NRC·CNRC

Platform to decarbonize the construction sector at scale

Positioning industry to achieve net-zero emissions by 2050

The National Research Council of Canada's (NRC) Construction Research Centre is addressing one of the biggest challenges facing Canada's construction sector: decarbonization.

The construction sector is a significant emitter of greenhouse gases, from the production of construction materials, to the heating, cooling, and maintenance of existing buildings and infrastructure. To achieve Canada's targeted emission reductions by 2050, new low-carbon technologies and tools are needed to support further advancements in construction.

In collaboration with academia, industry and governments, the NRC is applying its research and development (R&D) expertise to support the development and deployment of low-carbon construction solutions at scale.

Advancing a low-carbon regulatory framework

Together with stakeholders, the NRC will develop new low-carbon requirements and work collaboratively to implement these through standards, specifications, guidelines, and publications such as the Canadian National Master Construction Specification (NMS), and the National Model Codes, notably:

- Developing new language for the 2025 and 2030 National Model Codes that will enable the regulation of operational and life-cycle carbon emissions, respectively
- Developing a low-carbon guideline that considers life-cycle greenhouse gas (GHG) emissions in federally funded construction projects
- Revitalizing the NMS to include low-carbon solutions
- Developing and implementing a new suite of performance-based requirements in the National Model Codes
- Enabling the digitalization of the National Model Codes and the NMS

New research and technical solutions to reduce carbon will support these requirements, including life cycle assessment, life cycle performance of buildings and infrastructure, construction practices and materials, and digitalization.

Solutions for low-carbon construction

The NRC will harness and focus R&D and innovation capacity to address knowledge and data gaps in the development, identification and specification of low-carbon materials, products, services and practices. This includes:

- Supporting industry-developed carbon accounting tools for materials, components, assemblies, and whole assets including buildings, bridges, roads, and water infrastructure
- Supporting industry-developed zero- or low-carbon construction materials including, cement and concrete products; structural and façade materials; non-structural materials
- National database of life-cycle inventory for construction materials

A newly developed Centre of Excellence in Construction Life Cycle Assessment (CECLA) within the NRC's Construction Research Centre will help guide the research and support industry in low-carbon innovation.

Increasing construction sector productivity through digitalization

Digitalization increases productivity, while performance-based requirements drive innovation. Applied to the construction sector, these will support the Government of Canada's broader efforts on green procurement, and will contribute to the emerging low-carbon economy. This includes:

- Performing initial research to support the implementation of performance-based construction codes
- Developing a roadmap to help guide the digitalization of the construction sector
- Performing R&D to encourage greater environmental and productivity benefits from modular low-carbon solutions
- Developing digital portals to enable the submission of electronic building plans and/or permits and support virtual inspections

The NRC's collaborative R&D environment with flexible business arrangements provides opportunities for:

- Technology demonstration and validation in large-scale pilots
- Development of innovative low-carbon materials, systems and services
- Development of solutions for low-carbon design and retrofit of buildings, bridges, roads and water infrastructure
- Development of solutions for net-zero building operational carbon, as well as solutions for infrastructure asset management operation optimization for life cycle carbon reduction

Contact

Chris Pezoulas
Director, Business Development
Construction Research Centre
613-993-9502
Christopher.Pezoulas@nrc-cnrc.gc.ca

canada.ca/nrc-construction

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