# EmiratesGBC Technical Workshops

*by* AESG

## Driving Decarbonization Through Life Cycle Assessment (LCA) and Environmental Product Declarations (EPDs)

Presented by **Anam Ramzan, Sr.** Carbon Specialist

**12th of June 2026**

# Introduction to the Speakers

## Anam Ramzan

Sr. Carbon Specialist, AESG

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LEED AP | LFA | EDGE Expert | Active & Mode score AP

ISO 14046 GHG Lead Verifier

Sr. Carbon Specialist and Sustainability leader, with expertise in greenhouse gas (GHG) accounting, decarbonization roadmap and Net zero strategies, and life cycle assessment (LCA) within the built environment.

8 years of experience in sustainability consultancy, high performance building design

Academic background in Architecture

Professional Accrediations – LEED AP, LFA, EDGE Expert, Active & Modescore AP

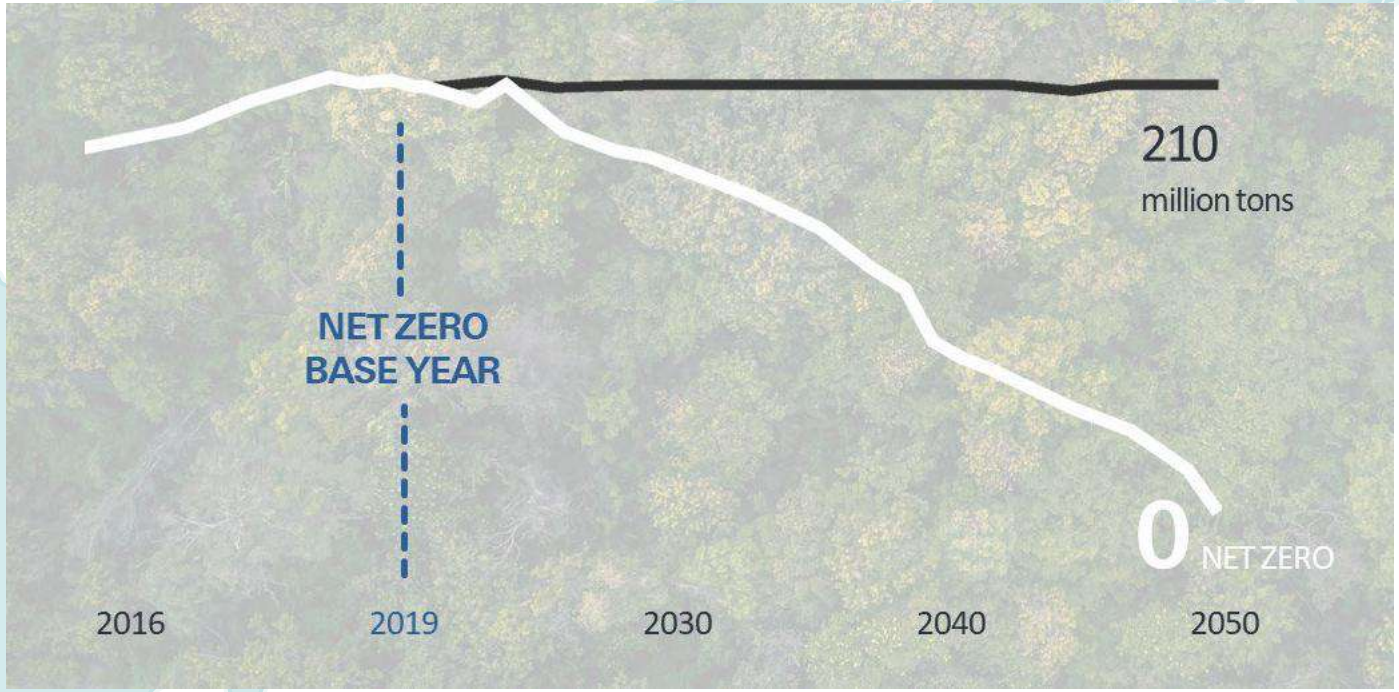
Collaborated with high-profile clients such as Diriyah, Qiddiya, ROSHN, SEVEN, Emirates NBD, and Brookfield.

# Key Takeaways

- Become familiar with the general steps for conducting an LCA, the standards followed and the data requirements
- Understand the process for developing EPDs
- Recognize the key benefits and challenges for the use of EPDs within the Built Environment
- Understand LEED v5's Decarbonization Pillar and its focus on operational and embodied carbon.

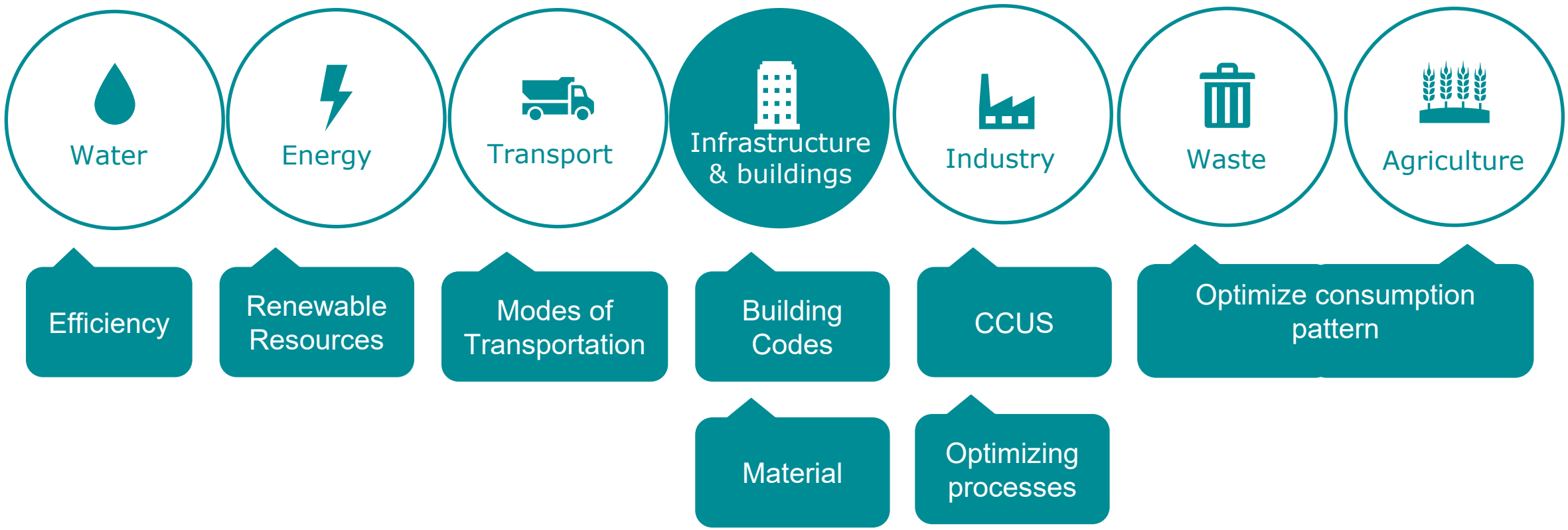
# Why Decarbonization matters?

