

Actions Needed to Electrify British Columbia's Buildings

CleanBC's plan for the building sector is a promising start to a clean energy future

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Summarized action steps

1. B.C. must set interim targets for updating high performance heating equipment ahead of the 2030 deadline and reinforce regulatory signals within the current mandate.
2. B.C. needs to explicitly grant local governments the authority to regulate GHGs in existing buildings, making it possible for other urban centres to replicate the policies advanced by the city of Vancouver.
3. BC Hydro should reward customers who switch to energy efficient fuels by reducing the high cost of service upgrades and introducing favourable rate structures.
4. Provincial budgets and utility resource plans (BC Hydro and FortisBC) must commit the funds needed for policy implementation. The Pembina Institute estimates that the residential sector requires \$1.6 billion annually in retrofit incentives to manage loads and phase out fossil fuels. Of this, \$800 million could come from the federal government, \$400 million from utilities, and \$400 million from the Province. This means roughly a tenfold increase in provincial incentives and a doubling of utility incentives.

In October 2021, the Province of British Columbia issued an update to the CleanBC Plan,¹ setting out a path to reduce greenhouse gas (GHG) emissions in all sectors, including buildings. Buildings are responsible for nearly 11% of B.C's total greenhouse gas emissions, exceeded only by road transportation and emissions from the oil and gas sector. Unlike these sectors, however, the building sector is regulated entirely by provincial and local governments, facilitating a straightforward and rapid transition to decarbonization.

¹ Province of British Columbia, *CleanBC Roadmap to 2030* (2021).
https://www2.gov.bc.ca/assets/gov/environment/climate-change/action/cleanbc/cleanbc_roadmap_2030.pdf

The CleanBC Plan contains many positive advancements to deliver GHG reductions in buildings, including a mandate for BC Hydro to encourage customers to switch from natural gas to clean electricity for heating, a faster installation process for customers who require electrical upgrades when switching from gas to electrical heating, a greenhouse gas intensity (GHGi) standard for new buildings, minimum efficiency standards for new heating equipment, and the elimination of incentives for fossil fuel heating equipment. The province also announced a commitment to 100% clean electricity by 2030, and a 6 MtCO₂ emission cap on gas utilities (equivalent to a 47% reduction below 2007 levels).

While the progressive action taken on climate is highly commendable, some areas still require political direction. The government also needs to address the risks associated with the implementation of B.C.'s commitments within the next year. Our analysis is informed by data collected from a broad-ranging stakeholder engagement process that led to the publication of the B.C. Building Electrification Roadmap (BERM) in March 2021.² The BERM provides guidance for utilities and governments on how to achieve provincial targets in buildings by gradually replacing fossil fuels and hot water heating with high-efficiency electrical heating. It was developed under the direction of a steering committee composed of B.C. Ministry of Energy, Mines & Low Carbon Innovation, B.C. Attorney General & Minister Responsible for Housing, BC Hydro, City of Vancouver, City of Richmond, Metro Vancouver, and the Zero Emissions Building Exchange. More than 160 stakeholders from industry and government including heating, ventilation and air conditioning (HVAC) contractors, homebuilders, developers, equipment manufacturers, utilities, local government, and provincial civil servants were consulted. The BERM provides a benchmark against which the gains achieved in the province's new climate plan can be measured.

Listed below are four actionable steps that are critical to meeting the climate targets for the building sector.

1. Set minimum performance standards for heating equipment

A rapid transition off fossil-fuel burning heating equipment is key to decarbonizing homes and buildings. The BERM recommends that B.C. set a minimum energy performance standard requiring a co-efficient of performance (COP)³ greater than 100% for all space and water

² *British Columbia's Building Electrification Roadmap* (2021). Available at https://www.zebx.org/wp-content/uploads/2021/04/BERM-Launch-Presentation_2021-04-21_v2.pdf

³ COP is a measure of efficiency of heating equipment, determined as the heat produced relative to the amount of energy consumed. Heat pumps operate at efficiencies greater than 100% by extracting more heat from surrounding air, water or ground than they use, whereas fossil fuel heating equipment operates at less than 100% efficiency since it creates heat simply by burning fuel, which always comes with system losses.

heating equipment by 2035. The CleanBC Plan shortens that timeline to 2030 and broadens the scope to allow equipment greater *or equal* to 100% thus allowing baseboard electric heating (100% efficient).⁴ Once these minimum performance standards for heating equipment come into force, the sale of fossil fuel furnaces and boilers will no longer be allowed in B.C. Fossil-fuel heating equipment reaching its end of life would be replaced by electric or gas heat pumps or baseboard heating.

