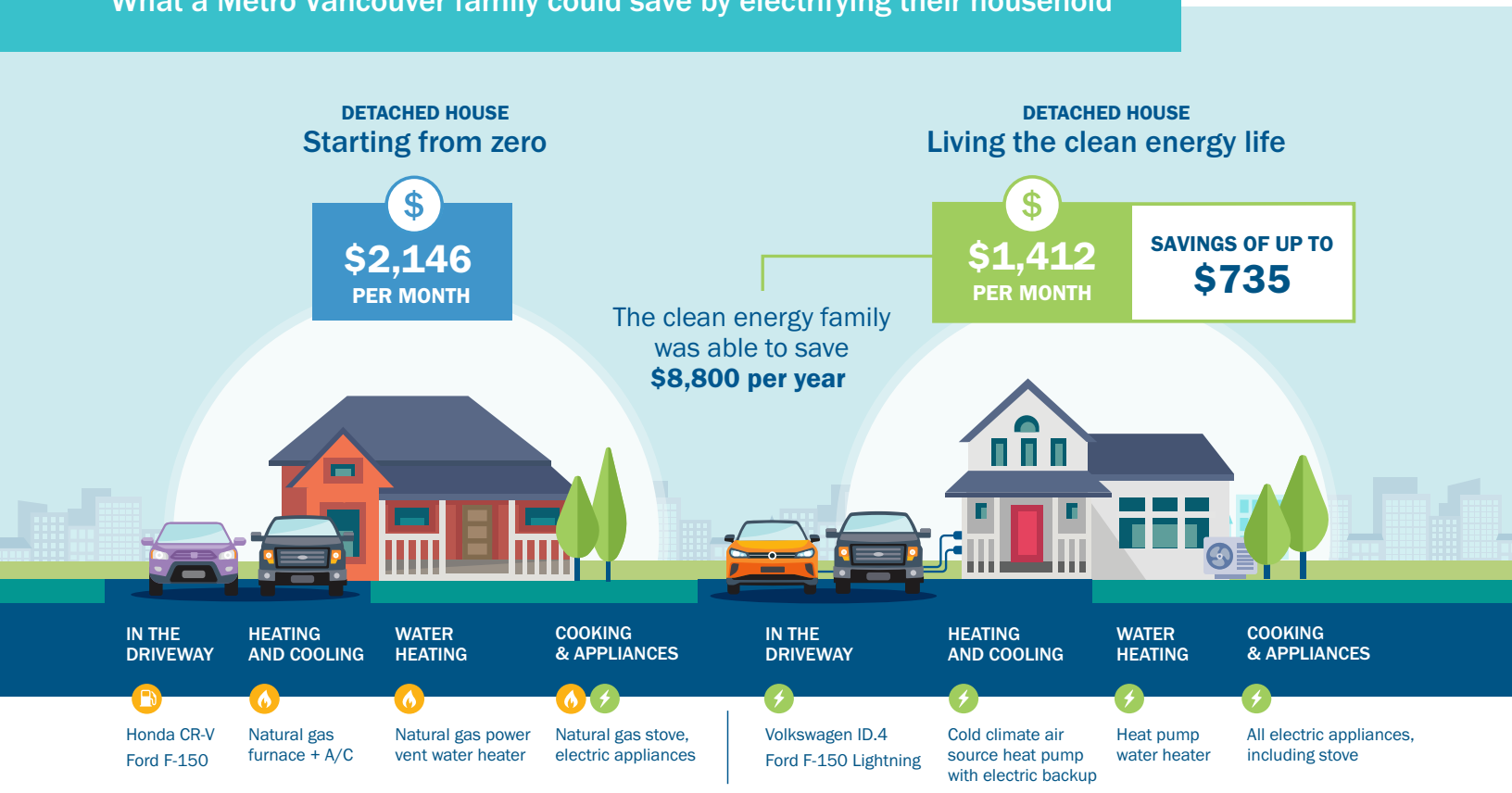
Source: Statistics Canada[53]

