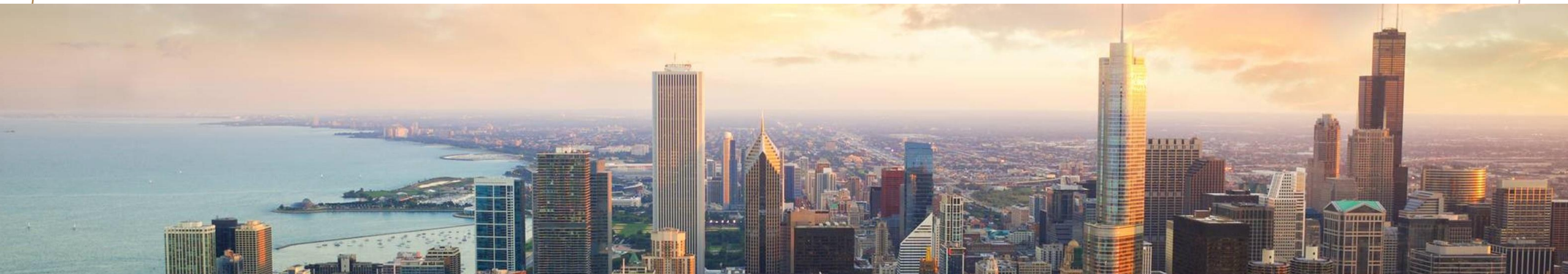
Building a Circular and Low-carbon Construction Industry Through Policy Integration

Afolasade Nubi & Dr. Daina Mazutis
University of Ottawa



Outline

- Research Motivation
- Background
- Research Questions
- Research Method: 3 Stages
- Key Findings
- Conclusion
- Expected Outputs for SPI

Motivation

Environment

We must completely change the way we build homes to stay below 2°C

CANADA'S NATIONAL OBSERVER

Why cleaning up Canada's building industry could be a big win for the economy and climate

New net-zero building designs and decarbonizing retrofits could lay the foundation for a green building boom — but the challenges are formidable.

It should be an environmental and economic win-win for Canada. Build net-zero office towers, homes

What's the Government Doing About the Housing Crisis in Canada?

Canada's long term housing outlook requires not only building more homes, but transforming the system that governs who builds them, who lives in them, and how markets function. The federal plan "Solving the Housing Crisis" builds on the National Housing Strategy's $65.8 billion already committed to date and pushes toward a $115 billion, 10-year goal. Key supply side initiatives announced in Budget 2024 include:

- A $55 billion Apartment Construction Loan Program and a $14.6 billion Affordable

Science

Demolishing buildings is a waste. There's another way: deconstruction

Taking apart and separating valuable materials allows them to be recycled, reused

Emily Chung · CBC News · Posted: Nov 17, 2024 4:00 AM EST | Last Updated: November 28, 2024

Listen to this article
Estimated 8 minutes

CIRCULAR CONSTRUCTION CANADA | Generate Canada

Benefits | Innovation Hub | Hub Projects | Hub Partners | Resources | About

Feb 1, 2026

BLOG: Building for the Future: Why Circularity is the Missing Piece in Canada's Housing Strategy

Canada is currently in the midst of a historic housing push. With the federal government's commitment to building 3.87 million new homes by 2031, the scale of construction ahead us is staggering. However, if we continue to follow a "linear" path—take, make, use, and dispose—we risk solving one crisis by creating another: a mountain of waste and a stock of rigid, "disposable" buildings that will fail the generations to come.

To meet our housing and climate goals simultaneously, we must pivot toward a circular economy. This means shifting from a model of demolition and landfilling to one of design fo disassembly, material reuse, and long-term adaptability.

Menu | CBC

NEWS | Top Stories | Local | Climate | World | Canada | Politics | Indigeno

Science

In an unprecedented warning, leading climate think-tank says Canada won't meet 2030 climate target

Early emissions estimate says Canada's climate progress has stalled

Inayat Singh · CBC News · Posted: Sep 18, 2025 5:00 AM EDT | Last Updated: September 18, 2025

Listen to this article
Estimated 5 minutes

BACKGROUND

Why the Construction Industry?

- The construction industry lies at the nexus of environmental opportunities and challenges.