**Limit global temperature increase to 1.5˚C compared to pre-industrial levels.**



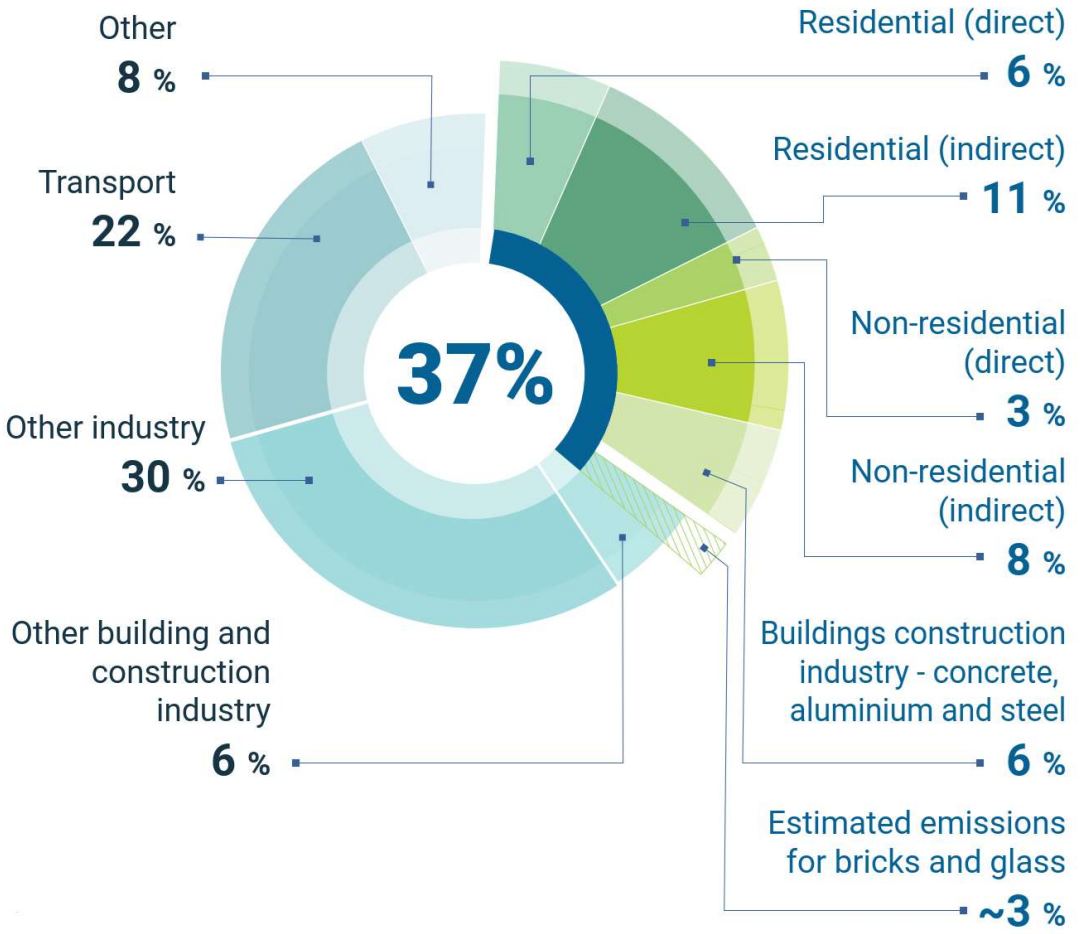

*Source: UAE Government 2023*

# Sectors


Water
Energy
Transport
Infrastructure & buildings
Industry
Waste
Agriculture
Efficiency
Renewable Resources
Modes of Transportation
Building Codes
Material
CCUS
Optimizing processes
Optimize consumption pattern

# Sectors Contribution

- The buildings and construction industry represents around 37% of global $CO_2$ emissions
- Sources of Carbon Emissions
  - Embodied
  - Operational




