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# Pathways to Accelerating Household Clean Technology Adoption Across British Columbia

# Author

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# Foreword

The Pacific Institute for Climate Solutions (PICS) was created in 2008 with an endowment from the Government of British Columbia to support evidence-based climate policy. This investment in our university-based network was groundbreaking and remains a core strength of the organization.

In fulfilment of PICS' mandate, this Insights Series elevates leading evidence at a pivotal moment for climate policy in B.C. Drawing on academic expertise from across the province, the series is designed to inform the 2025 independent review of CleanBC, British Columbia's plan to reduce greenhouse gas emissions and combat climate change.

When CleanBC was launched in 2018, climate action was a public and political priority. While concern about climate change remains widespread, it has increasingly been overshadowed by more immediate pressures, such as rising costs of living, strained public services, and growing geopolitical instability. Intensifying climate impacts exacerbate each of these challenges, which increases the complexity and opportunity for bold climate solutions. Now is not a time to retreat from ambition. Rather, it is a time for integrated solutions and public policy that unlock energy transformation, reduce climate risk, and increase prosperity at local, regional, and global scales.

The Insights Series highlights the deep connections between climate action and other top issues facing British Columbians: housing, affordability, economic competitiveness, Indigenous reconciliation, regional economic development, and fiscal efficiency.

B.C.'s climate leadership can be renewed—not by repeating the strategies of the past, but by evolving CleanBC to meet the realities of today.

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The number of households in B.C. with heat pumps increased by approximately 80 per cent from 2017 to 2022, from an estimated 142,000 to 254,000, supported by B.C.'s CleanBC Better Homes rebate programs. *iStock*

## Executive summary

B.C. households are on the front lines of both climate change and the affordability crisis. The energy used in homes determines monthly bills but may also contribute to provincial emissions. Addressing both challenges starts at the doorstep, with cleaner, more energy- and cost-efficient household technologies.

Public appetite for clean, cost-saving home technologies is strong and growing. Clean Energy Canada's 2024-25 market research shows that many British Columbians are ready to invest in solutions that cut both emissions and energy bills. In Metro Vancouver, nearly 70 per cent of residents say their next vehicle could be electric, more than 60 per cent view heat pumps positively, and close to 60 per cent want their next home to be "energy smart."

The problem is not public interest, but it is the practical barriers that get in the way. British Columbians understand

the value of clean technologies, but many households are held back by structural challenges. The most significant of these is the upfront cost. While 72 per cent of residents believe electric vehicles are cheaper to own than gas vehicles over time, most households still cannot afford the higher initial price tag.

*“Public appetite for clean, cost-saving home technologies is strong and growing.”*

Renters and people living in apartments or townhomes face additional hurdles. They often lack the authority to make upgrades, have limited access to home charging, and are constrained by strata regulations. These barriers affect a significant portion of the population: one in three British

Columbians rent, and nearly half live in multi-unit buildings.

Finally, knowledge gaps and misinformation are persistent barriers. Many residents still hold exaggerated fears about electric vehicle battery replacement or misunderstand how heat pumps work—both of which dampen adoption.

To move forward, climate action needs to shift from merely convincing British Columbians on the benefits of clean technologies to dismantling the frictions that stand in the way of uptake. British Columbians are ready to make the switch. With the right mix of affordability measures, regulatory updates, renter-inclusive supports, and trusted, hands-on guidance, the province has a clear opportunity to scale household adoption, deliver real energy savings to families across B.C., and reduce emissions, all while building durable support for CleanBC's broader climate goals. This paper outlines sets of recommendations to increase adoption of technologies that will improve affordability and reduce emissions.

Our high-level pathways for this increased uptake are:

- » Increase rebates, targeted low-interest loans, and asset-secured borrowing to address upfront cost of new household technologies; and encourage the federal government to allow more affordable EVs into the Canadian market.
- » Strengthen multi-unit residential building standards and expand rebates in order to ensure renters and apartment dwellers are able to add cost-saving technologies.
- » Promote knowledge and counter misinformation about clean technologies.
- » Modernize building and electrical codes and invest in EV charging infrastructure to make EVs easier to use and more accessible.

