



# A Buy Clean Roadmap for Canada

 CLEAN ENERGY CANADA

**BLUEGREEN**  
CANADA

# Contents

Key Terms	2
Executive Summary	3
What does Buy Clean mean in Canada?	5
Why is Buy Clean important for Canada?	7
Buy Clean and the United States	8
A Six-Step Roadmap to Buy Clean	9
Summary of Recommendations and Next Steps	16
Appendices	17
Endnotes	19

# Key Terms

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## **EMBODIED CARBON:**

Embodied carbon refers to the greenhouse gas emissions arising from the manufacturing, transportation, installation, maintenance, and disposal of building materials. Embodied carbon is a significant percentage of global emissions and requires urgent action to address it.

## **LIFE-CYCLE ASSESSMENT:**

Life-Cycle Assessment or LCA is a standardized method that can be used to quantify the environmental impacts of products and projects, including infrastructure and buildings. It looks at key stages in a product's life-cycle including material extraction, product manufacturing, product use, end of life, and beyond life (including reuse and recycling).

## **LIFE-CYCLE INVENTORY:**

Life-Cycle Inventory or LCI is the data collection portion of LCA. It consists of detailed accounting of all the flows in and out of the product system, including raw resources or materials, energy by type, water, and emissions to air, water, and land by specific substance. This kind of analysis can be extremely complex and may involve dozens of individual unit processes in a supply chain (i.e. the extraction of raw resources such as rocks and minerals, processing them into a product, transportation, etc.) as well as hundreds of tracked substances.

## **ENVIRONMENTAL PRODUCT DECLARATION:**

Environmental Product Declarations (EPDs) are independently-verified documents based on international standards that report the environmental impacts of a product, including global warming potential. These declarations can be used to track supply chain-specific product data and compare products if the products are functionally equivalent and have aligned scopes.



The following organizations provided valuable input and guidance in developing this policy brief and support its recommendations:



Aluminium  
Association  
of Canada



# Executive Summary

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As Canada plans its post-COVID-19 economic recovery, it should focus on the ways it can create jobs and enhance economic competitiveness while accelerating the transition to a net-zero economy. **A Buy Clean approach—prioritizing the use of low-carbon construction materials in public and private infrastructure projects—is one of the best tools the government has to achieve these objectives.** This policy brief outlines a “roadmap” for the federal government to develop and implement a Buy Clean approach in Canada, while at the same time working to align our policy with the U.S. and other international partners.

Investments in infrastructure and buildings will form the backbone of Canada’s pandemic recovery. The \$188-billion Investing in Canada Plan is funding infrastructure projects across the country, with potential to leverage hundreds of billions of additional dollars from provinces, territories, and municipalities over the next decade.<sup>1</sup> Similarly, private investment in new construction has bounced back over the past year and is projected to continue growing.<sup>2</sup>

These new investments in buildings and infrastructure will require a lot of construction materials, such as steel, cement and concrete, forest products, and aluminum. The production of these materials is carbon-intensive, accounting for about 11% of global greenhouse gas emissions.<sup>3</sup> Without concerted action, Canada’s infrastructure spending could lead to an avoidable increase in emissions and undermine domestic and international climate goals.<sup>4</sup>

Fortunately, **Canada has a low-carbon advantage.** Thanks in part to our 83% emissions-free electricity grid, many of our heavy industries (which directly employ 300,000 Canadians and support hundreds of thousands more indirect jobs) are among the cleanest in the world.<sup>5–8</sup> As a result, Canada is well-positioned to meet the demand for cleaner construction materials both at home and from trading partners as the global energy transition picks up pace.<sup>6</sup>

To meet this opportunity, the federal government must use all the tools at its disposal to adopt a Buy Clean approach for Canada: **federal procurement, infrastructure investments, and private sector codes and standards.**<sup>9</sup> The federal government is making good progress on the first of these, under the Greening Government Strategy and Low-Carbon Assets Through Life Cycle Assessment (LCA<sup>2</sup>) initiative.<sup>10,11</sup> **It must now act fast to address the other two pillars.** Federal infrastructure investments can influence spending by other levels of government, but must include criteria, targets, and incentives to reduce the carbon embodied in construction

materials, and require approaches that account for the full life-cycle performance of projects and materials (including opportunities for reuse and recycling). Building codes and other standards must also be reformed to apply similar criteria to private sector construction. The federal government must provide clear direction and oversight in order to coordinate efforts by multiple departments to gather data and develop policies, accounting tools, and guidance to ensure they are moving in the same direction.

Finally, **Canada should work closely with the U.S. as it develops its own Buy Clean strategy** to increase alignment around data and standards for construction materials. Collaboration on Buy Clean will benefit both countries by creating joint markets for clean materials, supporting jobs and industry competitiveness, and amplifying policy and financial supports for industrial decarbonization.<sup>12</sup>

The recommendations below will help Canada develop a successful Buy Clean approach that can reduce pollution, sustain jobs, and support industry’s economic competitiveness in a rapidly decarbonizing world:

## **PRIORITIZE BUY CLEAN ACTIONS ACROSS GOVERNMENT (2021-2022)**

1. Coordinate the efforts by multiple departments and agencies through the Privy Council Office, a centralized secretariat for the Cabinet of Canada, to prioritize and streamline Buy Clean solutions across government.

## **IMPROVE EMBODIED CARBON DATA TRACKING AND TRANSPARENCY (2021-2023)**

2. Prioritize and accelerate the LCA<sup>2</sup> initiative through added resources to build the material datasets in two years or less, integrate existing life-cycle data from other departments, and then maintain and improve over time.
3. Link LCA<sup>2</sup> outputs to government policy and decisions, including setting embodied carbon performance standards, and enforcing the use of tools and guidance for procurement agencies to integrate embodied carbon into decisions.

## **ACCELERATE AND STRENGTHEN THE GREENING GOVERNMENT STRATEGY (BY 2025)**

4. Move up short-term embodied carbon targets in the Greening Government Strategy to 2023 (from 2025), and

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extend targets to 2030 and beyond in order to provide a predictable pathway to net-zero emissions by 2050.

