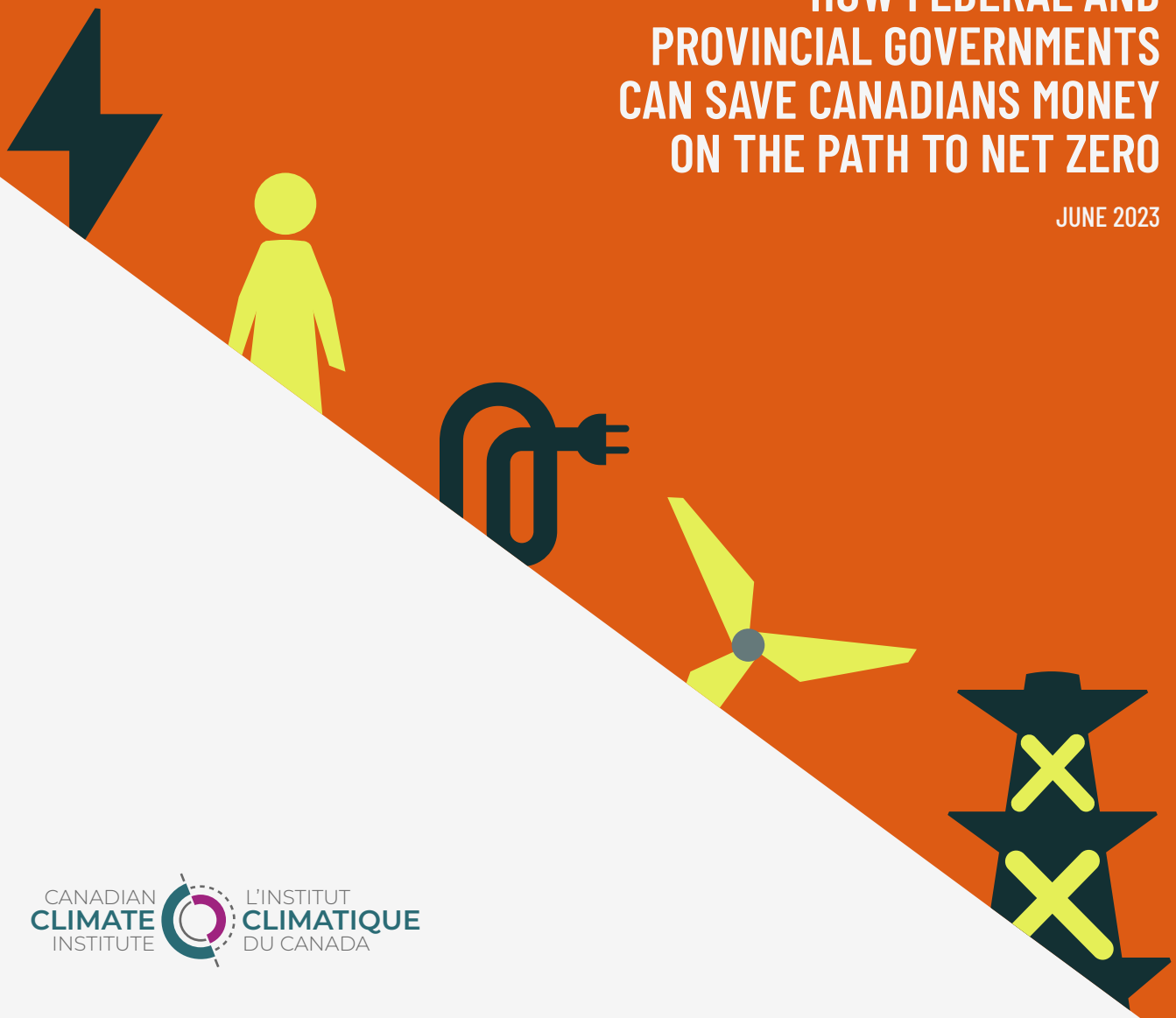
CLEAN ELECTRICITY, AFFORDABLE ENERGY

HOW FEDERAL AND PROVINCIAL GOVERNMENTS CAN SAVE CANADIANS MONEY ON THE PATH TO NET ZERO

JUNE 2023



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01 *Introduction*

The federal government's *Budget 2023* included substantial new financial supports for provinces and territories to help expand clean electricity. By tapping into the tens of billions of dollars on the table, provinces and territories can pave the way towards an affordable energy future for Canadians by expanding their clean electricity systems.

