



Embodied Carbon Policies Across the US

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Embodied Carbon Regulatory Pathways

Federal/State/Local Policy

- Procurement
- Incentives
- Green building rating system requirements
- Climate Action Plans
- Deconstruction
- Reuse

Building Codes

- Building Code
- Stretch/reach code
- Green Code

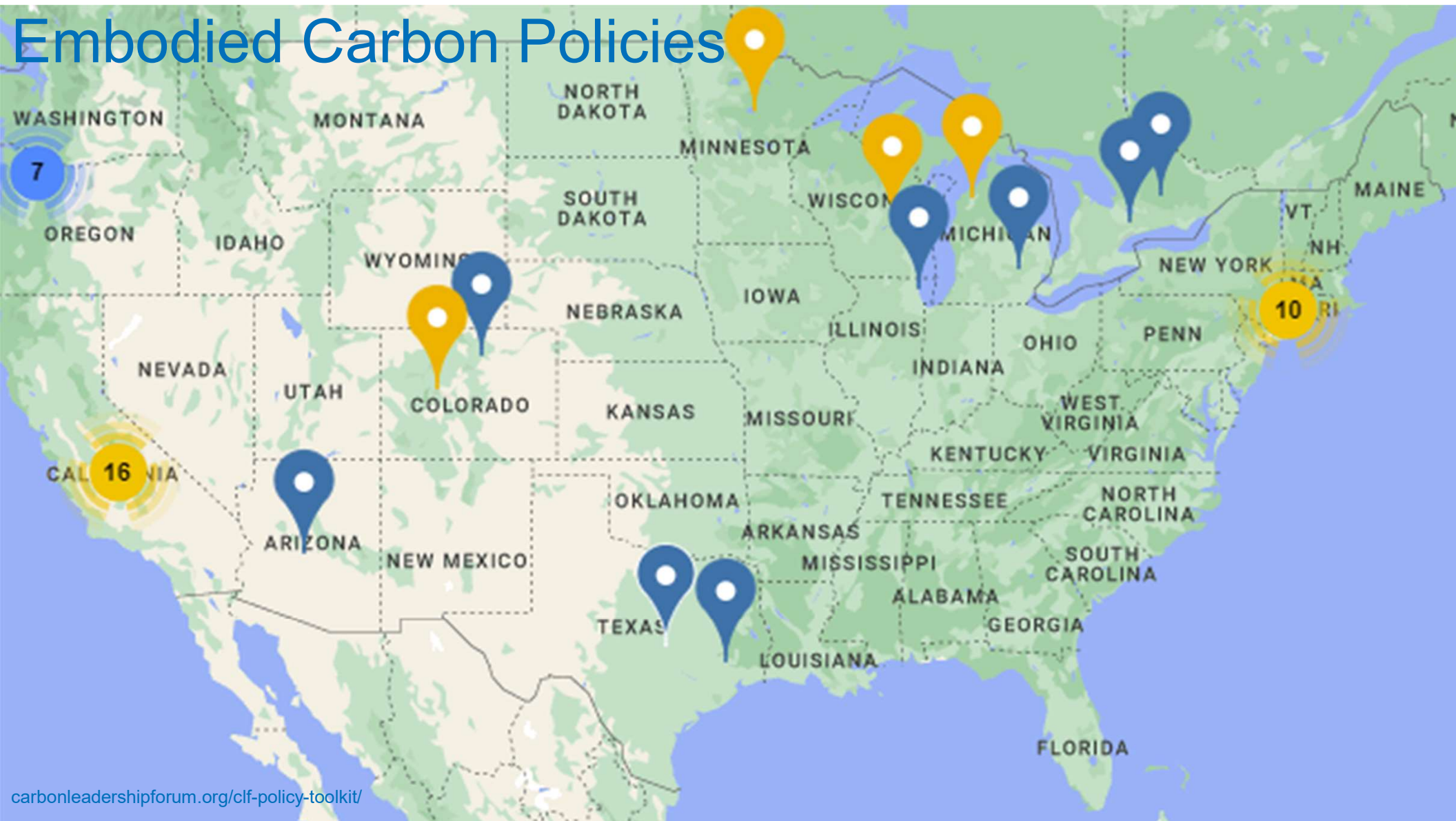
Local Codes

- Zoning
- Land Use
- County
- Design Standards

Utilities

- Incentives
- Education

Embodied Carbon Policies



Embodied Carbon Codes and Policies

Location	Policy	Embodied Carbon Approach
Vancouver, BC	Rezoning Requirement	Rezoning permits require a commitment to Passive House or WB LCA embodied carbon reporting.
Portland, OR	Low-Carbon Concrete Initiative	Concrete in city construction projects must meet specific GWP limits.
Oregon DOT	Department of Transportation (DOT) GHG Program	Program to reduce GHG emissions associated with concrete, asphalt pavement, and steel in DOT projects.
Marin County	Low-Carbon Concrete code	All concrete to meet specific GWP or cement limits.
California	Buy Clean California (BCCA)	State agencies, the University of CA, and CA State University systems construction projects must meet specific GWP limits for structural steel, concrete reinforcing steel, and light and medium density mineral wool board insulation.
Colorado	Buy Clean Colorado	State-funded construction projects must meet specific GWP limits for asphalt, concrete, glass, post-tension steel, concrete reinforcing steel, wood structural elements
Austin, TX	Green Building Program	The City rating system includes credits/points for WB LCA and embodied carbon reduction.
New Jersey	Port Authority of N.Y. & N.J. Low Carbon Concrete Program	Requires EPD reporting for concrete, steel, and asphalt. Require low GWP limits for concrete.
Toronto, ON	Waterfront Toronto Green Building Requirements -	Buildings can choose to use 50 percent recycled metal in steel and rebar, low-carbon concrete (with 25 percent Supplementary Cementitious Materials), or timber products certified by the Forest Stewardship Council.