*Source: UNEP 2022*

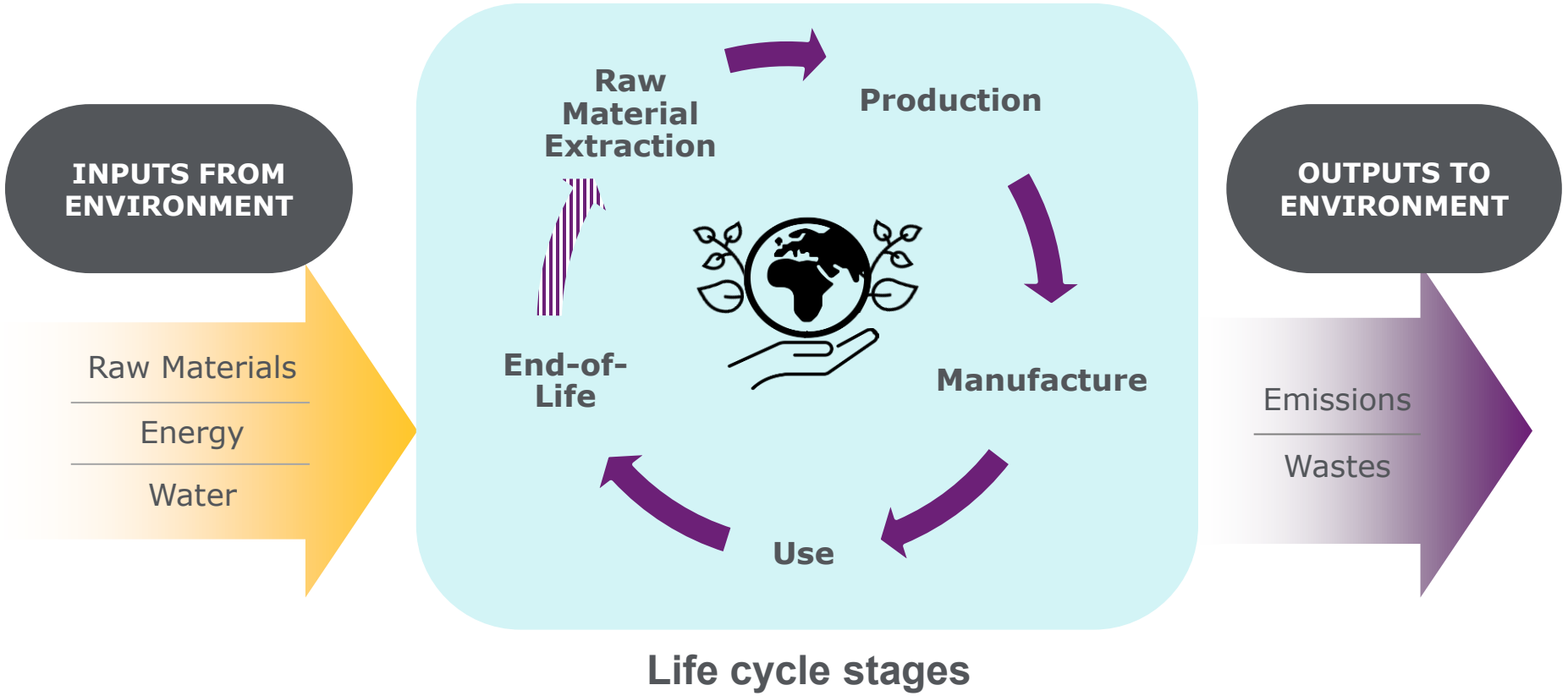
# Life Cycle Assessment

*If you can't measure it, you can't manage it.*

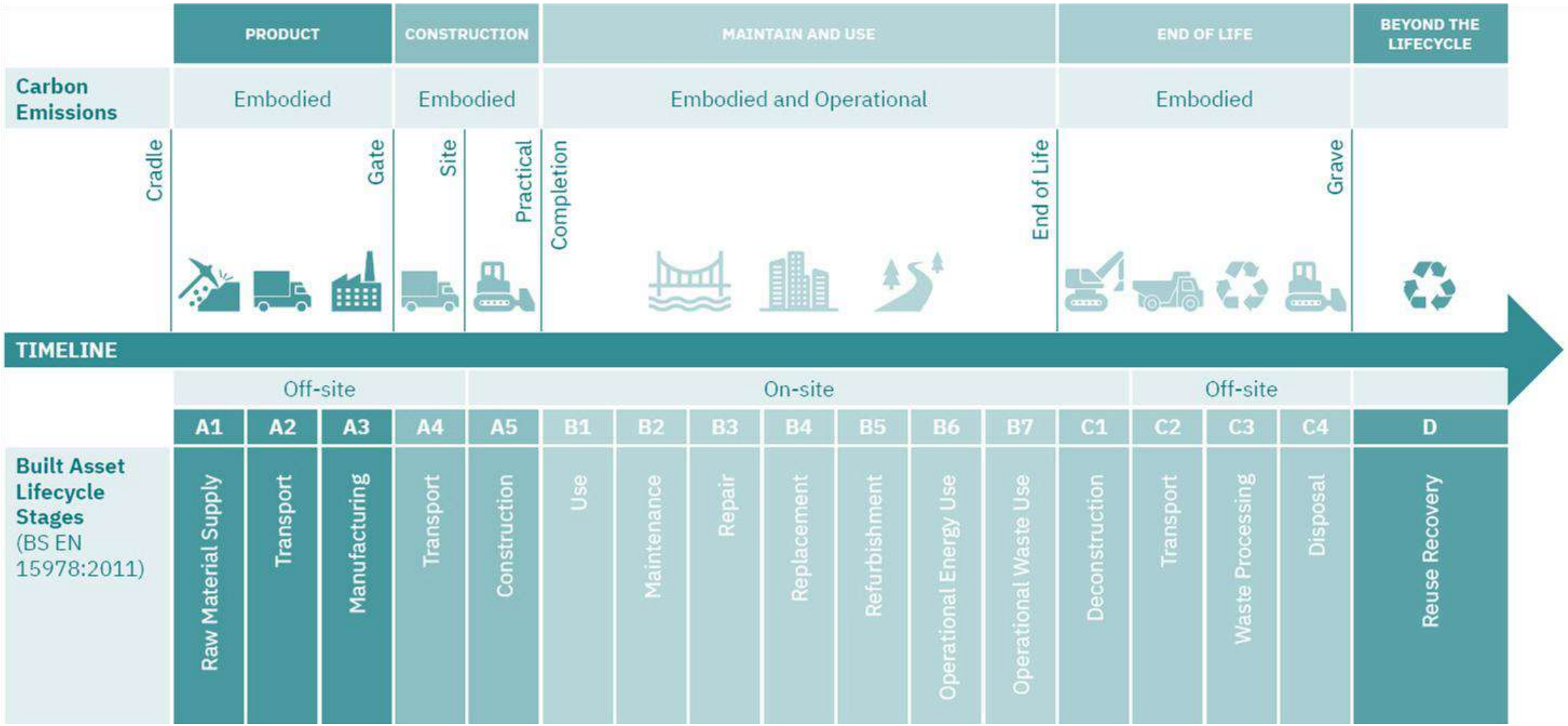
*-Peter Drucker*

# Life Cycle Assessment

## Environmental (LCA)



# Buit Asset Life cycle stages

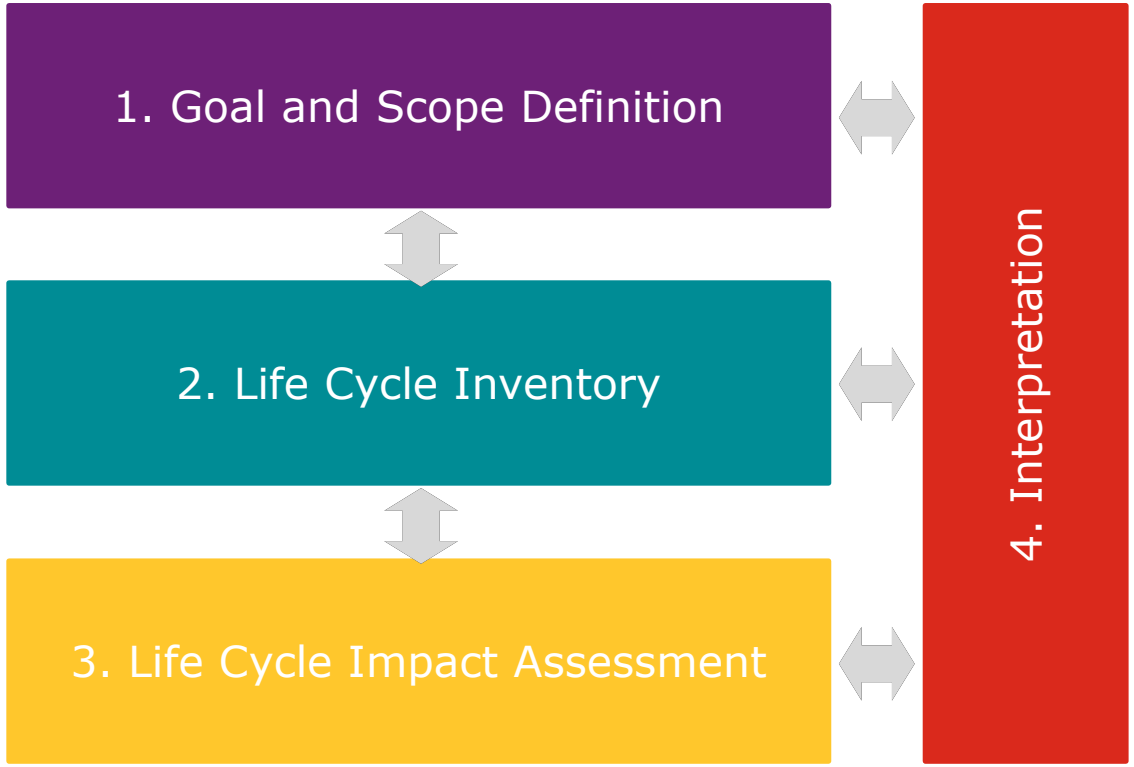



## System Boundary

# Environmental Impact

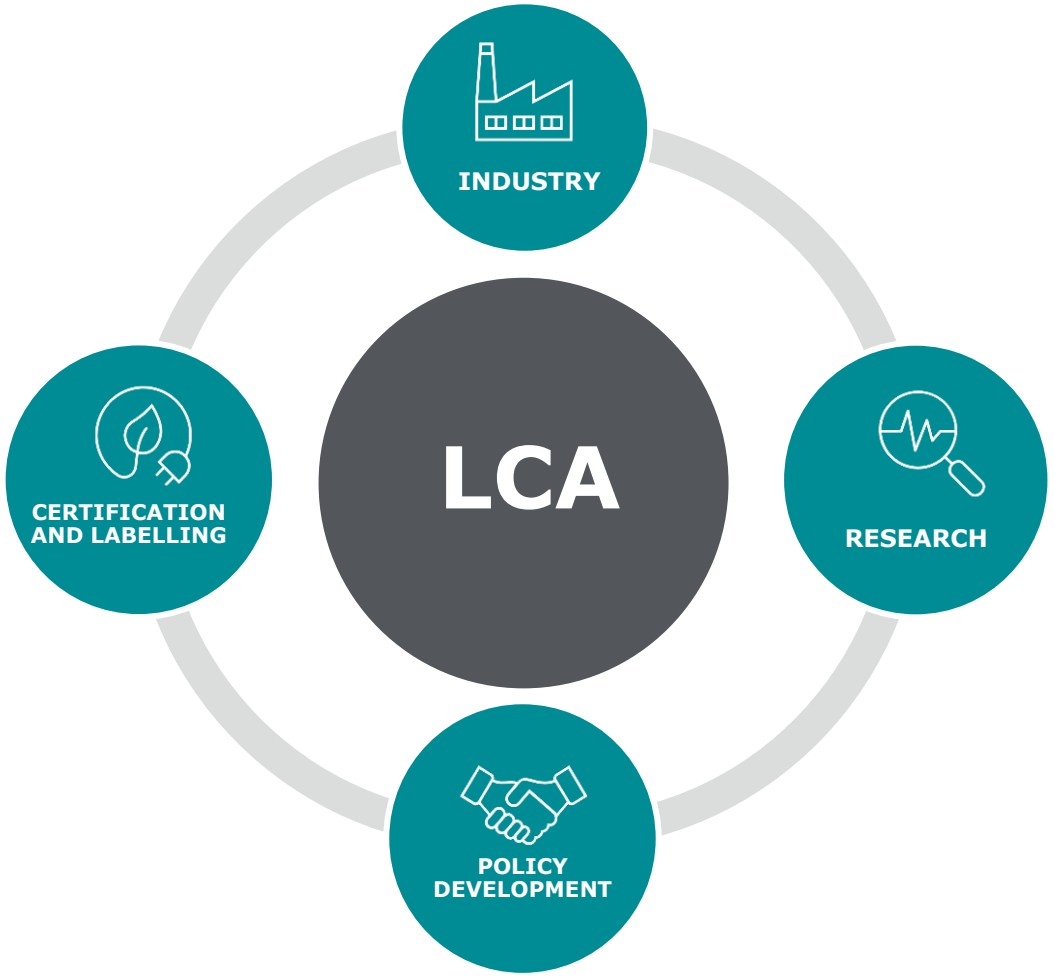
| Environmental Impact category / Indicator | Unit | End point Effect |
|---|---|---|
| Global Warming Potential (GWP) | kg CO2-eq | Climate Change |
| Ozone depletion | kg CFC-11-eq | Human Health |
| Acidification | kg SO2 | Acid rain leads to Soil and Forest Damage |
| Eutrophication | kg PO4-eq | Algae Formation effecting aquatic Life |
| Photochemical ozone formation | kg NMVOC-eq | Human Health<br>Causes respiratory problems |
| Depletion of fossil fuels Resources | MJ | Resource Scarcity |