Our research shows that as the country transitions to clean energy, average energy costs for Canadians will be 12 per cent lower in 2050 than today. Households will use more electricity in place of fossil fuels, as they switch to more efficient technologies like electric vehicles and heat pumps.

Electricity rates may rise gradually over time in this larger energy context. In response, provinces can develop policy tools that can help keep electricity affordable and ensure fairness for low- and medium-income households. Signing onto high-level conditions to access federal support will help provinces and territories realize this future.

Bigger, cleaner, smarter electricity systems are necessary if Canada is to make this transition and maintain its economic competitiveness. Clean electricity will be the foundation for emissions reductions in other sectors, as more activity is electrified over time. And businesses are increasingly demanding clean power as a necessary condition of their investment.

This report updates research from the Canadian Climate Institute's 2022 report, *The Big Switch*, which identified the scale of investment needed to get the country on a net zero emissions pathway. This analysis explores the potential benefits for provinces and territories of the latest federal fiscal support for clean electricity, and updates our projections of electricity rates from the *Big Switch*.

The federal government is offering provinces tens of billions in financial support for cleaner electricity systems.

Supports outlined in *federal Budget 2023* include:

- $3 billion over 13 years for renewable energy and electrical grid modernization projects through the Smart Renewables and Electrification Pathways (SREP) program.
- An estimated $25.7 billion between 2024 and 2035 is available through the Clean Electricity Investment Tax Credit (ITC), which applies a 15 per cent credit to an array of electricity generation and storage technologies and interties (with solar, wind, storage and small modular reactors built by taxed entities qualifying for 30 per cent under the Clean Technology Investment Tax Credit). Provincial uptake of the Clean Electricity ITC will be subject to high-level conditions that the federal government is still developing.
- At least $10 billion for clean power and an additional $10 billion for clean growth infrastructure is available in preferential financing from the Canada Infrastructure Bank, the federal government's primary investment financing vehicle for supporting clean electricity generation, transmission, and storage projects.

02 *Key Findings*

These supports represent an historic commitment to the clean energy transition. Our estimates in *Figure 1* show that all provinces stand to benefit. But in particular, provinces transitioning away from more emissions-intensive grids—Alberta, Saskatchewan, Nova Scotia and New Brunswick—stand to benefit the most relative to the scale of their existing grid infrastructure (receiving 33 per cent more funding than hydro-rich provinces per Gigawatt of presently installed capacity).

