Navigating Environmental Product Data

A Guide for Landscape Architects, Specifiers, and Industry Partners

ASLA 2023 Professional General Design Honor Award.
Grand Junction Park and Plaza. Westfield, Indiana. DAVID RUBIN Land Collective / Alan Karchmer

American Society of Landscape Architects

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Executive Summary

Reliable environmental information can help identify products that are better for the climate and environment.

The International Organization for Standardization (ISO) has classified reliable product environmental data into three types:

- Type I - Eco-labels
- Type II - Self-Declared Claims
- Type III - Environmental Product Declarations (EPDs)

Learn more about ISO best-practices in product environmental data.

Type I Eco-labels communicate that a product has one or more environmentally preferable attributes compared to others in its category. There are many verified eco-labels. . A good place to start is the U.S. Environmental Protection Agency (EPA)'s Eco-labels Recommendations for Federal Purchasing.

Type II - Self-Declared Claims may contain the environmental information needed but generally are not third-party verified. Product Carbon Footprints are a common type of self-declared data

Manufacturers can follow best practices when making their own Type II claims to ensure their communications are reliable and clear:

- Use standard definitions of common terms
- Be scientifically based
- And provide verifiable evidence

Type III environmental data, commonly referred to as Environmental Product Declarations (EPDs), is the gold standard of environmental product information. EPDs provide the insights, data, and baselines needed to enable policies and drive industry-wide decarbonization.

EPDs are a vital tool for reducing the carbon impacts of site construction and the broader environmental impacts of resource extraction.

Why EPDs are important:

- EPDs enable manufacturers to see the drivers of environmental impact within their products so product offerings can be optimized and impacts reduced.

- EPDs are a powerful tool to demonstrate an organizational commitment to transparency and support positive industry change.

- EPDs can be used to compare two functionally equal products, as long as they use the same PCR and the LCAs refer to the same background data.

- Construction material and product specifiers – landscape architects, engineers, architects – are increasingly asking for and making use of EPDs in their specification strategies.

- Broadly, EPD data can provide benchmarks across product categories, so better embodied carbon scenarios can be identified and specified.

- Increasingly, public procurement programs, especially in European markets, require the use of EPDs.

- Rating systems like SITES, LEED, BREEAM, and International Living Future Institute all recognize and award using products with EPDs.

- The U.S. Environmental Protection Agency (EPA) has launched "Buy Clean," a low-carbon labeling program to enable lower carbon procurement policies, which will use EPD data.

Start with these resources on EPDs:

- Carbon Leadership Forum's EPD 101: Embodied Carbon Accounting for Materials is an excellent starter guide.

- 2050 Materials provides product and material analysis tools to understand and compare low-carbon building materials, with a focus on architecture and interior design.

- Embodied Carbon in Construction Calculator Tool is a clearinghouse for both product and industry EPDS.

- Program Operators often host EPDs they've authored on their respective websites, which can be found through the links in the next key takeaway. Here are a couple free EPD databases hosted by program operators: Environdec Library and SCS Global Services Certified Green Product Guide

To start conversations with product manufacturers, use the ASLA guide: Collaborating with Industry Partners on Climate Action and Biodiversity: A Guide to Conversations Among Landscape Architects, Vendors, and Product Manufacturers.

For manufacturers looking to get started with EPDs, begin by finding a program operator on lists maintained by EC3 or the American Center for Life Cycle Assessment.

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The Bay: "One Park for All" in Sarasota. Sarasota, Florida. Agency Landscape + Planning / Ryan Gamma Photography

About ASLA

Founded in 1899, the American Society of Landscape Architects (ASLA) is the professional association for landscape architects in the United States, representing more than 15,000 members. The Society's mission is to empower our members to design a sustainable and equitable world through landscape architecture.

ASLA Biodiversity & Climate Action Committee

The ASLA Biodiversity & Climate Action Committee leads the implementation of the ASLA Climate Action Plan.

The committee:

- Provides input to ASLA leadership on strategies for communicating the role of landscape architecture in mitigating climate change and increasing and protecting biodiversity.

- Develops and promotes programs, products, and services that provide research data and learning opportunities to practitioners.

- Advances the adoption of climate positive design and nature-based solutions in the practice and teaching of landscape architecture.

Authors

Amy Syverson-Shaffer, ASLA, SITES AP, TRUE Advisor, Landscape Forms
Sasha Anemone, ASLA, SALT Landscape Architects

Contributors

Bryce Carnehl, Corporate ASLA, Hunter Industries
Benjamin Jensen, Assoc. ASLA, HOK

ASLA Team

Jared Green, Hon. ASLA, Senior Manager, Climate Action
Katie Riddle, ASLA, PLA, SITES AP, Managing Director, Programs
Pamela Conrad, ASLA, PLA, Climate and Biodiversity Fellow

A special thank you to those who provided additional insights

Meg Calkins, FASLA, SITES AP, North Carolina State University
Chris Hardy, ASLA, PLA, Sasaki
Radu Dicher, ASLA, SWA Group

ASLA Biodiversity and Climate Action Committee

Introduction

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Qianhai's Guiwan Park. Shenzhen, Guangdong, China. Field Operations / Holi Photography

The ASLA Climate Action Plan calls for landscape architects to reduce their project emissions by 50-65 percent by 2030 and achieve zero emissions by 2040.

The products and materials that landscape architects specify for their projects play a significant role in the overall global warming potential (GWP) of a project. They can also impact biodiversity, air and water quality.

This guide outlines how EPDs and other environmental reporting can be used to understand the environmental impacts of landscape materials and products and make decisions to reduce those impacts.

This guide defines the standard types of environmental data that are applicable to landscape design and construction and helps landscape architects navigate product and material research.

Landscape architects will learn about EPDs and other types of reporting and how they can inform decision making.

Product manufacturers seeking to develop EPDs will gain new insights.

This guide answers the questions:

- What are reliable environmental claims?
- Why are EPDs the gold-standard?
- What goes into making an EPD?
- What will I find in an EPD?
- How can I use environmental data?
- I have an EPD. Now what?
- How can manufacturers get started with EPDs?

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The University of Texas at El Paso Transformation. El Paso, Texas. Ten Eyck Landscape Architects, Inc / Adam Barbe

What are reliable environmental claims?

