

# Proposal for DC Embodied Carbon Policy

DC Green Building Advisory Council Private Sector Members

# What is embodied carbon?

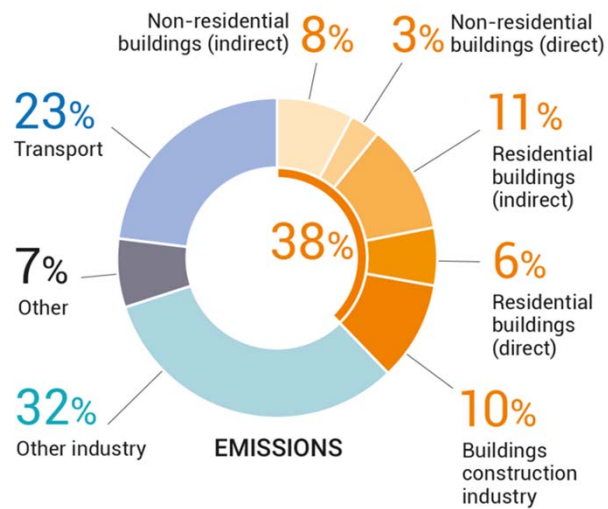
Embodied carbon refers to the greenhouse gas emissions arising from manufacturing, transportation, installation, maintenance, and disposal of construction materials.

## Building life-cycle carbon emissions:



Includes building energy use, which is addressed by the *Clean Energy DC Building Code Amendment Act of 2022* and *Clean Energy DC Omnibus Act of 2018*

# Why is embodied carbon important?

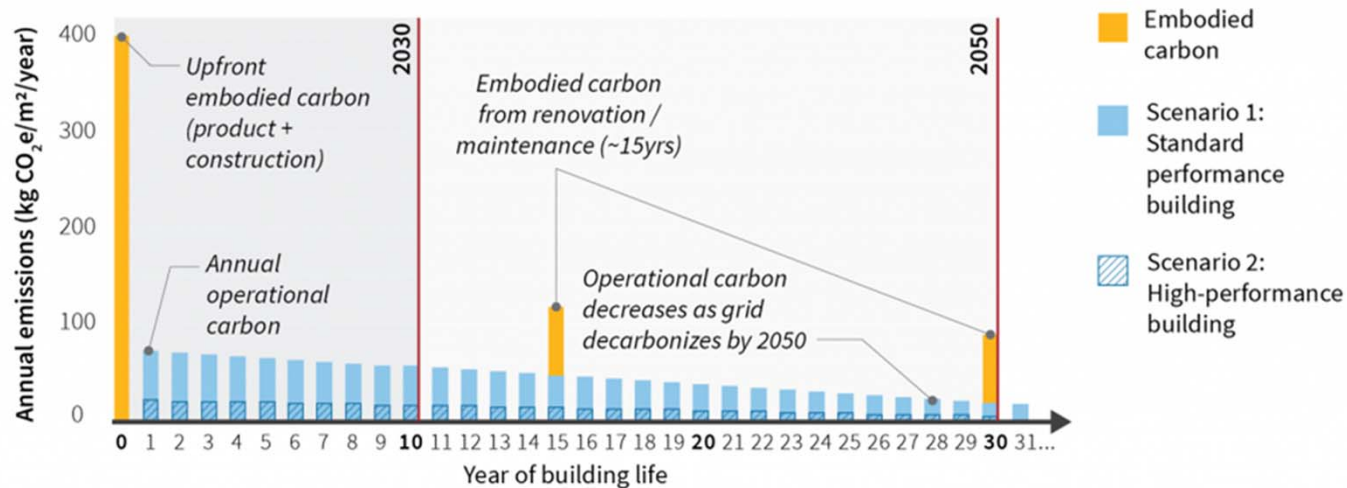


Source: IEA, 2020

## High impact at global scale

- Building materials are responsible for a large share of global CO<sub>2</sub> emissions, with concrete and steel being the heaviest emitting construction material industries

# Why is embodied carbon important?



Source: Carbon Leadership Forum

## Time value of “upfront carbon”

- Unlike operational carbon, embodied carbon cannot be reduced over time as the electrical grid decarbonizes

# How is embodied carbon measured?

Environmental Product Declarations (EPDs) act as a “nutrition label” for construction materials by declaring the environmental impact of an individual product.

