



What are EPDs? “Buy Clean Colorado Act”



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including slides from the FHWA as offered by Milena Rangelov



The Buy Clean Policy Map



Information collected from state legislative websites.

-  States that legislated green public purchasing
-  States that have considered green public purchasing legislation in past 2 years



State Buy Clean Policies (per April 2022)

Keywords: Buy Clean, embodied, carbon, carbon emissions, GHGs (greenhouse gases), construction materials, building materials, embodied carbon emissions, climate change, global warming potential, EPDs (environmental product declarations), low embodied carbon, low-carbon materials, etc.

Organization	Name	Status	Pollutants	EPD required?	Materials
State of California	Buy Clean California Act	Enacted	GHGs	Yes	Steel, mineral wool, glass
State of Washington	Buy Clean Buy Fair Washington	Pilot Project Funded	GHGs		Concrete, steel, wood
State of New York	NY State Low Embodied Carbon Concrete Leadership Act (NY A2591/S542)	Enacted	GHGs	No	Concrete
State of New Jersey	S3091/A4933 (Concrete Mandate)	Enacted	CO2 emissions		Concrete
State of Colorado	Buy Clean Colorado (HB 21-1303)	Enacted	GHGs	Yes	Concrete, cement, glass, steel, wood, asphalt
State of Minnesota	Buy Clean Minnesota	Study and Pilot Program Funded			
State of Oregon	Oregon Concrete EPD Program	Enacted		Yes	Concrete, asphalt, steel
State of Massachusetts	Environmentally Preferable Products (EPP) Procurement Programs				



EPDs report a range of environmental issues

EPDs report several Impact Indicators. In the U.S., the most used impact assessment method is TRACI developed by the EPA (see table below).

EPDs do not necessarily report the entire list below and can also list others.

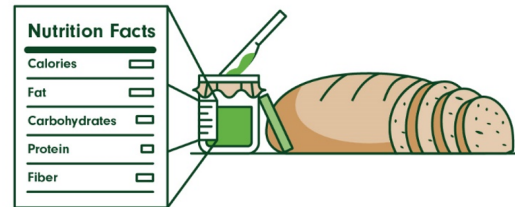
Parameter	Unit
Ozone Depletion	kg CFC-11 eq
Global Warming	kg CO2 eq
Smog	kg O3 eq
Acidification	kg SO2 eq
Eutrophication	kg N eq
Carcinogenics	CTUh eq
Non-carcinogenics	CTUh eq
Respiratory effects	kg PM2.5 eq
Ecotoxicity	CTUh eq
Fossil fuel depletion	MJ surplus eq



What Are EPDs?

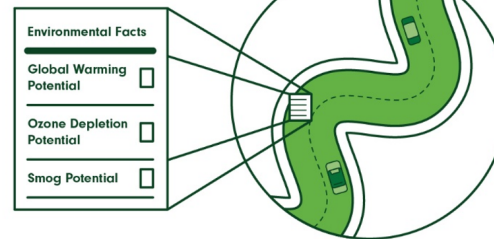


- Communicate environmental impacts of material or product.
- Express the results of an LCA.
- Developed with stakeholder input.
- Follow industry standards described in the PCR.
- EPDs are not required by Federal law or regulation.



Similar to nutrition labels for food products, EPDs communicate critical environmental information on pavement materials to the customer.

Using guidance from ISO and European Standards,



Source: FHWA.



How Are EPDs Used?



- Communicate Good Stewardship
 - Producers can use them to improve their production, save money, expand their outreach
 - Earn points in Sustainability Rating Systems
- Informing purchasing decisions
 - Procurement aid
- Data Source for
 - Benchmarking Progress
 - LCAs for Informing Policy, Pavement Design, or Pavement Management Practices



EPD Example

Example for a recent EPD for

- an asphalt mixture in Colorado, that is
- compliant with “Standard Special Provision - Revision of Sections 101 and 106 - Materials Environmental Product Declarations”, and, “Appendix O - Environmental Product Declaration Protocol - 23”





Key Terms - PCR

The Guidelines

Product Category Rule (PCR)



“Set of specific rules, requirements, and guidelines for developing Type III environmental product declarations for one or more categories” (ISO 14025)

The Analysis

The Communication



What Are Product Category Rules (PCR)?