Globally:

- **~ 40% of CO_2 emissions from buildings**
- **~ 30% of solid waste**
- **~ 50% of raw material consumption**

In Canada:

- **12% of the nation's solid waste stream**
- **~17% of national GHG emissions**
- **~7% of national employment**

(ECCC, 2010; Statistics Canada, 2021)

- Yet adoption of sustainable innovations remains slow (Hertwich et al., 2019; Mazutis & Abolina, 2019; Ruparathna & Hewage, 2015).

Canada has committed to 40% emissions reduction by 2030 & Net-zero by 2050 (ECCC, 2024).

- Transitioning to a low-carbon (LC) economy and adopting circular economy (CE) principles are now central to global sustainability and climate action strategies (Goodland & Walsh, 2024; Zhou et al., 2023).

RESEARCH QUESTIONS

1. How do decision-makers in C&D organizations make sense of LC and CE business models?

2. What is the role of LC and CE policies in driving sustainable changes in the construction industry?

3. What policies or regulatory changes are needed to better integrate LC and CE objectives into C&D projects?

RESEARCH METHODOLOGY

THREE (3) STAGE PROJECT

Stage 1 — Systematic Literature Review (Completed)

Stage 2 — Policy Mapping & Document Review (Completed)

Stage 3 — Interviews & Qualitative Analysis (Ongoing)

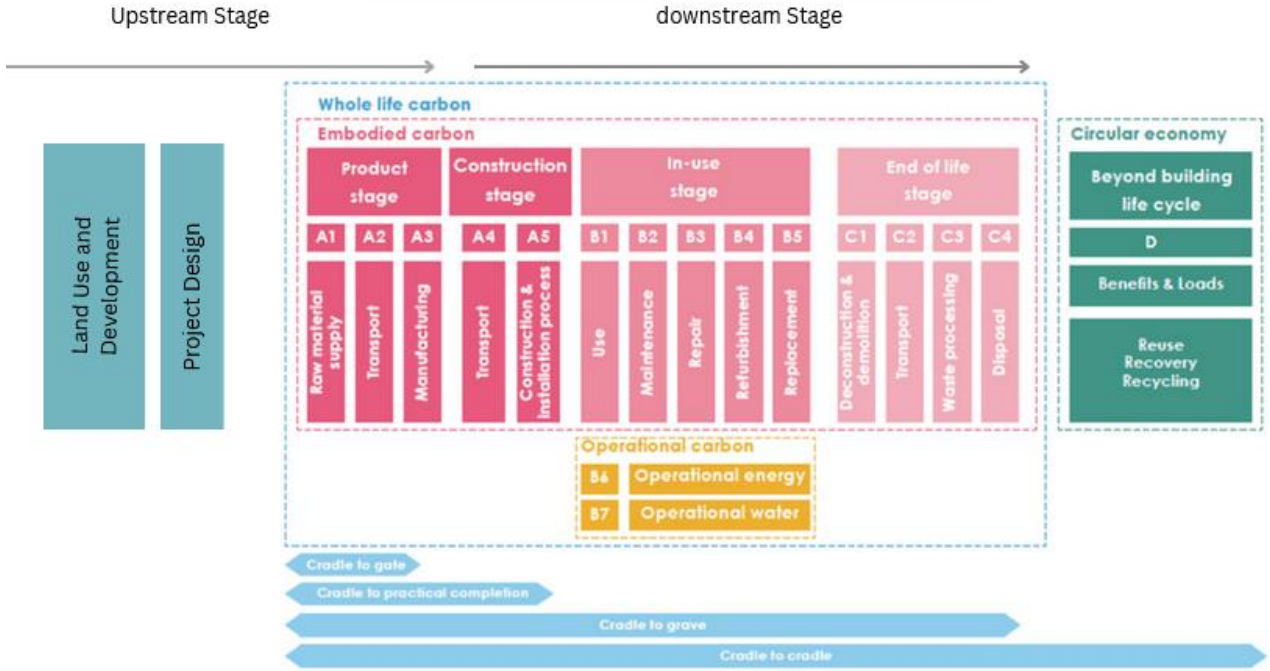
Systematic Literature Review (SLR)

- **Database used:** Web of Science
- **Studies reviewed -** Published between 2016 – 2024
- **Focus:** Canada only
- **Inclusion criteria**: 1). Focus on LC and CE policies, 2) Relevance to (C&D) industry; 3) Empirical research
- **Framework** – Building Life Cycle - Land Use and Development, Design Stage Product Manufacture, Construction, Operation, and End-of-Life (EN 15978:2011)
- **Articles reviewed** = 19 peer-reviewed publication + 36 research reports.
- **Output** – Paper presented at ASAC 2025 at Waterloo

