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Maximizing Public Funds:

Examining the fiscal efficiency of climate policy in B.C.

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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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Northbound traffic on the Alex Fraser Bridge from Delta to Richmond, during morning rush hour. iStock

Executive summary

As British Columbia nears its 2030 climate targets, the province remains on pace to achieve only half of its legislated emissions reductions. Meanwhile, deficit scenarios and growing fiscal pressures ranging from inflation and housing affordability to rising trade frictions underscore the need for climate policy that delivers maximum impact per dollar spent. In this context, understanding the fiscal efficiency and cost-effectiveness of climate policy instruments has never been more critical.

“Fiscal pressures underscore the need for maximum impact per dollar spent.”

Drawing on recent academic research, this paper outlines different ways to measure the cost-effectiveness of climate policies and examines the fiscal efficiency of key instruments

under CleanBC to inform upcoming policy decisions. The analysis highlights opportunities to prioritize policies that achieve greater emissions reductions at lower public cost while advancing energy affordability, innovation, and equity.

Key messages:

- » **Assessing cost-effectiveness requires considering more than just the price tag for government.** When judging a policy's value, we must look beyond up-front costs to include its broader benefits, behavioural impacts, and ability to drive lasting change.
- » **Flexible regulations can drive significant emissions reductions at low fiscal cost.** By creating performance standards with tradeable credit markets, policies like B.C.'s Low Carbon Fuel Standard and Zero Emissions Vehicle

(ZEV) mandate limit costs to consumers and avoid the need for large government outlays, while maintaining high levels of public support.

» **Carbon pricing remains a foundational tool.** When designed transparently and stringently, pricing pollution not only reduces emissions but also raises revenue that can be reinvested in decarbonization or address distributional impacts. Maintaining and enhancing the output-based pricing system for large emitters will be critical to cost-effectively achieving our emission reduction goals.

» **Incentive programs are widespread but variable in their fiscal efficiency.** The most effective programs target electrification (e.g., shifting from gas furnaces to heat pumps) and prioritize underserved or lower-income households where the purchases would otherwise not be made.

» **Strategic public infrastructure investment can yield high returns and lock in long-term emissions reductions.** Infrastructure shapes long-run demand and behaviour. Prioritizing investments that support decarbonization (e.g., increasing renewable electricity supply) and build climate resilience (e.g., buildings that better withstand fire and flood) will have long-term benefits that greatly exceed their initial costs.

» **Considering interactions across instruments is essential for an effective climate policy mix must.** Overlapping or misaligned policies can reduce cost-effectiveness. Clear design principles are needed to align subsidies, pricing, and regulations for maximum impact.



High tension electricity power transmission lines high above Shuswap Lake, Scotch Creek in the interior of B.C. *iStock*



Solar panels set up over a public parking lot in Greater Vancouver. iStock

1. Introduction

A volatile economic landscape characterized by recent inflation, tariffs, and uncertainty have forced governments to re-evaluate their fiscal priorities. As British Columbia forecasts a 2025-26 budget deficit approaching \$12 billion while seeking to address pressing challenges of affordability and economic resilience, climate policy risks being pushed to the back burner.

“To treat climate action as discretionary during difficult times simply pushes greater costs down the road.”

Yet, climate change represents a present and accelerating economic threat. To treat climate action as discretionary during difficult times simply pushes greater costs down the road and ignores the structural role of addressing climate change in long-term economic resilience. In this context, making smart use of public dollars today, by considering the fiscal efficiency and cost-effectiveness of climate policy choices, is more critical than ever. Done right, this can generate economic and social co-benefits including cleaner air, reduced traffic, good jobs in emerging industries, and innovative technology and businesses here in B.C.

B.C. has a strong track record on climate action. From 2007 to 2022, emissions per capita have declined by 20 per cent and emissions per dollar of GDP have fallen 29 per cent, representing decarbonization in action.^{1,2} Yet with strong growth in the



The intake station of the Strathcona Dam, which provides power for parts of Vancouver Island. *iStock*

economy (+42 per cent) and population (+25 per cent), total emissions remain stubbornly high over this period (+0.1 per cent). As 2030 approaches, we are on pace to reach only half of our legislated emissions reduction target.³

This represents an important moment to evaluate the fiscal efficiency and cost-effectiveness of CleanBC and chart a path forward.

This paper examines recent research on the fiscal efficiency of climate policy and explores the implications for B.C.'s existing policy mix. Section 2 examines alternative metrics for assessing the cost-effectiveness of climate policy and introduces the marginal value of public funds. Section 3 reviews recent research on the efficiency of key climate policy instruments for B.C. Section 4 discusses policy design considerations and Section 5 concludes.

“Cost-effectiveness is about more than minimizing expenditure; it requires accounting for broader benefits, behavioural impacts, and potential for long-term change.”