While a similar “aspirational” goal was set at the 2018 Energy Ministers’ Conference,⁵ B.C. is the first province to endorse this regulatory target of requiring a minimum COP greater than 100% for all space and water heating equipment in 2030, a notable achievement.

A key pending question is whether a requirement slated for eight years in the future will send a strong enough signal to motivate contractors and manufacturers to change their business practices. Interim measures and targets are essential to ensure market transformation ahead of the 2030 deadline.

The 2022 provincial budget includes funds for increased incentives for heat pumps, the elimination of a provincial sales tax on this equipment, a higher tax on gas furnaces and boilers, and \$9 million for tracking the progress on climate action — all positive steps that will accelerate competitive pricing for clean options. BC Hydro is also stepping up its funding for electrification incentives and efficiency measures. However, both of these funding pools will have to grow significantly if we are to fuel switch approximately 5% of the building stock per year, which is the pace needed to decarbonize the building sector by 2050. For renovations to happen at that scale, we estimate that provincial budgets for incentives should be in the order of \$400 million per year⁶ — an order of magnitude above what was included in the 2022 budget.⁷

Another strategy that could help accelerate market transformation ahead of the 2030 deadline would be to leverage political leadership at the local level. This is harder to do for equipment regulations than building codes, since regulations affect suppliers rather than contractors. A

⁴ One noteworthy difference in CleanBC’s plan: it commits to a COP **equal to** or greater than one by 2030. The inclusion of COP = 1 allows for the continued sale of baseboard heaters, a non-emitting heating option offering a reasonable compromise between upfront costs and operating costs when installed in well-insulated building.

⁵ “By 2035, all space heating technologies for sale in Canada meet an energy performance of more than 100%.” Energy and Mines Ministers’ Conference, *Paving the Road to 2030 and Beyond: Market transformation road map for energy efficient equipment in the building sector* (2018), 32.

<https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/emmc/pdf/2018/en/18-00072-nrcan-road-map-eng.pdf>

⁶ Madi Kennedy and Tom-Pierre Frappé-Sénéclauze, *Canada’s Renovation Wave: A plan for jobs and climate* (Pembina Institute, 2021). <https://www.pembina.org/pub/canadas-renovation-wave>

⁷ Government of British Columbia, *Budget 2022: Backgrounder 2* (2022).

https://www.bcbudget.gov.bc.ca/2022/pdf/2022_Backgrounder_2_Environment.pdf

proactive approach could be for the province to co-develop with local government a “heat-pump ready” set of bylaws and practices to streamline permitting processes, ensure quality installations, and collect data on what is being installed.

The province could also move more quickly on minimum performance standards for equipment that is market-ready such as heat-pump replacements for rooftop make-up air units (heating equipment on commercial and institutional buildings that heat the air cycled into the building to replace air exhausted out for ventilation purposes).

Since the current pace of heat pump installations is falling short of the level necessary for most buildings to be transitioned to heat pumps by 2030, the province should set interim targets for heat pump uptake (as a percentage of installations) to ensure the market transformation occurs at the necessary pace. It should also set up an annual reporting process so that provincial programs, utilities and training programs can be adjusted in a dynamic manner. This will support the work of the Building to Electrification Coalition, the organization behind the BERM, and provide context for regular feedback to and from the HVAC industry.

2. Regulate greenhouse gas emissions from new and existing buildings

The CleanBC Plan sets another important precedent in Canada: B.C. is the first province to commit to regulating carbon emissions (as opposed to energy use) for new construction. While the national building code, and the provincial codes that are based on it, includes climate pollution reduction as a sub-objective, this has been mostly pursued by improving energy efficiency, and is silent on whether the proposed building used high-carbon fuels like oil or natural gas, or low-carbon fuels like renewable electricity. In setting carbon limits for new construction, B.C. follows in the footsteps of municipalities such as Vancouver and Toronto.⁸ It also builds on the work of the BC Energy Step Code Council,⁹ formed by the province to support implementation of the Step Code, which has been working with government and industry partners to craft a framework that local governments in B.C. could use to regulate greenhouse gas intensity from new construction.