The appetite for affordable clean technologies is already there. By tackling the practical barriers that still stand in the way, B.C. can empower more households to take action and build lasting momentum for a cleaner, more affordable future.



Interest in EVs continues to be strong, but cost is a barrier. *iStock*

## Background

British Columbia households directly account for 23 per cent of provincial greenhouse gas emissions, above the national average of 17 per cent.<sup>1</sup> Connecting British Columbians with clean technologies (e.g., EVs, home space and water heating and cooling, rooftop solar and battery storage) not only addresses emissions but also builds support for climate action as homeowners and renters have the opportunity to directly access and interact with these technologies, plus enjoy the lower household energy costs they provide. Globally, households have become important investors in the energy transition, accounting for nearly 60 per cent of energy-investment growth in advanced economies with strong policy support.<sup>2</sup>

British Columbia has been leading the adoption of some household clean technologies in Canada, supported by both its incentive programming through CleanBC and strong regulatory policy for EVs. With EVs representing 23 per cent of new vehicle sales in 2024, B.C. exceeded the national

share of 15 per cent and was second only to Quebec (33 per cent).<sup>3</sup> B.C.'s market share was comparable to that of the global market (22 per cent).<sup>4</sup> Meanwhile, seven per cent of households in B.C. used a heat pump in 2022, an adoption level that is closer to the Canadian average of six per cent, with higher ownership in Quebec (10 per cent) and each of the Maritime provinces (10 to 32 per cent).<sup>5</sup>

The last year has yielded many changes in policy and context that have negatively influenced clean technology adoption at least in the short-term. EV uptake slowed down to 19 per cent in the first quarter of 2025, coinciding with a pause in the federal rebate in January.<sup>6,7</sup> Other recent changes to home technology rebates in B.C. include a pause in the provincial EV rebate in May 2025, and EV chargers and home batteries by Tesla ineligible for rebates as of March.<sup>8,9</sup> A provincial sales tax exemption for used EVs ended in April.<sup>10</sup> For home heating and cooling, a rebate for central ducted heat

pumps ended in April and a rebate for dual fuel heat pumps was halved in May.<sup>11, 12</sup> At the same time, the Government of B.C. introduced heat pump rebates for income-qualified apartment renters and condo owners in July.<sup>13</sup> However, the cancellation of B.C.'s consumer-facing carbon tax as of April 2025 removed a nudge for B.C. households to adopt EVs and heat pumps.<sup>14</sup>

*“A rebate for dual fuel heat pumps was halved in May.”*

Given the high level of public interest in household clean technologies, better understanding the barriers British Columbians are currently facing to adoption along with the policy options and tools to help address them will be key to public acceptance and buy-in for a renewed CleanBC plan. Clean Energy Canada has undertaken a research project over the course of 2024-2025 examining key household-level clean technologies for:

- » transportation (electric vehicles and home chargers)
- » home heating and cooling (heat pumps, electric hot water heaters, smart thermostats)
- » rooftop solar and household battery storage

As EVs and heat pumps are the most popular household clean technologies and contribute the most to reducing greenhouse gas emissions, they are a focus of many of our recommendations.

To understand what motivates urban and suburban British Columbians to adopt clean technologies, Clean Energy Canada partnered with Abacus Data on first-of-its-kind market research to better understand the next adopters of clean technologies, their barriers, and the solutions they need to help them make the switch. We drew on market research conducted with 1,500 participants in the Metro Vancouver area between November 2024 and January 2025. Metropolitan areas have the greatest density and size of population who face similar climates, barriers, and opportunities. A focus in these areas can help government design cost-effective policies that have the greatest possible impact and attract a broad cross-section of the population with similar levels of interest in adoption.

Using this market research, we developed five distinct adopter groups, ranging from the highly motivated to the not-at-all-interested. Overall, respondents are quite open to clean technologies: 69 per cent are inclined to buy an EV as their next car, 61 per cent have or positively view heat pumps, and 59 per cent say it's important their next home is energy smart.

To build a clear menu of policy options, Clean Energy Canada also conducted a jurisdictional scan across Canada and additional international research to identify best practices as to how leading jurisdictions are overcoming these challenges.



