Energy Futures

A Road Too Far

Assessing British Columbia's Power Needs and its Electric Vehicle Sales Mandate

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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.

Energy Futures

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Executive Summary

In an effort to take action on climate change, the British Columbia provincial government has set aggressive zero-emission vehicle (ZEV) sales targets, which surpass federal Canadian and US-regulated target standards. BC's accelerated plan 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.

Electric vehicles have some features that are favourable compared to conventional-powered vehicles, most notably, they do not emit any tailpipe emissions. However, there are questions whether they are at present a full substitute to gas-powered vehicles.

BC is currently home to approximately 5,000 public EV chargers and the provincial government has set a target of having 10,000 public chargers installed by 2030. Indications suggest even this target may be insufficient. While exact estimates vary, experts have indicated that BC could require upwards of 40,000 public chargers by 2030 and 90,000 by 2040. Installation costs could be in the billions.

An accelerated introduction of EVs will put further strain on BC's electrical system. Meeting the minimum new vehicle sales targets will require approximately 2,700 GWh of added electricity by 2030, about half the annual production of the Site C dam. By 2040, this requirement will grow to 9,700 GWh or equivalent to two Site C dams. The 2030 figure is also comparable to the electricity generated by almost two Buffalo Plains Wind Farms (Canada's largest single wind farm), while in 2040, it would be comparable to seven such wind farms.

As things stand today, British Columbia is facing challenges to its electricity system. In 2023, BC imported more power than Site C would produce in two years of operation. BC Hydro recently issued its first call for power in fifteen years though questions still persist on whether the call will be sufficient to meet anticipated demand. Moreover, staff capacity and resource limitations could make it difficult for new generating projects to be approved in a timely manner.

In regions most likely to see widespread EV adoption, BC Hydro's distribution system faces ongoing challenges – this is most notable in Metro Vancouver, where increasing delays are reported in connecting residential and commercial buildings to the electrical system.

Given these concerns, this report recommends that the BC government adjust or rescind its forthcoming zero-emission vehicle sales targets. Should the provincial government continue to move forward with policy surrounding zero-emission vehicle sales, this report recommends a focus on meeting emission standards rather than mandating new EV sales quantities.

The opinions and views expressed in this report are those of the author and are not necessarily those of the British Columbia Institute of Technology (BCIT).

Introduction

The provincial government in British Columbia has set ambitious goals to lower greenhouse gas (GHG) emissions in 2030, 2040, and 2050, by 40, 60, and 80 percent respectively from its 2007 emissions levels.

Many of BC's emissions reduction efforts fall within the province's Clean-BC Plan. (British Columbia, 2023a) A part of the province's strategy is to replace fossil fuel use with clean electricity sources, including hydro, wind, geothermal, biomass, and solar power. Below are some of the initiatives:

- Electrifying parts of the natural gas and energy sectors
- Replacing diesel engines with electric motors in mining and forestry operations
- Electrifying process heating production in mining
- Transitioning from fossil fuel transit powertrains to electric
- Replacing natural gas heating with heat pumps and gas stoves with electric alternatives
- Curtailing the use of diesel generators in remote communities
- Replacing on an accelerated basis, internal combustion engine (ICE) light-duty vehicles with zero-emission vehicles.[1]

Other plans include strengthening regulations to reduce methane emissions, mandating energy conservation in buildings and homes, and improving the efficient use of energy in construction and industrial operations.

To make progress, two factors must be addressed. British Columbia must substantially increase electricity production, to meet the demand created by both industry and individual citizens. The province also needs to expand transmission and distribution capacity since much of the electricity generated may be far from where it is ultimately used. One important aspect of CleanBC's plan is regulations to rapidly electrify light-duty vehicles,

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[1]*Zero-emission vehicles can include electric and hydrogen fuel-cell vehicles, though the vast majority of ZEVs will be fully battery electric or plug-in hybrid electric. For the purposes of this paper, electric vehicles and zero-emission vehicles are considered the same. Light-duty vehicles include automobiles, SUVs, light passenger trucks, and passenger vans.*

This paper will examine the feasibility of the BC government's mandate to replace internal combustion engine vehicles with electric vehicles (EVs) within an accelerated timeframe, while also considering the additional energy and infrastructure needed for electric vehicle adoption in British Columbia.

