

Building a Safer and more Resilient Future: Engineers' Role in Strengthening Canada's Building Code

The engineering profession's position

- The engineering profession recognizes the critical role of building codes, especially Canada's National Building Code, in fostering the safety, functionality, and resilience of buildings. Engineers contribute their technical expertise to develop and implement codes that help buildings withstand climate challenges and endure the impacts of time, sustained use, and environmental pressures.
- Engineers Canada emphasizes the importance of keeping building codes up to date with the latest advancements to enhance buildings for structural soundness and to protect public well-being. Through close collaboration with policymakers, government officials, and interest holders, engineers work to revise codes to meet the increasing demands for safety, health, energy efficiency (low emissions), and resilience.
- The engineering profession believes that building codes should incorporate climate resilience measures, such as flood-proofing, protection against indoor extremes heat and cold, wind-resistant design, tornado-specific protections, and fire-resistant materials. Prioritizing indoor air quality and occupant well-being not only enhances health but also encourages the adoption of sustainable, secure, and resilient building practices.

The challenge(s)

The Canadian Board for Harmonized Construction Codes (CBHCC), with the support of The National Research Council of Canada, is responsible for the development of Canada's National Model Codes. These codes cover a wide range of objectives, including health, safety, accessibility, fire and structural protection of buildings, and environmental conservation. The National Building Code of Canada (NBC) is one such National Model Code developed and administered by the CBHCC. It is recognized by various federal domains and serves as a foundational document for building regulations across the country.

While the NBC is a federal document, it is also adopted either entirely or partially by Canadian provinces, territories, and municipalities for their local building codes. As a result, most buildings in Canada are governed by provincial and territorial jurisdictions that adhere to the guidelines established by this National Model Code.

The NBC outlines technical requirements for the design, construction, alteration, and demolition of buildings across the country. It plays a key role in upholding the safety, functionality, and resilience of Canadian structures. Focused on safety, health, accessibility, and energy efficiency, the NBC sets the standard for our built environments. However, it is currently facing challenges that hinder its effectiveness and its ability to adapt to Canadians' changing needs. These challenges in the current state of the NBC need to be addressed to improve its efficacy.

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One evident challenge arises from the need to address the impacts of climate change more effectively in the NBC. The increasing severity and frequency of extreme weather events highlight the necessity for improved construction standards that will enable buildings to better withstand demanding climatic conditions. Professionals in the field emphasize the need for robust construction norms that can withstand these challenges..

Equally pressing is the slow pace of code updates. Currently, revisions to the NBC occur every five years,¹ a cadence that might inadequately tackle evolving climate challenges and the necessity for a more adaptive code development process. While efforts are underway to harmonize code adoption across Canada through the federal, provincial, territorial [Regulatory Reconciliation and Cooperation Table](#), there remains a compelling need for accelerated action to bridge this gap.² This becomes evident when considering instances where codes have not kept pace with technological advancements or where the current revision cycle has been outpaced by the rapid evolution of climate-related risks.

How Engineers Canada has contributed

Together with the 12 provincial and territorial engineering regulators, Engineers Canada actively contributes to enhancing the safety and resiliency of communities across Canada and mitigating the impact of climate change on infrastructure. This collaboration involves:

- Issuing [National Position Statements](#) that effectively communicate timely engineering perspectives on critical issues related to public interest, such as infrastructure, Indigenous reserves and remote Indigenous communities, and climate change mitigation and adaptation. These statements highlight the profession's stance on these matters, promoting the representation of the engineering perspective.
- Providing evidence-based recommendations to support [federal initiatives](#). Engineers Canada leverages its technical expertise and knowledge to inform and guide the development of sustainable infrastructure policies, promoting decisions that are grounded in sound engineering principles and practices.
- Developing [national guidelines](#) and papers that support the needs of regulators, engineers, and licensure applicants concerning the environment and sustainability. These resources serve as valuable references and provide guidance on implementing sustainable engineering practices in infrastructure projects across the country.

Provincial and territorial engineering regulators may play a crucial role in supporting the CBHCC's sustainable building development efforts in Canada. Engineering regulators maintain high standards of competency and ethics within the engineering profession and may develop guidance documents to assist engineers meet their professional obligations in relation to sustainable practices.. They may also offer education and training opportunities to equip engineers with the skills needed to implement sustainable technologies and systems in building projects. By collaborating with industry associations, academic institutions, and other interest holders, they may establish expectations for professional practice, and the adoption of sustainable engineering practices across Canada's public and private infrastructure and buildings.

¹ National Research Council of Canada. (2022). *Canada's national model codes development system*. <https://nrc.canada.ca/en/certifications-evaluations-standards/codes-canada/codes-development-process/canadas-national-model-codes-development-system>

² Natural Resources Canada. (2023). *Canada's national energy code*. <https://natural-resources.canada.ca/energy-efficiency/buildings/new-buildings/canadas-national-energy-code/20675>

Engineers provide significant technical expertise and insights into best practices, codes, and standards for building construction, maintenance, and sustainability. Their role is essential in shaping policies and programs that impact Canada's infrastructure landscape. The engineering profession therefore plays an important role in shaping building code revisions and promoting the resilience of Canada's built environment.

