

# The Role of Renewable Natural Gas in the Zero Carbon Step Code

A primer for B.C. local governments to decarbonize the building sector

by Jessica McIlroy | June 2023

## Summary

The Zero Carbon Step Code is a game changing tool and when combined with the Energy Step Code, has the potential to allow local governments to drive down carbon emissions alongside energy use. While the highest tier of the Zero Carbon Step Code prevents the use of fossil gas for space and hot water heating, and appliances, it still allows for connection to the gas system for the supply of renewable natural gas (RNG). With the continued use of renewable natural gas and allowance for fossil gas connections for water heating and cooking, we see risks that local governments should be aware of in continuing to build out natural gas infrastructure and allowing it to be installed for heating in new buildings.

This paper is a resource for B.C. local governments to better understand the role of and relationship between building codes/performance and RNG and other low-carbon fuels in decarbonizing the building sector. We caution that building code decisions that lock in the use of RNG for heating and cooling buildings can saddle building owners and operators with costly infrastructure expenditures for many years to come and result in missed medium- and long-term climate emissions reduction and resiliency targets.

## Introduction

Local governments play a significant role in addressing climate change, housing and affordability across Canada. The CleanBC Roadmap to 2030 recognizes that along with directly controlling emissions from their own facilities, operations and vehicle fleets, local governments have the capacity to influence about 50% of their community-level greenhouse gas (GHG) emissions. They also play an important role in the implementation of the B.C. Building Code, dictating whether we can reduce emissions related to heating and cooling our buildings.

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In February 2023, the B.C. government announced updates to the B.C. Building Code that allow local governments to opt in to the new Zero Carbon Step Code, empowering them with the authority to regulate carbon performance within their city limits.

We encourage B.C. municipalities to consider opting into the Zero Carbon Step Code and determining a carbon performance tier that is appropriate. To support decision-making, cities need support in understanding the role for RNG and other low-carbon fuels in decarbonizing their local economies. Multiple objectives can be achieved by requiring new buildings to meet high energy and carbon performance standards through high quality construction and electric heating. British Columbians can reduce energy demand and cost while living in better homes that help conserve limited renewable and low-carbon fuels for hard-to-decarbonize sectors.

As the B.C. government continues to strengthen its policies and plans around GHG emissions reductions and to build opportunities for clean electricity, the role of natural gas and renewable fuels remains uncertain. In our paper, *Regulating Gas in B.C. to Achieve 2030 and 2050 Climate Goals*,<sup>1</sup> we recommend governments and utilities prioritize the electrification of buildings — transitioning them off gas-powered furnaces, boilers and stoves and onto at least 100% efficient forms of heating — and reserve gas infrastructure for hard-to-electrify applications and for occasional times when electricity supply is challenged to meet demand. Priority should be given to the installation of electric heat pumps, which have much higher efficiencies, can provide cooling as well as heating, and will reduce the financial and energy supply risk for residents.

FortisBC, the province’s largest natural gas utility, currently has an application before the B.C. Utilities Commission looking for approval to revise its RNG program and change both the supplied gas rates and how the RNG percentage of the gas supplied is considered. If approved, Fortis would create a new RNG connection service would be able to consider all new natural gas customers to be connected to 100% RNG at the same rate as conventional gas connections and remove the RNG cost premium from their rates.

Based on our review of the potential and limitations of allocating renewable and low-carbon fuels to space heating, we conclude:

- The cost of installing and operating electric heating equipment is lower than RNG and mitigates against future cost increases associated with fuels.
- It is highly unlikely that enough RNG could be produced in B.C. to meet current and future heating energy requirements; RNG should be allocated to harder-to-electrify sectors.

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<sup>1</sup> Colton Kasteel and Tom-Pierre Frappé-Sénéclauze, *Regulating Gas in B.C. to Achieve 2030 and 2050 Climate Goals: Recommendations on the GHG Reduction Standard, DSM Regulation, and FortisBC’s revised renewable gas program*, (Pembina Institute, 2022). <https://www.pembina.org/reports/regulating-gas-in-bc.pdf>

- There is a high risk in attempting to reduce local GHG emissions through the purchase of RNG environment credits from other jurisdictions and it will be hard to ensure the mix of RNG to fossil gas is maintained.

The demands on building performance continue to evolve as B.C. experiences more heat waves, associated heat deaths, wildfires and air quality concerns. Governments at all levels are committing to providing increased housing supply and are recognizing the need to ensure all community members have access to climate-safe and resilient homes. If we don't ensure we are using the tools available to support electrification, we will continue to fail to reach our climate targets while risking increasing energy bills for residents.

## B.C.'s Zero Carbon Step Code

As of May 1, 2023, the B.C. Building Code requires local governments to enforce an efficiency measure called the Energy Step Code at a level of Step 3 for Part 9 (smaller homes and residential) buildings and Step 2 for Part 3 (larger and more complex) buildings, reaching 20% better energy efficiency, which is on track with the B.C. government's climate commitments. A new building regulatory tool was also introduced, the Zero Carbon Step Code, to begin regulating carbon pollution in new construction.

