LCA, EPD, PCR...

what it all means, how do we get the information, how are they being used

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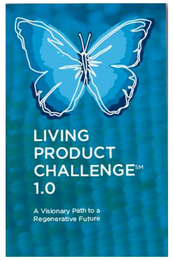
Director of Sustainability

WAP Sustainability

WAP SUSTAINABILITY CONSULTING

Our Roles

Declare Preparer
3rd Party Verifier



LPC EcoSystem Member
LPC Assessor
LCA Consultant

SASB Consultant
SASB Alliance

LEED Steering Committee Chair
MR TAG Past Chair

level Consultant
LCA Consultant
MH Consultant

HPD Preparer
3rd Party Verifier
HPD Working Groups

Scope 3 / Product Level LCA
Method Author

Original Drafting Committee Member

LCA Practitioner
EPD Preparer
LCA/EPD Verifier

GreenScreen Consultant
GreenScreen Licensed Profiler
GreenScreen Certification

LCA Provider

Vice-Chair of Materials Working Group

Material Health Assessor
Certification Assessor
LCA Consultant

Trained Service Provider
TSC Advisor

GRI Organization Stakeholder
GRI Consultant

Vice-Chair of ASHRAE 189.1

CDP Consultant
Climate Risk Assessor
Scope 3 / Product LCA

Higg Index Consultant
Higg MSI LCA Contributor

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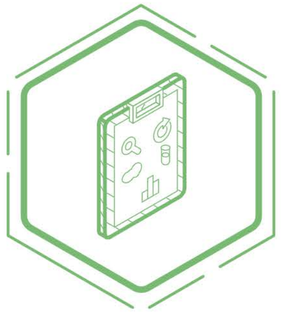

MANAGED SERVICE

ESG SUPPORT

CARBON MANAGEMENT

LIFE CYCLE ASSESSMENT

CERTIFICATION SERVICES

WORLD RESOURCES INSTITUTE

ENVIRONMENTAL PROFESSIONAL

ghg management institute

CLF Carbon Leadership Forum

U.S. GREEN BUILDING COUNCIL USGBC

ACLCA American Center for Life Cycle Assessment

SUSTAINABLE TRANSPORT COUNCIL™

ISO 20400.org

INTERNATIONAL WELL BUILDING INSTITUTE™

INSTITUTE for SUSTAINABLE PRACTICE LIPSCOMB UNIVERSITY

THIRD DERIVATIVE

G

So let’s start with huh?