2. Assessing the cost-effectiveness of climate policy

Governments, inevitably confronted with competing objectives and limited resources, must make efficient use of revenue to achieve the greatest possible benefit per dollar of public expenditure. But cost-effectiveness is about more than minimizing expenditure; it also requires accounting for broader benefits, behavioural impacts, and the potential to lock in long-term change.

The cost-effectiveness of climate policy is often measured as dollars per tonne of carbon dioxide equivalent emissions reduced, also referred to as the **emissions abatement cost**. Yet, there are multiple ways of measuring abatement costs, sometimes used interchangeably and without distinction, based on who is incurring the cost.⁴ These include:

- i. **Resource abatement cost:** the incremental cost of switching to a lower-emission alternative divided by the emissions reduced (see equation in [Table 1](#)), often presented as marginal abatement cost curves.⁵ While useful for comparing technologies, this metric excludes behavioural responses such as free riders and rebound effects (see Section 2.3) as well as the public finance implications, making it poorly suited for evaluating policy.
- ii. **Government cost:** the reduction in emissions per dollar of government spending.^{4, 6} This approach more directly assesses the cost-effectiveness of climate policy; however, it often fails to account for co-benefits of climate policy beyond emissions reduction (e.g., health benefits from improved air quality, poverty reduction, and traffic congestion). Additionally, this approach considers revenue raising policies (such as a carbon tax) to have negative costs, which could be perceived as “free” to governments, yet these policies do also impose costs on society that must be considered.
- iii. **Net social cost:** subtracts the value of co-benefits from public expenditure before dividing by emissions reduced.^{4, 7} This approach is more comprehensive but makes implicit assumptions around the cost-effectiveness of co-benefits rather than the fiscal efficiency of all benefits generated.

TABLE 1: COMMON ABATEMENT COST METRICS

	Resource cost	Government cost	Net social cost	Marginal value of public funds (MVPF)
Direct cost to	Technology purchaser	Government	Society	Society
Accounting for free riders	×	✓	✓	✓
Rebound effects	×	✓	✓	✓
Co-benefits	×	×	✓	✓
Equation	$\frac{\text{Additional tech cost}}{\text{Emissions reduced}}$	$\frac{\text{Public expenditure}}{\text{Emissions reduced}}$	$\frac{\text{Public expenditure} - \text{co-benefits}}{\text{Emissions reduced}}$	$\frac{\text{Social benefits} - \text{social costs}}{\text{Public expenditure}}$

These measures provide a way of ranking emissions reduction activities from least to most expensive, although they differ in what they capture (see summary Table 1) and may diverge markedly in what interventions are identified as most cost-effective.⁴

The cost per tonne may then be compared against the **social cost of carbon (SCC)**, the estimated economic damages of each additional tonne of greenhouse gas (GHG) emissions. Conversely, the SCC can be thought of as the economic benefits of reducing each tonne of GHG emissions. As understanding of climate impacts improves, the estimate of the social cost of carbon has increased.^{8,9} Canada currently employs a social cost of carbon of \$271 per tonne for 2025, rising to \$394 per tonne in 2050.¹⁰ In other words, any policy with an abatement cost of less than \$271 today would pass a cost-benefit analysis.

“Simply choosing climate policies with the lower per tonne abatement cost may overlook the opportunity for significant co-benefits.”

Rather than rely on these “cost per tonne” measures, public policy interventions can be evaluated using a metric called the **marginal value of public funds (MVPF)**.¹¹ This measures the social benefits generated by a policy minus social costs per dollar of public expenditure (see Table 1). Expanding the scope of benefits and costs beyond emissions also allows for comparing the relative welfare effect of public expenditure

across policy domains; high-MVPF policies mean greater social return for each public dollar spent. For instance, a policy with an MVPF of 1.5 yields social returns of \$1.50 for each dollar of public expenditure.

One important caveat of the MVPF approach is that it aggregates welfare gains without considering who benefits. It makes no distinction between a dollar of benefit to a high-income household and a low-income household. Policies that score moderately on MVPF but target vulnerable communities or reduce energy poverty may still be warranted on distributional equity grounds. Conversely, high-MVPF programs that exacerbate inequality may require complementary instruments (e.g., means-testing, rebates) to align with provincial priorities. Section 4.2 discusses important distributional considerations.

2.1 Co-benefits

Simply choosing climate policies with the lowest per tonne abatement cost may overlook the opportunity for significant co-benefits. These can be extensive and range from improved air quality, enhanced competitiveness and innovation in emerging industries, lower electricity prices, reduced traffic and vehicle accidents, to improved energy security in the face of volatile global markets.¹²

Ignoring co-benefits can skew assessments of climate policy. For example, evidence suggests the health co-benefits of climate action are substantial and may rival the magnitude of climate benefits in some cases.¹³⁻¹⁵ Since mitigating GHG emissions often also reduces harmful air pollutants produced alongside, climate policy can lead to lower rates of respiratory

disease. Estimates from the Canadian Climate Institute suggest a net-zero emissions pathway could save Canada \$7 billion per year in healthcare costs alone.¹⁶

2.2 Dynamic efficiency: accounting for technological innovation and lock-in

Well-designed climate policies can also help address additional market failures. Firms tend to underinvest in innovation because they cannot capture the full value of their inventions, known as knowledge spillovers.¹⁷ Firms developing low-carbon technologies may face high upfront costs and uncertain market demand, while some of the benefits of their innovation diffuse to competitors. Public support for innovation, through R&D fundings, subsidies, or risk guarantees can correct this failure and help unlock long-term benefits.