A professional solar panel crew installs panels on the roof of a house. *iStock*

## Pathways

This market research identified the following four key barriers to clean technology adoption along with actions the Government of B.C. could take to address these barriers.

### Barrier #1: upfront costs

Upfront cost was the number one barrier to adoption identified in our research, for both EVs and heat pumps, across every group. Some 86 per cent of respondents identified it as a major or minor barrier to choosing an EV, while 76 per cent said installation costs were a barrier when considering a heat pump.

On the other hand, 65 per cent understood that a household with clean technologies would pay a smaller monthly energy bill than the fossil-fuelled alternative. For EVs, 72 per cent recognized that owning an EV would end up being cheaper overall than owning a similar gas car, and yet only the most

motivated adopters were willing (or able) to spend more money upfront to buy an EV. Put simply, upfront cost remains a barrier even for those who already understand that the electric option will save them money down the road.

*“Upfront cost was the number one barrier to adoption identified.”*

Although upfront costs have decreased and economies of scale are making clean technologies more competitive, a price gap still exists. A previous Clean Energy Canada analysis found that while all EVs we analyzed were considerably cheaper than gas cars over a 10-year period, none were cheaper upfront without the inclusion of government rebates.<sup>15</sup> Similarly, clean technologies like heat pumps, heat pump water heaters, and

solar panels could save many households money over time but come with an upfront price premium. In our survey, 80 per cent of respondents agreed that governments should help make clean technologies more affordable through incentives, zero-interest loans, and investments in public charging (only 11 per cent opposed such efforts).

Recommendations to the Government of B.C. to address upfront costs include:

» **Ensure a selection of affordable EVs are available to British Columbians by 2030:**

Several polls have shown the vast majority of Canadians wish to pay less than \$40,000 Manufacturer's Suggested Retail Price (MSRP) for an electric or gas-powered new car.<sup>16, 17</sup> A policy package to achieve this should include:

– ***Restart cost-effective and targeted Go Electric rebates of up to \$2,500 for new EVs:***

Rebates increase household adoption and incentivize companies to bring affordable EVs to the B.C. market. B.C.'s EV rebate program has helped put nearly 195,000 zero-emission vehicles on the province's roads.<sup>18</sup> Going forward, existing price caps (e.g., \$50,000 for sedans and SUVs and \$70,000 for vans and pickup trucks) should be maintained but lowered annually until the sedan and SUV price cap reaches \$40,000 by 2030 to help drive down prices. To help move the burden from public investment, carmakers should be required to offer matching discounts of \$2,500 for their vehicles to be eligible without increasing MSRPs. An additional government-funded rebate of \$500 should be offered for EVs assembled in or made with Canadian critical minerals, components, batteries, or parts. Existing income requirements should be reconsidered to ensure working families can access the rebates.

- ***Adjust the 2030 and 2035 sales targets and add flexibility in the Zero-emission Vehicle (ZEV) mandate:***  
Making small adjustments to the 2030 targets to help automakers weather this temporary storm and lowering the 2035 requirement to ensure the policy is not equivalent to a ban on gas-powered vehicles while maintaining a long-term market signal that B.C. is committed to going electric. Any additional flexibility added in the regulation should be designed to achieve other EV-related goals, such as delivering more

affordable EVs and building out B.C.'s charging network. Conventional hybrid vehicles should not be eligible for credits under B.C.'s ZEV mandate. Ultimately, ZEV mandates are an affordability measure, with studies showing that they drive down EV prices.<sup>19, 20</sup>

– ***Work with the federal government to reduce Canada's trade barriers to EV imports:***

Few factors drive prices down like competition. Canada's 100 per cent tariff on Chinese EVs exacerbates an uncompetitive market at the expense of consumers. With a much lower tariff on Chinese EVs, Europe enjoys more affordable electric options, with only modest market share going to Chinese cars.<sup>21</sup> Vehicles approved for roads in Europe should likewise be approved in Canada, opening the door to more compact models. Doing so would open Canada's vehicle market to fill important market gaps, drive innovation and ultimately make our auto sector more competitive. While B.C. cannot directly control this issue, it can help raise it with the federal government at the one-year review of the China Surtax Order (2024) in fall 2025.<sup>22</sup>