EPDs are already embedded in DC Green Construction Code and Green Building Act (LEED).

Embodied carbon is measured in terms of global warming potential.

<b>Product Impacts</b>	
Declared Unit: 1 m <sup>3</sup> of 10,000 psi concrete at 28 days	
Amount Per Declared Unit	
<b>Global Warming Potential</b>	445 kgCO <sub>2</sub> eq
Emitted	460 kgCO <sub>2</sub> eq
Sequestered	-15 kgCO <sub>2</sub> eq
<b>Ozone Depletion</b>	0.000 kgCFC11eq
<b>Acidification</b>	2.96 kgSO <sub>2</sub> eq
<b>Eutrophication</b>	0.09 kgNeq
<b>Smog Formation</b>	0.61 kgO <sub>3</sub> eq
<b>Primary Energy Demand</b>	3017 MJ
Non-renewable	3000 MJ
Renewable	17 MJ

Environmental Product Declaration

**NRMCA**  
NATIONAL READY MIXED CONCRETE ASSOCIATION

**NRMCA MEMBER INDUSTRY-AVERAGE EPD FOR READY MIXED CONCRETE**

**NSF**  
Certified Environmental Product Declaration  
www.nsf.org

# Embodied Carbon Policy Approaches

*Legislation considered for DC  
would combine these approaches*

## Building Code

Applies to all **new construction** buildings

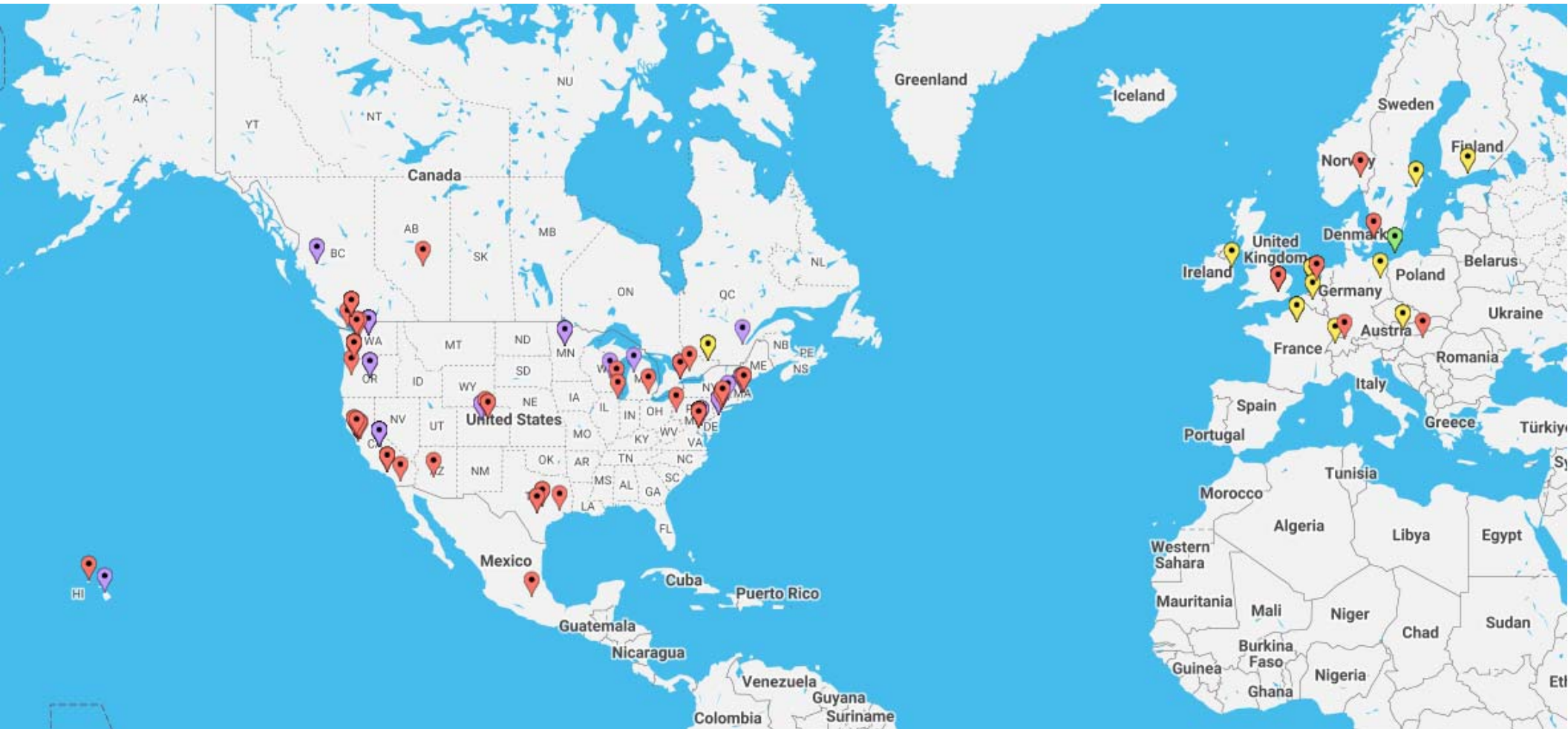
Incorporates **global warming potential limits** for construction materials into the building code