Accounting for the dynamic efficiency of climate action can reveal that seemingly expensive climate policy today may be much more cost-effective in the long term once innovation is accounted for.¹⁸ For example, early policy support for solar panels and electric vehicles have helped drive dramatic cost declines that make abatement costs much lower today than they were 10 years ago.¹⁹ To the extent that policy choices support innovation and reduce future costs of low-emitting technology, either directly through R&D or indirectly through subsidies, increasing adoption and thus technological learning, they can provide benefits in reducing the future costs of abatement that should be considered in identifying efficient policy options.

Evidence on whether knowledge spillovers in the form of learning by doing can justify generous deployment subsidies has been found to be context dependent.²⁰ For example, while they may be worthwhile in the offshore wind industry,²¹ this may not be the case for other technologies such as biofuels.²²

Decarbonization is a long-term effort that involves the replacement of long-lived capital and infrastructure. Vehicles, water heaters, furnaces, and power plants are all infrequently made choices that “lock-in” users to that specific technology, often for the duration of its usable life.²³ Choosing technologies with a lower price tag but higher emissions today may have higher dynamic costs by either locking in the lifetime emissions or stranding the asset by forcing its early retirement. Therefore, supporting and investing in technology choices representing more costly emissions reductions today can prove to be lower cost in the long term by setting us on a lower emissions trajectory compatible with our decarbonization goals.²⁴

“A significant share of public funding in broad incentive programs may fail to induce additional emissions reductions.”

2.3. Free riders and rebounds

While climate policy aims to shift behaviour and encourage low-carbon investments, its cost-effectiveness depends on whether it meaningfully alters decisions at the margin. Two challenges can significantly reduce the actual impact of a policy, undermining its efficiency: free-riding and rebound effects.

Free riding occurs when public subsidies go to individuals or firms who would have taken the desired action anyway, creating transfers that increase public spending without altering behaviour. This can be a pervasive problem. A U.S. study of energy efficient appliance subsidies finds 70 per cent of recipients would have made the purchase without the subsidy and another 15 to 20 per cent merely altered their purchase timing to take advantage of the program.²⁵ Similarly, earlier research on hybrid vehicles rebates in Canada finds that 74 per cent went to such free riders.²⁶ These findings suggest that a significant share of public funding in broad incentive programs may fail to induce additional emissions reductions and instead serve as costly windfalls to free riders.

The **rebound effect** occurs when efficiency improvements lower operating costs, which in turn increases consumption, partially offsetting some of the expected emissions reductions. The size of the rebound effect varies across technologies and can offset 5-40 per cent of energy savings.^{27, 28} For example, Barla et al.²⁹ estimate that Canadian vehicle fuel efficiency improvements resulted in a rebound effect of eight to 20 per cent from lower cost of travel leading to an increase in driving. Accounting for such behavioural responses is an important consideration when evaluating the cost effectiveness of alternative policies that is frequently left out of traditional cost-per-tonne metrics.

3. Fiscal efficiency of climate policies

Understanding which climate policies deliver the most social benefit per public dollar is critical in the current fiscal environment. Recent work by Hahn et al.⁴ applies the MVPF framework (Section 2) to assess 96 climate policies based on

empirical research in the U.S., accounting for climate benefits as well as co-benefits and behavioural responses such as rebound effects. Below I draw extensively on this work to assess the available evidence on the fiscal efficiency of alternative climate policies and seek to contextualize those findings in relation to CleanBC and B.C.'s circumstances.

3.1. Carbon pricing

Economists have long pointed to carbon pricing as the most cost-effective tool to reduce emissions. B.C. established itself as a global leader when it introduced a carbon tax in 2008. Revenue from the carbon tax was initially used to reduce personal income taxes along with targeted credits and corporate income taxes. This form of tax swap, where revenue from taxing a negative externality (GHG pollution) is used to reduce existing distortionary taxes, can reduce the overall costs of the tax system.^{30, 31} A growing body of research demonstrates that B.C.'s carbon tax helped reduce GHG emissions with minimal net impacts on economic activity.³²⁻³⁶

Although B.C. repealed the consumer carbon tax in April 2025, the output-based pricing system (OBPS) for large emitters remains in place and offers an important tool to cost-effectively reduce emissions while also generating revenue and addressing the challenges faced by industries that are emission intensive and trade exposed. National modelling suggests the OBPS will contribute the largest emissions reductions of any single policy by 2030.³⁷ However, opportunities for improvement remain. Available evidence suggests the policy stringency is highly variable across the different systems in Canada.³⁸ Increased transparency is needed in credit allocation, trading, and prices to assess the stringency, competitiveness effects, and overall costs of the program. Aligning the program with other provinces and territories to allow for a wider pool of credit trading can also improve cost-effectiveness.