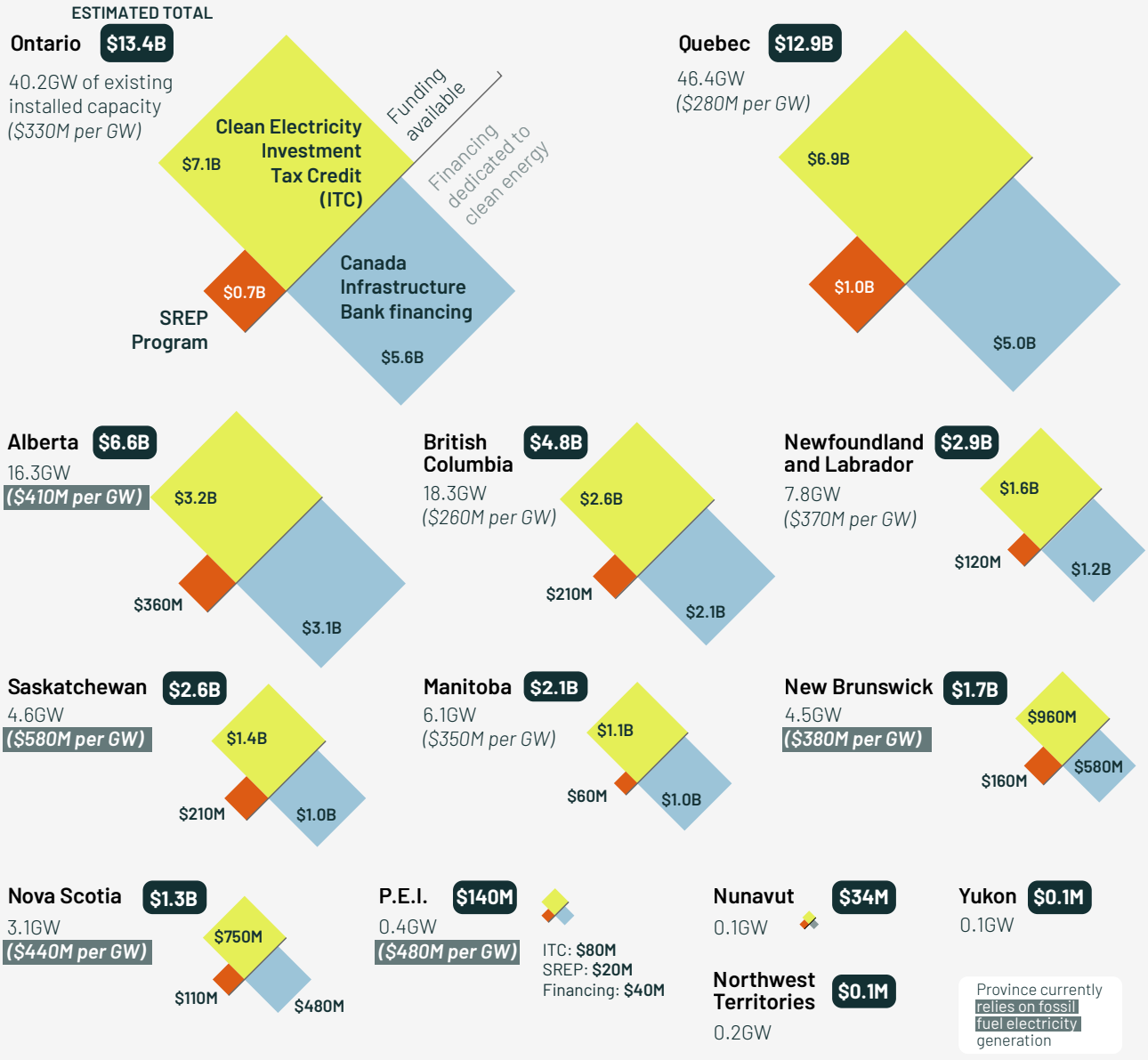
For example, Alberta could receive as much as $3.5 billion, in addition to $3 billion of financing support from the Canada Infrastructure Bank. Similarly, Saskatchewan could access more than $1.6 billion in direct support and over $1 billion in financing.

Provinces and territories accessing federal financial support by signing on to the high-level conditions attached to it will unlock direct benefits for their ratepayers. They would continue to retain control over how their grids decarbonize. And the funding and financing supports will reduce upward pressure on electricity rates that might otherwise occur as Canada makes the investments needed to modernize its aging grids and find efficiencies. It will help provinces build the bigger, cleaner electricity systems needed to support rising demand from electrification.

FIGURE 1.

Provinces can get billions of dollars in federal support for clean electricity

Those that currently rely on fossil fuels for electricity will receive more support to build a bigger, cleaner grid.



Through the energy transition, households will consume more electricity and at slightly higher rates over time, but spend less on fuel and on home heating bills as they switch from vehicles and appliances that run on fossil fuels to electric vehicles and heat pumps. These technologies are significantly more efficient than fossil fuel alternatives at meeting our needs—so even if electricity rates go up, energy spending will drop.

Energy bills will also be less volatile as households transition from fossil fuels to electricity. For example, electrification of transportation and space heating can help protect Canadians from price spikes in fossil fuels and wider associated price inflation. In September 2022, the price of energy was over 40 per cent higher in Europe than a year before, because of Russia's invasion of Ukraine. The United Kingdom's wholesale electricity price quadrupled, with the cost of fossil gas responsible for 85 per cent of this spike (*Brown, 2022*). The war, and the energy volatility it has driven has only increased Europe's resolve and efforts to move to a renewable energy system (*European Commission, 2022*).

For an average Canadian, ongoing cost savings across all forms of energy consumed will generally offset higher upfront costs for electric equipment—and these upfront costs will themselves fall over time, as our production and use of this equipment scales. Average household energy spending—on energy bills and the equipment that that energy powers—will decrease by 12 per cent between now and 2050 under a net zero transition.

