

CONSTRUCTION INDUSTRIES: TAPPING THE POTENTIAL OF ENERGY EFFICIENCY

As government and consumer expectations rise for sustainable construction, how can European and Canadian industries join forces to meet the new challenges?

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On both sides of the Atlantic, policymakers, businesses, and civil society are investigating zerocarbon policies that would drastically reduce the carbon and environmental footprints of the construction industry. In Europe, the Energy Performance of Buildings Directive requires all new buildings from 2021 (and public buildings from 2019) to be aligned with the Nearly Zero Energy Buildings (NZEB) standard. In Canada, the federal government is ensuring that all new federal buildings and major building retrofits prioritize low-carbon and climate resilience. [1]

As momentum is building (pun intended) for the construction sector to become more sustainable, we discussed how to accelerate the adoption of these critical policies with construction professionals working in Canada and Europe.

New constructions and retrofits – the untapped potential

Currently, the construction industries account for over one-third of global energy consumption, and nearly 40% of total CO₂ emissions [2]. Building operations account for approximately 28% of emissions and building materials and construction account for 11%. The construction industries thus have significant role to play in helping the world achieve the CO₂ emissions reduction targets outlined in the IPCC's sixth assessment report [3] (i.e., 50-65% by 2030 to zero CO₂ emissions by 2040 to limit global warming to 1.5°C).

While the European market and the Canadian market have comparatively different mixes of new constructions and retrofits, they share a common untapped potential for energy efficiency gains in buildings. Achieving carbon neutrality in the existing building stock will require accelerating the rate and depth of passive energy upgrades (i.e., including materials and construction) and active energy upgrades (i.e., using advanced technologies to monitor and optimize day-to-day energy consumption) throughout the building lifecycle. In the meantime, the demand for new, lighter-built, and more energy-efficient buildings is on the rise. It is currently unmet due to structural and regulatory obstacles.

[1] <https://www.canada.ca/en/treasury-board-secretariat/services/innovation/greening-government/strategy.html>

[2] <https://www.iea.org/topics/buildings>

[3] <https://www.ipcc.ch/report/ar6/wg1/>

An evolving landscape

The construction industry faces several competing pressures. Right now, reducing its carbon footprint is a challenge while simultaneously keeping costs under control and efficiently dealing with complex processes involving multiple stakeholders.

Nonetheless, many actors in the industry recognize the need to address these issues, especially within their own supply chains. They have already started to adopt concrete actions to reduce the carbon footprint of their operations; for example, by retrofitting their own facilities to nearly zero-energy buildings, or incorporating carbon pricing mechanisms into their Capital Expenditure (CAPEX).

Many are innovating and putting solutions on the market to reduce the carbon emissions associated with building operations, and/or are tackling the embodied carbon emissions [4] of their operations and solutions. Notably they are adopting the 3R principles: reduce (including material optimization and designing for lighter structures), reuse (including design for deconstruction) and recycle (including waste management and reduction).

Moving Forward

More could still be done by the regulators and by the construction industry to speed up the pace of adoption of these sustainable practices, including:

[Harmonizing key aspects of regulations between countries and between provinces](#)

Too often, the content and pace of adoption of building codes differ from one country to the next. In the case of Canada, they can differ from one province to the next. The same goes for product standards (e.g., on mass timber, high-performance windows or industrial transformers). This prevents actors in the industry from importing and/or commercializing more carbon-neutral solutions.

[Building smarter](#)

A carbon-neutral built environment starts with design and planning. Construction projects should be designed more holistically, taking into account the full life cycle of the building from initiation to repurposing, including intervention points.

[4] Embodied emissions are defined by McKinsey as the GHG emissions associated with building construction, including those that arise from extracting, transporting, manufacturing, and installing building materials on site, as well as the operational and end-of-life emissions associated with those materials.

This change of mindset has implications across the board, including the architectural design of the building (e.g., simpler to [dis]assemble), the materials used in the construction, and the way construction tenders are processed.

The industry could be helped along by the development and generalization of (re)certification processes pertaining to the continuous management of the building throughout its entire life cycle (e.g., ISO 14001), as opposed to a one-time stamp (e.g., the current Low Impact Development system).

Developing sustainable ecosystems

In some geographies, entire segments of a sustainable construction value chain are scarce to non-existent -- notably downstream activities of waste-collection and recycling -- and need to be developed.

Residential and industrial construction projects are also cost constrained and too seldom seen as long-term investments. The cost savings associated with developing/owning a more energy-efficient building are often offset by the upfront investment needed to build it. Developing financial literacy programs and offering public financial incentives – similar to incentives for electric vehicles, for example -- could do a lot to promote the early adoption of energy-efficient solutions in construction.

Planning for the future

Looking forward, pushing for the adoption and generalization of digital platforms such as Building Information Models and digital twins that incorporate new features like 6D (including the carbon impact of the building) will help connect construction processes from end to end and build more sustainable structures.

Achieving carbon neutrality will also require energy-efficient buildings that use little to no on-site fossil fuels, and that are powered by on- and off-site renewable energy (sometimes even sharing/trading energy with other structures). This will require significant technical innovations and massive changes in the current regulatory framework governing the production and distribution of energy.

To go further on this issue

Listen to our [full panel discussion on sustainable construction industries](#) to learn more on this issue.

You can also visit the corporate websites of our panelists to discover some of the solutions adopted by actors of the industry to accelerate the transition of our society towards carbon neutrality.



Carol-Ann Brown - [The Delphi Group](#)

Delphi is part of a group of organizations (including GLOBE Series, CCSR, and Leading Change) that is working together to achieve a sustainable, prosperous, and socially just future in a generation.



Adrian Thomas - [Schneider Electric Canada](#)

Schneider Electric brings energy management and automation solutions to help bridge the gap between progress and sustainability.



Oliver Lang - [Intelligent City](#)

Intelligent City is a housing technology company that takes a product and platform-based approach to offer urban housing and workspace solutions that is sustainable, affordable and consistently carbon-neutral.



Richard Juggery - [Saint-Gobain & Certain Teed Canada](#)

Saint-Gobain is a global company that designs, manufactures and distributes materials and solutions to address the challenges of sustainable construction.



Thomas Skelly - [Kingspan Canada](#)

The Kingspan Group is a global business group offering products that help reduce the impact buildings have on the environment throughout their lifecycle.



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