Response to the Request for Written Comments and Submissions on British Columbia's Highest Efficiency Equipment Standards (HEES) for Space and Water Heating - Point of Sale Regulations

February 15, 2024

Efficiency Canada

Carleton University

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Re: Request for Written Comments and Submissions on British Columbia's Highest Efficiency Equipment Standards (HEES) for Space and Water Heating - Point of Sale Regulations

We are writing to express support for the proposed British Columbia Highest Efficiency Equipment Standards (HEES) for Space and Water Heating - Point of Sale Regulations. The proposed regulations are feasible and timely, are in alignment with leading U.S. states, and demonstrate leadership in Canadian provincial climate and energy policy.

Similar requirements have been proposed or adopted in several other jurisdictions around the world. Manufacturers will already be complying with comparable requirements elsewhere, which will reduce the costs of implementation in B.C. For example:

- California is planning a zero-emission standard requiring all space and water heaters sold to be all-electric starting in 2030.[1] Ten other states are also exploring zero-emission standards;[2]
- Governors in 25 U.S. states have committed to collectively install 20 million heat pumps, with California specifically committing to six million, with

[1] (new construction and replacement equipment in existing buildings) California Air Resources Board. "2022 State SIP Strategy," September 22, 2022, p.103. https://ww2.arb.ca.gov/sites/default/files/2022-08/2022_State_SIP_Strategy.pdf.

[2] United States Climate Alliance, "U.S. Climate Alliance Announces New Commitments to Decarbonize Buildings Across America, Quadruple Heat Pump Installations by 2030", September 21, 2023. https://usclimatealliance.org/press-releases/decarbonizing-americas-buildings-sep-2023/

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manufacturer support.[3] Agencies in nine of the above states have started on implementation, focused on increasing heat pump market penetration to 65% by 2030 and 90% by 2040;[4]

- The Netherlands' hybrid heat pumps action plan has been created through collaboration between industry, environmental NGOs and three government ministries. It has set an emissions standard designating hybrid heat pumps as the minimum standard and restricts the sale of standalone fossil devices starting in 2026.[5]

- The European Union is revising its directive on appliance energy efficiency, *Ecodesign*, and it has been widely discussed to raise the minimum efficiency standard of heating appliances to 115%. If passed, this would apply to all countries by 2029, effectively ending the sale of standalone fossil fuel boilers across the EU.[6]

[3] "Ten Manufacturers Commit to California Heat Pump Goal", *HPAC Engineering*, October 11, 2023. https://www.hpac.com/heating/article/21275357/ten-manufacturers-commit-to-california-heat-pump-goal

[4] Northeast States for Coordinated Air Use Management. "Nine States Pledge Joint Action to Accelerate Transition to Clean Buildings", Press release. https://www.nescaum.org/documents/2.7.24-nescaum-mou-press-release.pdf

[5] Business.gov.nl, "Heat pumps mandatory when replacing a boiler", https://business.gov.nl/amendment/hybrid-heat-pump-mandatory/.

[6] Ecos, "The EU could take a step towards its 2050 climate target – if new Ecodesign rules phase out sales of fossil fuel boilers", 27 April 2023, https://ecostandard.org/news_events/the-eu-could-take-a-step-towards-its-2050-climate-target-if-new-ecodesign-rules-phase-out-sales-of-fossil-fuel-boilers/.

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- Additional states and countries have adopted building code requirements restricting fossil fuel heating when renovating buildings or in new construction:
    - Netherlands in 2018; Norway and Austria in 2020; Flanders, Belgium in 2021; and France and Belgium, as a whole, in 2022[7,8]
    - Australian Capital Territory and Victoria, Australia, in 2024[9,10]
    - New York State in in 2026[11] plus numerous cities around the U.S.

As proposed, HEES is an exciting progression of B.C.'s history of climate action, and the list of similar initiatives in the U.S., and globally, demonstrate that the proposal is reasonable and not an outlier.

