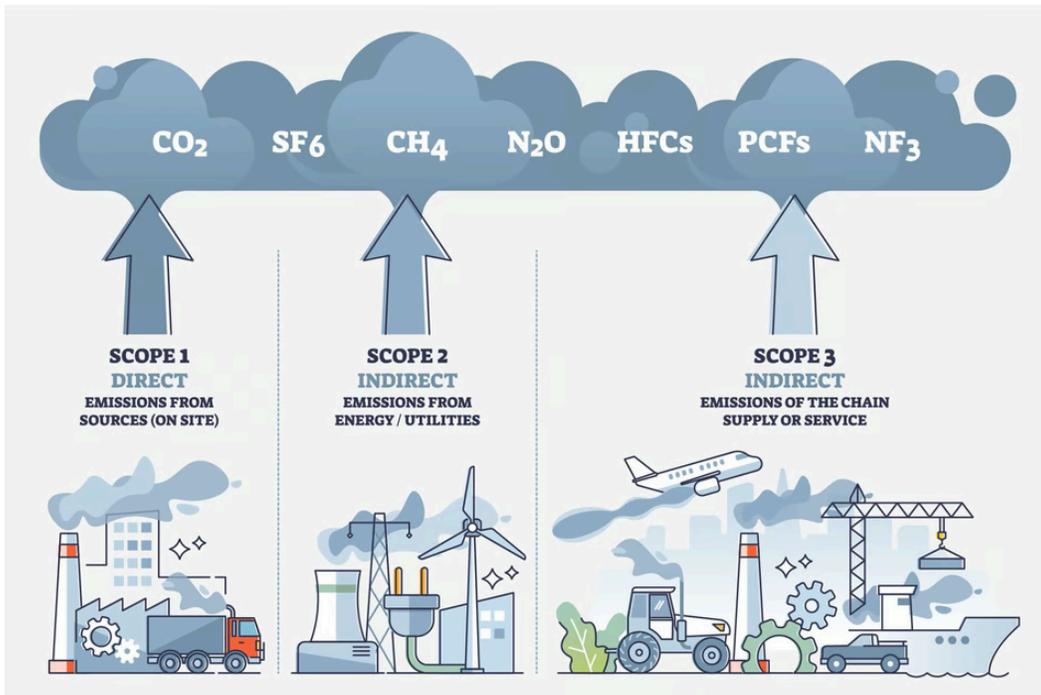


MEMO Published June 22, 2023 · 12 minute read

Improving Data for Federal Buy Clean Efforts

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Takeaways

Having access to accurate and transparent embodied carbon data is foundational to Buy Clean procurement efforts.

The Inflation Reduction Act provides resources to spur clean procurement, with roughly \$5 billion for federal agencies to purchase cleaner infrastructure materials and \$350 million to develop an embodied carbon labeling system and help manufacturers disclose their emissions.

To help improve the underlying lifecycle emissions data on which procurement decisions will be made, Congress provided the Department of Energy with \$5 million in the FY23 omnibus.

Congress needs to continue funding these data collection and curation efforts and establish the Federal Lifecycle Assessment (LCA) Commons as a robust and trusted resource for companies seeking to disclose the embodied emissions of their products.

Introduction

The Biden Administration has made significant progress in expanding the market for cleaner, commonly-used construction materials like concrete and steel by leveraging its enormous purchasing power to [Buy Clean](#). This commitment to using low-carbon materials for federal infrastructure projects is a crucial component of a whole-of-government approach to decarbonizing the industrial sector. The Inflation Reduction Act provided over \$5 billion to establish clean procurement practices across several federal agencies, as well as a suite of historic [investments](#) and tax credits to accelerate the adoption of clean industrial technologies among US manufacturers.