## “Buy Clean”

Applies to **public procurement** of construction materials

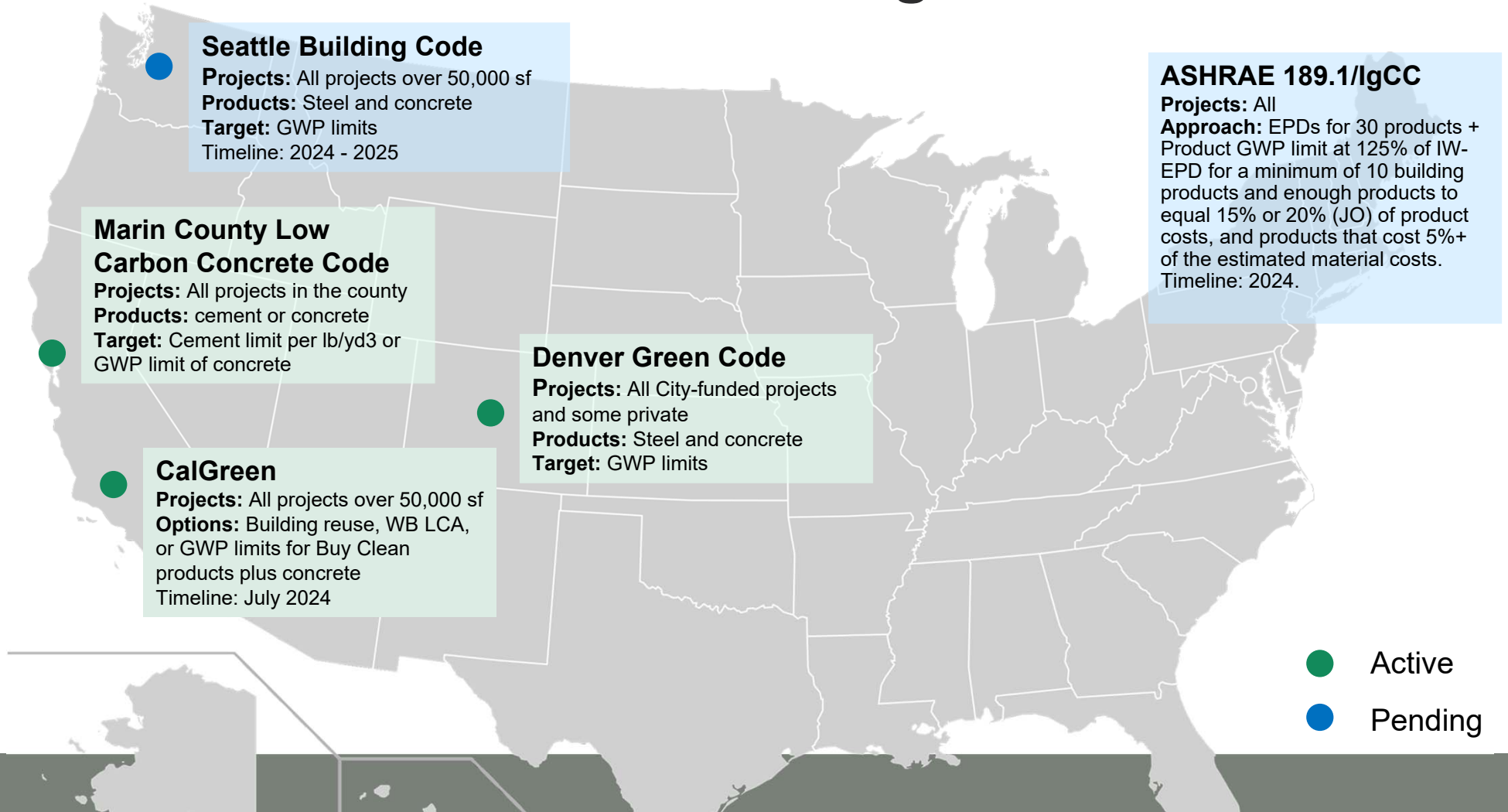
Directs an agency to establish **global warming potential limits** for construction materials