Affordable electricity also keeps costs low for B.C. households and businesses. An average B.C. household (assuming 1,000 kWh used) spends $114 a month on electricity.[21] In contrast, the same family in Alberta would spend $258 per month for the same amount of electricity. Indeed, analysis from Clean Energy Canada finds that a household in Metro Vancouver that switched out two gas cars for electric versions, ditched natural gas appliances, installed a heat pump, and made a few energy efficiency upgrades would cut $735 off their monthly energy bill (this average includes upfront costs).[3]

And lastly, low-cost, reliable electricity is B.C.'s competitive advantage. Foreign investors are increasingly looking to locate in jurisdictions with an electricity system that is reliable, affordable, predictable, and clean. Ontario and Quebec have landed more than $50 billion in automotive battery plant investments in part on the basis of cheap, clean power relative to potential sites in the U.S.[22,23]

Many B.C. industries benefit from affordable electricity, including mining, clean hydrogen production, manufacturing, and even fossil fuel production in the medium term, thanks to reduced costs and emissions. As the province grows its economy in the coming decades, affordable, clean electricity will be a key competitive advantage if the province makes the right moves now.

What a Metro Vancouver family could save by electrifying their household



Source: Clean Energy Canada,[3] updated to exclude the federal EV rebate that was paused in January 2025.

Photo: BC Hydro

B.C.’s grid can handle new loads and the transition to a clean future

BC Hydro, owned by the provincial government and serving 95% of the population, has taken a number of steps to ensure it’s bringing online the resources it requires. In January 2024, BC Hydro announced its intention to invest $36 billion over the next 10 years to support the growth and reliability of B.C.’s electricity system, a 50% increase in planned spending compared to 2023.[24]

Additional capacity is being brought online through Site C, which will be operational in 2025 and add 8% (5,100 GWh, or enough to power about 450,000 homes or 1.7 million EVs annually) to B.C.’s grid supply.[14] The most recent 2024 BC Hydro call for power will add another 8% (5,000 GWh) of supply to the province’s electricity grid, with all projects operational by 2032.[13] BC Hydro’s “Power Smarter” energy efficiency plan will free up an additional 3% (2,000 GWh) of supply for other uses.[25]

This new supply will meet new demand by 2030 and is sufficient to power the uptake of EVs and heat pumps, along with other measures in CleanBC, the province’s climate plan.

Between BC Hydro’s updated call for power, the completion of the Site C hydro dam, and energy efficiency investments, **B.C. is on track to meet a projected 15% increase in electricity demand by 2030.**[13]

B.C.'s grid can power more EVs and heat pumps

BC Hydro estimates that current EV sales requirements will increase electricity demand by 2% in 2030, consistent with other global forecasts.[2] This is based on 421,000 EVs on the road in 2030 and achieving the provincial EV sales requirements between now and 2030.[11] For comparison, the number of EVs on the road in B.C. was around 125,000 in 2023.[26]

A Canadian government study on the anticipated electricity needs of EVs found they would represent 3%, 16%, and 22% of electrical power demand in 2030, 2040, and 2050, respectively.[27] As the study states, "This number is significant, but since the growth is spread over 30 years, with most happening during the 2030 to 2050 timeframe, Canadian utilities have 10 years to refine the load forecast and plan for grid expansion."

Similarly, a recent U.S. study by Consumer Reports found that even if EVs accounted for 100% of new vehicle sales by 2035, it would take until 2050 for almost all vehicles on the road to be electric.[28] The study also noted that, if all U.S. vehicles were electric in 2050, electricity demand would need to increase by 26% by then, equating to a 1% per year growth rate in electricity generation, which is below the current U.S. growth rate.[29]

