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Meeting B.C.'s Energy Needs:

Towards A Provincial Energy Strategy

Energy Futures Institute
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A man in a suit and glasses is speaking at a podium. The podium and background banners feature the 'Energy Futures' logo, which consists of two blue chevrons pointing right. The text 'Energy Futures' is in a bold, sans-serif font, and 'AN INITIATIVE BY RESOURCE WORKS' is in a smaller font below it. A large white double chevron graphic is positioned to the right of the man.

Energy Futures

About the Energy Futures Institute

The Energy Futures Institute is a Resource Works-led project that is bringing a fresh perspective to discussions surrounding the future of energy in British Columbia.

Having launched in December 2023, Energy Futures is exploring some of the greatest challenges facing British Columbia's energy security, affordability and independence, answering the big questions on how we meet BC's growing energy demand while protecting our environment, not just today but for the coming decades and centuries ahead.

Energy Futures is led by former BC cabinet minister Barry Penner. Penner served as BC's Minister of Environment, Minister of Aboriginal Relations and Attorney General during his four terms as a MLA. Penner represented Chilliwack in the BC Legislature from 1996 to 2012.

Executive Summary

The Energy Futures Institute (EFI) has conducted a six-month review of British Columbia's energy landscape, highlighting the need for a comprehensive and integrated energy plan. While the provincial government's recent 'Powering Our Future: BC's Clean Energy Strategy' summarizes existing measures, the institute finds it lacking in specifics to address critical future issues. EFI has found that BC's growing energy demands are challenging to meet, with the province currently relying heavily on electricity imports to maintain reliability.

EFI is calling for a bold and realistic energy strategy that ensures reliable and affordable energy to support economic growth and living standards. Energy policy considerations should extend beyond climate and electricity to encompass reliability, resilience and affordability, along with other forms of energy.

Energy Futures Institute's 10 Recommendations

1. Undertake comprehensive cost/benefit analysis and economic impact assessments for all energy and climate policies.
2. Promote greater transparency by implementing a real-time public dashboard showing electricity production, use, & imports/exports for British Columbia.
3. Add reliability to the legislated energy objectives. By adding electricity reliability to the existing list of statutory priorities — affordability, rate stability, self-sufficiency and environmental sustainability — this important objective has a better chance of not being overlooked.
4. In light of rapidly growing power needs, dramatically increase domestic electricity production by considering all viable solutions, cancel current plans to decommission existing power generation facilities, and revive a modified Standing Offer Program for smaller projects.
5. Support First Nations reconciliation projects with flexible options for participation, and adequate transmission infrastructure & electricity supply.
6. Upgrade the electricity grid to address infrastructure gaps.
7. Expand natural gas transmission and hydrogen infrastructure to support domestic needs and energy exports.
8. Adopt a global perspective on emissions – leverage LNG exports to support global emissions reduction and energy security for allied countries.
9. Assert Provincial jurisdiction over energy policy – prevent municipalities from banning natural gas hookups for new construction and commit to not implementing a province-wide gas ban.
10. Revisit electric vehicle sales quotas, replace with emission standards.

Introduction

Over the past six months, the Energy Futures Institute has reviewed the current state of energy in British Columbia. While we have expressed concerns about certain aspects of individual policies impacting energy supply, we believe it is also important to provide constructive recommendations on how to achieve better results. Accordingly, we have developed a set of guideposts to assist in the development of an integrated energy plan to address the challenges facing our province.

On June 27th, the Provincial government released '[Powering Our Future: BC's Clean Energy Strategy](#)'. While the document summarizes a number of existing programs (eg. mandated 90% electric vehicle sales by 2030) and repeats commitments to keep electricity rates from rising faster than the rate of inflation, it does not answer the bigger questions of how this will be achieved when we are already a net importer of electricity.

Presumably, the *Powering Our Future: BC's Clean Energy Strategy* document is linked to the mandate letter¹ provided to the Minister of Energy, Mines and Low Carbon Innovation on January 15, 2024. It underlined the need for action to understand and provide a framework for action: "Develop and implement a climate-aligned energy framework for B.C. with an overall goal of maximizing our province's production of clean energy to use at home and for export." While we welcome this stated intent, as it recognizes that relying on a fragmented climate policy as a stand-in for a comprehensive energy policy has not been satisfactory, the *Powering Our Future* document is short on specifics.

As the work of the Energy Futures Institute has shown, the province's growing energy needs are not easy to meet. Indeed, the absence of a coherent energy plan is already resulting in ad-hoc rationing of electricity, as the government chooses which industries are worthy of connecting to the grid. Further, we have seen inconsistent direction on the future of natural gas and different electricity generation sources as they relate to BC's energy systems

British Columbia requires a bold, forward-looking, overarching energy strategy that ensures reliable and affordable energy to sustain economic growth and enhance living standards.

It is clear that previous assumptions – notably, that British Columbia has "an abundant supply of clean electricity"² and that demand for electricity will continue to grow slowly – are no longer valid. Instead, electricity demand is now growing faster than it has in a generation, driven by new industries, technologies and government GHG reduction policies. British Columbia has required

1 https://www2.gov.bc.ca/assets/gov/government/ministries-organizations/premier-cabinet/mlas/minister-letter/emli_-_osborne.pdf

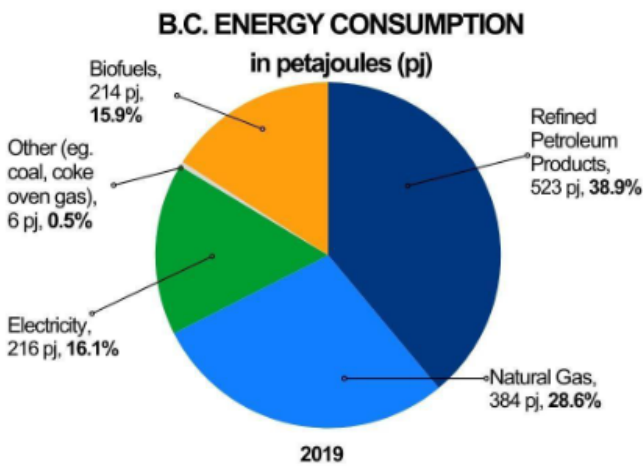
2 "A central pillar of the Roadmap focuses on our abundant supply of clean and affordable hydroelectric power as an alternative to fossil fuels." CleanBC Roadmap (gov.bc.ca) page 9.

significant electricity import to maintain reliability (equal to 20% of total electricity usage in 2023 and trending upward in 2024³).

While the BC Government has numerous plans and policies that have an impact on energy usage and development (e.g. the CleanBC Roadmap released in October 2021 as one example, and most recently, the province’s *Powering Our Province* document, there is no single overarching plan that sets out how the Province and its ministries, Crown corporations and agencies will address current and future energy needs in a comprehensive sense.