# Embodied Carbon Policy Map



[Embodied Carbon Policy Map \(batchgeo.com\)](http://batchgeo.com)

# Embodied Carbon in US Building Codes





# Embodied Carbon in US Buy Clean Policies



# Federal Policies

## Embodied carbon provisions in IRA

Section	Agency	Funding	Summary	Expiration Date
60112	EPA	\$250M	<b>EPD Assistance</b> to support the development and standardization of EPDs for construction materials with grants and technical assistance to manufacturers.	9/30/2031
60116	EPA	\$100M	<b>Low-Embodied Carbon Labeling for Construction Materials</b> to identify and label low-carbon materials and products based on data available via EPDs	9/30/2026
60503	GSA	\$2.15B	<b>Specify and install low-embodied carbon materials</b> and products for use in General Services Administration-owned buildings	9/30/2026
60506	FHWA	\$2B	<b>Low-Carbon Transportation Grants</b> that reimburse and incentivize the use of low-carbon materials and products for Federal Highway Administration projects.	9/30/2026
70006	FEMA	?	<b>FEMA Building Materials Program (SEC.)</b> may provide financial assistance for the use of low-carbon materials and incentives that encourage low-carbon and net-zero energy projects.	9/30/2026

Source: Carbon Leadership Forum

# Legislative Priorities

## **Priority 1: Building Code Amendments**

Amend the DC Building Code to include global warming potential (GWP) limits for embodied carbon intensive materials used

*Goal: To reduce the upfront carbon emissions associated with building construction in support of the District's climate goals.*

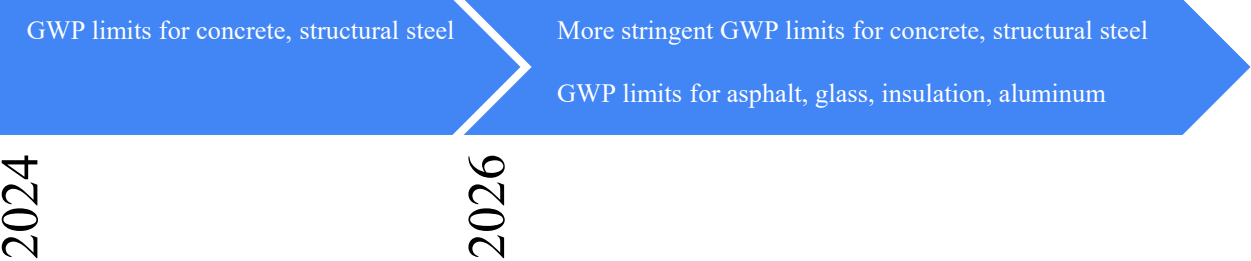
## **Priority 2: DC Government Procurement Standards**

