Wrong Move at the Wrong Time

Economic Impacts of the New Federal Building Energy Efficiency Mandates

by Ross McKitrick

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Executive Summary

As part of the 2030 emission reduction plan, the federal government is planning to decarbonize the building sector by enhancing the energy efficiency of new and existing buildings. In the Building Energy Efficiency (BEE) components of the *2030 Emissions Reduction Plan* (ERP), the government has proposed new building codes with the goal of achieving a 65% reduction in energy consumption for new residential buildings and a 59% reduction for new commercial buildings by 2030, compared to 2019 levels. This report provides a quantitative economic evaluation of the economic consequences of these changes from 2020 to 2050 and makes use of a large, detailed macroeconomic model of the Canadian economy specially adapted to track the effects of the policy.

While the BEE requirements are initially minor, they quickly ramp up in the middle of this decade and will increase home construction costs by an average of about 8.3% by 2030, potentially adding an estimated $55,000 to the average cost of new homes in Canada. The costs vary by province, ranging from a low of $22,144 in New Brunswick up to $78,093 in British Columbia. These requirements are expected to impose annual direct and indirect economic costs that sum to over $1,700 per worker beginning in the post-2026 period.

National GDP will initially decline to about 2% below the base case and maintain much of that gap through 2050. The GDP loss against the base case as of 2030 ranges from a low of 0.9% in Prince Edward Island to highs of 2.6% in British Columbia and 2.5% in Ontario. Nevertheless, the effects on GHG emissions are small (a reduction of about 1% below the base case) and on a per-unit basis cost about 50 times the carbon-tax value as of 2030. As a result of the large loss of GDP relative to reductions in GHG emissions, emissions intensity of the Canadian economy actually rises slightly due to the regulation.

Overall the proposed Building Energy Efficiency package is a very costly addition to the federal carbon tax. It will impose substantial costs while contributing relatively little to Canada's greenhouse gas reduction targets. Additionally the rules will affect mainly purchasers of new homes. Since older, higher-income households tend already to own their homes, the costs discussed in this study are likely to fall disproportionately on younger and lower-income people trying to enter the housing market.

1 Introduction

This report provides a quantitative economic evaluation of the economic consequences of the Building Energy Efficiency (BEE) components of the federal government's *2030 Emissions Reduction Plan: Canada's Next Steps for Clean Air and a Strong Economy* (ERP) (ECCC, 2022). The evaluation covers the period from 2020 to 2050.

As a preliminary matter, because the federal government has already implemented a carbon tax the BEE regulations are ill-conceived and guaranteed to be inefficient. The economic rationale for an emissions tax is that it drives consumers and firms to find the lowest-cost ways of cutting emissions. The options not selected by the private sector are precisely those that are not cost effective. Introducing new regulations to force people to implement them anyway undermines the market-based process and destroys the potential efficiency of the carbon tax.

The ERP contains many regulatory proposals, including BEE requirements, that are not easy to quantify. This report will explain how the policy targets are translated into quantitative parameters that can be used to estimate economic impacts.

The BEE requirements will add an estimated $55,000 to the average new home price in Canada by 2030, and will impose an overall economic cost of over $1,700 per worker annually beginning in the post-2026 period. National GDP will initially decline to about 2% below the base case and maintain much of that gap through 2050. The effects on GHG emissions is very small and on a per-unit basis the economic costs are about 50 times the carbon tax value as of 2030. As a result of the large loss of GDP relative to reductions in GHG emissions, emission intensity of the Canadian economy actually rises slightly because of the regulation.

2 Summary of Regulations

The over-riding goals of the *Emissions Reduction Plan* are to reduce Canada's greenhouse gas (GHG) emissions to the Paris target by 2030, specifically 40%–45% below 2005 levels, and put them on a path to net zero by 2050. The model used in this study focuses on two GHGs, carbon dioxide (CO_2) and methane (CH_4), and does not attempt to model regulation of minor gases such as nitrous oxide (N_2O) or perfluorocarbons.

According to the ERP (ECCC, 2022: 11), energy use inside buildings accounts for about 12% of current Canadian GHG emissions. The salient features of the ERP for the purpose of policy modeling are set out in the report on page 227 and are summarized as follows:

(a) buildings: shell energy efficiency (EE) improvements to cut heating needs by 3.5% and cooling needs by 3.6%;

(b) equipment: EE for all equipment except refrigeration to increase by 0.9% per year from 2022 to 2030; refrigeration stock EE increase by 1.3% per year;

(c) EE of all lighting systems to increase by 1.3% per year;

(d) EE of all motors to increase by 1.3% per year;

