

Clean Technologies Essential to the Construction of High-Performance, Net Zero Emission Buildings in Canada

By Passive House Canada

The federal government has committed to achieving net zero emissions by 2050. Buildings currently account for 13% of Canada's total GHG emissions and are the third largest source of emissions nationally. To address emissions in buildings, new buildings and retrofits must be constructed to high-performance standards, like the Passive House Standard, that target steep energy reductions. These buildings require specific clean technologies, called high-performance building components, that, when constructed, allow builders to reduce operating emissions by as much as 90% in new buildings and by at least 70% in retrofits. High-performance buildings are being constructed across Canada and deliver science-based outcomes rooted in verifiable metrics of success for energy efficiency, cost, and resilience.

However, access to affordable, Canadian produced, high-performance building components is currently limited. Builders are forced to look internationally to source materials resulting in increased project costs. There are many high-performance components that are only produced in the US, Europe, or Japan at this time, such as smart membranes for air tightness and vacuum insulated panels. This market gap is hindering the scaling-up of net zero, climate resilient buildings and threatens Canada's ability to meet its stated climate goals for the building sector. The federal government should incentivize and support Canadian Manufacturers to produce these technologies. It should also create opportunities for partnerships with international companies willing to manufacture locally. Doing so will increase market competitiveness, innovation, accessibility, and affordability of high-performance building components for the broader building sector.

The government should also support the scaling-up of the prefabrication construction sector. Currently comprised of small to medium sized businesses, the prefab industry already exists and is starting to thrive in Canada. The production and use of wood and metal prefab systems are accelerating the construction of high-performance, net zero buildings and are resulting in reduced labour costs, increased resource efficiency, and lower carbon impact of waste through disassembly. It is also helping to address the current labour shortage. Supporting this industry to grow in Canada will boost economic competitiveness and, through the export of such products, help reduce global emissions as well.

The federal government has stated its intention to target and drive down emissions in the building sector through plans such as the 2030 Emissions Reduction Plan and the Canada Green Buildings Strategy. Market access to affordable and Canadian produced, high-performance building components is currently slowing advancement and must be addressed to achieve our long-term goals.

The following components are integral to the construction and retrofit of net-zero emissions buildings. They include:

- Air source heat pumps with low GWP refrigerants for space heating and DHW applications
- HRVs and ERVs above 80% heat recovery efficiency and 70% humidity recovery efficiency

- High performance windows requiring 0.8 W/(m²K) for cool-temperate climate zones, 0.6 W/(m²K) for cold climate zones, and 0.4 W/(m²K) for arctic climate zones.
- High performance doors that have a U-value below 0.8 W/(m²K) for cool-temperate, 0.6 W/(m²K) for cold climate, and 0.4 W/(m²K) for arctic climate.
- Low embodied carbon insulation
- Smart membranes for air tightness
- Air tightness testing equipment such as blower doors
- Testing and monitoring equipment such as building automation systems and energy monitoring sensors to monitor energy use
- High efficiency appliances
- Prefabricated components
- Panelized construction systems for the following climate zones: cool-temperate, 0.15 W/(m²K), cold, 0.12 W/(m²K) and arctic, 0.09 W/(m²K).
- Vacuum insulating glass
- Vacuum insulated panels

Passive House Canada is available to provide additional information and technical expertise on this subject. We can also bring our members to the table for further discussion. Our members include designers, architects, tradespeople, manufacturers, and government officials.

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About Passive House Canada

Passive House Canada is a national non-profit professional association that advocates for and educates on the Passive House high-performance building standard that sharply reduces greenhouse gas emissions and provides resilient structures that can withstand extreme weather related to climate change.

Passive House is recognized by the United Nations as the optimal way to build healthy, climate-resilient, affordable, and energy-efficient residential, institutional, and commercial buildings through all stages of design, construction, and livability.

Our mission is to make the International Passive House standard of building performance understood, achievable, and adopted by government, industry, professionals, and the public across Canada through education, advocacy, events, and building projects