The ISO 14020 series of standards define three distinct categories of environmental data and claims:

- Type I - Eco-Labelling
- Type II - Self-Declared
- Type III - Environmental Product Declarations

How are the ISO standards created?

"ISO standards are developed by groups of experts within technical committees (TCs) that bring together industry, non-governmental organizations, governments, and other stakeholders from all over the world. Each TC deals with a different subject or specialist area. The ISO Environmental Management technical committee's Enviro-Labeling sub-committee consists of experts from 78 countries." (Pub100323, ISO)

Learn more about the types of environmental data and claims from the ISO.

Type I environmental labeling: ISO 14024

For eco-labeling schemes where there are clearly defined criteria for products

Type I Environmental Labels – like Forest Stewardship Council (FSC)® Certified or the EPA's ENERGY STAR® – are the most common form of product environmental claims.

These types of standards set environmentally-preferable criteria for a distinct product type and are often graphically portrayed on product information or packaging.

They are third-party verified and can be developed and managed by government entities or the private sector.

These labels can help consumers, purchasing agents, and landscape architects identify products that are more environmentally friendly.

There are hundreds of eco-labels applying to dozens of types of products, each with their own set of requirements and impact assessments.

To make sense of the various eco-labels on the market, refer to EPA Ecolabels Recommendations for Federal Purchasing.

Some eco-labels go beyond certifying a single preferable attribute and provide assurance of multiple categories of environmental information. These are called multi-attribute labels.

Some well known multi-attribute labels are:

- Cradle to Cradle Certified®
- ILFI Living Product Challenge™
- ILFI Declare™

Multi-attribute product data can be either self-reported by the manufacturer or third-party verified depending on the individual label requirements.

Type II self-declared environmental claims: ISO 14021

For products and services where there are neither criteria nor labeling schemes

"ISO 14020 provides businesses with an internationally recognized and agreed set of benchmarks against which they can prepare their own environmental labels and claims" (Pub 100323).

The 14020 and 14021 standards outline principles that ensure accurate and credible information form the basis of any self-declared claims by a business.

Aligning with ISO standards provides assurance that claims are valid when there is no eco-label to provide applicable third-party verification.

This enables innovative approaches to be marketed for their environmental benefits while also avoiding confusion and greenwashing.

Some recommended best practices are for claims:

- Be clear
- Be scientifically based
- Have verifiable evidence
- Use standard definitions of common terms like "compostable," "reduced resource use," and "renewable material."

Product Carbon Footprints (ISO 14067)

One common Type II claim is a Product Carbon Footprint (PCF). Standards for carbon footprints are outlined in ISO 14067. A PCF study follows a similar methodology to the development of an EPD and is based in Life Cycle Assessment (LCA). In these reports, the study is limited to the global warming potential, or carbon footprint, of the product.

ISO 14067 compliant reports do not require independent third-party verification, though they may undergo an internal review. As such, they fall under Type II, self-declared environmental data.

PCFs may include more detailed analysis of which materials contribute to the carbon footprint at which stage. This can help with finding ways to reduce footprints by making changes in materials, transport, production, distribution, or end of life.

If the goal of requesting an EPD is to study the embodied carbon impacts of a product selection or a whole project, landscape architects may find PCFs to be sufficient. Read more about the difference between EPDs and PCFs.

Type III environmental declarations: ISO 14025

For specific aspects of products using a life cycle approach

Type III environmental product declarations, commonly referred to as EPDs, are often compared to nutritional labels for products. They enhance communication between producers of products and purchasers.

They are unique among the types of environmental claims, providing a comprehensive report of impacts for the lifecycle of a product. EPDs are neutral, quantitative, and verified. In the third-party verification process, an independent expert reviews the background data, the LCA, and the EPD report for conformity with ISO 14025 and ISO 14040/14044.

Unlike eco-labels, EPDs do not mandate specific practices or confirm that a product meets environmentally preferable criteria.

EPDs also permit different products within the same category to be compared to one another, as long as the studies conform to identical parameters and the same Product Category Rule. (Environmental Life Cycle Assessment Textbook, American Center for Life Cycle Assessment)

	Type I (eco-labels)	**Type II (self-declarations)**	**Type III (LCA-based declarations)**
Third-Party Verified	Yes	No	Yes
Reports Environmental Preferability	Yes	Yes	No*
Reports Product Performance Attributes	Yes	Yes	No
Verifiable Methodology, Replicable Results	Yes	Yes	Yes
Source of Baseline Embodied Carbon Data	No	No	Yes
Easily Understood / Used by General Population	Yes	Yes	No
**Individual EPDs do not communicate environmental preferability, but enable comparison from one product to another if they are functionally equivalent and use the same PCR and background data.*			

The EPDs that can provide the highest data confidence use specific data rather than representative data in the life cycle assessment.

This begins with data that is specific to one manufacturer, meaning the study is based on the technologies and ingredient list of that particular business.

The next step up in confidence is facility-specific, meaning details of energy and manufacturing processes are known.

The EPDs with the most robust data and the least amount of uncertainty are also specific to a product and use actual supply chain data, as opposed to representative data. (How to get an EPD, BuildingTransparency.org)

There are also industry-wide EPDs that represent an average product in a sector or provide data for some industries with little differentiation between products from different producers, such as the ready-mix concrete industry.

Industry-wide EPDs also represent an intermediate product, such as unfinished metals. Or they can be regionally specific. Industry-wide EPDs provide a useful benchmark of business-as-usual for the industry.

Granada Beach, Long Beach, California. SALT Landscape Architects

Why are EPDs considered the "Gold Standard"?

EPDs are based on a type of scientific study and analysis called Life Cycle Assessment (LCA).

This means that an EPD promotes the complete documentation and transparency of the material flows associated with a product, across all life cycle stages defined for that product category.

They also go further to report on categories of environmental and human health beyond global warming potential. Key impact categories commonly found in EPDs align with the most urgent challenges to global sustainability.

For instance, land use and land use change – such as deforestation during the extraction of raw materials from the environment – are the biggest global drivers of biodiversity loss and are commonly reported EPD impact categories.