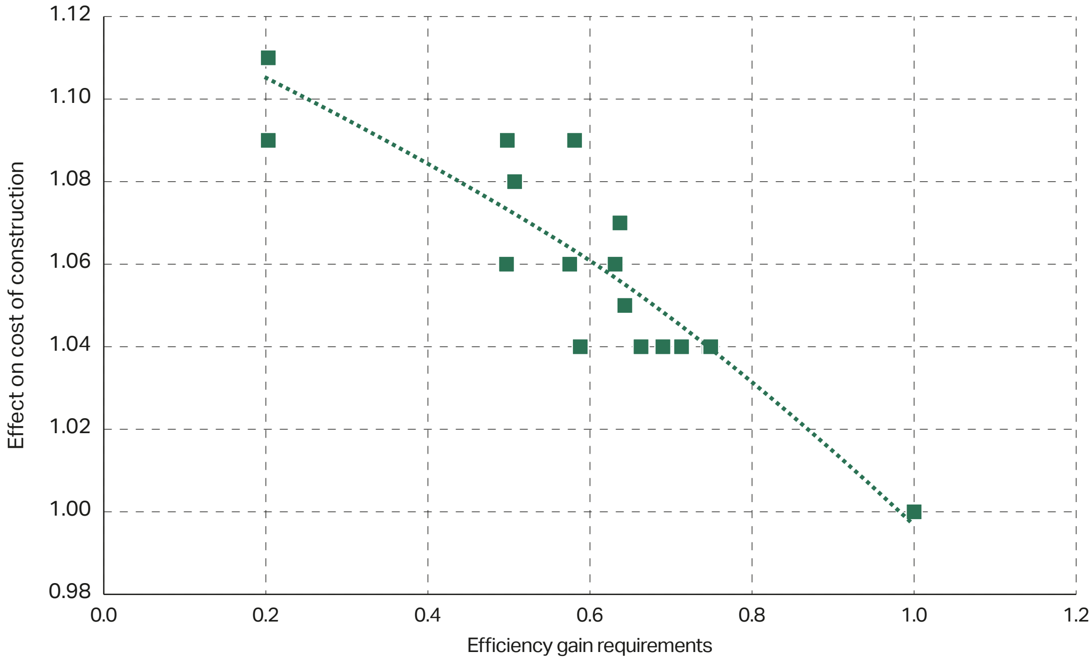
(e) new homes to use 61% less energy (compared to 2019) by 2025, 65% less by 2030;

(f) new commercial buildings to use 47% less energy by 2025 (compared to 2019) and 59% less energy by 2030.

Energy efficiency mandates for buildings and building components increase construction costs. Some characteristic values relating required targets for energy use (heating and cooling) and construction costs were set out for standard residential buildings in the *Energy Step Code* (CHBA, 2018). When graphed and tabulated, they can be summarized in figure 1. The horizontal axis shows the requirement for energy-efficiency improvements to buildings as a proportion of the base case (for instance, a required 10% efficiency gain corresponds to a value of 0.9). The vertical axis shows the effect on the price of construction as a multiple of the base-case value. A second-order polynomial line of best fit is shown. Note that these cost estimates do not include a profit margin for builders. Also, the concavity of the line suggests slightly diminishing marginal costs, which is implausible given diminishing returns to investments in energy efficiency. Nonetheless, the fitted curve was used as shown to assign a construction-cost adjustment factor to prescribed efficiency improvements.

Figure 1: Construction cost price index compared to efficiency gain requirements

$y = -0.0624x^2 - 0.0597x + 1.119$; $R^2 = 0.8302$



Source: CHBA, 2018; author's calculations.

The regulations in the ERP were translated into approximate requirements for energy-efficiency improvements as shown in table 1. Applied multiplicatively these imply a required total reduction in energy use in new buildings of 58.3%, which corresponds to the point 0.417 on the horizontal axis, implying an increase in the cost of building of 8.3% by 2030. Note there is a large discrete step in the target as of 2025. Since there are practical limits to what can be imposed in such a short time frame, this step was smoothed out to occur over two years rather than one.

Table 1: Approximate requirements for Building Energy Efficiency improvement mandated by the federal ERP

Building Energy Efficiency measure	Improvement required
(a)	— a one-time 3% improvement in 2022 (index = 0.97 × base case value thereafter);
(b–d)	— deduct 0.05% per year from 2022 to 2030;
(e–f)	— deduct 55% in 2025 and a further 4% in 2030.

The modeling framework is explained in McKitrick (2023a; 2023b) with additional details in the next two sections. The policy experiment is run under the assumption that the federal carbon charge is in place nationally at the prescribed level through 2030, but other elements of the ERP are not implemented.

3 Treatment of Dead-Weight Losses

The mandated change in construction standards imposes regulatory dead-weight losses, meaning firms incur (and pass on to consumers) increases in the cost of construction over and above that necessary to satisfy consumer demand. While buyers want some BEE features in new homes, and have the option to purchase them, the mandate is based on the assumption that buyers will not willingly choose all the BEE features that the regulator wants them to. The rule therefore requires households to buy more BEE features than they want, displacing other things they would have preferred to purchase. In some cases, the high-efficiency option is perceived as providing a service of lower-quality than the alternative (for instance, in heating, lighting, and appliance systems) and in some cases the homeowner simply does not believe the energy savings justify the higher up-front cost.