- PCRs are sets of industry-consensus standards and guidelines used to develop EPDs
- PCRs ensure EPD:
 - Consistency
 - Transparency
- PCRs and EPDs are not required by law or federal regulations



Key Terms - LCA

The Guidelines

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The Analysis

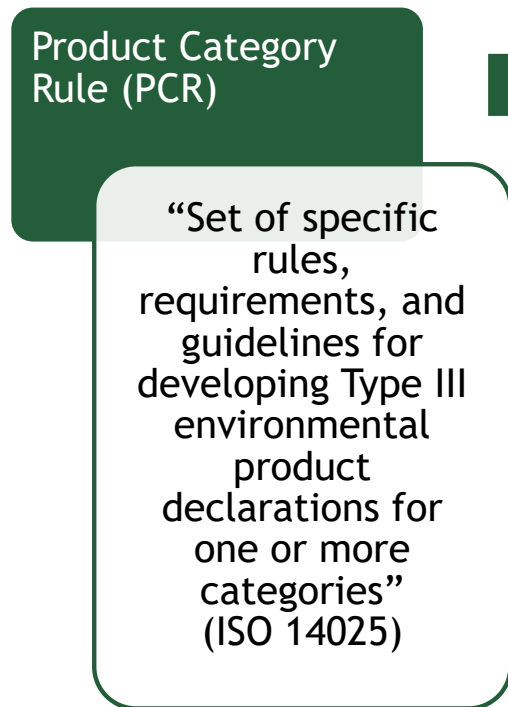
Life Cycle Assessment (LCA)

“A compilation and evaluation of the inputs, outputs, and potential environmental impacts of a product system throughout its life cycle.”
(ISO 14040)