The broader question of whether wholesale electric vehicle adoption is the best method for mitigating GHG emissions in the transportation sector is beyond this paper's scope and is not covered.

Zero-Emission Vehicle Plan

The provincial government originally legislated that by 2025, a minimum of 10 percent of all new vehicle sales in British Columbia must be zero-emission That number grew to 30 percent by 2030 and 100 percent by 2040. (British Columbia, 2023b) Amendments enacted in 2023 aim accelerated required zero-emission vehicle adoption to 26 percent by 2026, 90 percent by 2030, and 100 percent by 2035. (Legislative Assembly of BC, 2023) To incentivize EV adoption, the provincial government has offered a purchase subsidy program of up to $4,000, along with financial incentives for installing charging stations.[2]

Electric vehicles have some features that are favourable compared to conventional-powered vehicles, most notably, they do not emit any tailpipe emissions.[3] However, EVs contribute to considerable GHG emissions during both battery production and vehicle assembly, as well as through the energy sources used for electricity generation – collectively referred to as life cycle emissions. There are also uncertainties that put in doubt their ability to fully replace internal combustion engine (ICE) vehicles.[4]

British Columbia's accelerated targets for zero-emission vehicle sales are modelled on California's electric vehicle plans. However, BC's 2030

[2]Eligibility for BC's EV purchase subsidy is based on income level and the type of vehicle purchased. See Electric vehicle incentives in B.C. for more information on both programs.

[3]While electric vehicles are considered zero-emission vehicles, they do produce non-tailpipe particulate emissions, mostly from tire and brake wear. Some studies suggest that EVs emit more particulate emissions than ICE vehicles.

[4]For an assessment on the suitability of widespread EV adoption, see Jerome Gessaroli, A Bumpy Road Ahead: A Critical Assessment of Canada's Electric Vehicle Availability Standard, Macdonald-Laurier Institute, 2024 (forthcoming).

Zero-Emission Vehicle Plan: Continued

Table 1, BC, Canada, and the US timetables for Minimum New Zero-Emissions Vehicle Sales[5]	
BC Zero-emission Vehicle Amendment Act, 2023[a]	26% by 2026 **90% by 2030** 100% by 2035
Canadian Federal Electric Vehicle Availability Standard[b]	20% by 2026 **60% by 2030** 100% by 2035
US Environmental Protection Agency (EPA) regulations[c]	**67% by 2032**
California regulations[d]	35% by 2026 **68% by 2030** 100% by 2035

targets are more ambitious than Canada's national New Electric Vehicle Availability Standard and the targets set by both the US Biden Administration and the California plan.

The EPA lacks the authority to regulate new vehicle sales in the United States. Instead, the EPA is setting increasingly stringent emission standards over time, which will prompt auto manufacturers to shift towards EVs for compliance. So, while automakers must still meet strict emission targets, they can adjust their new vehicle offerings in any way they wish, offering more flexibility in the marketplace.

While the Canadian federal government's standards aligned with those of the EPA both the federal and BC governments have chosen to require automakers to sell specific proportions of battery and plug-in EVs.

Mandating specific EV sales numbers poses several challenges. Automakers could face difficulties in planning, given the need to reconcile differing new vehicle compositions for the US and Canadian markets.

5[a]Legislative Assembly of BC, Bill 39 – 2023: Zero-Emission Vehicles Amendment Act, 2023.

[b]Government of Canada, New Electric Vehicle Availability Standard will give Canadians better access to more affordable cars and cleaner air, December 19, 2023.

[c]United States Environmental Protection Agency, Biden-Harris Administration Proposes Strongest-Ever Pollution Standards for Cars and Trucks to Accelerate Transition to a Clean-Transportation Future, April 12, 2023.

[d]California Air Resources Board, California moves to accelerate to 100% new zero-emission vehicle sales by 2035, August 25, 2022.

Furthermore, discrepancies between EV market demand and government targets could arise. If EV sales in BC fall short of expectations, automakers may have to limit the sale of conventional combustion engine vehicles in order to comply with percentage targets and avoid significant financial penalties. However, doing so would likely drive-up prices of new and used conventionally powered vehicles, adversely affecting the finances of many British Columbians.