Federal agencies are now in the process of implementing procurement guidelines to increase demand for cleaner materials and incentivize US manufacturers to take advantage of available resources. For instance, the General Services Administration (GSA) recently published standards for the materials it will purchase with its \$2.15 billion budget for low-

carbon materials procurement, and the Environmental Protection Agency (EPA) will soon publish its recommendations to inform practices at other agencies, including the Department of Transportation (DOT), Housing and Urban Development (HUD), and Federal Emergency Management Agency (FEMA). These standards will set embodied carbon thresholds, based on available data of industry averages, and require the submission of ISO Type III Environmental Product Declarations (EPDs) as a method of verification, per [guidance](#) issued by the Federal Buy Clean Task Force.

Simultaneously, states such as California, Oregon, and Colorado have signed state Buy Clean policies into law, and nine other states joined the [Federal-State Buy Clean Partnership](#) to support federal efforts and send a harmonized demand signal to materials manufacturers, further growing the market for cleaner materials and the demand for EPDs. Contracting officers from across the country will soon rely on EPDs to evaluate federal and state infrastructure project proposals on the basis of embodied carbon.

It goes without saying that EPDs, and the lifecycle data used to create them, are foundational to the success of clean procurement programs. We need to ensure product data is accurate and comparable if we want to administer these programs fairly and ensure the makers of verifiably cleaner goods are rewarded. The federal government has a data infrastructure in place to do just that, called the Federal Lifecycle Assessment (LCA) Commons, but it needs resources to scale and provide the services necessary to meet this moment.

Role of LCA Commons in Low-Carbon Procurement

The Federal Buy Clean Initiative, with supporting resources from the IRA, leverages the purchasing power of the federal government to drive market development of low embodied carbon construction materials. Buy Clean complements Buy American procurement provisions to advance [national climate goals](#), create good-paying jobs, and increase the competitive standing of domestic manufacturers.

A wide range of industries have [recently coalesced](#) around the use of third-party verified EPDs to communicate the embodied carbon of products and inform sustainable procurement policies. EPDs are based on product lifecycle assessments that include both background data (the carbon content of electricity or fuels that are used to operate a plant or transport goods, for example) and foreground data (actual emissions data related to specific plant or product operations).

The creation of reliable and comparable EPDs is dependent on the robustness and validity of the underlying data used in their generation. Today, the federal government researches and compiles such data and houses it in LCA Commons. This platform provides open and transparent access at no cost to both background and foreground data that can be used by manufacturers, industry associations and other third parties involved in the creation of EPDs.

As an example of this process, consider a flat glass manufacturer. In order to conduct a lifecycle assessment and generate an EPD for their product, they would connect their facility-specific foreground data to public background data from the LCA Commons for electricity, fuels, transportation, raw materials, etc. Their proprietary foreground data from that manufacturer's plant would then be incorporated in an anonymized dataset and used as background data as part of a processed glass manufacturer's EPD. ¹

However, there are data collection and curation barriers preventing the execution of this ideal scenario. In the case of background data, not all manufacturers use LCA Commons for EPD generation but rather use proprietary data that may not be geographically aligned with where manufacturers operate and the accuracy of which is not made transparent to third-party verifiers of EPDs. Access to proprietary datasets also costs money that many small and medium-sized manufacturers either do not have or do not want to spend, limiting the accuracy of aggregate lifecycle data. The use of divergent and incomplete sources of background data undermines the comparability of the resultant EPDs. As such, organizations such as the American Center for Life Cycle Assessment (ACLCA) recommends use of common background data in their PCR Open Standard for use in generating EPDs. ² LCA Commons can and should be an easily accessible, universal source of common background data. For this to happen, the federal government needs to assemble lifecycle data, portions of which are stored in different formats across a number of federal entities, in a centralized place and present that data in a standardized, digital format.