The potential savings that a household chooses to forego as a result of declining a BEE option is a measure of the utility value to the household either of the superior performance of the less efficient good or of the alternative purchase made possible by not spending it on BEE. When the household is forced to spend it on the BEE feature anyway, they save some money subsequently on energy. Regulatory analysis of BEE policies often erroneously count these savings as the benefits to consumers of the regulation on the assumption that the household is irrational and the regulatory bureaucrat knows better than the household how it should spend its money. If we rule out the assumption of consumer irrationality (and bureaucratic infallibility), the foregone savings from declining a BEE feature can then be seen as a measure of the cost to the household of forcing them to make a purchase against their will, not a benefit of the regulation. Prior to the regulation the consumer preferred not to buy the BEE option even if that meant incurring higher energy costs in the future. The value of the energy saved as a result of having this choice removed is a measure of the lost benefit of the alternative goods and services the consumer can no longer obtain and should be counted as such. If this elementary economic principle were properly applied many government-based regulatory cost-benefit analyses would show net costs rather than net benefits (Gayer and Viscusi, 2013).

The model used in this study accounts for the economic losses of the regulatory measures as follows. The increment in building costs due to the regulation is applied to construction output in each province to determine the amount of required spending. This is divided into spending on goods and services, labour and capital using the input shares for construction in each province. The goods and services share of this amount plus one third of the capital share is treated as beneficial new spending applied to other sectors. The remaining factor shares are assumed to be dead-weight losses in the form of lost productivity since it is directed towards producing outputs the consumer preferred not to purchase.

4 Energy Efficiency, Emission Reductions, and Rebound Effects

There are longstanding debates over whether energy-efficiency mandates are needed to correct market failures and, if so, whether they do so efficiently or not. Useful surveys can be found in Alcott and Greenstone (2012), Gillingham and Palmer (2014), Adams and McKitrick (2016), and Gerarden, Newell, and Stavins (2017). Based on the discussion and evidence in these surveys some general points can be noted.

Energy efficiency gap hypothesis

The so-called "Energy Efficiency Gap" refers to potential net savings in energy costs that households and firms could realize if only they made greater investments in energy efficiency options, but for reasons often described as "market failures" or "behavioural failures" they fail to do so. Proponents of the Energy Efficiency Gap hypothesis have argued that consumers misunderstand the benefits and are prone to making systematic errors that bias them against beneficial efficiency investments, but many economists are skeptical that such savings exist in practice and believe that the evidence does not support a finding of systematic irrationality on the part of consumers.

Market failures

"Market failures" do exist in the form of unpriced externalities associated with energy production, but the term is often misapplied to describe situations in which households or firms make decisions that go against those a regulator thinks is in their best interest. Unless the agent's decision was based on faulty information or some form of market imperfection it is not strictly speaking a "market failure"; it may just indicate that households and firms have different priorities than the regulator. In particular, they may place less weight on energy efficiency and more on other aspects of product quality.

Inadequate information

Where sub-optimal decision-making is attributable to inadequate information (for instance regarding differing energy-use rates among appliances), the proper remedy is greater informational disclosure, not taking away consumers' choices.

The model used in this report tracks changes in GHG emissions that result from changes in fuel use, which are primarily governed by fuel prices, incomes, and elasticities. The regulation will have no direct effect on fuel prices but will have indirect effects.

Increased construction costs will suppress demand for energy use through cross-price effects and reduced real incomes. In provinces where most electricity is from non-emitting sources (such as nuclear in Ontario and hydroelectric in British Columbia and Quebec), improvements in electrical energy efficiency have limited implications for GHG emissions, although there may be an alignment of timing between when households use more energy and when the power grid is using more fossil fuels, such as reliance on peaking gas plants during hot weather.

There is also the question of whether changes to the housing stock driven by the BEE regulation will yield cuts in average home energy use over and above those due to price or real income effects, such as reduced natural-gas consumption for new home heating. Any such effect will be confined to buildings built after the regulation entered into force so it will leave most of the housing stock unaffected for many decades. In new houses, the magnitude of the effect will be determined by the size of the so-called rebound effect.

An investment that improves energy efficiency thereby lowers the cost of the energy-related service, which increases demand, thus offsetting some or all of the efficiency gain. For example, if a homeowner who customarily heats his home to 20°C installs new insulation, it thereafter takes less energy, and is less costly, to maintain it at 20°C. But the homeowner does not necessarily keep it at 20°C thereafter and pocket the savings. It may now cost the same as before to have a warmer house, say 22°C and the homeowner may opt to consume the same amount of energy as before and achieve a higher indoor temperature. In the same way, a homeowner who installs LED lighting to replace incandescent bulbs may leave the lights on longer or install more lighting units because it costs less to use each one. In this way, improved energy efficiency does not simply translate into lower energy consumption; instead it is partially directed into greater consumption of energy-related amenities.

