

The $50 Billion Question

What if Canada invested as much in affordable customer energy solutions as in major infrastructure?

November 2026

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PEMBINA Institute

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These acknowledgements are part of the start of a journey of several generations. We share them in the spirit of truth, justice and reconciliation, and to contribute to a more equitable and inclusive future for all.

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Executive summary

Canada's energy system consists of four interdependent components: energy supply, transmission and transport, local distribution networks, and the productive use of energy in buildings, transportation and industry. All four need investment, and Canada should invest in customer energy solutions at a scale comparable to its investments in major energy infrastructure projects. This would expand access to energy efficiency, demand flexibility, electric transportation, local generation and storage. These solutions can deliver direct savings for households and businesses, help mitigate electricity cost increases and avoid climate-related damages.

This report asks what Canada could achieve by approaching these customer energy solutions with the same ambition applied to major infrastructure projects. Using as a benchmark the scale of potential public investment in the Pacific Link pipeline and electricity system infrastructure expansion, this report illustrates what a $50 billion investment could deliver in recurring savings, local employment, healthier buildings, cleaner transportation and a more efficient electricity system.

What the investment could deliver

Two alternative illustrations demonstrate the scale of the opportunity. Their results should not be added together.

- **A household retrofit investment:** Directing $50 billion to the Canada Greener Homes Affordability Program or comparable programs could provide no-cost retrofits to approximately 3.5 million low- and moderate-income households. Estimated annual savings of $300–$1,700 per eligible household total approximately $1 billion to $6 billion, alongside annual carbon emissions reductions of roughly 5.3 million tonnes.
- **A broader customer energy portfolio:** Allocating $50 billion across home retrofits, oil to heat pump conversions, electric vehicle (EV) incentives, community solar and smart thermostats could generate an estimated $6.1–$10.0 billion in direct annual savings and abate 15.4–18.9 million tonnes of emissions annually, once deployed. Using the social cost of carbon, these emissions reductions represent an estimated annual societal benefit ranging from $5.1 billion to $7.7 billion between 2027 and 2040.

These estimates depend on the participation, technology and program assumptions set out in the report.

The same investments can also lower electricity system costs when they reduce demand during constrained periods or provide dependable local supply onto the electricity system; however, these potential electricity system savings are not included in portfolio estimates. Contributions to gross domestic product (GDP) and indirect jobs are also not included.

Who benefits?

Households facing high energy burdens could access upgrades that improve comfort and reduce energy costs. Affordable electric vehicles could extend transportation savings to more drivers and fleets and protect Canadians from volatile fossil fuel prices. Small-to-medium businesses can use operating savings to strengthen competitiveness, while schools, municipalities and community organizations can redirect funds toward other programs and services.

Canadian communities can support skilled employment, domestic suppliers and Indigenous-owned businesses. Community ownership can retain revenues locally, while healthier buildings and backup-capable energy systems can strengthen resilience to extreme weather.

Federal action to improve affordability

Canada's energy investment decisions today will shape household costs, business competitiveness and electricity affordability for decades. The federal government's Powering Canada Strong strategy provides an opportunity to connect investment in energy supply and infrastructure with support for practical customer energy solutions that lower costs where Canadians live and work. The 2026 Federal Budget included encouraging signals with targeted investments in building retrofits and electric vehicle adoption.

Continued investment is needed to balance affordability and growth, with federal government leadership in partnership with provincial, territorial and local governments, utilities and the private sector. The federal government should:

1. **Establish a customer energy affordability portfolio** under the Powering Canada Strong strategy, combining predictable support through no-cost programs, grants and incentives and low-cost financing. Allow eligible businesses to combine upfront incentives with the Productivity Mega Deduction, where applicable. Work with Indigenous governments, provinces, territories and municipalities on program design and delivery and support provincial, territorial and utility efforts to enable demand flexibility and customer participation.
2. **Expand retrofit access and delivery**, building on **existing federal programs and housing initiatives** to reach more houses and multi-unit residential buildings.

Ensure renters can participate, coordinate funding so participants can combine programs and help owners and residents plan and complete projects.

3. **Extend transportation savings to more Canadians** through incentives to reduce upfront costs of new and used EVs for households and small- and medium-sized businesses. Build on federal investment in accessible charging and help provinces and territories enable vehicle-to-building and vehicle-to-grid services.
4. **Build the workforce to deliver customer energy solutions**, aligning regional training with project demand and helping utilities, regulators and service providers integrate customer technologies into electricity system planning and operations.
5. **Assess customer-side solutions alongside electricity infrastructure proposals**, making federal contributions conditional on credible comparisons of demand- and supply-side options that meet electricity needs reliably and cost-effectively.

The analysis identifies a substantial opportunity to translate public investment into recurring customer savings, local economic activity and a more productive electricity system. Sustained investment in customer energy solutions can make affordable electrification accessible to more Canadians. It deserves a central place in Canada's energy priorities.

1. Affordability: In the national interest

Canadians are struggling to make ends meet. Across the country, the rising cost of living was Canadians' number one priority for the House of Commons in 2026.[1] More than half of small-to-medium-sized businesses would not recommend starting a business in Canada, primarily citing high costs and economic uncertainty.[2] The cost of groceries, energy, housing and transportation are putting pressure on Canadians' day-to-day budgets. Without decisive action on affordability, tight budgets will continue to limit household choices, business growth and the services communities rely on.

Energy bills are a primary source of financial burden for Canadians. Household energy costs have risen roughly 40% since 2021 and wages have not kept pace, leaving more Canadians to choose between energy costs and other priorities.[3] Fossil fuel prices — which are set on international markets and largely beyond Canada's control — are exacerbating these challenges. In 2022, high oil and gas prices linked to the Russian invasion of Ukraine led to an average of $12,000 in additional transportation, heating, and grocery expenditures per Canadian household over the following two years.[4] Similar geopolitical conditions in 2026 are expected to cost Canadians upwards of $12 billion in total direct additional expenses over 12 months.[5]

Energy efficiency and electrification reduce household and business exposure to both volatile energy prices and the rising costs associated with global emissions.[6] Affordability is a "shovel-

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[1] Nanos Research, *Importance of the Rising Cost of Living as the Top Priority for 2026 Parliamentary Agenda Up Since the Fall,* commissioned by CTV News, January 2026, 3. https://nanos.co/wp-content/uploads/2026/02/2025-2961-CTV-Dec-Populated-Report-House-of-Commons-priorities.pdf

[2] Michelle Auger, Laure-Anna Bomal, and Jonathan Galgay, *Canada's Entrepreneurial Drought – Part 1: The Shrinking Business Landscape* (Canadian Federation of Independent Business, 2026), 9. https://www.cfib-fcei.ca/en/research-economic-analysis/canada-entrepreneurial-drought-part1

[3] Natural Resources Canada, "Evaluation of the Energy Efficiency Program," High demand and uptake, April 16, 2026. https://natural-resources.canada.ca/corporate/planning-reporting/audit-evaluation/evaluation-energy-efficiency-program-0#a5d

Statistics Canada, "Employment and Average Weekly Earnings (Including Overtime) for All Employees by Province and Territory, Monthly, Seasonally Adjusted," table 14-10-0223-01. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410022301

[4] Jim Stanford and Erin Weir, *Counting the Costs: Impacts of the 2022 Oil Price Shock for Canadian Consumers and Workers* (Centre for Future Work, 2025), 3. https://centreforfuturework.ca/wp-content/uploads/2025/04/FalseProfits-March2025-Counting-the-Costs.pdf

[5] Jim Standford, *A Sequel We Don't Want: What the 2026 Oil Price Shock Will Cost Canadians* (Centre for Future Work, 2026), 4. https://centreforfuturework.ca/wp-content/uploads/2026/05/A-Sequel-We-Dont-Want.pdf

[6] Canadian Climate Institute, "The Costs of Climate Change." https://climateinstitute.ca/reports/the-costs-of-climate-change/

ready" project of national interest, and electrification is the tool at hand. While a highly electrified economy is expected to cut daily costs for 7 out of 10 Canadians, public investment can help more households and businesses access these savings.[7] Expanding access to proven technologies and programs, alongside the skilled workforce and delivery capacity needed to implement them, can help more Canadians manage energy costs over time. These investments can also help utilities serve growing electricity demand while limiting costs for ratepayers.

1.1 The $50-billion question

In September 2026, the federal government designated the Pacific Link pipeline a project of national interest. Based on a cost scenario informed by the Trans Mountain expansion and the expected 90% public ownership share, potential public investment in the Pacific Link pipeline is estimated at $53.8 billion.[8]

In May 2026, the federal government released *Powering Canada Strong: A National Strategy for an Electrified Canadian Economy*, introducing an objective to double Canada's electricity grid by 2050 and accelerate electrification.[9] Budget 2026 proposes more than $50 billion in support that includes $38.5 billion for proposed changes to the Clean Electricity and Clean Technology investment tax credits, $6 billion for emerging electricity generation technologies, nearly $4 billion to expand and strengthen electricity systems as demand grows, and $1.6 billion

[7] Canada Electricity Advisory Council, *Powering Canada: A Blueprint for Success* (2024), 56. https://natural-resources.canada.ca/sites/nrcan/files/energy/electricity/Canada-Electricity-Advisory-Council-Final-Report-2024.pdf

[8] The Alberta Government's high estimate for the cost of construction is $43.7 billion – a 27% lower cost per barrel than the Trans Mountain pipeline expansion (TMX) and an optimistic assumption given inflation and the size of the proposed pipeline. The Pembina Institute's cost scenario based on approximate TMX expenditures puts the likely capital cost at $59.8 billion. With Albertan and federal crown corporations currently expected to hold 90% of ownership, this estimate puts public investment for the pipeline alone at $53.8 billion. The federal support for the pipeline was announced alongside public support of an undisclosed amount for a $10 billion expansion of the Roberts Bank Terminal. New federal estimates from October 2026 put the port expansion capital cost at $5.9 billion (excluding financing costs) with a final investment decision expected mid-2027.

Ian Sanderson, *A Pipeline in Search of a Market: Economics and Taxpayer Risks* (Pembina Institute, 2026), 15. https://www.pembina.org/pub/pipeline-search-market

Akshay Kulkarni, "Why Expansion of Delta, B.C., Container Port Is Going Hand-in-Hand with Alberta Pipeline," *CBC News*, July 3, 2026. https://www.cbc.ca/news/canada/british-columbia/southern-pipeline-route-delta-roberts-bank-terminal-2-9.7256890

Transport Canada, "Roberts Bank Terminal 2 Listed as a Project of National Interest to Strengthen Canada's Trade Sovereignty," news release, October 30, 2026. https://www.canada.ca/en/transport-canada/news/2026/10/roberts-bank-terminal-2-listed-as-a-project-of-national-interest-to-strengthen-canadas-trade-sovereignty.html

[9] Government of Canada, *Powering Canada Strong: A National Strategy for an Electrified Canadian Economy* (2026). https://natural-resources.canada.ca/energy-sources/electricity-infrastructure/powering-canada-strong-national-strategy-electrified-canadian-economy

to improve energy reliability in the North through upgrades and support for a transition away from diesel.[10] These measures support Canada's goal of doubling electricity supply by 2050.

This report asks what Canada could achieve for energy affordability if it brought the same ambition to customer energy solutions for households, businesses and communities. Using the scale of potential public investment in these two major energy infrastructure initiatives as a benchmark, the report illustrates potential customer savings and emissions reductions, explains how these investments can also lower electricity system costs, examines who benefits, and identifies supportive federal actions. The findings show how investment can deliver benefits that continue over the lives of the supported technologies.