By supporting BC Hydro in issuing a ‘Call for Power’ (request for proposals) for 3,000 gigawatts of additional renewable electricity, the Provincial Government has taken an important step forward after suspending (and then officially terminating) the ‘standing offer’ program which had resulted in some of BC’s most visible renewable energy projects.⁴ Expanding renewable energy is a sensible component of any comprehensive energy plan, particularly given our province’s highly diverse energy sources, but limiting future energy sources to this form alone may have significant unintended consequences for BC and energy systems at large.

Energy policy considerations should extend beyond the climate and beyond electricity alone — reliability, resilience and affordability are also fundamental for quality of life, economic development and national security. Energy policy will play a critical role in determining our province’s ability to grow its industrial base, determining how fast our urban areas can densify, and how much new immigration our communities will be able to sustain. Further, as GHG emissions are not bound by provincial borders when looking at the global context of climate action, considerations should be given as to how British Columbia’s energy policies may impact worldwide GHG reduction efforts beyond our own geographic borders.



End-Use Energy Demand in British Columbia⁵

3 BC Needs New Energy Policy - Fraser Valley News

4 Pennask Wind Project on the Coquihalla Highway Connector and Fitzsimmons Creek Small Hydro Project above Whistler.

5 End-use (or secondary) energy demand includes energy used in residential, commercial, industrial and transportation sectors. Source: Canada Energy Regulator - Provincial & Territorial Energy Profiles .



Any provincial energy framework must be grounded in energy realities, not wishful thinking. British Columbia is not an island and does not exist in a vacuum - it's important to acknowledge the province is an integral actor in both regional and global energy systems.

A successful energy plan will acknowledge the important fact that less than 20 per cent of the province's total end-use energy demand is currently met through electricity, with the vast majority coming from fuels such as gasoline, diesel, and natural gas. An energy plan that is restricted from acknowledging this starting point is unlikely to meet the needs of British Columbia. Consequently, an energy plan needs to account for all energy types, recognizing their current role in BC's energy systems, and acknowledging their future use and demand.⁶

Ultimately, the objective for an energy plan should be to provide secure and affordable energy to British Columbians, underpinning jobs and investment, while delivering on progress toward a more sustainable future.

At the Energy Futures Institute, we hope that by offering these recommendations after canvassing a variety of stakeholders (including local government and industry), the result will be an energy framework leading to a stronger future.

Recommendations

We recommend that in a new, overarching energy plan, the provincial government commit to the following actions, which we have organized under three subject headings; Domestic Energy Production, Transmission & Infrastructure, and Policy & Governance.



Domestic Energy Production

1. Undertake comprehensive cost/benefit analysis and economic impact assessments for all energy & climate policies

Energy policies can have far-reaching economic implications, impacting industries, households, and the overall competitiveness of British Columbia.

To ensure informed decision-making, the provincial government should mandate comprehensive cost/benefit analyses and economic impact assessments for all proposed energy policies. This approach would quantify the full range of potential costs and benefits, helping identify trade-offs and enable policymakers to make data-driven decisions that balance sustainability with economic viability. While greenhouse gas (GHG) emission reductions are important, they are not the only consideration given that B.C. is responsible for only 0.13% of global GHG emissions.⁷

There was significant controversy in the fall of 2023 regarding economic modelling undertaken by Navius Research Inc. for the BC Government. Publicly revealed by the BC Business Council, the analysis looked at the impacts of the CleanBC Roadmap. The modelling indicated by 2030 the province's economy could be \$28.1 billion smaller than it would be without the additional CleanBC policies aimed at reducing GHGs, which the BC Business Council said could equate to 100,000 fewer jobs in the province. The BC Government strenuously objected to this interpretation of the modelling results.⁸

Having an independent third-party conduct an impartial cost/benefit analysis and economic impact assessment of energy and climate policies would provide common fact base (as long as it is made public). Greater transparency would enable a more informed public discussion of policy options.

An energy plan should adequately address infrastructure capital requirements and possible operating cost increases, not just for utilities whose job it is to deliver energy (electricity and natural gas), but of those businesses and individuals who will need to invest in new equipment and modify facilities to adjust to changes in energy types. If these factors are not taken into account, B.C. risks becoming a less desirable destination for investment.

The current energy situation has meant the provincial government (through their wholly-owned electrical utility BC Hydro) is, in effect, picking winners and losers when deciding which industries and investments are worthy of being allocated a portion of our increasingly limited electricity

⁷ GHG emissions are measured in gigatonnes of CO2 equivalent (GtCO2e). Based on 2019 data:

$$\text{Percentage} = \left(\frac{\text{BC's Emissions (67.9 MtCO}_2\text{e)}}{\text{Global Emissions (52,000 MtCO}_2\text{e)}} \right) \times 100 \quad \text{Percentage} = \left(\frac{67.9}{52,000} \right) \times 100 \approx 0.13\%$$

⁸ BCBC warns CleanBC will lead to 'serious job losses' on path to 2030 (Business in Vancouver)



supply. Potential job-creating projects have been left waiting and wondering if they will be among the chosen ones.⁹ A disciplined set of objective criteria by which such decisions are being made has not been shared with the public, which does not enhance investor confidence.

Legislation has been passed authorizing the provincial Cabinet to direct BC Hydro not to provide electricity service to cryptocurrency facilities located in the province.¹⁰ Anecdotal reports indicate operators of would-be data centres have also been told not to expect service any time soon. Large-scale hydrogen electrolysis projects have been seeking support from the provincial government, seeking access to enormous quantities of low GHG electricity from BC Hydro's grid for their needs.¹¹ Meanwhile, a number of LNG projects have been waiting years to learn whether sufficient electricity will be made available to facilitate liquefaction operations.

Greater transparency in how electricity is allocated to would-be investors and job creators in British Columbia would be a welcome breath of fresh air.

⁹ "There are currently approximately 7,000 Megawatts (MW) of proposed new industrial demand in BC Hydro's interconnections queue." [Powering Our Future: BC's Clean Energy Strategy](#), p.32.

¹⁰ Bill 24 – *Energy Statutes Amendment Act*, 2024.

¹¹ [Leaked memo reveals BC NDP trouble squaring energy ambitions with reality - Nov 24, 2024](#)

2. Promote greater transparency by implementing a real-time public dashboard showing electricity production, use, & imports/exports for British Columbia

As things stand today, there is no definitive, easily accessible source of real-time information on activity within British Columbia's electricity system.

To make effective public policy decisions, British Columbians must have access to information on the state of energy within our province. This will allow lawmakers, public servants, utilities, and stakeholders to make informed decisions regarding the future of electricity policy.