This initiative marks significant progress in ensuring that new construction does not lock-in polluting technologies. But it does not ensure ongoing performance of these new buildings or address most buildings that exist today and will still be standing in 2050.

⁸ Help Cities Lead, *Briefing Note: Regulating GHG Emissions for New Buildings* (2020). https://www.helpcitieslead.ca/wp-content/uploads/2021/01/HCL_Briefing_New_Buildings-1.pdf

⁹ BC Energy Step Code. <https://energystepcode.ca/about/>

The BERM recommends that the province put in place greenhouse gas intensity (GHGi) limits for existing buildings, increasing their stringency over time to eliminate fossil fuels as a base load for heating in most existing buildings by 2032.¹⁰ This recommendation was not included in the 2030 roadmap.

If the province chooses not to regulate building emissions, the BERM suggests it should grant local governments the authority to do so. This ask is echoed by the Help Cities Lead coalition,¹¹ and was endorsed by local governments at the 2021 annual assembly of the Union of British Columbia Municipalities (UBCM).¹² Doing so would allow local governments to replicate policies currently being developed by the City of Vancouver (which has unique and extraordinary regulatory authority as it was established under a distinct charter with the province) and ensure the carbon performance of existing buildings is improved over time. The regional government of Metro Vancouver is also exploring implementing a carbon cap in its Clean Air Plan, leveraging its authority to regulate air pollutants.¹³

3. Mobilize BC Hydro's resources to accelerate electrification

Transitioning a building from fossil fuel heating to high-efficiency electrical heating often requires a costly service upgrade, along with potentially long wait times, both of which act as barriers for customers interested in fuel switching.

BC Hydro should be commended for adopting several BERM recommendations in their recent five-year Electrification Plan, including a customer incentive funding program to encourage fuel switching and a commitment to reducing wait times for service connections and upgrades. But the Pembina Institute strongly encourages BC Hydro to complete its strategy with these two critical additions:

- Extend the cost of upgrading distribution systems beyond the property boundary across the ratepayer base, and provide incentives for upgrading electrical panels on the property. These expenditures can be justified as they enable load growth and contribute to increased sales of surplus power, resulting in a lower electricity rate for all customers.

¹⁰ Zero Emissions Building Exchange, *British Columbia's Building Electrification Roadmap* (2021). <https://www.zebx.org/launching-bcs-building-electrification-road-map/>

¹¹ *Briefing Note: Regulating GHG Emissions for Existing Buildings*.

¹² Union of British Columbia Municipalities, *2021 UBCM Resolutions Book* (2021). https://www.ubcm.ca/sites/default/files/2021-08/2021%20UBCM%20Resolutions%20Book_0.pdf

¹³ Metro Vancouver, *Clean Air Plan* (2021). <http://www.metrovancouver.org/services/air-quality/engagement/clean-air-plan/Pages/default.aspx>

This BERM recommendation could be addressed in the F2022-2025 rate application BC Hydro recently submitted to the British Columbia Utilities Commission.¹⁴

- Introduce new rate structures, such as a heat pump rate, that rewards customers who switch fuels. The current tiered rate structure limits residential customers to a fixed quantity of electricity at a lower rate before a rate increase of 50% is applied to energy consumption beyond the designated threshold. This rate was designed to encourage energy conservation in a time of electricity deficit by penalizing high consumption. Now that we are in an electricity surplus, and facing a climate imperative to fuel switch, the rate design is a disincentive for switching from natural gas heating to electric heating. Instead, opt-in electrification rates should be offered, guaranteeing that customers who switch from a fossil-based heating source to clean electricity can do so at competitive rates. BC Hydro is currently in the midst of a residential rate review, which offers an opportunity to make this change.¹⁵

4. Align incentive programs with climate objectives

BERM recommends replacing incentives for gas equipment with incentives for electric heat pumps in 2022 to help equalize the capital costs of fossil fuel with high-efficiency heating systems. Gas utilities should instead use incentive programs to reduce overall building heating emissions. This will prepare buildings for future electrification efforts by incenting improvements to the building structure that reduce heating requirements regardless of source. Heat pumps typically have lower outputs than similarly sized fossil fuel furnaces, so reducing overall building heating demand makes future conversion to heat pumps simpler while providing short-term GHG and cost reductions.