Here are the minimum EPD impact categories required under ISO 21930:

- Greenhouse Gasses (GHG)
- Ozone Depletion Potential (OPD)
- Eutrophication Potential (EP)
- Acidification Potential (AP)
- Photochemical Ozone Formation Potential (POCP)

According to the Carbon Leadership Forum's Embodied Carbon Policy Toolkit: "EPDs are the right tool for product-embodied carbon reporting in policies." Learn more and explore the Toolkit.

As robust EPDs provide important data to inform policy development, it's vital that we all do our part to support and encourage the development of more EPDs.

LCA, Defined

"Environmental life cycle assessment is the analytical framework for quantifying the resources used and the impact to the environment and human health by a product, service or system over its entire life cycle... The comprehensive approach of LCA promotes the complete documentation of evaluation of material as it flows upstream and downstream from an actor (such as a manufacturer) in the product life cycle." – Environmental Life Cycle Assessment Textbook, American Center for Life Cycle Assessment.

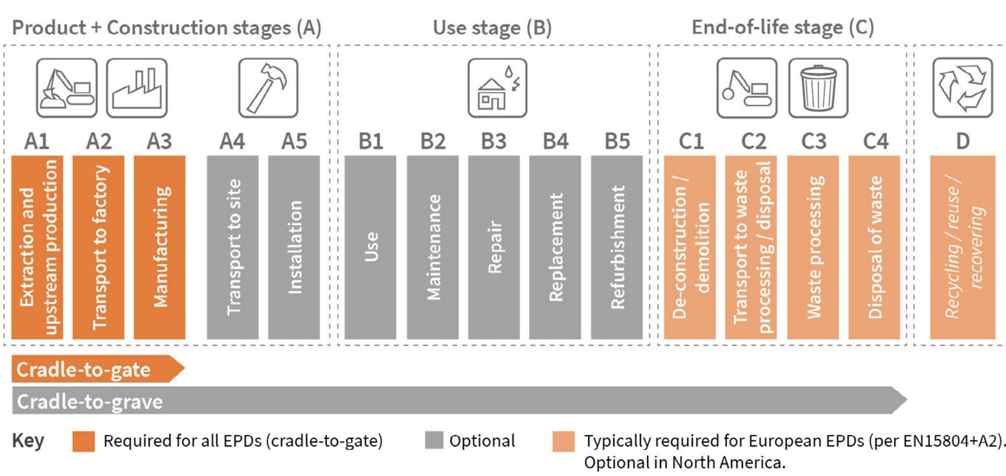
Product Life Cycle Stages

Depending on the product and goal of the study, a LCA can cover various stages of the product life cycle.

Studies that include all the stages between extraction of raw materials and disposal are generally referred to as "cradle to grave." Studies covering only manufacturing or product stages are often referred to as "cradle to gate."

The below diagram shows the life cycle stages as commonly defined per ISO 21930:

- Product Stage (A1-A3)
- Construction Stage (A4-A5)
- Use Stage (B1-B7)
- End-of-life-stage (C1-C4)
- And in some cases, potential recovery stage (D)



Life cycle stages typically included in North American EPDs. Module names are in accordance with ISO 21930. Product category rules (PCRs) dictate which life cycle stages are required, excluded, or optional. Lewis et. al. (2024) EPD 101: Embodied Carbon Accounting for Materials. Carbon Leadership Forum, University of Washington. Seattle, WA.

ASLA 2024 Professional General Design Honor Award. EcoCommons – Social and Ecological Resilience in the Campus Landscape. Atlanta, Georgia. Nelson Byrd Woltz Landscape Architects / Nick Hubbard

What goes into making an EPD?

To create an EPD, the client – generally a manufacturer, vendor, or trade association – will work with a qualified LCA practitioner, who is called a program operator, to first conduct a LCA of the product or process to be studied, per ISO 14040 and ISO 14044.

Then, the program operator will report out the results of the LCA in the standardized EPD format per ISO 14025.

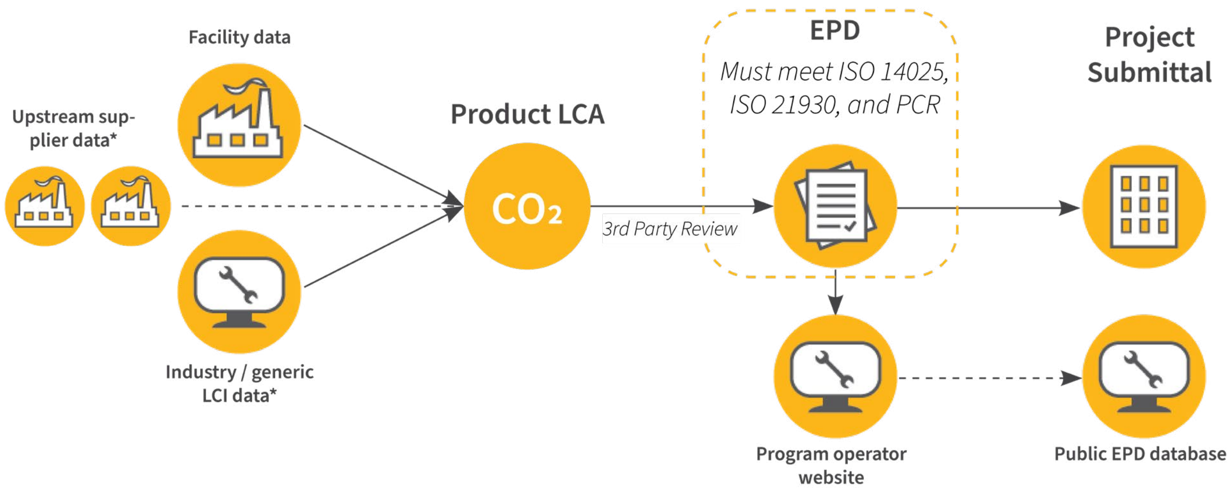
To conduct the LCA, an experienced LCA practitioner guides their client in the following steps:

- **Scoping the Project:** Define products or processes to be assessed, required level of detail, and system boundaries. The scope of an LCA – including life cycle stages studied, system boundary, and level of detail – depends on the subject and the intended use of the study. The depth and the breadth of LCA can differ considerably depending on the goal and standards referred to.

- **Life Cycle Inventory:** Collect and analyze production facility, supply chain, and representative data for all environmental inputs (e.g. material, energy) and outputs (e.g. emissions, waste) for each process.

- **Impact Assessment:** Classify and model inventory data to determine potential environmental impacts.