	Filter	No.	Description	Results (# of articles)
Review Planning	Developing research question Formulating research protocols Selecting keywords and database			
Initial Screening Criteria to identify search strings	Google Scholar search Keyword identification			
	Substantive	1	**construction OR development OR "built environment" OR "construction industry" OR "development industry" OR demolition OR "construction and demolition"**	11,145,776
	Substantive	2	Low carbon" OR "low carbon economy" OR "low carbon policy" OR "low carbon economy policy") OR ("circular economy" OR circula* OR circularity OR "circular economy policy" OR "circularity policy")	**1,291,110**
	Substantive	3	Nos 1 AND 2	28,972
	Substantive	4	Nos 3 and Peer-reviewed, Languages: (English), and date 2020-2024	14,269
	Substantive	5	Nos 4 and Country (Canada)	411
	Substantive and Method	6	Abstracts reviewed to ensure fit with search criteria and inclusion criteria	59
		7	Full-text review and articles included in the review	19
		8	Research Reports	36
			Total Articles/Reports reviewed	**55**

STAGE 1 – SLR FINDINGS

- Limited empirical evidence linking policy to construction outcomes
- Strong downstream policy focus (construction, operation, end-of-life)
- Upstream stages remain insufficiently addressed (land use, design, manufacturing)
- Operation phase dominates literature
- Circular economy integration remains fragmented across the lifecycle
- **Implication**: Policy design remains reactive rather than integrated across the building lifecycle.



Goodland & Walsh, 2024; Benachio et al., 2020; Hossain et al., 2020; Jalaei et al., 2022; Natural Resources Canada, 2024; Delphi Group, 2021

Paper presented at ASAC 2025 (Waterloo)

STAGE 2 - POLICY MAPPING & EXPANDED DOCUMENT REVIEW

Data collection - (April 2025 – October 2025)

Multi-level policy mapping

- 50 industry and government reports (**Stage 1: 36 reports + Stage 2: +14 new reports**)
- Official government websites, legislative and regulatory databases, public databases and selected media sources reviewed.

Policy coded

- **Across governance level** - Federal, provincial/territorial, and major municipalities (Toronto, Vancouver, Montréal, Calgary, and Ottawa)
- **Instrument type** - (Regulatory or economic); enforcement mechanism (mandatory, or voluntary)
- **Policy focus** - Low-carbon, circular economy, or both
- **Building lifecycle** - Land use, design, construction, manufacturing, operation, end-of-life.

Industry Alignment Analysis

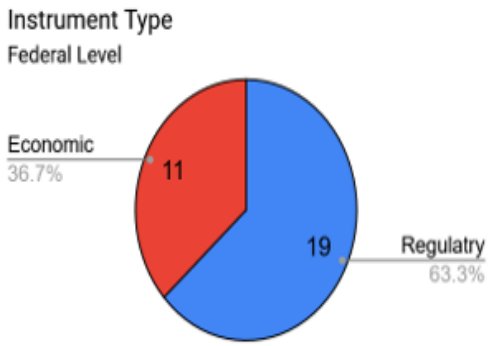
Barriers, challenges, and recommendations for advancing LC/CE transitions

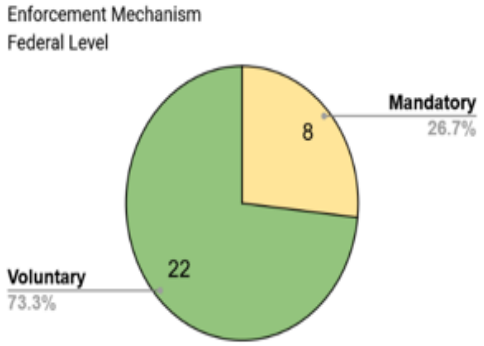
Output – Paper currently under review at ASAC 2026 (Calgary) and is currently under review at Business & Society, special issue about Circular Economy and Sustainable Development.