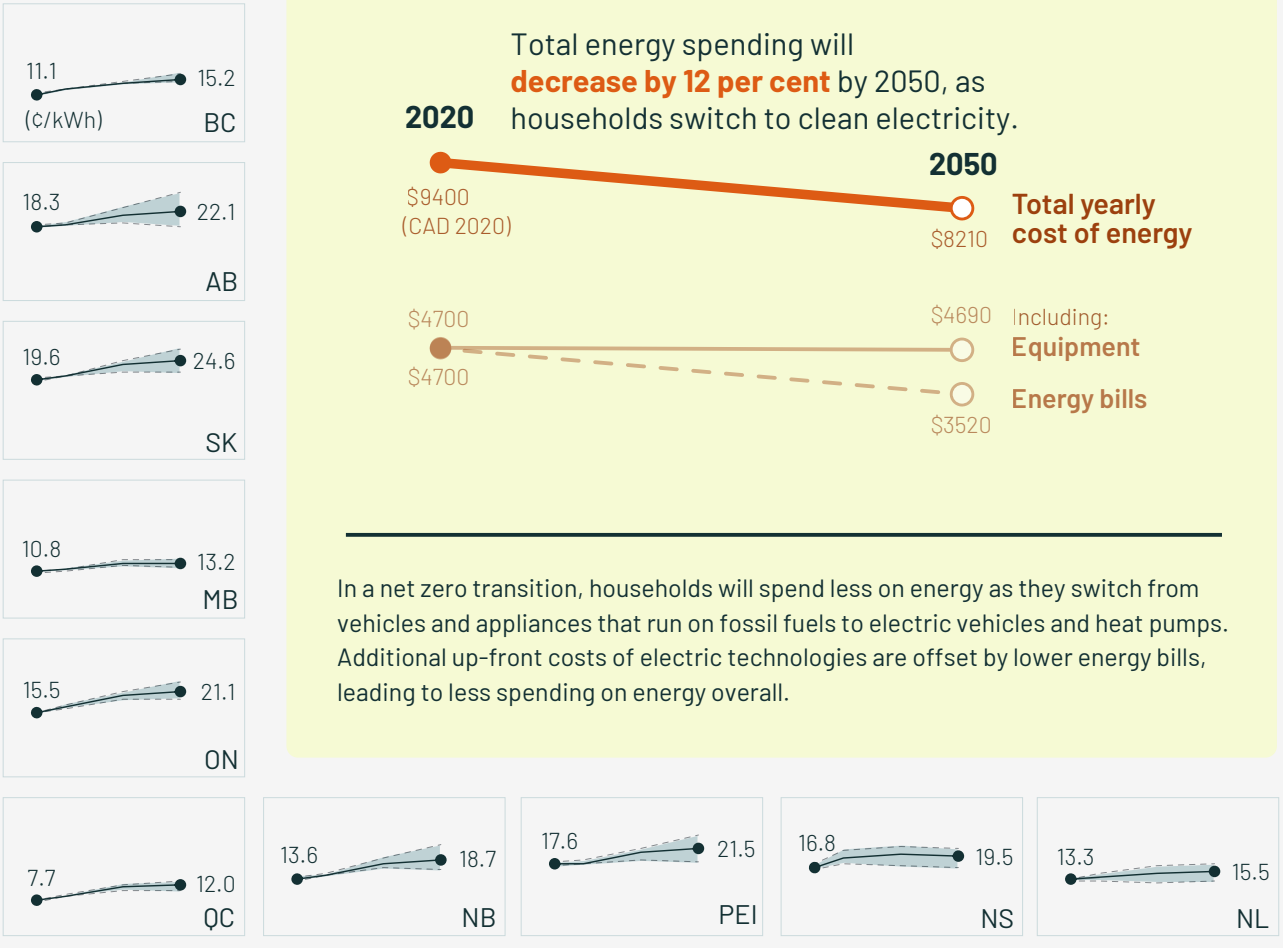
While electricity prices are expected to modestly rise in most provinces to 2050, utility rates are designed to spread investment costs over time, which lessens impacts on affordability. The exact impact on rates will vary by province, but can be anticipated. Our updated rate modelling in *Figure 2* provides a picture of what kind of rate increases provinces can expect.[1]

1. Because the design of the federal Clean Electricity Regulation is still pending, the rates we show above don't necessarily fully reflect its impacts. While some of the underlying modeling studies proxy its likely effects, others model a more gradual pace for grid decarbonization. This means that, in practice, meeting the goal of net zero electricity by 2035 could shift some of the needed investment and corresponding rate increases forward relative to what's seen in the figure. At the same time, this would mean that support from the federal government under the Clean Electricity Investment Tax Credits (which sunset in 2035) would increase, mitigating the impact on rates.