The pace at which the government mandates new zero-emission vehicle sales is one factor affecting how quickly the province must provide additional electricity infrastructure for EV charging.

Public Chargers

The proposed accelerated timeline presents several challenges, notably the need for faster development of a province-wide public and private charging network. The BC government aims to have 10,000 public EV chargers in use by 2030. (British Columbia, 2024[a]) This amount is likely inadequate. Table 2 summarizes what other jurisdictions deem necessary for public charging.

Table 2: Canadian federal government, US, and California, public charging metrics

Jurisdiction	Public charger metrics	Estimated public chargers for BC
British Columbia	Provincial government's target for 2030	10,000
Canada[b]	24:1 vehicle-to-charger ratio	47,458[a]
United States[c]	43.4 public chargers per 1,000 EVs	49,433[a]
California[d]	227,000 public chargers for 7,100,000 EVs	36,416[a]
Average based on the above metrics (not including BC)		44,436

[a]Estimated public chargers for BC calculated values are based on the proportion of chargers to EVs in column 2, and the number of EVs forecast for 2030 in Table 3. Example, 1,139,000 ÷ 24 = 47,458.

[b]Government of Canada, Updated Projections of Canada's Public Charging Infrastructure Needs, March 31, 2022.

[c]U.S. Department of Energy, National Plug-In Electric Vehicle Infrastructure Analysis, September 2017.

[d]California Energy Commission, Assembly Bill 2127 Second Electric Vehicle Charging Infrastructure Assessment: Assessing Charging Needs to Support Zero-Emission Vehicles in 2030 and 2035, March 6, 2024.

Public Chargers: Continued

As of March 2024, British Columbia had 5,000 public chargers. (British Columbia, 2024b) If we take an average of all estimates listed in table 2, 44,436, and subtract the chargers already installed, over 15 new public chargers will need to be installed in British Columbia every day between now and 2030.[6] Of course, these numbers do not include the tens of thousands of private chargers that will need to be installed in individual resident garages.

However, achieving the 2030 target is just an interim step. While BC's target is for 90 percent of new vehicles sold to be zero-emission, approximately 70 percent of the vehicles on BC roads in 2030 will still be gas-powered. The growth in EV stock will mostly occur between 2030 and 2040.

A report prepared for Natural Resources Canada (NRCan) estimates that there will need to be one public charger for 43 EVs when 90 percent of vehicles on the road will be electric. (Natural Resources Canada, 2022) Given the 43:1 EV to public charger ratio and assuming four million vehicles, the province will need a cumulative total of 93,000 public chargers by 2040.

The installation costs for these chargers will be high. The NRCan report states that installing one level 2 charger costs $8,000, while a fast charger costs $150,000. Using the same report's proportion of level 2 to fast chargers, the estimated cost for British Columbia is $700 million by 2030 and $1.1 billion between 2031 – 2040.[7] The total cost, excluding the already-installed public chargers, is estimated to be $1.8 billion.

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[6]Between 2024 to the end of 2030, 44,436 – 5,000 = 39,436 chargers will need to be installed. 39,436 ÷ (7 × 365) = 15.4 ≈ 15.

[7]The $700 million was calculated as follows. The NRCan reports shows that 30 percent of all vehicles in Canada will be electric sometime between 2030 and 2035. The number of public chargers between 2030 and 2035 was assumed to be an average of the 2030 and 2035 figures. Fast chargers = (13,800 + 32,000) ÷ 2 = 22,900. Level 2 chargers = (181,000 + 410,000) ÷ 2 = 295,500. Based on the former numbers, the proportion of public fast chargers is 7.2 percent of the total while public level 2 chargers make up 92.8 percent of the total. Using these percentages and the charger costs, we can estimate the cost to install the required public chargers by 2030. 44,436 are required – 5,000 already installed = 39,436 public chargers are needed to be installed. (7.2% × 39,436 × $150,000) + (92.8% × 39,436 × $8,000) = $718,681,664 ≈ $700 million.