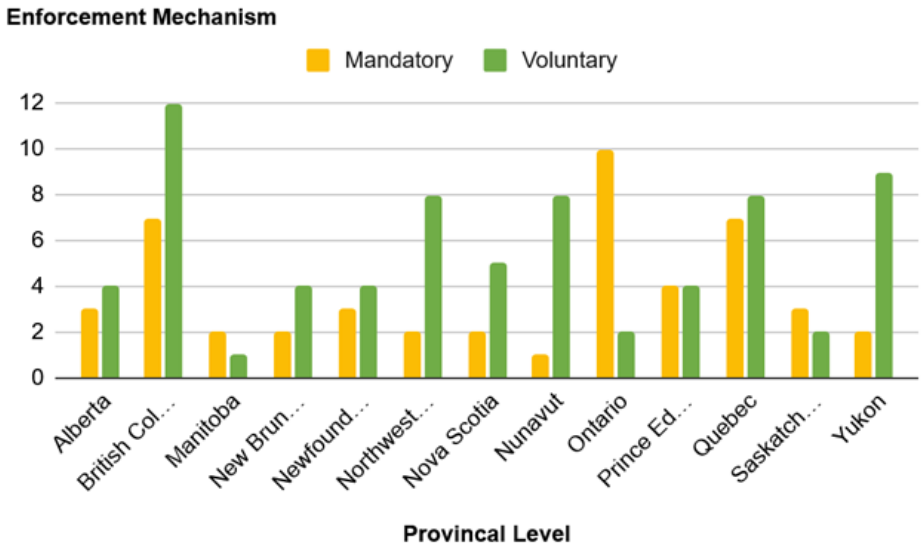
FINDINGS

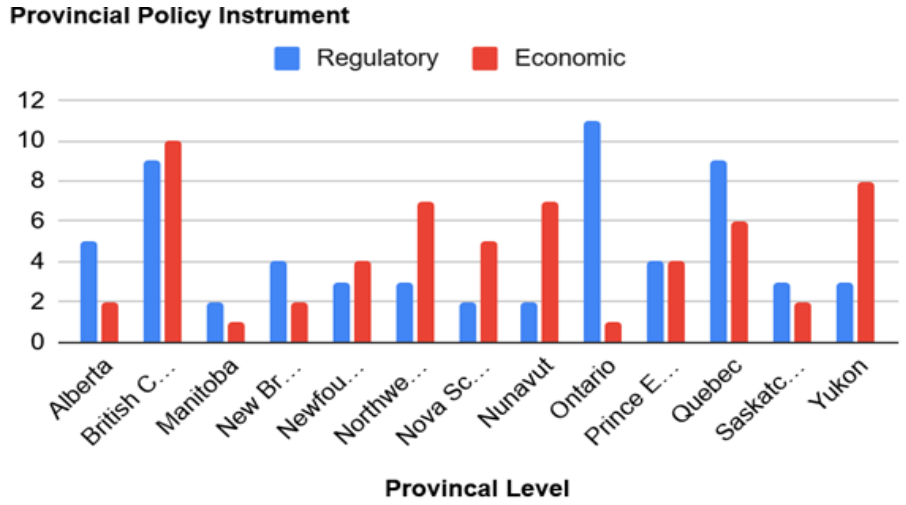
- 184 LC/CE-relevant policies in the C&D sector mapped, comprising 28 federal, 116 provincial/territorial, and 40 municipal instruments.