- **Reporting:** Report results and relevant LCA based communication tools, such as EPDs or in some cases Environmentally Preferable Product certification or validation of claims.



Flow of data to create an EPD. (*) indicates areas where specificity and other minimum data requirements are set by the Product Category Rule. Dashed lines indicate that something is optional. Policies can also add requirements.

Lewis et. al. (2024) EPD 101: Embodied Carbon Accounting for Materials. Carbon Leadership Forum, University of Washington. Seattle, WA.

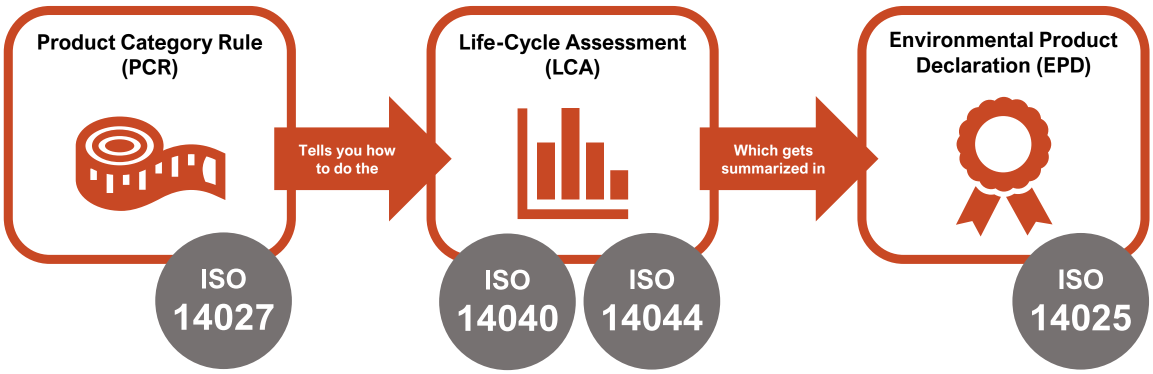
Product Category Rules: a Key Standard for Robust EPDs

As we have seen throughout this guide, layers of standards within the ISO 14000 series – ISO 14020, ISO 14021, ISO 14024, ISO 14025, ISO 14040, ISO 14044 and ISO 14067 – support the development and communication of credible environmental product data. But there is one area of standards that is key to every EPD that we have not yet covered: Product Category Rules (PCRs).

PCRs are important to EPDs as they define how to conduct the LCA and how to summarize the results based on the characteristics of the product category in consideration.

Primary areas of study for one product can vary significantly from another. For example, think of two products like a bottle of beer and a task chair.

A beer and a chair have different life cycle stories, material flows, end-of-life scenarios, units of measure, etc. Therefore, each category requires a unique set of guidelines to inform a useful, applicable study.



Source: Adapted from SCS Global Services: Life-Cycle Assessment, The Future of Sustainability (2024)

Adapted from SCS Global Services: Life-Cycle Assessment: The Future of Sustainability (2024)

PCRs are developed by collaborative committees with representatives from stakeholder groups that include program operators, trade associations, industry representatives, academics, and government officials. Two well known online libraries for PCRs are The International EPD System PCR Library and NSF Standards Product Category Rules.

PCRs direct what is included in the data inventory, how the analysis is conducted, and what is reported in the EPD.

These include but are not limited to:

- Life cycle stages
- Impact categories
- Geographic scope
- Reference service life
- Calculation rules
- Product scope
- EPD reporting format
- Functional units

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Hunter's Point South Waterfront Park Phase II: A New Urban Ecology. Long Island City, NY. SWA/BALSLEY and WEISS/MANFREDI with ARUP / ©Lloyd/SWA, courtesy of SWA/BALSLEY and WEISS/MANFREDI

What will I find in an EPD?

To get familiar with the EPD format, we can tour through the Industry Average Environmental Product Declaration for Slag Cement.

Open the EPD through this link and follow along.

Basic Product Information and Introduction

Like most EPDs, this one begins with general information about the study, such as:

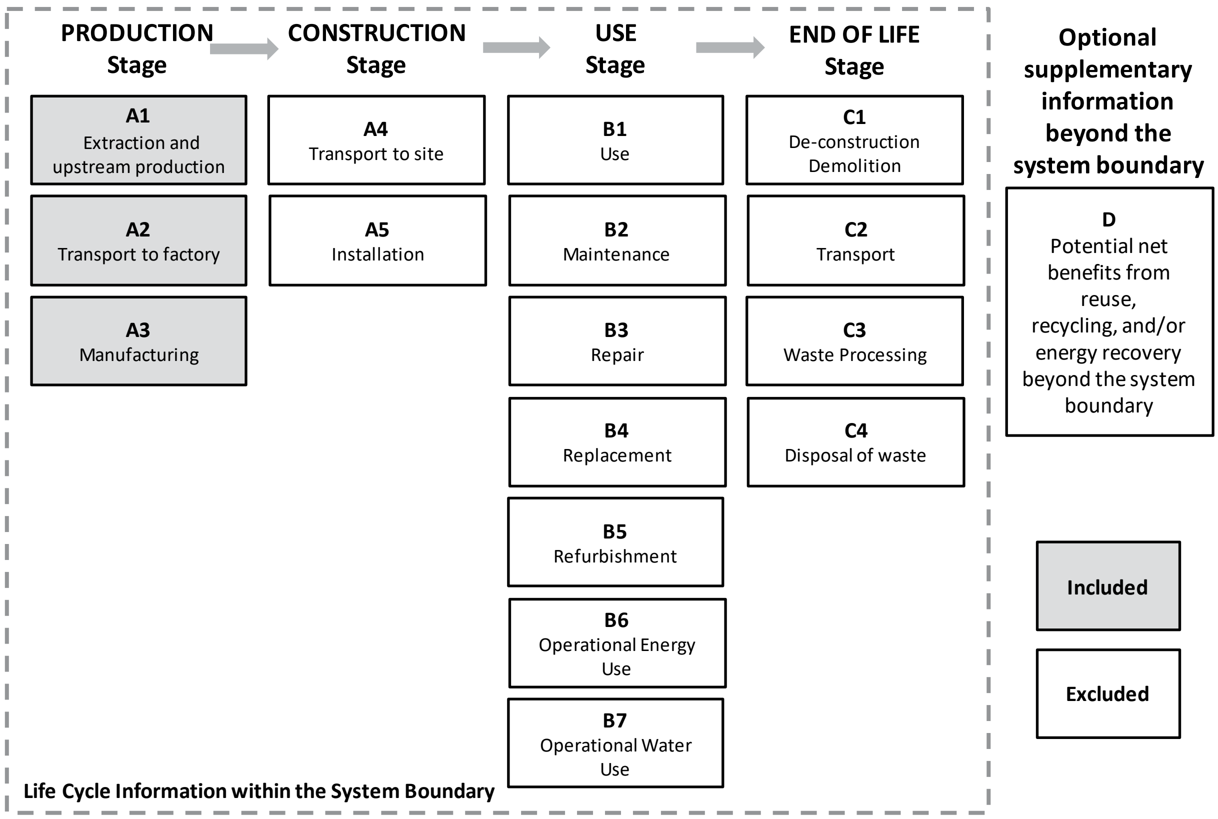
- ISO standards
- PCRs used
- EPD owner / who commissioned the study
- Program operator (ASTM in this case)
- Date of issue and validity period
- Declared unit
- Life cycle stages included
- Who provided independent verification
- Who prepared the report
- And a description of the product.