The rebound effect is the fraction of initial energy savings offset by an increase in energy consumption induced by improved efficiency. There is a longstanding debate about how large it is. A recent study using long term US data (Bruns, Moneta, and Stern, 2020) found that energy consumption drops following improvements in energy efficiency, but that the effect is only temporary and within four years the rebound effect climbs to 100%, implying no long-run reduction in total energy use, and therefore in GHG emissions.

Even if the rebound effect is less than 100%, there will be a secondary off-setting effect as a result of the substitution between old and new housing. The increased cost of new houses will slow down the turnover and replacement of the existing housing stock as people choose to renovate existing homes rather than build new. Extending the average age of the housing stock will tend to increase its average energy use. Also, to the extent owners of new homes reduce their energy consumption this will slightly reduce fuel prices, inducing an increase in the use of fuel by owners of older homes.

Notwithstanding the empirical evidence that BEE regulation may not affect energy use, we will assume that it does and introduce the effect as follows. It is assumed that each period 1.5% of the household stock consists of new additions. [1] Over time, the fraction of the housing stock built after the date of the regulation therefore grows. The energy-efficiency factor (as shown on the horizontal axis of figure 1) is applied to this fraction of households, less a 50% rebound effect. This yields an efficiency improvement that is then applied both to household electricity and natural-gas consumption.

[1] Based on data from the Natural Resources Canada (n.d.): Table 21: Housing Stock by Building Type and Vintage, <https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP&sector=res&juris=ca&year=2020&rn=21&page=0>.

5 Economic Impacts

Tables 2 to 4 summarize the macroeconomic effects as of 2030. Table 2 shows the estimated effect of the new regulations on the cost of new home construction as of 2030. The estimate is obtained by taking the mean home selling price for each province [2] as a proxy for the cost of building new homes and multiplying it by 8.3%. The mean includes land costs, which leads to overstating the building cost (although less so for apartments and condominiums). But, it also averages in the purchase costs of older homes (which are cheaper than comparable new builds), which leads to underestimation. The national cost estimate is just under $55,000, and the provincial estimates range from a low of $22,144 in New Brunswick to $78,093 in British Columbia.

Table 2: Cost of new regulations per new home, by province, 2030

	Cost per new home		Cost per new home
Canada	$54,982		
British Columbia	$78,093	Quebec	$38,070
Alberta	$35,499	New Brunswick	$22,144
Saskatchewan	$26,436	Nova Scotia	$30,677
Manitoba	$26,894	Prince Edward Island	$28,369
Ontario	$71,818	Newfoundland & Labrador	$22,966

Sources: CREA, 2023; author's calculations.

Table 3 summarizes the main macroeconomic impacts nationally and by province as of 2030. Real GDP is expected to fall by 1.8% against the baseline, which is a slight recovery from a minimum of 2.1% below the baseline in 2026. Instead of the economy growing by 28.5% from 2022 to 2030 it grows by only 26.3%. The loss in GDP by province ranges from a low of 0.9% in Prince Edward Island to highs of 2.6% in British Columbia and 2.5% in Ontario. Since employment changes very little, the effect is mainly felt as a drop in GDP per worker (column 3). The knock-on effects on real industrial output tend to be small at the macroeconomic level (column 4). While earnings per worker decline, the rate of return to capital rises slightly, on average, in most provinces (column 5). Finally, GHG emissions decline only modestly as a result of the policy, by just under 1% nationally (column 6). The changes in GHG emissions

[2] Obtained from Canadian Real Estate Association (2023).

Table 3: Summary of main macroeconomic effects as of 2030, nationally and by province, showing percentage deviation from baseline

	(1) GDP	(2) Employment	(3) GDP per worker	(4) Real industrial output	(5) Capital returns relative to average	(6) GHG emissions
Canada	−1.8	−0.1	−1.7	−0.4	0.4	−0.9
British Columbia	−2.6	−0.2	−2.4	−0.6	0.0	−1.2
Alberta	−1.2	−0.1	−1.1	−0.3	1.0	−1.0
Saskatchewan	−1.0	0.0	−1.0	−0.5	0.2	−1.0
Manitoba	−2.0	−0.1	−1.9	−0.5	0.3	−0.5
Ontario	−2.5	−0.1	−2.4	−0.4	0.3	−0.9
Quebec	−2.0	−0.1	−1.9	−0.5	0.6	−0.6
New Brunswick	−0.8	0.1	−0.9	−0.4	0.0	−0.4
Nova Scotia	−1.6	0.0	−1.6	−0.6	0.1	−0.4
Prince Edward Island	−0.9	−0.1	−0.9	−0.4	−1.3	−0.3
Newfoundland & Labrador	−1.2	0.0	−1.2	−0.5	−0.1	−0.3
Far North	−0.9	0.1	−1.0	−0.5	−0.3	−0.4

Source: Author's calculations.

in 2030 are not primarily the result of the energy efficiency measures themselves but of indirect effects on consumption patterns by price and income effects.