Below is a list of recommended actions that B.C. could take to further strengthen and support the implementation of the regulations:

1) Every air conditioner should be a heat pump

As an electric heat pump can reduce electricity consumption by up to 2/3 compared to electric resistance heating (baseboards) alone, any electric

[7] *Reuters*. "Oil Producer Norway Bans Use of Heating Oil in Buildings." June 15, 2017, sec. Energy. https://www.reuters.com/article/idUSKBN1961VK/

[8] Lowes, Richard, Duncan Gibb, Jan Rosenow, Samuel Thomas, Matt Malinowski, Alexia Ross, and Peter Graham. "A Policy Toolkit for Global Mass Heat Pump Deployment," 2022, p 55. https://www.raponline.org/knowledge-center/policy-toolkit-global-mass-heat-pump-deployment/.

[9] *ABC News*. "No New Gas Connections for Canberra Homes and Businesses from next Year." August 4, 2022. https://www.abc.net.au/news/2022-08-04/act-no-new-gas-connections-from-2023-new-homes/101299552

[10] Ore, Adeshola, and Australian Associated Press. "Victoria Announces Ban on Gas Connections to New Homes from January 2024." *The Guardian*, July 28, 2023, sec. Australia news. https://www.theguardian.com/australia-news/2023/jul/28/victoria-announces-ban-on-gas-connections-to-new-homes-from-january-2024.

[11] Phillips, Anna. "N.Y. Ditches Gas Stoves, Fossil Fuels in New Buildings in First Statewide Ban in U.S." Washington Post, May 7, 2023. https://www.washingtonpost.com/climate-environment/2023/05/03/newyork-gas-ban-climate-change/.

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resistance heating system being required to be paired with a heat pump rather than an air conditioner would provide highly efficient heating and cooling, and lower utility bills.[12] The Cool Way to Heat Homes report details the benefits of heat pumps over central air conditioners in Canada. The requirement for newly installed air conditioners to provide low carbon heating and cooling (electric heat pumps) has been in effect for one and two-family detached homes in Vancouver since January 1, 2023.[13] The provincial government should explore making this a province-wide standard and expanding to more building types.

Similar requirements are in place in several cities in California and Colorado. Discussions with Vancouver's senior green building planner reveal the implementation of the requirement has been smooth, with AHRI Canada's support and distributors appreciative of the reduction in models and a simpler supply chain.[14]

2) Phase out of fuel oil

Fuel oil is the most expensive, greenhouse gas intensive and least efficient heating source. A ban on new fuel oil space and water heating systems, like that of the province of Quebec[15], could provide important customer cost and greenhouse gas savings. Heat pumps provide clean customer cost savings compared to fuel oil[16] and no new oil furnaces/boilers installations after 2030 is essential for net-zero by 2050, given the 20-year lifespan of equipment. Fuel oil tanks are an environmental

[12] Ferguson, A and Sager, J. Cold-climate air source heat pumps: assessing cost-effectiveness, energy savings and greenhouse gas emission reductions in Canadian homes. Natural Resources Canada – CanmetENERGY. 2022. https://geoscan.nrcan.gc.ca/starweb/geoscan/servlet.starweb
[13] "Mechanical Permit." City of Vancouver. Accessed January 30, 2024. https://vancouver.ca/home-property-development/mechanical-permit.aspx
[14] Christopher Higgins, Presentation to the Hybrid Heat Coordination Group, January 12, 2024.
[15] Government of Quebec. "Q-2, r. 1.1 - Regulation Respecting Oil-Fired Heating Appliances." Légis Québec, September 1, 2023. https://www.legisquebec.gouv.qc.ca/en/document/cr/Q-2,%20r.%201.1
[16] Ferguson, A and Sager, J. 2022

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hazard[17] and there is limited renewable fuel oil available in Canada. The federal *Oil to Heat Pump Affordability* program is available to low-to-moderate income Canadians to help with the transition.

3) Proper heat pump sizing for hybrid systems to avoid stranded assets

There is a risk of stranded heat pumps in hybrid, but non-single package systems, installed between now and 2030, where the gas furnace fails before the heat pump after HEES has come into effect. If the heat pump is sized to meet just the cooling load, and the gas furnace component breaks down before the heat pump, there are two main scenarios:

a) The heat pump is replaced ahead of its end-of-life with a higher-capacity and/or cold-climate capable model that can meet the building's heating load

b) Electric resistance heat strips can be added to meet the heating load previously supplied by the furnace.