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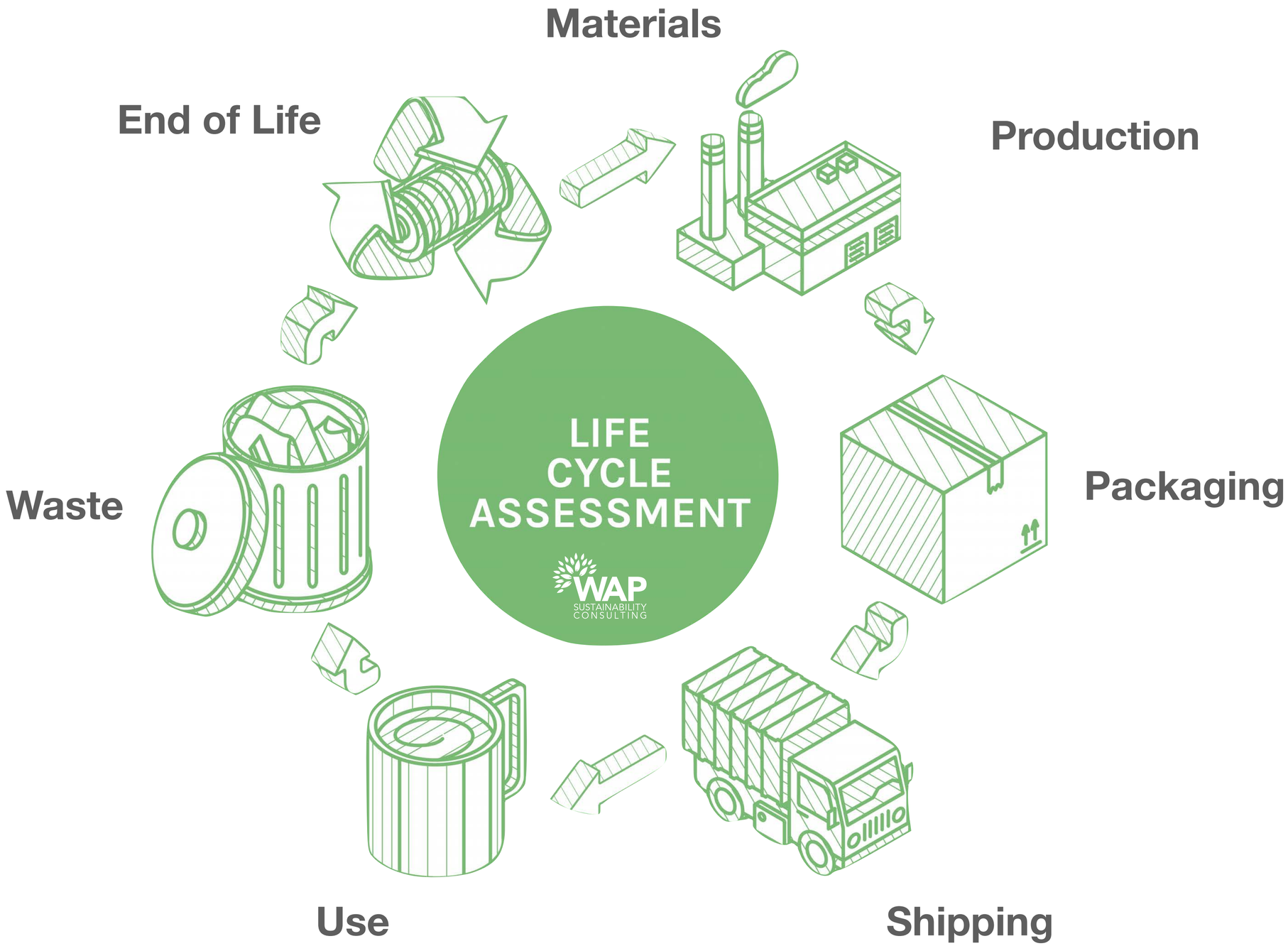

Materials
Production
Packaging
Shipping
Use
Waste
End of Life
LIFE
CYCLE
ASSESSMENT
WAP
SUSTAINABILITY
CONSULTING

LCA

Life Cycle Assessment is a widely recognized tool for the assessment of a product’s impacts throughout its entire life cycle, from raw materials acquisition to end-of-life disposal/reuse/recycling. The LCA practitioner can be an internal resource that the manufacturer has or an external consultant.

Life Cycle

Defines which product life cycle phases are included

- Product Stage (Modules A1-A3): Raw Material and Manufacturing (required)
- Construction Stage (Modules A1-A4): Transportation and Installation
- Use Stage (Modules B1-B7): Use, Maintenance, Repair, and Replacement
-

PRODUCT STAGE			CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS/LOADS BEYOND SYSTEM BOUNDARY
Raw material supply	Transport	Manufacturing	Transport from gate to site	Assembly/ Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse-/ recovery-/ Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
✓	✓	✓												✓	✓	