This recommendation was reflected in the CleanBC Plan. The province made a commitment to stop allowing gas utilities to incent natural gas boilers and furnaces, but no timeline was given. Along with BERM, we urge the province to implement this recommendation immediately. The plan also mentions using an assumed carbon price to allow utilities to incent higher cost measures that return long-term GHG benefits, such as envelope upgrades like insulation and better windows. FortisBC is currently investigating the role of natural gas in achieving significant reductions in GHG emissions in existing buildings and would benefit from clarity in the timing and details of programs replacing existing incentives with incentives better aligned with provincial climate plans.

¹⁴ BC Hydro, *F2022-F2025 rate application* (2020). <https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/regulatory-filings/rra/00-01-2021-08-31-bchydro-f23-f25-rra-ex-b-2-application.pdf>

¹⁵ BC Hydro, “Residential rate design.” <https://www.bchydro.com/about/strategies-plans-regulatory/rate-design/current-activities/residential-rate-design.html>

These changes in demand side management (DSM) structure should include expanded incentives that encourage electrification to effectively drive market transformation. While the CleanBC Plan does mention the province’s intention to provide more funding for retrofits, the 2022 budget falls short of the level of incentives needed to ensure a rapid scale-up of a retrofit economy. Current funding for B.C. residential building retrofits is approximately \$500 million annually (including existing provincial and utility programs). We estimate that public investments of \$1.6 billion per year is needed to meet our GHG reduction targets.¹⁶ If half of the revenue comes from the federal government, a quarter from utilities, and a quarter from B.C., the budget allocation for CleanBC programs for residential buildings would be approximately \$400 million per year over the next 10 to 15 years. There are also non-financial barriers to adoption of retrofits, such as low consumer awareness and lack of qualified installers, and these factors need to be addressed in conjunction with increasing incentives, but these figures represent the ultimate scale of investment needed to retrofit existing buildings in line with the province’s climate action commitments. The 2022 budget included \$11 to \$24 million annually for incentives over the next three years. While this provincial allocation is, on a per capita basis, amongst the highest in Canada, it still falls short of the level of funding that is commensurate with the climate emergency.

Conclusion

All levels of government recognize that electrification is critically important to reducing emissions from B.C.’s building sector. Recent announcements from the provincial government and BC Hydro set B.C. on a new course. Effective implementation, however, is contingent on the four strategies outlined above. Some, such as setting a GHGi target for existing buildings and allocating more funding for incentives, still require political direction. Others, such as establishing regulatory timelines and empowering BC Hydro to actively pursue electrification, now have clear political direction and need to be rapidly implemented.

Looking forward, B.C. must also ensure the effective implementation of the gas utility cap, and implement in 2022 the requirement to phase out incentives on gas-burning equipment. (Our upcoming work on gas regulations in B.C. will cover these issues.)

Over the next two years, regulations and programs that send a clear signal for the electrification of buildings and the rapid scale-up of deep retrofit services must be established in order to ensure that the progressive commitments made lead to on-the-ground action. The province and BC Hydro are now in the process of implementing some of the most important

¹⁶ Tom-Pierre Frappé-Sénéclauze, Anjali Helferty and Jay Nordenstrom, “For health, climate and jobs, Canada needs a major housing investment,” *Pembina Institute*, March 16, 2021. <https://www.pembina.org/op-ed/health-climate-and-jobs-canada-needs-major-housing-investment>

policies to achieve net-zero GHG by 2050 in buildings. FortisBC is also adapting their climate action practices, developing new incentive models for deep retrofits, and growing the provincial supply of renewable gases. The Pembina Institute recognizes their political leadership and encourages forward momentum to firm up their commitments that either remain vague or require timelines. The CleanBC Plan represents a comprehensive, leading plan for reducing GHG emissions from buildings and can serve as a model for other Canadian jurisdictions to follow.