5. Publish a list of eligible materials that the Greening Government targets will apply to, and develop embodied carbon benchmarks for these materials in consultation with industry, labour and environmental groups, LCA experts, and other stakeholders.
6. By 2025, require all federal agencies and Crown corporations to adopt embodied carbon targets and benchmarks for their spending on construction materials.

#### **SET BUY CLEAN TARGETS FOR FEDERAL INFRASTRUCTURE INVESTMENTS (BY 2025)**

7. Update the climate lens to include embodied carbon reporting requirements for eligible materials.
8. Work with provincial, territorial, and municipal government partners to develop and apply Buy Clean criteria to future federal infrastructure transfers.
9. Build capacity and support structures to encourage a shift away from the 'lowest-cost' bid approach and ensure procurement staff at all levels of government have the necessary training, skills, and tools to implement Buy Clean and life-cycle approaches in decision-making.
10. Launch a Clean Infrastructure Challenge Fund, open to provinces, territories and municipalities, to showcase infrastructure projects built using low-carbon construction materials.
11. Amend the Canada Infrastructure Bank's mandate to include embodied carbon requirements for all infrastructure investments.

#### **DEVELOP PRIVATE SECTOR LOW-EMBODIED-CARBON STANDARDS (2025-2030)**

12. Work with provinces and territories to update the model national building codes by 2030 to include standards for measuring, reporting, and reducing embodied carbon in new construction.
13. Support the development of standards, labels or similar tools to ensure private sector accountability on the embodied carbon performance of construction materials. Such standards must be independent, verifiable, and auditable, and should be phased in over time, beginning with a voluntary approach and moving to mandatory requirements.

#### **INTERNATIONAL COLLABORATION ON BUY CLEAN (2021 ONWARDS)**

14. Work with the U.S. to develop a joint approach to Buy Clean that applies to federal procurement and infrastructure spending. This should include development of a North American database to support embodied carbon disclosure, setting aligned procurement standards, and working together to support industry pathways to net-zero by 2050.



# What does Buy Clean mean in Canada?

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To reap the maximum benefits of Buy Clean in Canada the policy needs to be built on three pillars: what governments buy, what governments invest in, and the set of rules governments create for themselves and the private sector.



## 1. Procurement

The Government of Canada directly procures about \$22 billion of goods and services each year—including \$2.7 billion in construction contracts—making it the single largest buyer in the country.<sup>13,14</sup> Under the Greening Government Strategy the federal government has committed to using its procurement budget to reduce the embodied carbon of the structural materials of major construction projects by 30%, starting in 2025; and to conduct whole building/asset life-cycle assessments by 2025 at the latest for major projects.<sup>10</sup>

Data on the life-cycle environmental impacts of construction materials is essential to implementing these commitments, and to support Buy Clean more generally. The National Research Council is developing life-cycle inventory datasets as part of the Low-Carbon Assets through Life Cycle Assessment (LCA<sup>2</sup>) initiative.<sup>11</sup> Outputs from LCA<sup>2</sup> will enable infrastructure buyers to assess and compare different design and material choices based on embodied carbon, and sellers to differentiate their products through quantification and disclosure.

## 2. Infrastructure

Canadian public and private investment in infrastructure was \$100 billion in 2019, of which nearly three-quarters was public sector spending.<sup>15</sup> The Government of Canada has committed to invest \$188 billion over 12 years under its 'Investing in Canada Plan' on several priorities, including public transit, green infrastructure, water/wastewater and affordable housing.<sup>16</sup> These federal investments will leverage additional investment from other levels of government and the private sector. There are currently no requirements to use low-carbon construction materials in any public infrastructure built under the Investing in Canada Plan. In fact, an emphasis on "lowest cost" bids often disadvantages Canadian suppliers. Industry in Canada is subject to a price on carbon to reduce harmful pollution, a policy not necessarily in place in countries that Canada imports goods from. This leads to carbon leakage—where the emissions are moved from one country to the next, resulting in higher overall emissions. Moving toward a "total cost of ownership" or life-cycle approach to infrastructure can reward higher-performing domestic producers that have lower carbon footprints.

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## Buy Clean and construction materials

- **Steel:** more than half of steel produced globally is used in the construction of buildings and infrastructure.<sup>17</sup> In Canada, the majority of steel production occurs in Ontario and Quebec. Steel is 100% recyclable and can be reused and remanufactured infinitely. On average, Canada's steel industry recycles approximately 7 million tonnes of scrap annually (50% of production), and has one of the lowest carbon footprints globally.<sup>5,18</sup>
- **Cement and concrete:** cement is used as a binder in concrete, which is the most widely used construction material in the world. Government infrastructure projects consume an estimated 40% of cement produced.<sup>12</sup> The cement and concrete industry is dispersed across Canada, with more than half of production in Ontario and Quebec.<sup>9</sup> A number of low-carbon technologies exist with potential to reduce emissions by 20-30%.
- **Aluminum:** globally, 24% of aluminum is used in construction, mostly in high-rise buildings and bridges due to its lightweight and durable nature.<sup>19</sup> Canadian aluminum production is concentrated in Quebec, and has the lowest carbon intensity in the world.<sup>9</sup>
- **Wood:** most commonly used in construction of low-rise buildings, there is growing demand for using 'mass timber' and other wood products in mid- and high-rise buildings in Canada. Canada is home to 36% of the world's third-party, independently certified forests.<sup>20</sup> More than half of the country's forest products industry is located in British Columbia and Quebec.<sup>9</sup>

## 3. Codes and Standards

The federal government provides direction to set and update the model National Building Codes, which are national standards that provinces and territories may adopt. These include standards for operational energy efficiency, but not embodied carbon. The National Building Codes need to include standards for embodied carbon, and the federal government should work with provinces and territories to develop and apply these standards by 2030 at the latest. Embodied carbon standards can also be applied to emissions-intensive materials and products, on a voluntary or mandatory basis, to support additional carbon reduction while protecting competitiveness.