# LCA Methodology




**ISO 14044:2006**

# LCA Application



# Decarbonization Strategies

## Life Cycle Thinking – Strategies

### DESIGN BETTER BUILD LESS

- Life-cycle analysis
- Resource-efficiency
- Circular approaches
- Durability and recycling
- Local value chains

### USE ALTERNATIVE BUILDING MATERIALS

- Develop supply chains
- Standardize and certify products
- Mainstream alternative materials in conventional construction

### DECARBONIZE CONVENTIONAL MATERIALS

- Energy-efficiency
- Reduce carbonized energy
- Process innovation
- Substitute with materials and natural fibers

### REDUCE OPERATIONAL CARBON

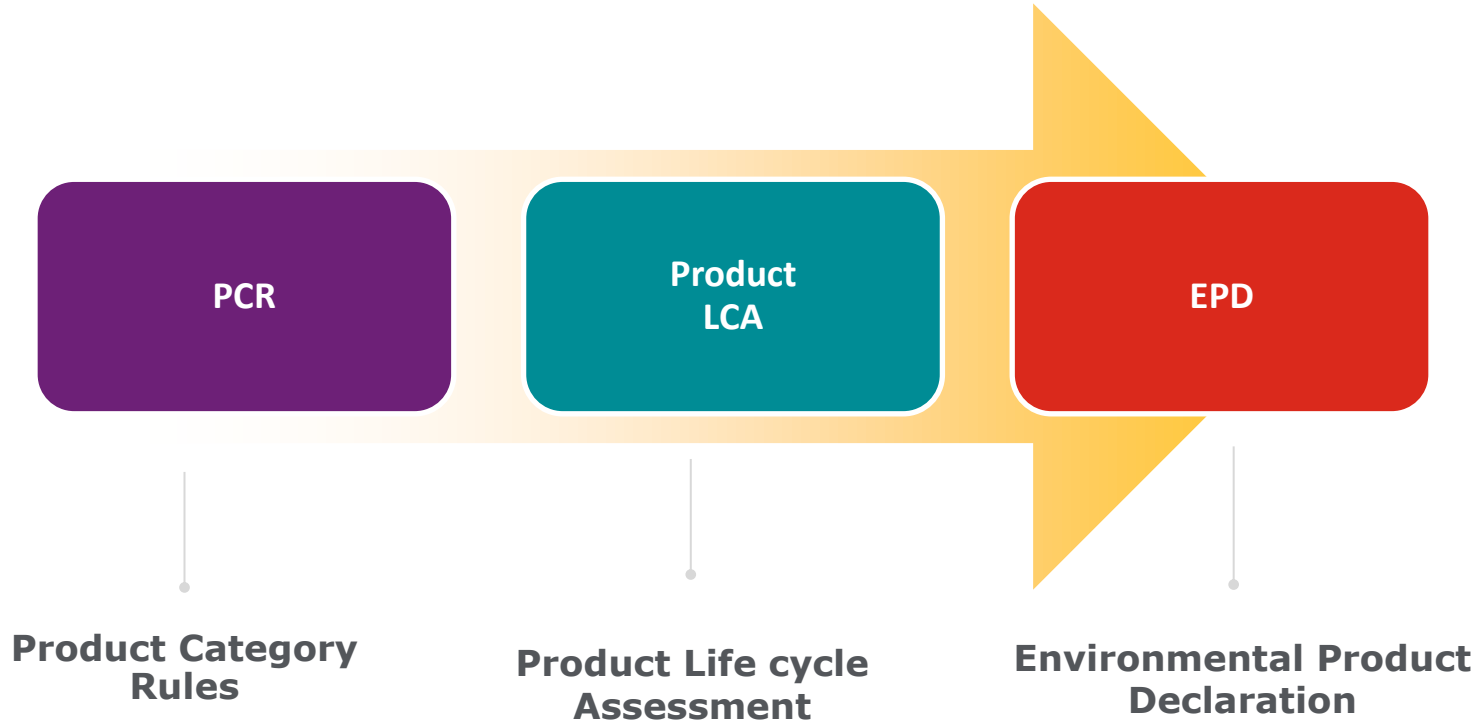
- Minimize heating and cooling loads by using insulating passive materials.
- Incorporate onsite energy collecting and storing materials into building envelope