In the case of foreground data, GHG industry averages are generated for different types of products based on the actual plant-specific performance data in terms of energy and resource requirements. Manufacturers generate and submit these emissions profiles to the U.S. Life Cycle Inventory (LCI) database housed on the Federal LCA Commons platform. These inventories are a critical input to the lifecycle assessment of a product's carbon footprint, but there is a limited sample of sources for the data being entered into USLCI and used in the calculations of industry averages. The limited source of LCI data is due to lack of automation in the submission process, making the task more onerous for manufacturers than it should be, and lack of adequate tools to ensure manufacturers that their confidential data will be properly protected. The government needs the ability to encrypt plant-specific

data submissions to protect proprietary data and engender greater industry participation in this process.

The good news is that these are all things that can be resolved with better coordination among entities that collect and store different components of background and foreground data. Now we just need modest, but sustained, funding to curate and store this data in a central, easily accessible digital repository to make it easier for manufacturers to use.

Federal Support for LCA Data Collection and Curation

Recognizing the growing need for accurate and comparable EPDs to inform sustainable procurement efforts, the Biden Administration and current Congress provided the Department of Energy (DOE) \$5 million in FY23 to “increase participation in databases used in generating environmental product declarations (EPDs), the disclosure tool measuring the embodied carbon of a product or service, in coordination with the Environmental Protection Agency.”³ DOE should use this funding, and any future funding allocated for this purpose, to solidify the LCA Commons as the universal source of lifecycle data and address current barriers to broader use by: 1) fostering greater coordination among participating federal entities involved in lifecycle data storage; 2) making the interface more accessible and easy to use to discourage the use of alternative datasets that create inconsistency; and 3) promoting a greater level of confidence among manufacturers that their proprietary data remains anonymous and secure.

Right now, the LCA Commons does not have an explicit source of funding. It is the product of a 2018 Memorandum of Understanding (MOU) among USDA, EPA, and DOE to:

- Advance federal LCA data, research, and information systems by leveraging multi-agency resources and expertise,
- Improve consistency in LCA methods developed by each agency to develop LCA results for decision-making and public disclosure, and
- Enhance public and agency access to federal Life Cycle Inventory (LCI) data and models in a standardized researchable format from a common repository.⁴

The MOU formalized the working relationship between these agencies to continue implementing the vision of a centralized Federal LCA Commons, standardized LCI data documentation formats, and increased multi-agency and public access to LCI data. The MOU also expanded the vision to ensure inter-agency collaboration on LCA data, models and research to maximize the value of federal government LCA efforts and results. This

includes LCA tools and data products developed and maintained by EPA (i.e., the TRACI Life Cycle Impact model) and DOE (i.e., ANL's Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation or GREET model, NETL's Upstream Dashboard Tool and Electricity Grid Mixer, and NREL's US Life Cycle Inventory database, or USLCI). NETL also created a web repository of LCI data with the intention of increasing transparency in their modeling and improving public access to underlying data sets.

Even without a dedicated funding stream, this inter-agency working group has made significant progress since its inception in 2018. However, given the skyrocketing demand for LCA data to comply with Buy Clean and other clean procurement initiatives, as well as the forthcoming expiration of the MOU at the end of 2023, federal administrators of LCA data need specific direction and funding from Congress to scale their efforts and improve the data housed within the LCA Commons platform.

To that end, we recommend that Congress provides funding in FY24 and beyond for the following activities:

1. Resources for DOE national labs to manage and maintain their public background and foreground data repositories in the Federal LCA Commons. ⁵

NETL – lifecycle model integration and maintenance for the background data associated with construction materials; maintaining and expanding the Electricity Baseline (generation and consumption mix life cycle inventory data for up to 68 balancing authorities, 10 FERC regions) recommended for North American geographic scope EPD comparability by the American Center for Life Cycle Assessment (ACLCA) Open Standard.

ANL – re-structuring the Excel or .net tool Greenhouse Gases, Regulated Emissions, and Energy Use in Technologies (GREET) lifecycle model and its Building LCA module to be interoperable with the Fed LCA Commons JSON-LD public repository formats, i.e., FAIR Data Principles. Maintain and provide up-to-date, background vehicle technology, fuels data, and a selected subset of chemicals and materials from GREET in the standard data formats to a centralized background database. Coordinate with the ACLCA PCR Committee to ensure timely and accurate transfer of updates/expansion of the Product Category Rule (PCR) Open Standard & Addenda to the lab collaborators and inform data infrastructure development.