FIGURE 2.

Switching to clean electricity will save Canadians money

Even as electricity rates gradually increase over time…



…Average household spending on energy would decrease.

In a net zero transition, households will spend less on energy as they switch from vehicles and appliances that run on fossil fuels to electric vehicles and heat pumps. Additional up-front costs of electric technologies are offset by lower energy bills, leading to less spending on energy overall.

Projected residential electricity cost by province (cents per kilowatt-hour)

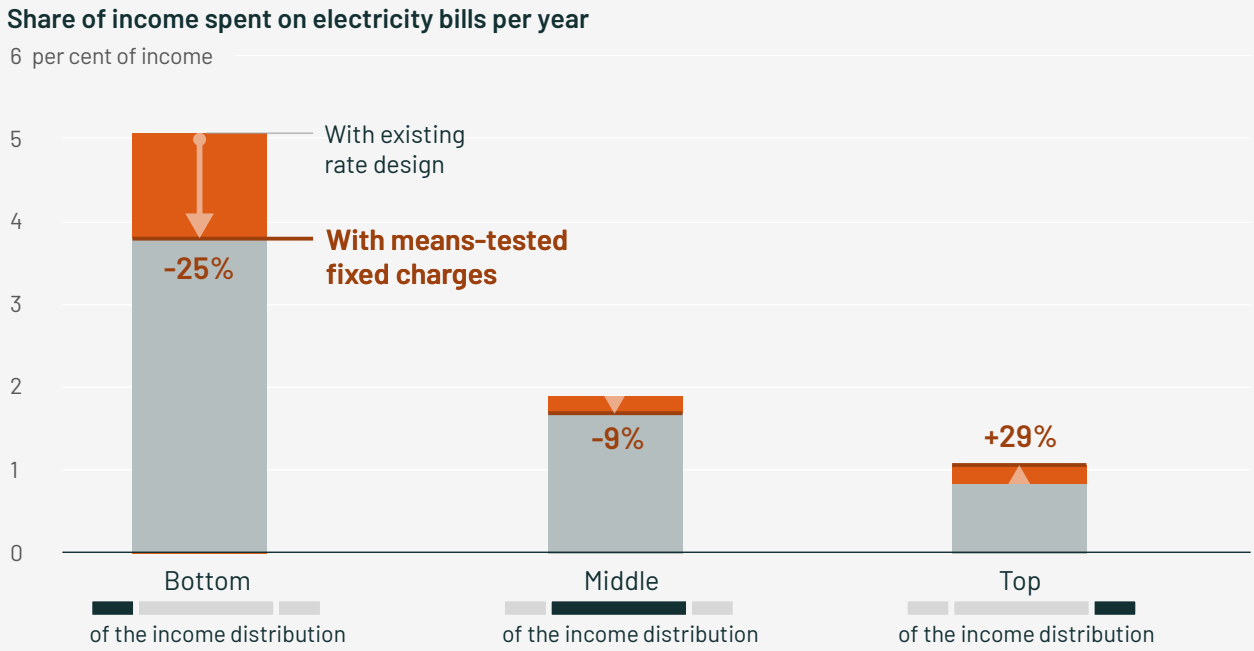
Even though future electricity rate increases are expected to be modest in Canada—especially in the context of lower overall energy costs—not all households will see the same benefit. Lower-income households, for example, face obstacles to participating in energy efficiency programs and are less likely to benefit from savings at the gas pump due to lower rates of vehicle ownership. Existing rate structures are also likely to exacerbate inequities in the energy transition (*Dolter & Winter, 2022*). Provinces can reduce disproportionate impacts on low-income households by targeting supports to where they are most needed.

