



From the office of the Chief Executive Officer / Du cabinet du chef de la direction

January 10, 2020

The Honourable Rosa Galvez, Senator
The Senate of Canada
Ottawa, Ontario
K1A 0A4

Dear Senator Galvez:

On behalf of Engineers Canada, I would like to thank you for your detailed report, published in June 2019, entitled "*Canada's Building Code in the Context of Climate Change, Adaptation, and Sustainability – White Paper on the urgency of building code modernization and implementation.*"

Engineers Canada is the national organization that represents the 12 provincial and territorial engineering regulators that license the more than 300,000 members of the engineering profession in Canada. Our organization has a long-standing history of working and collaborating with the federal government in order to help inform and develop legislation, regulations, and policies.

In the face of extreme weather events and Canada's rapidly changing climate, Engineers Canada strongly agrees with the parts of your report regarding areas of improvement in The National Building Code of Canada (NBC). However, Engineers Canada and the engineering regulators have several recommendations that could enhance and strengthen your report's recommendations.

Extreme weather and rapid changes to Canada's climate present a profound risk to both public safety and the reliability of Canada's infrastructure. The disruption and cost to Canada's economy when infrastructure is damaged or destroyed by extreme weather events is growing and becoming more frequent across Canada.

Engineers Canada agrees with your report that building code revisions represent a key opportunity to implement climate change adaptations and climate risk assessments to protect public safety and transition Canada to a low-carbon economy. They are also a key opportunity to incorporate technical expertise in climate change adaptation.

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Given the unique perspectives of engineers in Canada, Engineers Canada recommends the following to improve upon and strengthen your report's recommendations:

- Part 9 of your report regarding housing and housing sizes requires further review considering Canada's changing climate. This must reflect regional climatic differences, particularly when providing exemptions for residential buildings.
- A review of the "Validity of Climate Zones – Average Daily Temperatures" is necessary. This section is not applicable or useful from an engineering perspective. Building designs require daily maximum temperature extremes in the summer and daily minimum temperature extremes in the winter. It is imperative that designs withstand these extremes, so they assure reliable service and minimize public and business disruptions that have negative social and economic impacts.
- Increased infrastructure resiliency criteria are required under the NBC to ensure that future iterations of the NBC contain realistic and comprehensive criteria which serve to adapt communities to emerging climate risks. Our organization strongly believes that these criteria should be a condition for funding approvals for future building projects under the NBC.

Engineers Canada also supports your position that climate risk assessments should be incorporated as part of an overarching framework for the NBC, specifically, to ensure that standardized environmental impact assessments of building projects take place.

Public sector and academic research institutions are conducting research into understanding how resiliency and adaptation could be integrated into energy performance and life-safety objectives to provide a holistic approach to building sustainably. Some of the research areas that are currently being tackled in British Columbia are provided in appendix A.

British Columbia's Building Code has already established energy performance metrics applicable for both Part 9 and Part 3 buildings, via the *BC Energy Step Code*. This voluntary Code, adopted by more than 50 communities across British Columbia, provides a structured pathway for buildings to be progressively built through energy performance steps from better than base building code all the way to Net-Zero Energy Ready levels of performance. The highest level of the code also allows the progressive Passive House standard to be used, a proven global standard that results in new and existing building heating energy reduction of 90 per cent over the average Canadian building.

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Engineers Canada is encouraged that the National Research Council of Canada, in collaboration with Environment and Climate Change Canada, is working to update weather data used in the NBC through the Climate-Resilient Buildings and Core Public Infrastructure project. Engineers and practitioners require scientifically defensible climatic information, as well as up-to-date climate projections, to increase public confidence in federal environmental assessments, building codes and processes, while simultaneously supporting evidence-based information to guide project planning activities. Engineers Canada agrees that consistent national climate data will ensure that accurate climate projections are made, enabling effective planning for both present and future projects under the NBC.

Senator Galvez, Engineers Canada would like to work collaboratively with you and your staff to support these changes in the NBC. Our past involvement with the federal government demonstrates how we can constructively engage and support your efforts.

Thank you once again for inviting us to provide comments on this important topic.

Yours sincerely,



Gerard McDonald, MBA, P.Eng.
Chief Executive Officer

CC: Jeanette M. Southwood, FCAE, FEC, LL.D. (h.c.), P.Eng., IntPE, Vice-President, Corporate Affairs and Strategic Partnerships
Joey Taylor, M.Sc., PMP, Manager, Public Affairs
David Lapp, FEC, P.Eng., IRP, Manager, Globalization and Sustainable Development
Peter Mitchell, FEC, P.Eng., Director, Professional Practice Standards and Development, Engineers and Geoscientists BC

Attachment: Appendix A - Research areas currently being tackled in British Columbia

Appendix A: Research areas currently being tackled in British Columbia

Efficiency & adaptation strategies	Issues	Research areas and needs
Better insulation and airtightness as a heat loss mitigation strategy	Insulation and airtightness do minimize heat loss, but may exacerbate overheating risk in summer, particularly as the climate warms.	Current research looks at design trade-offs that balance insulation, ventilation, and envelope strategies to minimize winter heat loss and summer overheating.
Adoption of heat pump and district-energy based technologies	Heat pump-based solutions that offer both heating and cooling offer opportunity to rapidly decarbonize the built environment provided the electricity grid is clean. District-energy based solutions can offer emissions reductions benefits even when the grid is not de-carbonized.	Heat-pump solutions may carry a higher operational energy cost but would perform well in a warming planet where cooling demand is expected to dominate energy use. District energy solutions have been most successful in areas where city-owned utilities have been created to provide services. Public awareness and governmental incentives can be improved in this area.
Approaches for flood resilience	Certain communities have established design flood elevations and requirements related green infrastructure but implementing these requirements have been carried out only in certain communities.	BC Housing Mobilizing Building Adaptation and Resilience project has established primers on resilience and is working on pilot projects to build awareness and knowledge.
Integrating sustainability into urban design	Rezoning applications have promoted densification, and required homes larger than a certain area to meet more stringent energy performance requirements, but efforts are limited to certain communities and neighbourhoods.	Urban planners have responded with addressing this by integrating development planning with transit planning, requiring electric vehicle charging outlets, removing barriers to build multi-unit residential buildings, laneway homes and pre-fabricated wood buildings.
Using future projected weather files in energy modelling	Energy modelling can be a tool to design buildings to achieve higher energy performance and climate resilience, but there is lack of expertise in the Part 9 area for practitioners to provide services.	Future projected climate files are already being considered in energy modelling, and research work has identified projected changes to climate data referenced in the Code, but outside of a niche group of energy modellers, and researchers.

Appendix A: Research areas currently being tackled in British Columbia

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Promoting the use of mass-timber	Use of mass-timber has several sustainability co-benefits, and BC is working with select early adopter communities to promote the use, but there are concerns that the building industry has related to fire resistance and seismic stability.	Engineers and Geoscientists BC and the Architectural Institute of BC have embarked on the development of Professional Practice Guidelines that would apply in carrying out professional activities for mass timber buildings up to 12 storeys, and efforts to mainstream the use of mass timber must be further supported.
New specifications for concrete	Concrete mixes for sustainable pavements and technologies for reducing the carbon intensity of cement exist, but there aren't any code requirements related to their use.	As focus turns to permeable pavements and embodied emissions to tackle flooding and climate impacts, these opportunities have been largely missed outside of few lower mainland municipalities.
Strategies for existing building retrofits	The market demand for renovations places a great value in terms of life safety and visual appeal and is not focused on climate resilience and energy efficiency.	Strategies developed for existing building retrofits should not be onerous obligations and must provide clarity on requirements.