System Boundary

The system boundary of the study can be represented graphically, like so:

System Boundary

This EPD is a cradle-to-gate EPD covering the *production stage* (A1-A3) as depicted in the figure below. The production stage includes extraction and recovery of raw materials (cradle) through the manufacture of slag cement ready for shipment (gate). Downstream activity stages - *Construction, Use, End-of-life, and Optional supplementary information beyond the system boundary* - are excluded from the system boundary.



Items *excluded* from the system boundary include:

- Production, manufacture, and construction of manufacturing capital goods and infrastructure
- Production and manufacture of production equipment, delivery vehicles, and laboratory equipment
- Personnel-related activities (travel, furniture, and office supplies)

Industry Average EPD for Slag Cement

Depending on the PCR, various life cycle stages may be included in or excluded from an EPD.

It may be helpful for one product type to only study cradle to gate impacts, which covers resource extraction to the moment a product leaves the factory. In other EPDs, the study can extend through construction and even the full cradle to grave life cycle, which covers resource extraction through manufacturing, transportation, use and eventual disposal.

In the case of the slag cement EPD, the module names are in accordance with ISO 21930.

Data and Results

On page 7 of the EPD, we find detailed information about the data:

- Cut-off criteria
- Data collection narrative
- Allocation rules
- Data quality requirements and assessment

Then, we get into the LCA results.

Production Stage EPD Results for One Metric Ton of Slag Cement

Impact category and inventory indicators	Unit	A1, Extraction and upstream production	A2, Transport to factory	A3, Manufacturing	Total
Global warming potential, GWP 100[1)], AR5	kg CO_2 eq	1.8	62.7	82.6	**147.0**
Ozone depletion potential, ODP[2)]	kg CFC-11 eq	2.9E-07	1.4E-05	1.0E-05	**2.4E-05**
Smog formation potential, SFP[2)]	kg O_3 eq	0.19	33.1	4.28	**37.6**
Acidification potential, AP[2)]	kg SO_2 eq	8.7E-03	1.7	2.6E-01	**2.0**
Eutrophication potential, EP[2)]	kg N eq	2.9E-03	0.08	2.4E-01	**0.33**
Abiotic depletion potential for non-fossil mineral resources, ADP elements[3)*]	kg Sb eq	1.7E-06	2.4E-06	6.8E-05	**7.2E-05**

Industry Average EPD for Slag Cement

The table excerpt above shows the first six rows of impact category results, broken out by stage – extraction and upstream product, transport to factory, and manufacturing – and in total for the cradle to gate modules.

In the global warming potential impact category, 147 kilograms of carbon dioxide equivalent is emitted in the cradle to gate stages for every metric ton of slag cement.

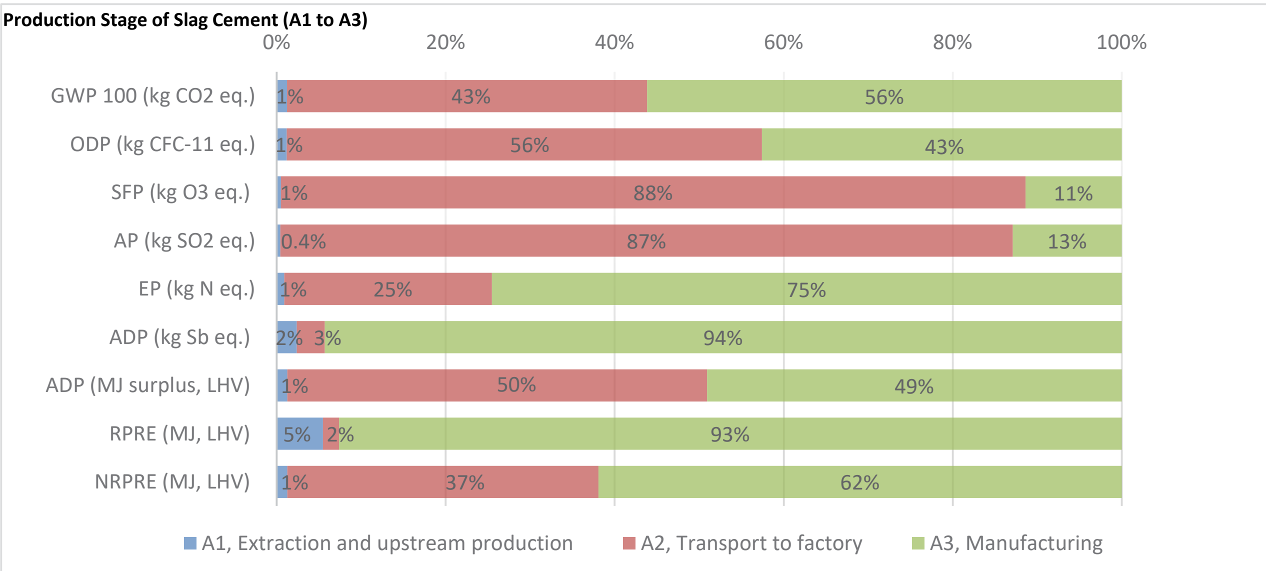
In total, the EPD reports data for:

- 10 core impact categories
- 14 secondary impact categories
- 2 additional parameters for transparency

LCA Interpretation

In the following section, the results have been analyzed to break down the contribution by stage in nine key impact categories.