Introduce an interim standard for DC-funded capital projects to procure “low carbon” materials ahead of building code

*Goal: For DC government to demonstrate market leadership in procuring low carbon materials now and in the future.*

# Phase-In

## DC Government Procurement Standards (Priority 2):



## Building Code Amendments (Priority 1):

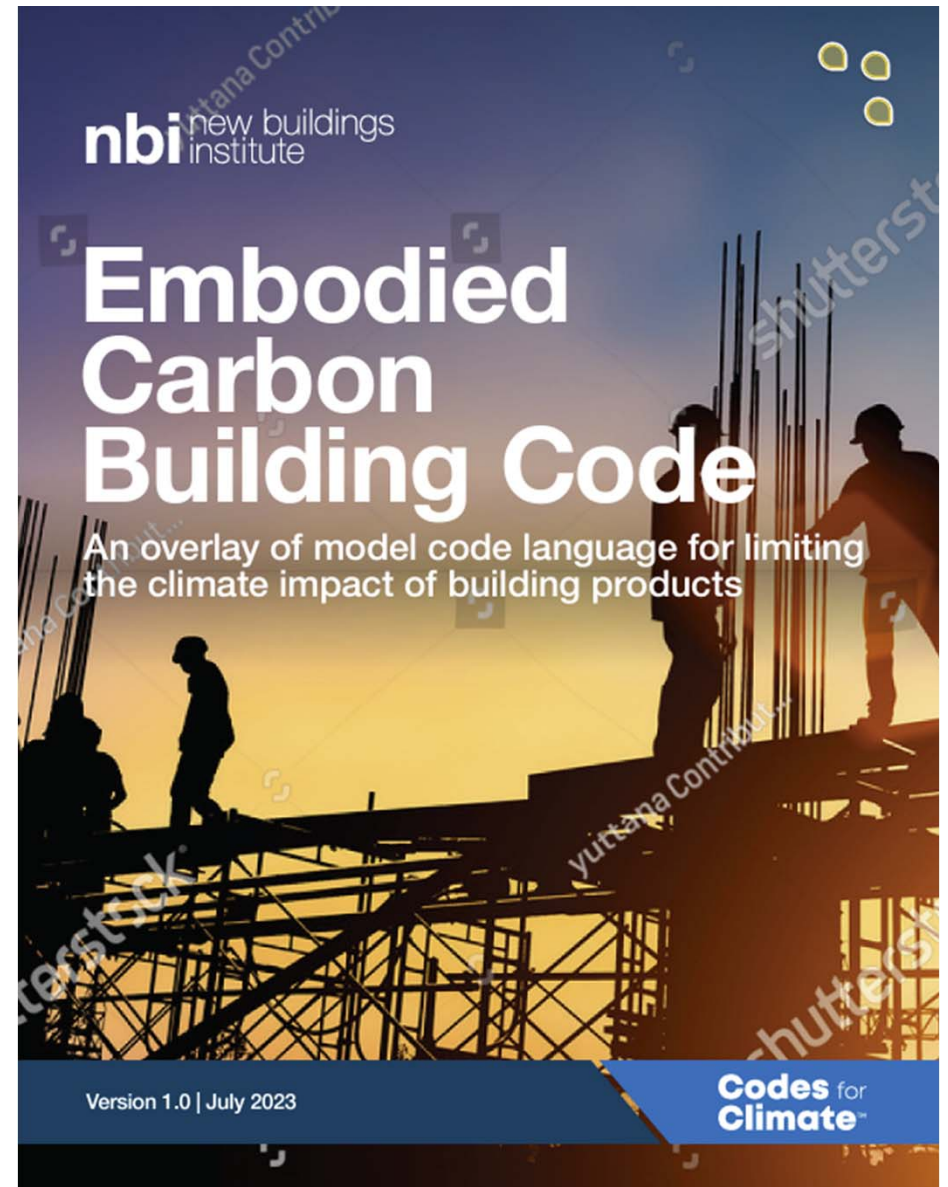


# Policy Framework

- **Rulemaking agency:** determined by Mayor
- **Reporting requirements:** product-specific Type III EPD having at least cradle-to-gate scope
- **Covered materials:** concrete and structural steel for first phase; asphalt, glass, insulation, aluminum phased in over time
- **Benchmarking agency:** DOEE
- **Enforcement:** DOB
- **Backstop for rulemaking:** NBI model code overlay
- **Relevant DC policy precedents:** Clean Energy DC Building Code Amendment Act of 2022, Greener Government Buildings Act of 2022