Table 4 provides sectoral detail at the national level. For most sectors, real output, labour demand, and capital demand experience relatively small changes. The construction sector (row 11) is rather hard hit as of 2030, with output declining by 6.8%, labour demand falling by over 82,000 workers, and capital demand declining by 7.1%. The redirected spending shows up as an output increase in other manufacturing (row 18), and as increased employment in other manufacturing (row 18, 14,100 workers), wholesale and retail sales (row 19, 6,500 workers) and media, banking, and other professional services (row 24, 12,000 workers).

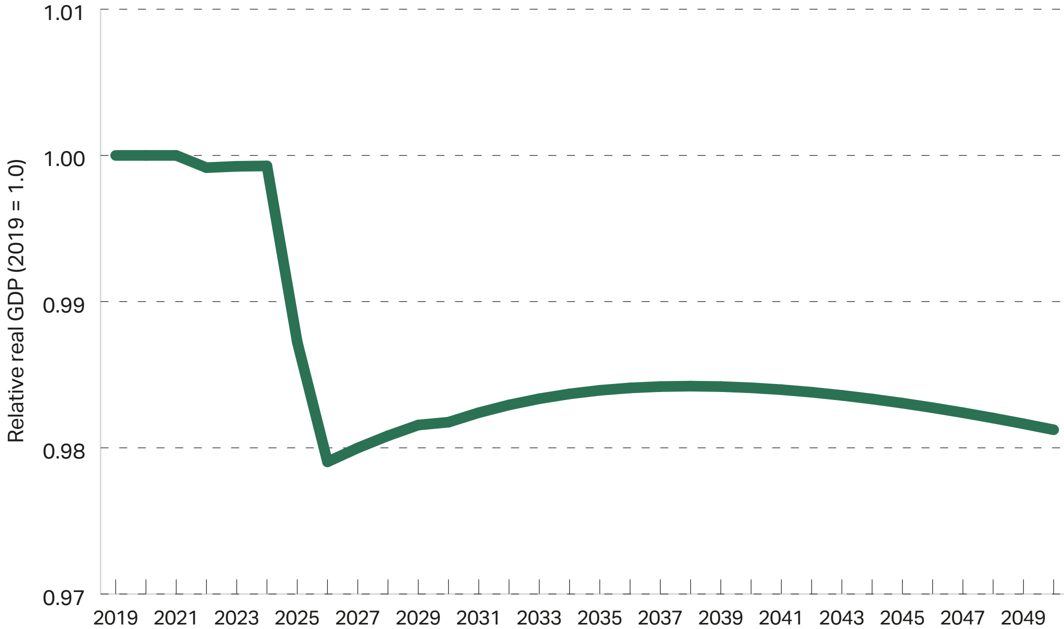
The national effects over time are summarized in figures 2 to 6. Figure 2 shows GDP under the BEE regulation relative to the base case. The drop is largest as of 2026–2028 (–2.1% to –1.9%) and by 2034 it has partially recovered to –1.6% but begins declining again thereafter as the effects of the higher cost structure affects long-term capital formation in the model. The cost per worker (figure 3) measured as the decline in real earnings relative to the base case follows a similar path. It exceeds $2,100 in 2026, declines to $1,746 by 2036 then begins increasing again through 2050. Employment falls throughout the phase-in period but eventually begins recovering in the 2040s (figure 4).

Table 4: National output and factor demand effects by industry, 2030.

	Output (%)	Labour demand ('000)	Capital demand (%)
1. Agriculture, fishing, and trapping	−0.1	0.5	−0.2
2. Forestry and logging	0.1	0.2	−0.2
3. Oil sands	−0.3	0.1	−0.4
4. Conventional crude oil	−0.3	0.1	−0.4
5. Natural gas	−0.4	0.0	−0.5
6. Oil and gas support activities	0.1	0.4	−0.2
7. Coal	−1.9	0.0	−1.0
8. Other mining	−0.1	0.9	−0.3
9. Electricity	−2.5	−2.3	−2.4
10. Other utilities, including gas distribution	−0.3	0.2	−0.1
11. Construction	−6.8	−82.4	−7.1
12. Food production	0.0	1.2	−0.3
13. Semi-durables	0.2	1.4	−0.2
14. Refined fuels	−0.1	0.0	−0.3
15. Other petrochemicals	0.2	2.1	−0.1
16. Cement and concrete	−5.1	−1.5	−5.3
17. Automotive parts and assembly	0.2	1.7	−0.2
18. Other manufacturing	0.6	14.1	0.3
19. Wholesale and retail sales	0.0	6.5	−0.3
20. Air, rail, and bus transportation	−0.1	1.8	−0.2
21. Gas pipelines	−0.7	0.0	−0.4
22. Crude pipelines	−0.4	0.0	−0.4
23. Trucking, courier, and storage	0.0	1.1	−0.2
24. Media, banking, finance, IT, other prof. services	−0.1	12.0	−0.1
25. Education and health	0.0	3.4	−0.3
26. Entertainment and Miscellaneous	0.0	5.0	−0.3
27. Government	0.0	11.3	0.0