Maintaining public confidence is vitally important to the long-term success of our regulatory framework and a lack of timely information breeds mistrust. The end result is an unstable investment climate due to uncertainty and moving policy goalposts. Therefore, a fundamentally important value in good energy policy is transparency and public awareness.

Other jurisdictions are more forthcoming with timely information. As an example, here is a link to the [Alberta dashboard](#). At Energy Futures, we believe a similar online dashboard should be developed in British Columbia, perhaps maintained by the BC Utilities Commission.

3. Add reliability to the legislated energy objectives

The Energy Futures Institute is recommending a revision to the *Clean Energy Act* to prioritize reliability in addition to affordability, rate stability, self-sufficiency and environmental sustainability.

Simply legislating that something should occur does not necessarily mean that it will.

For example, earlier this year the BC cabinet enacted a regulation stating that BC Hydro rate increases should not exceed inflation.¹² This stroke of the pen does not by itself reduce cost pressures on the utility. Other policies which increase demand for electricity such as electric vehicle sales mandates,¹³ accelerate the need for more capital and possibly operating expenditures. Ultimately, these expenditures must either be paid by ratepayers via energy price increases or taxpayers via subsidies and bailouts.

Nevertheless, by adding electricity reliability to the list of priorities that statutorily must be considered, this important objective has a better chance of not being overlooked.

¹² Order-in-Council 60/2024 (BC Energy Objectives Regulation)

¹³ BC requires a minimum of 26 percent of new vehicle sales to be zero emission by 2026, 90 percent by 2030, and 100 percent by 2035. Source: Zero-Emission Vehicles Act (gov.bc.ca)

4. In light of rapidly growing power needs, dramatically increase domestic electricity production by considering all viable solutions, cancel current plans to decommission existing power generation facilities, and revive a modified Standing Offer Program for smaller projects.

To meet its rapidly growing electricity needs, British Columbia may need to consider more options than has previously been the case. The key to having a reliable energy supply capable of supporting economic growth and enhancing living standards is diversification. Adding the objective of dramatically reducing GHG emissions while also maintaining affordability further complicates the equation.

The Quebec Government has recently expressed the need to increase electrical generation capacity by 100% in the next 25 years to support their GHG reduction goals.¹⁴ Given that British Columbia has a similar GHG profile associated with its domestic electricity production, and has legislated decarbonization objectives which are at least as aggressive as Quebec, it is reasonable to assume British Columbia is facing a similarly daunting challenge in terms of generating more electricity, ie. doubling existing generation capacity.

In fact, this has recently been acknowledged by the BC Government for the first time. The *Powering Our Future* document released on June 27, 2024, refers to research suggesting “BC’s electricity use will likely double from current levels in order to keep up with population and economic growth, transition from fossil fuels, and achieve net zero emissions by 2050.”¹⁵ No cost estimates were provided and there was no discussion of the impact on rates. The enormity of the challenge of building in just 25 years an equivalent amount of generation, transmission and other related infrastructure that it took 120 years to develop should not be underestimated.

¹⁴ [CBC News: Hydro-Québec to invest up to \\$185B to increase capacity](#), November 2, 2023.

¹⁵ [Power our Future - BC's Clean Energy Strategy June 2024](#), p18. The Canadian Climate Institute, for example, estimates that BC will need to add 1.3-2.6 times more generation and 1.8-2.9 times more capacity by 2050.



Natural Gas

While approximately 90% of electricity capacity in British Columbia is based on hydroelectric sources, natural gas still provides 522 megawatts (mw) of dispatchable generating capacity. Of this, 119 mw is owned and operated by BC Hydro¹⁶ with a total of just over 400 mw under contract with three privately-owned facilities.¹⁷

The CleanBC Roadmap released by the BC Government in October 2021 requires “phasing out remaining gas-fired facilities on its [BC Hydro’s] integrated grid by 2030.”¹⁸ The Energy Futures Institute believes that moving forward with such plans would be a mistake – further jeopardizing B.C.’s system reliability.

In other jurisdictions, it has been recognized that natural gas electricity generation is a complementary energy source for weather-dependent renewables, supporting a greater degree of intermittent (not dispatchable or firm) electricity sources such as solar and wind power.

A significant percentage of the electricity imported by BC Hydro in 2023 and so far in 2024 was likely from natural gas generation in the United States and Alberta (imports at night have been as high as imports during the day), which is ironic given CleanBC Roadmap not permitting such generation in our province. It’s worth observing the atmosphere isn’t much concerned about the political boundaries from where GHGs are emitted.

BC Hydro’s latest Integrated Resource Plan (approved by the BC Utilities Commission in March, 2024) reflects this policy direction and will result in contracts not being renewed with the privately-owned facilities. This loss of more than 400 mw of dispatchable electricity generating capacity is one reason the North American Electricity Reliability Corporation (NERC) identified British Columbia as “a risk area” in their latest annual assessment, stating “load-loss and unserved energy risks increase in 2026 as forecasted demand increases and natural-gas-fired generation retires.”¹⁹

Looking ahead, serious consideration should be given to additional natural gas electricity generation capacity to mitigate the risks to hydroelectric output from below average precipitation. Relying on intermittent renewable sources of electricity to meet extended periods of peak demand has been shown to be inadequate, causing Powerex to recently comment on the importance of dispatchable sources of electricity during peak periods.²⁰

¹⁶ Prince Rupert Generating Station (46 mw) and Ft. Nelson Generating Station (73 mw).

¹⁷ Island Generation in Campbell River (275 mw), McMahon Cogeneration Plant in Taylor (120 mw) and Houweling Nurseries Generation in Delta (8.8 mw).

¹⁸ CleanBC Roadmap (gov.bc.ca) page 29.

¹⁹ NERC 2023 Long-Term Reliability Assessment, page 9 and pages 109-111.

²⁰ “The January 2024 Event highlights that the U.S. Northwest region not only faces a capacity adequacy challenge, but that it also faces a fuel supply sufficiency challenge during extended weather events....Some resources, particularly those with base load or dispatchable capabilities and abundant fuel supply, are able to contribute at a very high level to meet both of these reliability challenges. This includes hydro facilities with longer term storage, as well as nuclear, gas, coal and geothermal resources.” [Power Ex - Analysis of the January 2024 Winter Weather Event](#), p. 20.



Modern natural gas power plants, such as combined cycle plants, are highly efficient and can potentially be integrated with Carbon Capture and Storage (CCS) technology²¹ to further reduce emissions. These plants may also be designed to switch to hydrogen or other low-carbon fuels in the future, providing a flexible and future-proof energy solution. It would also open the door to local tax and employment benefits, which are not realized when importing equivalent amounts of electricity from outside the province.