In this analysis, the LCA practitioner has identified that upstream production is a minor contributor. Transport is a significant contributing activity. Manufacturing generally contributes the largest share, especially in the eutrophication, abiotic depletion, and renewable resources as fuel impact categories.



Industry Average EPD for Slag Cement

Prior to listing references, the EPD concludes with additional environmental information, including the health and environmental protection standards and regulations that apply to production.

How can I use EPDs?

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Perkins&Will / Sahar Coston-Hardy

If you are interested in using EPDs in your design process, the first step is acquiring them.

The best source for industry EPDs is the Embodied Carbon in Construction Calculator Tool (EC3), which serves as a clearinghouse for both industry and product EPDs for common construction materials.

If you already have a specific product or manufacturer in mind, reach out to them to see if they have EPDs developed.

Keep in mind that developing LCAs and EPDs is a time consuming and expensive process, so many available products do not yet have associated EPDs. Don't let this deter you from asking.

Manufacturers respond to demand and showing a consistent desire for environmental documentation is the best tool that we have to support its widespread development.

The SITES rating system recognizes this by awarding one point for an advocacy letter requesting environmental documentation.

I have an EPD. Now what?

The Carbon Leadership Forum describes EPDs as "nutrition labels" for products and materials. Like a nutrition label, they are useful if you are trying to compare similar products or trying to meet specific goals.

Some questions to ask yourself:

- Has your firm, municipality, or client set any carbon reduction or broader sustainability goals?
- Do you have any project-specific goals you are trying to meet?
- If you don't yet have any set goals for this project, are there any overarching values or priorities defined by the design team or client that can help to guide material selection?

EPDs can help you understand a product or material's environmental effects not only in terms of carbon and GWP but also metrics such as smog formation potential, acidification potential, consumption of freshwater, and more.

If you want to compare multiple EPDs in order to inform decision making, you will need to confirm that you are comparing "oranges to oranges."

CHECKLIST: Can I use an EPD to compare these products?

(You must check all of the following boxes for the EPDs of both products in order to fairly compare them.)

- ☐ Functionally equivalent (e.g., strength, stiffness, insulative properties, etc.)
- ☐ Created using the same PCR
- ☐ Include the same life cycle stages
- ☐ Use of one product versus another does not change other aspects of the design or assembly

If you can't check all of these boxes but would like to compare two products, then it is important to use WBLCA or other tools rather than use EPDs.

Lewis et. al. (2021) AIA-CLF Embodied Carbon Toolkit for Architects, Part II: Measuring embodied carbon. Carbon Leadership Forum, University of Washington. Seattle, WA.

For accurate comparison, make sure that your EPDs follow the same PCR. This will ensure that they follow the same methodology and are calculating the same life cycle stages and reporting format.

If you're finding it difficult to pull actionable information from EPDs, know that you are not alone.

The reality is that they are a relatively new tool for both manufacturers and designers, and our profession is just beginning to build collective literacy and understanding of environmental reporting.

There are some drawbacks to EPDs, and limitations to be aware of:

- Reporting on habitat or human health impacts isn't required in all PCRs
- EPDs do not take into account the risk of unsafe or unethical working conditions
- LCA may omit impacts in maintenance, use, or disposal depending on life cycle stages
- The LCA could refer to representative data that doesn't reflect the actual product, though the LCA report should address data quality requirements
- Uncertainty is high for some impact categories, such as eco-toxicity.
- There have been misleading claims of biogenic content, resulting in carbon neutral and carbon positive products

Regardless of these limitations, EPDs are our most comprehensive tool for quantifying impacts.

There are efforts underway to improve consistency and data quality across the board:

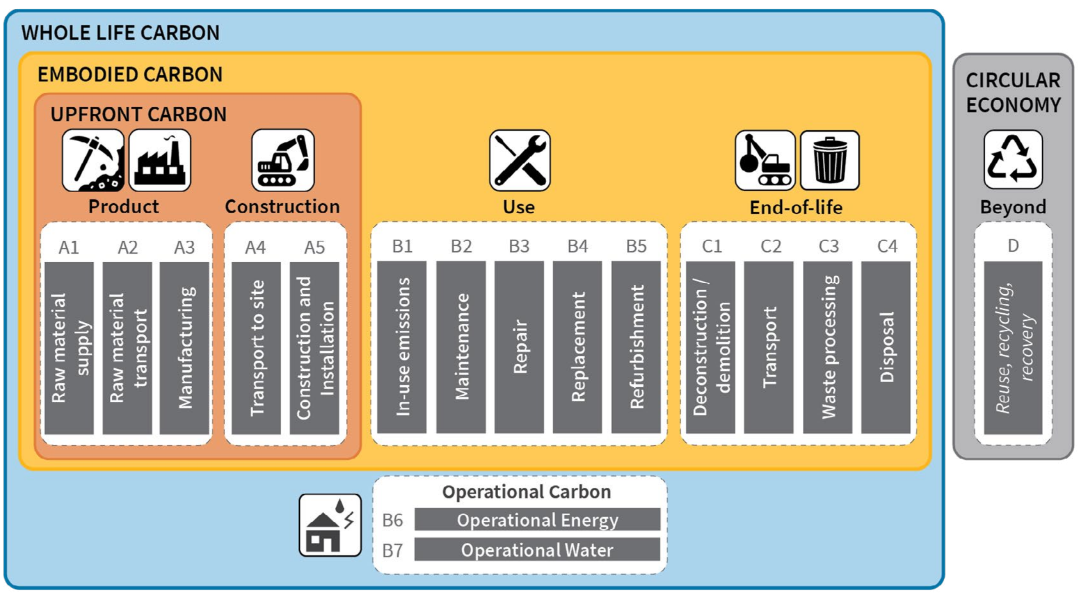
- Find out more about the ideal EPD and how to get there from the Rocky Mountain Institute.

- The Embodied Carbon Harmonization and Optimization Project brings AEC industry organizations together, taking steps toward clarity, alignment, and collaborative action.