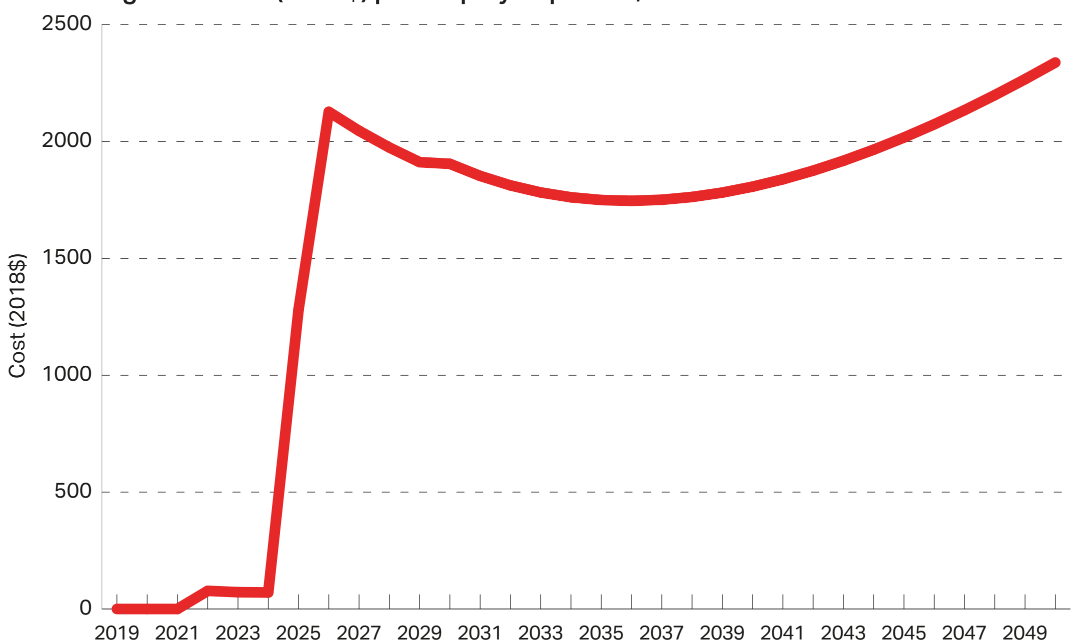
Source: Author's calculations.

Figure 2: Relative real GDP (2019 = 1.0), 2019–2050



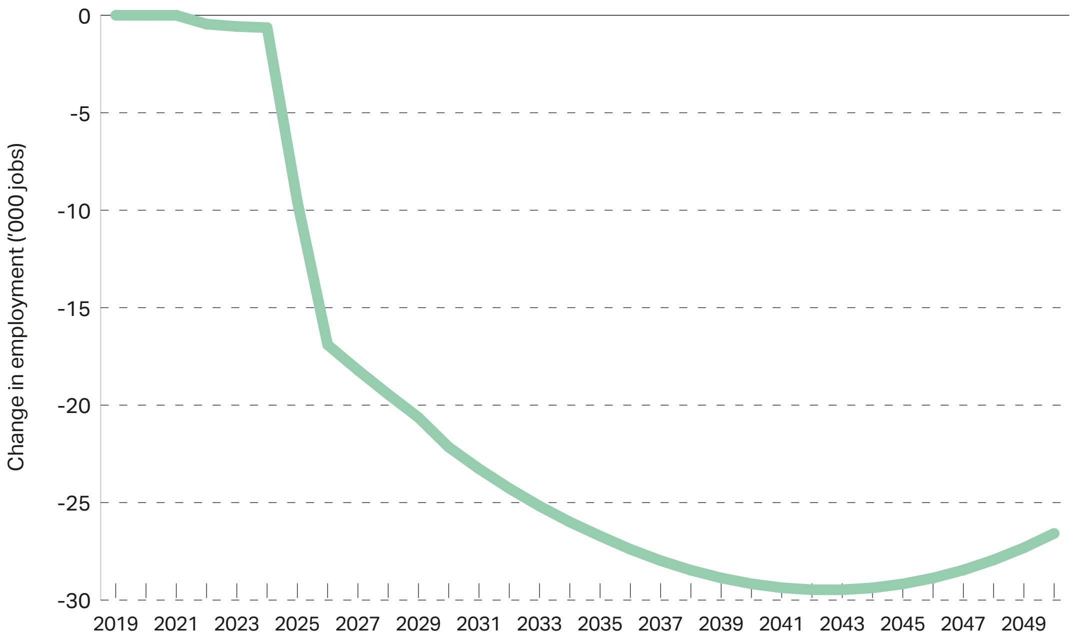
Source: Author's calculations.