Renewable Natural Gas (RNG)

RNG (also known as biogas in other jurisdictions), is chemically almost identical to natural gas. It is produced from organic waste²² and can be integrated into the existing natural gas infrastructure. This provides a useful contribution of energy while also offering an important revenue stream for BC's agricultural sector, providing another option for reducing GHGs in our energy supply. However, in order for this energy source to make its way to the end-user, residential and commercial buildings need to be constructed with connections to the natural gas distribution system. Builders are reporting that in communities where the Zero Carbon Step Code has been adopted, natural gas connections are not being approved.

²¹ CCS involves capturing CO₂ emissions and storing them underground rather than having them enter the atmosphere. B.C. has the geological capacity for CCS, particularly in the sedimentary basins of the northeast.

²² Includes food, agricultural or forestry waste, sewage and landfills.

Large-Scale Hydroelectric Power

Hydroelectric power has been the cornerstone of British Columbia's energy supply, providing the vast majority of B.C.'s electricity. Although dependent upon adequate precipitation, hydro has historically been a reliable and cost-effective means of generating electricity.

However, the development of new major hydroelectric projects has proven to take an exceptional amount of time and money (the Site C dam was announced in 2010 by former Premier Gordon Campbell²³ and was initially estimated to cost \$6 billion, and is still under construction – the final cost may be \$16 billion). Large dams also can have a major impact (eg. threatening wildlife and aquatic species) negatively affecting those who depend on the land base, such as farmers, trappers and hunters (including Indigenous communities).

While Site C will undoubtedly help address B.C.'s current electricity shortfall by increasing annual electricity production by about 8% in a year with average precipitation, it wouldn't have come close to making the province self-sufficient in 2023 when 20% of British Columbia's needs were met by imported electricity. Thus, it regrettably won't be the long-term 'silver bullet' that many seem to have assumed.

Currently, legislation prohibits the development of additional large-scale hydroelectric dams with storage capacity.²⁴ Nevertheless, BC Hydro CEO Chris O'Riley has hinted during media interviews that while completion of the Site C dam remains the focus, further hydroelectric projects in British Columbia may be considered along with all other options for meeting the province's energy needs. Legislative amendments would need to be required to permit the development of an additional large-scale hydroelectric dam, along with extensive consultation with Indigenous and likely non-Indigenous communities.

²³ [Site C dam project moving forward on Peace River | CTV News](#), April 2010.

²⁴ [Clean Energy Act \(gov.bc.ca\)](#) section 11.





Nuclear Power

Despite the Canada Energy Regulator's projection that nuclear power could play an important role in achieving net-zero emissions by 2050 (nuclear energy does not emit GHGs), the provincial government maintains a prohibition on nuclear power generation. Premier David Eby has cited the province's renewable energy resources, such as hydro, wind, and solar power as justification for this approach.²⁵

However, given BC's ambitious GHG reduction legislation, rapidly increasing electricity demand²⁶ and advances in nuclear power technology, along with its ability to provide a stable and low-carbon energy source at scale, the province may need to reassess this stance. Powerex has noted that nuclear energy is one source of electricity that can help address reliability challenges.²⁷ Small Modular Reactors (SMRs) could eventually offer a viable alternative to traditional nuclear plants, potentially addressing safety and cost concerns traditionally associated with nuclear energy. However, outside of Russia and China, SMRs are still in the early stages of development²⁸ and costs continue to be high compared to other electricity sources.

²⁵ www.politicstoday.news/british-columbia-today/nuclear-energy-a-no-go-in-b-c-premier-eby-says/

²⁶ "The peak demand forecast in the province of British Columbia has increased by over 600 MW since 2023 (7.4%), contributing to a drop in Anticipated Reserve Margin by over 10 percentage points." [NERC Summer 2024 Reliability Assessment](#), page 5.

²⁷ [Powerex - January 2024 Winter Weather Event](#), p.20.

²⁸ [Small modular reactors | International Atomic Energy Agency](#)

Geothermal Power

To further diversify domestic energy supply while working to reduce GHG emissions, the province should consider accelerating the development of geothermal power.

British Columbia has significant geothermal potential, with 16 identified sites capable of generating over 1,000 MW collectively. For example, the Fort Nelson First Nation is currently pursuing the development of a project, Tu Deh-Kah Geothermal, with the goal of providing between 7 to 15 MW of non-emitting geothermal electricity in Northeastern BC. This venture could be BC's first geothermal electricity facility and among the first in Canada.

Geothermal electricity projects elsewhere, such as the Geysers complex²⁹ in California, provide reliable and sustainable energy³⁰ supplementing weather-dependent renewables. While no energy source comes without some adverse impacts, geothermal energy can offer a relatively low environmental footprint for both electricity generation and direct-use applications like heating for buildings and industrial processes. However, development of this resource is capital-intensive and can be technically challenging. Considering the potential societal benefits, enhanced government support for geothermal development in B.C. should be considered.

29 [Geysers Geothermal Complex](#)

30 [Geothermal power could be 'massively impactful for global decarbonisation' as US plant gets a boost \(msn.com\)](#), Jun 26, 2024





Wind

British Columbia trails many jurisdictions in its utilization of wind to generate electricity. With 747 megawatts of total installed capacity spread across 10 different projects, this intermittent source of power currently contributes approximately 2,100 gigawatt hours of electricity annually,³¹ or about 4% of BC's electricity generation. In contrast, Alberta has 4,748 megawatts of wind power capacity which supplied 12% of that province's electricity needs in 2022.³²

There is clearly an opportunity to significantly increase wind power's contribution to BC's energy supply. Wind power is weather dependent and thus intermittent, but is well suited to integrating with large hydroelectric storage dams given the latter's ability to quickly ramp up or down in terms of output to adjust to fluctuations in wind generation. Like all energy sources, wind power has its detractors with common complaints including impairment of the views, noise when in close proximity and reputed impact on avian species.

31 [Independent Power Producer \(IPP\) Supply List - In Operation \(April 1, 2024\) \(bchydro.com\)](#)

32 [Alberta Wind Power Facts - Alberta Electric System Operator](#)



Solar

British Columbia has 2 megawatts of grid-connected solar power, compared to Alberta's 1,650 megawatts.³³ While the prevailing weather in many parts of British Columbia may not be as conducive as California and Alberta to sunshine, there is clearly an opportunity to expand solar power generation in British Columbia. However, this source is also intermittent and cannot be relied on for baseload power.

BC Hydro has recently announced a rebranding of the net metering program (it will now be called the self-generation program) along with a set of rebates to help subsidize the cost for individual homeowners and businesses to install solar panels and battery storage systems.³⁴ It is not exactly clear how much BC Hydro plans to spend on this initiative, as it is part of \$700 million "efficiency" program announced in June 2024.³⁵ Homeowners will be able to receive up to \$5,000 for solar panels and as much as another \$5,000 to defray the cost of installing battery storage. Up to \$150,000 will be made available for qualifying apartment buildings and businesses. No estimate has been provided on the estimated cost per kilowatt of generating electricity through this program, so it is difficult to evaluate if this is a cost-effective way to generate more electricity in the province.