Parameters (Weighted Average)	Units	Modules Included in LCA							
		A1 - A3	A4	A5	B1 - B7	C1	C2	C3	C4
Global Warming Potential (GWP)	kg CO2 eq	2.13E+02	2.12E+01	3.93E+01	0	2.1E+00	3.2E+00	1.6E+00	0
Ozone depletion (ODP)	kg CFC 11 eq	6.47E-06	1.16E-05	3.81E-06	0	2.6E-07	2.2E-06	1.1E-06	0
Acidification potential (AP)	kg SO2 eq	8.13E-01	1.29E-01	1.13E-01	0	1.6E-02	1.9E-02	1.2E-02	0
Eutrophication potential (EP)	kg N - eq	1.68E-01	2.62E-02	3.27E-02	0	3.7E-03	4.8E-03	2.5E-03	2.1E-02
Photochemical ozone creation (POCP) -	kg O3 - eq	7.66E-02	9.30E-03	1.24E-02	0	4.7E-03	1.4E-03	8.9E-04	0
Abiotic depletion potential for fossil resources (ADP-fossil fuels)	MJ	3.00E+02	1.87E+01	6.88E+02	0	2.9E+01	4.0E+01	2.0E+01	0

Results will be presented by impact category across each life cycle module.

What is the EPD?

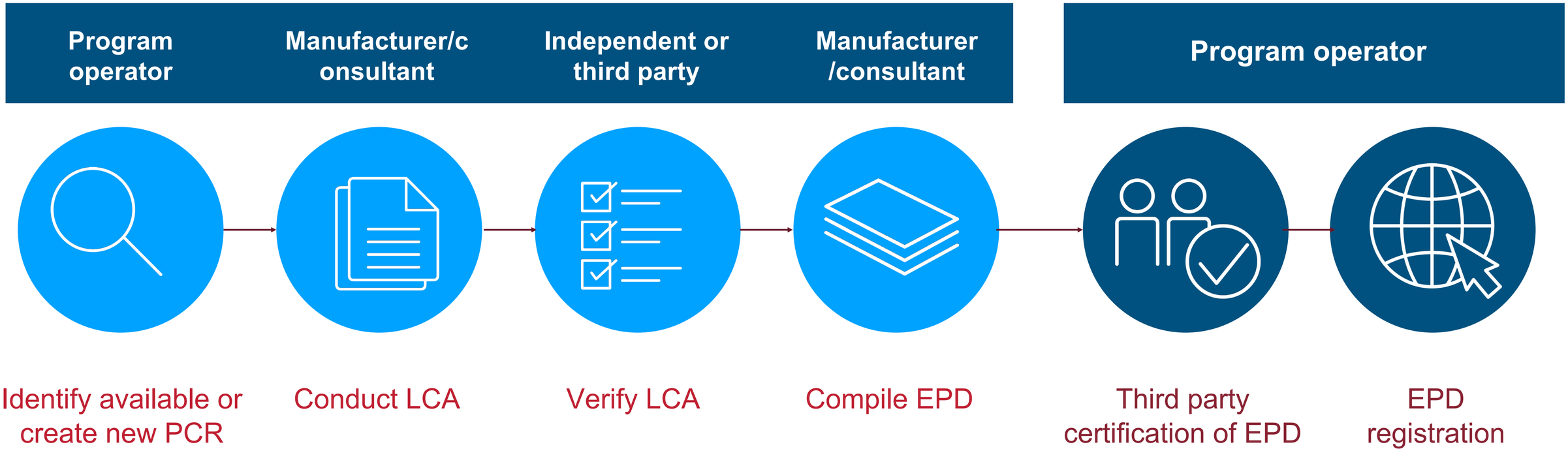
Type III label, third party verified, and internationally recognized!

A single transparent disclosure of a product's impacts throughout its life cycle. EPDs are an evaluation tool to help manufacturers, purchasers, suppliers and distributors from government to institutional facilities evaluate a product's characteristics. Further, they enhance awareness of the overall impact of a product. EPDs can represent one product, a group of similar products from one or more manufacturer's site, or multiple manufacturers (e.g. an industry average EPD)

EPD: Contents

- An EPD contains:
- General declaration information
- The product definition and information about building physics
- Declared or functional unit of assessment (e.g. m2 of installed product, 1 ton, 100,000 hand drying instances)
- Information about basic materials and the materials’ origins
- A description of the product’s manufacturing and processing
- Information about installation, in-use conditions and end of life
- LCA results by impact category, and
- Testing results and verifications.

