



# National Infrastructure Assessment

JUNE 30, 2021

# Recommendation Summary

## 1 Structure and Scope

- Expand the definition of infrastructure to include all buildings, from publicly owned and funded to commercial, retail and industrial
- Establish an independent commission with support staff and an expert panel for each priority
- Have regard for the role that infrastructure can play to address social sustainability needs, especially Canada's reconciliation efforts and the importance for appropriate housing
- Deploy CaGBC expertise on the NIA commission and/or in an expert panel

## 2 Procurement, Low Carbon Materials, and Funding

- Achieve net-zero emissions carbon design and performance for federal owned and leased buildings, including crown corporations with significant real-estate through the Greening Government Strategy
- Require low carbon and "Made in Canada" construction materials thresholds and ensure that eligible firms demonstrate low-carbon development, design, and experience
- Develop a low-carbon supply chain with funding for R&D and manufacturing
- Streamline funding through a hub that combines investment programs from all levels of government

## 3 Zero Carbon Buildings

- Require zero carbon buildings as the standard for all new construction by 2030
- Establish reduction targets for embodied carbon and require the use of Life Cycle Assessment for federally funded buildings

## 4 Retrofit Economy

- Implement a retrofit strategy with specific objectives and milestones in terms of investment, number of buildings refurbished per year and require disclosure on energy consumption and carbon emissions to track measurable outcomes
- Align infrastructure funding with the implementation of a stringent provincial/territorial retrofit building code
- Encourage private investments through adoption of the Investor Confidence Project (ICP) as a means to de-risk building retrofit

## 5 Workforce Development

- Prioritize investment in workforce capacity development for building retrofits and development of industry-led low-carbon occupational roadmaps
- Invest in the rapid upskilling of workers and develop flexible approaches to low-carbon skills training to bring underrepresented groups into the green building sector
- Support the development of collaborative platforms and partnership initiatives that address siloed approach to skills development, such as [Workforce 2030](#)

# Introduction

The Canada Green Building Council (CaGBC) is a national, non-profit industry association dedicated to making green building the norm. Our market research and analysis, certification programs, and capacity-building efforts have accelerated the transformation to high-performing, healthy and low carbon green buildings, homes, and communities throughout Canada. With more than a thousand corporate members, we regularly convene industry stakeholders to share information and advance industry priorities. In May, we sought feedback on the National Infrastructure Assessment (NIA) through a survey given to a select group of industry stakeholders and members. We used the results to inform this submission and to affirm the support of the green building sector in the pursuit of a net-zero emissions economy.

In the years following the Paris Agreement, we have learned the importance of infrastructure in the fight against a pandemic, climate change, and inequality. Buildings have a crucial role to play: they are the best opportunity to reduce greenhouse gas (GHG) emissions and other environmental impacts, are an integral part of creating resilient and adaptive communities, and to offer safe, and affordable housing, workplaces, and leisure spaces.

Meeting Canada's national and international commitments means ensuring the nation's infrastructure is low carbon, resilient, safe, and accessible to all, including Indigenous peoples, racialized communities, and underserved regions. During the leader's summit in April 2021, Prime Minister Justin Trudeau strengthened Canada's resolve by increasing emission reduction targets to 40-45 per cent by 2030 compared to the 2005 levels and achieving net-zero emissions by 2050. These targets are challenged by a complex reality:

- Despite efforts, the building sector has increased its emissions by almost 6% from 86 Mt CO<sub>2</sub> eq in 2005 to 91 Mt CO<sub>2</sub> eq in 2019;<sup>1</sup>
- Among cities, buildings are the second-highest emitter behind transportation with operations accounting for 17% of Canada's GHG emissions. Combined with materials and construction processes, this rises to 28%; and,
- Less than a third of green building industry leaders have a decarbonization plan with specific targets.<sup>2</sup>

Canada faces an uphill battle. This is the critical decade where Canada must shift policies, and programs and investments must work to unlock the full potential of our

sector. CaGBC documented that in 2018, over 460,000 Canadians worked in the green building when considering operations, construction, education, and manufacturing. At the same time, green building activity contributed approximately \$48 billion towards Canada's GDP – an increase of over 50 per cent from four years previous. By meeting Canada's 2030 emission reduction targets, the building sector will see a [threefold increase in size](#) to 1.5 million jobs strong, with at least 120,000 new jobs being added to the energy efficiency industry alone.<sup>3</sup>

