



**IFC**

**International  
Finance Corporation**  
WORLD BANK GROUP

*Creating Markets, Creating Opportunities*

# Embodied Carbon Materials Assessment EDGE Version 3.0.0

September 2023



# Introduction

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An innovation of International Finance Corporation (IFC), the EDGE Green Building certification application has recently upgraded from assessing Embodied Energy in Materials in a building to assessing the Embodied Carbon in those materials.

This is a significant milestone as the industry moves towards reducing the carbon footprint of the construction material of new buildings in addition to reducing carbon emissions from the operation of such buildings



# Overview

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According to data from the International Energy Agency (IEA), the building sector contributes to over 39% of the global energy-related emissions. More than one-third of those emissions come from embodied carbon. This aspect, considering the enormous amount of construction activity expected for the next few decades, shows the magnitude of the problem.

By 2030, global floor area is expected to increase by around 15%, equivalent to the entire built floor area of North America today. Global floor area is expected to double by 2060, with 80% of new development likely to take place in emerging markets.



Such an enormous amount of construction will result in concentrated emissions from pre-construction and construction phases. While traditionally the focus has been on emissions from operations, given these volumes of new construction, there is increased urgency to address the embodied carbon emissions and to decarbonize the manufacturing of construction materials.



# The Transition to Embodied Carbon

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Currently there are limited sources of free data that calculate the embodied carbon of a new building, motivating IFC to include embodied carbon in their free EDGE tool, supporting the mission to help decarbonize the global building sector.

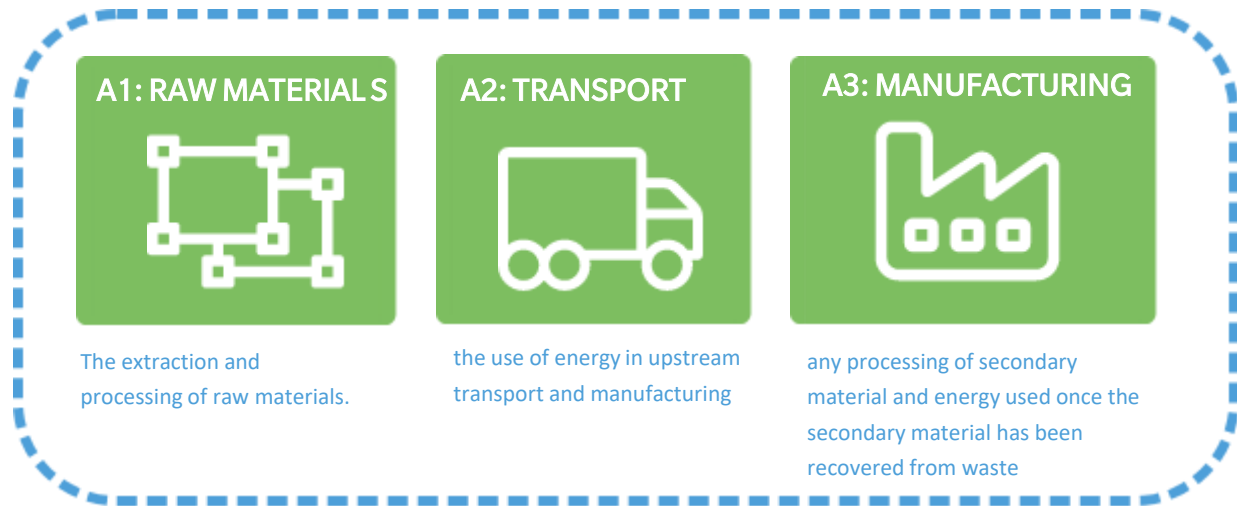
The move from embodied energy to embodied carbon helps to assess the environmental impact of energy generation, which was not covered under embodied energy. As different countries emit different levels of GHG for the production of the same building material (i.e., concrete or floor tiles), the environmental impact is different even with same energy use.

The EDGE embodied carbon indicator is reported as Global warming Potential (GWP) in kg CO<sub>2</sub>. GWP is assessed for all materials using the 5<sup>th</sup> Assessment Report impact values (IPCC, 2014). The following methodology is used to assess embodied carbon of materials.



# System Boundary

The system boundary for the datasets is based on EN 15804+A2:2019 covering Modules A1 to A3. This includes:



## PRODUCT STAGE or CRADLE TO GATE

Our database has a total of 615 components and 164 construction materials and assembly materials. It also provides a regionalized approach, refining some of the analysis based on global regions and the prevalence of import/export of certain materials in such regions.

EDGE also offers a unique feature to its users and enables them to add new customized materials and their embodied carbon values. Users can claim embodied carbon for “customized materials” under the EDGE Materials tab by verifying the material according to ISO 14067, or with the material’s Environmental Product Declaration (EPD).

The scope of the database has been defined based on the categorization/classification of building materials in terms of:

- The relative influence of a building material on the environmental impact of the building project
- The geographical and technological differences in the production processes of building materials

# Embodied Carbon

## Notes and Methodology

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The LCA models for the EDGE are created within the GaBi 10.5 Software and Databases. All the models used in for EDGE, as well as the underlying data in GaBi, have been produced in accordance with ISO 14040 and ISO 14044, EN 15804+A2:2019, in addition to the International Reference Life Cycle Data (ILCD) guidance.

The ISO 14040 and 14044 standards define the basic framework of the LCA process and provide measures of quality control and transparency in conducting and reporting LCA. EN 15804+A2:2019 is the latest and most recognized standard in the world when it comes to LCA of construction products. The ILCD system was developed by the European Commission to provide more precise guidance for LCI dataset development, beyond the ISO standards, to allow LCI datasets to be more comparable. LCI datasets that follow ILCD are composed using consistent rules for the boundaries of processes as well as the types and definitions of material and energy flows composing the inventory. These rules allow users to generate results that are meaningful, consistent, and more comparable across databases, studies, and practitioners.