# Code Language

NBI's Embodied Carbon Building Code overlay includes prescriptive embodied carbon amendments for 40 product categories, for the International Building Code.



# Cost of Low Carbon Materials

A study by RMI<sup>1</sup> found that many lower carbon construction materials are available at no to low cost premium.

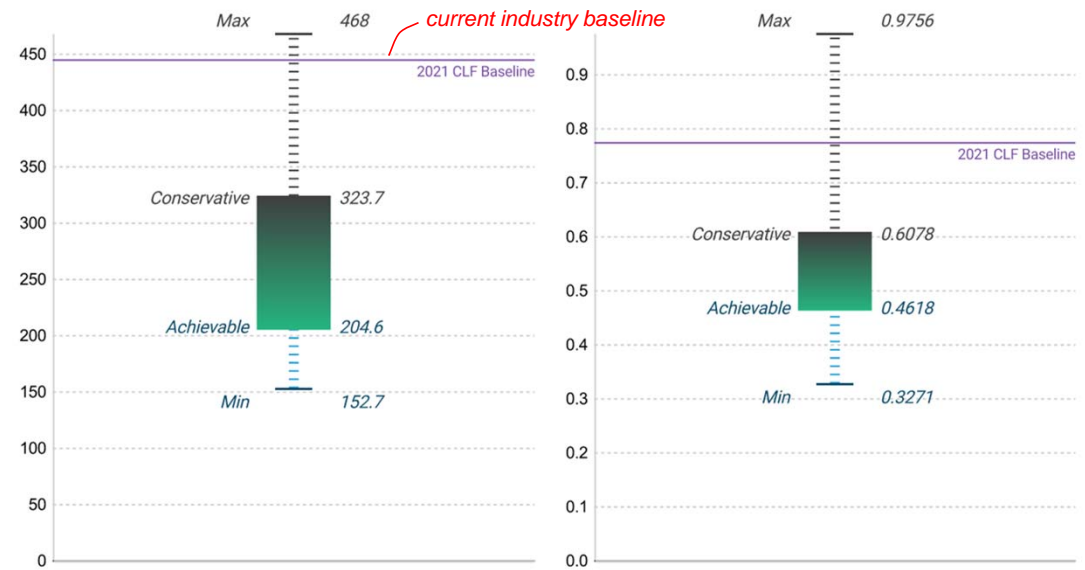


<sup>1</sup><https://rmi.org/insight/reducing-embodied-carbon-in-buildings/>

# Availability of Materials

The local supply of concrete in the DC area has a lower carbon impact relative to industry average due to local market drivers.

Domestically sourced steel has a lower carbon footprint than steel sourced globally.



kg CO<sub>2</sub>e/ 1 yd<sup>3</sup> **CONCRETE**  
Sourcing: local  
Compliant products: 63/63

kg CO<sub>2</sub>e/ 1 lb **STEEL**  
Sourcing: regional  
Compliant products: 12/13



# Stakeholder Engagement

## Concrete

A local concrete roundtable was hosted by the National Ready Mix Concrete Association September 8, 2023. Suppliers, contractors, architects, and engineers were in attendance.