EPD development process



LCA Results

Results shown below were calculated using TRACI 2.1 Methodology.

TRACI 2.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	C2-C4
GWP	Global warming potential	kg CO_2-Eq.	3.9E+01	2.5E+00	1.5E+00	1.8E-01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	3.1E-06	9.6E-11	2.8E-08	5.8E-09
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	3.1E-01	1.5E-02	1.6E-02	1.3E-03
EP	Eutrophication potential	kg N-Eq.	1.2E-01	8.4E-04	2.6E-03	8.4E-05
SP	Smog formation potential	kg O_3-Eq.	3.0E+00	4.1E-01	4.7E-01	3.5E-02
FFD	Fossil Fuel Depletion	MJ-surplus	5.4E+01	4.8E+00	2.5E+00	4.0E-01

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	C2-C4
GWP	Global warming potential	kg CO_2-Eq.	3.9E+01	2.5E+00	1.5E+00	1.8E-01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	2.4E-06	9.6E-11	2.1E-08	4.4E-09
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	3.0E-01	1.3E-02	1.5E-02	1.1E-03
EP	Eutrophication potential	kg$(PO_4)^3$-Eq.	6.6E-02	2.2E-03		
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	1.6E-02	5.7E-04		
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	9.0E-04	0.0E+00		
ADPF	Abiotic depletion potential for fossil resources	MJ	6.3E+02	3.5E+01		

Results below contain the resource use throughout the life cycle of the product.

Resource Use

Parameter	Parameter	Unit	
PERE	Renewable primary energy as energy carrier	MJ	
PERM	Renewable primary energy resources as material utilization	MJ	
PERT	Total use of renewable primary energy resources	MJ	
PENRE	Nonrenewable primary energy as energy carrier	MJ	
PENRM	Nonrenewable primary energy as material utilization	MJ	
PENRT	Total use of nonrenewable primary energy resources	MJ	
SM	Use of secondary material	MJ	
RSF	Use of renewable secondary fuels	MJ	
NRSF	Use of nonrenewable secondary fuels	MJ	
FW	Use of net fresh water	m^3	

LIFECYCLE IMPACT CATEGORIES

The environmental impacts listed below were assessed through the product's production phase (cradle to gate impacts).

ATMOSPHERE

Global Warming Potential refers to long-term changes in global weather patterns that are caused by increased concentrations of greenhouse gases in the atmosphere.

Ozone Depletion Potential is the destruction of the stratospheric ozone layer, which shields the earth from ultraviolet radiation that's harmful to life, caused by human-made air pollution.

Photochemical Ozone Creation Potential happens when sunlight reacts with hydrocarbons, nitrogen oxides, and volatile organic compounds, to produce air pollution known as smog.

WATER

Acidification Potential is the result of human-made emissions and refers to the decrease in pH and increase in acidity of oceans, lakes, rivers, and streams – polluting groundwater and harming aquatic life.

Eutrophication Potential occurs when excessive nutrients cause increased algae growth in lakes, blocking the underwater penetration of sunlight needed to produce oxygen and resulting in the loss of aquatic life.

EARTH

Depletion of Abiotic Resources (Elements) refers to the reduction of available non-renewable resources, such as metals, that are found on the periodic table of elements, due to human activity.

Depletion of Abiotic Resources (Fossil Fuels) refers to the decreasing availability of non-renewable carbon-based compounds, such as oil and coal, due to human activity.