Both scenarios increase the cost to the resident by, respectively, requiring an early heat pump replacement, or increasing heating bills. Education and incentives for insulation and air sealing (see next point) and proper heat pump sizing can reduce this cost.

Sizing heat pumps primarily for heating loads will prevent them from becoming stranded assets and ensure cost-effectiveness if the furnace fails first. Electric resistance strips can then supplement the (larger) heat pump during cold weather without incurring high heating bills. Alternatively, British Columbia could promote single package designs earlier than 2030 to reduce this risk.

[17]Environment and Climate Change Canada. "Overview of the Storage Tank Regulations." Government of Canada, September 22, 2022. https://www.canada.ca/en/environment-climate-change/services/pollutants/storage-tanks-petroleum-allied-products/regulations.html.

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4) Significantly increase funding and promotion of utility and government-funded energy efficiency programs, particularly for low-income and Indigenous communities

Heating and cooling systems work better in insulated and airtight buildings, while lowering utility bills, improving comfort, and lessening the impact of electrification on the grid. Existing or new programs that support insulation, air sealing and envelope improvements before or concurrently with heating system replacements should be well-funded and well-communicated to the public. This will be particularly important in low-income and Indigenous communities, to ensure proposed regulations do not exacerbate energy poverty.

In Efficiency Canada's 2023 Energy Efficiency Programs Update report, British Columbia landed in the middle of the pack for spending on energy efficiency programs at approximately $36 per capita.[18] Leading provinces spent considerably more (Prince Edward Island spent $178 per capita, and New Brunswick spent $72). While B.C. ranked somewhat higher on spending for low-income and Indigenous programming overall, it was still far behind leading provinces. Increasing support for building envelope upgrades can be conceptualized as a market transformation strategy to support HEES regulations.

As mentioned in the previous point, hybrid heating systems allow for an additional opportunity for insulation that may be more convenient for building owners and reduce costs following furnace failure. Insulating and air-sealing a building with hybrid heating allows the building owner to future-proof the heat pump by reducing the building's heating load closer to the capacity of the heat pump and avoiding potentially costly upgrades or high heating bills when the furnace fails. We have seen this in practice in North Carolina (U.S. climate zones 3 and 4; similar winters

[18] Nippard, A., Gaede, J. 2023. The 2023 Energy Efficiency Programs Update: Provinces and Territories. Efficiency Canada, Carleton University, Ottawa, ON.

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to coastal B.C.) where a well-insulated house with a hybrid system has never had to use its furnace component.[19]

5) Include eliminating fixed monthly cost of natural gas service from regulation savings calculations

Analysis of bill impacts of these regulations that assumes customers continue to pay fixed-cost natural gas distribution charges might not be a realistic assumption, which fails to present an opportunity for overall customer bill savings or lower costs of GHG reductions. Elimination of the fixed monthly natural gas fees is a significant contributor to the cost savings from electrification.[20] A case where a customer fully electrifies space and water heating yet continues to pay fixed charges for a gas cooking appliance or fireplace might not be realistic. The customer might wish to electrify these appliances as well to avoid fixed charges. We suggest that the analysis of the regulation include scenarios of life cycle savings for all-electric heat pumps and electric water heaters with and without fixed natural gas charges.

6) Additional technical suggestions

The province should consider the following recommendations, which could help future-proof the regulations so that they continue to be relevant when they take effect in 2030 or help build momentum before they take effect. These suggestions could be considered and incorporated now or included as an additional step at a later date (similar to how the installation requirements have been scheduled to be finalized in 2028). Either way helps take advantage of the six years before 2030 in order to make further progress.

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[19] CLASP. "3H Hybrid Heat Homes: An Incentive Program to Electrify Space Heating and Reduce Energy Bills in American Homes." Accessed September 14, 2023, p. 22. https://www.clasp.ngo/research/all/3h-hybrid-heat-homes-an-incentive-program-to-electrify-space-heating-and-reduce-energy-bills-in-american-homes/.