New York	Low Embodied Carbon Concrete Leadership Act (LECCLA)	State-funded projects are required to procure low embodied carbon concrete.
US GSA	Low Embodied Carbon Concrete and Environmentally Preferable Asphalt Standards	Requires all GSA projects provide EPD reporting and GWP limits for concrete and improved asphalt.
CalGreen (Pending)	Carbon Reduction Regulations	All California projects over 50,000 sf can comply through building reuse, whole building LCA, or specific GWP limits for select products.
Denver Green Code	Embodied Carbon Reduction for Concrete and Steel	Requires projects using the voluntary code to meet specific GWP limits for concrete and steel products.
ASHRAE 189.1/IgCC	Global Warming Potential of Building Products	EPDs for 30 products + Product GWP limit at 125% of IW-EPD for a minimum of 10 building products and enough products to equal 15% or 20% (JO) of product costs, and products that cost 5%+ of the estimated material costs.

Buy Clean California

Projects: State-funded building construction

Products: Structural steel, rebar, flat glass, mineral wool board insulation

Table 1: GWP limits for eligible materials

Eligible material	Maximum acceptable GWP limit (unfabricated)*
Hot-rolled structural steel sections	1,010 kg CO ₂ eq. or 1.01E+03 kg CO ₂ eq. for one metric ton of structural steel.
Hollow structural sections	1,710 kg CO ₂ eq. or 1.71E+03 kg CO ₂ eq. for one metric ton of structural steel.
Steel plate	1,490 kg CO ₂ eq. or 1.49E+03 kg CO ₂ eq. for one metric ton of structural steel.
Concrete reinforcing steel	890 kg CO ₂ eq. or 8.90E+02 kg CO ₂ eq. for one metric ton of bar.
Flat glass	1,430 kg CO ₂ eq. or 1.43E+03 kg CO ₂ eq. for one metric ton of flat glass.
Light-density mineral wool board insulation	3.33 kg CO ₂ eq. for 1 m ² of mineral wool board insulation at RSI-1.
Heavy-density mineral wool board insulation	8.16 kg CO ₂ eq. for 1 m ² of mineral wool board insulation at RSI-1.

