Electrification in the BC Hydro Integrated Resource Plan

December 20, 2020

This information sheet outlines:

- What is electrification and how it's addressed in the Integrated Resource Plan (IRP)
- What's assumed in BC Hydro's reference load forecast and in the electrification scenarios
- BC Hydro's five-year electrification action plan

What is electrification? How it is addressed in the IRP?

In the context of the IRP, electrification is used to refer to switching from using fossil fuels to using electricity for power from clean energy sources. This reduces greenhouse gas (GHG) emissions and can be a powerful tool to mitigate the impacts of climate change.

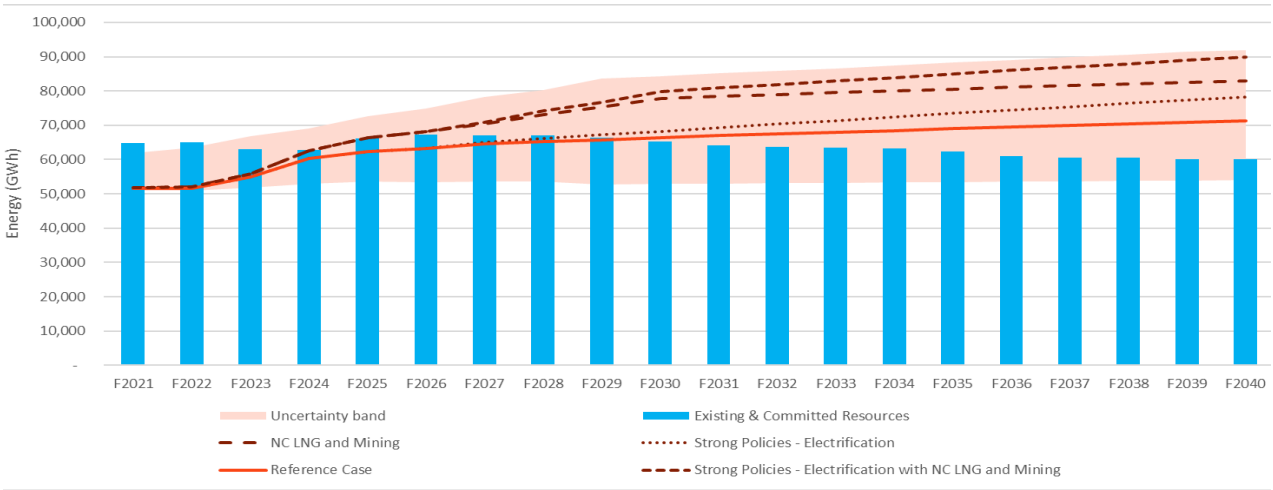
The Government of B.C.'s strategy to reduce GHG emissions is outlined in the CleanBC plan. It lays out how B.C. will be shifting away from fossil fuels and towards clean and renewable energy, including electricity provided by BC Hydro. When it comes to BC Hydro's clean electricity, the plan focuses on fuel switching within three sectors: transportation, the built environment where British Columbians live and work, and industry. How much electrification takes place within these sectors over the long term will impact how we plan the power system. The CleanBC plan establishes GHG reduction goals for 2030 and includes actions to achieve the first 75% of that goal, with the additional actions to come to achieve the remaining 25%.

BC Hydro projects the future electricity needs of our customers through our annual load forecast. It estimates the electrical load we expect to serve over the next 20 years, and includes electrification activities like those outlined in the CleanBC plan. It includes a reference forecast – our best single estimate of future needs – and a range of other future loads to manage the certainty about how the future will unfold. The reference forecast includes electrification activities that have a higher level of probability of materializing and uses uncertainty bands to help plan for higher and lower electricity demand projections for what our current and future customers could call upon BC Hydro to deliver.

Distinct from the load forecast reference case and its uncertainty band, the IRP uses **electrification scenarios** to explore what our electricity demand could look like for B.C. to meet its GHG reduction targets. As the CleanBC plan outlined how B.C. will achieve approximately 75% of the emission reductions required to achieve the Government of B.C.s 2030 targets, the electrification scenarios look at the demand for clean electricity associated with fully meeting the 2030 and 2040 targets. The scenarios are focused on the amount of electricity that could be required, while not identifying the exact roles and plans that entities such as the Government of B.C., BC Hydro, biogas suppliers and others would play in achieving the Government of B.C.'s GHG targets. That said, BC Hydro is developing our detailed electrification action plan and targets for our role within the CleanBC plan at a level of detail below that required for electrification scenarios in the IRP. Information on our five-year electrification plan is provided in the last section of this document.