- Industry generally supportive
- Request for performance path
- Full download at Oct. 4 GBAC meeting

## Steel

The Green Building Advisory Council has spoken with the Director of Government Relations at the American Institute of Steel Construction.

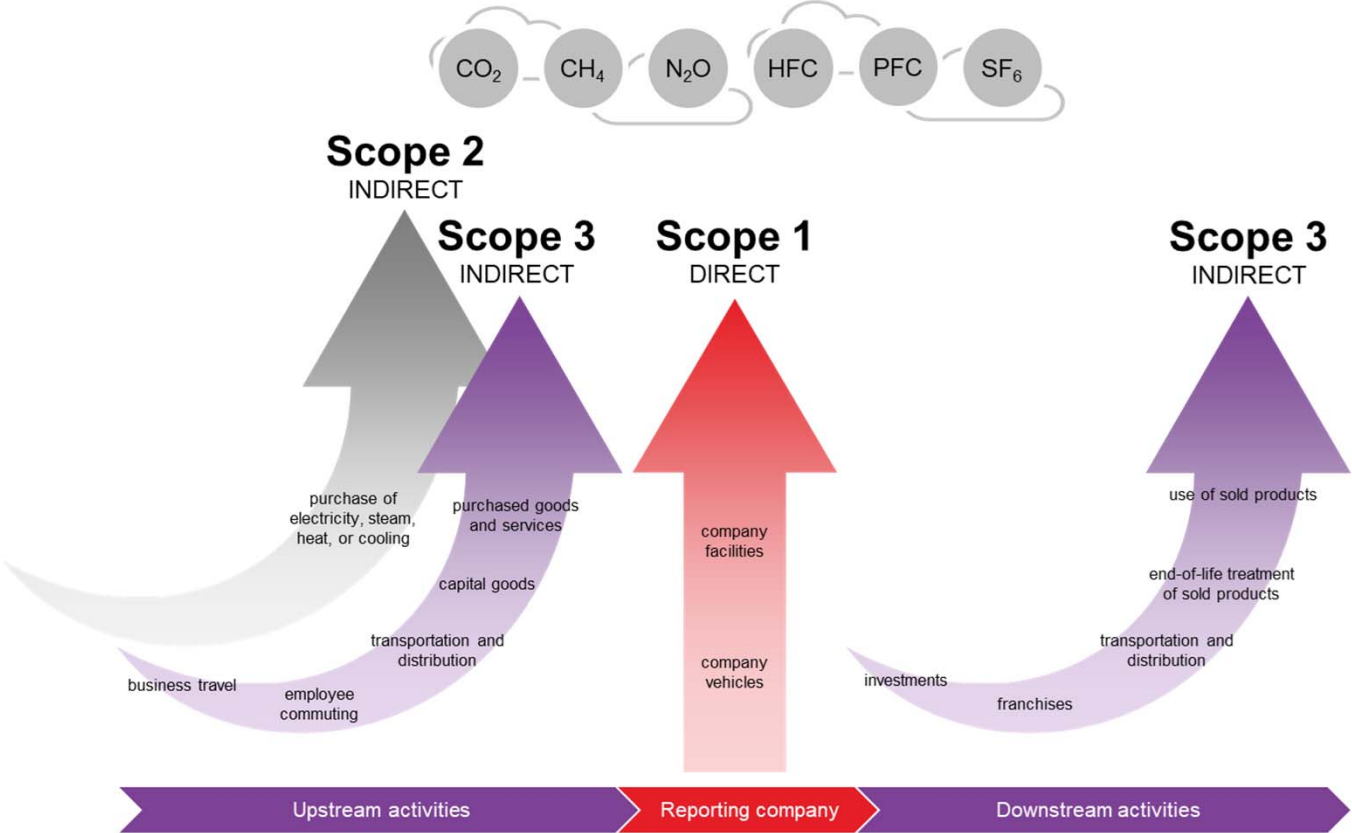
# Recommended Resources

[CLF Steps to Develop a Buy Clean Policy](#)