NREL – expanding capacity for USLCI database to support data submission training for data providers as well as provide curation support to data providers to be able to receive external data from industry associations conformant to the ACLCA Open Standard, i.e., updating data submission guidelines to reflect ACLCA Open Standard criteria and data collection capabilities to ensure confidentiality.

Pacific Northwest National Laboratory (PNNL) – coordinating with Federal LCA Commons Technical Working Group Data Management Team and Interoperability Curator as well as ACLCA on the 2022 Product Category Rule (PCR) Open Standard & Addenda Toolkit for comparable EPDs and PCRs to create and maintain mappings to public background data for creation of cloud-based solution for streamlining creation of Open Standard-conformant LCA models with digital LCI templates.

2. Resources for United States Department of Agriculture (USDA) National Agriculture Library (NAL) to host and manage the Federal LCA Commons Collaboration Server. NAL currently leads the knowledge management and public access function of the Federal LCA Commons. As a library, it is within NAL's mission to support the Federal LCA Research community with data curation and public access services. NAL has developed and maintains the basic knowledge management infrastructure for collaboration, data sharing, and public access and would require an investment to scale up activities in this space. With an investment to scale, NAL would build capacity internally for technology management and externally for contract support for data and technology operations.

- Hiring a Federal LCA Commons Interoperability Curator (full-time employee) to oversee updating and maintaining the interoperability of data published by Federal agencies and labs to their respective repositories.
- Establishing Federal LCA Commons data submission guidelines to reflect best practices and consensus dataset structuring and metadata content conventions.

Conclusion

A successful Buy Clean program that leverages the full purchasing power of the federal government must be based on an accurate and standardized system to quantify and track the lifecycle greenhouse gas (GHG) emissions associated with widely used construction materials. EPDs have emerged as the global mechanism for communicating the embodied emissions of such construction materials. Data used to generate transparent, reliable, and comparable EPDs, which is essential for the equitable procurement of low-embodied carbon construction materials, is publicly available on the Federal LCA Commons platform.

Sustained annual funding of the activities described above is required to expand, enhance and maintain the lifecycle data housed within the Federal LCA Commons. While the \$5 million provided to DOE in the FY23 budget is a good start, the federal entities involved in collecting and curating an increasing amount of data need ongoing support to build the platform into a centralized, widely-used repository for the generation of EPDs.

Clean procurement decisions are only as effective as the data on which they are based. The federal government is uniquely positioned to improve the accuracy and comparability of such data, and for a nominal amount of annual funding, it can leverage its existing resources to support both public and private clean procurement efforts across the country.

ENDNOTES



- 1.** Carbon Leadership Forum, et al. “Request for Information (RFI) to Support New Inflation Reduction Act Programs to Lower Embodied Greenhouse Gas Emissions Associated with Construction Materials and Products.” Submission to Environmental Protection Agency Request for Information. May 2023. <https://www.regulations.gov/comment/EPA-HQ-OPPT-2022-0924-0128>. Accessed 21 June 2023.
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- 4.** Memorandum of Understanding among the US Department of Agriculture, US Environmental Protection Agency, and the US Department of Energy for Cooperation in Data, Research, and Information systems for Life Cycle Assessment/Analysis. https://www.lcacommons.gov/sites/default/files/pdfs/LCA%20MOU%20Final%20signed_2.pdf. Accessed 21 June 2023.

- 5.** Rebe Feraldi. “Data-Driven Buy Clean: Decarbonization and Beyond. National Renewable Energy Laboratory,” Office of Energy Efficiency and Renewable Energy, US Department of Energy. April 2023.
<https://www.nrel.gov/docs/fy23osti/84772.pdf>. Accessed 21 June 2023.