*GWP limit is based on a 100-year lifetime impact.

DGS leveraged current industrywide EPDs to determine the industry average and set the final limit above.

New York and New Jersey

New York

- **LECCA:** Award state contracts based on price, AND climate performance.
- **GreenNY:** Specification for low-carbon concrete with procurement rules.
- **EO 22:** Provide bid-stage EPDs (+ declaration for climate-aligned procurement.)
- **NY Lower Carbon Concrete Specification:** Purchasing standards.
- **NYCEO 23:** Require low-carbon concrete specifications.

New Jersey (AB 5223)

- **Projects:** State-funded and concrete producers
- **Product:** Concrete
- **Carbon Target:** GWP limits
- **Financial Incentive:** Up to 8% tax credit incentives for concrete producers who overperform state-established embodied carbon standards (verified through EPDs.)
- **Bid Incentive:** Up to 5% bid discount for exceeding set concrete GWP limits
 - Up to 3% bid discount rate for bids with carbon capture, utilization, and storage

Roadmap for Embodied Carbon in Codes

Product-level

EPD Reporting

GWP Limits

EPD Quicksheet

CEN B E3000 ABC

INDUSTRY PERFORM

INDUSTRY PERFORM	PERCENT PRODUCTION	REPORTED	PERCENT PRODUCTION
356.1	24%	reported	PAK
0300925	42%	reported	PAK
303	5%	reported	PAK
1987	63%	reported	PAK
99.72	-14%	reported	PAK

INDUSTRY AVERAGE SOURCE / TYPE

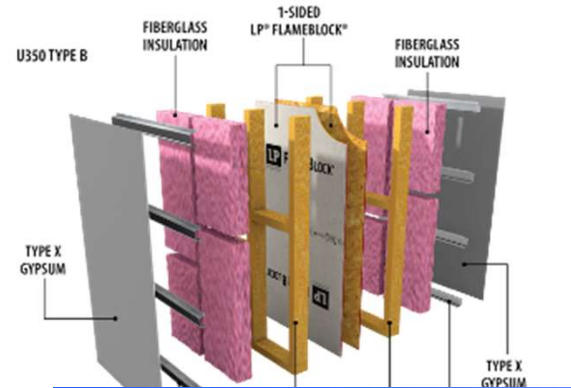
INDUSTRY AVERAGE SOURCE / TYPE



Systems-level

GWP Reporting

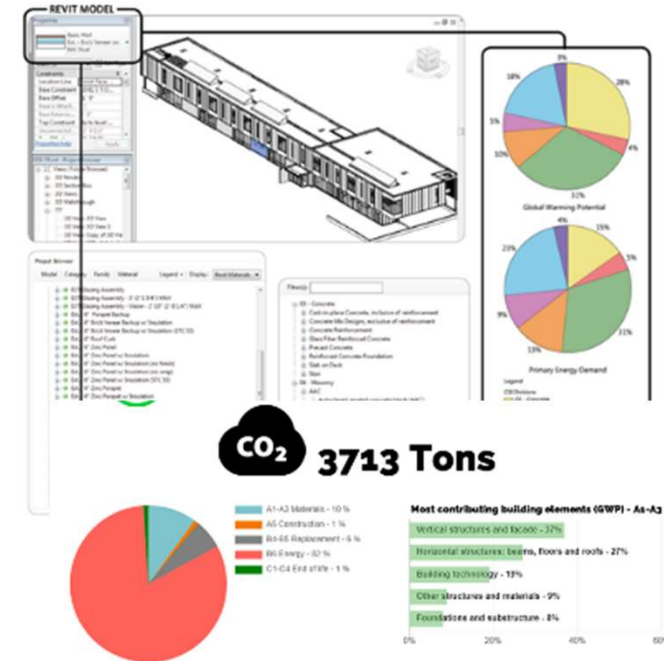
GWP Limits



Building-level

WB LCA Reporting

CO2e Limits



ASHRAE 189.1 Addendum z and ak

EPD Reporting: (addendum z)

- 30 EPDs from not less than 20 different *building products*
- Enough products to equal 25% of product costs
- Products that cost 5%+ of the estimated material costs
- Report GWP and functional unit (aka LCA-lite)

A value of 45% of the estimated total construction cost shall be permitted to be used in lieu of the total cost of all *building products* permanently installed in the *building project*.

