

Tracking Federal Action on Embodied Carbon

Actors across the federal government are taking steps to address embodied carbon. This document provides a summary of recent highlights and ongoing initiatives related to reducing embodied carbon across federal agencies and programs.

This document was published in **March 2021**. To learn more about different policy initiatives related to embodied carbon or track updates on the policy initiatives in this document, please visit the Carbon Leadership Forum’s [Policy Toolkit](#).

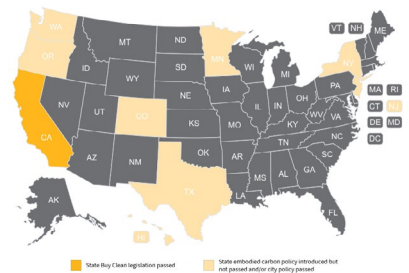
Procurement policy approaches to reduce embodied carbon

A low embodied carbon procurement policy is an approach to reducing embodied carbon that requires construction materials purchased by a federal, state, or municipal agency to meet purchasing requirements that address the greenhouse gas emissions arising from the manufacturing and (sometimes) transportation, installation, maintenance, and disposal life cycles stages of a building material.

This approach leverages the purchasing power of government agencies to encourage a shift toward lower-carbon options in the broader construction materials market. Public procurement policies have a large potential to impact embodied carbon, as nearly a third of the total annual embodied carbon of construction and nearly half of the cement use in the United States can be attributed to public projects (see [What is a Buy Clean Policy?](#)).

The following five-part framework can be used to understand and compare the growing number of low carbon procurement policies:

- **Scope:** Which materials and projects are covered?
- **Disclosure:** What environmental (or other) data is collected?
- **Standards** (optional): Is there a maximum carbon footprint set for each eligible material?
- **Incentives** (optional): Are bid incentives, performance bonuses, tax credits, or other incentives included to support compliance or encourage high performance?
- **Compliance:** How do agencies and stakeholders (e.g. contractors, architects, etc.) comply with the policy, and how is the policy phased in over time?



Growing landscape of embodied carbon policy in the United States at the state and city level ([CLF Policy Toolkit, March 2021](#)).

CLEAN Future Act: Federal Buy Clean Program

In March 2021, the House Committee on Energy & Commerce introduced the Climate Leadership and Environmental Action for our Nation’s (CLEAN) Future Act. This climate-oriented bill aims to “achieve net zero greenhouse gas pollution no later than 2050, with an interim target of reducing pollution by 50 percent from 2005 levels no later than 2030.” It is a wide-ranging bill that tackles the power, building, transportation, and industrial sectors. Sections 521-525 of the CLEAN Future Act lay out the Federal Buy Clean program. A federal Buy Clean program has been introduced twice previously: first, [by Senator Klobuchar in 2019](#) and again in the [first draft of the CLEAN Future Act](#) released in 2020.

The bill is described below using the framework outlined in the previous section:

Scope

Federal Buy Clean would apply to building materials purchased on projects involving federal funds, to be specified in more detail by the Administrator, the Environmental Protection Agency (EPA), and coordinating agencies. This means that federally funded infrastructure projects, even if only partially funded by federal funds like state projects, could be eligible.

The transparency program would begin with aluminum, iron, steel, concrete, and cement and expand to a secondary list including flat glass, insulation, unit masonry, and wood products. The program allows for the addition (or exclusion) of materials by the EPA or through public petition.

Disclosure

Section 522 Embodied Emissions Transparency would build on the progress from the private sector in the use of [environmental product declarations \(EPDs\)](#) → by requiring the EPA, in consultation with the Secretary of Energy, the Director of the National Institute of Standards and Technology, and relevant National Laboratories to “establish a program to enhance the transparency, quality, and availability of life-cycle assessment data” by:

- Designating a product category rule—either developed by a third party or newly developed by the EPA—for each eligible material (Sec 522c);
- Establishing a National EPD Database to provide a publicly accessible database of EPDs that conform to the designated PCRs; and
- Requiring the EPA to evaluate EPDs and recommend opportunities for harmonization or improvement.

Harmonizing the development and reporting of life cycle assessment (LCA) data is a role that has been taken on by federal governments in Europe, such as through Germany’s [ÖKOBAUDAT](#) database and France’s [INIES database](#).