Instrument Type and Enforcement Mechanism at the Federal Level

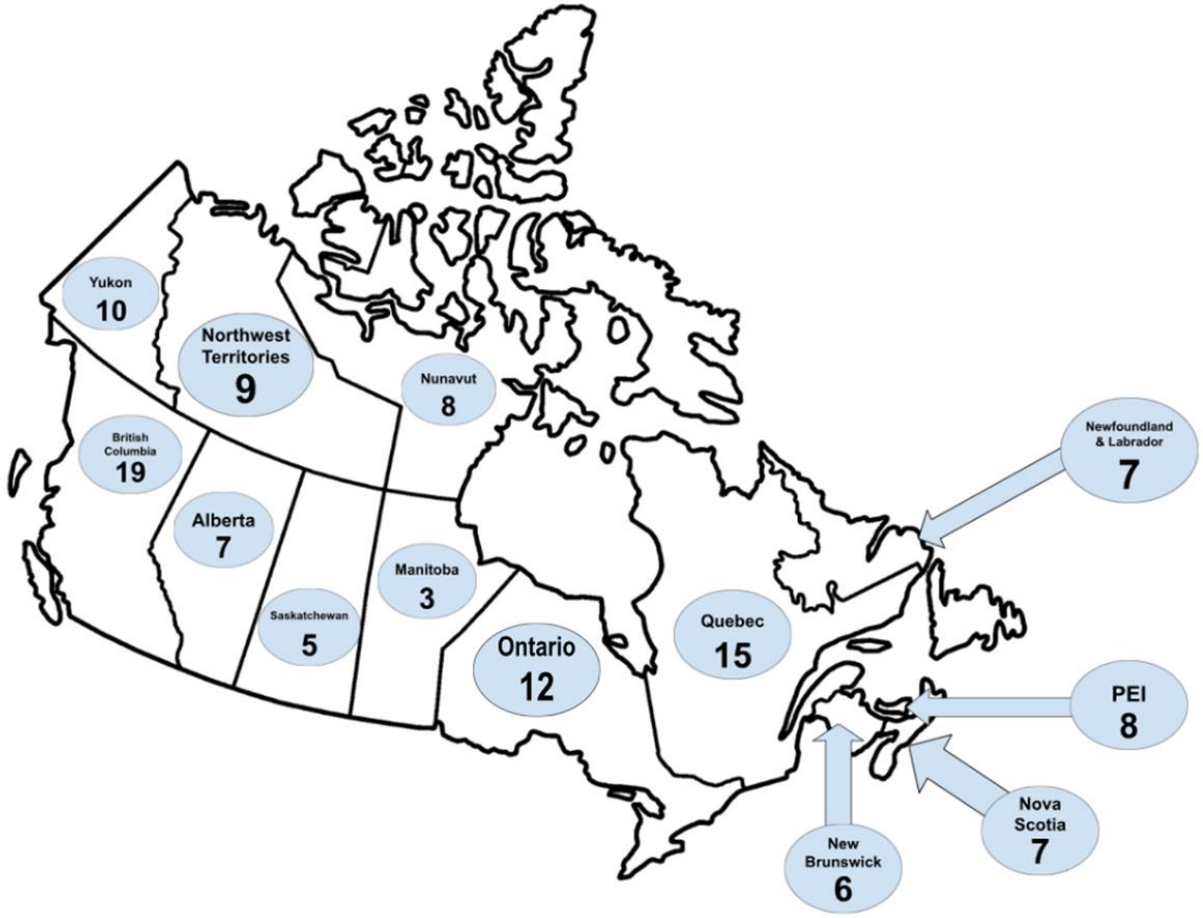