# Why is Buy Clean important for Canada?

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Buy Clean policy is important to establish in Canada for several reasons. **First, Canada needs to match the growing ambition of the U.S., our top trading partner.** Buy Clean policies are spreading rapidly at state and local levels,<sup>21</sup> and a proposed national Buy Clean program has been recently introduced to Congress.<sup>22</sup> Aligning our approach with that of the U.S. will demonstrate Canada's willingness to match the new administration's climate ambitions and provide an opportunity to develop North American low-carbon Buy Clean criteria for construction materials. An aligned approach could also help counter 'Buy America' provisions and potentially increase Canadian access to the \$700 billion U.S. procurement market.

**Second, Buy Clean policy will help to support economic competitiveness and jobs in Canada's heavy industry sector.**

As the world moves to a net-zero future, the EU, U.K. and other trading partners are developing industrial strategies to decarbonize heavy industry and manufacturing while maintaining competitiveness. By increasing domestic demand, Buy Clean can position Canada's industries for the future low-carbon global economy, while leveling the playing field against imports from low-cost, high-emissions jurisdictions in Asia and elsewhere.

**Third, Buy Clean policies will drive additional industrial emissions reductions to close Canada's 2030 emissions gap.**

Buy Clean complements existing policies that reduce industrial emissions, including the output-based pricing system, regulations (e.g. the Clean Fuels Standard), and funding for demonstration projects (e.g. the Net-Zero Accelerator). Utilizing public purchasing power drives additional demand for low-carbon products, establishes greater investor certainty and confidence, and therefore encourages industry to invest in new carbon-cutting technologies and processes.



*Credit: The Forest Products Association of Canada*



# Buy Clean and the United States

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The U.S. is Canada's largest trading partner, and U.S. federal procurement and infrastructure is a key market for Canadian industrial producers, valued at \$700 billion.<sup>23</sup> Buy Clean is gathering pace at national, state and local level in the U.S., with at least eight initiatives launched in 2021 taking various approaches to embodied carbon reduction.<sup>24</sup>



Credit: Cement Association of Canada

**CALIFORNIA** passed the first piece of Buy Clean legislation in 2017, which applies to four materials: steel rebar, structural steel, glass, and insulation. California's program was phased in over four years, with requirements for disclosing embodied carbon (via EPDs) followed by the introduction of mandatory carbon intensity benchmark requirements in 2021 for all state-funded infrastructure projects. Two bills introduced in 2021 would extend coverage to include concrete, gypsum board and other materials.

**NEW YORK AND NEW JERSEY** introduced legislation in 2021 that would require state infrastructure projects to use low-carbon concrete. New York's proposed Low Embodied Carbon Concrete Leadership Act (LECCLA) provides a discount of up to 5% for bids that use the lowest-carbon concrete (demonstrated by submitting an EPD), and an additional 3% incentive for concrete using carbon capture and storage.

**THE FEDERAL GOVERNMENT** introduced the CLEAN Future Act to Congress in March 2021. The act would establish a national Buy Clean program that includes a national database of environmental product declarations (EPDs), embodied carbon performance standards for federally-funded infrastructure projects, and a labelling program for products with significant carbon reductions. An initial list of eligible materials includes cement, concrete, steel, iron and aluminum (wood products and other construction materials could be added later). A separate Buy Clean bill is expected to be introduced in the Senate in 2021. In addition, the U.S. General Services Administration is taking steps toward reducing embodied carbon in federal building procurement.<sup>25</sup>

# A Six-Step Roadmap to Buy Clean

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Buy Clean policy is complex and far-reaching, requiring coordinated action from multiple government departments and agencies. Below we outline the key steps and policy design considerations for the federal government.

## Step 1: Prioritization and Coordination

Buy Clean policy is currently split between a number of different federal departments and agencies, leading to an inconsistent approach that is hindering progress. For example:

- **The Treasury Board Secretariat** leads the Greening Government Strategy that sets targets to reduce embodied carbon in federal procurement.
- **The National Research Council**, an agency of **Industry, Science and Economic Development** (ISED), is developing a public life-cycle inventory dataset for Canadian construction materials. ISED is also working to develop low carbon supply chains for the cement and concrete industries.
- **Environment and Climate Change Canada** manages the industrial greenhouse gas reporting program and life-cycle emissions dataset for fuels and electricity production, which provide important data to support Buy Clean.
- **Infrastructure Canada** manages the \$188-billion Investing in Canada Plan, which funds infrastructure in partnership with provinces, territories and municipalities. It also oversees the **Canada Infrastructure Bank** which has a mandate to attract private sector investment. Other departments, including **Transport Canada**, also fund infrastructure projects.
- **Global Affairs Canada** leads trade negotiations with the United States, including how Buy America and Buy Clean policies could impact Canada's economy.
- The **Department of National Defence** is the largest federal procurement agency and also has the highest carbon footprint.
- **Natural Resources Canada** and the **Canadian Forest Service** provide support and resources on the development of mass timber construction across the country.

**The government must coordinate and prioritize these various efforts through a centralized office or department** with sufficient authority to engage the key departments and agencies in working together on the solutions needed to make Buy Clean a reality. Government should assign responsibility for Buy Clean coordination to the Privy Council Office, and provide them with a clear mandate, timelines and milestones.

## Step 2: Improve Data and Transparency

Having access to accurate, comparable and verifiable data on the life-cycle impacts of construction materials is crucial to a successful Buy Clean policy. Procurement agencies need standardized data in order to assess and compare the carbon content of different materials when evaluating bids. Producers and companies bidding on infrastructure projects need common datasets and methods to quantify and report their emissions, and to ensure a level playing field across competing materials and products.

The commonly accepted approach to quantify embodied carbon is life-cycle assessment (LCA) which tracks carbon pollution across an entire product supply chain, and is produced using a consistent dataset of resource and energy flows called a life-cycle inventory (LCI). The LCA produced with this data is generally reported in a standardized protocol called an environmental product declaration (EPD). EPDs are developed according to standard rules and guidelines, and must be independently verified against international standards.