³³ [Alberta Wind Power Facts - Alberta Electric System Operator](#)

³⁴ [B.C. Hydro to offer rebates for solar panels, battery storage | CBC News](#)

³⁵ [Energy Efficiency Plan \(bchydro.com\)](#), p.3.

Run-of-River Hydro

RoR projects are a well-understood technology. There are more than 60 operating RoR projects in British Columbia that are privately owned and selling electricity to BC Hydro. Such projects typically don't produce electricity consistently throughout the year, and like the renewable energy forms discussed above, are for the most part dependent on weather.

While BC Hydro has referred to existing RoR projects as “a cost-effective option for meeting longer-term resource requirements”³⁶ they are not typically considered a dispatchable source of power.³⁷ It can also be assumed the best sites in terms of cost, output and minimal environmental impact have already been developed, although there are likely additional sites which could be developed.

³⁶ BC Hydro submission to BC Utilities Commission, 9 Nov 2023

³⁷ Run-of-River hydroelectric facilities usually do not have significant water storage capacity. Their electricity generation depends on the water flow available in the watercourse at any given time.



Image Source: Ledco

Battery Storage

Battery storage is a growing part of utility planning and operations in many industrial countries. Advocates point to opportunities to enhance grid stability, enabling greater intermittent renewable energy integration (particularly in jurisdictions without large scale hydroelectric storage), cost reductions to electricity systems by helping to meet short-term peak demand and enhancements to grid resilience.

Alberta has 190 megawatts of installed battery storage connected to their grid, supplied by 10 or more facilities. In Saskatchewan, there is one installed battery storage facility near Regina. The 20 megawatt system was built at a cost of \$34 million (originally estimated to cost \$26 million) and officially completed in July, 2024. It is reported to be able to keep the lights on for 20,000 homes for one hour in the event of a grid emergency.³⁸

There are not yet any utility scale battery storage systems in British Columbia, although government-owned electricity utility is reportedly exploring the feasibility of developing up to 600 megawatts of battery storage to assist in meeting short-term peak demand.³⁹

Powerex has recently noted that battery storage systems can “contribute substantially towards meeting capacity challenges (through 4-hour or longer discharge cycles) but do little to address (and may actually exacerbate) multi-day fuel supply challenges as they do not provide net energy over the course of one or more full charging/discharging cycles (i.e., they actually consume energy across each day of a multi-day event due to cycle losses).”⁴⁰

38 [New battery storage system to alleviate pressures on Sask. power grid | Regina Leader Post](#)

39 [Powering our Future - BC's Clean Energy Strategy, June 2024 \(gov.bc.ca\)](#), p. 34

40 [Analysis of the January 2024 Winter Weather Event – Powerex](#), p.20.





Standing Offer Program for Smaller Projects

Citing cost concerns and a claim that the electricity was not needed, one of the first actions of the current BC Government⁴¹ was to suspend the 'standing offer' program which had resulted in a number of non-emitting energy projects in different regions of the province. This program was open to projects of 15 mw of capacity or less. A similar 'micro-standing offer program, for projects smaller than 1 megawatt), was also suspended.

Arguably the most visible wind power project in the province, the [Pennask Wind Power Project](#) on the Coquihalla Highway between Merritt and West Kelowna, resulted from the standing offer program. It also produced BC's most viewed Run-of-River project, [Fitzsimmons Creek Hydro Project](#), above Whistler Village and right below the Peak-to-Peak gondola.⁴² Its annual electricity output is equal to the power used by the ski resort during the year to operate its 38 lifts, 17 restaurants, 269 snow-making guns and support facilities.⁴³

The current Call for Power is restricted to projects of at least 40 mw or larger.⁴⁴ This may leave otherwise viable and beneficial projects on the drawing board, depriving Indigenous and non-Indigenous communities alike of economic activity and the province of much-needed electricity.

Accordingly, an updated standing offer program should be re-instated for potential projects that are less than 40 MW in size.

⁴¹ "BC Hydro has a surplus supply of electricity which is expected to continue into the 2030s. The surplus means there is no need for new electricity supplies for the foreseeable future." Standing Offer Program - govTogetherBC. BC Minister of Energy, Michelle Mungall, said British Columbians were having to pay for "power they did not need." [Government to write \\$1 billion off BC Hydro's books - Business in Vancouver \(biv.com\)](#)

⁴² [Fitzsimmons Creek 7.5 MW Hydro Electric Facility \(ledcor.com\)](#)

⁴³ [Innergex: Fitzsimmons Creek Micro-Hydro Plant at Whistler Mountain | Bus Ex \(bus-ex.com\)](#)

⁴⁴ [www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/independent-power-producers-calls-for-power/independent-power-producers/call-for-power-consideration-memo.pdf](#)

Transmission & Infrastructure

5. Support First Nations reconciliation projects with flexible options for participation, and adequate transmission infrastructure & electricity supply

Adequate transmission infrastructure and electricity supply are crucial for supporting all forms of residential and commercial activity, but especially for First Nations reconciliation projects in northwest BC. These projects can be an important part of the provincial economy, increasing exports of energy products and critical minerals required for global decarbonization efforts.

Projects like the Northwest Transmission Line (NTL)⁴⁵ enhanced regional economic growth by supporting several mines and reducing environmental impacts by replacing diesel-electric power generation in remote communities. Ensuring First Nations' participation in reconciliation projects, such as the Cedar LNG project, can foster economic self-determination and provide meaningful employment opportunities.

However, more transmission capacity alone will not be sufficient without adequate electricity supply to flow through expanded transmission lines.

Regarding BC Hydro's 2024 'call for power', the one-size-fits-all requirement of at least 25% First Nations equity stake could exclude the involvement of some First Nations, who may prefer a royalty payment arrangement instead. The 25% First Nation equity requirement may also preclude otherwise meritorious projects from going ahead, preventing those projects from helping meet our growing electricity needs with low-carbon sources.

⁴⁵ Completed in 2014, the 287 kv transmission line runs 388 kilometres along Highway 37 from Terrace to near Bob Quinn Lake.



6. Upgrade the electricity grid to address infrastructure gaps

Connect isolated communities

Connecting isolated rural communities, such as Fort Nelson, to British Columbia's main electricity grid can significantly enhance energy reliability and reduce dependence on costly and polluting diesel generators.

This integration supports economic development, improves living standards, and has the potential to advance reconciliation efforts by providing Indigenous communities with new energy options.