1.2 Energy affordability: Canada's next major project

Our analysis shows that a **$50 billion investment in a portfolio of customer energy solutions could deliver $6.1–$10.0 billion in direct household and business savings every year and avoid 15.4–18.9 Mt CO2e of annual emissions. That is equivalent to roughly 5.4%–6.6% of the country's total emissions from transportation, buildings, and electricity**. Using the social cost of carbon, we estimated avoided climate-related damages of $5.1-$6.3 billion in 2027, rising to $6.3–$7.7 billion annually by 2040. While major infrastructure projects can take years to deliver benefits, customer energy solutions can start lowering costs for households and businesses as upgrades are completed. Sustained investment can also support employment for skilled workers and help make homes, workplaces and communities healthier, safer and more resilient to extreme weather.

[10] As outlined in Government of Canada, *Powering Canada Strong: From Strategy to Action* (2026). https://natural-resources.canada.ca/energy-sources/electricity-infrastructure/powering-canada-strong-strategy-action

2. Customer energy solutions: Canada's affordability opportunity

2.1 A strategic resource

Customer energy solutions are tools and technologies that help utility customers lower costs and manage their energy use within their homes, businesses, and communities.

When these solutions reduce or shift electricity demand or supply power where and when it is needed, they also become customer-side or demand-side resources for the electrical grid. Utilities can use these resources to manage peak demand, ease pressure on local infrastructure, and strengthen grid reliability and resilience to keep electricity affordable and secure for all customers.

Customer energy solutions can improve affordability in three connected ways: direct savings, lower electricity costs and avoided climate-related damages. This triple benefit strengthens the case for customer energy solutions as a central part of Canada's affordability strategy.

2.1.1 Delivering direct savings today

Customer energy solutions allow Canadians to reduce their energy bills and access utility rewards available in an electrified economy. They help households, businesses, and organizations:

- **Use less energy** through insulation, air sealing, better windows, efficient equipment and appliances, heat pumps and other building and industrial process upgrades. These efficiency measures reduce energy bills and limit exposure to volatile fossil-fuel prices while keeping indoor spaces comfortable and healthy, and reducing climate exposure.
- **Use energy at better times** through smart controls, managed EV charging, and energy storage. This demand flexibility allows utility customers to ease pressure on the grid during peak periods, benefitting from time-of-use pricing and demand-response rewards where available.
- **Produce, store, and export energy locally** through rooftop and community solar, batteries and other local resources. These distributed energy resources make energy available when and where it is most valuable, allowing customers to offset demand and receive on-bill credits for eligible electricity exports.

- **Reduce transportation costs and emissions** through affordable electric transportation and accessible charging, reducing monthly fuel and operating expenses.

Together, these solutions allow communities across the country to participate in, and directly benefit from, Canada's effort to electrify, ensuring affordability and energy security.

2.1.2 Limiting electricity rate increases while enabling electrification

Efficient, flexible and local energy solutions allow the electricity system to serve more demand at a lower cost to ratepayers. Just as rapid transit and carpooling reduce rush-hour traffic and help avoid highway expansion, customer-side solutions ease pressure on the electricity grid during high-traffic periods and shift electricity use to hours when the system has more available capacity. By slowing growth in peak demand and making better use of the grid during non-peak periods, these solutions allow utilities to:

- serve more demand with existing infrastructure
- optimize the timing and size of new generation, transmission and distribution investments

Realizing these system savings requires utilities and their regulators to account for dependable customer-side capabilities in planning and operations. Where these capabilities avoid or defer a more expensive investment, they can lower the costs utilities must recover from customers, helping limit future rate increases.

Canadian utilities have used demand-side management to help manage demand and electricity system costs while enabling load growth. More broadly, between 2000 and 2023, Canada's per-capita energy use fell by 13% while energy use per dollar of GDP declined by 29%.[11] To maintain energy affordability in the coming years, Canada — like other rapidly electrifying economies — will need to scale simultaneous investment in energy efficiency, demand flexibility, and distributed energy resources.[12]

[11] Natural Resources Canada, *Energy Fact Book: Spring 2026 Edition* (Government of Canada, 2026), 55. https://energy-information.canada.ca/sites/default/files/2026-05/energy-fact-book-spring-2026.pdf

[12] International Energy Agency, *Electrification* (2026), 19, 58-60. https://iea.blob.core.windows.net/assets/1c696cc3-e251-46a9-8d4d-9edb2a4e806a/Electrification.pdf

Demand-side management in action

In France, flexible electricity use from EVs and residential hot water heaters alone accounts for 5.3 GW of avoided peak demand — more than 4.5 times the capacity of B.C.'s $16-billion John Horgan dam (formerly Site C).[13] Leveraging these customer-side resources saves French ratepayers from bearing the costs of avoidable infrastructure and supply.

Ontario's 2021–2024 investments in efficiency and demand flexibility delivered $2.32 in avoided electricity supply costs for every dollar of program spending and reduced peak demand by 604 MW, roughly equivalent to the peak demand of 200,000 heat pumps.[14] In Quebec, residents, organizations and industry reduced demand by 2.6 GW on the coldest days of winter in 2025–2026, deferring capacity needs roughly equivalent to the output of the James Bay La Grande-4 generating station.[15]

2.1.3 Mitigating the financial impacts of climate change

Customer energy solutions can help avoid future climate-related damages by abating emissions. Some do this by directly replacing fossil fuel use with electricity. Others enable new electrified heating and transportation loads to come online more rapidly and with fewer upgrades. The societal cost savings associated with each tonne of these abated emissions can be captured through the social cost of carbon.[16]

Retrofits that include local generation and storage also improve community resilience in the face of wildfires and extreme weather. These measures create safer and healthier buildings and can

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[13] Réseau de Transport d'Électricité, *Baromètre des flexibilités de consommation d'électricité: Suivi du plan de passage à l'échelle des flexibilités de la consommation, édition 2026* (2026), 11. https://assets.rte-france.com/prod/public/2026-04/2026-04-16-barometre-flexibilite-consommation.pdf

The capacity of the John Horgan Dam is 1,100 MW. BC Hydro, "John Horgan Dam and Generating Station." https://www.bchydro.com/energy-in-bc/projects/john-horgan-dam.html

[14] Independent Electricity System Operator, *Making a Difference: Energy Efficiency in Ontario 2021-2024 Conservation Demand Management and Legacy Framework Results* (2025), 18. https://www.ieso.ca/-/media/Files/SaveOnEnergy/CDM/2024-Energy-Efficiency-Annual-Report.pdf

Assuming a heat pump with approximately 3 kW maximum demand, 604 MW is equivalent to the demand of 201,333 heat pumps. Brennan D. Less and Iain S. Walker, "HVAC Heat Pump Upgrades and Their Impact on Household Maximum Power Demand," in *Proceedings of the ACEEE Summer Study 2024* (ACEEE, 2024), 12. https://eta-publications.lbl.gov/sites/default/files/2024-12/aceee_2024_heat_pumps_and_peak_power.pdf

[15] Hydro-Québec, "A look at our collective efforts." https://www.hydroquebec.com/residential/energy-wise/why-be-energy-wise/collective-efforts-overview/

[16] Environment and Climate Change Canada, "Social Cost of Greenhouse Gas Estimates," Interim Updated Guidance for the Government of Canada, April 2023 https://www.canada.ca/en/environment-climate-change/services/climate-change/science-research-data/social-cost-ghg.html

maintain essential electricity services during outages, where generation and storage are designed for backup operation. Together, these measures can help limit the costs to Canadians from climate-related health impacts, disruption, and damage.[17]

This triple benefit strengthens the case for customer energy solutions as a central part of Canada's affordability strategy.

2.2 Ready to scale

Canadians have already demonstrated strong demand for energy programs that lower daily costs. In 2024, the Canada Greener Homes Grant closed early due to higher-than-anticipated demand. Participating households continue to save an average of $386 per year.[18] In Nova Scotia, funds for the federal government's Oil to Heat Pump Affordability program were also fully allocated a year ahead of schedule. That program combined federal and provincial support to save households roughly 80% in upfront costs and $1,337 per year in energy bills[19] in a province where 27% of households experience energy poverty.[20] Similar provincial and utility energy efficiency programs and demand-response programs also regularly receive high participation levels.[21]

The organizations and businesses delivering these programs provide an established foundation, ready to scale. For example, regional co-delivery models leverage trusted partners, including local and Indigenous governments and community organizations. These partners have extensive

[17] Canadian Climate Institute, "The Costs of Climate Change."

[18] Natural Resources Canada, "Canada Greener Homes Grant at a Glance," Highlights, modified April 16, 2026. https://natural-resources.canada.ca/energy-efficiency/home-energy-efficiency/canada-greener-homes-initiative/canada-greener-homes-grant-glance-0

[19] Paul Hollingsworth, "Nova Scotia Heat Pump Rebate Ending Next Year Ahead of Other Provinces," CTV News, December 20, 2025. https://www.ctvnews.ca/canada/article/nova-scotia-heat-pump-rebate-ending-next-year-ahead-of-other-provinces/

Natural Resources Canada, "The Oil to Heat Pump Affordability Program," backgrounder, modified February 28, 2025. https://www.canada.ca/en/natural-resources-canada/news/2025/02/the-oil-to-heat-pump-affordability-program.html

[20] Spending more than 6% of their income on energy. Efficiency Canada, "Energy Poverty in Canada." https://www.efficiencycanada.org/energy-poverty-in-canada/

[21] Dunsky Energy + Climate Advisors, *New Brunswick Demand Side Management Potential Study, Volume 1: Results (Final)*, prepared for New Brunswick Power Corporation (2025), 42. https://www.nbpower.com/media/1494245/nb-power-dsm-potential-study-2025-volume-i.pdf

FortisBC Energy Inc., *Application for Additional Demand-Side Management Expenditures for 2026 and 2027* March 31, 2026, 1. https://www.cdn.fortisbc.com/libraries/docs/default-source/about-us-documents/regulatory-affairs-documents/gas-utility/260331-fei-2026-2027-incremental-dsm-expenditures-application-ff.pdf?sfvrsn=6cb53e72_1

experience delivering equity-focused demand-side management programs.[22] A network of skilled workers in local small-to-medium-sized businesses deliver reliable equipment installation, providing a foundation for growth.

2.2.1 Leveraging federal dollars

The federal government has announced time-limited programs that reduce the cost of customer energy programs for homes and businesses. However, durable policy is needed to coordinate resources and enable existing delivery networks to move beyond boom-and-bust cycles.

In recent years, federal support has taken these forms:

- The federal government has earmarked $800 million over five years for Canada Greener Homes Affordability Program (CGHAP), which provides no-cost retrofits to low- and moderate-income households that would otherwise be unable to afford the upfront investment.[23] This provides a necessary foundation for reducing energy costs for these households.
- The $2.275 billion Electric Vehicle Affordability Program provides individuals and organizations with $5,000 to $2,000 rebates from 2026-2031, with $1.87 billion in funding remaining as of November 2026.[24]
- In September 2026, the federal government announced the Productivity Mega Deduction, a proposed measure allowing businesses to deduct the full cost of eligible depreciable assets in the first year they become available for use.[25] The deduction reduces a business's taxable income, subject to applicable eligibility rules and asset-specific limits. The measures cover a range of business investments including eligible clean energy generation, energy conservation equipment and qualifying zero-emission vehicles; it is not limited to clean technology assets alone.