In the context of policies that generate revenue, the MVPF measures the cost on individuals of raising one dollar in government revenue (see Figure 1). In this case, a lower score is better, indicating lower costs to raise \$1 of revenue. Hahn et al.⁴ find that taxes on polluting goods impose a cost of less than \$0.70 for each dollar of revenue raised. The cancellation of the consumer carbon price removes a major source of revenue used to pay not only for household rebates but also targeted subsidy programs and earlier personal and corporate tax reductions, adding to the deficit challenge facing the province.

FIG 1: MARGINAL VALUE OF RAISING PUBLIC FUNDS

MVPF = $\frac{\text{Welfare cost to individuals}}{\text{Revenue raised}}$

In the absence of consumer carbon pricing, alternative revenue raising approaches such as taxing fossil fuels through motor fuels or royalty rates can also represent cost-effective revenue generation with lower costs than existing sources, such as income taxes.^{39, 4} For example, Hahn et al.⁴ estimate the MVPF of a gasoline tax to be 0.6 compared to 1.1 for revenues from an income tax. This implies that every dollar of revenue shifted from an income tax to gasoline tax represents a welfare increase of more than 50 cents.*

Yet an explicit price on carbon is neither strictly necessary nor sufficient to achieve our emission reduction targets.⁴⁰ Alternative policy instruments such as flexible regulations can drive significant emission reductions at low fiscal cost.

3.2. Flexible regulations

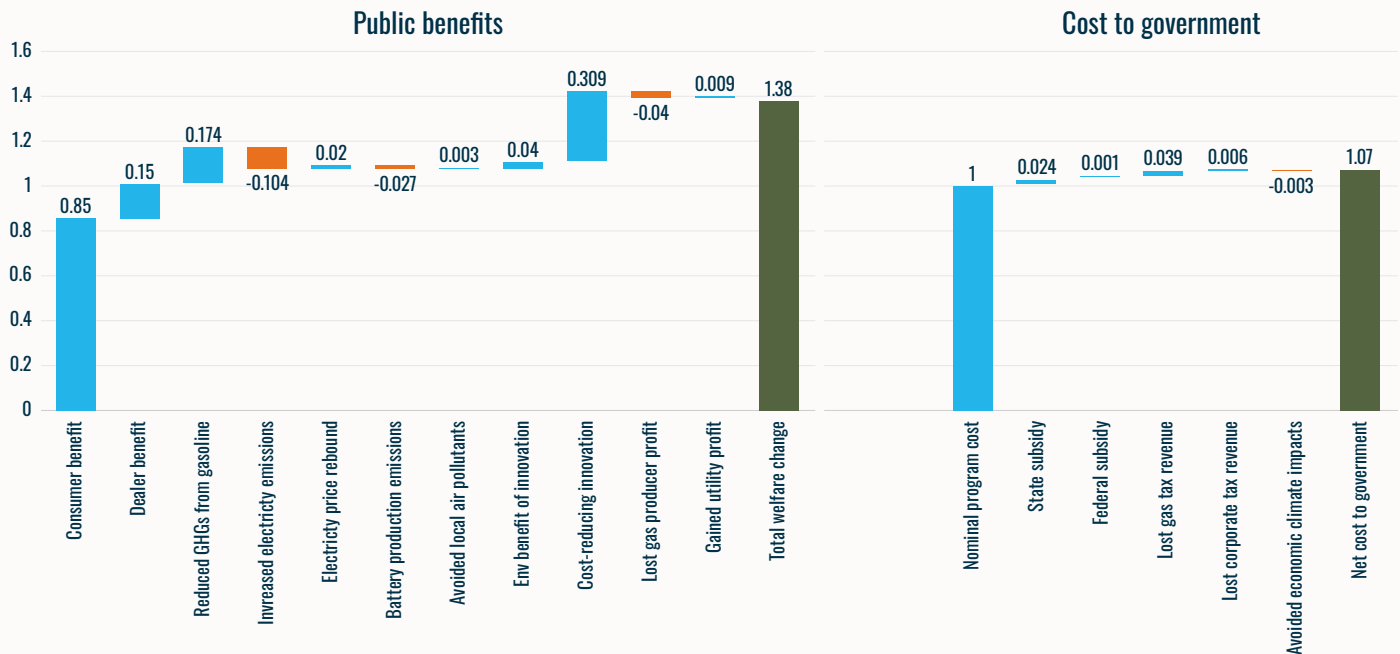
A flexible regulation sets an aggregate performance standard (e.g., emissions per unit of output) and allows firms flexibility in how they achieve that standard.⁴¹ It establishes a credit market where firms with an emissions intensity below the standard can sell credits to firms who are unable to reach the standard. In this way, a flexible regulation provides incentives for all firms to reduce their emissions but gives high-emitting firms the opportunity to buy credits from low-emitting firms, which helps to keep the costs of the system relatively low. British Columbia has several flexible regulations (sometimes referred to as a tradeable performance standards) in place such as the Low Carbon Fuel Standard and ZEV Sales Mandate.⁴²

From a fiscal perspective, these flexible regulations have the potential to drive large emissions reductions without imposing major costs on government beyond monitoring and enforcing compliance. Flexible regulations have been shown to receive high levels of public support in comparison to carbon pricing.⁴³

However, they typically do not have the added benefit of generating revenue and governments need to carefully

* However, revenue generation through a gas tax is more regressive than an income tax. See Section 4.2 on distributional impacts.