TRACI	1.56E+00 kg CO_2-Equiv.	5.16E-11 kg CFC 11-Equiv.	3.28E-02 kg O_3 -Equiv.	1.14E-02 kg SO_2-Equiv.	1.12E-04 kg N-Equiv.	kg Sb-Equiv.	7.10E-01 MJ
CML	kg CO_2-Equiv.	kg R11-Equiv.	kg Ethene-Equiv.	kg SO_2-Equiv.	kg PO_4-Equiv.	kg Sb-Equiv.	MJ

Who Demands It…and why is finance HUGE in this

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High Level Carbon/LCA Demand Drivers - organizations

- Sustainable Accounting Standards Board (SASB)
- Carbon Disclosure Project (CDP)
- Global Reporting Initiative (GRI)
- Task Force on Climate-Related Financial Disclosure (TCFD)
- Science Based Target Initiative (SBTi)
- MSCI

1st Buy Clean Act

Jan. 1, 2019 CA started requesting EPDs; Jan. 1, 2020 CA requires EPDs for certain material types

The department shall establish a maximum acceptable global warming potential (GWP) for four types of materials:

- Carbon Steel Rebar
- Structural Steel
- Flat Glass
- Mineral Wool Board Insulation

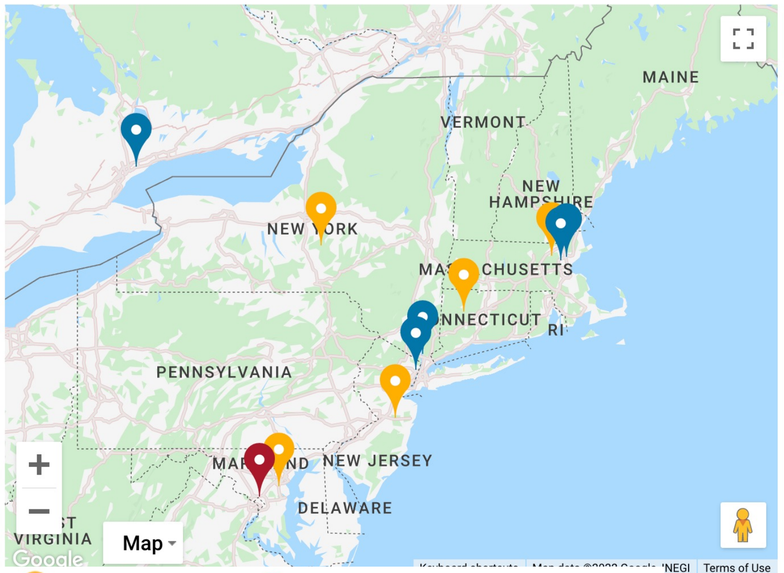
First legislation in the U.S. that require the use of EPDs

Proposed legislation AB 1369 would include gypsum board, insulation, carpet, and ceiling tiles.
(https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB1369)