The Low-Carbon Assets through Life Cycle Assessment (LCA<sup>2</sup>) initiative, led by the National Research Council, is developing several key outputs that will support lower embodied carbon buildings and infrastructure.<sup>11</sup> These include:

- A centralized, publicly available Canadian **life-cycle inventory database** to provide objective data to improve the quality and consistency of life cycle assessments.
- **Infrastructure-specific tools and guidelines** to help measure, evaluate and track the full life cycle of the carbon emissions of built assets.

- **Low-carbon benchmarks** for construction materials and products.
- Procurement specifications to support integration of LCA into decision making.
- Research to improve LCA tools and data and improve accuracy and comparability.

The LCA<sup>2</sup> initiative will provide the essential, comprehensive, and science-based data needed to underpin any effort Canada takes to reduce carbon pollution in infrastructure. Given its importance, its outputs must be supported and accelerated in the following ways:

1. **Prioritized through added resources**—both in terms of funding for the project and staff to build the LCI datasets in two years or less, and then maintain and improve over time.
2. **Supported with additional data**—life-cycle data for energy-related inputs to heavy industry (such as fuels, electricity, and transport) are needed to complement the material-specific data being gathered by LCA<sup>2</sup>. Environment and Climate Change Canada (ECCC) has developed such a dataset for the Clean Fuels Standard. ECCC, NRC and the Centre for Greening Government within Treasury Board, should work together to ensure this dataset is integrated with LCA<sup>2</sup>, to fill data gaps, and develop a fully-resourced plan for ongoing database management.
3. **Link LCA<sup>2</sup> to government policy and decisions**, by using its outputs to develop guidelines, standards, specifications, and benchmarks to support low-carbon procurement and infrastructure spending. The government must ensure that standardized data is accessible and transparent to public and private sector users, either through the creation of a simple-to-use tool or by providing data to external tools (e.g. EC3, Climate Earth etc.). This is especially important for local governments with limited capacity and expertise in LCA to allow them to integrate Buy Clean criteria into their procurement processes.

### Life-cycle assessments and environmental product declarations:

**Life-cycle assessment** (LCA) is the generally accepted method to measure embodied carbon emissions in construction materials. LCA quantifies the environmental impacts at key stages, from raw material extraction, through processing, manufacturing, transportation, construction, to end-of-life and beyond life (i.e. reuse and recycling). A product's carbon footprint is expressed through global warming potential (GWP). **Life-Cycle Inventory** (LCI) is the data collection portion of LCA. It consists of detailed accounting of all the flows in and out of the product system, including raw resources or materials, energy by type, water, and emissions to air, water, and land by specific substance. **Environmental product declarations** (EPDs) are the standard tool used in the building industry to communicate the results of an LCA—they can be thought of as a 'nutrition label' for a product's carbon footprint. EPDs can report a range of impacts in addition to GWP, and are independently verified in accordance with international standards. The rules for developing an EPD are set out in **product category rules** (PCR). For example, this tells industry which stages of a product's life cycle should be included in the EPD, and whether data should be industry-wide or product/facility-specific.

*Sources: Clean Energy Canada, Building the Future, 2019; Carbon Leadership Forum, Guidance on Embodied Carbon Disclosure, 2021*

## Step 3: Accelerate and Strengthen Greening Government Strategy

As the single largest buyer of goods and services in Canada, the federal government can play an important role in developing new markets, such as those for low-carbon building materials. To date, there has been good progress on addressing embodied emissions from procurement through the Greening Government Strategy and the planned development of the LCA<sup>2</sup> database and tool to support decision-making (see above). The Greening Government Strategy is led by the Centre for Greening Government of the Treasury Board of Canada Secretariat, and applies to core government departments and agencies.<sup>10</sup> It includes commitments to:

- Disclose the embodied carbon emissions in the structural materials of major construction projects by 2022, and reduce these emissions by 30%, starting in 2025.
- Conduct whole building/asset life-cycle assessments by 2025 at the latest for major buildings and infrastructure projects.

This work is important to demonstrate federal government leadership and road test new reporting methods and procurement processes. The government should build on this promising start to provide additional clarity and develop a more comprehensive approach, by taking the following steps:

**SET MEDIUM AND LONG TERM TARGETS.** Quantitative targets provide a clear signal to industry that there will be future demand for low-carbon products. The existing Greening Government Strategy sets targets to 2025. We recommend (1) accelerating these existing commitments to 2023, and (2) extending targets out to 2030 and beyond, to align them with Canada’s national climate targets and a pathway to net-zero by 2050. Targets should be regularly reviewed and adjusted based on factors such as market conditions and technology availability.<sup>12,26</sup>

**CLARIFY SCOPE AND DISCLOSURE REQUIREMENTS.** The current Greening Government Strategy references “structural materials of major construction projects.” This should be updated to clarify which materials are eligible, and whether a “major construction project” is based on a financial value or area threshold. Lessons from other jurisdictions suggest beginning with a subset of emissions-intensive materials for which life-cycle data already exists or can be rapidly collected, before extending to other construction materials. The U.S., for example, has a two-tiered list in its proposed Buy Clean program (see chart). The requirements around embodied carbon disclosure should also be clear so that producers and infrastructure providers know which tools to invest in (EPD or other LCA method), and at what level (i.e. product or facility-specific).