» **Maintain and improve incentives for other household clean technologies:**

The number of households in B.C. with heat pumps increased by approximately 80 per cent from 2017 to 2022, from an estimated 142,000 to 254,000 supported by B.C.'s CleanBC Better Homes rebate programs.<sup>23</sup> Incentives should be maintained and expanded for heat pumps,



Seven per cent of households in B.C. used a heat pump in 2022, an adoption level that is closer to the Canadian average of six per cent. iStock

EV home charging, rooftop solar power, battery storage systems, and other big-ticket items where upfront cost is likely to be a barrier, even if they eventually pay back their initial investment through savings. Incentives should be: funded through innovative financing (see below); broadly accessible, including to middle-income households in high cost of living areas; and scaled to the performance of equipment (while requiring proper sizing), so households are incentivized to install the most efficient models.

» **Offer new, innovative financing methods:** In addition to incentives, creative financing can also ease the upfront and ongoing costs of going electric, in some cases spreading out the cost in such a way that borrowers experience net savings straight away. Opportunities for B.C. include:

- Offer low or zero-interest 10-year loans up to \$40,000 that can be used for a range and combination of upgrades, from heat pumps, to rooftop solar, to heat pump water heaters and even smart thermostats, similar to what the federal government did through its now-ended Greener Homes Loan program.<sup>24</sup>
- Assist all provincial local governments to offer Property Assessed Clean Energy (PACE) programs, allowing homeowners to pay for upgrades through higher property taxes over a set period, tying the upgrade to the property rather than their personal credit.
- Initiate a program similar to Manitoba's, which provides financial support for the installation of ground-source heat pumps (\$75 a month with no upfront cost).<sup>25</sup>
- Work with financial institutions to offer Home Equity Lines of Credit (HELOC) to finance solar installations, leveraging the equity in their homes.
- Initiate leasing systems to avoid upfront costs on homeowners.

## Barrier #2: housing type

One third of British Columbians rent their homes, with 65 per cent of renters based in Metro Vancouver.<sup>26</sup> Renters often lack the agency to make clean technology upgrades, and 86 per cent of renters in our survey said that renting their home was a barrier to adopting a heat pump.



Smart thermostat. iStock

There are additional challenges when it comes to effecting change in rental buildings. Tenants typically pay monthly energy bills but do not usually have a say in the installation of more efficient energy technologies. Property owners, meanwhile, would bear the costs of making improvements, but they do not always benefit directly from the cost savings and quality-of-life benefits. This “split incentive” problem can hinder widespread adoption of clean technologies in rental units.

Similarly, 44 per cent of British Columbia households reside in apartment buildings, with different levels of access to various technologies and a sometimes limited ability to make required infrastructure changes, even when residents own their homes.<sup>27</sup> Three-quarters (73 per cent) of those living in apartments and townhomes said that access to home charging was a barrier to EV adoption, while 57 per cent said they did not have the ability to make heat pump installations (compared to 46 per cent of those in detached homes).

Recommendations to the Government of B.C. to empower renters and apartment dwellers include:

» **Introduce EV-readiness requirements for new homes:**

Requiring new homes, including apartments, to be constructed with heat pumps and EV chargers or the necessary wiring for easy installation ensures renters have access to new technologies in a cost-efficient manner. Because this approach primarily benefits individuals moving into newly built residences, the policy will

help more British Columbians the sooner the policy is implemented. The City of Vancouver, for example, has put in place a requirement for all new development permit applications that 100 per cent of residential parking stalls, except visitor stalls, must be EV-ready.<sup>28</sup> In fact, more than thirty B.C. municipalities, accounting for 79 per cent of the provincial population, have adopted EV readiness requirements for new buildings in their bylaws. But a piecemeal approach led by municipalities is not the best option for anyone: residents, charging station providers, developers, or our climate. And varied and sometimes contradictory regulations add complexity and bureaucratic red tape, delaying installations. The Government of B.C. should move forward with a province-wide 100 per cent EV readiness requirements in new builds via changes to the B.C. building or electrical code or a zoning bylaw mandate.