FIG 2: DECOMPOSING THE MARGINAL VALUE OF PUBLIC FUNDS SPENT ON EV SUBSIDIES



Source: Hahn et al.⁴ based on the findings of Muehlegger & Rapson.⁴⁵

consider distributional impacts and policy interaction effects in policy design.^{44, 22} Introducing price ceilings in credit markets can help deliver certainty to regulated firms and potentially provide a source of revenue generation.

3.3. Incentive programs

Incentives that reduce the cost of purchasing a low-emission technology are the most common type of climate policy implemented in B.C. as well as across Canada. These programs aim to accelerate the adoption of low-emitting technologies by reducing upfront costs and shifting consumer and business choices. To the extent that incentives contribute to additional low-emitting technology uptake, replacing current high-emitting technologies, they can help reduce emissions. They can also play an important role in addressing additional market failures such as innovation spillovers, network externalities, and information asymmetries. B.C. has used targeted incentive programs across sectors including for electric vehicles, e-bikes, heat pumps, home energy efficiency improvements, and low-emission agricultural practices, among others. More than half of these programs specifically target the transportation and buildings sectors, which

together represent roughly half of provincial emissions.⁴²

3.3.1. Transportation

CleanBC's GoElectric program makes up 75 per cent of the province's transportation incentive programs. Electrification is the most promising pathway for decarbonizing passenger transportation and B.C. has a clear advantage with its low-emissions electricity grid. More than 90 per cent of transportation incentive programs in B.C. are well-targeted toward end-use fuel switching (i.e. switching from gasoline and diesel to electricity).⁴²

One of the most salient programs under CleanBC is the consumer rebate for electric vehicle adoption, which is currently paused. Hahn et al.⁴ estimate an MVPF for EV subsidies of 1.3 in the U.S. indicating that each dollar of public expenditure on EV subsidies generates approximately \$1.30 in benefits.

Figure 2 breaks down this calculation into its component parts, including the public benefits and costs on the left and the costs to government on the right. Each dollar of EV subsidy expenditure generates direct benefits to consumers (\$0.85) and EV sellers (\$0.15). It also generates global environmental



The Go Electric Training program helps B.C.'s workforce lead the move to EVs. As of December 31, 2024, 412 electricians have been trained to install and maintain charging infrastructure, and 632 automotive technicians have been trained to diagnose, repair and maintain EVs. [Source](#)

benefits from reduced GHG emissions (\$0.17) as well as innovation benefits which reduce future technology costs (\$0.31) and future abatement costs (\$0.04). On the other hand, it imposes modest societal costs from battery production (\$0.03) and lost profits from gasoline sales (\$0.04).

The cost to government includes not only the program cost (\$1.00) but also lost revenue from gasoline taxes (\$0.04) and corporate income taxes (\$0.006) and can induce greater costs on other orders of government to the extent that it induces EV adoption if it can also receive a federal subsidy (also currently paused).

“Shifting building energy use away from fossil fuels and toward electric end-uses represents a significant decarbonization opportunity.”

However, it is noteworthy that these estimates are based on a study of California's EV rebate program⁴⁵ and the value increases with a cleaner electricity grid. Specifically, the environmental costs of increasing electricity demand (\$0.10) would be negligible in B.C. where electricity generation is largely carbon-free and the local health benefits of EVs are

higher in jurisdictions with a clean grid.⁴⁶ This suggests the MVPF for EV subsidies in a jurisdiction with clean electricity are likely upwards of 1.5.⁴

The current program pause and future uncertainty may also be impacting consumer behaviour as consumers delay purchase decisions to see if federal and provincial programs resume. In this way, program predictability is important to consumers just as it is to businesses making investment choices.

A key impediment to widescale EV adoption is the availability of charging infrastructure. This creates a network effect where the market under invests in EVs compared to what would be socially optimal.⁴⁷ B.C. is addressing this by providing incentives for home and workplace chargers and requiring charger capability in new multi-unit residential buildings. While Hahn et al.⁴ do not estimate the MVPF of charging subsidies, other research suggests that every subsidy dollar spent on EV charging infrastructure contributes more than twice the level EV adoption compared to each dollar spent on purchase subsidies.^{48, 49} Thus, public support for EV charging infrastructure may be more cost-effective than direct support for EV adoption.