- The UN Environment Programme's Biogenic Carbon Project aims to reduce gaps in LCA methodologies and enhance credibility of LCA results for biogenic content.

As EPDs continue to improve, they are an extremely important tool in developing baselines and support for more intuitive future forms of common reference, such as the EPA low carbon "Buy Clean" label now in development.

Even if you find that your first experience with EPDs doesn't inform your decision making, know that by continuing to request and consult them you are supporting a system of environmental reporting that will become more useful over time.



Life cycle stages and modules subcategorize the full life cycle of a building to communicate when environmental impacts occur and help communicate what parts of the life cycle are included in an assessment.

Lewis, M., Huang, M. (2021) CLF Embodied Carbon Toolkit for Building Owners, Part III: Targeting net zero embodied carbon. Carbon Leadership Forum, University of Washington. Seattle, WA.

EPDs also provide inputs for whole life carbon accounting for buildings and sites. The diagram above depicts the life cycle stages and the whole life carbon impacts of a project. These impacts can be studied and described using Whole Building Life Cycle Assessments (WBLCA) or Whole Project Life Cycle Assessments (WPLCA). Embodied carbon is nested within these holistic studies.

Enable the best climate approaches in your designs by using these tools.

From the ASLA Climate Action Field Guide and the ILFI Embodied Carbon Quick Guide:

Pathfinder
A free tool to measure carbon impacts from materials, site impacts, operational emissions, and carbon sequestration.

Carbon Conscience
A free tool to help designers assess embodied carbon impact from the early stages of planning.

Embodied Carbon in Construction Calculator (EC3)
An open-source materials comparison tool and EPD database that enables evaluation of embodied carbon data across material classes.

Tally
A LCA application that integrates with Autodesk® Revit® to allow comparison of design alternatives and direct reporting of environmental impacts.

Athena Impact Estimator
A LCA tool that allows users to create unique assemblies and envelope configurations, allowing flexibility for complex designs and existing buildings.

How can manufacturers get started with EPDs?

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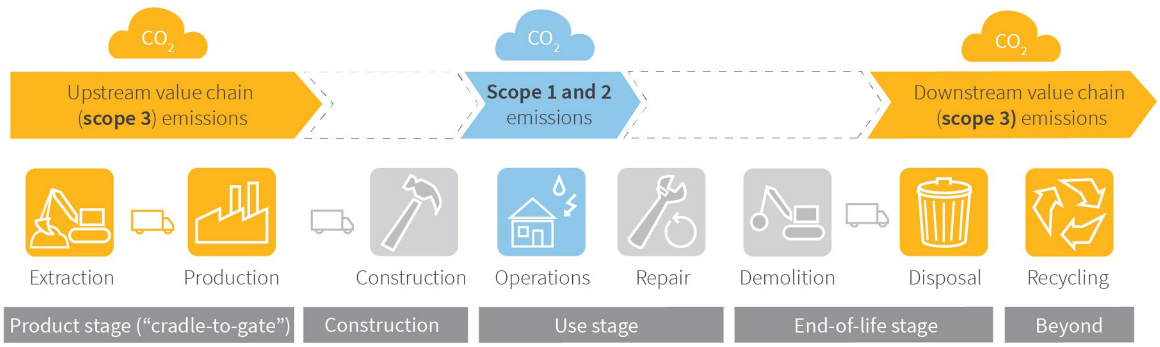
If you're a product manufacturer or vendor that's heard the buzz around how important EPDs are to decarbonizing our industry, then you've no doubt wondered if EPDs may be beneficial to your customers and for your market advantage.



Lewis, M., Huang, M. (2021) CLF Embodied Carbon Toolkit for Building Owners, Part III: Targeting net zero embodied carbon. Carbon Leadership Forum, University of Washington. Seattle, WA.

The short answer is EPDs are the most comprehensive tool to communicate product environmental impacts and robust EPD data is essential to accelerate industry-wide decarbonization. As illustrated in the diagram above, your products' embodied carbon has an impact on the scope 3 emissions of your customers.

Leading firms are developing EPDs and making a real difference in the impact of their industries by doing so. However, there are some reasons that developing EPDs may not be right for every business and product offering.

Questions to consider before you get started:

- Do you make a product that is used in large volumes in site construction?

  The higher the volume, the bigger the potential embodied carbon impact – and the bigger the potential to reduce impact by choosing a lower-carbon alternative. If you make a high volume product, robust data from your EPDs could help improve material baselines and data quality for your industry as a whole.

- Do you manufacture with global priority materials such as steel, concrete, aluminum, or glass?

  Robust EPDs are vital to understand the impacts and paths to decarbonization for the biggest contributors to global warming potential. These industries – such as steel, aluminum, and concrete production – are the focus of decarbonization policies in markets around the world.

- Are there industry-wide EPDs that apply to your product?

  If so, perhaps your project is differentiated by lower environmental impact, which would warrant a product-specific EPD.

- Do you have access to facility-specific, process-specific, and supply-chain specific information on the materials and ingredients in your products?

  EPDs that refer to information specific to a product, your facility, supply chain, and processes yield the most robust and highest-quality data. If you don't have access to information that is specific to the product, the LCA will refer to representative data, yielding an EPD that is more representative of business-as-usual in your industry.

- Is there a PCR that applies to your product?

  If not, multi-stakeholder PCR development could be a big step forward for your industry. PCRs can be searched on the EPD International PCR Library.

- Is your industry represented by a trade association that can help maximize the benefits of EPD development?

  Trade associations are often the owners of industry-wide EPDs and the development of new PCRs. They can provide technical assistance, recommend best practices for your category, and offer other support.

- Do you make a product that has little material differentiation between offerings? Or are your products highly differentiated?

  If there is little differentiation, one EPD may cover many products. If products are highly differentiated, you may need a separate EPD for every item. If an EPD covers a product with many options, the EPD may need to cover the range of options. Costs could vary widely depending on the product offering.

- Are your customers looking to use your EPD data in their Whole Project Life Cycle Assessments?

  Depending on the tools, datasets may use averages for your product category. For example, early in project phases, EPDs would generally not be referred to for something like individual irrigation system parts. This is because of the small impact compared to the entire project and the small amount of differentiation between product offerings. Rather, the tools would provide an average of all EPDs published in the category and call out the methodology for referring to representative data.