» **Expand rebates for renters:** The Government of B.C. recently announced rebates for the purchase and installation of heat pumps in individual suites in multi-unit residential buildings (MURBs) that both renters and owners can access.<sup>13</sup> This new rebate is a step in the right direction that should be expanded to other clean technologies, including EV chargers.

» **Introduce regulatory requirements for rental units:** Energy efficiency standards for rental units could lower operating costs for renters (a measure the U.K. has had in place for years).<sup>29</sup> Additionally, maximum temperature rules for rental units could literally save lives and also incentivize the installation of heat pumps. Vancouver, for example, requires that all permanently installed A/C systems are heat pumps in detached homes.<sup>30</sup>

» **Continue offering government support for stratas:** Almost half (44 per cent) of British Columbia households reside in apartment buildings, with the share at 59 per cent in Metro Vancouver.<sup>27</sup> Therefore, B.C. should maintain the funding support it already provides not only for individuals, but also for stratas undertaking larger building-wide upgrades necessary to electrify their heating and cooling systems or install charging in parkades.<sup>31, 32</sup>

## Barrier #3: knowledge gaps

Limited knowledge and poor-quality information are affecting new technology adoption. Specifically, 22 per cent of homeowners said they were interested in installing a heat pump in the future, while an additional 25 per cent were interested but needed more information (another 14 per cent said they already had one). Overall, knowledge of heat pumps remains relatively low, with only around half of British Columbians aware of key facts, such as heat pump efficiency in cold weather or cost benefits. Encouragingly, after receiving information about heat pumps, that 22 per cent jumped to 34 per cent who said they would like to install one at some point. While interest in heat pumps is growing, educating consumers about their benefits, and addressing knowledge gaps is essential for increasing adoption.

*“Limited knowledge and poor-quality information are affecting new technology adoption.”*

The knowledge gap is less extreme with EVs but still apparent. After receiving more information about EVs, respondents' intention to purchase one as their next vehicle increased from 69 per cent to 72 per cent. In terms of poor-quality information, it is no secret that anti-EV memes run rampant online. Somewhat surprisingly, the second-most cited barrier for respondents was potential battery replacement costs. In reality, the battery replacement rate for modern EVs is less than 1 per cent, and nearly all of these replacements happen under warranty.<sup>33</sup> Similarly, older Tesla models that have now been on the road for many years have experienced just 12 per cent range declines after 320,000 kilometres of driving.<sup>34</sup> And yet, 53 per cent said this was a major barrier for them, compared to 36 per cent who said the same about a lack of public charging infrastructure—a concern more grounded in reality.

Recommendations to the Government of B.C. to address knowledge gaps in clean technology solutions include:

» **Develop a home electrification resource hub:** Social media and search engines are primary sources of information for British Columbians interested in home upgrade projects. The Government of B.C. could run and advertise electrification resource hubs (an easy-to-use

website and app) that answer common and technical questions and connect users with local vendors and applicable incentives, providing all the information one would need when making and acting on a decision. As an example to build on, B.C. recently introduced a Home Energy Planner that includes individualized household energy scores, recommended upgrades, and the resources to get started.<sup>35</sup>

» **Offer or fund awareness-raising events:** Seeing is believing—and understanding. The Government of B.C. should re-launch its Emotive Community Outreach Incentive Program (COIP), which supported communities and local governments in delivering EV awareness campaigns.<sup>36</sup> Additional innovative initiatives for other clean technologies should also be considered. For example, programs like "Energy Neighbour" in Toronto help individuals navigate complex installation processes, while the U.S. Department of Energy under Biden was supporting in-home "heat pump parties" (think Tupperware parties) to help homeowners showcase their upgrades to interested neighbours.<sup>37–39</sup>

» **Train vendors:** People will struggle to sell what they do not fully understand. There are ways to educate. Electric Mobility Canada, for instance, hosts a national training program that aims to equip car sales staff with the knowledge they need to answer questions about EVs and sell them effectively.<sup>40</sup> Similarly, the Heating, Refrigeration and Air Conditioning Institute of Canada offers heat pump training to installers and hosts an annual heat pump tradeshow and conference.<sup>41, 42</sup> The Government of B.C. should fund dealership and contractor training to ensure those interacting directly with potential household clean technology buyers are well equipped to answer questions and provide relevant information. Training could also include equipping contractors with a comprehensive understanding of the rebates available and applicable to their customers to lower barriers to access them.

