



Foresight

Smart Policy Series

INCENTIVIZING LOW CARBON PATHWAYS FOR SMART BUILDINGS





INCENTIVIZING LOW CARBON PATHWAYS FOR SMART BUILDINGS

Homes and buildings consume a considerable amount of energy. In Canada, energy used to heat, and cool buildings accounted for 12% of national GHG emissions or 17%, **if emissions from generating the electricity used in buildings are also included (2014).**¹ This is a challenge many stakeholders are interested in solving. So far, energy efficient technologies, solutions and interventions, smart building operations and maintenance and occupant behaviour constitute the dominant approaches towards **energy consumption and GHGs reduction.**² Smart devices are continuously being installed and deployed and various research projects have undertaken the task of analyzing the vast amounts of respective data collected.

Already there is significant investment and acquisitions in these solutions. In 2017, GTM Research found that \$650 million in venture capital had been invested since 2010, going to **48 different companies.**³ Acquisitions are happening, with Generac recently acquiring Vancouver smart building company **Neurio Technology in 2019**⁴ and in 2018 **Acuity acquired Lucid**⁵ and **Ingersoll Rand purchased Agilis Energy.**⁶ Additionally, in 2017, Italian utility Enel purchased EnerNOC, a deal that included acquisition of a **robust energy management software solution.**⁷

Understanding energy consumption in office buildings is complex due to the fact that energy use varies greatly from one building category to another within this sector. Lighting, ventilation, heating, cooling, refrigeration, IT equipment and appliances represent energy demand. However, the amount of energy consumed by infrastructure and equipment is only a part of the equation when it comes to

energy savings. There are also interventions that can be made at the design stage of buildings, prior to construction as well as the behavioural aspects of the occupants in buildings to incentivize better energy savings.

So, what are the existing legislation, frameworks, policy and standards supporting a market for innovative energy and technology inventions and solutions for buildings?



SNAPSHOT OF EXISTING TARGETS, FRAMEWORKS, POLICY & INCENTIVES

Governments around the world are adopting and implementing policies targeted to a more efficient use of energy in buildings, as a way to achieve their overall climate change targets and reduction in emissions. Take the European Union for example. Buildings across the region are responsible for approximately 40% of energy consumption and **36% of CO2 emissions.**⁸ To support emission reduction, the Energy Efficiency Directive has set an ambitious objective to achieve a 20% cut in Europe's annual primary energy consumption by 2020, while the European Council agreed on the newest Climate and Energy framework that has increased the respective targets to 40% by 2030. National countries set their own indicative national energy efficiency targets into their plans and follow guidance and **best practice from the EU.**⁹ Depending on country preferences, these targets can be based on primary or final energy consumption, primary or final energy savings, or energy intensity.

Canada has ambitious plans, and in particular, the Province of British Columbia is seen as a global leader in greening the built environment. The Pan Canadian Framework on Climate Change frames how the economy approaches innovation in the built environment to meet climate change targets. This includes, among others (1) making new buildings more energy efficient; (2) retrofitting existing buildings.

Making buildings energy efficient

Federal, provincial and territorial governments are working towards developing and adopting increasingly stringent building codes, with a goal of making buildings 'net-zero energy ready'. The current National Energy Code of Canada is the NCEB 2015. This standard is for building energy performance and has been influencing the way buildings are designed since its inception in 1997. Efficiency programs such as NRCan endorsed Energy Star recognizes the most efficient Canadian facilities with Energy Star for Industry certification. Using the energy performance indicators (EPIs) it's possible to benchmark performance against similar industrial facilities in Canada and US. Other energy management systems that support performance, analysis and improving efficiency are ISO 50001 and the Superior Energy Performance program. The wider benefit of these programs is that there is a source data now available on key EPIs for benchmarking. This data will provide evidence of energy and GHG reduction, further making the case for future investment.

In British Columbia, buildings represent 29% energy consumption and 12% GHG emissions. A strategy combining legislation, codes and frameworks are paving the way for decarbonization. Outlined in the Clean BC plan is a goal to for all new buildings to be 'net zero ready' by 2032. This is set to be achieved through the BC Energy Step Code, a voluntary provincial standard enacted in April 2017

that provides an incremental and consistent approach to achieving more energy-efficient buildings that go beyond the requirements of the base BC and National Building Code. On a city level, Vancouver has a goal to be 100 percent powered by renewable energy by 2050, with all new buildings producing zero emissions before 2030. This will be facilitated by the City through the Zero Emission Building Plan and Vancouver's Building Bylaw providing guidance for energy requirements for new buildings, energy requirements for alterations to existing buildings, and energy efficiency updates for [a range of buildings sizes](#).¹⁰ These city level initiatives are closely coordinated with the province wide Energy Step Code to maintain consistency.