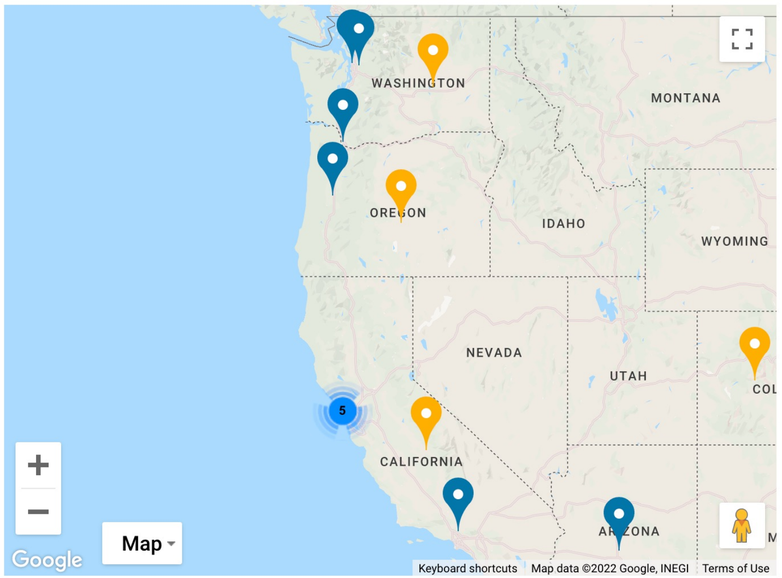
There is more though

National Policy State or Provincial Policy Local Policy

National Policy State or Provincial Policy Local Policy



National Policy State or Provincial Policy Local Policy



Chapter 7.8. Carbon Intensity of Building Construction

(a) The commission, in consultation with the State Air Resources Board, shall **develop a framework for measuring and then reducing the carbon intensity of the construction of new buildings**, including those for **residential uses**. The commission shall design the framework to achieve an 80 percent net reduction in the carbon intensity of construction and materials used in new construction by 2045 with interim goals of 20 percent below 2020 levels by 2030 and 40 percent below 2020 levels by 2035. The framework shall be developed in coordination and consultation with other state agencies and experts in academia, industry, and public health.

The **framework shall include** both of the following:
(1) **A life-cycle assessment, as defined in the International Organization for Standardization (ISO) 14040 series of standards with a focus on the Product Stage & Construction phases (A1—A5),** to determine the carbon intensity of the construction of new residential and nonresidential buildings, including, but not limited to, the carbon intensity of the materials used, the energy used in the construction, and the waste generated by the construction.

(2) A requirement for the submission by an entity undertaking the construction of a project with a minimum size of five new residential units or ____ square feet of nonresidential building space, as applicable, an **Environmental Product Declaration, Type III**, as defined by the International Organization for Standardization (ISO) Standard 14025, or similarly robust life-cycle assessment methods that have uniform standards in data collection consistent with ISO Standard 14025, industry acceptance, and integrity for construction materials used for the building and the life-cycle assessment established pursuant to paragraph.

CALIFORNIA LEGISLATURE—2021–22 REGULAR SESSION

ASSEMBLY BILL **No. 2446**

Introduced by Assembly Member Holden

February 17, 2022

An act to add Chapter 7.8 (commencing with Section 25680) to Division 15 of the Public Resources Code, relating to greenhouse gases.

LEGISLATIVE COUNSEL'S DIGEST

AB 2446, as introduced, Holden. Embodied carbon emissions: construction materials.

The California Global Warming Solutions Act of 2006 designates the State Air Resources Board as the state agency charged with monitoring and regulating sources of emissions of greenhouse gases. The act requires the state board to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective greenhouse gas emissions reductions and to ensure that statewide greenhouse gas emissions are reduced to at least 40% below the statewide greenhouse gas emissions limit no later than December 31, 2030.

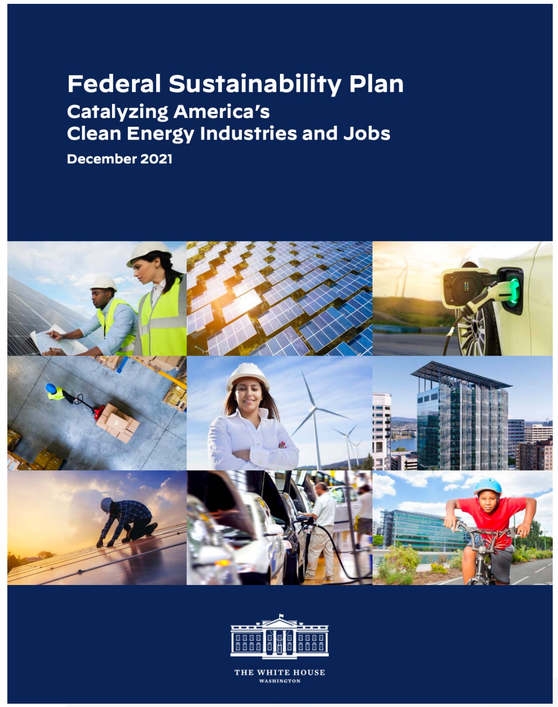
Existing law requires the State Energy Resources Conservation and Development Commission to adopt regulations on building design and construction standards that increase efficiency in the use of energy and water for new residential and nonresidential buildings, and energy and water conservation performance standards for new residential and nonresidential buildings.