We already possess the technical expertise to retrofit and build zero-carbon. The NIA will determine the pathways required to decarbonize the construction sector. By doing this, the federal government will play an integral part in transitioning the building sector for a low carbon economy: from scaling up the retrofit industry to new zero carbon buildings. To advance these outcomes, CaGBC recommends that the federal government prioritize policies and market supports for green buildings – in both the public and private sectors – in the following ways:

## 1. Structure and Scope

Canada's international partners in the Commonwealth, the United Kingdom and Australia, have established institutions to audit or assess their infrastructure. Their experiences can inform Canada's NIA approach. A common feature between the two countries was establishing mechanisms and a structure independent from the government to engage external expert advisors. An independent commission would ensure public sector and policy decision-makers confidence in the process. CaGBC would also recommend gathering experts from relevant fields to help guide NIA's efforts, a model undertaken by the UK Commission on Infrastructure for their own assessment which is due to be released in 2023. CaGBC is uniquely positioned as an industry association to offer insight and guidance on the pathways to achieve low-carbon and resilient buildings, on the readiness of the sector to respond and to provide recommendations on key policy and programmatic tools designed to support widespread adoption.

When establishing an independent commission, key consideration should be given to harnessing the capacity of infrastructure to support broader social sustainability (health and wellness, accessibility, inclusivity) and reconciliation needs which are further heightened due to climate change. For instance, Australia and New Zealand are the most advanced OECD countries concerning reconciliation with Indigenous Peoples. The NIA should

<sup>1</sup> ECCC, *Greenhouse gas sources and sinks: executive summary 2021*, <https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/sources-sinks-executive-summary-2021.html#toc3>

<sup>2</sup> CaGBC, *National Infrastructure Assessment: Survey To Industry Leaders*, May 2021.

<sup>3</sup> Clean Energy Canada, *Efficiency Canada, Less Is More - A win for the economy, jobs, consumers, and our climate: Energy efficiency is Canada's unsung hero*. [https://www.energycanada.org/wp-content/uploads/2018/05/Report\\_LessIsMore\\_EconomicImpactStudy-2018-05-01.pdf](https://www.energycanada.org/wp-content/uploads/2018/05/Report_LessIsMore_EconomicImpactStudy-2018-05-01.pdf)



**9 out of 10** green building leaders recommend including publicly-owned, leased or funded buildings as well as ones that provide a social good. **7 out of 10** also include all commercial, industrial, manufacturing and retail spaces.

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use a similar path and broad-based social purpose lens as applied in the [Infrastructure Australia, a Reconciliation Action Plan](#) to avoid biases and resolve the huge infrastructure deficit in First Nations, Metis and Inuit communities.

The framing of infrastructure in the [engagement paper](#) expands the traditional views of infrastructure to include roads and bridges and roads and bridges and institutional, community, and possibly commercial and residential buildings. CaGBC believes that the NIA must take a wider view of infrastructure to include all public buildings (owned, leased, and funded) and buildings with a social, commercial, and industrial purpose.

## 2. Procurement, Low Carbon Materials and Funding

Establishing a robust low carbon and building marketplace can be accelerated through government procurement policies and coordinated funding models. Federal procurement policies are one of the most effective ways to signal to the market the economic opportunities of green building as well as the skills, expertise, and products needed to support low-carbon buildings.

CaGBC commends the objective of the Greening Government Strategy to transition its real-property, as well as leased federal buildings to be net-zero emissions and to its commitment to support the establishment of a green building industry in Canada. We encourage the federal government to strengthen the strategy and commit to strengthen the call to action by requiring all federal crown corporations to adopt the Strategy and the commitment to net-zero emissions by 2050. Such an ambitious goal for retrofit and construct new federal buildings sends a strong signal to provinces, territories, and the private sector. Expanding the Strategy to require crown corporations will further enhance an already positive business case for zero carbon buildings in every community while catalyzing the whole supply chain from coast to coast to coast. This action will demonstrate the federal government's

commitment to shifting Canada's whole built environment toward decarbonization and to making zero carbon buildings the norm for Canada.

