



# LCA and EPDs for the Lighting Industry

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**Athena Sustainable Materials Institute**  
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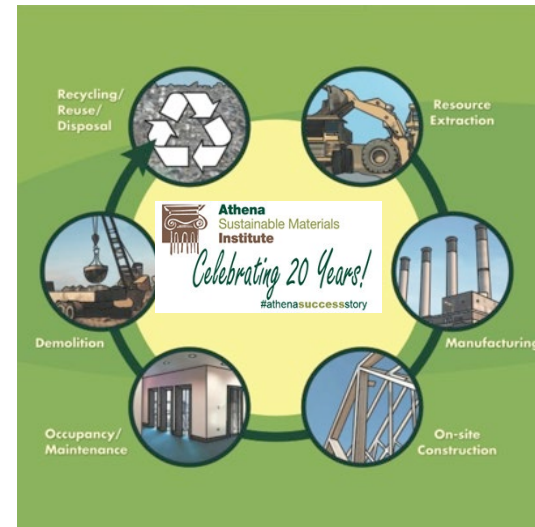
# Agenda

1. Introductions
2. Overview of LCA/EPDs
3. Market Drivers for EPDs
4. Lighting Industry LCA/EPDs
5. Q/A



# Athena Institute - who we are, what we do

- A not-for-profit research organization established in 1997, with staff in Ottawa, Toronto, Vancouver and Pennsylvania.
- Work in partnership with forward-looking organizations focused on advancing a more sustainable built environment.
- Our core (common-good) program is supported through membership funds and grants.
- Fee for service consulting:
  - LCAs, PCRs and EPD services
  - LCA review & EPD verification
  - Life cycle policy analysis



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**Impact Estimator**  
for Buildings

[www.athenasmi.org](http://www.athenasmi.org)

<https://calculatelca.com/>

# Industry Groups Producing EPDs w/ Athena



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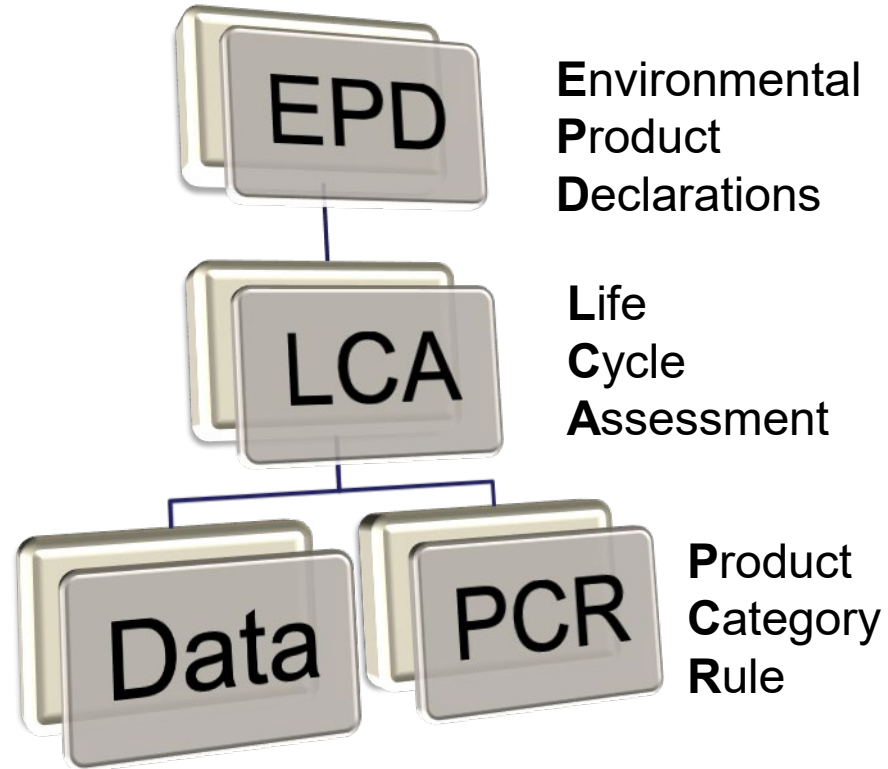
# Overview of LCA and EPD