## Barrier #4: infrastructure and electrical concerns

Sometimes, a home or building needs electrical upgrades to support new technologies. This could include a new 200-amp electrical panel or wiring for a 50-amp plug. When it comes to multi-unit residential buildings, the infrastructure challenges can be even greater—and more costly—for the stratas or building managers navigating them.

In some cases, the cost may not be as high as homeowners initially think. For example, adding a home energy management system can eliminate the need for a more expensive electrical panel upgrade. And the best solution may even be an old-fashioned one: keeping it simple. For example, 71 per cent of homeowners who live in houses and townhomes (and who do not currently drive an EV) said they drive less than 50 kilometres a day. These drivers could comfortably manage using only Level 1 charging, which plugs into a regular outlet, requiring no additional electrical work. Likewise, mini-split heat pumps offer a simpler solution for homes without ducts and can be combined with existing heating systems like electric baseboards to further simplify and lower the cost of installation. Yet many may not be aware of these options.

*“Adding a home energy management system can eliminate the need for a more expensive electrical panel upgrade.”*

Finally, insufficient public charging continues to be a real barrier for many people, cited as a major or minor barrier by 74 per cent of respondents. Similarly, the largest survey of EV drivers in Canada, conducted by the CAA, has found a lack of public charging to be one of the more notable concerns among people with actual experience driving EVs (nevertheless, nine in 10 intend to get an EV again).<sup>43</sup>

Recommendations to the Government of B.C. to address infrastructure and electrical concerns include:

» **Modernize building and electrical codes:** The cheapest way to add EV charging or a heat pump to a home is to install these features when the home is first built. Many places already require EV charging readiness in

new construction and efficient heating systems. The Government of B.C. should include these requirements in its building code, streamlining the process for builders and future homeowners. Homeowners sometimes are required to make unnecessary panel upgrades due to electrical codes mandating a maximum capacity that will not actually be used. Ontario recently allowed home energy management systems to be included in panel size calculations and B.C. should adopt the same methodology for calculating minimum electrical panel capacity.<sup>44</sup>

» **Expand government grants and zero-interest loans:**

Programs that reduce the cost of upgrading will make it easier for homeowners to make the switch. This support is especially crucial for stratas facing costlier, more complex upgrades. The CleanBC EV rebate for home chargers could be expanded to include the costs of panel upgrades.

» **Educate consumers, stratas, installers, and municipalities about simpler solutions:**

From Level 1 charging to a home energy management system in lieu of a costlier electrical panel upgrade, consumers need not be upsold where easier, effective solutions exist that could meet their needs. This can include older apartment buildings as well, where the electrical challenges of a Level 2 system are considered cost prohibitive.

» **Invest in charging infrastructure:** The Government of B.C. should develop an EV charging strategy that sets clear deployment targets for both public and private charging infrastructure that are aligned with any updates to the Government of B.C.'s ZEV sales targets and puts an emphasis on home charging in MURBs to ensure all B.C. drivers have the option of fueling their vehicles with clean, affordable B.C. electricity at home. The strategy should also seek to improve public charging infrastructure in rural areas, which would further enable those British Columbians driving the farthest distances to help them make the switch and benefit from the larger absolute cost savings that accrue from high annual mileage.



An induction cooktop can save families on their energy bills, and improve indoor air quality compared to gas stoves. *iStock*



B.C.'s EV rebate program has helped put nearly 195,000 zero-emission vehicles on the province's roads. *iStock*

## Conclusions

Household-level clean technologies not only help reduce B.C.'s greenhouse gas emissions but also build support for climate action and lower households' energy costs. However, enabling the next wave of clean technology adopters in the province will require more than selling people on their benefits. As many British Columbians are already sold on clean technologies, the Government of B.C. should focus on systematically breaking down the barriers keeping would-be EV drivers and heat pump owners from doing what they already want to do. Informed by our first-of-its-kind market research involving a 1,500-person survey of Metro Vancouver residents, this report offered several recommendations for how the Government of B.C. can help British Columbians make the switch to clean technologies.

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