EVs can also contribute to grid capacity and reliability. While most current EVs are unidirectional, meaning they only take power from the grid, EVs have the ability to also do the opposite and improve grid reliability when they are used as batteries that utilities can draw from in times of need. In fact, there are vehicles for sale today, including Ford's F-150 Lightning (extended range), GM's Chevrolet Silverado EV First Edition RST, and Tesla's Cybertruck, that are bidirectional, meaning they can both send and receive power to the home (called vehicle-to-home) or to the grid in conjunction with a participating utility (called vehicle-to-grid).[32–34]

In fact, this is already happening today. The Baltimore Gas and Electric Company has a vehicle-to-grid pilot program up and running in partnership with Ford and Sunrun to deliver power to vehicle owners' homes during peak demand times in summer to support Maryland's grid. Utility PG&E is offering California customers under their Vehicle-to-Everything program the opportunity to earn incentives by sending electricity to the grid from their EVs in times of peak demand.[35,36] Meanwhile, Oakland, California, is converting its 74 school buses to vehicle-to-grid-capable electric buses that will be able to provide 2.1 GWh back to the grid annually, enough to power 400 homes for a year.[37]

Bidirectional charging is expected to become much more widespread in the coming years. In August 2024, California passed a law that gives the California Energy Commission the powers to require "any weight class" of battery-electric vehicles to have vehicle-to-grid charging capabilities.[38]

And the story is much the same for heat pumps with the additional benefit that, in B.C., heat pumps can reduce demand on the electricity grid. Heat pumps use significantly less electricity than electric baseboards, which would lower grid demand and save money for the 40% of B.C. households currently heating their homes this way.[7] Heat pumps also provide high-efficiency cooling in the summer.

Time-of-use pricing can save you even more while strengthening the grid

Currently, BC Hydro offers time-of-use rates to incent customers to operate appliances, including EVs and heat pumps, during off-peak hours to help balance electrical loads across the grid.[30] BC Hydro offers an option to subscribe to a 5 cent per kWh discount for power usage between 11 pm and 7 am with a corresponding 5 cent per kWh surcharge between 4 pm and 9 pm. **Ontario offers an ultra-low overnight rate that can charge a 2025 Hyundai Ioniq 5 in Toronto from empty to 100% for $4.65. Filling up a comparable gas-powered Toyota RAV4 would be over $86.**[31]

A heat pump is also three to five times more energy efficient than a natural gas furnace, resulting in less electricity demand than some commenters have assumed.[8,9] In fact, a new Clean Energy Canada report shows that a typical B.C. household living in a detached house that transitioned from a natural gas furnace to a heat pump would be expected to save $570 a year (including equipment costs and rebates).[3]

Given that 40% of B.C. households use electric baseboard heating, moving these dwellings to heat pumps would cut their electricity use by 40% a year on average, reducing overall electricity demand on the grid by 5%.

Wind and solar will be important parts of B.C.'s energy future

Wind and solar are among the cheapest sources of power globally and in Canada.[40] In fact, Alberta wind projects have delivered power at less than 5 cents per kWh, well below the province's residential retail prices above 24 cents per kWh.[41,42]