Figure 3: Cost (2018$) per employed person, 2019–2050



Source: Author's calculations.

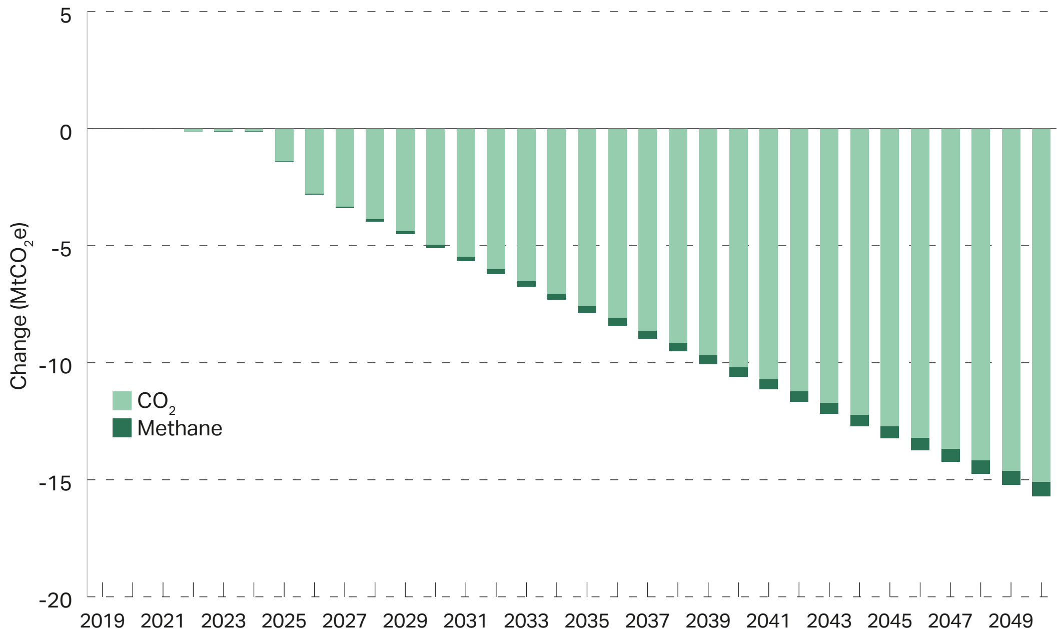
Figure 4: Change in employment ('000 jobs), 2019–2050



Source: Author's calculations.

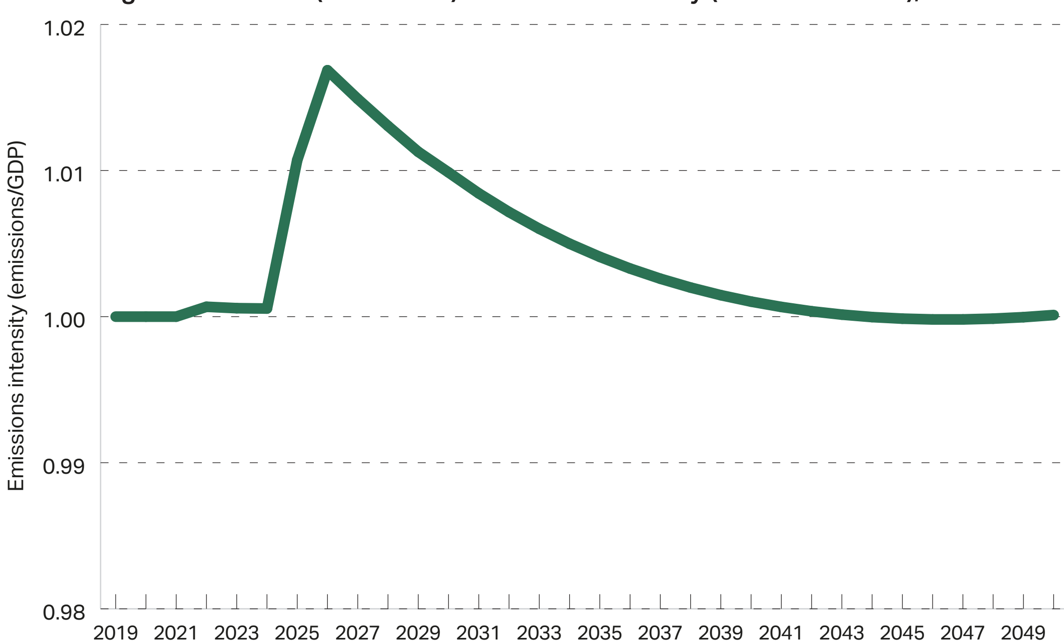
Figure 5 shows that the effects on GHGs are initially modest, cutting total emissions against the baseline by about 5 megatonnes of carbon dioxide equivalent ($MtCO_2e$) as of 2030 (just under 1% of the total) and by about 16 $MtCO_2e$ by 2050 (about 2% of the base case). For context, while the carbon tax helps GHG emissions to be reduced slightly through the 2020s there is still a 50-$MtCO_2e$ gap between national GHG emissions and the Paris target as of 2030, of which the BEE policy contributes only 5 $MtCO_2e$ at an overall cost to the economy of over $9,000 per tonne, about 50 times the nominal carbon-tax value as of 2030. Since GDP falls by a larger fraction than emissions, emissions intensity actually rises slightly (figure 6).