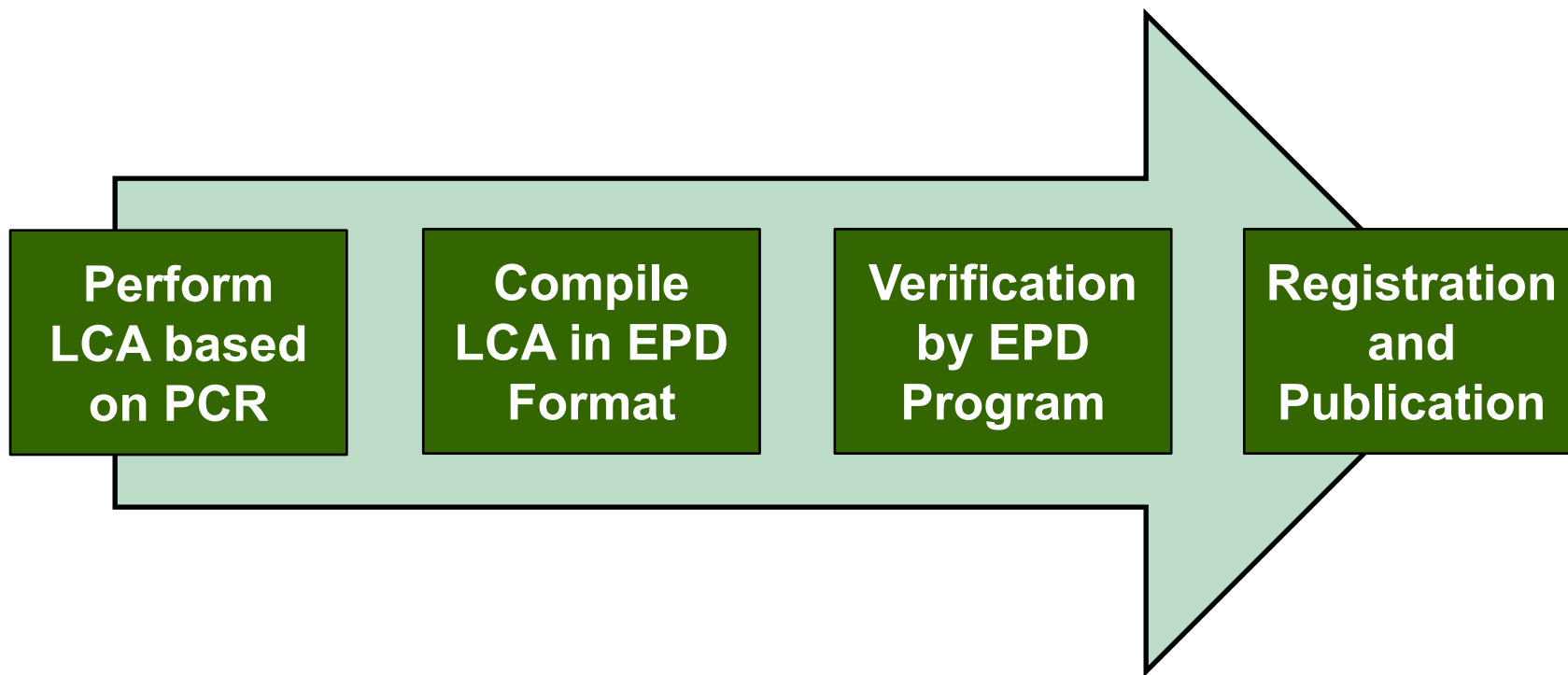
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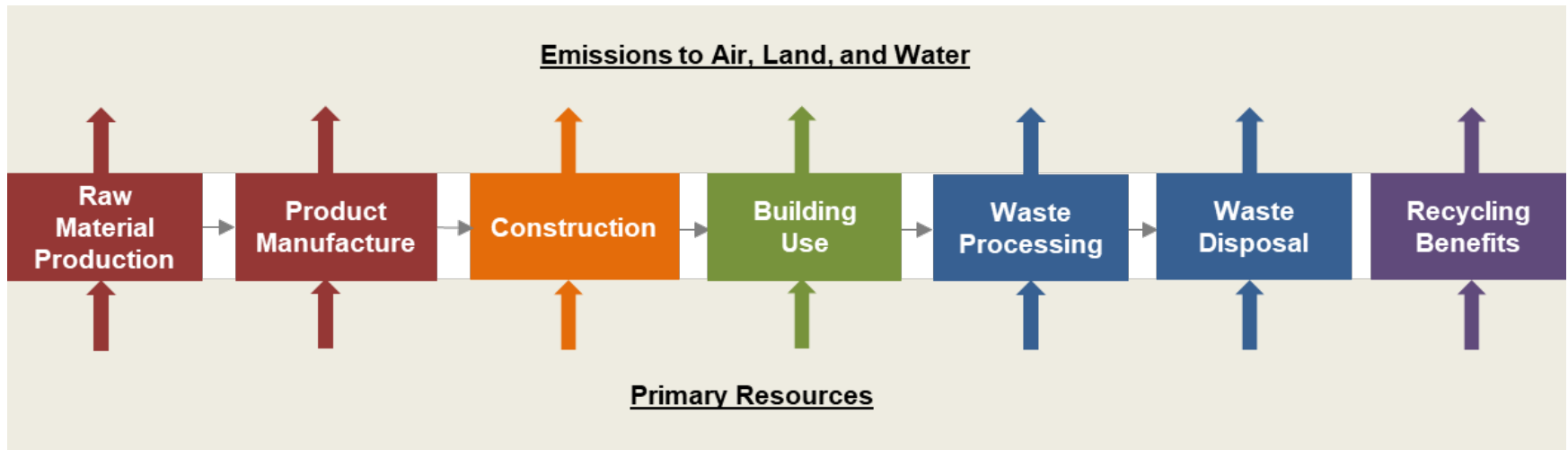
# Acronyms



