

## EXECUTIVE SUMMARY

'Buy Clean' is a type of procurement policy that establishes construction material purchasing requirements for government agencies with the goal of reducing industrial emissions associated with government procurement and creating a market for lower carbon construction materials. The Buy Clean California Act (BCCA), the first policy of this type introduced in the United States, was passed into law by the State of California in October 2017. Buy-clean policies are now being explored at the federal, state, and local levels across the United States.

Buy-clean policies focus on reducing **cradle-to-gate embodied carbon**, or the greenhouse gas emissions arising from the raw material extraction, transportation, and manufacturing of construction materials. Embodied carbon is measured as **global warming potential** (GWP).

The BCCA requires the California Department of General Services (DGS) to set limits on the maximum allowable GWP per unit for structural steel, concrete reinforcing steel, flat glass, and mineral wool board insulation used on certain State projects. DGS is directed to set these limits at the industry average using data from facility-specific environmental product declarations (EPDs) or industry-wide EPDs based on domestic production data.

The goal of *Buy Clean California Limits: A Proposed Methodology for Assigning Industry-Average GWP Values for Steel, Mineral Wool, and Flat Glass in California* is to propose industry-average GWP values for eligible materials using a methodology that meets the following criteria:

1. meets the requirements and intent of the BCCA;
2. is representative of typical manufacturing production;
3. is constrained to high quality, published LCA data sources that are available as of December 2021.

Buy-clean policies vary in their design. Evaluating policy design - such as which type of limit and how many limits should be required as part of a buy-clean policy - is out of the scope of this report.

The research team used the following steps to assign industry-average GWP values to each category:

1. Define the product category.
2. Gather and assess the available LCA data.
3. Evaluate the representativeness of available data sources to select one of the following methods:
  - Method A: Use the collection of product-specific EPDs (including facility-specific EPDs) to calculate an average.
  - Method B: Use the industry-wide EPD value.
  - Method C: Use the industry-wide EPD and adjust the value to fill in representativeness gaps.
  - If none of these options prove adequate, because there is not yet sufficiently representative data, then the category is not yet ready for a reliable GWP limit.
4. Assign a GWP value.

### **Cradle-to-gate embodied carbon**

Includes the greenhouse gas emissions arising from the raw material extraction, transportation, and manufacturing of construction materials. In an LCA, this includes stages A1-A3.

### **Global warming potential**

The potential climate change impact of a product or process as measured by an LCA, reported in units (typically kg) of carbon dioxide equivalent (CO<sub>2</sub>e).

### **Life cycle assessment (LCA)**

LCA is a systematic set of procedures for compiling and examining the inputs and outputs of materials and energy, and the associated environmental impacts directly attributable to a building, infrastructure, product or material throughout its lifecycle (ISO 14040: 2006).

Table 1 summarizes the product categories and proposed GWP limit values.

**Table 1.** Buy Clean California Act Proposed Industry-Average Global Warming Potential (GWP) Limit Values

<b>Eligible Material</b>	<b>Subcategory</b>	<b>Proposed GWP limit</b>
<b>Structural Steel</b>	Hot-Rolled Structural Sections (unfabricated)	1,080 kg CO <sub>2</sub> e / metric ton
	Hollow Structural Sections (unfabricated)	1,710 kg CO <sub>2</sub> e / metric ton
	Plate (unfabricated)	1,590 kg CO <sub>2</sub> e / metric ton
<b>Concrete Reinforcing Steel</b>	Rebar (unfabricated)	920 kg CO <sub>2</sub> e / metric ton
<b>Flat Glass</b>		1,430 kg CO <sub>2</sub> e / metric ton
<b>Mineral Wool Board Insulation</b>	Light Density	3.33 kg CO <sub>2</sub> e / m <sup>2</sup> RSI-1
	Heavy density	8.16 kg CO <sub>2</sub> e / m <sup>2</sup> RSI-1

In order for GWP limits to be effective they must be scientifically derived, transparent in their underlying methodology, and clear in scope and definition. Improving the availability and quality of LCA data through improvements to product category rules, increasing access and transparency of data, and increasing participation from manufacturers will support the effectiveness of future buy-clean policy development.