[20] Ferguson, A and Sager, J. 2022

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a) Using CSA SPE-07 load-based test procedure for air-source heat pump testing

While AHRI 210/240 is the air-source heat pump test method referenced by regulations in Canada and the US, there have been concerns that it does not correctly evaluate the performance of variable-speed heat pumps. Several organizations have developed an alternative CSA SPE-07 test method, and the U.S. Department of Energy is expected to propose some changes through its test procedure rulemaking soon.[21] As one of these test methods is likely to become the default by 2030, we would recommend adding a placeholder or a revision step prior to 2030.

b) Adding water-source heat pumps

While ground- and air-source heat pumps are considered in the proposal, we would also recommend adding water-source, which can harvest heat from a number of additional sources: solar-thermal panels, wastewater, and waste heat from industrial facilities (for use in district heating). It is unclear whether the ground-source heat pump test methods will apply to all configurations of this technology, so adding them in explicitly or through a waiver process may be helpful to allow for innovation in this area.

c) Adding demand-response-ready requirements for electric storage water heaters

The U.S. states of Washington and Oregon have required electric storage water heaters to have a CTA-2045 communication port since January 1, 2023,[22,23] while Colorado will require the related AHRI-1430 standard starting

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[21] U.S. Department of Energy, "Test Procedures for Central Air Conditioners and Heat Pumps", *Regulations.gov*, Accessed February 11, 2024. https://www.regulations.gov/docket/EERE-2022-BT-TP-0028

[22] Washington State Legislature, "Appliance Efficiency Standards", HB 1444 (2019), Certification of Enrollment, p. 15. https://lawfilesext.leg.wa.gov/biennium/2019-20/Pdf/Bills/Session%20Laws/House/1444-S2.SL.pdf?q=20240211075558

[23] Oregon Legislative Assembly, "An Act Relating to energy efficiency standards; creating new provisions; amending ORS 469.229, 469.233, 469.238, 469.239, 469.255 and 469.261; repealing ORS 469.235; and prescribing an effective date", HB 2062 (2021), Enrolled, p. 14. https://olis.oregonlegislature.gov/liz/2021R1/Downloads/MeasureDocument/HB2062/Enrolled.

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January 1, 2026.[24] The standard communication port will allow these water heaters to participate in utility demand-flexibility programs easily and cheaply, whereby the water heater adjusts its usage to take advantage of lower-cost or lower-emission electricity available during off-peak periods. While B.C.'s electric grid currently has low emissions (15 g CO_2e/kWh[25]), there are imports of higher-emissions electricity from Alberta (540 g CO_2e/kWh), which could increase in the face of load growth from the electrification of water and space heating and transportation.

d) Requiring electrification analyses pre-2030

There are additional steps that can be taken to accelerate heat-pump uptake prior to 2030, reducing emissions in the short term and paving the way to a successful implementation. In addition to the incentives mentioned above, another method is to require installers to conduct an electrification analysis when replacing fossil fuel space and water heating equipment. Such a requirement has recently been adopted in the U.S. city of Denver[26] and can familiarize installers with electric alternatives and encourage voluntary electrification.

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[24] Colorado General Assembly, "An act concerning environmental standards for certain products, and, in connection therewith, making an appropriation", HB 23-1161 (2023), Signed, p. 22. https://leg.colorado.gov/sites/default/files/2023a_1161_signed.pdf

[25] Environment and Climate Change Canada. "Emission Factors and Reference Values." Government of Canada, June 14, 2023. https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/output-based-pricing-system/federal-greenhouse-gas-offset-system/emission-factors-reference-values.html.

[26] Denver Code of Ordinances, "Section 10-20 Electrification Requirements for Existing Buildings", https://library.municode.com/co/denver/codes/code_of_ordinances?nodeId=TITIIREMUCO_CH10BUBURE_ARTIIBUFICO_S10-20ELREEXBU.

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Thank you for the opportunity to participate in the consultation for this essential decarbonization policy.

Sincerely,

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