What's assumed in BC Hydro's reference load forecast and the electrification scenarios

The graph below illustrates BC Hydro's current reference forecast, the range of uncertainty surrounding that forecast, and three electrification scenarios used in the IRP.



Each of these scenarios have assumptions of increasing electrification that are incremental to those in the reference case. That is, they each assume progressively more actions to accomplish GHG goals and the corresponding load that comes with each. The table below specifies what electrification measures are included in the reference load forecast and the illustrative electrification scenarios.

Much of the information used within the IRP's electrification scenarios was derived from the Navius report titled *British Columbia Electrification Impacts Study: Forecasting the Impact of Achieving British Columbia's Greenhouse Gas Emissions Targets on Provincial Electricity Consumption*. It estimates the total demand from electrification if Provincial GHG targets are to be achieved.

The following table outlines the electrification assumptions included in BC Hydro's Reference Case Load Forecast versus various scenarios for the three major sectors identified by the CleanBC plan.

Table 1: Electrification assumptions by 2040 (GWh) by major sector

Transportation (electric vehicles)	Built environment (space and water heating)	Industry (oil and gas)
Load Forecast – Reference case		
Light duty electric vehicles (EV) growth is informed by the targets established in the Zero Electric Vehicle mandate as well as economic cost comparisons against internal combustion engine (ICE) vehicles. Light duty EV load is projected to grow by about 5,300 GWh with more than half ramping up after 2030.	BC Hydro funded, and government funded Low Carbon Electrification (LCE) activities that incentivize customers to switch from fossil fuel-based energy to clean electricity. This does not include specific oil and gas electrification projects that are already included in Industry forecast. LCE load is assumed to reach approximately 150 GWh, of which a portion will include space and water heating. (i.e. low carbon electrification).	The Oil and Gas industrial sub-sector encompasses various activities, including shale gas (i.e. production /processing plants, conventional gas processing plants), oil (and condensate) pipelines, oil refineries and oil producers, natural gas pipelines, propane terminals, and liquified natural gas (LNG) terminals. Most of the electricity is used to drive compressors for production and pipeline transportation. Load growth is driven by both low carbon electrification, as well as economic growth. However, it is difficult to allocate load growth between the two main drivers. Oil and Gas subsector load is projected to grow about 2,500 GWh by 2040, with most of that growth occurring before 2030.
Load Forecast – High uncertainty band		
Assumes higher light duty EV sales relative to the reference case. Light duty EV load is projected to grow by about 7,000 GWh with more than half ramping up after 2030.	No change relative to the reference forecast.	Assumes higher oil and gas production and higher percentage of industrial load growth is electrified than the reference forecast. Oil and Gas subsector load is projected to grow about 5,600 GWh by 2040, with most of that growth occurring before 2030.

Transportation (electric vehicles)	Built environment (space and water heating)	Industry (oil and gas)
Scenario – Electrification – strong policies [incremental to the Reference load forecast]		
Medium and heavy duty vehicle electrification adds about 700 GWh, depending on battery costs, with the majority deployed after 2030.	Additional ~4000 GWh of load primarily on the South Coast, with more than half showing up before 2030.	Additional ~3000 GWh from electrification of the Oil and Gas subsector.
Scenario – North Coast LNG and Mining		
Not applicable.	Not applicable.	Assumes 100% potential LNG and Mining customers electrify, for an estimated ~10,000 GWh, with most showing up before 2030.
Scenario – Electrification – strong policies with North Coast LNG and Mining		
This scenario is the GWh of the two previous scenarios added together.		

Additional electrification scenarios for the IRP will be developed once BC Hydro's December 2020 Load Forecast is completed.

BC Hydro's five-year electrification action plan

While the IRP sets out the strategy for the power system, it does not select specific projects, programs, or initiatives, each of which can be subject to their own consultation and approval processes. This is true for specific demand-side management (DSM) programs, individual electricity purchase agreements (EPAs) with independent power producers, or BC Hydro's own capital works projects. Similarly, BC Hydro's electrification plans are strategically envisioned in the IRP through any electrification plan's potential to create additional need for electricity in the form of the load scenarios as presented in the previous section; however, like DSM programs, EPAs and capital projects, the implementation details behind any electrification plans are not included in the IRP.

BC Hydro is developing actions and targets for electrification and load attraction as part of our electrification plan. It will build on the Government's Phase Two Comprehensive Review of BC Hydro and will be a five-year plan that will include:

- Rate design to support electrification
- Low carbon electrification programs
- Tariff changes to make it easier for customers to connect to our grid
- Transmission and charging infrastructure

An engagement process for the electrification plan will be launched in early 2021.

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