Provincial governments have policy options to improve fairness for low- and middle-income households facing potential electricity bill increases. Targeted support and innovative rate design can help ensure affordability for all. For example, utilities often use fixed charges to recoup some of the costs of electricity transmission and distribution infrastructure. These fixed charges could be modified to vary based either on income (as proposed by utilities in California) or by peak electricity demand from a household (higher-income households tend to have higher peak energy demand). These options have not yet been implemented in Canada. As *Figure 3* illustrates, this could result in improved fairness. Low-income households would particularly benefit, seeing savings that amount to 1.3 per cent of their average income. And while this benefit would be funded by higher charges for high-income households, these cost increases would only amount to only 0.2 per cent of their incomes.

FIGURE 3.

Provinces can make energy more affordable

Targeted policy solutions, like means-tested fixed charges, help keep electricity bills fair and affordable for low- and middle-income households.



03 *Conclusion*

Tens of billions of dollars in federal support are available for provinces and territories ready to build bigger, cleaner, smarter electricity grids. Provinces and territories should sign on to the conditions for this support in order to unlock its benefits for ratepayers. Significant investments will be required to modernize electricity infrastructure across Canada and ensure it is ready to supply reliable and affordable power in a net zero future. These necessary upgrades will likely lead to modest increases in electricity rates in the decades ahead, but the federal support available will help keep costs down.

Further, Canadian consumers will be insulated from the effects of potential electricity rate increases because overall energy spending will drop as households switch from fossil fuel technologies to more efficient and cleaner electrical alternatives. While average Canadians will benefit from these substantial savings on energy bills, provinces and territories should use targeted policy action to keep electricity affordable for those on lower and middle incomes.

Federal government support combined with provincial government policy actions can and should unlock an affordable energy future for Canadians.

Acknowledgments

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Methods

Distribution of federal funding

Figure 1: The allocation of federal funding and financing commitments among provinces and territories is based on the anticipated investment in generation capacity within each jurisdiction (in terms of technology, scale and timing). We estimate this anticipated investment by averaging findings across three of the electricity modeling studies profiled in our 2022 report *The Big Switch*: EPRI 2021, CER 2021, and IET 2021 (for a breakdown of the assumptions and findings of these studies, see the Annex of our 2022 report *Bigger, Cleaner, Smarter*). The resulting chart shows cumulative funding and financial support by province or territory to 2035. Total funding for each program stream reflects estimates and allocations from the 2023 federal budget.

Updated rates analysis

Figure 2: This figure updates our rates analysis from *The Big Switch*. For further details on methodology see (*Dolter & Winter 2022*). Updates to our previous analysis and methods include:

- Accounting for electricity-focused funding estimates and allocations announced in the 2023 budget.
- Changing 2023 rate values (the starting point in this analysis) to reflect current rates in each province and inflating to 2023 dollars.
- Investment costs are apportioned across users contemporaneously and over time, and funded primarily by debt. Modelling of rates therefore requires understanding of existing as well as future potential debt. Our latest analysis updates existing debt assumptions, particularly for Newfoundland and Labrador.
- Model-specific calculations are now used to move from utility average costs to average consumer prices.

Affordability analysis

Figure 2: Analysis presented here is based on modelling results from our report, *Canada's Net Zero Future*, which modelled 62 scenarios that achieve net zero emission targets in Canada. Model outputs include total annual energy expenditures across all scenarios by income quintile. Expenditures are expressed in terms of energy bills (or amount paid for energy consumption) and annualized equipment cost, such as household energy appliances and vehicles. The annualized equipment cost excludes any homeowner subsidy programs.

Since the model outputs 62 projections for energy expenditures, the scenario that projected the highest total energy expenditures by 2050 was selected as a representative, and most conservative scenario for this analysis. Total energy expenditures by income quintile were converted to expenditures per household using the underlying population projections.

The results of this analysis are shown in *Figure 2*, which represents the average household energy spending (energy expenditures) in 2020 to 2050 under the most conservative scenario. Numbers are presented in aggregate for the average Canadian household.

Targeted policy (Means-tested fixed charges)

Figure 3: The final analysis explores how regulators and utilities could change rate structures to address the issue of distributional equity and affordability for low and middle income households. We consider the impact of making fixed charges income-dependent (increasing with income) and compare results with the present flat fixed rate design. The fixed charges in the modelling match the progressivity of the federal personal income tax system. The work follows the methodology outlined in (*Dolter & Winter, 2022*) and uses the updated rates presented here.

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