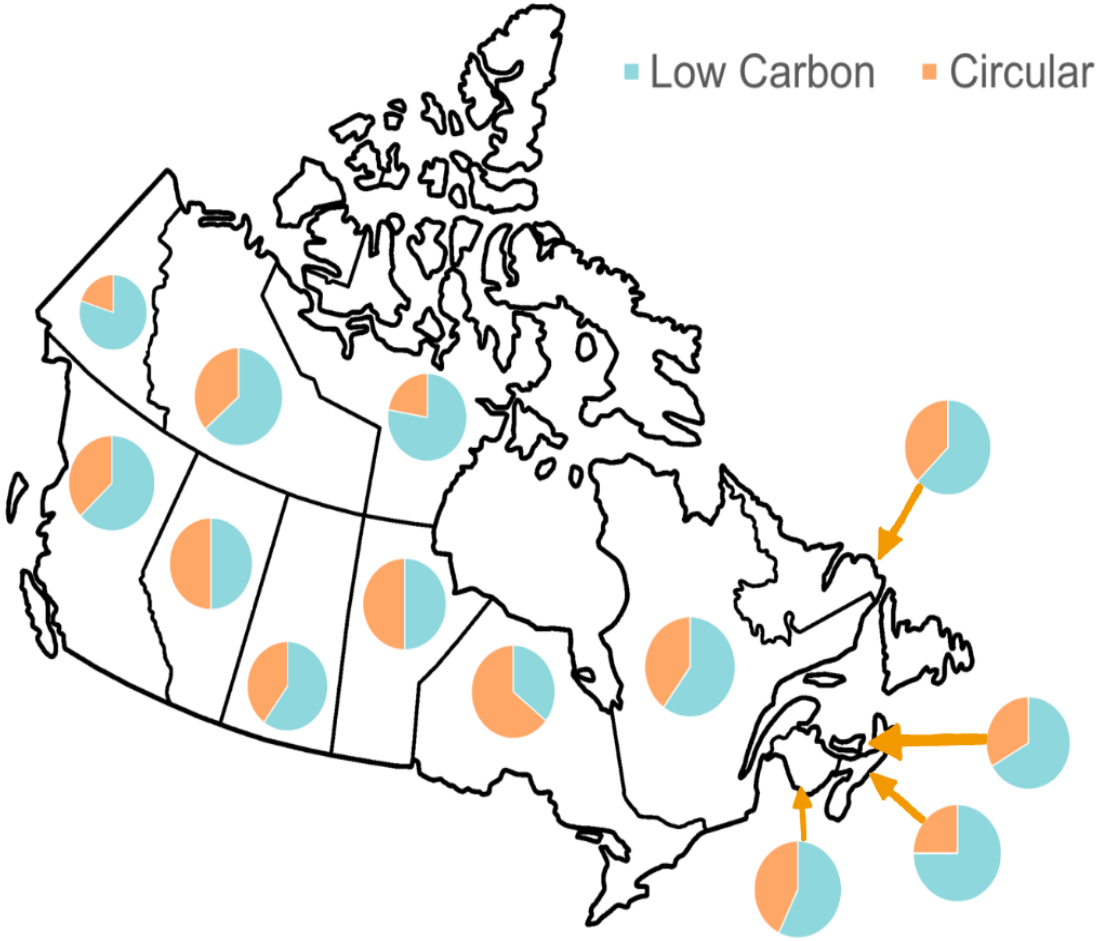






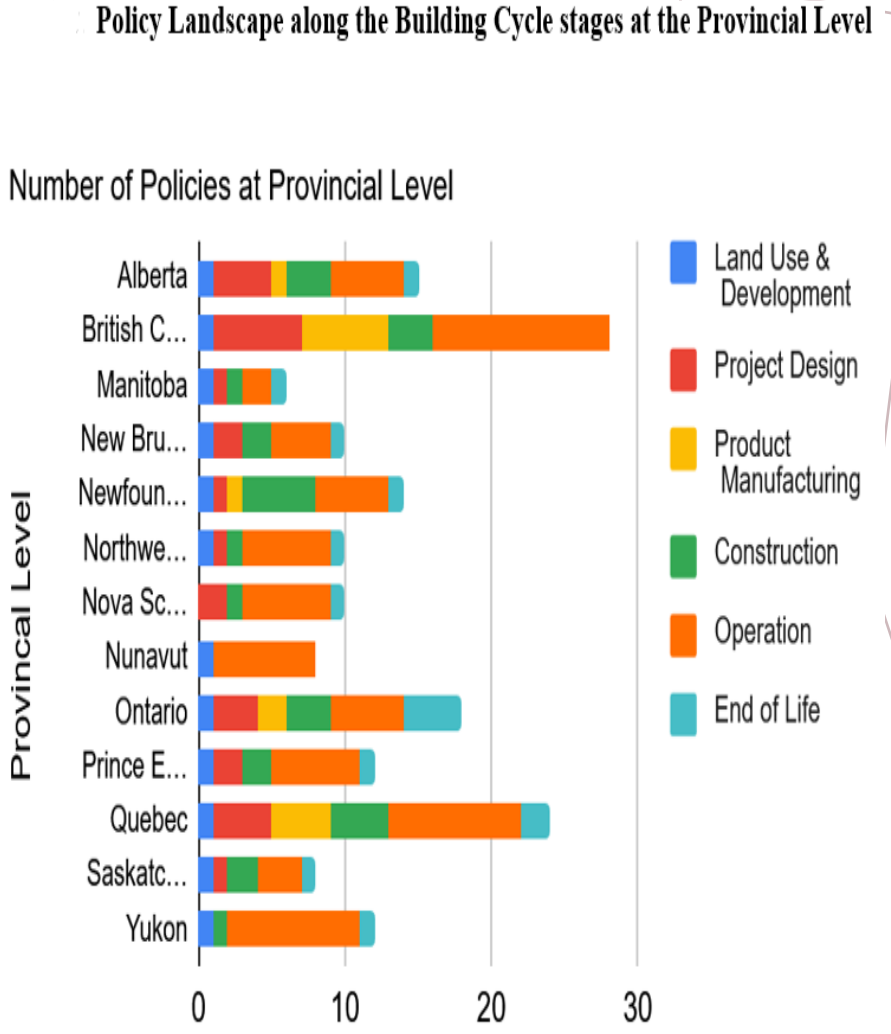
POLICY FOCUS – LC, CE, OR BOTH – PROVINCE/TERRITORY