3.3.2. Buildings

CleanBC also offers a range of building retrofit and equipment subsidies including for home energy efficiency improvements and electrification technologies such as heat pumps and induction stoves. Given B.C.'s low-emissions electricity grid, shifting building energy use away from fossil fuels and toward electric end-uses represents a significant decarbonization opportunity.

Extensive research demonstrates that energy efficiency programs tend to underperform projections. A recent study of Canada's national energy efficiency retrofit program finds that home retrofit subsidies achieved only half of their expected energy savings⁵⁰. A review by Giandomenico et al.⁵¹ finds that energy efficiency programs resulted in an average improvement of just 7.2 per cent, with no program delivering savings greater than 50 per cent. Window and door replacements were found to be the least effective intervention. This underperformance can largely be attributed to excessive optimism in engineering model predictions and varying quality of work by contractors, with only six per cent of the shortfall explained by rebound effects.⁷ Evidence from Michigan's weatherization program finds that costs exceed social benefits, with an average annual return

of -7.8 per cent.⁵² Likewise, Hahn et al.⁴ estimate the MVPF for energy efficiency support to be 0.98, indicating that costs to government exceed the social benefits by a small margin.

“Allowing infrastructure to evolve solely in response to market forces... will fall short of what is needed to achieve deep decarbonization.”

B.C. should therefore leverage its clean electricity advantage to emphasize support for building electrification (e.g., switching from gas furnaces and stoves to heat pumps and induction) rather than supporting minor efficiency improvements such as window and door replacements, which tend to underperform.

Well-targeted support can increase both the emissions impact and fiscal efficiency of a program. By focusing support on consumers whose behaviour is most likely to be affected by a subsidy, programs can minimize free riding and enhance the fiscal efficiency of programs. For example, Giandomenico et al.⁵¹ find that the most efficient programs were those that exclusively targeted low-income households using fossil fuels. In this way, limiting support based on income thresholds and/or property values (as is done in B.C. for [heat pump rebates](#) and ZEVS) as well as existing fuel source used can enhance program equity and cost-effectiveness. Setting more precise incentive levels for improvements based on realized reductions from specific technologies can also enhance cost-effectiveness.^{53, 54}

Additionally, pairing supports with reinforcing revenue generation can amplify their impact while minimizing net public cost. For example, B.C.’s [PST exemption](#) on electric heat pumps that is combined with a corresponding PST increase on gas furnaces represents a well-targeted revenue shift that strengthens the price signal favoring electrification and limits government cost.

Another approach for increasing home electrification while limiting direct fiscal outlay is through Property Assessed Clean Energy (PACE) financing. PACE programs enable consumers to finance clean energy upgrades such as heat pumps through their property tax bill, reducing upfront costs and spreading repayment over time as on-bill cost savings are realized. Evidence demonstrates that PACE increased uptake of residential solar PV adoption in California.⁵⁵ However,

potential interactions with the mortgage lending market must be carefully evaluated.⁵⁶ Learning from pilot programs like the Saanich PACE program to support heat pump adoption can help inform best practices.



Headquartered in North Vancouver, Jetson builds in the CleanBC Energy Savings Program Heat Pump Rebate straight into their quotes to eliminate complexity for their customers. [Source](#)

3.4. Infrastructure investment

Advancing major infrastructure projects is a priority for both federal and provincial governments to shore up our productivity and resilience. Strategic infrastructure investment is also central to enabling long-term emissions reductions. CleanBC currently supports infrastructure expansion through programs like the [CleanBC Communities Fund](#), which provides co-funding for community-scale clean energy, transportation, and efficiency projects. However, it is important to recognize that all infrastructure investments influence future emissions trajectories. Without deliberate effort, allowing infrastructure to evolve solely in response to market forces, even under emissions regulations, will fall short of what is needed to achieve deep decarbonization.

Infrastructure shapes the availability and desirability of low-carbon options. Research on induced demand shows that infrastructure influences long-term behaviour. For example, expanding road capacity leads to an increase in driving,⁵⁷ while investments in active or public transit can shift mode choice and reduce transport emissions.^{58, 59} Infrastructure does not simply serve demand—it creates it.

This matters for fiscal efficiency. Investments in long-lived assets such as transit lines, electricity generation and networks, or buildings have long payback periods and often lock in technology and fuel choices. Without deliberate investments, dirtier capital may dominate due to lower upfront cost or familiarity. Therefore, it can be optimal to prioritize initially expensive, clean infrastructure investments because they displace future high-emissions infrastructure and reduce path dependence.²⁴ In these cases, high upfront costs may yield greater efficiency in the long term. This emphasizes the importance of B.C.'s Zero Carbon Step Code to ensure that new buildings are ready to reach net-zero and avoid costly retrofits down the road.