# The LCA/EPD Process



# Life Cycle Assessment



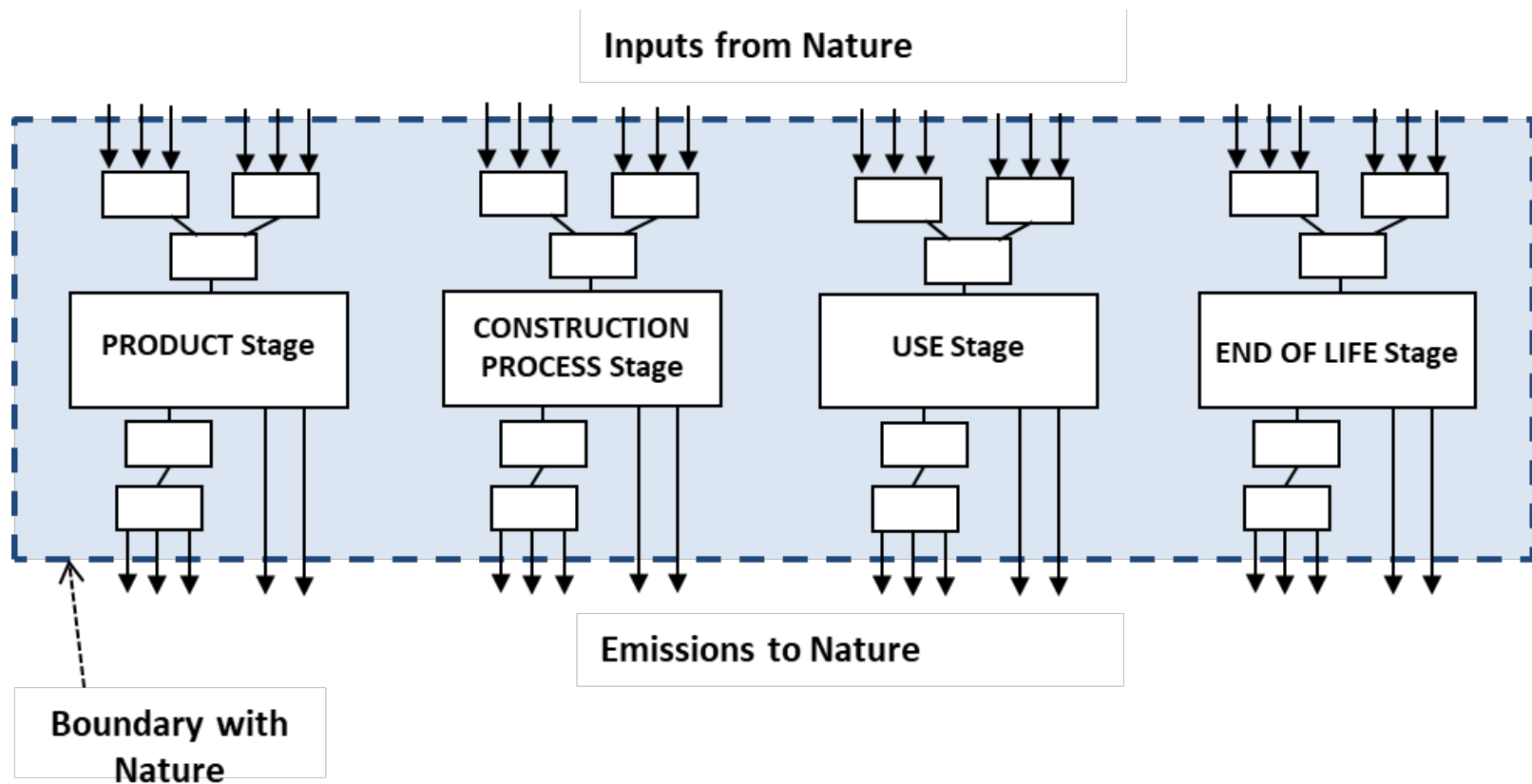


## LCA and EPDs based on “Functional Unit”

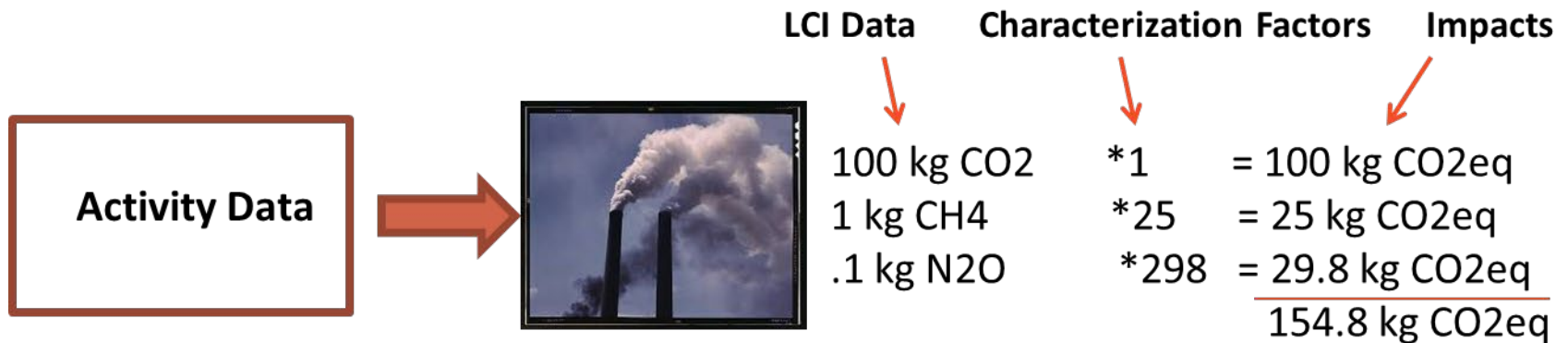
- Cradle-to-grave scope
- Description of performance
- Time dimension
- Only credible way to compare products



# Life Cycle Assessment



# Life Cycle Assessment



Total Global Warming Potential is 154.8 kg CO<sub>2</sub>eq



# Life Cycle Impact Assessment



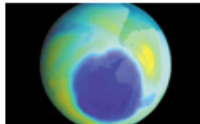
Global warming



Acidification



Eutrophication



Ozone depletion



Smog



Fossil fuel consumption



# EPD Document

PCA Since 1958 America's Concrete Manufacturers

ENVIRONMENTAL PRODUCT

**Environmental Product Declaration**

**NRMCA MEMBER INDUSTRY-AVERAGE EPD FOR READY MIXED CONCRETE**

**NRMCA**  
NATIONAL READY MIXED CONCRETE ASSOCIATION

**NSF**  
Certified Environmental Product Declaration  
www.nsf.org

**ENVIRONMENTAL PRODUCT DECLARATION**

**Primary Structural Steel Frame Components**

Metal Building Manufacturers Association  
Industry-Wide EPD

**MBMA**  
METAL BUILDING MANUFACTURERS ASSOCIATION

The Metal Building Manufacturers Association (MBMA), Cleveland, OH, was founded in 1956. Since that time, MBMA and its manufacturer members have worked together as partners to further its mission to conduct research to help enhance building codes and standards, and to educate the construction community. MBMA's mission is to support a strong, sustainable metal building systems industry that meets the needs of building owners and society.

