The Impact of Federal Buy Clean Requirements on the Concrete Industry

Eric Dunford
Senior Director of Government Affairs
CarbonCure Technologies
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Meet the Speaker

Eric Dunford
Senior Director of Government Affairs
CarbonCure Technologies
Key Points

01 What is Buy Clean?
02 Carbon in Concrete
03 Measuring Carbon in Concrete
04 Executive Orders
05 Potential Effects on the Concrete Industry
06 How Buy Clean Could Affect Your Business
What is Buy Clean?

‘Buy Clean’ loosely refers to any legislation that proposes to incorporate climate considerations as a part of public procurement decision-making.

Key Principles:

● Climate impact of purchased materials must be tracked and recorded

● Independent and transparent quantification of life cycle impacts of materials

● Establishment and publication of industry averages, maximum carbon limits, etc.
What is Buy Clean?

- First implemented in California beginning in 2017 (Bill 262 – Assemblyman Rob Bonta)
- Subsequently implemented in Colorado and proposed in several other states (e.g., Washington, Minnesota)
- Scheduled for introduction at the federal level in the United States beginning on January 1, 2023
How Carbon in Concrete is Measured

Type III Environmental Product Declaration (EPD):
A third party-verified declaration of environmental impact

- Estimates environmental impacts associated with material manufacturing
- Equivalent to a nutritional label
- Ideally, EPDs are prepared for individual concrete mix designs at a specific plant
- Relies on a Life Cycle Assessment (LCA) following a Product Category Rule (PCR)
- Valid for five years
Concrete LCA Boundary: Cradle to Gate

Reference: Adapted from K. Simonen, Life Cycle Assessment
Origins of Carbon in Concrete

Constituent materials of concrete (by mix composition)
- Aggregates: 60-75%
- Water: 14-20%
- Cement: 10-15%
- Air: 1-8%

Emissions sources in concrete manufacturing (by life-cycle phase)
- A1 - Extraction: 99%
- A2 - Transportation: <1%
- A3 - Manufacturing: 1%

Reference: National Ready Mixed Concrete Association EPD Database
Why Do We Need EPDs for Concrete?

- Decarbonization of this sector is especially important due to size of impact and need for continued growth.
- Diversity of concrete products limits value of industry averages.
- Effective policy action depends on access to more accurate and granular information.

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The Impact of Federal Buy Clean Requirements on the Concrete Industry

Source: 2018 2030, Inc. / Architecture 2030, All Rights Reserved.
How are EPDs Created?

1. Follow PCR Guidance
   Product Category Rule for Concrete defines how to perform LCA calculations and reporting.

2. Data Collection
   Information on raw materials, suppliers, ancillary materials and other plant data is gathered.

3. Life Cycle Assessment
   Analyses of emissions sources to quantify net climate impact of material.

4. Create EPD
   Documenting the life cycle assessment results in a standardized reporting format.

5. EPD Verification
   External assurance that the quantifications are reasonable / accurate.
The US Federal Buy Clean Executive Order
Catalyzing Clean Energy Industries & Jobs Through Federal Sustainability

- Executive Order issued December 8, 2021
- Section 303 established a federal Buy Clean Task Force for the first time
- Identifies concrete and steel as target sectors
- Directs Task Force to provide recommendations for use of EPDs for these materials
- Directs Department of Transportation to establish an Embodied Carbon Working Group
## GSA Maximum Carbon Limits

### Industry Average Global Warming Potential Values

(kg of carbon dioxide equivalent per cubic meter – CO$_2$e kg/m$^3$)

<table>
<thead>
<tr>
<th>Strength</th>
<th>Minimum</th>
<th>Maximum</th>
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### Maximum Global Warming Potential Limits for GSA Low Embodied Carbon Concrete

(kilograms of carbon dioxide equivalent per cubic meter – CO$_2$e kg/m$^3$)

<table>
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<tr>
<th>Specified compressive strength (f’c in PSI)</th>
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<th>High Early Strength</th>
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**Reference:**
- National Ready Mix Concrete Association *Industry Average EPD for Ready Mixed Concrete 2021*
- General Services Administration *Low Embodied Carbon Concrete Standards 2022*
## GSA Maximum Carbon Limits

### Industry Average Global Warming Potential Values

The table below shows the average global warming potential values for concrete with different strengths, measured in kilograms of carbon dioxide equivalent per cubic meter (kg of CO₂e kg/m³).

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### Maximum Global Warming Potential Limits for GSA Low Embodied Carbon Concrete

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How Buy Clean Could Affect Your Business

1. **Type III EPDs** become a requirement for all federal projects
2. Bidders may be blocked from projects if their concrete mixes are above the **maximum specified limits**
3. Climate performance likely to be normalized as another **bid selection criterion**

*Note: Buy Clean policies are not restricted to the USA!*
Low-Carbon Concrete in Canada

Greening Government Strategy

- Commits Government of Canada to disclosing the quantity of embodied carbon in structural materials purchased for major projects
- Target of 30% reduction in carbon impact of structural materials by 2025
- Investigating alignment with US Federal Buy Clean requirements
- Awaiting publication of *Roadmap to Net-Zero-Carbon Concrete*
How You Can Prepare

1. **Understand your impact:** Investigate vendors and create EPDs for your mix designs

2. **Be ready to communicate:** Ensure that your teams are ready to speak to the carbon impact of your mix designs

3. **Invest in carbon reduction:** Implement options for lower carbon processes or technologies so that you are positioned for success
Unanticipated Consequences

Small, family-owned, and independent concrete producers may face disadvantages in creating EPDs and lower carbon concrete products due to:

- Unequal distribution of, and access to, lower carbon materials like SCMs
- Unequal access to technology solutions
- Greater relative financial burden of EPD generation and maintenance
What might the future hold?
Other levels of government are likely to copy federal requirements and carbon limits for concrete materials.

Several states are already compelling or have proposed requirements to track carbon impact of concrete and other materials.

Examples include California, New York, New Jersey, Colorado, and Illinois.
Private Sector is Ahead of Federal Procurement Requirements

- Likely that private sector buyers will mimic and accelerate federal Buy Clean policy
- Example: First Movers Coalition – 55 corporations working with government to procure low-carbon steel, aviation fuel, and carbon dioxide removal
- Direct experience suggests private sector is moving faster and setting more ambitious targets
How Else Could EPDs be Used?

- Reporting and baseline creation is just the first step in policy development
- What is the purpose of a baseline?
- Decarbonization roadmaps demand successive reductions in carbon intensity of construction materials over time
- Reasonable to expect that disclosure requirements will be followed by more stringent standards for carbon reduction
How Else Could EPDs be Used?

**Economic incentives**
The use of ‘green premiums’ to reward exceptional climate performance and incentivize innovation adoption.

**Carbon limits**
The establishment of maximum carbon limits (e.g., GSA) and/or integration of carbon into procurement scoring.

**Required carbon disclosure**
Consistent with Buy Clean policies requiring the submission of EPDs during project bidding.

Reference: adapted from Low Carbon Concrete and Construction: A Review of Green Public Procurement Programs
Thank You!

Questions?

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