#### U.S. Buy Clean Program—Proposed List of Eligible Materials

Initial list	Aluminum, Iron, Steel, Concrete, Cement
Secondary list	Flat Glass, Insulation, Unit Masonry, Wood products

*Source: Section 522, CLEAN Future Act, March 2021, U.S. Congress, House of Representatives.*

**DEVELOP BENCHMARKS.** Carbon-intensity performance standards should be developed for specific materials. These provide the baseline against which future targets are measured, and can be used to differentiate between high- and low-carbon products. Benchmarks should be developed in consultation with industry, account for regional contexts (i.e. electricity grid intensity), and based on a period of data collection. For example, California’s Buy Clean policy included a three-year EPD disclosure period during which time it gathered data to develop mandatory carbon-intensity “caps,” based on industry averages.<sup>27</sup> Benchmarks can also be designed to encourage low-carbon innovation, for example, by allocating a portion of infrastructure funds to the best-performing materials or projects (e.g. in the lowest 20th percentile of carbon intensity) or using specific low-carbon technologies (such as cement made with carbon capture utilization and storage or steel produced using clean hydrogen).<sup>28</sup>

Government should also consider using financial incentives to encourage compliance and innovation. These could include grants or tax credits to companies developing EPDs, or discounts on bids that use low carbon materials (e.g. New York State’s proposed LECCLA policy that includes a 5% discount for the bid using the lowest-carbon concrete).<sup>26</sup>

**EXTEND GREENING GOVERNMENT STRATEGY BEYOND PROCUREMENT.** The Greening Government Strategy applies to core government departments and agencies, but is only “encouraged” for Crown corporations with significant property assets or procurement budgets.<sup>10</sup> The government should set a realistic, but ambitious deadline (by 2025 at the latest) for Crown corporations to adopt the Greening Government Strategy targets, including for embodied carbon. As the next section articulates, the government must also include infrastructure investments in Buy Clean as these are financially significant and can influence spending at other levels of government.



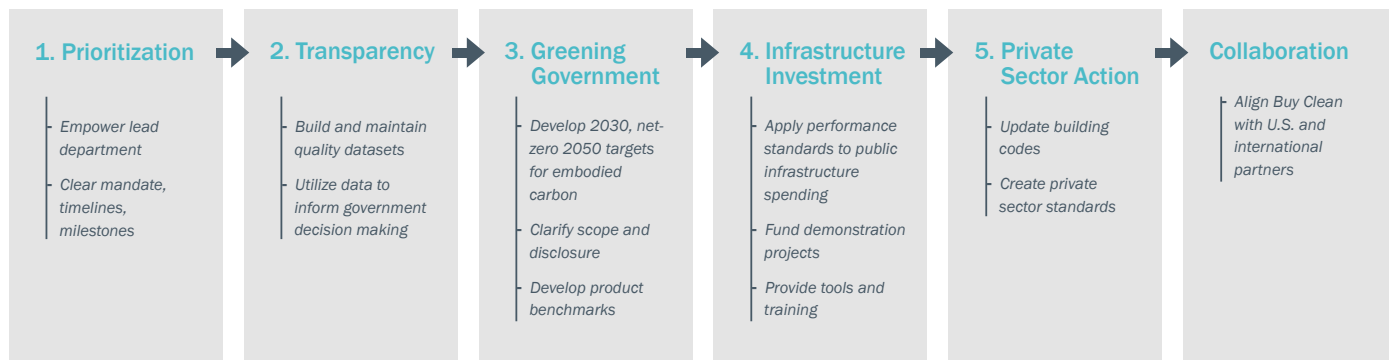


Figure 1. Components of a Buy Clean policy.

## Step 4: Set Buy Clean Criteria for Federal Infrastructure Investments

Procurement is one important tool at the government's disposal. Another is through federal infrastructure investments. Total Canadian public infrastructure spending is about \$73 billion each year, with the majority from provincial, territorial and municipal governments (Figure 2). The federal government, through Infrastructure Canada, plays a key role both through its own spending under the Investing in Canada Plan, and by setting standards and criteria in its transfers to other levels of government.

### Infrastructure spending by asset ownership, 2018-2019

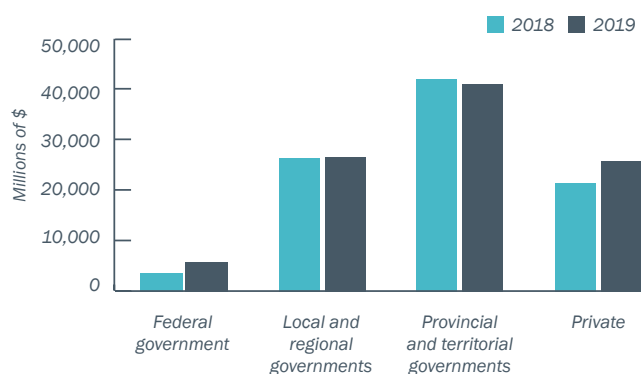


Figure 2. Canadian infrastructure investment by asset ownership.  
Source: Statistics Canada. Table 34-10-0280-01 Capital expenditures, infrastructure assets, by ownership.

The Investing in Canada Plan (ICP) commits \$188 billion over 12 years (2016-2028) toward a range of infrastructure priorities, from public transit and roads, to community, social and 'green' infrastructure.<sup>1</sup> As of July 2021, \$96 billion (51%) of this commitment has been approved for over 73,000 projects.<sup>16</sup> None of this funding explicitly considers embodied carbon, despite the material-intensive nature of virtually all infrastructure.

**The government should include embodied carbon criteria in its bilateral agreements with provinces and territories through use of the climate lens.** The climate lens tool requires proponents to assess the expected mitigation and/or adaptation benefits associated with an infrastructure project. At present, the climate lens only applies to a subset of programs, which together account for less than a fifth of total spending committed under ICP. Infrastructure Canada should update the climate lens to incorporate embodied carbon of key construction materials as part of the GHG assessment. The new requirements should be included in provincial and territorial bilateral agreements, during the five-year program review of the existing agreements in 2023, and in future funding agreements.<sup>29</sup> **Infrastructure Canada should also work with provinces and territories to develop national infrastructure embodied carbon standards and targets, and include these in amended bilateral agreements.**

This would align Canada with the U.S., which is proposing "Buy Clean standards for federally funded infrastructure projects" with the goal of "steadily reduc[ing] the quantity of embodied emissions of construction materials and products, and promot[ing] the use of low-emissions construction materials and products, in projects involving Federal funds."<sup>30</sup>

The EU, Canada's other major trading partner, also sets embodied carbon performance standards for procurement and infrastructure. The EU's Green Public Procurement criteria are developed to facilitate the inclusion of green requirements in public tender documents. They include LCA and embodied carbon criteria for specific infrastructure types, such as office buildings, roads, and wastewater infrastructure.<sup>31</sup> The EU also requires that procurement contracts be awarded based on the Most Economically Advantageous Tender (MEAT), which considers the full life-cycle costs of a product or project instead of just the lowest upfront cost.<sup>32</sup>