Other standards such as LEED (Leadership in Energy and Environmental Design) are used across Canada. Available for all building, community and home project types, LEED provides a framework to create healthy, highly efficient and cost-saving green buildings. It's a globally recognized symbol of sustainability achievement. Since 2004, the Canadian Green Building Council has certified over 4,000 LEED buildings in Canada and registered over 8,000 – with the second highest number of [LEED projects anywhere in the world](#).¹¹



Retrofitting existing buildings

B.C. government is supporting both private owners and social housing through a couple of different efficiency schemes and mechanisms. The Efficiency B.C. scheme launched in 2018 with matching funds from Federal government provides incentives to homeowners, commercial and multi-unit residential buildings to do upgrades, studies and receive rebates for new technology installations. For public housing, a \$1.1 billion, 10-year Capital Renewal Fund was launched support the improvement and preservation of existing, aging public housing stock. Of this, \$400 million is targeted to energy performance improvements that again, will lead to GHG reductions.

DEMAND FOR NEW PRODUCT & SERVICES

These investment trends coupled with progressive policies and standards send a signal to the market that future demand for products and services for the construction and building industry is set to soar. According to a recent report by the Vancouver Economic Commission: *‘Vancouver & British Columbia’s zero emissions & net-zero energy building policies are stimulating a \$3.3B market for high-performance building products & technologies in Metro Vancouver.’* ¹²

Through our work at Foresight, we see a number of emerging startups and companies with new business models that combine smart metering, repairing, upcycling, automation, gamification, and energy source substitution is important like Ecobee, Ecotagious and Open. These innovations are attractive to customers for many reasons, immediate generation of savings being among the most important ones.

WHAT’S NEXT FOR SMART BUILDINGS?

Recently, the Canadian Green Building Council launched the Disclosure Challenge as a way to demonstrate the value of data transparency and remove barriers within the wider real estate community, which will enable more municipal and provincial jurisdictions to move forward with requirements for the public reporting of building performance data.

In our view, publicly available data will prove valuable to 1) create rich data-sets on current and projected GHG emission reductions and energy efficiency 2) can provide actionable insights on where exactly in a building can GHG emissions be managed better and 3) in aggregate the data provides a snapshot of progress in the real estate building sector, particularly if combined with the [Energy Star](#) dataset as they do in the USA. ¹⁴

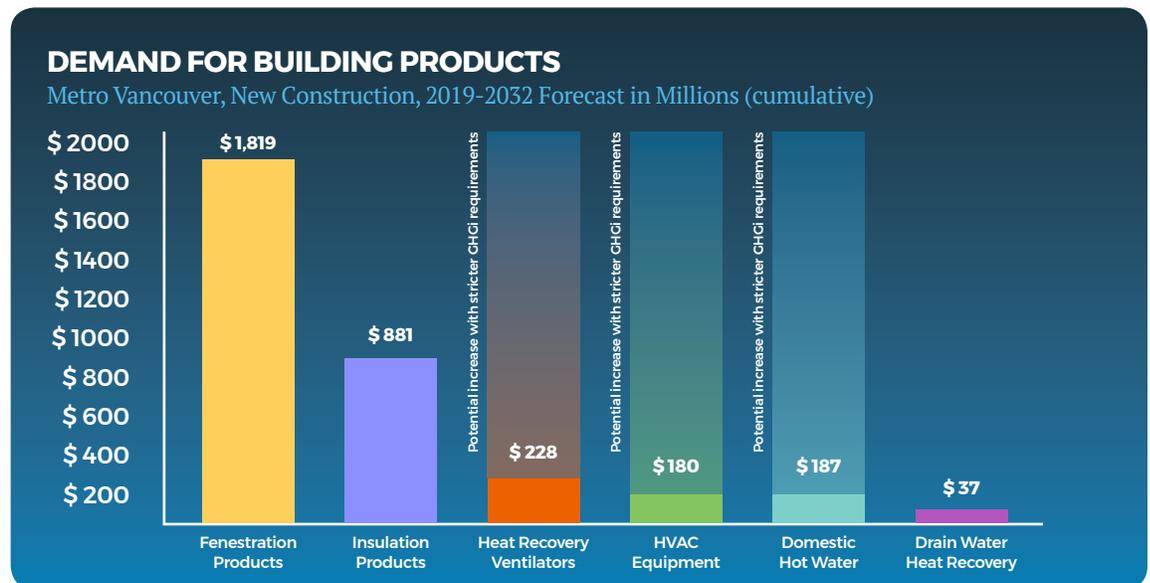


Figure 1. A breakdown of market opportunity for building products. ¹³

Endnotes

- ¹ nrcan.gc.ca/energy/facts/energy-ghgs/20063
- ² Occupant Behaviour: Impact on Energy Use of Private Offices
- ³ greentechmedia.com/squared/the-lead/building-energy-management-in-2018-quantifying-a-fragmented-industry
- ⁴ globenewswire.com/news-release/2019/03/13/1752344/0/en/Generac-Announces-Acquisition-of-Neurio-Technology-Inc.html
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- ¹⁴ greentechmedia.com/squared/the-lead/building-energy-management-in-2018-quantifying-a-fragmented-industry