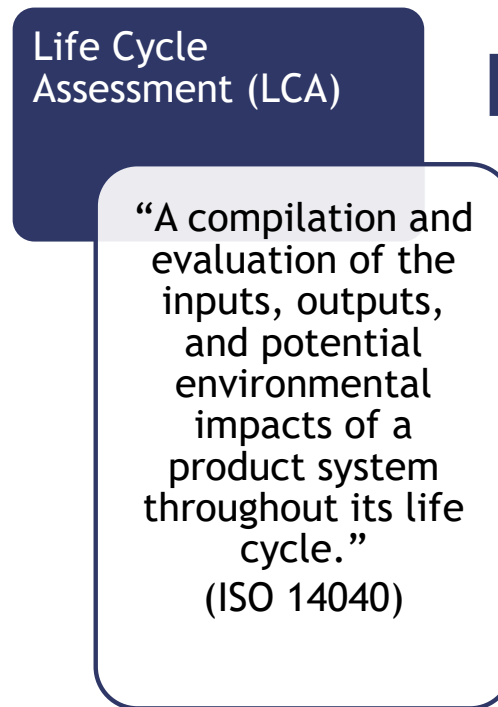


The Communication

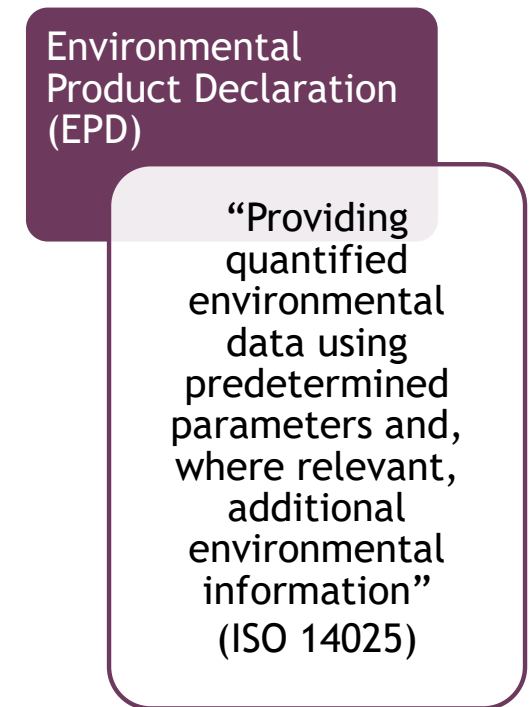
The Guidelines



The Analysis

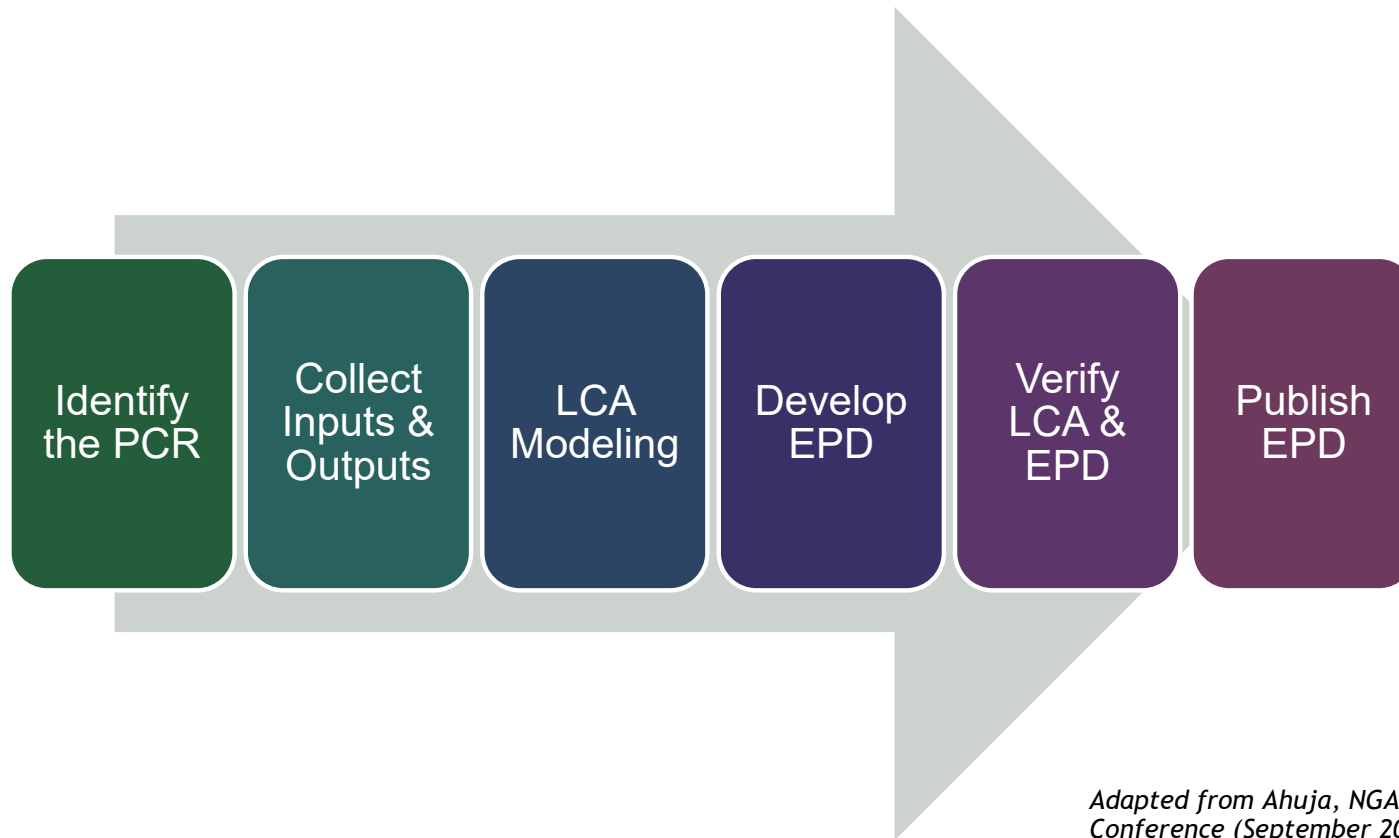


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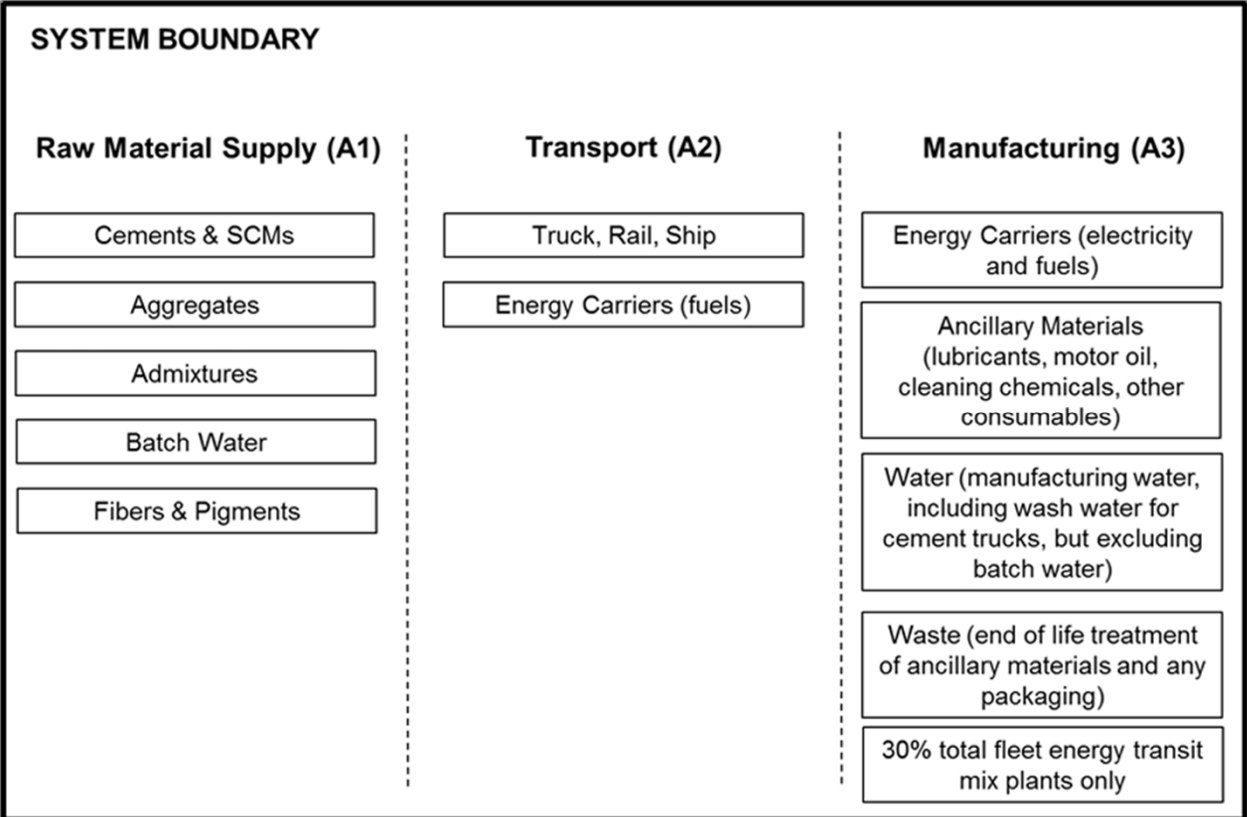