The $1.1 billion was calculated as follows. The NRCan report states that 69,000 public fast chargers and 658,000 public level 2 chargers will be required in Canada by 2050, when EVs will make up 90 percent of all vehicles on the road. Fast chargers are then calculated to make up 9.5 percent and level 2 chargers are calculated to make up 90.5 percent of all public chargers. The NRCan report also uses a ratio of 43 EVs for one public charger at that time. Table 3 of this report estimates by 2040 BC vehicles on the road will be 90 percent or 4.017 million electric vehicles. 4.017 million ÷ 43 = 93,418 ≈ 93,000 public chargers required by 2040 in BC. Given 43,219 public chargers would have already been installed by 2030, 93,000 – 44,436 = 48,564 ≈ 49,000 will need to be installed between 2031 – 2040. The cost for these public chargers is: (9.5% x 49,000 x $150,000) + (90.5% x 49,000 x $8,000) = $1,053,010,000 ≈ $1.1 billion.

Automotive Industry Response to the New Sales Mandate

The proposed, more aggressive zero-emission targets introduced in 2023 have sparked concern within the automotive sector.

Brian Kingston, president of the Canadian Vehicle Manufacturers' Association, remarked that "there is no obvious pathway to 90 percent by 2030." (Mertl, 2023) The president of BC's New Car Dealers Association also expressed concern over the shorter timeframe. (Mertl, 2023) Similar concerns in the US from both the automotive industry and unions resulted in the EPA easing its shorter-term emission targets.

High EV prices, even with purchase subsidies, an underdeveloped charging network, and range anxiety are all factors that have inhibited widespread adoption. A sales mandate does not negate the existence of these challenges.

An Estimate of Electricity Required for Electric Vehicles

A large influx of electric vehicles will have a significant impact on BC's electricity system. When determining the viability of the province's zero-emission mandate, it's important to understand whether British Columbia actually has sufficient electricity to meet the anticipated increase in demand.

It's important to note that even if the 100 percent sales target is met, most of the stock of BC's vehicles will still be conventionally powered vehicles for some time.

Several factors influence the amount of electricity needed for electric vehicles. These include the vehicle's average lifespan, charging station availability, and the vehicle's energy usage, which is largely determined by its size. Additionally, the proportion of plug-in hybrid vehicles to full-battery electric vehicles affects electricity requirements.

Table 3 is a forecast that provides some insight into how much more electricity the province needs in order to meet its zero-emission new vehicle plans.

An Estimate of Electricity Required for Electric Vehicles: Continued

Table 3, Estimated Electricity Required to Meet BC's Zero-Emission Sales Mandate[ab]					
(Vehicles in 000s)	**2024**	**2026**	**2030**	**2035**	**2040**
Non-Electric vehicles	3,268[c]	3,245	2,721	1,633	452
Electric vehicles	229	374	1,139	2,534	4,017
Total vehicles	3,497	3,619	3,860	4,167	4,469
Proportion EVs to total vehicles	7%	10%	30%	61%	90%
Required electricity (GWh)[d]	552	902	2,748	6,113	9,691
Req'd electricity generation[e] (GWh)	589	963	2,932	6,523	10,340

Table 3 indicates that about 2,700 GWh of electricity is required to meet the 2030 objective. The amount required more than doubles by 2035 and is almost 9,700 GWh by 2040. BC Hydro would need to produce even more than that amount, as on average, 6.3 percent of power is lost through its transmission facilities.

Other studies have estimated similar amounts of additional electricity required by the province to meet the transition to EVs, under the government's targets.[8]

- A working paper from the University of Victoria "Electric Vehicles and the Demand for Electricity" estimates the BC electric system needs will add between 4,390 – 9,260 GWh to accommodate the widespread adoption of electric vehicles. (van Kooten & Clarke, 2023)
- Natural Resources Canada commissioned a comprehensive study on electric vehicle adoption and its impact on the electrical grid across Canada. The report estimates that 2,600 GWh of electricity will be needed by 2030 to support light-duty electric vehicles. (ICF Canada, 2021)
- A report by the Canada Energy Regulator does not estimate electricity requirements. However, it does state that EVs consume between 150 – 300 Wh/km.[9] Using an average of these figures, 225 Wh/km, for calculating electricity required in 2030, suggests 3,306 GWh would be needed by 2030 about 20 percent more than the 2,748 GWh in Table 3. (Canada Energy Regulator, 2023)

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[a]Model assumptions: 14-year vehicle life (Toronto Star, 2018); Vehicle growth based on BC government population growth forecasts (BC Stats); EV energy usage is 187 Wh/km (Electric Vehicle Database); 12,900 average annual km driven (Canadian Vehicle Survey).