**These efforts must be accompanied by work to build capacity in procurement agencies and among professional engineers and specifiers, through training and professional development, tools and guidelines, and procurement templates.** An example of how the government can support implementation of new procurement practices is the U.K. Commissioning Academy, which was launched in 2011 by Cabinet Office. The Academy trains decision makers in central and local government to improve procurement practices and outcomes.<sup>33</sup>

Infrastructure Canada is also responsible for the arms-length Canada Infrastructure Bank (see sidebar). The CIB is investing \$35 billion in infrastructure across the country, in partnership with the private sector, and should align its priorities with a federal Buy Clean approach. **The Minister of Infrastructure has an opportunity to update the CIB's mandate during a legislative review in mid-2022, and should include embodied carbon as a priority in future investment decisions.**

Finally, **Infrastructure Canada should begin showcasing low-carbon materials in infrastructure projects by creating a Clean Infrastructure Challenge Fund.** This would be open to provincial, territorial and municipal governments, and would be an opportunity to showcase recent public investments to decarbonize heavy industry (e.g. Net-Zero Accelerator/Canada Infrastructure Bank funding for Algoma Steel) by supporting demonstration projects using low-carbon materials and innovative procurement practices.

## Canada Infrastructure Bank

The Canada Infrastructure Bank is an arms-length Crown corporation with a mandate to invest \$35 billion from the federal government into infrastructure projects, including \$10 billion over the next three years in five areas: clean power, building retrofits, public transit, broadband, and agriculture-related infrastructure. The CIB's overall policy direction and investment priorities are set by the Government of Canada, and the CIB is accountable to the federal government through the Canada Infrastructure Bank Act and its annual Corporate Plans.<sup>34</sup> **The CIB's current priorities include reducing operational GHG emissions in public sector and commercial buildings—but not addressing life-cycle emissions or embodied carbon of construction materials.**<sup>35</sup> Large-scale building retrofits represent an opportunity to reduce embodied carbon, e.g. through selection of insulation and other materials, reuse/recycling of existing assets, or reducing transport emissions.<sup>35,36</sup> Similarly, the CIB's longer-term priorities include funding for public transit infrastructure, roads, highways and bridges, and power generation and transmission—all of which have the potential to create or reduce significant embodied emissions. The Minister of Infrastructure will be undertaking a review of the CIB's legislation and priorities by mid-2022.<sup>34-36</sup> As part of this review we recommend that Buy Clean policies are applied to the CIB's mandate alongside GHG reductions and energy efficiency. These criteria should apply to all CIB investment decisions and be phased in to become mandatory by 2025.

## Step 5: Private Sector Standards

The private sector accounts for a significant proportion of infrastructure spending and related emissions. Of total infrastructure investments of \$100 billion in 2019, the private sector spent \$26 billion, with spending concentrated on transport, electricity, communications, and energy infrastructure.<sup>37</sup> Investment in residential, commercial and industrial building construction adds another \$78 billion.<sup>38</sup> Because these activities largely happen outside of the public sector, they would not be covered by Buy Clean standards on federal spending, and complementary policies would be needed.

## Public/private sector infrastructure spending in 2019

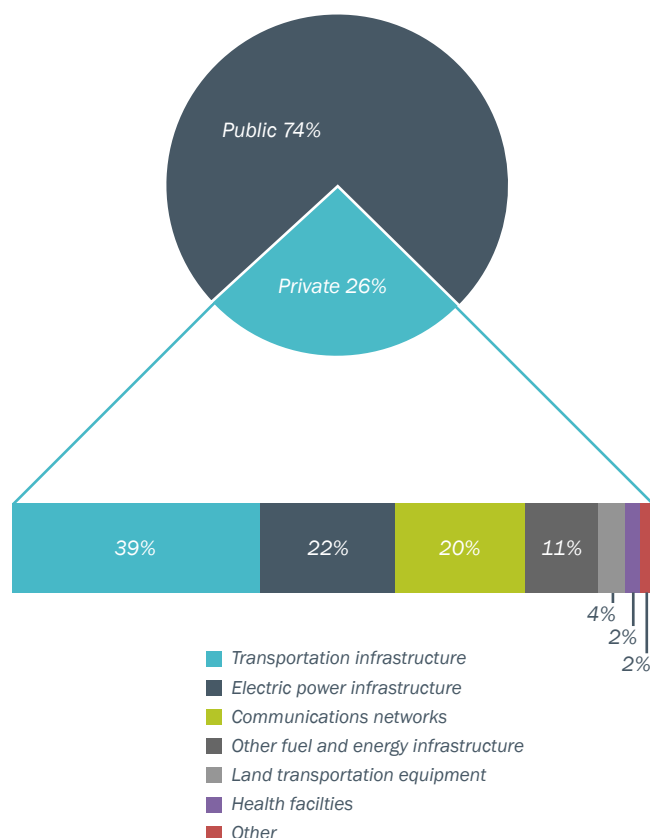


Figure 3. Breakdown of private sector infrastructure spending.  
Source: Statistics Canada. Table 34-10-0280-01 Capital expenditures, infrastructure assets, by ownership.

Voluntary action is already happening in the private sector—but better coordination is needed to require the use of standardized data and approaches. For example, construction companies are beginning to request EPDs for certain materials and developing carbon accounting tools to quantify and reduce embodied carbon for infrastructure projects.<sup>39</sup> The Zero Carbon Building Standard, developed by the Canada Green Building Council, is a voluntary standard that has been used for a number of buildings across Canada and requires reporting and/or offsetting of embodied carbon.<sup>40</sup> A growing number of construction and engineering companies around the world are setting targets to reduce supply chain emissions, including those embodied in construction materials.<sup>41</sup>

The federal government should build on private sector leadership by setting embodied carbon standards that apply to both public and private construction projects. **A first step should be to update the model national building codes to account for embodied carbon.** Although the national codes have included building energy efficiency standards since 1997, there are no equivalent standards for embodied carbon. The federal government must provide clear direction and resources to the Canadian Commission on Building and Fire Codes (CCBFC) to include embodied carbon in future updates to the national codes. **It must also work collaboratively with the provinces and territories**—which are responsible for implementing building codes—to develop and adopt embodied carbon standards by 2030 at the latest.