Key Terms





EPDs - Cradle-to-Gate Inputs



NSF Concrete PCR



EPDs - Cradle-to-Gate Inputs

Production Stage			Construction Stage		Use Stage							End of Life Stage			
Extraction & Upstream Production	Transport to Factory	Manufacturing	Transport to Site	Installation	Use	Maintenance (Includes Production, transport, and disposal)	Repair (Includes Production, transport, and disposal)	Replacement (Includes Production, transport, and disposal)	Refurbishment (Includes Production, transport, and disposal)	Operational Energy Use	Operational Water Use	Deconstruction/Demolition	Transport	Waste Processing	Disposal
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4

Adapted from NSF Concrete PCR



EPDs - Types of EPDs

- **Cradle-to-Gate**

- “Includes the impacts calculated from initial material production (e.g., oil exploration and extraction, mining of rock) up to the gate of the manufacturing site (and before transport to the paving site) (EN15804 modules A1-A3).”

- **Cradle-to-Site**

- “Includes the impacts of cradle-to-gate plus the transportation to the paving site, and the construction operation of paving (EN15804 modules A1-A5).”

- **Cradle-to-Grave**

- “Includes the impacts of cradle-to-site, plus the use stage processes (e.g., vehicle operation, stormwater, noise) and maintenance and rehabilitation ending just before the first reconstruction (EN15804 modules A1-A5, B1-B7, and C1-C4).”

FHWA Tech Brief: Environmental Product Declarations, July 2020

Fewer life cycle stages

More life cycle stages

- **Types of Data**

- There are multiple types of data that can be used to produce an EPD.
 - National Averages
 - Supply Chain Specific
 - Facility Specific
 - Material Specific
- HB 1303 requires facility- and material-specific data for EPD development.
- Industry-average data and general material EPDs can be used as a basis for Cradle-to-Gate EPD development, but facility- and material-specific adjustments must be made.





Where Can I Find EPDs?



Material	Source
Portland Cement	PCA / ASTM International
Slag Cement	ASTM International/ Slag Cement Association
Steel	SCS Global Services
Asphalt mixes	National Asphalt Pavement Association
Concrete mixes	NRMCA/ NSF International
Aggregates	ASTM International



Areas of Improvement and Future Developments

- Currently, no overarching agency governs development of EPDs and PCRs
 - A need for improved standardization and harmonization
- Closer ties to QA
- Need for consistent, reliable, public background data with high quality and regular updates
- New EPD programs: chemical admixtures, additives, SCMs etc.
- Digital PCRs and digital EPDs
 - Automation for cheaper and more efficient production of more consistent EPDs
 - Easier use of EPDs as data sources.



How Agencies Can Use EPDs



- Establish an EPDs database
- Encourage development and use of EPDs
- Compile EPDs to track and communicate progress towards agency goals
- Use EPDs as input in LCA
- Conduct pilot program to introduce industry to EPDs and their applications
- Consider EPDs for material procurement
- Participate as a stakeholder for creating PCRs



Questions?



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