Achieving this will require the federal government to change the focus of procurement from the lowest-cost option to a one that favours sustainability: requiring the use of low-carbon construction materials and the ability to determine a "made in Canada" threshold. This preferred procurement approach already exists, with examples such as the California Buy Clean Act. This measure is supported by 80 per cent of industry leaders interviewed in our survey.

The NIA can play a role in driving the development of the low-carbon construction materials supply chain needed to feed the pipeline of zero carbon projects. This new supply chain will need sustained investment in research and development, and manufacturing support. Furthermore, the NIA needs to consider lifecycle impacts of materials. Already, LEED v4 and v4.1 has supported building product disclosure by introducing Environmental Product Declarations to the marketplace in 2016. For products and materials where lifecycle information is available, environmental, economic, and social lifecycle impacts are calculated.



**7 out of 10** respondents identified lack of R&D funding for sustainable building materials as the biggest barrier to a reliable and diverse low carbon building supply chain.

Smart building technologies, electrification of heating as well as insulation and envelope technologies stood out as **the areas requiring the most investment.**

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Along with meeting performance thresholds and standards, the federal procurement process now needs to consider requiring eligible firms to demonstrate their low-carbon experience. The federal government's proactive market development initiatives will drive uptake of zero carbon building in the commercial and institutional market.

The building industry, like other sectors, expects a level playing field and predictable and stable policy environment as it relates to funding and financing. Instead, there is a patch quilt of programs and policies by all levels of government which, at times, contradict each other, or muddy the waters with multiple or overlapping initiatives. As highlighted in our industry survey, the building sector expects a coherent yet flexible approach from public authorities, especially the federal government. This can be addressed by providing an industry-accessible central hub that integrates all retrofit and new construction investment tools from municipal, provincial, and federal levels. A “one-stop shop” approach would increase efficiency and innovation – and demand is already there, with 74 per cent of respondents in our industry survey showing support for the creation of such a hub.

### 3. Zero Carbon Buildings

The NIA must include a commitment to build all new government-owned and funded buildings to zero carbon. The cost of not adopting a zero carbon approach to building construction and retrofit increases with each passing day. Every new building built today and every existing building that is not zero carbon is contributing to increased emissions – and will inevitably require major investments in mechanical equipment, ventilation systems, and building envelopes to achieve Canada’s net zero emissions target by 2050. As a result of inaction today, existing buildings must be retrofitted before their normal lifecycle re-investments. This will be more costly and disruptive to building owners, operators, and tenants than an upfront investment in zero carbon buildings.

On average, zero carbon buildings can achieve a positive financial return over a 25-year lifecycle, inclusive of carbon pricing. Importantly, research shows that zero carbon buildings can be built today and that cost savings from zero carbon operations will cover upfront investments. Furthermore, as the cost of carbon rises over time, the business case for zero carbon buildings (new or the retrofit of existing) grows stronger, spurring new investments and innovations.

If the NIA would include a commitment to zero carbon buildings, over 12 Mt CO<sub>2</sub>e/year from operations could be avoided by 2050. However that means that all federally funded new construction projects should be striving to achieve the [Zero Carbon Building Standard](#) or similar target. By 2030, all new construction above 20,000 sq. ft from coast to coast to coast must be zero-carbon building (50 per cent of industry leaders from our industry survey agreed, and 21 per cent suggested 2025).

Achieving this target will also require us to focus embodied carbon. The vast majority (74% between now and 2030) of emissions are expected to come from materials used in new buildings. The NIA must develop specific milestones for the reduction of embodied carbon, and follow the example of the federal government, with the Greening Government Strategy, seeking a 30 per cent reduction in embodied carbon for its buildings starting in 2025.

## Zero Carbon Building

A “zero carbon” building is characterized by four key components:

- demonstrating a zero carbon balance in its operations;
- incorporating a design that prioritizes reducing energy demand and meeting energy needs efficiently;
- using renewable energy onsite; and
- evaluating the level of carbon in the manufacturing of structural and envelope materials as part of the design.