[b]GWh (or gigawatt-hour) is a unit of energy equivalent to one billion watt-hours (Wh). It serves as a measure of the output of large electric power stations.

[c]Non-EV totals are divided equally over the number of years of vehicle life remaining. Every new year, new non-EV purchases are based on old vehicle replacement and additional vehicles purchased based on population growth, minus all EV purchases. EV purchases are based on the targeted proportion of EVs for that year for both old vehicle replacement and additional vehicles purchased based on population growth.

[d]Required electricity = each year's Total EVs × average energy usage × average annual kms driven.

[e]Required electricity generation is the amount that must be generated to deliver the required electricity amount through the electric system to the consumer. This number is calculated based on BC Hydro's power loss estimate of 6.28 percent through its transmission grid.

For comparison, the Site C dam will be capable of producing 5,100 GWh annually assuming average water flows (which we did not have last year and seem unlikely to have this year). (BC Hydro, 2024) Therefore, BC will require additional electricity equivalent to more than one Site C dam by 2035, and approximately two dams by 2040. Site C is estimated to cost $16 billion and will take 10 years to build. (Kurjata & Bains, 2021) (British Columbia, 2018)

The province is unlikely to build another large dam in the short to medium term. Instead, it intends to turn to other clean energy sources for new electricity generation. One option is wind. The Buffalo Plains Wind Farm project in Alberta is an example. It is expected to be operational by December 2024 and will be the largest single wind farm in Canada. (Power Technology, 2023a) Planning, permitting and construction will have taken just under 7 years. (Buffalo Plains Wind Farm, n.d.) It will be able to generate 1,500 GWh of electricity per year. (Power Technology, 2023b) By 2030, BC will need almost two times the energy production of the Buffalo Plains wind farm and seven times the equivalent by 2040 to meet its electric vehicle charging needs.

Solar and wind power, while generally cost-competitive and mostly GHG-free, have a significant drawback – they are intermittent. Solar panels generate electricity only when the sun shines, and wind turbines only generate electricity when the wind blows. Consequently, utilities must have backup sources to meet variable load demands. This always means having dispatchable power available through facilities such as natural gas plants. Fortunately, BC dams have ample reservoir backup storage, capable of meeting power needs during solar or wind intermittency. Therefore, the likelihood of incurring large capital costs to procure additional such systems is low.

The Call for More Power

CleanBC's Roadmap To 2030 asserts that "B.C's abundant supply of clean electricity is one of our greatest allies in the fight against climate change." (CleanBC) While the province may have once had an abundant supply of electricity, for five of the last 13 years BC Hydro has been a net importer of electricity. The following points undermine the notion that there is ample electricity available to fulfil the government's electrification plans:

1. In 2023, BC Hydro had to import about 10,000 GWh, which accounted for about 17 percent of the province's electricity needs. (CBC, 2023) (Antweiler, 2023)

2. A 15 percent growth in electricity demand is expected by 2030. (British Columbia, 2023c)

3. The North American Electric Reliability Corporation (NERC), a nonprofit company whose mission is "to promote the reliability of bulk electricity supply in North America", identified BC as being at risk for an energy shortfall over the next decade in its 2023 report. (Canada Energy Regulator, 2020) (NERC, 2023) This marked the first time that NERC classified BC as being at future risk. Figure 1 shows that expected electricity reserves which are important to the system's reliability, are projected to decline over the next 10 years, falling below the minimum recommended levels from 2029 onwards.[11]

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[8]Differences in electricity values between Table 3, the "NRCan" and "Electric Vehicles and the Demand for Electricity" papers are primarily due to either the initial stock of vehicles at each model's start or the vehicle growth rate over time.