This bill would require the commission to develop a framework for measuring and then reducing carbon intensity in the construction of new buildings, including those for residential uses. The bill would require the commission to design the framework to achieve an 80% net reduction in the carbon intensity of construction and materials used in

Federal Carbon Requirements

White House Executive Order 14057

- Federal Sustainability Plan
  - Net-Zero Emissions Procurement by 2050
    - Purchase using EPDs & Develop GWP max



GSA

GSA Concrete and Asphalt

Low Embodied Carbon Concrete Standards for all GSA Projects
March 2022 version

1. The [prime contractor] shall provide a product-specific cradle-to-gate Type III environmental product declaration (**EPD**) for each concrete mix design specified in the contract and used at the project, using NSF International's product category rule for concrete. Please send EPD(s) with each concrete mix batch design (including type [e.g. standard or lightweight mix] and volume) to embodiedcarbon@gsa.gov, and upload the submittals into GSA's project management information system.

2. The [prime contractor] shall provide **low embodied carbon concrete** that meets the global warming potential (GWP) limits of the table below, for concrete of the mix type and strength class.

	Maximum Global Warming Potential Limits for GSA Low Embodied Carbon Concrete (kilograms of carbon dioxide equivalent per cubic meter - CO_2e kg/m^3)		
Specified compressive strength (f'c in PSI)	**Standard Mix**	**High Early Strength**	**Lightweight**
up to 2499	**242**	**326**	**462**
2500-3499	**306**	**413**	**462**
3500-4499	**346**	**466**	**501**
4500-5499	**385**	**519**	**540**
5500-6499	**404**	**546**	**N/A**
6500 and up	**414**	**544**	**N/A**
These numbers reflect a 20% reduction from GWP (CO_2e) limits in proposed code language: "Lifecycle GHG Impacts in Building Codes" by the New Buildings Institute, January 2022.			

Rating Systems/Code

- LEED
- LBC
- BREEAM
- NAHB National Green Building Standard
- International Rating Systems – AUS Green Star, Singapore BCA Green Mark, etc
- IgCC/ASHRAE 189.1

Climate emergency | Learning & development | Latest News | e-learning | Training needs analysis

Deloitte launches climate change learning for all staff

by Ashleigh Webber | 20 Aug 2021

JHVEPhot

IBM Commits to Net Zero Greenhouse Gas Emissions by 2030

February 16, 2021

ARMONK, N.Y., Feb. 16, 2021 — IBM today announced that it will achieve net zero greenhouse gas emissions by 2030 to further its decades-long work to address the global climate crisis. The company will accomplish this goal by prioritizing actual reductions in its emissions, energy efficiency efforts and increased clean energy use across the more than 175 countries where it operates.

Thermo Fisher Scientific Commits to Achieve Net-Zero Carbon Emissions by 2050

Accelerated efforts align with the Paris Agreement and Race To Zero to combat climate change

August 5, 2021
1:42 PM CDT
Last Updated 15 days ago

Sustainable Business

Exxon mulls pledging net-zero carbon emissions by 2050 - sources

2 minute read

Reuters

MARKETING AND COMMS

Netflix Commits to Net Zero by 2022, Better Representation Onscreen and Off

PNC Commits $20 Billion to Environmental Finance

AUGUST 18, 2021 BY EMILY HOLBROOK

Crocs commits to becoming net zero PREMIUM

Published: 23 July 2021 Written by Chris Remington Print

FINANCIAL TIMES

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Investors trigger boardroom changes at ExxonMobil as activists force Shell to cut emissions

Save

Members of the environmental group Milieudefensie celebrate in The Hague on Wednesday after a Dutch court ordered Royal Dutch Shell to accelerate its emissions cuts © Peter Boer/Bloomberg

Thanks – questions?

Josh Jacobs
josh@wapsustainability.com

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