MBMA members are deeply committed to the social, environmental and economic principles of sustainability. This strategy is aimed at improving the quality of life for everyone now without compromising the ability of future generations to meet their needs.

This industry average EPD includes only the Primary Structural Steel Frame components used in metal building systems. These components serve as the load carrying columns and beams of a metal building system.

Separate EPDs are available that address the secondary structural steel framing and the exterior metal roof and wall panel cladding used to form a complete metal building system.

This industry average EPD is representative of the MBMA metal building systems members.

A complete list of members is available at [https://www.mbma.com/System\\_Members](https://www.mbma.com/System_Members).

**CERTIFIED**  
ENVIRONMENTAL PRODUCT DECLARATION

Illustration of primary structural steel framing (columns/beams) supporting secondary structural steel framing members (girders/purlins) with metal roof panel (standing seam or through fastened) and metal wall panel (through fastened) cladding.

Note: Primary structural steel framing featured in illustration above.

**ENVIRONMENTAL PRODUCT DECLARATION**

**NORTH AMERICAN SOFTWOOD LUMBER**

AMERICAN WOOD COUNCIL  
CANADIAN WOOD COUNCIL

The American Wood Council (AWC) and the Canadian Wood Council (CWC) are pleased to present this Environmental Product Declaration (EPD) for North American softwood lumber. The EPD includes Life Cycle Assessment (LCA) results for all processes up to the point that planed and dry lumber is packaged and ready for shipment at the manufacturing gate. The underlying LCA and the EPD were developed in compliance with ISO 14025:2006 and ISO 22020:2017 and have been verified under the UL Environment EPD program.

The AWC and CWC represent wood product manufacturers across North America. The North American forest product industry is a global leader of sustainable forest wood products. This EPD reflects years of research and numerous sustainability initiatives on behalf of our members to continually improve the environmental footprint of North American wood products. We are pleased to present this document to show our progress.

Please follow our sustainability initiatives at [www.awc.org](http://www.awc.org) and [www.cwc.ca](http://www.cwc.ca).

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UL ENVIRONMENT



# Market Drivers for LCA and EPD



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# USGBC: LEED Rating System

## 5 Rating systems

### BD+C

**BUILDING DESIGN + CONSTRUCTION**  
 New Construction  
 Core & Shell  
 Schools  
 Retail  
 Healthcare  
 Data Centres  
 Hospitality  
 Warehouses & Distribution

### ID+C

**INTERIOR DESIGN + CONSTRUCTION**  
 Commercial Interiors  
 Retail  
 Hospitality

### O+M

**OPERATION + MAINTENANCE**  
 Existing Buildings  
 Data Centres  
 Warehouses & Distribution  
 Hospitality  
 Schools  
 Retail

### ND

**NEIGHBOURHOOD DEVELOPMENT**  
 New land developments  
 Land Redevelopment  
 Residential  
 Mixed Use  
 Commercial  
 Industrial

### HOMES

**HOUSES + UNITS**  
 Single Homes  
 Low Rise Multi Unit  
 Mid Rise Multi Unit

## Credit Categories

Each rating system is made up of a combination of credit categories.

Within each of the credit categories, there are specific prerequisites projects must satisfy and a variety of credits projects can pursue to earn points. The number of points the project earns determines its level of LEED certification.