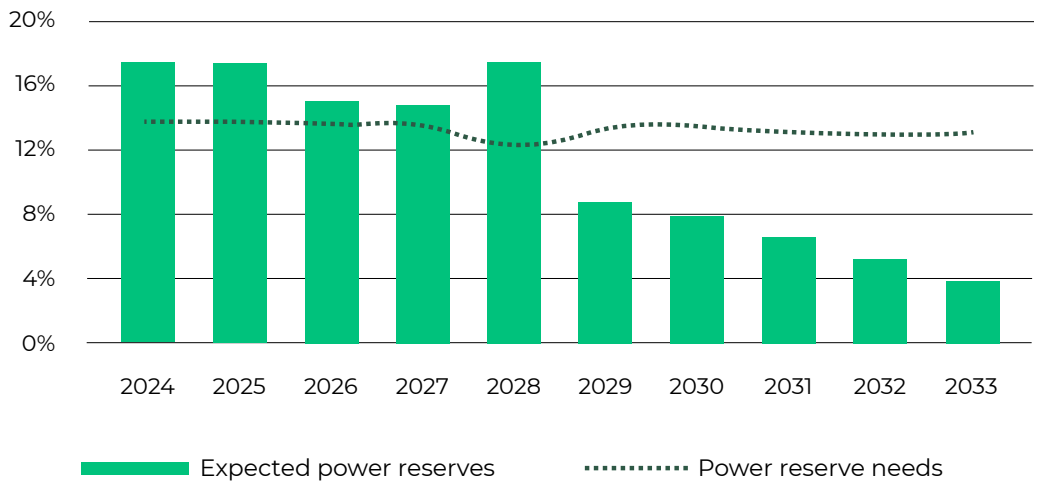
[9]The 150 – 300 Wh/km is calculated as follows. The document says EVs use about 3,000 – 6,000 kWh per year and cars are driven an average of 20,000 km per year. 3,000 kWh/yr ÷ 20,000 km/yr = 150 Wh/km. For 6,000 kWh per year the energy usage is 300 Wh/km. The average (150 Wh/km + 300 Wh/km) ÷ 2 = 225 Wh per year.

[10]Fortis BC which also generates electricity in the southeast part of the province, does not expect to need additional capacity until 2030.

[11]Electricity reserves refers to the amount of available generation capacity either immediately or after a short interruption. NERC refers to the Expected power reserves and Power reserve needs variables as Anticipated Reserve Margin and Reference Margin Level respectively.

The Call for More Power: Continued

Figure 1, Comparing Power Reserves to Needs in BC



(NERC, 2023 Long-Term Reliability Assessment).

Adding to the expected insufficient reserve margins is BC Hydro's plan to stop using gas-fueled electrical generation by 2030 (amounting to an energy output of roughly 2,300 GWh).[12] (NERC, 2023)

BC does not have a sufficient electricity supply to meet CleanBC's ambitious electrification plans. In June 2023, BC Hydro announced its intention to add 3,000 GWh of clean electricity by 2030 through an upcoming call for power in April 2024. (BC Hydro, n.d.) BC Hydro is also exploring shorter-term solutions to generate an additional 700 GWh per year before 2029. (Ingram, 2024)

[12]NERC gives a capacity figure of 462 MW for the natural gas facilities. To maintain consistency in the report I converted the capacity figure to annual energy, using a capacity factor of 0.57. 462 MW × 0.57 × 8,760 hours per year ≈ 2,300 GWh per year. MW (or megawatt) is a unit of power equivalent to one million watts. It measures the rate at which electricity is generated.

Transmission and Distribution Infrastructure Needs

As important as the need to generate additional electricity is, equally important is having the necessary transmission and distribution infrastructure. Based on growing EV demand, electric utilities in BC will need an integrated focus not only on new power generation but on upgrading the distribution system as well.