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[22] James Gaede, Alyssa Nippard, and Katharine Turner, *The 2025 Energy Efficiency Programs Report* (Efficiency Canada, 2026), 47–48. https://www.efficiencycanada.org/wp-content/uploads/2026/02/The-2025-Energy-Efficiency-Programs-Report.pdf

[23] Innovation, Science and Economic Development Canada, "Government of Canada's New Canada Green Buildings Strategy to Help Canadians Save Money on Their Energy Bills," news release, July 16, 2024. https://www.canada.ca/en/innovation-science-economic-development/news/2024/07/government-of-canadas-new-canada-green-buildings-strategy-to-help-canadians-save-money-on-their-energy-bills.html

[24] Transport Canada, "Electric Vehicle Affordability Program: Overview." https://tc.canada.ca/en/road-transportation/innovative-technologies/electric-vehicles/electric-vehicle-affordability-program/overview

[25] Department of Finance Canada, "Government of Canada introduces new Productivity Mega Deduction to boost Canada's advantage as the most competitive G7 country for new business investment," backgrounder, September 15, 2026. https://www.canada.ca/en/department-finance/news/2026/09/government-of-canada-introduces-new-productivity-mega-deduction-to-boost-canadas-advantage-as-the-most-competitive-g7-country-for-new-business-inve.html

- On October 2, 2026, the federal government and the Federation of Canadian Municipalities announced $66.3 million in funding awards for 162 projects through the Green Municipal Fund's Community Efficiency Financing and Sustainable Affordable Housing initiatives. The projects support local retrofit financing programs and the planning, renovation and development of energy-efficient affordable housing, helping more communities prepare for and deliver upgrades that can reduce energy costs.[26]
- On October 8, 2026, the federal government announced an investment in home retrofits, including a new $2 billion National Heat Pump Rebate program, alongside financing measures for multi-unit residential buildings and a $107.1 million renewal of the Deep Retrofit Accelerator Initiative supporting commercial, industrial, and multi-unit residential buildings.[27]
- Budget 2026 proposes $587 million over five years, starting in 2027–2028, to renew the Zero Emissions Vehicle Infrastructure Program and support over 55,000 additional EV chargers. It also proposes $400 million over seven years starting in 2027-2028 for the Strategic High Efficiency Industrial Facilities Transition program, supporting energy-saving technologies at industrial and manufacturing facilities including small- and medium-sized enterprises.

These federal commitments strengthen the foundation for expanded access to customer energy solutions. Figure 1 puts the scale of these commitments in context. Sustained funding could help existing programs reach more households and businesses, with savings beginning immediately as upgrades are completed.

[26] Environment and Climate Change Canada, "Government of Canada and Federation of Canadian Municipalities support home energy retrofit financing projects across Canada," October 2, 2026. https://www.canada.ca/en/environment-climate-change/news/2026/10/government-of-canada-and-federation-of-canadian-municipalities-support-home-energy-retrofit-financing-projects-across-canada.html

[27] Prime Minister of Canada, "Prime Minister Carney announces landmark investment to retrofit one million homes, cutting energy costs and emissions," media release, October 8, 2026. https://www.pm.gc.ca/en/news/news-releases/2026/10/08/prime-minister-carney-announces-landmark-investment-retrofit-one

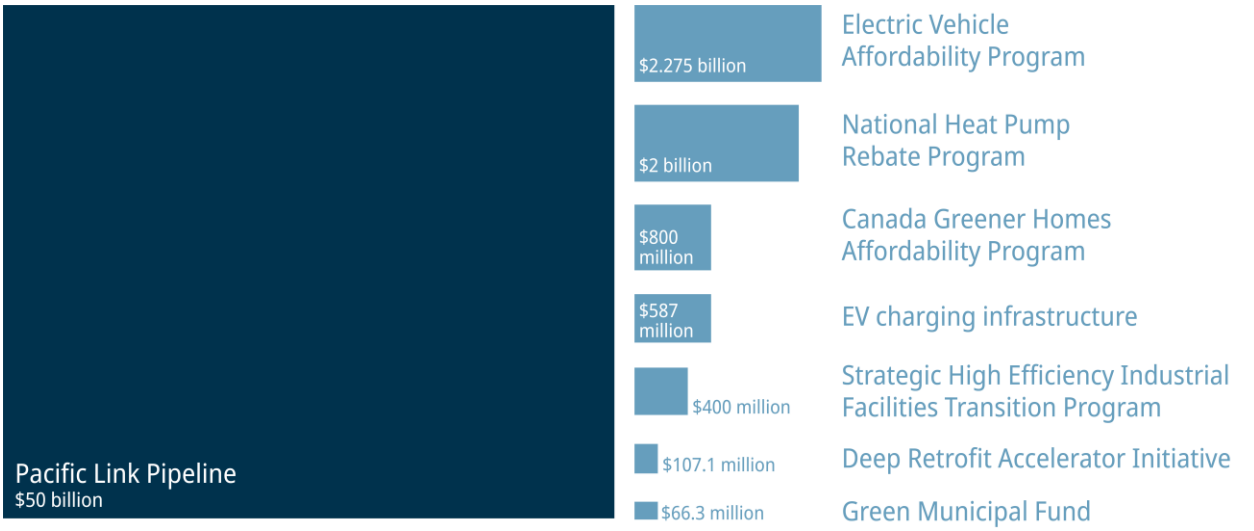

Figure 1. Potential public investment in large energy infrastructure compared to federal allocations for customer energy solutions

To strengthen affordability and deliver more direct savings to Canadians, government should make strategic and sizeable investments to help double electrification and energy efficiency by 2050, alongside its electricity supply goal.[28] An investment comparable to other major projects could substantially expand the reach of proven programs today, addressing both affordability and customer choice. While a pipeline's broader economic benefits may take years to emerge, expanded customer energy programs could support local employment during delivery and begin reducing energy costs and emissions as upgrades are completed.

As electrification advances, expanded funding should prioritize households and small businesses that cannot afford the upfront cost of upgrades. Without targeted support, they may miss out on technologies and programs that can reduce energy costs and help manage electricity demand. Proven programs can reach those facing the highest energy burdens, volatile fuel prices or costly upgrades — including households still heated with oil.

2.3 Protecting energy users

Powering Canada Strong aims to double electricity supply by 2050 and accelerate electrification across the economy. This strategy is central to Canada's pathway to clean energy and economic prosperity. However, to maintain Canada's affordable electricity advantage while doubling supply, governments and utilities must protect ratepayers from avoidable rate increases by helping Canadians make better use of the existing grid and manage their demand.

[28] Pembina Institute, "Clean Energy Leaders Call on Canada to 'Double, Double, Double' by 2050," media release, September 17, 2026. https://www.pembina.org/media-release/clean-energy-leaders-call-canada-double-double-double-2050

Electricity costs are top of mind for Canadians. In a September 2026 poll, 33% of respondents ranked electricity affordability as their top electricity priority, more than twice the share who prioritized expanding supply faster.[29] Making electrification affordable will require drawing on the least-cost, reliable options for meeting electricity needs

Energy efficiency can reduce the need for new electricity supply at a lower cost. For example, Ontario's efficiency measures cost as little as 3 cents per kilowatt-hour of electricity saved while recent generation procurement cost B.C. 7 cents per kilowatt-hour and Quebec estimates the cost of new supply at 13 cents per kilowatt-hour.[30] While efficiency cannot replace all new supply, overlooking cost-effective customer-side options will make electrification more expensive — particularly as the cost to produce electricity is projected to double in Ontario by 2042.[31]

Many jurisdictions use legislation and regulatory requirements to ensure utilities assess customer-side resources before committing to conventional grid investments. These resources, including energy efficiency, demand flexibility, local generation and storage, can be combined as non-wires alternatives to meet an identified grid need. Where they can meet that need reliably at lower cost, utilities should prioritize non-wires solutions to reduce, defer or right-size conventional infrastructure upgrades. This helps utilities invest in grid infrastructure when and where it is needed, protecting ratepayers from avoidable rate increases.[32]

Canadian provinces should require these assessments in utility planning, while federal support can help households, businesses and communities access the technologies and upgrades needed to participate. Together, these measures can help utilities accommodate growing electricity

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[29] Canadian Renewable Energy Association, *Clean Power Nation: Meeting the Power Needs and Expectations of Canadians* (2026), 5. https://renewablesassociation.ca/wp-content/uploads/2026/10/CanREA-Clean-Power-Nation-report.pdf

[30] Independent Electricity System Operator, *Making a Difference*, 2.

$74/MWh in 2024. BC Hydro, "BC Hydro Secures Electricity Purchase Agreements with New Renewable Energy Projects at a Lower Cost Than Previous Calls," statement, February 12, 2025. https://www.bchydro.com/news/press_centre/news_releases/2025/call-for-power-epas.html

Hydro-Québec, *Energy Efficiency Pathway: Working Together to Use Energy Wisely* (2025), 3. https://www.hydroquebec.com/data/a-propos/pdf/trajectoire-en-efficacite-energetique_ang.pdf?v=20250505

[31] Yadullah Hussain et al., "The 2030s & 2040s: A Bumpy Growth Path," in *The Price of Power: How to Cut Canada's Net Zero Electricity Bill* (RBC Economics and Thought Leadership, 2022). https://www.rbccm.com/en/insights/2022/09/the_price_of_power_how_to_cut_canadas_net_zero_electricity_bill

[32] Canadian Solar Industries Association, *Non-Wires Alternatives (NWAs): Energizing Distributed Energy Resources to Bring Value to Canadian Grids, Utilities and Ratepayers* (2020), 21 https://www.rds.oeb.ca/CMWebDrawer/Record/673241/File/document

Kari Hyde, *Demand as a Utility Resource: Legislative and Implementation Pathways to Demand-Side Management* (Pembina Institute, 2026). https://www.pembina.org/pub/demand-utility-resource

demand sooner and at a lower cost, preserving Canada's electricity cost advantage as electrification advances.

3. What would $50 billion deliver?

A $50 billion investment in customer energy solutions could expand access to energy upgrades and technologies in communities across the country. These include home and building retrofits, efficient appliances and equipment, smart energy controls, electric vehicles, building energy management systems, rooftop and community solar, batteries and thermal storage. Benefits can begin as soon as upgrades are completed and technologies are installed.

The following illustrations show two different ways to understand the scale of a $50 billion investment. Calculations, references and assumptions for these illustrations are listed in Appendix A. The two illustrations (Table 1) are alternatives and should not be added together.

Table 1. Two illustrations of investing $50 billion in customer energy solutions

	Illustration 1: Scaling Greener Homes retrofits	Illustration 2: Portfolio of solutions
Allocated public funds	$50 billion	$50 billion
Annual direct savings to Canadians once deployed	$1.0–$6.0 billion	$6.1–$10.0 billion
Annual emissions reduction	5.3 Mt CO_2e	15.4–18.9 Mt CO_2e
Annual societal savings due to avoided emissions[a]	$1.8–$2.2 billion	$5.1–$7.7 billion

[a] based on social cost of carbon for 2027-2040. Results have been rounded.

3.1 Illustration 1: Scaling Greener Homes retrofits

Consider a $50 billion investment in the Canada Greener Homes Affordability Program or comparable programs: these funds could provide no-cost retrofits for 3.5 million low- and moderate-income households or one hundred times the reach of the current program in Quebec, British Columbia, Nova Scotia and Prince Edward Island combined. Since CGHAP households are expected to save an estimated $300 to $1,700 annually, this scale of investment could deliver between $1 billion and nearly $6 billion in combined household savings every year.

This same $50 billion could reduce annual emissions by approximately 5.3 Mt CO_2e — the equivalent of taking 1.2 million cars off the road or roughly 5.2% of Canada's remaining gas- and diesel-powered light-duty vehicles. Based on the social cost of carbon, these emissions

reductions represent an additional $1.8 billion in indirect annual savings for Canadians in 2027, rising to $2.2 billion per year by 2040.