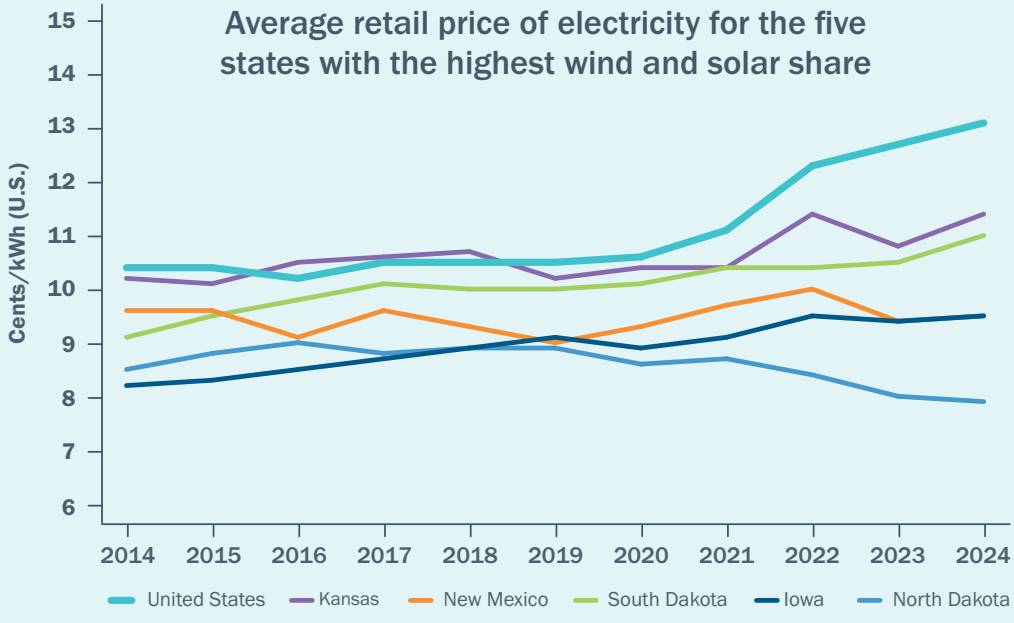
Our neighbours to the south have seized on renewables in a big way. Currently, the top five U.S. states with the highest shares of solar and wind capacity (Iowa leads with 55%) also have electricity rates that are 25% lower than the U.S. average.[16,43] Even larger states like Texas, which ranks eighth in wind and solar share (35%), has an average retail power price around 25% below the American average.

And globally, renewables are successfully being integrated into electricity systems. South Australia saw 75% of its electricity needs met by solar and wind in 2023.[44] The state is hoping to achieve a 100% renewable-powered grid by 2027 while lowering overall electricity prices.

A look at other countries around the world offers plenty of examples of high wind and solar shares, such as 67% in Denmark, around 40% in Germany and the Netherlands, and 28% in Australia.[17] In a scenario where Canada achieves a net-zero economy by 2050, wind and solar would be responsible for only 30% to 40% of required electricity production, less than some countries already produce today.[18]

And while wind and solar are variable resources (they rely on the wind blowing and the sun shining), solutions are available to complement them, from batteries and dispatchable clean power like large hydro, nuclear, and geothermal, to stronger grids and interconnections, to technological demand-side measures (i.e. storing and sending power where and when it's needed).[45,46]

An analysis from Clean Energy Canada found that solar and wind with battery storage are set to produce cheaper electricity than natural gas in Alberta and Ontario, and this trend is expected to be similar for B.C.[47]



Over the past decade, electricity in these five states has become **25% cheaper than the national average.**

Source: U.S. Energy Information Administration

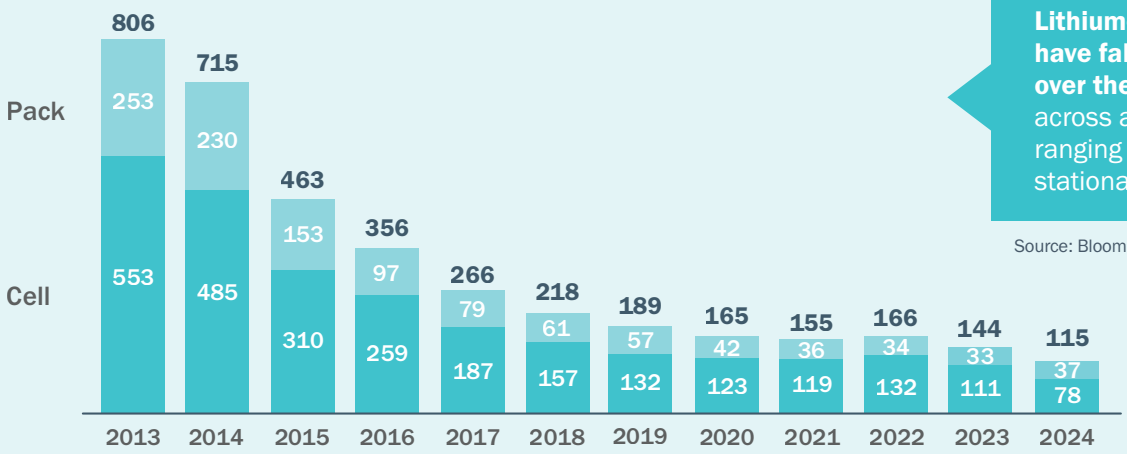
Battery storage costs have dropped 90% in the past 15 years and are forecast to fall another 12% by 2030. In fact, in 2023 the world's electricity grids added 42 gigawatts of storage capacity.[48,49] Last year, Ontario completed the procurement of 2,195 MW of new battery storage capacity, while BC Hydro plans to add up to one half of a Site C dam's worth of storage.[25,50]