POLICY MAPPING — KEY FINDINGS

- Policy landscape is **fragmented and uneven** across provinces
- Current policy landscape is **primarily LC focused**, with CE considerations still emerging
- Majority of policies focus on **operational performance (energy efficiency)**
- Regulatory instruments and voluntary enforcement dominate
- **Policy coordination across levels of government is limited**
- **Ontario** is distinct for its **highly mandatory and regulatory approach**, and it is the only province where CE policies exceed LC measures, yet it also exhibits lifecycle imbalances
- **British Columbia and Quebec** maintain the most extensive provincial policy portfolios yet both remain strongly low-carbon oriented and heavily concentrated in the operation stage
- The **Northern territories** rely almost exclusively on voluntary, incentive-based tools and display the narrowest lifecycle coverage.



Canadian Green Building Council; Canadian Standards Association: Canadian Construction Association; Circular Economy Leadership Canada; National Research Council; Environment and Climate Change Canada

KEY INDUSTRY–POLICY GAPS

Standards, Data, and Measurement
Lack of uniform standards, definitions, and reliable data systems
Policies remain focused on operations, not design or end-of-life
Governance Fragmentation
Inconsistent provincial and municipal regulations
Weak coordination and reliance on voluntary instruments
Economic Barriers
High costs of reused materials, low landfill fees
Limited incentives for reuse and circular practices
Supply Chain & Infrastructure
Limited CE-compliant materials and reuse networks
Weak policy support for manufacturing and end-of-life stages
Cultural & Capacity Constraints
Preference for “quick, cheap, new” Low awareness, training, and cross-sector collaboration
Overall Insight:
Policy signals exist, but gaps in standards, governance, markets, and capacity limit industry transition.

STAGE 3: INDUSTRY INTERVIEWS & QUALITATIVE ANALYSIS

- **Interviews** - 26 completed (approx. 650 pages of transcripts)
- **Target sample**: ~35interviews (~10 experts + ~25 across lifecycle)
- Benchmark aligned with CSA studies (20–25 interviews)
- Supplemented with other qualitative data sources (e.g., newspaper articles, conference notes etc.)
- Preliminary analysis currently underway - Excel coding/Nvivo
- Planned output - Paper 2 of PhD & publish in Journal of Management
- **Early insights indicate:**
  - -Varied industry responses to policy pressures
  - -Economic and operational constraints shaping decisions
  - -Policy Inconsistency, Provincial Interference and Jurisdictional Conflict
  - -Operational Dominance
  - -Carbon Pricing Impact
  - -Financial Viability and the Business Case

Building Lifecycle Stage	# of Inter-views Completed	# To be Completed	Total
Land Use & Development (including gov.)	**2**	**3**	**5**
Project Design	**4**	**1**	**5**
Product Manufacture	**2**	**3**	**5**
Construction	**5**	**0**	**5**
Operation	**5**	**0**	**5**
End of Life	**2**	**3**	**5**
Industry Experts	**6**	**4**	**10**
Total	**26**	**9**	**35**

CONCLUSION

- Canada’s construction sector is central to both climate and circular economy transitions
- Policy landscape is expanding, but remains fragmented and uneven across jurisdictions and lifecycle stages
- Current policy mix is predominantly low-carbon focused, with circular economy integration still limited
- Industry faces structural barriers in standards, governance, markets, infrastructure, and capacity
- Preliminary evidence suggests policy signals influence direction, but economic and systemic factors shape implementation

- **Final insight:**
  Accelerating sustainable construction in Canada requires coordinated, lifecycle-integrated policy design that aligns low-carbon and circular economy objectives with industry realities.

EXPECTED OUTPUTS FOR SPI/EEPRN

- Completed:
  - 2 conference papers/presentations (ASAC 2025; 2026)
  - 1 journal article (Under review @ Business & Society)
- To be completed:
  - Stage 3 final paper (thesis paper; conference; journal article)
  - Integrated final report (Stage 1 + 2 + 3)
  - BPiPS compendium submission
  - Blog post
  - Other knowledge mobilization activities (TBD)

THANK YOU

Funding appreciation

- Economics and Environmental Policy Research Network (EEPRN)
- The Smart Prosperity Institute (SPI)
- Social Sciences and Humanities Research Council (SSHRC)

Special acknowledgement / Research support

- Ingus Dimiševskis - ingus.dimisevskis@gmail.com

Afolasade Nubi & Dr. Daina Mazutis

Anubi058@uottawa.ca
Daina.Mazutis@telfer.uottawa.ca