3.2 Illustration 2: A broader customer energy portfolio

A national portfolio of customer energy solutions could extend benefits across provinces and territories through measures tailored to community needs. The illustrative portfolio combines home retrofits, oil-to-heat pump conversions, EV purchase incentives, community solar rebates and smart thermostats that enable energy savings and participation in demand-response programs.

A $50 billion investment could support all the measures listed in Table 2 and discussed below, helping Canadian households and businesses reduce energy costs over time.

Table 2. A $50 billion portfolio of customer energy solutions

Customer energy solution	One-time public investment ($ billion)	Annual direct savings to Canadians ($ billion/year)	Annual emissions reduction (Mt CO_2e/year)	Other co-benefits
Household upgrades				
Home retrofits	$24	$0.4–$2.0	1.8	Lower heating and cooling demand; potential peak reduction
Oil to heat pump conversions	$6	$0.75–$1.4	1.5	Efficient electrification; peak impacts depend on building performance, equipment and controls
Affordable electrified transportation				
EV incentives	$10.5	$3.4	9.0	Improved air quality; peak reduction through managed charging and vehicle-to-grid
Distributed energy resources				
Community solar rebates	$4.1	$0.2	1.7–4.8	Local supply; contribution to constrained demand depends on location and generation timing
Smart thermostats	$5.4	$1.4–$2.9	1.4-1.8	Peak reduction through coordinated demand response

& demand response				
TOTAL	**$50 billion**	**$6.1–$10.0 billion/year**	**15.4–18.9 Mt CO_2e/year**	

Results have been rounded.

Household upgrades

Home retrofits: $24 billion would deliver no-cost retrofits to 1.2 million homes, or 10% of the 12 million home retrofits needed in Canada by 2050.[33] At $20,000 per retrofit, these upgrades could generate between $360 million and $2 billion in annual household energy savings, improve comfort and safety, and reduce roughly 1.8 Mt CO_2e every year — equivalent to taking over 419,000 gas vehicles off the road. This per-household allocation is larger than the $14,285 CGHAP average to provide a conservative estimate for the impact of these funds and/or to cover expanded upgrades per-home.

Oil to heat pump conversions: Just under $6 billion would support a reinstated oil-to-heat pump affordability program, providing grants of $10,900 toward conversion costs for 548,000 remaining oil-heated households. These upgrades could unlock $0.75–$1.4 billion in annual energy savings.

Oil-heated homes account for 5% of Canada's residential emissions.[34] Dedicated rebates for oil-to-heat pump conversions could reduce annual emissions by 1.5 Mt CO_2e, benefiting all Canadians. This reduction is equivalent to the carbon absorbed by 25.3 million tree seedlings grown for 10 years. Oil-to-heat pump conversion rebates can complement the new National Heat Pump Rebate program by covering additional conversion costs beyond the new rebate and other available support.

Affordable electrified transportation

EV incentives: $10.5 billion would provide 2.1 million incentives of $5,000 for eligible EV purchases, available to households, building owners, businesses and fleet operators. These incentives could generate an estimated $3.4 billion in annual fuel and operating savings for recipients and reduce emissions by 9.0 Mt CO_2e per year — equivalent to 5.8% of Canada's

[33] Kai Millyard and Jared Kolb, *Retrofitting Canada's Homes: Progress Report #2* (Green Communities Canada, 2025), 4. https://greencommunitiescanada.org/wp-content/uploads/2025/12/GreenCommunitiesCanada_2025RetrofitReport_FINAL_En-1.pdf

[34] Natural Resources Canada, "Residential Sector – GHG Emissions," National Energy Use Database. https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=AN&sector=aaa&juris=00&rn=2&page=0

transportation emissions. Section 5.3 outlines ways to apply these incentives to reduce upfront EV purchase costs for households, small and medium-sized businesses, and fleet operators.

Distributed energy resources

Community solar rebates: Just over $4.1 billion would support approximately 3,852 community solar projects, expanding access to community-owned electricity generation. At $1.08 million in public funds per 2 MW project, this investment could cover a 30% rebate to reduce upfront capital requirements for projects that deliver bill savings or investment returns to participants. Depending on where the projects are located, investment could support annual emissions reductions ranging between 1.7 Mt CO_2e (if distributed evenly across the country) and up to 4.8 Mt CO_2e (if concentrated in provinces and territories with the most emissions-intensive electricity systems). Each of the 770,400 participating households could save $308 per year — a total of $238 million in savings per year.

Smart thermostats & demand response: $5.4 billion could equip approximately 15.3 million compatible Canadian households with a $350 smart thermostat. These devices could help households use less energy and participate in utility demand response programs where available. Assuming 7%–9% space heating and cooling savings, households could save a combined $1.1–1.4 billion on energy costs each year. If all households participated in demand-response programs, rewards could add $0.3–$1.5 billion annually, based on current Ontario and B.C. programs. Associated energy savings could reduce emissions by 1.4 to 1.8 Mt CO_2e — equivalent to approximately 1.7–2.2 times the emissions of Toronto's Portlands Energy Centre, a natural gas-fired generating station.

Direct savings and emissions reductions: a win-win

A $50 billion public investment in customer energy solutions could deliver an estimated $6.1–$10.0 billion in direct annual savings to Canadians and abate 15.4–18.9 Mt CO_2e annually (Table 2), equivalent to reducing Canada's transportation, buildings, and electricity emissions by 5.4%–6.6%.[35] Using the social cost of carbon, these emissions reductions represent estimated indirect annual savings of $5.1–$6.3 billion in 2027, rising to $6.3–$7.7 billion annually by 2040. This valuation captures avoided climate-related damages rather than direct financial savings to Canadian households or governments.

[35] Based on 288 Mt CO_2e in emissions released per year across transportation, buildings, and electricity in 2023. Canada Energy Regulator, "Canada's Energy Future Data Visualization Tool: Emissions Modelled in Current Measures," 2023 (last historical data)." https://apps2.cer-rec.gc.ca/energy-future/

Over 10 years, estimated customer savings and monetized climate benefits could exceed the initial public allocation by $67–$117 billion. This comparison does not represent a financial payback to government or account for all costs[36].

The portfolio estimates exclude potential electricity system savings, contributions to GDP and indirect employment effects. Potential electricity savings depend on where and when measures are deployed and how utilities incorporate them into planning and operations.

[36] See Appendix (A.2.2.4) for further information on methodology.

4. Benefits for everyday Canadians

Investments in energy solutions in homes, businesses, and communities benefit both customers and the electricity system. Households can reduce energy and transportation costs, while businesses and community organizations can redirect operating savings toward staff and services. Utilities can make better use of existing infrastructure and manage growing demand, helping maintain reliable service and limit electricity cost increases for all customers. These investments also support local employment and Canadian supply chains, improve health and comfort, and strengthen resilience to extreme weather.

Many benefits can continue throughout the life of an upgrade or technology. High-performance windows and insulation can lower heating costs for decades, while community solar projects can provide financial returns or on-bill savings for more than 25 years. Electric vehicles can reduce fuel costs over their useful life. Sustained investment can extend these benefits to more Canadians and give Canadian businesses greater confidence to grow markets for energy efficiency, demand flexibility and distributed energy.

4.1 Lower energy costs for households and businesses

Lower household energy costs can leave more income for other essentials, such as groceries, rent and transportation. These savings are especially important for the nearly 2 million households experiencing energy poverty.

In six provinces and territories, more than 20% of households spend at least 6% of their income on energy bills, and households that rely on heating oil face additional pressure with prices rising 40% since last winter.[37] No-cost home retrofits could reduce these household energy bills by $300–$1,700 per year.[38] Switching from oil heating to a heat pump can reduce annual costs

[37] Willy Pallov, "Nova Scotia heating oil prices surge by as much as 40 per cent as residents brace for costly winter," *SaltWire,* September 16, 2026. https://www.saltwire.com/nova-scotia/heat-homes-oil-cost-expensive-winter

[38] Natural Resources Canada, "Canada drives lower bills and cleaner energy in Quebec, British Columbia, Nova Scotia and Prince Edward Island," news release, June 29, 2026. https://www.canada.ca/en/natural-resources-canada/news/2026/06/canada-drives-lower-bills-and-cleaner-energy-in-quebec-british-columbia-nova-scotia-and-prince-edward-island.html

by $1,377–$4,500.[39] Where utility programs are available, demand-response initiatives can provide additional bill credits to those who reduce energy use during peak times.

Lower energy costs can help businesses manage operating expenses and allow community organizations to direct more funding to services. In Quebec, businesses, public institutions (such as schools and hospitals), and community organizations participating in utility demand response programs received an average of $91,600 in bill credits in 2025.[40] In New York, utility customers with onsite generation and storage may qualify for payments through multiple utility programs when their systems support local grid needs, such as by reducing demand or exporting power during peak periods.[41]

Energy savings in practice

Households: No-cost retrofits can help households facing high energy burdens. Before receiving a no-cost retrofit, one single parent in Calgary spent 13% of their income on utilities.[42]

Schools, municipalities, and community organizations: Lower operating costs can help preserve funds for services people rely on. A Nova Scotia affordable housing non-profit reinvested savings from the former oil to heat-pump program to support residents.[43] A British Columbia school district saved $22,000 by reducing energy use when the grid was constrained.[44]

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[39] (Lower bound) Environment and Climate Change Canada, "Oil to Heat Pump Affordability (OHPA) Program at a Glance". https://www.canada.ca/en/environment-climate-change/services/energy-efficiency/home-energy-efficiency/canada-greener-homes-initiative/oil-heat-pump-affordability-ohpa-program-glance.html

(Upper bound) Natural Resources Canada, "Enhancements to the Oil to Heat Pump Affordability Program," modified December 23, 2024. https://natural-resources.canada.ca/energy-efficiency/home-energy-efficiency/canada-greener-homes-initiative/enhancements-oil-heat-pump-affordability-program

[40] Hydro-Québec, "Demand Response Rate Offers." (noting that more than 2,500 customers participating in the Demand Response Option received a total of $229 million in bill credits during winter 2025). https://www.hydroquebec.com/business/energy-savings-business/manage-power-demand-offers.html

[41] New York State Energy Research and Development Authority, "The Value Stack: Value of Distributed Energy Resources." https://www.nyserda.ny.gov/All-Programs/ny-sun/contractors/value-of-distributed-energy-resources

[42] Kambo Home Upgrades Program, "Nora's Home Upgrades Story." https://www.homeupgradesprogram.ca/participant-stories/noras-story

[43] Nova Scotia Power, "Powering Our Communities: Energy Upgrades for Souls Harbour Rescue Mission," September 20, 2024. https://www.nspower.ca/about-us/articles/details/articles/2024/09/20/powering-our-communities--energy-upgrades-for-souls-harbour-rescue-mission

[44] BC Hydro, *School Buildings: BC Hydro Demand Response Program.* https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/power-smart/business/programs/demand-response-for-business-resources-school-buildings.pdf

4.2 Utility and electricity customer benefits

Customer energy solutions give utilities additional tools to manage growing demand and local grid constraints. Energy efficiency, demand flexibility, local generation and storage can help utilities make better use of existing infrastructure, maintain reliable service and connect new customers and electrified loads. Where these options cost less than conventional upgrades, they can reduce the cost of serving customers and help limit future rate increases.

To realize these benefits, utilities need to plan for and use customer-side resources, supported by rules that allow them to recover their costs and reward them for the value these resources deliver.