As mentioned above, the benefits of remedying this challenge are proven as demonstrated by the Northwest Transmission Line (NTL) along Highway 37. NTL resulted in enhanced opportunities for economic development - more than was envisioned in 2008 when the decision was made to go forward with this proactive measure.

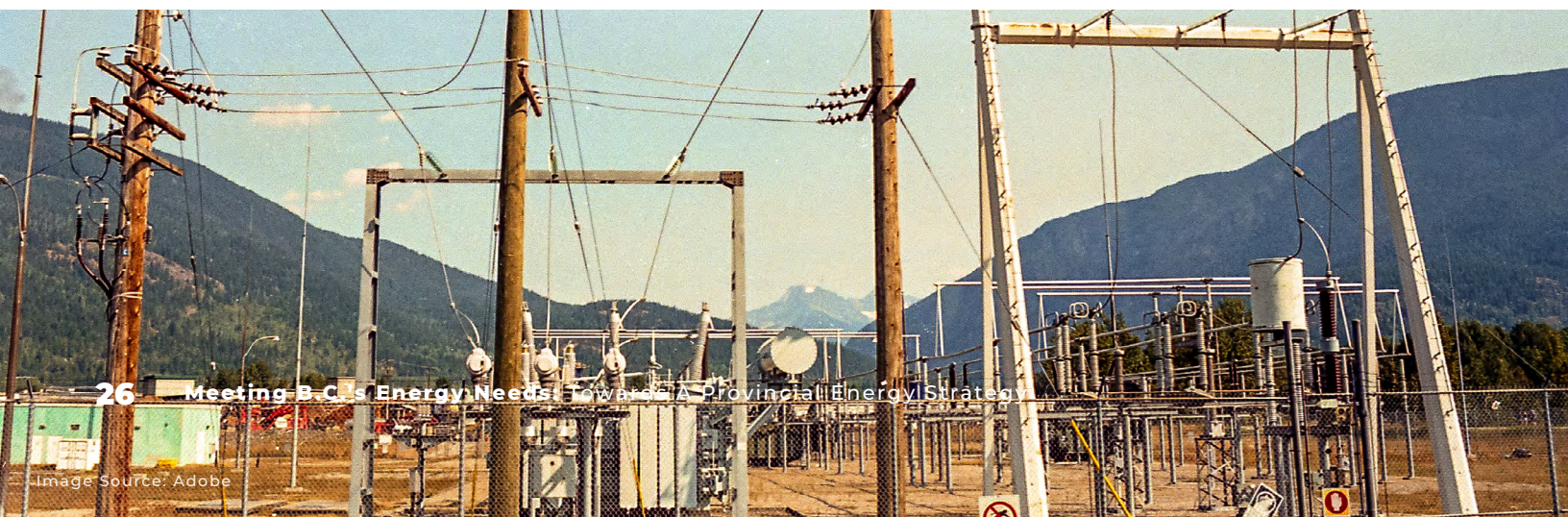
Connecting Fort Nelson to British Columbia's grid would help support GHG reductions from the oil & gas sector, providing greater ability to electrify upstream and processing activities. It could also be a step toward enhanced electricity trading opportunities with Alberta and possibly the Territories,⁴⁶ bringing the goal of an enhanced intertie with northern neighbours closer to reality.

BC Hydro's distribution grid is struggling to keep pace with the rapid development.⁴⁷ This challenge will persist as the population grows, delaying or limiting new projects including much needed additional housing options. The distribution grid challenge will be exacerbated by the current aggressive EV sales mandates of 90% by 2030 and 100% by 2035 and the Zero Carbon Step [building] Code which effectively forces new residential and commercial buildings to be heated by electricity (this issue is discussed in more detail below) rather than natural gas.

Upgrading the electricity distribution networks is essential to meet the growing demand and support new developments, as well as increased EV vehicle use. Investments in substations and streamlined permitting processes are critical to ensuring reliable power supply and avoiding project delays.

⁴⁶ [CBC News - Yukon Seeks BC Electricity Grid Connection](#), June 11, 2024.

⁴⁷ www.westerninvestor.com/british-columbia/bc-hydros-distribution-grid-not-keeping-pace-with-development-7245391, July 7, 2023



Expanding intertie connections

A recurring question is whether British Columbia and Alberta should expand the existing 500kv transmission intertie through the Crowsnest Pass region (developed in the late 1980s) to increase the current maximum of electricity (1,200 megawatts) that can be exchanged between the two provinces. This was most recently studied six years ago.

There have been operational limitations which reduce the maximum capacity of the existing infrastructure. At Energy Futures Institute, we support expanding the intertie capacity. However, British Columbia claims the Alberta Electric System Operator (AESO) has taken steps to “unilaterally reduce import capacity of the intertie.”⁴⁸

According to a Briefing Note prepared from BC Minister of Energy, Josie Osborne, additional investment is required on the Alberta side of the border to restore capacity of the intertie. Actual capacity available for trading has been recently been reduced to just $\frac{1}{4}$ of the originally intended amount of capacity by AESO, according to the Ministry of Energy.⁴⁹ AESO says the issue is linked to the need for “additional equipment” near the intertie.⁵⁰ Resolving this dispute needs to be a high priority for all parties in order to optimize use of this existing asset, in order to help maintain system reliability and the economic benefits from trading.

While the Energy Futures Institute is fully of the belief that the best paths towards electricity security involve the expansion/maintenance of domestic electricity supply and effective management of the rate of electrification, it’s nonetheless important that strong intertie connections exist so as to provide BC with sufficient supply redundancy options as well as options for future electricity exports.

Energy Futures Institute also recommends that BC Hydro examine expanding the BC – USA interconnection (two 500kv transmission lines and a 230kv line added in 2021), which crosses the border near Blaine, Washington. Population and electricity demand have been increasing on both sides of the border. Given long lead times for regulatory approvals and construction, planning should start now for possible future expansion of capacity.

⁴⁸ [Powering Our Future: BC's Clean Energy Strategy](#), page 36.

⁴⁹ [Briefing Note - Ministry of Energy, June 30, 2024](#)

⁵⁰ [Alberta - British Columbia Intertie Restoration \(7006\) » AESO](#)

7. Expand natural gas transmission and hydrogen infrastructure to support domestic needs and energy exports

Natural Gas

The BC Utility Commission's Christmas Eve rejection in 2024 of FortisBC's \$327 million natural gas pipeline expansion in the South Okanagan highlights problems with the CleanBC Roadmap policy.

This project was deemed necessary by the BCUC to meet the region's growing energy demands, particularly for heating homes. However, pointing to the government's CleanBC Roadmap, the BCUC declined to approve the project.⁵¹

Expanding infrastructure is crucial to ensure energy security and support both domestic needs and potential energy exports.