Figure 5: Change in CO_2 and methane ($MtCO_2e$), 2019–2050



Source: Author's calculations.

Figure 6: Relative (2019 = 1.0) emissions intensity (emissions/GDP), 2019–2050



Source: Author's calculations.

Discussion and Conclusions

In general, the proposed Building Energy Efficiency package is an extremely costly add-on to the federal carbon tax. It will add an estimated $55,000 to the average new home price in Canada by 2030, with overall economic costs of at least $1,700 per worker beginning in the post-2026 period. In response to the policy, GDP initially declines to about 2% below the base case and much of the gap persists through 2050. GHG emissions decline by a modest amount but on a per-unit basis the economic costs are about 50 times the carbon-tax value. As a result of the large loss of GDP relative to reductions in GHG emissions, emission intensity of the Canadian economy actually rises slightly because of the regulation.

The Building Energy Efficiency (BEE) components of the federal government's *2030 Emissions Reduction Plan* will affect mainly purchasers of new homes. Since older, higher-income households tend already to own their homes, the costs discussed in this report are likely to fall disproportionately on younger and lower-income people trying to enter the housing market. Analysis of the particular demographics of those in the new home market would be a useful step in determining the distributional impacts of this regulation.

References

Adams, Tom, and Ross McKitrick (2016). *Demand-Side Mismanagement: How Conservation Became Waste*. Fraser Institute. <https://www.fraserinstitute.org/studies/demand-side-mismanagement-how-conservation-became-waste>, as of August 16, 2023.

Alcott, Hunt, and Michael Greenstone (2012). Is There an Energy Efficiency Gap? *Journal of Economic Perspectives* 26, 1: 3–28. <https://doi.org/10.1257/jep.26.1.3>, as of August 16, 2023.

Bruns, Stephan B., Alessio Moneta, and David I. Stern (2020), Estimating the Economy-wide Rebound Effect Using Empirically Identified Structural Vector Autoregressions. *Energy Economics* 91, 105158. <https://doi.org/10.1016/j.eneco.2021.105158>, as of August 16, 2023.

Canadian Home Builders Association [CHBA] (2018). *Energy Step Code: Building beyond the Standard. A Study by Industry for Consumers*. CHBA Central Okanagan (December).

Canadian Real Estate Association [CREA] (2023). *National Price Map*. <https://www.crea.ca/housing-market-stats/canadian-housing-market-stats/national-price-map/>, as of April 3, 2023.

Environment and Climate Change Canada [ECCC] (2022). *2030 Emissions Reduction Plan: Canada's Next Steps for Clean Air and a Strong Economy*. <https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/climate-plan-overview/emissions-reduction-2030.html>, as of June 14, 2022.

Gayer, Ted, and W. Kip Viscusi (2013). Overriding Consumer Preferences with Energy Regulations. *Journal of Regulatory Economics* 43: 248–264. <https://doi.org/10.1007/s11149-013-9210-2>, as of August 16, 2023.

Gerarden, Todd, Richard G. Newell, and Robert N. Stavins (2017). Assessing the Energy Efficiency Gap. *Journal of Economic Literature* 55, 4: 1486–1525. <https://doi.org/10.1257/jel.20161360>, as of August 16, 2023.

Gillingham, Kenneth, and Karen Palmer (2014). Bridging the Energy Efficiency Gap: Policy Insights from Economic Theory and Empirical Evidence. *Review of Environmental Economics and Policy* 8, 1: 18–38. <https://doi.org/10.1093/reep/ret021>, as of August 16, 2023.

McKitrick, Ross (2023a). Economic Implications of a Phased-in EV Mandate in Canada. Working Paper 23-01. Department of Economics and Finance, University of Guelph. <https://ideas.repec.org/p/gue/guelph/2023-01.html>, as of August 16, 2023.

McKitrick, Ross R. (2023b). *Detailed Description of the LFX-CM5 Model*. LFX Associates. <https://www.lfxassociates.ca/publications.html>, as of August 16, 2023.

Natural Resources Canada (n.d.). *Comprehensive Energy Use Database*. <https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/trends/comprehensive_tables/list.cfm>, as of August 16, 2023.

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He has also written policy analyses for numerous Canadian and international think tanks. Professor McKitrick appears frequently in Canadian and international media and is a regular contributor to the *Financial Post* Comment page. In addition to his economics research, his background in applied statistics has led him to collaborative work across a wide range of topics in the physical sciences including paleoclimate reconstruction, malaria transmission, surface temperature measurement, and climate model evaluation.

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