### END-OF-LIFE

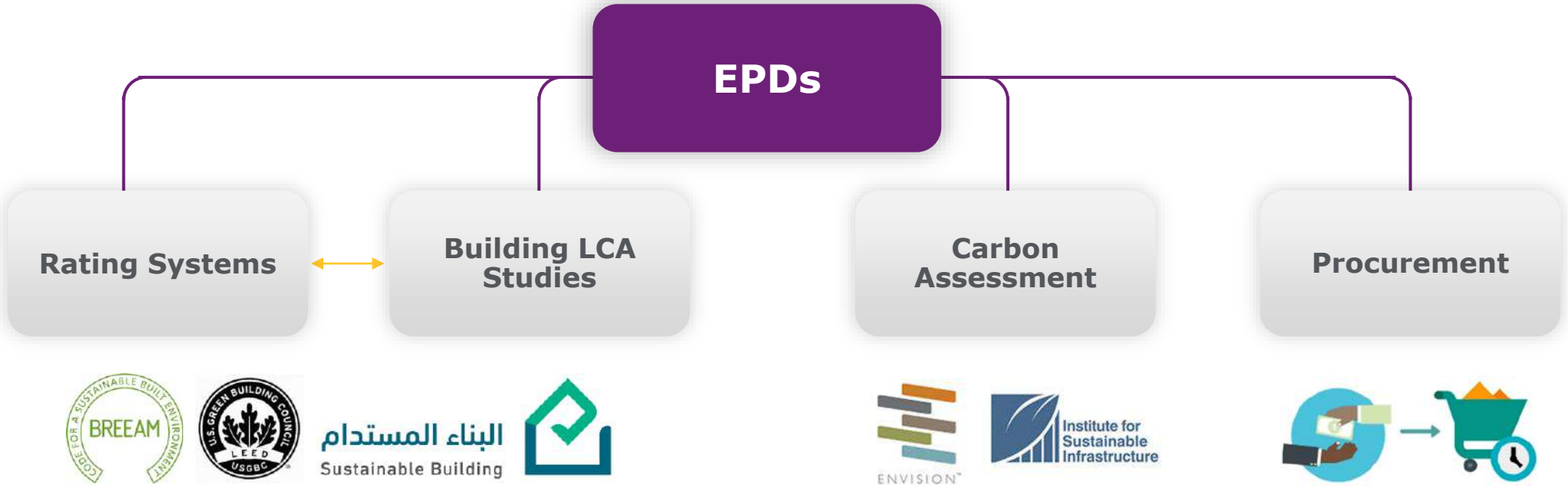
- Source reduction
- Reuse
- Recycle
- Waste – to – energy

