

EXECUTIVE SUMMARY

Any viable path to net zero for the buildings sector must ensure that Canadians have reliable access to affordable heating and cooling. And that means that the shift toward net zero requires not just changes in how individual buildings are heated and cooled, but also changes to energy systems more broadly and to the regulatory frameworks that govern them.

The economy-wide goal of net zero by 2050 is increasingly the frame for policy conversations in Canada and around the world. In Canada, energy utilities are only beginning to map out what the clean energy transition means for their systems and customers. Similarly, regulators and the governments that oversee them are only starting to contend with what the energy transition requires from them.

So far, inertia is prevailing. And without significant shifts in policy to enable and accelerate the transition to net zero in the buildings sector and the energy systems that serve it, continued inertia will result in higher costs, missed climate targets, or both.

This report seeks to facilitate progress by bringing clarity to these complex topics and by advising policy makers—particularly in provincial governments—on ways to accelerate the shift toward net zero buildings while protecting affordability and reliability.

Our analysis draws on multiple sources of data and evidence. We commissioned original modelling to identify pathways to net zero that minimize overall costs to the economy, and to surface important differences between provinces. We surveyed the literature to identify consistent patterns in what a cost-optimal pathway to net zero means for the buildings sector and for energy systems across the country. And we engaged with stakeholders and experts to solicit feedback on our assumptions and results, and adjusted inputs and sensitivity analyses in response. In parallel, we analyzed regulatory proceedings and inquiries throughout North America concerning gas utilities and the energy transition, and extracted data from utility filings to quantify growth in the gas network.

Based on this analysis, several insights emerge. Overall, the model's cost optimization consistently shows that achieving net zero in Canada will require a significant increase in the use of electricity for building heat, and a declining use of gas, starting right away.

Continued inertia poses risks to achieving Canada's climate goals and ensuring affordability and reliability through the energy transition.

Despite some recent progress, Canada's buildings sector and its electricity and gas systems are not yet on that cost-optimal net zero path. We find that this is unlikely to change under current policy and regulatory approaches, and that continued inertia poses risks to achieving Canada's climate goals and ensuring affordability and reliability through the energy transition.

Finding 1

On a cost-optimal pathway to net zero, electricity will power most space heating in Canada

The details vary from province to province, but the pattern is consistent across all regions and in all sensitivity scenarios: as Canada's energy transition accelerates, electricity will power more and more space heating in Canada. Heat pumps with electric resistance backup are often the most cost-optimal long-term pathway—even considering the significant electricity system build-out that they require. This finding is broadly consistent with other major Canadian and global studies that have investigated the same topic.

Mitigating peak demand to keep electricity affordable and reliable will likely emerge as the central challenge facing electric utilities in this transition. Our modelling finds that in the buildings sector, retrofits of existing buildings, the rising energy efficiency of new buildings, and the switch from electric baseboards to much more efficient heat pumps can all contribute to reducing the scale of the necessary electricity system build-out. Hybrid systems, which maintain existing gas connections as a backup to electric heat pumps, play a role in some contexts to mitigate peaks in winter electricity demand. And other options like heat and energy storage, thermal energy networks, and demand-side management will also likely play an important role.

Finding 2

Even with low-carbon gases or hybrid heat, continued expansion of the gas network is inconsistent with cost-effectively reaching net zero

Given the rapid shift away from gas consumption in buildings along a cost-optimal pathway to net zero, provinces that continue to expand their gas distribution networks risk significantly raising the cost of meeting climate targets, putting targets in jeopardy, or both. Additional expansion of the gas system to new homes or neighbourhoods is risky for ratepayers because it can lock in higher-cost ways of delivering heat to homes and businesses, or result in stranded assets that gas consumers must still pay off.

Hybrid heat (the pairing of heat pumps with gas furnaces) does not justify continued expansion of gas networks. Hybrid heat can be a legitimate stepping stone to full electrification in some contexts, and a viable long-term pathway in others—especially when furnaces are burning low-carbon gases. But because hybrid systems would only switch to gas in the coldest days or months, overall demand for gas would still fall dramatically, so expansion poses the same risks for ratepayers.

Likewise, low-carbon gases like hydrogen and biomethane will not serve as replacement fuels on a scale that can justify continued gas network expansion. Our modelling and numerous other studies find that these gases are either too scarce or too costly to heat more than a small fraction of Canada's buildings, and are instead taken up by other sectors such as heavy industry. Even under lower-cost assumptions for these fuels, electrification of building heat still dominates.

Finding 3

A business-as-usual approach to utility regulation is not in the interest of ratepayers

In the energy transition, gas utilities' incentives do not necessarily align with what is most affordable for ratepayers over the long term. Because gas utilities realize returns primarily on the infrastructure they install, rather than the fuel they sell, and because they earn a predetermined rate of return on regulator-approved capital investments, these entities have a direct economic incentive to pursue continued growth of gas infrastructure and new customers—even if the long-term usage case is uncertain.

The longer that regulators and policy makers delay action to overturn the status quo, the greater the risk that Canadians will end up on the hook for an overbuilt and underused gas system, an overburdened electrical grid, or both.