The Zero Carbon Step Code allows authorities who have jurisdiction over the B.C. Building Code — including local governments — to require or incentivize builders to meet one of three carbon performance tiers.<sup>2</sup> The different carbon performance tiers allow for feasible adoption across the province. Used in combination, these two regulations promise to reduce both energy demand and carbon pollution for new construction, by requiring both high levels of efficiency and emissions limits. However, while the highest tier of the Zero Carbon Step Code prevents the use of fossil gas for space and hot water heating, and appliances, it still allows for the connection to the gas system for the supply of RNG.

## Renewable and low-carbon fuels in buildings

What are renewable and low-carbon fuels?

Several types of renewable and low-carbon fuels will likely be used in the B.C. economy as the province transitions to net-zero. While there are several methods of generating these fuels, the available supply will likely not reach the equivalent levels of the current demand for fossil fuels. Renewable and low-carbon fuels are lower in supply and higher in financial risk, and should therefore be allocated only to applications where there are no other alternative sources of energy. Each renewable and low-carbon fuel has a unique emissions profile, often varying

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<sup>2</sup> BC Energy Step Code. <https://energystepcode.ca/>

depending on how it is produced, and often emits GHGs that prevent it from being defined as net-zero.

Natural gas is the primary fuel used for home heating and therefore renewable natural gas is the primary focus of this paper. While hydrogen has also been proposed as an alternative or supplement for RNG, there are limits to how much hydrogen can be mixed into the supply before delivery pipelines and the equipment inside buildings would require modification or replacement. Hydrogen would not reduce costs for customers and is therefore not included in the cost analysis below.

How does the cost of heating with RNG compare with electricity?

The scenarios modelled by FortisBC and BC Hydro to address climate targets all show that the total demand for natural gas in buildings will decrease. As customers shift to electricity due to available financial rebates and the interest in lowering emissions, fewer gas customers will remain to cover costs, causing rates to increase for those who continue to heat with gas. Combined with the higher cost of RNG due to lack of availability, RNG-based heating will cost British Columbians more than heating with electric heat pumps, which are more efficient and use less energy than traditional furnaces and boilers.

To better understand the potential impacts of FortisBC's request for special consideration of RNG, the B.C. Sustainable Energy Association commissioned a study comparing the combined capital and operating costs of using RNG versus electricity for providing space heating, hot water, cooking and clothes drying for an average new residential dwelling in B.C. They concluded that FortisBC's proposed RNG connection service would be a more costly zero-carbon solution than electricity for heating new residential homes, assuming both RNG and electricity provide zero-carbon heating solutions, which is not always the case.<sup>3</sup>

The capital and operational cost comparisons detailed in the study show that the total cost of heating an average new residential home with electricity over the lifetime of the equipment is 24% lower because of the high cost of RNG. While the initial capital costs of electric heat pumps can be higher, by not connecting the home to the gas grid all-electric homeowners avoid monthly fixed connection and delivery charges all together. Local governments can also relieve upfront capital cost burdens through targeted incentive programs, especially for low-income households, which would in turn benefit from low-cost heating.

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<sup>3</sup> Jim Grevatt and Liz Bourguet, *Cost Comparison of RNG Scenario and Electricity Scenario regarding FortisBC Energy Inc. Renewable Gas Connections Proposal* (B.C. Sustainable Energy Association, 2022). [https://docs.bcuc.com/Documents/Proceedings/2022/DOC\\_69041\\_C1-11-BCSEA-Intervener-Evidence.pdf](https://docs.bcuc.com/Documents/Proceedings/2022/DOC_69041_C1-11-BCSEA-Intervener-Evidence.pdf)

Could B.C.'s RNG production capacity meet projected energy demand as well as climate targets?

The overall potential of RNG supply in B.C. remains highly uncertain, even though several studies attempted to estimate the supply potential of various renewable and lower-carbon gases. They project a significant range in supply forecasts depending on which types of hydrogen are brought to market and at what levels, and whether wood waste or virgin wood products are available for fuel.

For example, a 2022 B.C. Renewable and Low-Carbon Gas Supply Potential Study prepared for the multiple stakeholders, including the B.C. Bioenergy Network, FortisBC and the Province of B.C., quantified the supply potential of renewable and low-carbon gases that could be used to lower overall GHG emissions from B.C. gas use.<sup>4</sup> The amount of RNG that could be produced in B.C. varies greatly and depends on where wood fuels is being sourced and if it is redirected away from the pellet industry, if biomass is redirected away from electricity generation, and if net-zero carbon hydrogen becomes commercially viable.

Natural Resources Canada funded a study in 2020 to better understand Canada's RNG production and supply potential.<sup>5</sup> It concluded that RNG production potential is limited by access to raw materials because of competition, logistical constraints and economic viability. With these constraints, the study determined that Canada has the potential to meet only 3.3% of our current natural gas consumption requirements with RNG. It also indicated that B.C. would be one of the largest importers of RNG.