Climate change and reservoir levels

While B.C. has experienced serious drought conditions in the past several years, BC Hydro is not seeing a trend in the long-term drying of our hydro reservoirs in the province.[51,52]

Volume-weighted average lithium-ion battery pack and cell price split

Real 2024 US$/kWh



Lithium-ion battery prices have fallen dramatically over the past 12 years across applications ranging from vehicles to stationary storage.

Source: BloombergNEF[54]

Putting the customer in charge

Households are evolving from being just customers to becoming both consumers and providers of electricity, also referred to as "prosumers." Smart thermostats, using your EV to provide power to the grid, rooftop solar, and home battery storage systems are all technologies that help British Columbians reduce energy bills and prepare for emergencies while building a stronger electricity grid. Shifting and optimizing power demand means that utilities save money by not having to pay for unneeded power plants, fossil fuels, and grid infrastructure. The more customers lower costs and improve reliability for everyone, the more they can earn. B.C. ratepayers can already start today with the provincial government's grid-tied household solar and battery storage incentives.[39]

Maintaining B.C.'s clean electricity advantage requires acting now

The fortunate situation British Columbians now find themselves in with some of the world's cheapest electricity was a result of decades of thoughtful planning and the build-out of our electricity system.

Now is the time to plan for the coming decades to ensure that future generations of British Columbians will continue to benefit. To that end, there are a number of actions the provincial government should take to lock in our clean power advantage:

1 Provide clarity on B.C.'s energy future to bring focus to actions by 2030

- Take an efficiency-first approach that only prioritizes new infrastructure where efficiency and demand-side solutions cannot address energy needs.
- Develop local energy planning processes that identify and address the unique energy challenges and opportunities in different regions, building community support and buy-in, and matching investments to the unique needs of the region.
- Develop a new integrated energy planning process for B.C.'s electricity and natural gas systems to minimize the costs to ratepayers.
- Adopt key regulations like the High Efficiency Equipment Standards and put in place incentives that help support energy efficiency and electrification.

2 Accelerate the deployment of more clean electricity generation and transmission infrastructure before 2030

- Accelerate the schedule for regular clean power calls to incentivize new investments and provide certainty to industry and Indigenous Nations.
- Establish a framework to determine the “highest and best use” of electricity resources, helping prioritize which industries should be first in line for electricity connections based on provincial priorities.
- Commission an assessment to help inform the most realistic, cost-effective pathways for building out clean energy supply to inform energy planning and bring stakeholders together around a common set of assumptions for the build-out of our clean energy system.

3 Prioritize efforts to help households adopt clean technologies to lower their energy bills before 2030

- Refine rebates and incentives for EVs, heat pumps, home retrofits, and rooftop solar to better ensure those who need the help are receiving it.
- Make it easier for homeowners and renters to access these technologies through streamlining rebates, permitting, and grid connection processes.
- Ensure new builds are prioritizing heat pump installations and EV charging readiness from day one, reducing the need for avoidable, costly retrofits and costs paid by homeowners.
- Adopt household clean technology deployment targets that catalyze private investment and help focus efforts to address the necessary regulatory, financial, labour, supply chain, and other related challenges.

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