4.3 More affordable transportation

It's now cheaper to own an EV than a gas vehicle over a 10-year ownership period in all provinces and territories. Drivers benefit from lower fuel and operating costs, saving roughly $1,600 per year or $23,000–$32,000 over the vehicle's lifetime.[45] EVs also protect drivers from volatile fossil fuel prices. However, 72% of Canadians still consider upfront costs a key barrier.[46]

Incentives for new EVs can also help build a more affordable used vehicle market over time. Today most used EVs are available in B.C., Quebec, and Ontario where EV adoption has benefitted from longstanding supportive policies and rebates.[47] Extending incentives to used EVs would help more Canadians access these lower-cost vehicles and their ongoing fuel and maintenance savings.

Incentives that make EVs more affordable can also support growth in charging infrastructure. As more Canadians drive electric vehicles, demand for charging increases in apartments, workplaces, public locations, rural communities and along highways. Greater use of charging stations can strengthen the business case for businesses, property owners and charging

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[45] Dunsky Energy + Climate Advisors, *Powering Up: A National and Sub-National Outlook on Electric Vehicle Adoption, Barriers, and Impacts to the Grid, National Report: Canada* (prepared for Electric Mobility Canada, 2025), 12. https://emc-mec.ca/wp-content/uploads/2025/10/v2-23014_Powering-Up_National-Report_EN-updated-14Oct2025.pdf

Clean Energy Canada, *Back in the Race: In a Comeback Year for EVs in Canada, Electric Cars Remain Significant Cost-Savers, While Electrified Households Enjoy a Range of Other Benefits* (April 2026), 4. https://cleanenergycanada.org/wp-content/uploads/2026/04/Report_MyCleanBill2026_V7.pdf

[46] Clean Energy Canada, "Poll: EV Interest Climbs, but Some Canadians Are Waiting for Chinese EVs, More Electric Pickups, or Just Don't Realize Prices Have Improved," October 9, 2026. https://cleanenergycanada.org/poll-ev-interest-climbs-but-some-canadians-are-waiting-for-chinese-evs-more-electric-pickups-or-just-dont-realize-prices-have-improved/

[47] Clean Energy Canada, *Recharged and Ready: The State of Canada's Used EV Market* (2026), 6. https://cleanenergycanada.org/wp-content/uploads/2026/10/Report_2026_UsedEVs_V5.pdf

providers to invest in expanded networks, making electric transportation more convenient and accessible.

Managed charging programs can reduce pressure on the electricity grid by shifting vehicle charging away from periods of peak demand, helping avoid or defer some infrastructure upgrades.[48] With suitable equipment and utility programs, EV batteries can provide backup power to buildings or supply electricity to the grid. These capabilities can create additional value for vehicle owners while helping utilities meet peak demand and maintain reliable service.

4.4 Local jobs and Canadian supply chains

Electrifying Canada's economy will require between 235,000 and 350,000 construction workers each year by 2050, along with 60,000 to 90,000 additional long-term operations and maintenance roles.[49] Combined, that's roughly equal to the number of jobs across all of forestry, fishing, mining, quarrying, and oil and gas in Canada today.[50] Customer energy solutions will contribute to this broader employment opportunity through work for electricians, heating and cooling technicians, energy advisors, retrofit contractors and installers in communities across Canada.

Customer energy investments can also strengthen Canadian supply chains and domestic energy capabilities. Predictable demand for these technologies and services can give Canadian manufacturers, technology developers and service providers greater confidence to invest and grow. Canadian businesses already supplying these solutions include Futuri's smart electrical panels that can reduce the need for electrical service upgrades, Vitalis' heat pumps for commercial, industrial, and district energy applications, and Moment Energy's commercial-scale storage built from repurposed EV batteries.[51] Indigenous-owned businesses can share in opportunities beyond manufacturing through installation, maintenance, procurement and community-led projects.

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[48] Brittany Blair and Garrett Fitzgerald, *The State of Managed Charging in 2024* (Smart Electric Power Alliance, 2024), 10. https://sepapower.org/wp-content/uploads/2024/08/SEPA-State-of-Managed-Charging-2024-Report_print.pdf

[49] Tyee Bridge and Jim Stanford, *Jobs For Today: Canada's Building Trades & The Net-Zero Transition* (Green Jobs BC, 2025), 6. https://ccg.eco/resource/jobs-for-today/

[50] 339,200 jobs in 2025. Statistics Canada, "Employment by industry and economic region, annual," Table 14-10-0466-02. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410046602

[51] Futuri, "Electrify More Homes Without Costly Service Upgrades." https://www.futuripower.com/

University of British Columbia, "A made-in-BC heat pump with global impact," media release, June 26, 2026. https://news.ubc.ca/2026/06/a-made-in-bc-heat-pump-with-global-impact/

Moment Energy, "The Era of Independent Energy Is Here." https://www.momentenergy.com/

Budget 2026's expanded investment in Build Canada Homes also presents an opportunity to scale energy retrofits in affordable rental housing.[52] The Canada Rental Protection Fund supports the acquisition and renewal of existing rental properties, while Build Canada Homes encourages modern construction methods and Canadian manufacturing.[53] Connecting these efforts could support the use of prefabricated retrofit panels to improve building efficiency, lower energy costs for residents and create more predictable demand for Canadian manufacturers.

4.5 Health, resilience and emissions reduction

Customer energy investments can strengthen community resilience and deliver benefits beyond participating households and businesses. For example, retrofits provide communities with healthier and safer homes, workspaces, schools and community buildings.[54] Upgrades such as efficient heating and cooling and better insulation and windows help maintain safer indoor temperatures during extreme weather events such as the 2021 B.C. heat dome. Well-sealed buildings with appropriate ventilation and filtration can improve air quality and reduce exposure to wildfire smoke, while onsite generation and storage designed to operate during outages can maintain access to essential community services.[55] These healthier, more resilient buildings will become increasingly important as extreme weather places greater pressure on communities.[56]

Household and business energy solutions can deliver health and climate benefits beyond participating customers to the broader community. Electrifying transportation reduces air pollution from gasoline and diesel vehicles, which is associated with an estimated 1,200

[52] Housing, Infrastructure and Communities Canada, "Build Canada Homes Announces the Launch of the Canada Rental Protection Fund," news release, September 22, 2026. https://www.canada.ca/en/housing-infrastructure-communities/news/2026/09/build-canada-homes-announces-the-launch-of-the-canada-rental-protection-fund.html

[53] Canadian Housing Acquisition Fund, "Canada Rental Protection Fund." https://www.acquisitionfund.ca/crpf

[54] Raidin Blue and Betsy Agar, *Healthy Buildings in a Changing Climate: Climate Adaptation and Decarbonization in Canadian Buildings* (Pembina Institute, 2024). https://www.pembina.org/pub/healthy-buildings-changing-climate

[55] Health Canada, *Guidance for Cleaner Air Spaces During Wildfire Smoke Events* (S2020), 18. https://www.canada.ca/content/dam/hc-sc/documents/services/publications/healthy-living/guidance-cleaner-air-spaces-during-wildfire-smoke-events/guidance-cleaner-air-spaces-during-wildfire-smoke-events.pdf

Federation of Canadian Municipalities, *Retrofitting Community Buildings to Support Climate Resilience* (Green Municipal Fund, n.d.), 5. https://media.fcm.ca/documents/programs/gmf/gmf-cbr-retrofitting-community-buildings-to-support-climate-resilience-guide.pdf

[56] Canadian Institute for Climate Choices, *The Health Costs of Climate Change: How Canada Can Adapt, Prepare, and Save Lives* (2021), 30. https://climatechoices.ca/wp-content/uploads/2021/06/ClimateChoices_Health-report_Final_June2021.pdf

premature deaths and $9.5 billion in annual health costs.[57] Energy efficiency measures and switching to electric heating systems can reduce emissions from buildings. Reducing peak demand can reduce reliance on natural gas-fired electricity generation, where it supplies peak needs, and solar can displace fossil-fuel generation in the eight provinces and territories where fossil fuels supply more than 10% of generated electricity.[58]

Building safety and savings for all

In the aftermath of Hurricane Fiona in 2022, community buildings played a key role in disaster recovery. The Pictou County Wellness Centre, for example, housed electrical workers and provided public charging.[59] This experience illustrates the importance of preparing buildings for future emergencies. Equipping community buildings with generation and storage that can operate during outages, efficient heating and cooling and improved building envelopes can help keep essential services available during extreme weather and wildfires.

Alongside these resilience benefits, energy upgrades can also lower operating costs. When energy efficiency upgrades and onsite generation were announced for the Pictou County Wellness Centre in 2022, projected savings were $356,000 annually over 15 years, potentially freeing up public funds for other community services.[60]

4.6 Community economics

Customer-side investments can support local jobs and business activity that generate tax revenue, which governments can reinvest in public priorities. Electrification can also keep more household energy spending within provincial economies. A Pembina analysis found that 90% of every dollar spent charging an EV stays in Ontario's economy, while 50% of every dollar spent fueling a gas vehicle leaves the province.[61] Switching to electricity can therefore retain more spending locally, while reducing household and business exposure to global fuel prices.

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[57] 2015 estimate. Health Canada, *Health Impacts of Traffic-Related Air Pollution in Canada* (2022), 3. https://www.canada.ca/content/dam/hc-sc/documents/services/publications/healthy-living/health-impacts-traffic-related-air-pollution/health-impacts-traffic-related-air-pollution.pdf

[58] Canada Energy Regulator, "Canada's Energy Future Data Visualization Tool: Electricity Generation, All Provinces & Territories, Current Measures Scenario," 2026. https://apps2.cer-rec.gc.ca/energy-future/

[59] Federation of Canadian Municipalities, *Retrofitting Community Buildings to Support Climate Resilience*, 6.

[60] Municipality of Pictou County, "PCWC Invests in Energy-Saving Upgrades," January 20, 2022. https://munpict.ca/news/new-blog-post-64/

[61] Chandan Bhardwaj, *Where Does Your Money Go When You Fuel Your Vehicle? How charging an EV keeps more energy spending in Ontario* (Pembina Institute, in press).

Public funding can encourage additional investment from households, businesses and utilities. The former Canada Greener Homes Grant and Loan combined public support with household contributions to help cover upgrade costs. The National Heat Pump Rebate program can build on this approach. Complementary funding can extend the reach of public investment and its benefits.

Community ownership of energy projects

Well-designed community energy projects can return revenue to households, businesses and organizations[62]. Under some cooperative models, community solar can offer members annual returns of 4%.[63] Nova Scotia's Amherst Solar Garden, developed with utility participation, provides residents with monthly on-bill savings and requires no upfront contribution.[64] When planned around utility needs, community-owned generation and storage can also support the wider electricity system. Community ownership can increase public acceptance of similar projects.[65]

Indigenous-owned community-scale projects strengthen energy reliability and climate resilience while helping address energy poverty and affordability.[66] They also give communities greater control over energy decisions and keep project revenues and economic benefits local.

[62] RMI, *Electricity Affordability Toolkit: Community Solar Programs*, (2025). https://affordability-toolkit.rmi.org/pdfs/community-solar-programs.pdf

[63] For example, Solshare, a B.C.-based corporation that operates with a co-operative model, had dividend rates of 4.75% in 2025. Solshare Energy Corp., *Solshare Energy Corp. Financial Position* (financial statements, period ending January 31, 2026), 4. https://www.solshare.ca/wp-content/uploads/sites/5/2026/04/2026-Solshare-financials.pdf

[64] National Renewable Energy Laboratory, *Community Solar Program Design and Subscription Models* (2022; revised 2023), 12. https://docs.nlr.gov/docs/fy23osti/86242.pdf

[65] Jessica L. Hogan, "Why Does Community Ownership Foster Greater Acceptance of Renewable Projects? Investigating Energy Justice Explanations," *Local Environment: The International Journal of Justice and Sustainability* 29, no. 9 (2024). https://doi.org/10.1080/13549839.2024.2360716

[66] Indigenous Clean Energy, *Regenerative Energy 2026: A National Survey of Indigenous Clean Energy Leadership Across Canada* (2026), 28. https://indigenouscleanenergy.com/wp-content/uploads/2026/05/2026-National-Survey.pdf

5. Recommendations for federal action

Canada's energy system depends on coordinated investment in four interdependent components: energy supply, transmission and transport, local distribution networks, and the productive use of energy in buildings, transportation and industry. How efficiently energy is used, when it is needed and where it is generated affect the amount of supply and infrastructure investment required.