*Source: UNEP 2022*

# What is an Environmental Product Declaration (EPD)?



# Application of EPDs



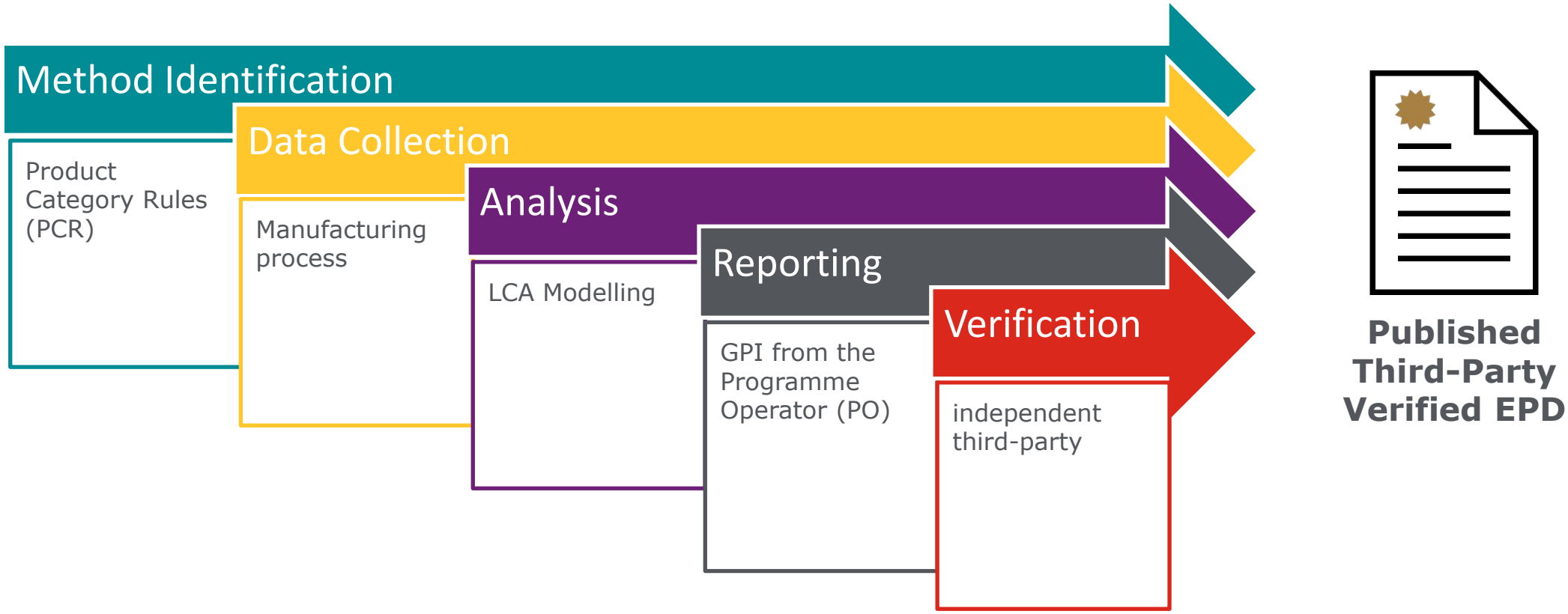
# Types of EPDs

**Single-Company, Single-Product EPD**

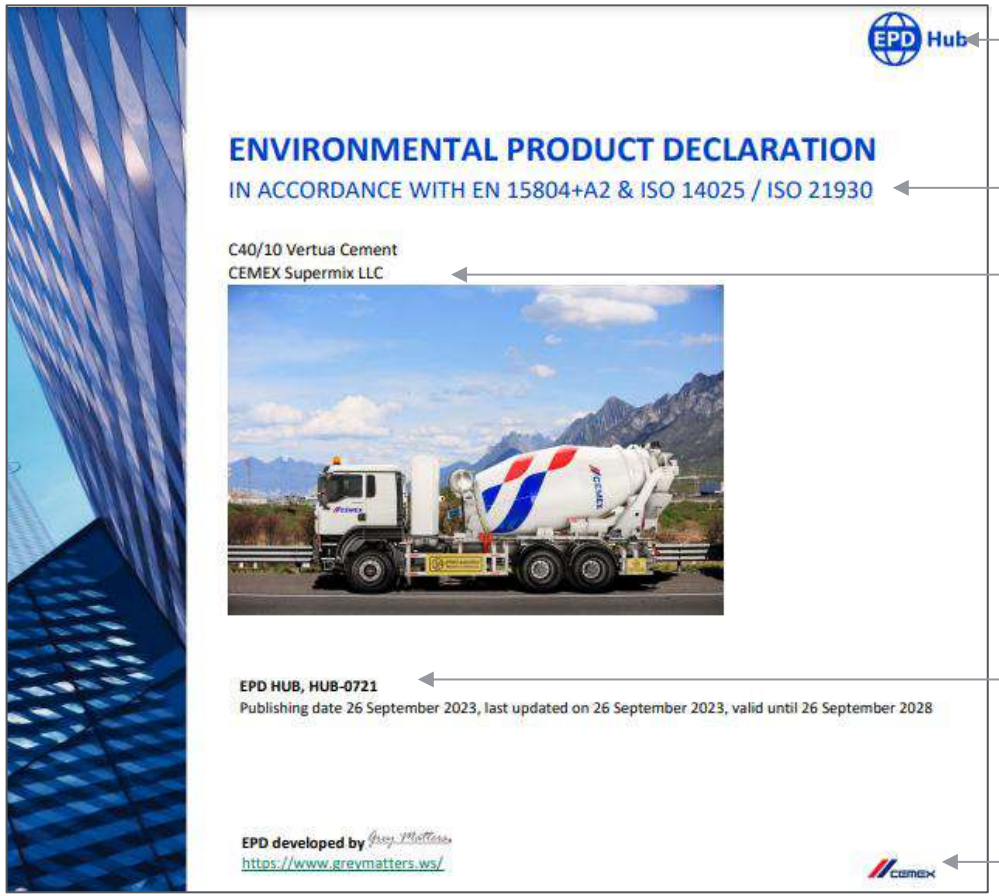
**Multiple Product EPD**

**Sector or Industry-Average EPD**

# Process for Development of EPDs



# EPD Examples



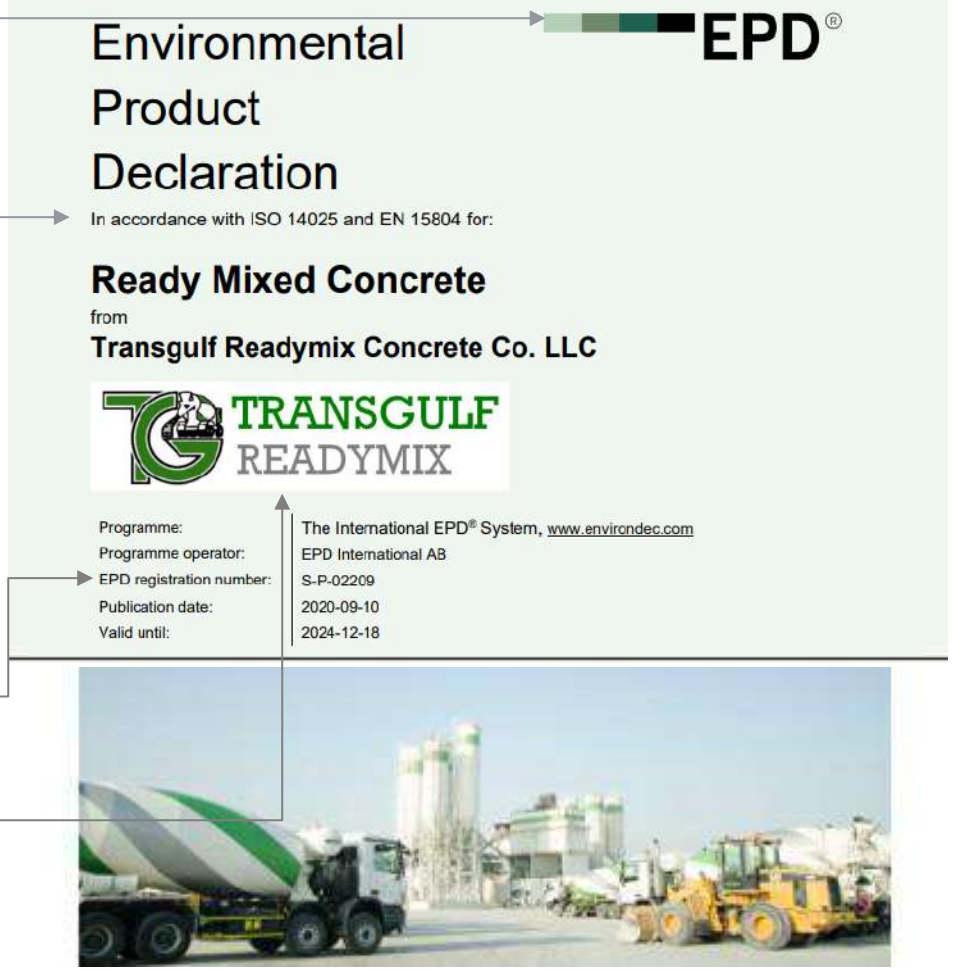

Programme Operator

International and European Standards

Product and Manufacturer

EPD ID Number and Validity Date

Manufacturer's logo



# EPD Examples

## SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

| Product stage | | | Assembly stage | | Use stage | | | | | | | End of life stage | | | | Beyond the system boundaries |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| x | x | x | MND | MND | MND | MND | MND | MND | MND | MND | MND | x | x | x | x | x |
| Raw materials | Transport | Manufacturing | Transport | Assembly | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | Deconstr./demol. | Transport | Waste processing | Disposal | Reuse | Recovery | Recycling |