The job of an energy regulator is in part to protect ratepayers in an environment of utility monopolies, and the energy transition presents new challenges to their ability to deliver on this mandate. Their mandates—which are typically to ensure utilities provide safe and reliable energy at just and reasonable rates—were established before climate change was a societal concern, so it can be unclear how regulators should factor in climate goals and the changes underway in the energy transition. And while some provinces have set net zero goals into law, no province has sufficiently aligned its climate and energy policies with those goals. Because regulators are not in a position to make assumptions about future policy, many regulators have been

understandably cautious in the face of this ambiguity. With some exceptions, regulators continue to approve gas network expansion.

Prudent, forward-looking utility regulation is more important than ever in the energy transition. The longer that regulators and the provincial policy makers who oversee them delay action to overturn the status quo, the greater the risk that Canadians will end up on the hook for an overbuilt and underused gas system, an overburdened electrical grid, or both.

Finding 4

Provincial and territorial policy is the missing piece for achieving climate goals while protecting reliability and affordability

If utility regulators are to continue delivering on their mandate of providing safe and reliable energy at just and reasonable rates, provincial governments must equip them to face the new challenges of the energy transition head-on. But no province has yet issued a long-term direction on what the clean energy transition means for the future of gas for building heat in their jurisdiction, nor mandated gas and electricity systems to transform to get on a cost-effective path to net zero.

This lag in provincial policy leadership carries significant consequences. Gas networks are continuing to expand, with buildings standing out as one of only *three sectors* of the Canadian economy where emissions continue to rise

under current climate policies. And regulators are not adequately equipped to effectively oversee the energy transition. These two policy problems interact to keep energy systems on the wrong track.

Absent policy leadership, provinces risk ending up with underdeveloped or unbalanced energy systems that are not ready for what's coming, straining affordability and reliability.

Specific policy changes can put Canada on a net zero pathway that protects affordability and reliability. While a widespread shift in how Canadians heat their buildings will take place over decades, policymakers and regulators are making decisions today that will lay the groundwork out to 2050 and beyond. This report makes the following recommendations to help regulators and governments make decisions in the clean energy transition in a way that protects long-term energy affordability and system reliability for Canadians.

Recommendation 1

Provincial governments should equip regulators, system operators, and utilities to make decisions consistent with net zero

Provincial governments should clarify their policy objectives and ensure that energy system planning is aligned with the clean energy transition. They should:

- Legislate a target for net zero by 2050 as well as interim milestones, update mandates to include achievement of these climate targets, and equip regulators with the necessary financial and human resources.
- Commission and regularly update independent pathway assessments that unpack a jurisdiction's options for reaching net zero economy-wide, and the pros and cons of each option. These high-level assessments should complement, and ideally integrate, more granular pathway assessments undertaken by utilities and/or system operators.
- Produce energy roadmaps that present the government's vision for how the jurisdiction's technology and energy mix, and the infrastructure it will require, should evolve in line with net zero. In particular, roadmaps should specify the roles of the gas network and electricity grid through the transition and identify responsibilities for overall energy system coordination.

Recommendation 2

Provincial governments should stop treating gas system expansion as the default option, and equip regulators to consider alternatives

Across Canada, government policy should no longer treat the connection of new buildings to gas networks as a matter of course. In most contexts, and particularly for new developments, electrification should be the default, unless there is a specific local alternative such as a thermal energy network. The following policy actions could help reset this default:

- Provinces could immediately direct regulators to consider the risks of stranded gas assets when reviewing gas utility submissions, and weigh those risks against alternatives to replacing and extending gas pipelines.
- Provinces could also direct regulators to reform obligation-to-serve requirements for gas utilities, so they do not necessitate continued gas network expansion.
- Provinces could also mandate that new buildings be fully electric, except where a suitable net-zero alternative exists (such as a thermal energy network).

Recommendation 3

Provincial governments should require gas utilities to provide maps of their networks to facilitate a managed transition that protects ratepayers

Provincial governments, regulators, and gas utilities should start laying the groundwork for the gradual, managed contraction of gas networks. Mapping existing gas infrastructure is a foundational part of this proactive work. Canadian provinces can learn from other jurisdictions, including California, the Netherlands, and Germany, that have already pursued alternatives to new pipelines and begun selective, proactive gas network pruning based on detailed understanding of their gas grids.

Recommendation 4

All orders of government should strengthen policies to support building electrification, peak management, and energy efficiency

Consumer-focused climate policy should be strengthened alongside reforms to utility regulation. The suite of consumer-focused policies that should be strengthened includes: regulatory certainty (building codes, appliance standards); direct financial support for energy retrofits, smart electrification, and peak management (grants, financing); implementation support (labour market development, training); and a broad-based, consistent, and rising price on greenhouse gas emissions.

Recommendation 5

All orders of government should centre equity in policy design and provide targeted support to the most affected

As governments and regulators act to limit the extent of the infrastructure liabilities facing ratepayers, provincial policy must still determine who bears the unrecovered costs of stranded or underused energy infrastructure, and how. Governments should also help address the barriers that can prevent renters and low-income households from electrifying and accessing energy retrofits. Governments and regulators presiding over energy system changes should expect that there will be equity impacts, and proactively design solutions to address them.