**INTEGRATIVE PROCESS**  
 Encouraging cross discipline collaboration



**LOCATION & TRANSPORTATION**  
 Access to variety of transport and/or credit for constrained sites



**MATERIALS & RESOURCES**  
 Using sustainable materials & reducing waste



**WATER EFFICIENCY**  
 Smart use and reuse of water



**ENERGY & ATMOSPHERE**  
 Energy Performance



**SUSTAINABLE SITES**  
 Minimising impact on ecosystems & water resources



**INDOOR ENVIRONMENT**  
 Indoor air quality & access to natural light & views



**INNOVATION**



**REGIONAL PRIORITY**  
 Geographic environmental priorities



LEED is administered by the US Green Building Council. For information on the scheme go to [www.usgbc.com](http://www.usgbc.com)

Source: WT Sustainability 2015

## The Ratings





# USGBC: LEED Rating System



LEED v4.1

- Credits for whole-building LCA
- Credits for EPDs
- Credits for Optimization based on LCA
- Credits for HPDs and CSR

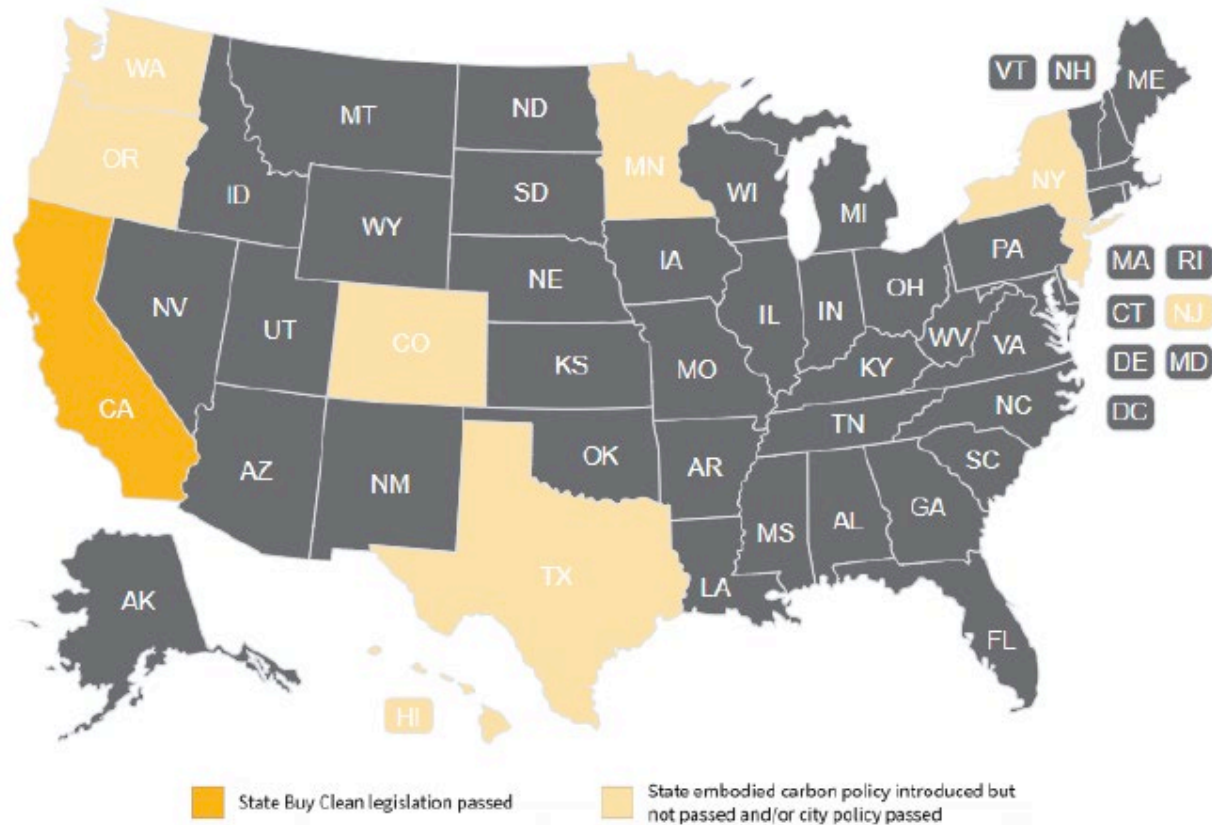


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## Regions considering/passed Buy Clean legislation



Source: <https://carbonleadershipforum.org/clf-policy-toolkit/#map>



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# Proposed Industry Study for Lighting



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# Lighting Industry EPD

- Five products
  - 4 inch downlight
  - 4 foot linear
  - Street poll
  - Cylinder
  - Troffer