- Are there other types of environmental assurance that would better meet your customer's needs?

  EPDs are not the only way to communicate environmental data. In some cases, other options will be the best way to communicate environmentally preferable attributes. Perhaps your industry has a target area of impact that is captured by a verified eco-label, in which case the label may be most helpful.

- Have your competitors or others in your category published EPDs?

  If competing product offerings that are functionally identical have EPDs using the same PCR and LCA data, specifiers can use EPDs to compare one product to the other for environmental preferability. This also means that if no other products in the category have an equivalent EPD, then the EPD cannot be used for comparison. If your product category is short on EPDs or not aligned to a common PCR, it could be an opportunity to work with others in your industry towards alignment. A product or material trade association could also develop recommendations for best practices.

- Do you have key sustainability initiatives that should come before EPD development?

  If your organization has yet to plan for key operational sustainability strategies, such as increased energy efficiency, reducing waste to landfill, water conservation, or other priority impacts, reduction in environmental impact may be best achieved by taking on these core capacities first.

- Is there funding available for your EPD project? How about technical assistance?

  In 2024, the EPA awarded $160 million dollars in grants to 38 recipients to develop robust EPDs and the production of low-carbon materials. Some of these grants will support technical assistance. Several will tackle workforce development to grow the number of sustainable construction professionals available to support this important work. Follow the EPA's Sustainable Marketplace: Greener Products and Services to stay up to date on funding and other assistance opportunities.

You've Decided to Develop EPDs. Now What?

ASLA 2022 Professional General Design Honor Award.
From Brownfield to Green Anchor in the Assembly Square District. Somerville, Massachusetts. OJB / Kyle Caldwell

Creating your first comprehensive environmental impact study for products can seem a daunting task at the outset.

In reality, the step-by-step process to conduct a LCA or create an EPD is well supported by knowledgeable LCA professionals.

Manufacturers will work with an experienced program operator to create an EPD. Listings of these operators are maintained by EC3 and the American Center for Life Cycle Assessment.

A good first step is to engage with a program operator, who will help you navigate the EPD process.

Prior to conducting the LCA, the PCR will be selected and study goals will be defined. If the industry or product does not have a clear PCR, a program operator will have the right expertise to help find the best strategy for moving forward.

Be prepared to collaborate across departments, including subject matter experts in engineering, supply chain, facilities, marketing, finance, and logistics to gather the input data for the LCA. If your suppliers have their own EPDs, these can in-turn be referenced in your LCA.

Gathering robust input data at the study outset is a big lift. But the process of creating EPDs has the added benefit of building longer-term organizational capacity for future environmental assessment and reporting.

Learn more and get assistance from Building Transparency.

Conclusion

ASLA 2024 Professional General Design Honor Award.
Tom Lee Park: "Come to the River." Memphis, Tennessee. SCAPE / Landscape Architecture, Studio Gang / Brad Howe

Environmental product data takes many forms. There are plentiful standards and resources available to help manufacturers and designers navigate the options.

For landscape architects who want to verify a product's sustainability or account for a project's carbon, aligning with global environmental data standards provides credibility and assurance.

For the industries that supply the construction materials in our landscapes and infrastructure, there is a great opportunity to bolster the transition to better practices.

A key part of this collective effort is developing robust and high-quality EPDs. Collaborations between landscape architects, specifiers, and product manufacturers can accelerate changes that will reduce our collective impacts.

Start a conversation on this essential topic today!

References

AIA-CLF Embodied Carbon Toolkit for Architects, Part II: Measuring embodied carbon

CLF Building LCA 101: Embodied Carbon Accounting

CLF Embodied Carbon Disclosure Guide

CLF Embodied Carbon Toolkit for Building Owners

CLF EPD 101: Embodied Carbon Accounting for Materials

Environmental Life Cycle Assessment Textbook, American Center for Life Cycle Assessment

EPA Eco-labels Recommendations

EPA Criteria for Product Category Rules

EPA's Sustainable Marketplace: Greener Products and Services

How to get an EPD: BuildingTransparency.org

Industry Average EPD for Slag Cement

ISO Guide to Environmental Label StandardsILFI Embodied Carbon Quick Guide

Resources

2050 Materials EPD Library

ASLA Climate Action Field Guide

Biodiversity and Climate Action 101 - ASLA Webinar Series

Collaborating with Industry Partners on Climate Action and Biodiversity: A Guide to Conversations Among Landscape Architects, Vendors, and Product Manufacturers.

EC3 Embodied Carbon in Construction Calculator Tool

EC3 Materials EPD Search

The Embodied Carbon Harmonization and Optimization Project

EPA Low-Carbon Label Program

EPA TRACI Tool

EPD International EPD Library

ILFI Embodied Carbon Quick Guide

The International EPD System PCR Library

NSF Standards Product Category Rules

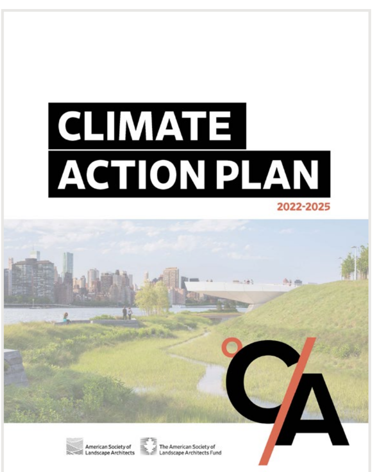
Program Operators from the American Center for Life Cycle Assessment

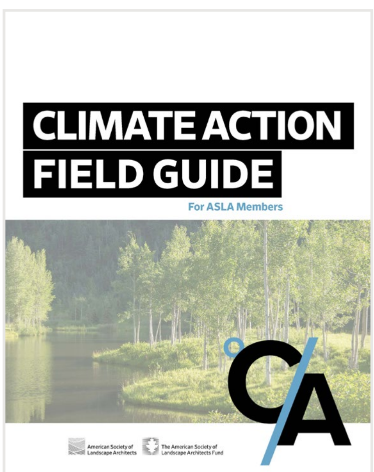
Program Operators from EC3

SCS Global EPD Library

UN Environment Programme's Biogenic Carbon Project

Please submit ideas and feedback on this guide to info@asla.org.





Download the ASLA Climate Action Plan and Field Guide at asla.org/climate