Standards

Section 524 would require the EPA and Secretary of Energy to establish a Buy Clean program in coordination with [relevant Federal agencies](#). → Buy Clean programs typically require eligible materials used on public infrastructure projects to submit EPDs that demonstrate that a product meets a performance standard set by the program. Standards are typically maximum global warming potential (GWP) limits measured in kilograms of carbon dioxide equivalent per unit of product, as calculated through a life cycle assessment. The involved agencies would determine how GWP limits are developed, the materials that must meet these limits, the implementation timeline, and other details of the program.

Incentives

The bill includes two types of incentive programs. First, Section 522 establishes support for manufacturers by:

- Creating a technical assistance program for manufacturers of eligible materials to help them develop and verify EPDs;
- Creating a grant program for small businesses to develop EPDs; and
- Requiring public outreach and education to manufacturers to encourage them to submit EPDs to the national database.

Second, Section 525 establishes a Climate Star program, which is similar to the existing Energy Star program in that there will be a Climate Star label that indicates products meet low-carbon performance criteria. This would enable Climate Star products to be promoted in federal procurement policies and catalogs of products, creating an additional incentive for manufacturers to manufacture low-carbon products.

Compliance

The bill requires that development of the Buy Clean program begins within a year of enactment, but does not specify a specific timeline by which eligible materials must meet performance standards. The development of compliance requirements and responsibilities on relevant projects is left to the agencies listed in the previous section.

→ Environmental product declaration (EPD)

The CLEAN Future Act defines an EPD as a document that includes a product-specific measurement of the embodied emissions of a product on a mass basis and per functional unit that:

- is in accordance with international standards, such as a Type III EPD, as defined by ISO 14025;
- is calculated for a specific facility;
- communicates transparent and comparable information;
- includes all stages of manufacturing required by the product;
- is verified by an independent third party;
- is developed in accordance with the criteria specified in the appropriate PCR designated by the EPA;
- is valid for no more than 5 years.

→ Relevant Federal agencies

The bill (Sec 524(b)) identifies the following agencies as relevant for developing the Buy Clean program with the EPA and Secretary of Energy:

- Department of Commerce;
- General Services Administration;
- Department of Defense, including the Army Corps of Engineers;
- Department of Transportation;
- Department of Agriculture;
- Department of Veterans Affairs
- Any other Federal agency determined appropriate by the Administrator and the Secretary of Energy.

General Services Administration (GSA)

In February of this year, the Green Building Advisory Committee (GBAC) approved an [advice letter](#) (PDF) on procurement policy recommendations to reduce embodied carbon at the US General Services Administration (GSA). The GSA is a federal agency that supports the basic functions of the federal government, including procurement. The advice letter was developed between February 2020 and September 2020 by GBAC’s Embodied Energy Task Group (EETG), which collected policy recommendations from the Carbon Leadership Forum, The Rocky Mountain Institute (RMI), and others.

The approved letter outlines the environmental, economic, human health, and social justice benefits for reducing industrial greenhouse gas emissions and asserts that the benefits of reducing embodied energy and carbon in the GSA’s construction portfolio could be achieved with “little to no additional cost [to the GSA] beyond a minimal amount of administrative time” while encouraging a market shift towards lower-energy and lower-carbon materials.

The policy recommendations outlined in the letter were intentionally aligned with existing federal policy and systems. This makes it relatively easy for the GSA to expand its current procurement standards (*Facilities Standards for Public Buildings Service (P100)*) to include embodied carbon because the recommendations would be similar to existing environmental policies on energy targets, accessibility, or waste diversion. The letter is unique in that it recommends both [material-scale](#) and [building-scale](#) → approaches:

Part 1: Material approach *(applies to all projects, including tenant improvements)*

The material-scale approach would require contractors to collect a third party–certified, product-specific EPDs for 75% of new eligible materials (estimated by dollar value or weight) on all projects. These EPDs must demonstrate that the global warming potential (GWP) of the material installed is in the best-performing 80% of functionally-equivalent products based on data from a publicly-available EPD database. The letter contains additional recommendations that encourage material salvage, reuse, and use of materials manufactured in plants with an ENERGY STAR score of 50 or higher.

Part 2: Building approach *(applies to prospectus-level* projects)*

The building-scale approach would require the project team to design a building in such a way that results in a 20% reduction of GWP compared to a baseline building, per the requirements defined in LEED v4.1’s Building Life-Cycle Impact Reduction credit or the Green Globes Assessment Protocol for Commercial Buildings. The reductions would be measured and verified through a whole building life cycle assessment (WBLCA) of (at a minimum) the project’s structure and enclosure and submitted to a publicly-available database.