The findings of this report show why local distribution and customer energy solutions deserve a central place in Canada's energy investment priorities, alongside major supply and infrastructure projects. The following five recommendations identify federal actions to expand access to customer energy solutions, strengthen delivery and integrate these resources into electricity system planning and investment.

5.1 Establish a customer energy affordability portfolio

The federal government should establish a clear, multi-year investment envelope under Powering Canada Strong for customer energy solutions across homes, transportation, businesses and communities. The portfolio should build on the federal government's 2026 commitments and extend public investment across a broad range of customer energy solutions that unlock direct savings for households, small- and medium-sized businesses, and community organizations.

The portfolio should:

- Provide predictable, sustained support.
- Combine no-cost programs, targeted grants and incentives, and long-term, low-cost financing to accommodate different needs and abilities to pay.
- Prioritize households facing high energy burdens and limited ability to pay for upgrades.
- Cover energy efficiency, demand flexibility, local generation and storage and electrified transportation.
- Encourage co-investment from provinces, territories, utilities, communities and private partners.

Upfront incentives and tax deductions address different barriers to investment. The Productivity Mega Deduction allows businesses to deduct eligible investment costs sooner, but they must still

finance the purchase. The immediate value of the deduction also depends on a business' corporate tax rate. Businesses with limited cash flow may therefore need additional assistance to invest in energy-saving equipment and technologies.

Targeted rebates and accessible financing can reduce this initial barrier. Federal program rules should allow eligible businesses to combine upfront incentives with the Productivity Mega Deduction where applicable, with clear guidance on how these measures interact.

Program delivery should include workforce development, Indigenous co-design and co-delivery, consumer and tenant protections, quality assurance and transparent reporting on costs and outcomes. Federal programs should work with provinces and territories to protect tenants' rights and ensure tenants share in the benefits of upgrades.

Canada already has proven programs, experienced delivery partners and skilled businesses that can scale customer energy solutions. The federal, provincial, territorial, municipal and utility collaboration on the Canada Greener Homes Affordability Program demonstrates that public funds can activate strong existing implementation networks across the country**.** Further investment can scale these regional co-delivery models to deliver savings to a wider range of Canadians. Federal financing should strengthen existing financing channels, while predictable support can encourage complementary investment from provincial, territorial, municipal and private partners.

For demand flexibility, federal support can help customers access compatible technologies and support provinces, territories and utilities in developing and expanding programs that integrate customer-side resources into electricity system planning and operations. Participant arrangements and customer compensation would be established through the relevant provincial and territorial utility and regulatory framework.

5.2 Expand retrofit access and delivery

The federal government should expand proven retrofit programs and provide sustained support for the organizations that deliver them. This includes the following:

- Direct Build Canada Homes to establish a long-term program for prefabricated, panelized retrofits of existing affordable rental housing, building on Budget 2026's expanded commitment and working with the Canada Rental Protection Fund to identify suitable properties and aligning procurement to create predictable demand for Canadian manufacturers.
- Expand CGHAP with long-term funding while maintaining no-cost, direct-install retrofits for low- and moderate-income households. Coordinate CGHAP and the

National Heat Pump Rebate with provincial, territorial and utility programs, allowing participants to combine funding dollars and complementary upgrades. This will simplify participation and establish clear accounting of funding and the resulting energy savings.[67]

- Reinstate targeted support through the Oil to Heat Pump Affordability program to address additional conversion costs beyond the new rebate and other available support.
- Provide ongoing access to grants, incentives, and low-cost financing for households and building owners able to contribute toward upgrade costs.
- Ensure renters, affordable housing providers and Indigenous communities can participate, with tenant protections and Indigenous co-design and co-delivery built into program arrangements.[68]

Federal investment in Indigenous infrastructure and housing should strengthen communities' capacity to plan and deliver energy upgrades, building on the co-designed Bringing It Home project accelerator, which helps communities retain expertise and move projects from development through installation.[69] The federal government should also work with Indigenous partners to explore Indigenous Clean Energy's proposed collaborative process to develop a multi-source, long-term endowment to fund and finance energy-efficient Indigenous housing across the country for the next 15 to 20 years.[70]

The commitment of $107.1 million over three years to the Deep Retrofit Accelerator Initiative, starting in 2027–2028, can help building owners move complex retrofits from planning to completion and connect projects with available financing.

Beyond direct incentives, federal action could improve access to retrofit financing by helping lenders and insurers recognize the lower operating costs and potential climate resilience benefits of upgraded buildings. Consistent methods for assessing these benefits would make it easier for building owners to secure financing for energy efficiency improvements.

[67] Brendan Haley and Carol Maas, *Aligning DSM Cost-Effectiveness Testing with Public Policy* (Efficiency Canada, 2026), 54-61. https://www.efficiencycanada.org/wp-content/uploads/2026/08/Report_Aligning-DSM-Cost-Effectiveness-Testing-with-Public-Policy.pdf

[68] Abhilash Kantamneni, James Gaede and Brendan Haley, *Making Net-Zero Retrofits Work for Energy-Poor Households* (Efficiency Canada, 2025), 30. https://www.efficiencycanada.org/wp-content/uploads/2025/03/Making-Net-Zero-Retrofits-Work-For-Energy-Poor-Households.pdf

[69] Indigenous Clean Energy, "Bringing it Home." https://indigenouscleanenergy.com/our-programs/bringing-it-home/

[70] Indigenous Clean Energy, *Regenerative Energy*, 35.

5.3 Extend transportation savings to more Canadians

Federal funding should help more Canadians take advantage of the lower operating costs of electric vehicles, including households that buy used vehicles and Canada's small businesses. Support should include:

- Allow eligible small and medium-sized businesses to combine expanded Electric Vehicle Affordability Program incentives with the Productivity Mega Deduction, where applicable. The incentives would reduce upfront purchase costs, while the deduction could reduce taxable income.
- Develop pathways to extend support to used electric vehicles, giving Canadians more affordable purchase options.
- Redesign and reinstate a rebate program for medium- and heavy-duty zero-emission vehicles to support adoption among small- and medium-sized businesses and fleet operators.
- Build on Budget 2026's proposed renewal of the Zero-Emission Vehicle Infrastructure Program, complemented by financing through the Canada Infrastructure Bank Charging Initiative. Prioritize charging access in apartments, workplaces, public locations, tourism corridors and rural communities, and require federally supported charging infrastructure to enable managed charging where appropriate.
- Support provinces and territories in developing regulatory frameworks and utility programs that allow EV batteries to supply electricity to buildings or the grid, including appropriate compensation for customers providing grid services.

Purchase incentives should be complemented by measures that increase the availability of affordable EVs. While Europeans can choose from over 20 EV models priced under $40,000, only a handful of low-cost EVs are available on the market in Canada.[71] Federal investment in local EV supply chains, greater market competition,[72] and stronger vehicle emissions requirements[73] can support a wider selection of affordable EVs.

[71] Clean Energy Canada, *Missing Out: Europe Enjoys 21 Electric Vehicles Selling for Less Than $40,000 Canadian. Only One of Them Is Available in Canada* (2025). https://cleanenergycanada.org/wp-content/uploads/2025/09/MissingOut-V5.pdf

[72] Pembina Institute, *Building a Competitive EV Industry in Canada*, submitted to Department of Finance Canada, August 1, 2024. https://www.pembina.org/pub/building-competitive-ev-industry-canada

[73] Chandan Bhardwaj, *Getting the Vehicle Emissions Standard Right* (Pembina Institute, 2026), 8. https://www.pembina.org/pub/getting-vehicle-emissions-standard-right

5.4 Build the workforce to deliver solutions

The federal government should work with provinces, territories, Indigenous governments, employers and training providers to align skilled workforce planning with investments in customer energy solutions. Planning should account for demand from home and building retrofits, electric transportation, demand flexibility, and local generation and storage, extending workforce development beyond major infrastructure projects. Federal support for regional workforce planning can help communities, training institutions and employers tailor expertise to local needs and meet regional demand for skilled and specialized workers.

Federal action should:

- Direct skills and training investments to regions and occupations where shortages could delay customer energy solutions or increase costs.
- Support the expansion and modernization of training for electricians, heating and cooling technicians, energy advisors, contractors and installers, including through apprenticeships, work-integrated learning, upskilling and Indigenous-led training.
- Ensure the Energy and Electricity Workforce Alliance is sufficiently supported to assess and address the workforce needs across the Powering Canada Strong strategy, including those associated with customer energy solutions.
- Fund collaborative training and technical assistance to help utility planners, operators, regulators and service providers assess and integrate customer technologies into electricity system planning and operations.

Pairing sustained investment in customer energy solutions with workforce development can help communities complete upgrades and realize savings sooner. Predictable project demand can also give Canadian businesses greater confidence to hire, train and grow.

5.5 Assess customer-side solutions alongside electricity infrastructure proposals

The federal government has committed to limiting the impact of electricity infrastructure expansion on electricity bills.[74] This commitment should apply to local distribution upgrades as well as major generation and transmission projects. Federal support for grid modernization should help utilities integrate customer-side resources and make better use of existing infrastructure, alongside necessary expansion.

[74] *Powering Canada Strong*, 11.

The federal government should require applicants for electricity infrastructure funding to assess whether cost-effective customer-side solutions could reduce, defer or right-size the proposed investment while maintaining reliable service. Assessments should consider energy efficiency, demand response, managed EV charging, local generation and distributed storage, individually or in combination with new infrastructure.

This requirement would help direct federal contributions toward the lowest-cost reliable options for meeting electricity needs. It should recognize the value of customer-side solutions in electricity planning while supporting new generation, transmission and distribution infrastructure where needed.

Strategies such as the Powering Canada Forward Fund could help protect Canadians from the near-term impacts of grid expansion on electricity rates by letting utilities access federal funds for infrastructure upgrades today while repaying costs over time as electricity demand and the customer base grow.[75] These supports should require a credible assessment of customer-side alternatives and transparent reporting on the selected investment costs and expected benefits.

[75] Dale Beugin, Kate Harland, Michael Liebreich, and Rick Smith, *Powering Canada Forward Fund: How Canada Can Double the Size of Its Grids While Keep Electricity Rates Affordable* (Canadian Climate Institute, 2026). https://climateinstitute.ca/wp-content/uploads/2026/07/Powering-Canada-Forward-Policy-Brief-Canadian-Climate-Institute.pdf

Appendix A. Calculations, references and assumptions

A.1 Illustration 1

Retrofits provided by $50 billion investment

- Cost per retrofit: $14,285 per household[76]
- Total retrofits possible: 3.5 million

Annual savings

- Savings for CGHAP households: $300 to $1,700 annually[77]
- Total savings for 3.5 million households:
- Minimum savings ($300) = $1.05 billion
- Maximum savings ($1,700) = $5.95 billion

Annual emissions reductions

- Emissions reductions for CGHAP households: 1.5 tonnes per household.[78]
- Total reductions for 3.5 million households: 5.25 Mt CO_2e

Vehicle equivalence

- Annual emissions of an internal combustion vehicle: 4.29 t CO_2e[79]
- Number of vehicles that would emit 5.25 Mt CO_2e: 1.22 million
- Number of gas- and diesel-powered light-duty vehicles in Canada in 2025: 23.3 million[80]

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[76] Based on the federal government's estimate that $500 million in public funds for CGHAP in Quebec, British Columbia, Nova Scotia and PEI will reach 35,000 low-to-median income households. Natural Resources Canada, "Canada drives lower bills and cleaner energy."