*Modules not declared = MND. Modules not relevant = MNR.*

| Impact category | Unit |
|---|---|
| GWP – total[1)] | kg $CO_2$e |
| GWP – fossil | kg $CO_2$e |
| GWP – biogenic | kg $CO_2$e |
| GWP – LULUC | kg $CO_2$e |
| Ozone depletion pot. | kg $CFC_{-11}$e |
| Acidification potential | mol $H^+$e |
| EP-freshwater[2)] | kg Pe |
| EP-marine | kg Ne |
| EP-terrestrial | mol Ne |

THE INTERNATIONAL EPD® SYSTEM

| Building Lifecycle Information | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Stage A1-A3 | | | Construction Process Stage A4-A5 | | Use Stage B1-B7 | | | | | | | End of Life Stage C1-C4 | | | | Benefits and Loads Beyond the System Boundary |
| Raw Material Supply | Transport | Manufacturing | Transport | Construction & Installation Process | Use | Maintenance | Repair | Replacement | Refurbishment | Operational Energy Use | Operational Water Use | De-construction & 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 |

| PARAMETER | UNIT |
|---|---|
| Global warming potential (GWP) | kg $CO_2$ eq. |
| Depletion potential of the stratospheric ozone layer (ODP) | kg CFC 11 eq. |
| Acidification potential (AP) | kg $SO_2$ eq. |
| Eutrophication potential (EP) | kg $PO_4^{3-}$ eq. |
| Photochemical ozone creation potential (POCP) | kg $C_2H_4$ eq. |
| Abiotic depletion potential – Elements | kg Sb eq. |
| Abiotic depletion potential – Fossil resources | MJ, net calorific value |

# Key Challenges of EPDs

### AWARENESS

Limited awareness among manufacturers, designer and consultants

### DATA AVAILABILITY AND QUALITY

Manufacturers lack detailed product specific data

### HIGH COST IN MARKET

High Upfront cost and Verification Expenses for independent third-party verification

# LEED V5 Updates and Key Information

**>> V5 guides only to BD+C, ID+C and O+M**

LEED V5

**BD+C**
Building Design and Construction

**ID+C**
Interior Design and Construction

**O+M**
Building Operations and Maintenance

**LEED v4.1** Residential and Cities & Communities

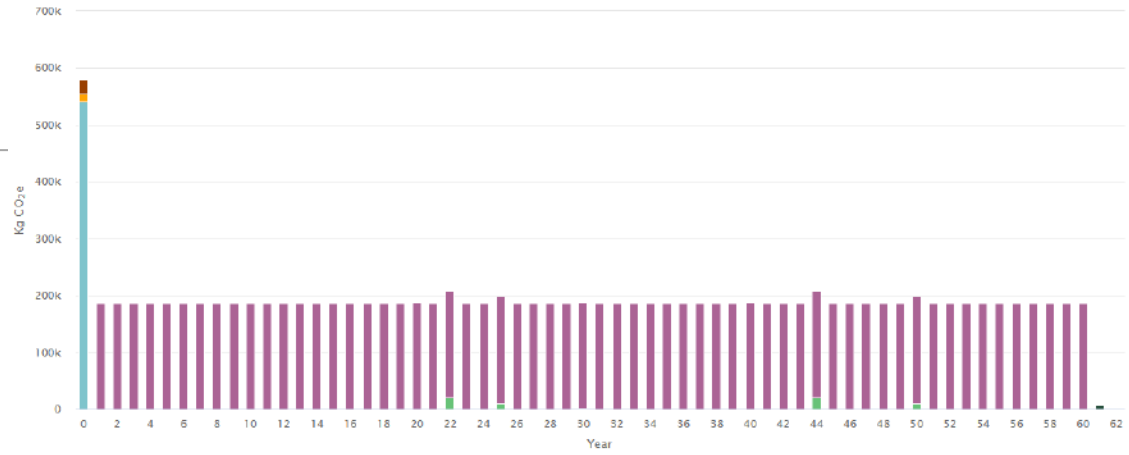
# Rating system structure revision

**>> Impact Areas**

**Decarbonization (50%)**

**Ecological Conservation and Restoration (25%)**

**Quality of Life (25%)**



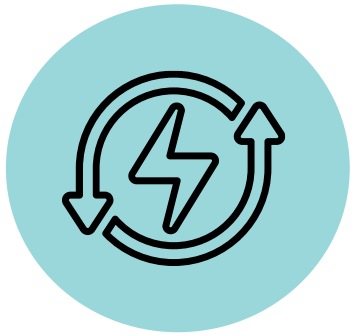

- **Operational Carbon**
- **Embodied Carbon**
- **Refrigerant Emission**
- **Transportation Emission**

# Rating system structure revision

## >> Platinum Requirements

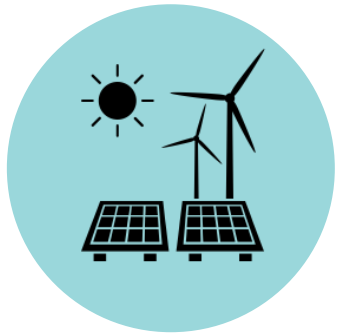
Achieve all prerequisites and earn more than 80 points

✓ Comply with the following credits:
BD+C & ID+C



**EAc1 Electrification**

**EAc3 Enhanced Energy Efficiency**



**EAc4 Renewable Energy**

**MRc2 Reduced Embodied Carbon**

# Rating system structure Revision

## MRc2 Reduced Embodied Carbon

**OPTION 1**

Whole-Building Life-Cycle Assessment **(Points 1–6)**
20% Reduction in GWP is Mandatory for Platinum
Maximum Reduction is 40% in GWP for Maximum points

**AND/OR**

**OPTION 2**

Environmental Product Declaration (EPD) Analysis **(Points 1–3)**
Path 1. Project-Average Approach **(Points 1–3)**
OR
Path 2. Materials-Type Approach **(Points 1–2)**

**AND/OR**

**OPTION 3**

Track Carbon Emissions from Construction Activities (**Points 1–2)**

AESG

# Questions?

*June 12th , 2026*

**Speakers:**
Anam Ramzan
Sr. Carbon specialist at AESG