Most of FortisBC's current supply of RNG is produced from the province's landfills, agricultural and food waste, and wastewater. However, future RNG supply available for buildings will depend on demand from other sectors, such as transportation and industrial processes. The competing demand from the broader North American gas market would also be a major factor. Domestic RNG supply projections show there will not be enough supply to meet the economy-wide demand for thermal energy that is currently supplied by fossil gas.<sup>6</sup>

In short, by 2030 and 2050 the amount of renewable and low-carbon gases that will be available to meet provincial climate targets would be very limited, and plans that rely on these sources of heating have a high level of risk when it comes to both supply and affordability.

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<sup>4</sup> Martin Tampier et al, *B.C. Renewable and Low-Carbon Gas Supply Potential Study – Final Report*. (2022). <https://www.cdn.fortisbc.com/libraries/docs/default-source/news-events/bc-renewable-and-low-carbon-gas-supply-potential-study-2022-03-11.pdf>

<sup>5</sup> Jamie Stephen et al, *Renewable Natural Gas (Biomethane) Feedstock Potential in Canada* (TorchLight Bioresources, 2020). [https://www.enbridge.com/~media/Enb/Documents/Media%20Center/RNG-Canadian-Feedstock-Potential-2020%20\(1\).pdf](https://www.enbridge.com/~media/Enb/Documents/Media%20Center/RNG-Canadian-Feedstock-Potential-2020%20(1).pdf)

<sup>6</sup> *Regulating Gas in B.C. to Achieve 2030 and 2050 Climate Goals*.

## Can we be sure RNG used in space and water heating is truly low-carbon?

To keep up with the supply of RNG that is currently proposed in FortisBC's long-term resource plans, a portion of the supply would need to be purchased from out-of-province sources. In this situation, the gas itself is not imported; rather, FortisBC would purchase the 'environmental attributes' associated with RNG, a form of carbon credit, allowing FortisBC to claim a lower emissions profile. The RNG itself is produced in a different province or state where the manufacturer has the option to sell an emissions credit through a carbon market. In this situation, a customer purchasing RNG for their home may be receiving fossil gas but a carbon credit has been applied to it.

Purchasing environmental attributes can help an economy transition to low-carbon while regulations are introduced to phase out fossil fuel consumption; however this is not a long-term solution as continued availability of purchase agreements is not guaranteed. Furthermore, to meet GHG emissions reduction commitments, the jurisdictions from which the environmental attributes are sourced will most likely need to retain those credits or face their own higher levels of supply competition and higher prices. At that stage, homes and buildings locked into gas-based equipment would face the costs of fuel-switching, or would have to compete with hard-to-decarbonize sectors also vying for the same RNG.

## Where else is RNG needed to meet our climate targets?

Given the anticipated demand for renewable and low-carbon fuels by other sectors of the economy, B.C. and its local governments would be best served by using the limited RNG resources in applications that cannot easily be electrified.<sup>7</sup>

In the industrial sector, electricity cannot easily meet the demand for the high-grade heat provided through combustion in processes such as cement production, aluminum smelting and fossil fuel extraction.

While battery electric technologies are expected to meet the needs of light- and most medium- and heavy-duty vehicles in Canada, hydrogen-powered fuel cells will likely be needed for the heaviest vehicles, such as long-haul trucks.

In the building sector, renewable and low-carbon gases may need to be reserved as backup to provide heating only during peak demand, for example by storing the thermal heat and making it available when needed. Another option is hybrid heating equipment that uses both RNG and electricity. This can be by utilities using RNG in combined heat and power plants near high-demand areas, or customers using dual-fuel heat pumps or combining electric heat pumps with

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<sup>7</sup> *Regulating Gas in B.C. to Achieve 2030 and 2050 Climate Goals.*

legacy furnaces and boilers for use during the coldest days of the year. More research would be needed to see which approach is optimal from a cost and carbon perspective.

## Conclusion

The Energy Step Code and new Zero Carbon Step Code provide local governments with the tools to ensure that buildings in B.C. are both zero-emissions and climate resilient. The development of new homes with gas infrastructure, however, even for the intended use of renewable natural gas and other low-carbon fuels, locks in infrastructure that could quickly become a retrofit cost if renewable natural gas supplies cannot keep up with demand and/or become very costly to purchase.

Local governments have started to develop the terms for adoption of the Zero Carbon Step Code. We recommend that local governments undertake financial and energy supply risk analyses to fully understand the long-term impacts of gas system connections and the use of RNG when making decisions to adopt the Zero Carbon Step Code and at what tier. While the different tiers will require different levels of electrification, municipalities such as Saanich are stating that RNG will not be recognized for compliance with the zero-carbon tier.<sup>8</sup> The B.C. government should continue to work closely with local governments in the roll out of the Zero Carbon Step Code, encouraging and providing support for electrification.

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<sup>8</sup> District of Saanich, *Information for Applicants – Land Use Applications and Building Permits*, (2023). <https://www.saanich.ca/assets/Community/Documents/Planning/sustainability/Step-Code-FAQ.pdf>