[77] Natural Resources Canada, "Canada drives lower bills and cleaner energy."

[78] Natural Resources Canada, "Canada drives lower bills and cleaner energy."

[79] U.S. Environmental Protection Agency (EPA), "Greenhouse Gas Equivalencies Calculator: Calculations and References," Gasoline-Powered Passenger Vehicles per Year. https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator-calculations-and-references

[80] Statistics Canada, Table 23100308, "Vehicle registrations, by type of vehicle and fuel type" (Total, vehicles weighing 4,536 kilograms or less, Gas & Diesel, 2025), September 22, 2026, https://open.canada.ca/data/en/dataset/a9e40f30-3229-4fb7-8105-83e751c848d4

- Equivalent % of vehicles removed: 5.2%

Social cost of carbon

- Social cost of carbon in 2027 (2021 dollars): $280/tonne[81]
- Social cost of carbon in 2040 (2021 dollars): $341 /tonne in 2040
- Average annual inflation (2021-2026): 3.55%[82]
- Value of the 2021 Canadian dollar in 2026: $1.19
- Annual indirect savings in 2027 from reducing 5.25 Mt CO_2e: $1.8 billion
- Annual indirect savings in 2040: $2.2 billion.

A.2 Illustration 2

A.2.1 Portfolio costs

Table 3. Summary of costs for a $50 billion portfolio of customer energy solutions

Solution	Public funds allocated per participant	Cost to recipient	Number of recipients	Total cost in public funds
Home retrofits	$20,000	None	1,200,000	$24,000,000,000
Oil to heat pump conversions	$10,900	Cost of conversion less $10,900	548,000	$5,973,200,000
EV incentives	$5,000	Cost of vehicle less $5000	2,100,000	$10,500,000,000
Community solar rebates	$1,080,000	70% of project costs	3,852 projects	$4,160,200,000
Smart thermostats	$350	None	15,330,481	$5,365,700,000
TOTAL				**$49,999,000,000**

Results have been rounded.

[81] Environment and Climate Change Canada, "Social Cost of Greenhouse Gas Estimates," Table 1, Updated SC-GHG Estimates (C$2021, $/tonne of respective GHG).

[82] Bank of Canada, "Inflation Calculator." https://www.bankofcanada.ca/rates/related/inflation-calculator/

Home retrofits

- Cost per retrofit: $20,000*[83]
  *increased from $14,285 per-home CGHAP average to allow for a conservative estimate of the impact of the funds and/or expanded upgrades per-home

Oil to heat pump conversions

- Current federal conversion incentive: $10,000
- Amount needed to allocate $6 billion to all eligible households: $10,900
- Number of households with oil heating: 548,000[84]

EV incentives

- Current federal EV incentive: $5,000

Community solar rebates

- Capital cost of community solar system (F2026–F2027): $1.8/W[85]
- Capital cost of 2 MW system: $3,600,000
- Size of rebate: 30%
- Rebate per project: $1,080,000
- Number of projects that could be funded with $4.16 billion for rebates: 3,852

Smart thermostats & demand response

- Cost of smart thermostat: $350[86]

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[83] Low estimate for 30-50% energy savings in 2026 covering measures such as heat pumps, insulation upgrades, and window replacement. Janani Venkatesh, "What It Costs to Retrofit a House in Canada (And Ways to Save)," April 1, 2026. https://greenbuildingcanada.ca/cost-retrofitting-canada/

[84] Natural Resources Canada, "Residential Sector Canada Table 20: Total Households by Building Type and Principal Heating Energy Source," National Energy Use Database, https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP&sector=res&juris=ca&year=2023&rn=20&page=0

[85] BC Hydro, *2025 Integrated Resource Plan Application,* Appendix J Attachment 1: Dunsky Solar Potential Study – Key Inputs and Assumptions (2025), 2. https://docs.bcuc.com/documents/proceedings/2025/doc_84202_b-1-bch-2025-irp-application.pdf

[86] BC Hydro, *Power Smart 2.0: Putting conservation first* (2026). https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/power-smart/residential/programs/power-smart-plan.pdf

- Percentage of households with thermostats in 2023: 91%[87]
- Number of households in Canada (2025): 16,846,682[88]
- Number of households with thermostats: 15,330,481

A.2.2 Portfolio impacts

A.2.2.1 Cost savings

Table 4. Summary of annual savings from a $50 billion portfolio of customer energy solutions

Solution	Annual cost savings per participant	Number of recipients supported	Total annual savings ($ billion/year)
Home retrofits	$300–1,700	1,200,000	$0.36–2.0
Oil to heat pump conversions	$1,377–2,600	548,000	$0.75–1.42
EV incentives	$1,600	2,100,000	$3.4
Community solar rebates	$308	770,400	$0.24
Smart thermostats	$103–133	10,808,050	$1.1–1.4
Demand response rewards	$20–95	15,330,481	$0.32–1.5
TOTAL			**$6.1-10.0 billion/year**

Results have been rounded.

Home retrofits

- Annual savings per participant: $300–1,700[89]

Oil to heat pump conversions

- Annual savings per participant:
  - Low value: $1,377[90]

[87] Statistics Canada, "Use of Thermostats," table 38-10-0049-01. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3810004901

[88] Statistics Canada, "Estimates of the Number of Private Households by Size on July 1st," table 17-10-0159-01. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=171001590

[89] Natural Resources Canada, "Canada drives lower bills and cleaner energy."

[90] Environment and Climate Change Canada, "Oil to Heat Pump Affordability (OHPA) Program at a Glance". https://www.canada.ca/en/environment-climate-change/services/energy-efficiency/home-energy-efficiency/canada-greener-homes-initiative/oil-heat-pump-affordability-ohpa-program-glance.html

- High value: 2,600[91]

EV incentives

- Annual savings per participant: $1,600[92]

Community solar rebates

- Projected savings from a 10-kW share in the Amherst, Nova Scotia solar garden: $7709 over 25 years[93]
- Annual savings per share: $308
- Number of 10-kW shares available from 3852 2-MW projects: 770,400

Smart thermostats

- Average Canadian annual energy bill: $2,376[94]
- Percent of residential energy used for space heating and cooling: 62%[95]
- Assumed average Canadian annual energy bill for space heating and cooling: $1473.12
- Annual space heating and cooling savings from smart thermostat: 8–9%[96]
- Assumed space heating and cooling savings: 7-9%
- Annual savings on energy bill per household: $103-133

[91] Environment and Climate Change Canada, "Federal Funding Will Lower Heating Costs Across Newfoundland and Labrador," news release, October 16, 2026. https://www.canada.ca/en/environment-climate-change/news/2026/10/federal-funding-will-lower-heating-costs-across-newfoundland-and-labrador.html

[92] Dunsky Energy + Climate Advisors, *Powering Up: A National and Sub-National Outlook on Electric Vehicle Adoption, Barriers, and Impacts to the Grid, National Report: Canada* (prepared for Electric Mobility Canada, August 2025), 12. https://emc-mec.ca/wp-content/uploads/2025/10/v2-23014_Powering-Up_National-Report_EN-updated-14Oct2025.pdf

[93] Nova Scotia Power, "Community Solar Garden Calculator." https://www.nspower.ca/cleanandgreen/innovation/community-solar-garden-calculator

[94] Natural Resources Canada, *Energy Fact Book: Spring 2026 Edition*, 44.

[95] Natural Resources Canada, *Energy Fact Book: Fall 2026 Edition* (2026), 51. https://energy-information.canada.ca/sites/default/files/2026-10/energy-fact-book-fall-2026.pdf

[96] Natural Resources Canada, "Is Your Thermostat Smart Enough?," modified June 1, 2025. https://prod-natural-resources.azure.cloud.nrcan-rncan.gc.ca/stories/spotlight-energy-efficiency/your-thermostat-smart-enough

BC Hydro, *Fact Sheet: Rebates on Smart Thermostats* (BC Hydro, 2025), 2. https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/power-smart/residential/programs/fact-sheet-rebates-smart-thermostats.pdf

- Percentage of households with thermostats in which the main thermostat is both programmable and programmed to lower when asleep (excluded from cost savings, included in demand response rewards): 29%[97]
- Number of households in which a smart thermostat could result in energy savings: 10,808,050

Demand response

- Demand response rewards (Ontario): $20/year[98]
- Demand response rewards (B.C.): $50 per season for enrolled thermostats and roughly $3 per peak demand event with 15–20 peak demand events per year[99]
- Demand response under B.C. rates with 15 events per year: $95/year
- One-time enrollment rewards (not included): $75–100
- Collective household enrollment rewards (not included): $1.1–1.5 billion

A.2.2.2 Emissions reduction

Table 5. Summary of GHG emissions abated from a $50 billion portfolio of customer energy solutions

Solution	Annual emissions reduction per participant or project (tonnes CO_2e)	Number of recipients supported (households, businesses, organizations)	Total annual emissions reduction (Mt CO_2e/year)
Home retrofits	1.5	1,200,000	1.8
Oil to heat pump conversions	2.8	548,000	1.5
EV incentives	4.3	2,100,000	9.0
Community solar rebates	440–1,241	3,852	1.7–4.8
Smart thermostats	0.13–0.16	10,808,050	1.4–1.8
TOTAL			**15.4–18.9 Mt CO_2e/year**

[97] Product of percentage of main thermostats that are programmable (61%), percentage of programmable thermostats that are programmed (78%) and percentage of programmed thermostats that lower temperature in winter when asleep (62%). Statistics Canada, "Use of Thermostats."

[98] Save on Energy, "Peak Perks." https://saveonenergy.ca/For-Your-Home/Peak-Perks

[99] BC Hydro, "Enroll Your Smart Home Devices in Peak Saver." https://www.bchydro.com/powersmart/residential/rebates-programs/peak-saver/enroll-smart-home-devices.html

Results have been rounded.

Home retrofits

- Annual emissions reduction per participant: 1.5 tonnes CO_2e [100]

Oil to heat pump conversions

- Annual emissions reduction per participant: 2.8 tonnes CO_2e[101]

EV incentives

- Annual emissions reduction per participant: 4.3 tonnes CO_2e[102]

Community solar rebates

- Project size: 2 MW
- Annual generation potential: 1,000 kWh/kW-peak[103]
- Annual generation per project: 2,000,000 kWh
- Approximate life-cycle emissions intensity of rooftop solar: 50 g CO_2e /kWh[104]
- Average emissions intensity of electricity generation (2026):[105]
  - in Canada (low value): 270 g CO_2e/kWh
  - in Nova Scotia, Saskatchewan, and Nunavut (high value): 670 g CO_2e/kWh
- Emissions reduced per project:
  - low value: 440 tonnes CO_2e
  - high value: 1241 tonnes CO_2e

[100] Natural Resources Canada, "Canada drives lower bills and cleaner energy."

[101] Natural Resources Canada, "The Oil to Heat Pump Affordability Program," backgrounder, modified February 28, 2025. https://www.canada.ca/en/natural-resources-canada/news/2025/02/the-oil-to-heat-pump-affordability-program.html

[102] U.S. EPA, "Greenhouse Gas Equivalencies," Gasoline-Powered Passenger Vehicles per Year.