Additional natural gas transmission capacity is needed for southwestern B.C. due to continuing population and industrial growth, and to increase supply to Washington State and Oregon, which are facing worrisome capacity constraints during periods of peak demand.

The main north-south natural gas transmission line (known as the Enbridge Westcoast Pipeline) in British Columbia transports natural gas from the northeastern part of the province to the southern regions and into markets in the Pacific Northwest of the United States. Expansion of the pipeline would help reduce the risk of brownouts or blackouts and provide greater tax revenue to governments in Canada by supporting greater natural gas exports.

51 [Energy regulator rejects FortisBC's \\$327M application for natural gas pipeline | CBC News](#)





Hydrogen

Enhancing the distribution infrastructure for hydrogen fuel is one way to help provide additional energy alternatives with lower associated GHG emissions.

This includes developing refuelling stations and distribution networks to ensure reliable and widespread access to hydrogen. Investing in this infrastructure will facilitate the adoption of hydrogen fuel in transportation and industrial applications, contributing to energy diversification and reducing reliance on traditional fossil fuels. Demonstration projects like the Smart Hydrogen Energy District (SHED) at UBC can provide a way to accelerate hydrogen adoption and should be actively encouraged.

However, the challenge with hydrogen from a GHG and cost perspective is how it is produced. Grey Hydrogen is currently the cheapest method, but its GHG emission profile is higher than other options. It is generally made by reforming natural gas. Blue Hydrogen involves adding carbon capture and storage technology to the production process, which increases costs but helps address GHG concerns through sequestration. Turquoise hydrogen is produced through a process called methane pyrolysis, with CO₂ converted to solid carbon for other uses.⁵² Green Hydrogen has often been considered the most expensive method as it involves electrolysis (passing an electric current through water to separate its molecules into hydrogen and oxygen gases). This can require large quantities of non-emitting electricity (from solar, wind power, geothermal or hydroelectric facilities).

Technology improvements may make this option more cost competitive, but British Columbia is already experiencing challenges meeting existing demand for electricity. Approximately 7,000 Megawatts (MW) of proposed new industrial demand waiting in BC Hydro's interconnections queue.⁵³

⁵² [Potential for Turquoise Hydrogen \(Methane Pyrolysis\) in BC, April 2024 \(cice.ca\)](#)

⁵³ [Powering Our Future: BC's Clean Energy Strategy, p.32.](#)



Policy & Governance

8. Adopt a global perspective on emissions – leverage LNG exports to support global emissions reduction and energy security for allied countries

British Columbia has a vital role to play in global emissions reduction. Supporting these efforts involves recognizing that British Columbia is not an isolated actor when discussing GHG emissions. BC's LNG exports can serve as a tool for supporting developing states' transition away from dirtier fuels such as coal and oil.

This approach would not only support global emission reduction efforts but could strengthen BC's economic position in the international energy market and support Canada's geopolitical allies.

Demand for LNG increased following the 2022 invasion of Ukraine with many of Canada's allies looking for an alternative to Russian natural gas. Greece and Germany raised this issue with Prime Minister Trudeau but were advised that Canada would not facilitate LNG exports from our east coast.

British Columbia should also support LNG bunkering in coastal ports. Major international cruise lines have invested billions of dollars in developing new, sophisticated ships which run on liquified natural gas, dramatically reducing criteria pollutants like sulphur (almost 100%), nitrogen oxides (95%) and fine particulate matter (by 98%), while also trimming GHG emissions by 20-25%. However, bunkering (fueling services) for LNG-powered ships is not widely available on the west coast of North America. Currently, there are no LNG-powered cruise ships operating from the Port of Vancouver.

9. Assert Provincial jurisdiction over energy policy – prevent municipalities from banning natural gas hookups for new construction and commit to not implementing a province-wide gas ban.

Even when not used for generating electricity, natural gas assists the electrical system when used for space heating, as industry and residential users would otherwise look to the electricity grid to keep them warm. In fact, on the coldest day, the vast majority of energy used for heating in British Columbia comes from natural gas. See chart below.

Relying on electric heat pumps for heating needs during the coldest days would dramatically increase electricity demand during peak periods. Expanding electrical generating capacity, transmission, and distribution networks would be a formidable challenge. Already, the costs of upgrading and expanding local electricity distribution capacity have been staggering, with more than \$2 billion recently announced for two communities^{54 55} and a further \$3 billion earmarked for Vancouver Island.⁵⁶

A study submitted to the BC Utilities Commission in February 2023 revealed that if only 25% of residential users in Kelowna switched from natural gas heating to electric heat pumps, demand for electricity on the coldest days of the year would increase by 50.6% (from 472 megawatts to 711 megawatts), at an estimated cost of up to \$1.7 billion in just that one community for upgrades to local distribution. This number does not include the cost of building additional generating capacity.

Compounding challenges, the British Columbia Utilities Commission (BCUC) has been hesitant to approve new natural gas projects, further limiting access to this heating source and placing additional strain on B.C.'s at-risk electricity system.⁵⁷

54 [BC Hydro to Spend \\$725 million in Langley | BC Gov News](#)

55 [BC Hydro to Spend more than \\$1.25 billion in Burnaby | BC Gov News](#)

56 <https://vancouversun.com/news/local-news/vancouver-island-3-billion-bc-hydro-upgrades>

57 [BCUC rejects FortisBC plan to build 30-km pipeline for Okanagan | Globalnews.ca](#)





Municipal Regulation & The Zero Carbon Step Code

Energy utilities like BC Hydro and FortisBC are regulated by the provincial government, yet many municipalities have effectively banned new natural gas hookups by adopting the 'Zero Carbon Step Code' before it becomes mandatory in 2030 as per the CleanBC Roadmap. The Zero Carbon Step Code consists of four emission levels (EL), representing levels of allowable emissions.⁵⁸

EL-1: Measuring only. No limits.

EL-2: Primary heating system to be electrified in most cases.

EL-3: Primary heating system and water heating system to be electrified in most cases.

EL-4: All building systems including equipment & appliances electrified in most cases.

The BC Government's 'Zero Carbon Step Code'⁵⁹ is accelerating demand and thus cost pressures on the electricity system. To achieve the highest level, known as 'Emissions Level 4: Zero Carbon Performance' usually involves relying entirely on electricity for energy,⁶⁰ effectively restricting the use of natural gas for new residential and commercial buildings.

⁵⁸ [CleanBC Roadmap](#), page 40.