Technical advancements have improved our understanding of embodied carbon. Most notably, whole-building Life Cycle Assessment (LCA) quantifies the environmental impacts of resource consumption, emissions, and waste throughout a building’s life. Governments and building owners are using LCAs, which use a standardized, quantified measurement system to assess the environmental impacts of buildings from the extraction of raw materials through to decommissioning and reuse or recycling, and to identify the lowest carbon designs and materials.

### 4. Retrofit Economy

Retrofitting existing buildings to be energy-efficient and low-carbon is foundational to achieving Canada’s GHG targets. However, despite aging infrastructure and the abundance of economically viable projects, renovations are not happening at the depth or scale necessary. In our report [A Roadmap for Retrofits in Canada](#), we determined that GHG emissions from large buildings could be reduced by 51 per cent (or 21 Mt CO<sub>2</sub> eq) below 2005 levels by implementing the following actions:

- Recommissioning 60% of very large buildings (over 200,000 square feet) and 40% of large buildings (25,000 to 200,000 square feet) to optimize the equipment and systems in existing buildings;
- Deep retrofits in 40% of buildings over 35 years old prioritizing mechanical and envelope upgrades;
- Switching to low carbon fuel sources in 20% of buildings over 35 years old in all regions; and,
- On-site renewable energy systems installations in 30% of buildings located in provinces with carbon-intensive electricity grids.

While the \$2 billion investment from the Canada Infrastructure Bank is a good start, the government of Canada needs a multipronged approach to jump-start



**2/3** of interviewees stated that their work was impeded by lack of access to or improperly skilled workforce (design, engineering, trades).

**Almost 9 out of 10** would like a workforce development strategy from the federal government prioritizing training recruitment that supports low-carbon skills for retrofits and zero carbon new construction.

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outlines how a building will adapt over time to remove the combustion of fossil fuels from building operations. Transition plans for portfolio of buildings would take this to scale of determining investment strategies in enhancing carbon performance. Data from both benchmarking and transition plans would allow the government to better adapt its programs and investment strategies to meet the needs of the industry.

Lastly, the NIA can play a role in de-risking retrofit investment opportunities for private sector lenders by introducing standardized project origination for retrofits like the Investor Confidence Project (ICP) framework and its Investor Ready Energy Efficiency (IREE) certification. The role of the ICP protocols and IREE certification is similar to an appraiser or a rating agency. It provides third-party verification and validation. The ICP framework is a tool that can be used to support increased transparency, consistency, and reliability of building energy-efficiency retrofit projects, as well as provide recognition of best practices and due diligence to project developers and building owners. It supports project quality assurance and mitigates potential conflict of interest associated with the project, both real and perceived. This approach provides a foundation for bundling projects, a prerequisite for scaling investment, by defining a roadmap from retrofit project design to reliable investment opportunity.

## 5. Workforce Development

At present, the building industry is not adequately equipped to deliver the scale and scope of green building construction and retrofitting required to meet Canada's GHG targets. Reducing carbon emissions requires high-performance buildings and retrofits delivered at unprecedented speed and scale. Success will be dependent on the workforce's capacity to design, build, renovate, and operate low-carbon and zero carbon buildings. The NIA must intentionally connect the climate and workforce development agendas across government departments, policies, and programs, and leverage the building sector to create good jobs and reduce emissions.

Canada will need triple the current number of design and construction professionals working on low-carbon buildings and retrofits, to upwards of 1.5M building sector workers engaged in low-carbon and zero carbon building projects.<sup>6</sup>

The workforce programs announced with the 2021 Budget will fast-track the workforce needed to build a low-carbon economy in Canada. However, the federal government now must focus this unprecedented investment towards strengthening existing workers' skills with low-carbon knowledge, practices, and technologies. In addition, it must rapidly reskill workers into the construction sector and attract a new and diverse generation of green building workers. One example of a program designed to develop rapid and flexible approaches to low-carbon

unprecedented levels of low-carbon retrofit activity. The NIA should define the number of buildings that should be refurbished and set an annual target. The European Union (EU) articulated a target of three per cent annually<sup>4</sup> to meet its goals. Analysts have suggested that Canada must quickly scale up its retrofit activity, otherwise, it will take 71 years to retrofit commercial buildings and 142 years for residential.<sup>5</sup> To ensure the appropriate level of investments, the federal government must set aside a percentage of its GDP towards building retrofits. The UK National Infrastructure Commission recommended between 1.0 and 1.2 per cent of their GDP per year as a benchmark.