[Pacific Coast Collaborative Embodied Carbon Policy Case Studies](#)

[Clean Energy Canada Lessons from the United States on “Buying Clean”](#)

# How does embodied carbon relate to DC's emissions?



*Adapted from WRI/WBCSD*

# CalGreen 2022 Proposal

	Description	<i>Existing Voluntary</i>	Mandatory 100,000 sf (Schools: 50,000 sf)	Tier 1 100,000 sf (Schools: 50,000 sf)	Tier 2 100,000 sf (Schools: 50,000 sf)
Option 1	<b>Building Reuse</b>	75% of the structure and enclosed to be reused	<b>45% of the structure and enclosed to be reused</b>	<b>75% of the structure and enclosed to be reused</b>	<b>75% of the structure and enclosed to be reused AND 30% of interior non-structural elements to be reused</b>
Option 2	<b>WBLCA</b>	10% reduction from baseline	<b>10% reduction from baseline</b>	<b>15% reduction from baseline</b>	<b>20% reduction from baseline</b>
Option 3	<b>Prescriptive Approach</b>	N/A	<b>175% of IW-EPD GWP Limits</b> (weighted average available for concrete)	<b>150% of IW-EPD GWP Limits</b> (weighted average available for concrete)	<b>IW-EPD GWP Limits</b> (weighted average available for concrete)

# “Buy Clean” Precedents

State or City / Policy	Covered Materials	Status
California <a href="#"><u>Buy Clean California Act</u></a>	Structural steel, flat glass, mineral wool	Adopted in 2017 Starting July 1, 2022, eligible materials must be GWP limits
Colorado <a href="#"><u>Buy Clean Colorado Act</u></a>	Asphalt, concrete, glass, steel, wood	Adopted in 2022, will establish GWP limits for covered materials used on public projects starting in 2024
New York (City) <a href="#"><u>Executive Order 23</u></a>	Concrete	Adopted in 2022, directs Mayor’s office to set low carbon concrete requirements for public procurement and to require concrete and steel EPDs
New York (State) <a href="#"><u>New York State Low Embodied Carbon Concrete Leadership Act</u></a>	Concrete	Adopted in 2021, will provide incentives for low carbon concrete procurement in state procurement contracts
New Jersey <a href="#"><u>New Jersey Embodied Carbon Concrete Leadership Act</u></a>	Concrete	Adopted in 2023, will provide incentives for low carbon concrete procurement in state procurement contracts
Portland, Oregon <a href="#"><u>Low Carbon Concrete Initiative</u></a>	Concrete	Adopted in 2020, requires product-specific EPDs meeting published GWP limits
General Services Administration <a href="#"><u>Low Embodied Carbon Concrete and Environmentally Preferable Asphalt Standards</u></a>	Concrete, asphalt	Adopted in 2022, requires new construction and major renovation projects for GSA to procure low carbon concrete and environmentally preferable asphalt

Maryland’s [Buy Clean Maryland Act](#) was first introduced in 2022 but has not yet passed. The bill would direct GWP limits to be set for covered materials (concrete, glass, steel, and wood) and apply to public projects.

# Building Code Precedents

State or City / Code	Covered Materials and/or Approaches	Status
<a href="#">Marin County Concrete Code</a>	Concrete	Adopted in 2019, requires concrete used for buildings projects to meet cement or GWP limits
<a href="#">California CALGREEN</a>	Reuse, WBLCA, or prescriptive (concrete, steel, glass, mineral wool)	Currently in review for mid-cycle update Will be mandatory for non-residential projects over 50,000 ft <sup>2</sup>
<a href="#">2022 Denver Green Building Code</a>	Concrete, steel	Adopted in 2023 Embodied carbon provisions are elective
<a href="#">ASHRAE 189.1 (IgCC)</a>	Various, selected by project teams	Currently in review Would be adopted by jurisdictions adopting IgCC
<a href="#">Vancouver Buildings By-Law</a>	WBLCA	Effective July 2023, larger buildings will be required to report whole building embodied carbon