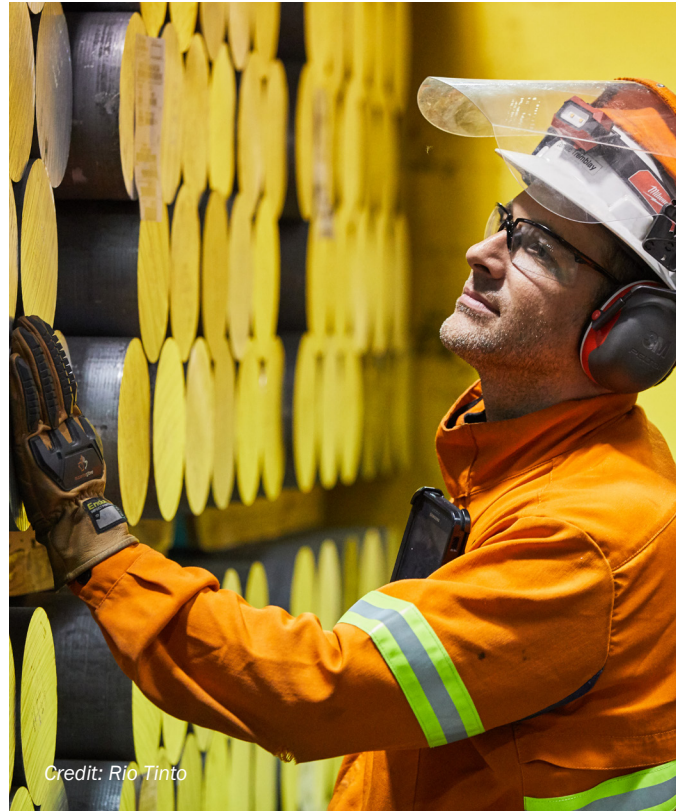
There is both an opportunity and a need to **ensure accountability in the private sector—in order to verify that materials being used are truly low-carbon and are recognized as such.** Globally, there are a number of approaches being considered to support this objective. The U.S. CLEAN Future Act proposes the creation of a Climate Star program which will identify and promote products with significantly lower embodied emissions than comparable products, and includes performance criteria, third-party certification, and regular audits. By 2025, federal departments must procure Climate Star-labelled products if available.<sup>42</sup> The U.K. is proposing to develop voluntary low-carbon product standards by 2025 for steel, cement, and other industrial materials, which would provide an accredited certification for products that are less carbon intensive than the market norm. These standards would be gradually phased in after 2025 to become mandatory, setting an upper limit on embodied emissions that increases in stringency to 2050.<sup>43</sup> In Canada, the CSA Group recently released technical specifications for concrete carbon intensity quantification and verification, which could serve as a model for other material standards.<sup>44</sup>

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## Step 6: International Collaboration

Canada should work with the U.S. and other jurisdictions to leverage a larger public market for low-carbon materials. The U.S. has a much larger federal procurement market than Canada, estimated at \$700 billion annually, and is pursuing a federal Buy Clean strategy that includes a national database and embodied carbon standards for infrastructure projects.<sup>42</sup> The two countries recently agreed to work together on developing net-zero supply chains for construction materials,<sup>45</sup> and have identified the potential to align a Canadian and U.S. Buy Clean approach.<sup>46</sup> As a next step, **Canada should work with the U.S. to develop a Memorandum of Understanding on a unified approach to Buy Clean policy, standards and life-cycle assessment data, to be signed at the COP26 climate conference in November 2021.**

Beyond this, Canada should continue to work through other forums, such as the UN Industrial Deep Decarbonization Initiative, to stimulate the demand for low-carbon construction materials and set common standards for embodied carbon data across more international partners. Recent research suggests the global potential for Buy Clean policies to reduce emissions is significant. A commitment by the top national producers to procure low-carbon steel and cement could reduce up to 900 million tonnes of carbon pollution annually.<sup>12</sup>





# Summary of Recommendations and Next Steps

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Buy Clean represents an opportunity for Canada to reduce emissions, support industries as they transition to net-zero, and create new markets for low-carbon products. To seize this opportunity, the Government of Canada must act fast to turn commitments into action. Below we summarize the key steps needed along with suggested timelines:

## **PRIORITIZE BUY CLEAN ACROSS GOVERNMENT (2021-2022)**

1. Coordinate the efforts by multiple departments and agencies through the Privy Council Office to prioritize and streamline Buy Clean solutions.

## **IMPROVE EMBODIED CARBON DATA AND TRANSPARENCY (2021-2023)**

2. Prioritize and accelerate LCA<sup>2</sup> through added resources to build the dataset in two years or less, integrate existing life-cycle data from other departments, and then maintain and improve over time.
3. Link LCA<sup>2</sup> outputs to government policy and decisions, including setting embodied carbon benchmarks, and creating tools and guidance for procurement agencies to integrate embodied carbon into decisions.

## **ACCELERATE AND STRENGTHEN THE GREENING GOVERNMENT STRATEGY (BY 2025)**

4. Move up short-term embodied carbon targets in the Greening Government Strategy to 2023 (from 2025), and extend targets to 2030 and beyond in order to provide a predictable pathway to net-zero emissions by 2050.
5. Create a list of eligible materials that the Greening Government targets will apply to, and develop embodied carbon benchmarks for these materials in consultation with industry, labour groups, LCA experts, and other stakeholders.
6. By 2025, require all federal agencies and Crown corporations to adopt embodied carbon targets and benchmarks for their spending on construction materials.