GWP Limits: (addendum ak) (JO)

- 10 *building products*
- Enough products to equal 15% or 20% (JO) of product costs
- Products that cost 5%+ of the estimated material costs

Assemblies allowed as a product when individual product component parts' have a Type III EPD for comprising at least 80% of the product by cost or weight.

GWP limit set at 125% IW-EPD

Concrete EC IBC Example

Section 1901 General

ADD NEW TEXT AS FOLLOWS:

1901.7 Embodied CO₂e in Concrete Products. **80%** of all concrete mixes used in the building project's *primary structural frame, secondary structural members, lateral force-resisting system, and foundations* shall not exceed the project limit (CO₂E_{max}) determined by **125%** of IW-EPD's kg-CO₂e/cy. Confirmation of the product's kg-CO₂e/cy and EPDs shall be verified by a licensed design professional, with a summary available to the code official prior to the certificate of occupancy.

Exceptions:

- Precast, shotcrete, or auger cast concrete.
- Projects less than 50,000 gross floor area.
- Projects where the total volume of concrete is less than 50 cubic yards.
- Concrete mixes that are less than 150% of IW-EPD's kg-CO₂e/cy per strength class.
- Projects where no concrete suppliers with product-specific environmental product declarations (EPD) for a concrete strength are located within 100 miles of the project site

Equation 1901.7.1

$$\text{CO}_2\text{E}_{\text{proj}} < \text{CO}_2\text{E}_{\text{max}}$$

where: $\text{CO}_2\text{E}_{\text{proj}} = \sum \text{CO}_2\text{E}_n v_n$ and $\text{CO}_2\text{E}_{\text{max}} = \sum \text{CO}_2\text{E}_{\text{lim}}$
 v_n
and

n = the total number of concrete mixtures for the project

CO_2E_n = the global warming potential for mixture n per mixture EPD, kg/y³

$\text{CO}_2\text{E}_{\text{lim}}$ = the global warming potential limit for mixture n per Table 1901.7, kg/y³

v_n = the volume of mixture n concrete to be placed

Marin County Concrete Code

Projects: All projects in the county

Products: cement or concrete

Target: Cement limit per lb/yd³ or GWP limit of concrete

Table 19.07.050 Cement and Embodied Carbon Limit Pathways

	Cement limits for use with any compliance method 19.07.050.2 through 19.07.050.5	Embodied Carbon limits for use with any compliance method 19.07.050.2 through 19.07.050.5
Minimum specified compressive strength <i>f_c</i> , psi (1)	Maximum ordinary Portland cement content, lbs/yd ³ (2)	Maximum embodied carbon kg CO ₂ e/m ³ , per EPD
up to 2500	362	260
3000	410	289
4000	456	313
5000	503	338
6000	531	356
7000	594	394
7001 and higher	657	433
up to 3000 light weight	512	578
4000 light weight	571	626
5000 light weight	629	675
Notes		
(1) For concrete strengths between the stated values, use linear interpolation to determine cement and/or embodied carbon limits.		
(2) Portland cement of any type per ASTM C150.		

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	Building Reuse	75% of the structure and enclosed to be reused	45% of the structure and enclosed to be reused	75% of the structure and enclosed to be reused	75% of the structure and enclosed to be reused AND 30% of interior non-structural elements to be reused
Option 2	WBLCA	10% reduction from baseline	10% reduction from baseline	15% reduction from baseline	20% reduction from baseline
Option 3	Prescriptive Approach	N/A	175% of IW-EPD GWP Limits (weighted average available for concrete)	150% of IW-EPD GWP Limits (weighted average available for concrete)	IW-EPD GWP Limits (weighted average available for concrete)

Thank you!

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