[103] Natural Resources Canada, "Photovoltaic Potential and Solar Resource Maps of Canada," modified January 16, 2025. https://natural-resources.canada.ca/energy-sources/renewable-energy/photovoltaic-potential-solar-resource-maps-canada

[104] National Renewable Energy Laboratory, *Life Cycle Greenhouse Gas Emissions from Solar Photovoltaics* (2012), 2. https://docs.nlr.gov/docs/fy13osti/56487.pdf

[105] Environment and Climate Change Canada, "Table 5.3: Electricity Consumption Intensities (g CO_2e/kWh Electricity Consumed) for 2026," in Emission Factors and Reference Values, Version 4.0 (September 9, 2026). https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/output-based-pricing-system/federal-greenhouse-gas-offset-system/emission-factors-reference-values.html#toc7

Smart thermostats & demand response

- Total national residential emissions from space heating and cooling (2023): 29.5 Mt CO2e
  - Electric heating: 7.5 Mt CO2e[106]
  - Natural gas heating: 21.0 Mt CO2[107]
  - Cooling (all electric): 0.99 Mt CO2[108]
- Number of households in Canada (2023): 16,170,178[109]
- Average space heating and cooling emissions per household (2023): 1.82 t CO2e
- Assumed household energy savings (see Portfolio costs): 7-9%
- Emissions savings per household with smart thermostat: 0.13-0.16 t CO_2e
- Number of households in which a smart thermostat could result in energy savings (see Portfolio Impacts: Cost savings): 10,808,050

Social cost of carbon

- Social cost of carbon in 2027 (2021 dollars): $280/tonne[110]
- Social cost of carbon in 2040 (2021 dollars): $341 /tonne in 2040
- Average annual inflation: 3.55%[111]
- Value of the 2021 Canadian dollar in 2026: $1.19
- Estimated annual societal savings due to avoided emissions (15.4–18.9 Mt CO_2e / year) in 2027: $5.1–$6.3 billion.
- Estimated annual societal savings due to avoided emissions in 2040: $6.3–$7.7 billion.

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[106] Natural Resources Canada, "Residential Sector, Canada: Table 7: Space Heating Secondary Energy Use and GHG Emissions by Energy Source," Comprehensive Energy Use Database. https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP&sector=res&juris=ca&rn=7&year=2023&page=2

[107] Natural Resources Canada, "Residential Sector, Canada: Table 7."

[108] Natural Resources Canada, "Residential Sector - GHG Emissions," Energy Efficiency Trends Analysis Tables, National Energy Use Database. https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=AN&sector=aaa&juris=00&rn=2&page=0

[109] Statistics Canada, "Estimates of the Number of Private Households by Size on July 1st,"

[110] Environment and Climate Change Canada, "Social Cost of Greenhouse Gas Estimates," Table 1, Updated SC-GHG Estimates (C$2021, $/tonne of respective GHG).

[111] Bank of Canada, "Inflation Calculator." https://www.bankofcanada.ca/rates/related/inflation-calculator/

A.2.2.3 Emissions equivalencies

Table 6. Emissions equivalencies

Solution	Total annual emissions reduction (Mt CO_2e)	Gas-powered vehicles off the road	Tree seedlings grown for 10 years (million)	Natural gas fired power plants	Percent of Canada's transportation emissions
Home retrofits	1.8	419,580	29.7	2.2	-
Oil to heat pump conversions	1.5	357,669	25.3	1.9	-
EV incentives	9.0	2,100,000	148.6	11.1	5.8%
Community solar rebates	1.7–4.8	395,132–1,114,596	28.0–78.9	2.1–5.9	-
Smart thermostats	1.4–1.8	321,624–413,516	22.8–29.3	1.7–2.2	-

Results have been rounded.

- Annual emissions per gas-powered vehicle**:** 4.29 tonnes CO_2e/year[112]
- Number of tree seedlings grown for 10 years to sequester 1 Mt CO_2e: 16.5 million[113]
- Annual emissions from transportation in Canada (2023): 156.59 Mt CO_2e[114]
- Annual emissions from a natural gas fired power plant: 0.808 Mt CO_2[115]

A.2.2.4 10-year savings

The following tables provide an estimate of direct savings and annual societal savings due to emissions reductions in the 10 years following the completion and adoption of all upgrades and technologies. While a portfolio would be allocated across multiple years in practice, 2027 is used as Year 1 to provide a conservative estimate of 10-year post-portfolio savings since the social cost of carbon increases over time.

[112] U.S. EPA, "Greenhouse Gas Equivalencies," Gasoline-Powered Passenger Vehicles per Year.

[113] U.S. EPA, "Greenhouse Gas Equivalencies," Gasoline-Powered Passenger Vehicles per Year."

[114] Canada Energy Regulator, "Canada's Energy Future Data Visualization Tool: Emissions Modelled in Current Measures," 2023.

[115] City of Toronto, *2023 Sector-Based Emissions Inventory,* 8. https://www.toronto.ca/wp-content/uploads/2025/11/99d0-2023-SBEI-Reportfinal-FINAL-ua.pdf#page=14

Table 7. Low estimate of cumulative 10-year savings

Year	Social cost of carbon (C$ / tonne CO_2e)		Annual emissions reduction (Mt CO_2e)	Costs/savings (C$ billion 2026)				
	$2021	$2026		Annual direct savings	Annual societal savings[a]	Cumulative direct savings	Cumulative societal savings[a]	Total NET cumulative[b]
Year 1 (2027)	280	333	15.4	6.1	5.1	6.1	5.1	-38.7
Year 2	285	339	15.4	6.1	5.2	12.3	10.4	-27.4
Year 3	289	344	15.4	6.1	5.3	18.4	15.7	-15.9
Year 4	294	350	15.4	6.1	5.4	24.5	21.1	-4.4
Year 5	299	356	15.4	6.1	5.5	30.7	26.5	7.2
Year 6	303	361	15.4	6.1	5.6	36.8	32.1	18.9
Year 7	308	367	15.4	6.1	5.7	42.9	37.8	30.7
Year 8	313	372	15.4	6.1	5.7	49.1	43.5	42.6
Year 9	317	377	15.4	6.1	5.8	55.2	49.3	54.5
Year 10 (2036)	322	383	15.4	6.1	5.9	61.3	55.2	66.6

[a] Due to avoided emissions. This estimate does not include other societal savings such as health and productivity benefits.

[b] Total cumulative direct savings and avoided societal costs (due to emissions reduction) in excess of the $50 billion investment

Results have been rounded.

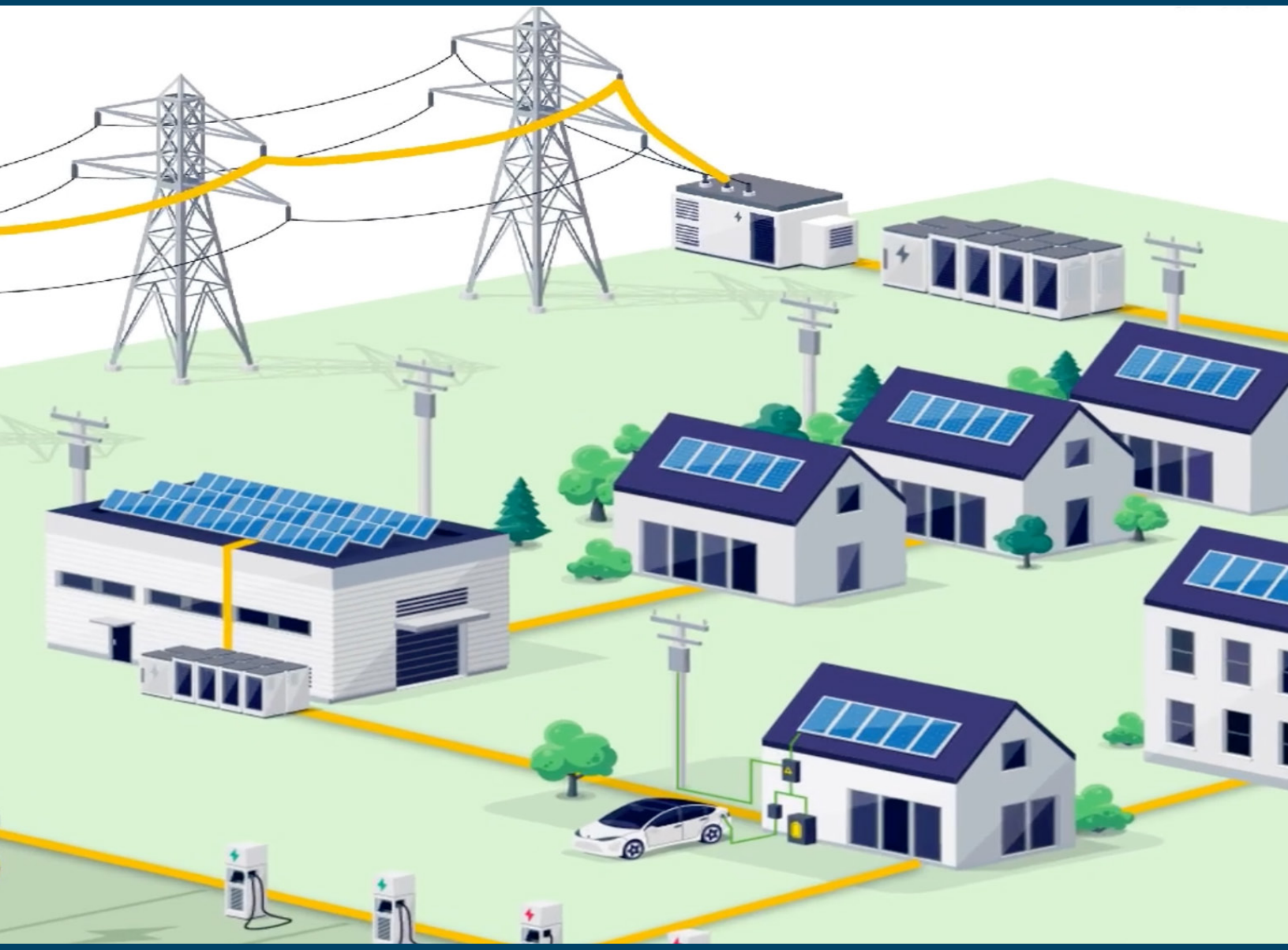
Table 8. High estimate of cumulative 10-year savings

Year	Social cost of carbon (C$ / tonne CO_2e)		Annual emissions reduction (Mt CO_2e)	Costs/savings (C$ billion 2026)				
	$2021	$2026		Annual direct savings	Annual avoided societal costs[a]	Cumulative direct savings	Cumulative avoided societal costs[a]	Total NET cumulative[b]
Year 1 (2027)	280	333	18.9	10.0	6.3	10.0	6.3	-33.8
Year 2	285	339	18.9	10.0	6.4	19.9	12.7	-17.4
Year 3	289	344	18.9	10.0	6.5	29.9	19.2	-0.9
Year 4	294	350	18.9	10.0	6.6	39.8	25.8	15.6
Year 5	299	356	18.9	10.0	6.7	49.8	32.5	32.3
Year 6	303	361	18.9	10.0	6.8	59.7	39.4	49.1
Year 7	308	367	18.9	10.0	6.9	69.7	46.3	65.9
Year 8	313	372	18.9	10.0	7.0	79.6	53.3	82.9
Year 9	317	377	18.9	10.0	7.1	89.6	60.5	100.0
Year 10 (2036)	322	383	18.9	10.0	7.2	99.5	67.7	117.2

[a] Due to avoided emissions. This estimate does not include other societal savings such as health and productivity benefits.

[b] Total cumulative direct savings and avoided societal costs (due to emissions reduction) in excess of the $50 billion investment

Results have been rounded.



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