## **SET BUY CLEAN TARGETS FOR FEDERAL INFRASTRUCTURE INVESTMENTS (BY 2025)**

7. Update the climate lens to include embodied carbon reporting requirements for eligible materials.

8. Work with provincial, territorial, and municipal government partners to develop and attach Buy Clean criteria to future federal infrastructure transfers.
9. Build capacity and support structures to encourage a shift away from the 'lowest-cost' bid approach and ensure procurement staff at all levels of government have the necessary training, skills, and tools necessary to implement Buy Clean and life-cycle approaches in decision-making.
10. Launch a Clean Infrastructure Challenge Fund, open to provinces, territories and municipalities, to showcase infrastructure projects built using low-carbon construction materials.
11. Amend the Canada Infrastructure Bank's mandate to include embodied carbon requirements for all infrastructure investments.

## **DEVELOP PRIVATE SECTOR LOW-EMBODIED-CARBON STANDARDS (2025 TO 2030)**

12. Work with provinces and territories to update the model national building codes by 2030 to include standards for measuring, reporting and reducing embodied carbon in new construction.
13. Support the development of standards, labels or similar tools to ensure private sector accountability on the embodied carbon performance of construction materials. Such standards must be independent, verifiable and auditable, and should be phased in over time, beginning with a voluntary approach and moving to mandatory requirements.

## **INTERNATIONAL COLLABORATION ON BUY CLEAN (2021 ONWARDS)**

14. Work with the U.S. to develop a joint approach to Buy Clean that applies to federal procurement and infrastructure spending. This should include development of a North American database to support embodied carbon disclosure, setting aligned procurement standards, and working together to support industry pathways to net-zero by 2050.

# Appendix A

## Key federal departments and agencies—roles and responsibilities

Department / Agency	Current relevant activities	Potential role in Buy Clean
Privy Council Office	Climate Secretariat	Coordinate policy development across multiple departments
Treasury Board Secretariat	<p>Greening Government Strategy (includes embodied carbon targets for procurement)</p> <p>Proposed minimum standards for low-carbon concrete procurement</p> <p>Canada-U.S. Greening of Government Initiative (collaboration and international forum)</p>	<p>Continue implementing Greening Government Strategy and pilot projects (e.g. low-carbon concrete)</p> <p>Extend embodied carbon targets to 2030 and beyond</p> <p>Align Canada and U.S. approaches to Buy Clean</p>
Innovation, Science and Economic Development (National Research Council)	<p>LCA<sup>2</sup> initiative (life-cycle database and tool for building materials)</p> <p>Develop low-emissions building materials supply chain for cement, concrete, steel and other materials</p> <p>Develop and update model building codes</p>	<p>Finalize LCA<sup>2</sup> and release tools and guidance to support adoption</p> <p>Work with INFC, TBS and PSPC to use LCA<sup>2</sup> to support improved disclosure and procurement decisions</p> <p>Develop sector-specific pathways for other emissions-intensive construction sectors (e.g. steel, aluminum)</p> <p>Develop embodied carbon performance standards for 2025 update of model building code and new model retrofit code</p>
Infrastructure Canada	<p>Investing in Canada Plan (\$188 billion over 12 years)</p> <p>National Infrastructure Assessment</p>	<p>Develop and adopt Buy Clean standards for infrastructure spending</p> <p>Update Climate Lens to include Buy Clean standards in bilateral agreements</p> <p>Provide funding and support for provinces, territories and municipalities to use low-carbon materials in federally-funded infrastructure projects</p>
Public Services and Procurement Canada	Procures goods and services for federal departments and agencies	Implement Buy Clean standards in all procurement decisions and construction contracts
Department of National Defence	Largest procurement agency and source of government GHG emissions	Integrate Buy Clean standards into all major procurement and infrastructure decisions
Environment and Climate Change Canada	Develops and updates Canada's climate plan	Provide technical support and data to develop Buy Clean performance standards
Global Affairs Canada	Address trade issues around Buy America and U.S. Buy Clean standards	<p>Negotiate Buy America exemptions for Canadian low-carbon materials and products</p> <p>Promote Canada's clean industry advantage to foreign investors</p>
Transport Canada	Provides funding for transportation infrastructure projects, including roads, highways, bridges, public transit, airports and ports	Integrate Buy Clean standards into all major transportation infrastructure projects
Canada Infrastructure Bank	Invests in infrastructure projects to attract additional private/institutional investment and support low carbon economy	<p>Adopt Greening Government Strategy targets</p> <p>Integrate Buy Clean standards into future investment decisions</p> <p>Invest in industrial decarbonization projects that support low-carbon infrastructure</p>
Natural Resources Canada and Canadian Forest Service	Develops and support the implementation of forest policy, including mass timber construction	Continue supporting mass timber construction for a range of building types, including through demonstration projects, publishing guidance, and updating codes and standards

# Appendix B

## United States Buy Clean policy summary

Jurisdiction	Policy or legislation	Materials	Project types	Disclosure	Embodied carbon standards
Federal	CLEAN Future Act, 2021	Aluminum, iron, steel, concrete, cement (initial list)	Buildings and infrastructure	EPDs or similar tool	Yes
California	Buy Clean California Act, 2017	Steel, glass, mineral wool	Buildings and infrastructure	EPDs	Yes
	AB 1365 and 1369, 2021	Addition of concrete, gypsum board, insulation, carpet and ceiling tiles, and other products	Buildings and infrastructure	EPDs	Yes
Minnesota	B3 Guidelines, 2017	At least 5 products used in construction of a building	Buildings	EPD or product-specific LCA	No
Washington State	Buy Clean Buy Fair, 2021	Concrete, steel, wood	Buildings	EPDs	No
New York State	LECCLA, 2021	Concrete	Buildings and infrastructure	EPDs	Yes
New Jersey	AB 5223, 2021	Concrete	Buildings and infrastructure	EPDs	No
Colorado	Global Warming Potential For Public Project Materials, 2021	Asphalt, cement, concrete, glass, steel, wood	Buildings and infrastructure	EPDs	Yes
Oregon	Buy Clean pilot, 2021	Concrete, asphalt, steel	Infrastructure	EPDs	Yes

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