3.5. Information and “nudges”

Behavioural interventions (commonly referred to as “nudges”) have shown promise in encouraging energy conservation at low public cost. For example, Allcott⁶⁰ finds that personalized electricity consumption feedback can reduce residential demand. Hahn et al.⁴ estimate an MVPF of 3.07 for similar programs, indicating high public returns relative to public expenditure. However, in jurisdictions like British Columbia, where electricity is already near-zero emissions, reductions in electricity use may not translate into meaningful emissions reductions. This underscores the importance of tailoring nudge interventions to where they can achieve the most environmental impact.

Evidence also supports the use of information disclosure policies to incentivize investment in energy-efficient technologies. For instance,⁶¹ find that mandatory disclosure of home energy performance can increase market value for efficient homes. Applying this insight, B.C.'s Home Energy Label program could help stimulate demand for electrification upgrades by making emissions intensity and energy costs a visible attribute in housing markets.

“Available support should emphasize fuel-switching and explore innovative targeting approaches to avoid free-riders.”

While peer effects are another important behavioural lever, they tend to be more influential when technology choices are visible, such as rooftop solar panels.⁶² In contrast, heating system choices remain largely hidden from social networks, limiting the power of peer diffusion. Initiatives that promote social learning, such as group purchasing programs or community-led outreach, may help bridge this visibility gap. In Connecticut, for example, a solar adoption campaign that fostered peer-to-peer interaction and bulk discounts led to higher uptake and lower costs.⁶³ Hahn et al.⁴ estimate this program's MVPF at 1.8, making it more cost-effective than many direct subsidies.

Taken together, these findings suggest that information programs and nudges can play a meaningful role in a cost-effective policy portfolio, particularly when strategically designed to maximize visibility and uptake of high-impact electrification technologies.

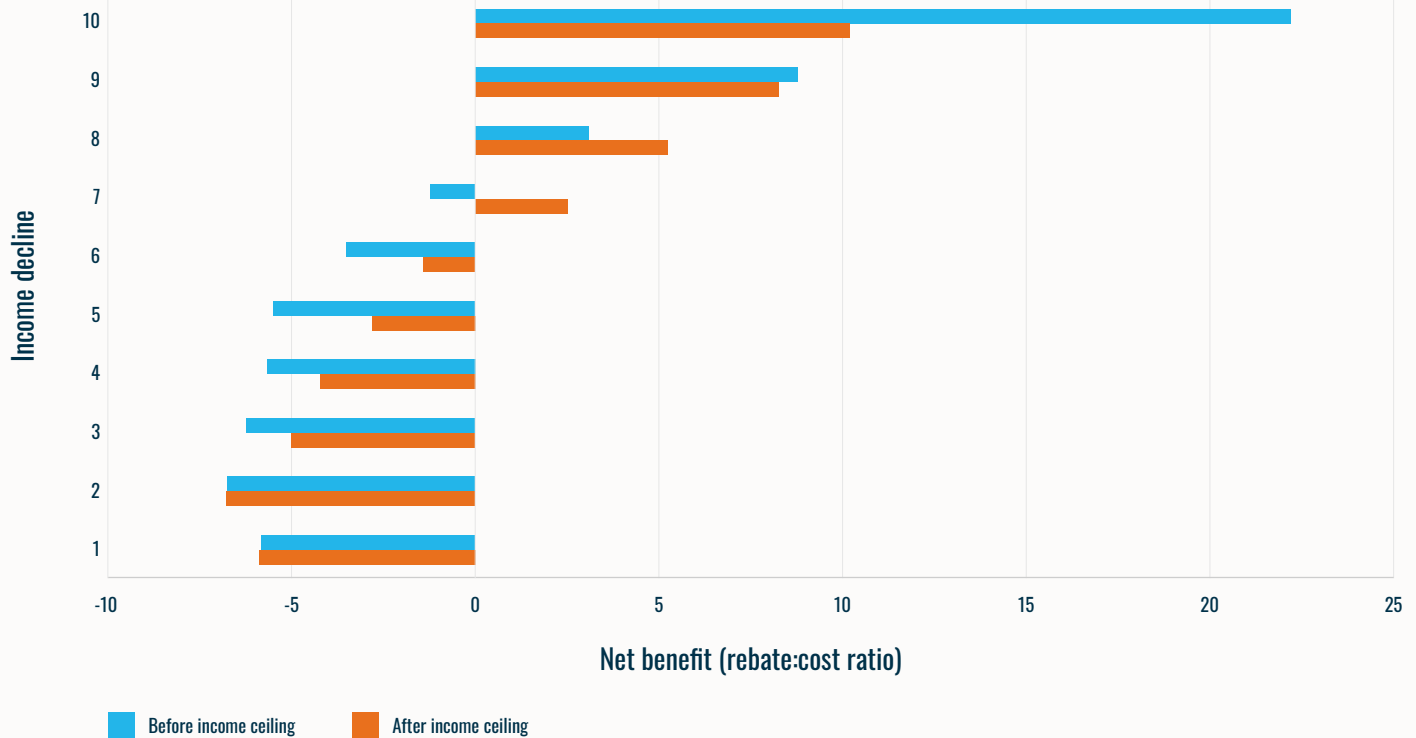
4. Policy design considerations

4.1. Targeting additional emission reductions

In the context of a constrained fiscal environment, B.C.'s use of policy “carrots” to incentivize emission reductions need to be effectively targeted to ensure they drive new emission reductions rather than rewarding actions that would have happened anyway. Therefore, available support should emphasize fuel-switching and explore innovative targeting approaches to avoid free riders.