To acquire better data on the performance of buildings, it is critical that benchmarking, disclosure, and labelling become part of the practice of managing buildings and measuring progress. The 2018 Reports from both the House of Commons and Senate recommended these regulations. A great resource to support this type of activity is Arc Skrou – a building performance platform – that measures and scores operational performance for any type of building or entire portfolios, and has become the go-to resource by industry and government globally.

A complementary tool to performance tracking and reporting regulation would include the introduction of zero carbon transition plans for buildings and could be applied to building portfolios. A zero carbon transition plan

<sup>4</sup> Euractiv, *Complete overhaul' of buildings needed to meet EU's 2030 climate goal*, <https://www.euractiv.com/section/energy/news/complete-overhaul-of-buildings-needed-to-meet-eus-2030-climate-goal/>

<sup>5</sup> Efficiency Canada, <https://www.energycanada.org/wp-content/uploads/2021/06/Canadas-Retrofit-Mission-At-A-Glance.pdf>

<sup>6</sup> CaGBC, *Canada's Green Building Engine*, [https://www.cagbc.org/cagbcdocs/advocacy/CaGBC\\_CanadasGreenBuildingEngine\\_Executive\\_Summary\\_EN.pdf](https://www.cagbc.org/cagbcdocs/advocacy/CaGBC_CanadasGreenBuildingEngine_Executive_Summary_EN.pdf)

skills training could be a fit-for-trainee approach to bring underrepresented groups into the building sector, especially women and racialized youth.

The federal government should work in partnerships with industry and support collaborative approaches, such as [Workforce 2030](#),<sup>7</sup> to bring together employers, labour, and education interests and break siloed approaches to create shared roadmaps<sup>8</sup> for workforce development.

## Conclusion

Tackling climate and the need for resiliency presents an unprecedented challenge and an opportunity for Canada. Reaching net-zero emissions by 2050 requires the decarbonization of all infrastructure, including buildings. This approach represents a significant economic opportunity. The construction and infrastructure sectors can be quickly mobilized with shovel-worthy projects that will generate skilled jobs, drive innovation, and grow the domestic supply chain. Achieving this will be no small feat: the federal government will have to simultaneously tackle carbon reduction, affordability, and finance bold actions. Doing so will showcase Canada as a global leader for creating healthier, green buildings and communities that can reduce our carbon emissions and limit global warming at 1.5 degrees.

As evidenced by rapid growth over the last 15 years, the building sector is ready to move forward on decarbonization. The retrofit industry can make an important contribution to the economy and our way of living, but it needs a kickstart through intentional changes to procurement and public investment. A national retrofit strategy which aligns GHG emissions reduction with making homes and buildings healthier and more affordable, will also achieve much needed social sustainability objectives.

Across the country, thousands of energy efficiency audits have already been conducted and can offer a pipeline of retrofit projects, resulting in significant emission reductions and job creation as part of the economic recovery. Many zero carbon designs exist but are held back by the need to secure financing for the additional capital expenditures. Other shovel-ready green building projects currently approaching development could be incentivized to enhance their carbon targets.

The Intergovernmental Panel on Climate Change published a report on June 24, 2021, demanding the doubling down of governments' and companies' efforts to decarbonize. Moving to zero carbon buildings and more generally, to a net-zero emissions economy, will change Canada profoundly. We need to be bold, ambitious, and creative to achieve the country's 2050 decarbonization goal and meet our ambitions with action.

<sup>7</sup> Workforce 2030 launched in 2020 as Canada's first and only coalition supporting low-carbon workforce development across Ontario's building industry, including related unions and education providers. It is a proven example of a collective impact approach to help address the need for a strong, inclusive, and skilled workforce that can support achieving GHG reduction targets.

<sup>8</sup> Workforce occupational roadmaps represent internal exploration of how each occupation is impacted and how it can prepare to work on a low carbon project including upskilling, innovating work processes, and growing the capacity of new and incumbent workers.

## COMPANIES AND ASSOCIATIONS SUPPORTING THIS SUBMISSION