This conclusion is consistent with a 2021/2022 Natural Resources Canada (NRCan) national request for information, aimed at industry stakeholders on electric system readiness for electric vehicles. NRCan summarized the replies into several common elements. Regarding infrastructure readiness and availability, NRCan stated,

> "Respondents said that the **current grid infrastructure will be unable to meet higher loads**. (original in boldface) [They] anticipate increasing investment needs in grid readiness measures in order to reliably meet the increase in EV-related load." (NRCan, 2022)

The challenge in meeting the additional demand from EVs is generally a distribution system issue, which is the portion of the electrical grid connected to homes and buildings. Upgrades to substations, transformers, and distribution powerlines are needed, and while this type of work by electric utilities is standard, the extra load required by EVs will make this work more challenging.

EV adoption will not be uniform in all neighbourhoods. Older neighbourhoods specifically may require more upgrading. (ICF Canada, 2021) Largescale population growth and incremental electricity requirements from CleanBC initiatives, such as heat pump installations, play a contributing role in determining which regions have a more urgent demand for distribution system upgrades.

A Business in Vancouver article highlights the stress BC Hydro's distribution system is facing in parts of Metro Vancouver. The article quotes the Delta city manager stating that major areas for development are "challenged for appropriate [access to electricity] ". (Mitham, 2023) Another example is the Cloverdale sports complex, whose 2024 opening may be delayed "because BC Hydro's distribution grid can't keep up." (Mitham, 2023) BC Hydro has also acknowledged that power demand is now three years ahead of its existing capacity.

Conclusion

The BC government has set ambitious targets requiring 90 percent of all light-duty new vehicle sales to be zero-emission by 2030 and 100 percent by 2035. These targets surpass those set by the Canadian federal government, the United States federal government, and even the state of California.

However, the approach to meeting these targets varies by country. The US federal government requires automakers to meet stringent emission standards rather than targets for new EV sales. This allows automakers to determine their own mix of gasoline-powered, hybrid, plug-in hybrid, and fully electric vehicles as long as they meet the overall emission standards. This provides a degree of flexibility in the marketplace while still achieving overall goals.

Conversely, British Columbian (and federal) regulations are prescriptive, requiring that new EV sales constitute a certain proportion of overall sales. If the demand for EVs is insufficient for an automaker to reach the government's target, the automaker may stop selling gasoline-powered or hybrid vehicles to avoid large financial penalties. This could lead to insufficient vehicle supply and substantially higher prices for new and used gas or hybrid vehicles.

The current public charging infrastructure is insufficient to meet the provincial government's ambitious goals, with a need far exceeding BC's 5,000 existing public chargers. Whether the chargers can be installed to meet the accelerated sales timeline is questionable. The high cost of a province-wide public charging network will also be very significant.

The electricity required for EVs is substantial, with an estimated 2,700 GWh needed by 2030 and 9,700 GWh by 2040. Even more electricity will be needed to meet expected population growth as well as CleanBC's ambitious plans to electrify BC's economy.

However, just generating more electricity isn't enough. It needs to be delivered to where it will be consumed and where vehicles will be charged, whether at individual homes, workplaces or public parking lots. BC Hydro faces challenges in upgrading certain parts of the distribution network, which could affect the ability to install sufficient charging stations in a timely manner.

The timeline for bringing more power online is lengthy, and while BC Hydro has issued a call for power, it may lack the internal capacity to review and approve proposals in a timely manner, given the passage of time since the last call for power. In addition, permitting delays in British Columbia are widely known and appear to have been increasing, as acknowledged by Premier David Eby in April 2023.

Recommendations

Given these concerns, this report makes three recommendations:

1. The Government of BC should adjust or rescind its mandated targets for new minimum zero-emission vehicle sales. There are unanswered questions surrounding the province's ability to provide power and distribution upgrades on a timeline consistent with an accelerated adoption of electric vehicles.

2. If the provincial government decides to keep its mandate for new minimum zero-emissions vehicle sales, it ought to emulate the model used by the United States federal government. The US's 2030 target is ambitious but more realistic than that set by the BC government. Rather than mandating specific EV sales, the US federal model requires automakers to meet required emission standards. This provides modest improvements to avoid supply and price disruptions in the market if EV demand is insufficient to meet government sales targets.

3. Lastly, how quickly the government adjusts emissions standards must be aligned to realistic timetables for building out new public charging infrastructure, constructing new power sources, and upgrading the distribution grid.

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