⁵⁹ <https://news.gov.bc.ca/releases/2023ENV0030-000653>

⁶⁰ [Low Carbon New Buildings | City of Victoria](#)

In essence, local governments have been encouraged to act as energy regulators by implementing policies on the types of energy that can be used by residents and businesses. This is limiting future energy options (such as renewable natural gas) for residential and commercial users alike, as without physical connections to natural gas infrastructure, renewable natural gas cannot be delivered. These actions place greater pressure on the electrical grid by increasing demand for electricity, particularly during peak periods.

The provincial government can safeguard future energy choices and limit excessive demand for electricity by restricting the ability of local governments to ban natural gas usage and infrastructure, making it clear the provincial government is solely responsible for energy policy.

The Government of Quebec brought forward new legislation allowing the Province to decide when and if municipalities can ban natural gas in their community. The objective is to reduce the strain on Hydro-Québec's electricity grid.

In the interest of safeguarding energy choice and limiting excessive electricity demand, the Energy Futures Institute recommends that the provincial government reassert its status as the sole jurisdiction for energy policy by prohibiting municipalities from banning natural gas hookups. Beyond this, it's recommended that implementation of the Zero Carbon Step Code, as stipulated in the CleanBC Roadmap,⁶¹ be suspended until the impacts and costs to the electricity distribution, transmission and generation system are properly studied and publicly understood.

⁶¹ [cleanbc_roadmap_2030.pdf \(gov.bc.ca\)](#), p. 40.



10. Revisit electric vehicle sales quota, replace with emission standards

Zero-Emission Vehicle Sales Quotas

British Columbia has legislated the most aggressive zero-emissions vehicle sales mandates in North America, and possibly the world, requiring a minimum of 26 percent of new vehicle sales to emit zero GHG emissions by 2026, with the number escalating to 90 percent by 2030, and 100 percent by 2035.⁶² By way of comparison, the State of California has set a target of 68% EV sales by 2030.⁶³

Under BC's *Zero-Emission Vehicle Act*, failure to meet the sales quotas will attract a penalty of about \$20,000 per vehicle, which is likely to be passed on to the consumer.⁶⁴

Electric vehicles have some attractive features that are favourable compared to internal combustion engine (ICE) vehicles. Most notably, they do not emit any tailpipe emissions. However, EVs may not immediately be suitable for all applications or all consumers. For example, without the ability to charge vehicles at home, consumers may be reluctant to commit to an EV. Further, EVs are also typically more expensive than comparable ICE vehicles.

⁶² [Zero-Emission Vehicles Act](#)

⁶³ [Reuters - Automakers Question Feasibility of California EV Sales Mandate, Feb 29, 2024.](#)

⁶⁴ [BC Consumers will pay the price, BC New Car Dealers Association, June 2024](#)

To help address the price differential between EVs and conventional ICE vehicles, governments have been providing taxpayer-funded rebates. However, British Columbia recently effectively shrunk the number of EV vehicles eligible for provincial rebates by 75% by lowering the manufacturer's suggested retail price (MSRP) for vehicles that can qualify for the CleanBC 'Go Electric rebate program'.⁶⁵ Car dealers have predicted this will make it more difficult to achieve British Columbia's EV sales mandate.⁶⁶

Whenever government intervenes in the marketplace to mandate consumer choice, some degree of public backlash can be expected. This appears to be happening with the North American EV market, as the topic of EVs has become politicized. This is unfortunate, given the performance and environmental benefits associated with EVs.

Infrastructure to Support EV Adoption

It's important to make sure that BC has the infrastructure needed to support the dramatic increase in EVs envisioned by the BC Government's CleanBC climate policy and the corresponding legislated EV sales mandate of 90% (by 2030) and 100% (by 2035).

Energy Futures Institute has researched this issue, releasing a report on April 30, 2024 prepared by Professor and researcher Jerome Gessaroli.⁶⁷ He found that British Columbia has an insufficient number of vehicle charging stations to support high levels of EV adoption province-wide and that the current EV sales mandate would further strain BC's electricity system.

While the province is targeting 10,000 public chargers by 2030, estimates outlined in the report suggest that upwards of 40,000 public chargers could be needed by 2030 and more than 90,000 public chargers could be needed by 2040.

The legislated sales targets for EVs are anticipated to require approximately 2,700 GWh of added electricity by 2030. By 2040, this requirement will grow to 9,700 GWh of additional electricity demand, close to the output of two Site C dams under normal water conditions.

A study prepared for the Metro Vancouver Regional District last year⁶⁸ indicates just that portion of British Columbia alone could require more than 100,000 public charging stations to support current legislated EV sales mandates, at a cost of [up to \\$2.9 billion just for the charging infrastructure](#). Currently, there are only approximately 5,000 public charging stations in the entire province.

BC's current power grid (generation, transmission and especially distribution) will need significant

⁶⁵ <https://globalnews.ca/news/10576386/expert-says-ev-rebate-cost-more/>

⁶⁶ www.newcardealers.ca/auto-blog/bc-consumers-will-pay-the-price-for-changes-to-electric-vehicle-rebate-program/

⁶⁷ BC lacks infrastructure to meet zero-emission vehicle mandate, Energy Futures Institute

⁶⁸ Regional Electric Vehicle Charging Analysis and Guidance Report, Metro Vancouver, Sept 2023

upgrades at the cost of multiple billions of dollars to handle increased electricity demand from the current legislated shift to EVs. Already, BC Hydro has announced it will cost \$2 billion to upgrade systems in just two communities (Langley⁶⁹ and Burnaby⁷⁰), with a further \$3 billion earmarked for Vancouver Island.⁷¹

The Energy Futures Institute recommends that British Columbia modify its approach. Adjusting or rescinding the EV sales mandate until necessary grid upgrades and power supply additions are completed. This will help prevent reliability issues and ensure a stable transition. This approach will also allow time to develop [adequate charging infrastructure](#), facilitating a more sustainable transition to EVs by avoiding potential reliability issues and decreasing public resistance/opposition. It also allows for incremental improvements in expensive infrastructure, supporting a balanced and effective reduction in emissions while maintaining energy security.

Further, the Energy Futures Institute recommends that British Columbia adopt the U.S. model of setting fleet emission standards rather than specific sales quotas for electric vehicles (EVs).⁷² This would allow the market to adapt more organically, by providing more flexibility for automakers, more choice for consumers and better alignment with the timing of improvements to BC's electrical grid, technological advancements and availability of vehicles. It may also reduce the unintended consequence of increasing public resistance to electric vehicles due to perceptions of government “telling people what to do”.

69 [BC Hydro to Spend \\$725 million in Langley | BC Gov News](#)

70 [BC Hydro to Spend more than \\$1.25 billion in Burnaby | BC Gov News.](#)

71 <https://vancouversun.com/news/local-news/vancouver-island-3-billion-bc-hydro-upgrades>

72 www.cbc.ca/news - New U.S. EPA Tailpipe Emission Rules, March 2024.





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