Additional federal developments

The section provides an overview of additional federal policy levers, ongoing research and education initiatives, and other programs to track related to embodied carbon:

Federal Highway Administration (FHWA) Sustainable Pavements Program

The [Sustainable Pavements program](#) led by the FHWA advances the knowledge and practice of sustainability related to pavement systems, including LCA best practices, standards and tools, such as the upcoming Pavement LCA tool. The program provides educational resources aimed at providing technical assistance to transportation agencies, who are key to reducing the approximately 12% of annual US embodied carbon attributed to highway and street construction (see [What is a Buy Clean policy](#)).

→ Material vs. Building Policies

Material-scale approach:

- Scope: Typically focus on a handful of high-impact and high-quantity materials
- Disclosure: Require EPDs for a specified list of materials
- Goal: Encourage manufacturing to adopt cleaner manufacturing technologies and publish high-quality embodied carbon data
- Cannot be used to compare across categories (i.e. concrete vs. wood); can be used to compare functionally equivalent products (i.e. rebar A vs. rebar B)

Building-scale approach:

- Scope: Structure, enclosure, and/or interiors or entire building
- Disclosure: Typically require a WBLCA
- Goal: Encourage design teams and owners to employ a range of strategies, particularly in early-stage design decisions (such as considering building reuse options or choice of structural system material)
- Can compare across product categories (i.e. concrete vs. wood)

* In fiscal year 2020, “prospectus-level” means valued at a \$3.095 million dollars or more

Executive orders

The Executive branch does not require legislative action to change procurement policy to tie sustainability requirements to infrastructure spending. In early 2021, the Biden Administration released an [Executive Order on Tackling the Climate Crisis at Home and Abroad](#) calling for “regulatory amendments to promote increased contractor attention on reduced carbon emission and Federal sustainability.” Additional executive orders could authorize or require specific agencies like the GSA and Department of Transportation to adopt low-carbon procurement policies or initiate a Buy Clean program.

LCA background data and research initiatives

The [Federal LCA Commons](#) is an interagency community formed by the United States Department of Agriculture (USDA), Department of Energy (DOE), and EPA. It focuses on advancing federal LCA research, modeling methods, and data, including building materials.

The [US Life Cycle Inventory Database](#), developed by the National Renewable Energy Laboratory (NREL), provides data on the energy and material flows into and out of the environment that are associated with producing a material, component, or assembly in the US, including building materials.

Publicly accessible LCA datasets, such as those developed by federal agencies, could provide an opportunity for increased harmonization of EPDs through requiring the use of public, freely accessible LCA data within product category rules.

Industrial efficiency and research and development (R&D) programs

The federal government supports the adoption of energy efficiency and clean manufacturing practices through research and direct collaboration with manufacturers.

Rebecca Dell describes the scale of current federal investment in clean manufacturing and other industrial innovation in [her testimony](#) at the CLEAN Future Act’s hearing:

Currently, we spend no more than \$850 million per year on manufacturing and industrial innovation...Manufacturing and construction generate more employment and almost as much GDP as the healthcare sector. The healthcare sector is supported by the research and development activities of the National Institutes of Health, with an annual budget of \$42 billion, or 5,000% of what we spend on the industrial sector.

[Dell’s testimony](#) states that a majority of current funding is through the [DOE’s Advanced Manufacturing Office](#), a subdivision of DOE’s Office of Energy Efficiency & Renewable Energy. It supports R&D and technical partnerships focused on new manufacturing technologies. The DOE has a number of other relevant funding opportunities, such as [Advanced Research Projects Agency-Energy \(ARPA-E\)](#).

The EPA’s [ENERGY STAR program](#) has an industrial energy efficiency benchmarking and voluntary certification program for cement, glass, and a growing number of other construction material manufacturing sectors. Manufacturers of all sizes can use the free [Energy Performance Indicator \(EPI\)](#) tool developed for each sector to benchmark their plant’s efficiency against other US manufacturers and take advantage of the program’s free educational resources and technical assistance opportunities to improve their plant’s efficiency.

High-performing manufacturers can have individual plants certified by ENERGY STAR if they achieve a score of 75 or higher (out of 100) using the EPI tool and receive third-party verification of their efficiency efforts. On March 18, 2021, the EPA [announced the 2020 ENERGY STAR-certified plants](#), including 13 cement plants and two flat glass manufacturing plants.

Questions?

Reach out to info@carbonleadershipforum.org or join the CLF online community.