Through close collaboration with the engineering profession, the CBHCC aids in promoting that buildings in Canada are designed, constructed, and maintained to high standards of safety, reliability, and sustainability. The expertise and dedication of engineers, along with the support of regulatory bodies, contribute significantly to the development and continuous enhancement of building codes that govern the design, construction, and retrofitting of buildings across the nation.

Recommendations to the federal government

The Canadian Board for Harmonized Construction Codes is responsible for the development of Canada's National Model Codes. To promote the safety and resilience of buildings, a comprehensive revision of the NBC is imperative. Due to the existing planning timelines, climate resilience measures are anticipated to be integrated into the NBC post-2030. The code revision scheduled for 2025 is expected to include standards for operational greenhouse gas emissions, while the 2030 code revision is likely to incorporate requirements pertaining to embodied carbon. With millions of new homes planned for development in Canada to meet housing affordability needs, an off-cycle upgrade to the NBC should be prioritized. This upgrade should integrate physical climate resilience measures, such as indoor passive/active cooling requirements and safe indoor maximum and minimum temperature limits.

Furthermore, any future revisions should accommodate the escalating severity of climate conditions and integrate measures to mitigate flood risks, withstand extreme weather events, and enhance energy efficiency. More frequent code updates and a streamlined process that enables prompt responses to emerging challenges are essential.

By prioritizing measures that foster climate resilience and embracing a more agile approach to code development, Canada can better safeguard its communities, mitigate financial losses, and promote sustainable and secure building practices.

The CBHCC should also:

- Promote the adoption of the [*National Energy Code of Canada for Buildings 2020*](#) uniformly across Canada. This code serves as a national model, specifying exact technical prerequisites for facilitating energy-efficient design and construction of new buildings and expansions. It addresses elements such as the building envelope, lighting, heating, ventilation, air conditioning, service water heating, electrical power systems, and renewable energy systems nationwide. Adherence to this code can reduce energy consumption and greenhouse gas emissions from new constructions, resulting in reduced operating costs and improved indoor environmental quality.³
- Develop a code that aims for zero emissions for new buildings and homes. This involves designing and constructing structures to minimize emissions from the outset, rather than trying to offset emissions later. This approach can reduce energy use and greenhouse gas emissions from buildings while promoting the use of renewable energy sources and other sustainable technologies.

³ Natural Resources Canada. (2023). *Canada's national energy code*. <https://natural-resources.canada.ca/energy-efficiency/buildings/new-buildings/canadas-national-energy-code/20675>

- Incorporate climate resilience and indoor air quality measures into building codes to protect against extreme weather events. These codes could include mandates for flood-proofing, wind-resistant design, fire-resistant materials, and passive cooling strategies. Specific requirements for indoor air quality should also be included to foster occupant health and safety. This could involve mandating the use of mechanical heat recovery ventilation systems for adequate ventilation and incorporating [ASHRAE Standard 241](#) into the NBC to mitigate disease transmission risk through exposure to infectious aerosols in new buildings, existing buildings, and major renovations.
- Continue focusing on the outputs from the Climate Resilient Buildings and Core Public Infrastructure (CRBCPI) Initiative. Led by the National Research Council of Canada, this initiative has developed tools and guidance to help the construction industry integrate climate change considerations into buildings and infrastructure. Prioritizing these resources can enhance climate-resilient construction capacity within industry.

These recommendations focus on making buildings more energy-efficient, reducing emissions, improving resilience to climate change, and improving indoor air quality. By adopting these recommendations, the CBHCC can contribute to creating a safer, more functional, and resilient built environment in Canada.

How Engineers Canada will contribute

Engineers Canada is committed to:

- Supporting the CBHCC in their ongoing efforts to modernize building codes, standards, and other relevant instruments, including the development of new infrastructure maintenance standards.
- Promoting the adoption of best practices among interest holders, such as professionals, public and private organizations, and local communities. This helps them understand the benefits of modernizing building codes and encourages progress in the modernization process.
- Engaging in continuous collaboration with practitioners, government officials, and decision-makers to highlight the importance and advantages of long-term investments in climate-resilient core public infrastructure. This also includes understanding evolving solutions as research and technologies progress and as the role of efficient and resilient buildings in Canada's broader economy becomes clearer. By advocating for sufficient funding for infrastructure maintenance, Engineers Canada aims to provide safe and reliable services while protecting public health and the environment.

Through these initiatives, Engineers Canada aims to actively contribute to the improvement of building codes, the resilience of infrastructure, and the overall well-being of Canadians. By leveraging their expertise and collaborating with interest holders, Engineers Canada seeks to drive positive change in the development, operation, and maintenance of infrastructure across the country. This can be accomplished by ensuring consultation is initiated early and maintained throughout the process, especially when proposing revisions to the NBC.