## Functional Unit

- Scope: Cradle-to-Grave
- “Lighting that delivers an outgoing artificial luminous flux of 1,000 lumens during a reference lifetime of 35,000 hours”

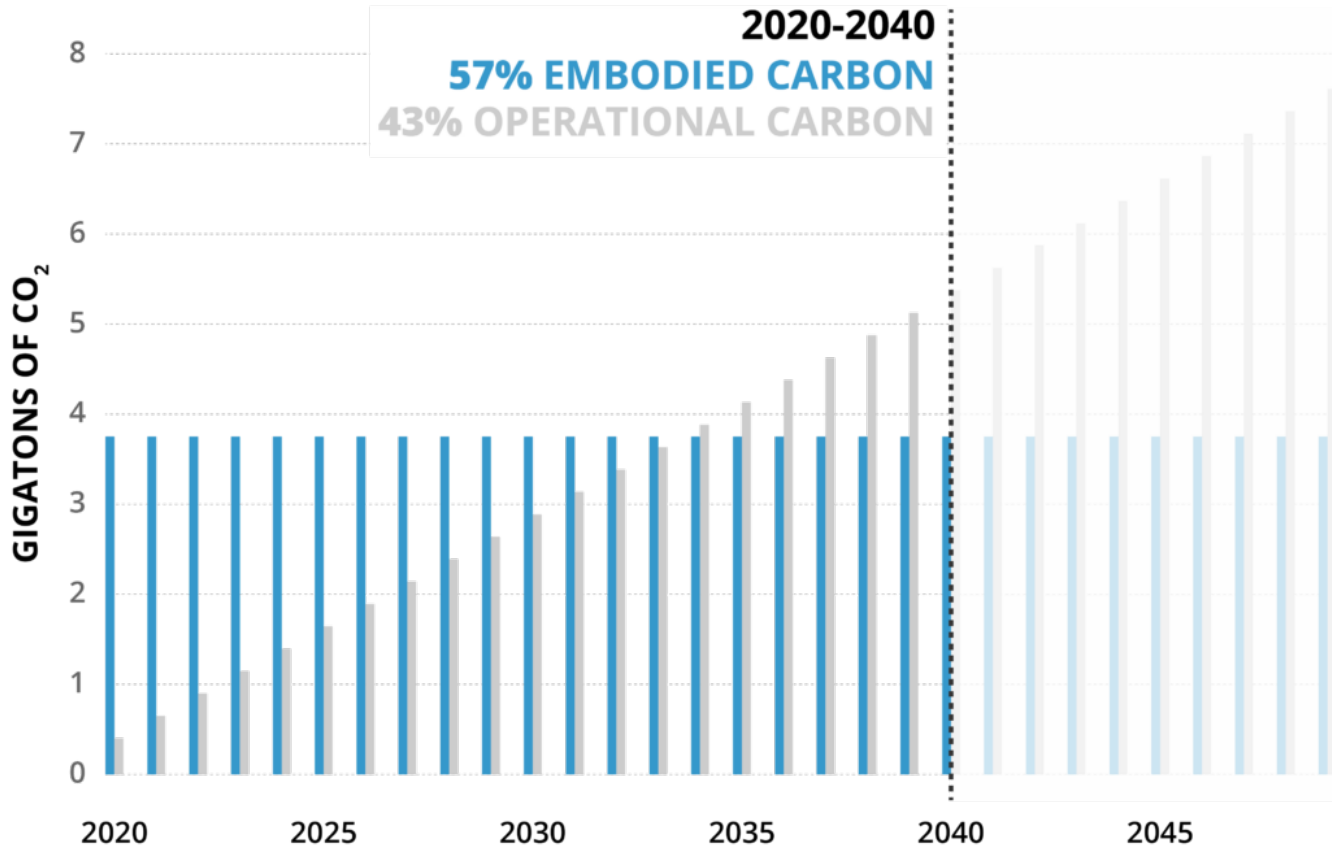


## Functional Unit

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- “Lighting that delivers an outgoing artificial luminous flux of **1,000 lumens** during a reference lifetime of **35,000 hours**”



# Operational vs. Embodied Carbon



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Data Sources: UN Environment Global Status Report 2017; EIA International Energy Outlook 2017



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**Thank You!**

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