» **Emphasize fuel switching:** B.C. has a major clean electricity advantage. Policies to support the electrification of high-emitting sectors such as transportation, buildings, and industry are essential to reaching our climate goals. Here, B.C.'s Clean Electricity Standard plays a critical role in maintaining this advantage. Continuing the diversification and expansion of clean electricity generation, particularly to rural and remote northern communities, and leveraging recent cost declines in solar plus storage, will prepare the province to meet growing electricity demand from electrification without increasing emissions. This also reinforces the cost-effectiveness of fuel-switching policies by reducing future system costs and maintaining reliability.

FIG 3: NET BENEFIT TO COST RATIO OF CALIFORNIA'S EV REBATE PROGRAM BEFORE AND AFTER INCOME ELIGIBILITY CEILING⁶⁷



» **Avoid free riders:** Exploring innovative policy designs could help target truly additional technology adoption while lowering revenue costs of implementing the policy.^{64, 65} For instance, in reverse auctions for participation in incentive programs, instead of offering the same incentive to any consumer (many of whom would have purchased the technology anyway), potential consumers bid the incentive level they need to make a purchase. The funding body then allocates available funding starting from the lowest bids. Knowing they are competing for scarce funds, consumers are incentivized to bid the lowest value they would need to complete the purchase. Setting aside funding amounts for income groups or geographic regions could help mitigate distributional equity impacts.⁶⁵

4.2. Managing distributional impacts and affordability

Rapid inflation following the COVID-19 pandemic has increased pressure on household finances. Correspondingly, this has prompted governments to shift the focus of climate policy

from “sticks” to “carrots”. However, subsidies for new long-lived capital tend to benefit the wealthiest, with support often going to homeowners and purchasers of new vehicles.⁶⁶

Evidence from California demonstrates that the incidence of EV subsidies funded by cap-and-trade revenue is strongly regressive.⁶⁷ Introducing income limits on eligibility (as B.C. has) helped reduce the share of subsidies going to the highest income earners, but incidence remained regressive (see [Figure 3](#)). Notably, early evidence on heat pump adoption suggest it may be an important exception, where uptake appears to be more even across the income distribution.⁶⁸

“Point-of-sale rebates can help encourage adoption among those that face constraints in covering the full cost of technologies up front.”

Targeting programs to support low-income earners and renters can enhance distributional outcomes and additionality of incentive programs. For example, point-of-sale rebates (rather than having to apply and wait or file your tax return) can increase salience and help encourage adoption among those that face constraints in covering the full cost of technologies up front.⁶⁶

Additionally, exploring income-based electricity rates, as implemented in California, can help ensure that low-income households do not face disproportionate energy cost burdens as electrification increases.⁶⁹ These rate structures can also be aligned with broader affordability objectives to ensure price signals are preserved without exacerbating energy poverty.

4.3. Policy interactions

B.C. already has many climate policies in place. To ensure an effective and efficient climate policy mix, it is crucial to understand and account for interactions between overlapping policies. In many cases these can create synergies: for instance, policies to support end-use fuel switching have an outsized impact thanks to B.C.'s Clean Electricity Delivery Standard. Additionally, even a modest price on emissions can significantly enhance the cost-effectiveness of the policy mix.⁷⁰

However, overlapping policies that target the same emissions using different mechanisms can reduce cost-effectiveness without increasing emissions reductions, particularly with quantity- or intensity-based instruments.⁷¹

³⁷ Using subsidies to support emissions reductions among firms that already face stringent regulations are less likely to support additional abatement and should be used judiciously to support competitiveness.

5. Conclusion

As British Columbia prepares for the next phase of climate policy under CleanBC, rising fiscal constraints and mounting climate urgency demand a more strategic approach to public spending. This analysis highlights how different policy instruments vary widely in their cost-effectiveness, and that greater emissions impact can be achieved with less expenditure, if policies are carefully chosen and designed. Flexible regulations that shift costs within regulated markets, transparent carbon pricing that raises useful revenue, and well-targeted incentives all have distinct roles to play in a fiscally prudent climate strategy.

A forward-looking policy mix must also consider long-term dynamics: how infrastructure shapes future behaviour, how innovation lowers future costs, and how policy interactions can amplify or undercut impact. Prioritizing policies that support electrification can leverage B.C.'s clean electricity advantage. Meanwhile, aligning instruments to avoid redundancy and ensure complementarity can stretch limited public dollars further. By embracing this lens of fiscal efficiency, B.C. can better navigate trade-offs and deliver a climate strategy that is economically sound, socially fair, and environmentally ambitious.

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