

CASE STUDY 2020

Interface®  

EMBODIED CARBON: INTERFACE BASE CAMP



PROJECT INFORMATION



Location: Midtown Atlanta, GA
Area of Work: 40,000 square feet,
complete renovation of a 1960s
office building + adding half a
fourth floor + a full interior fit out

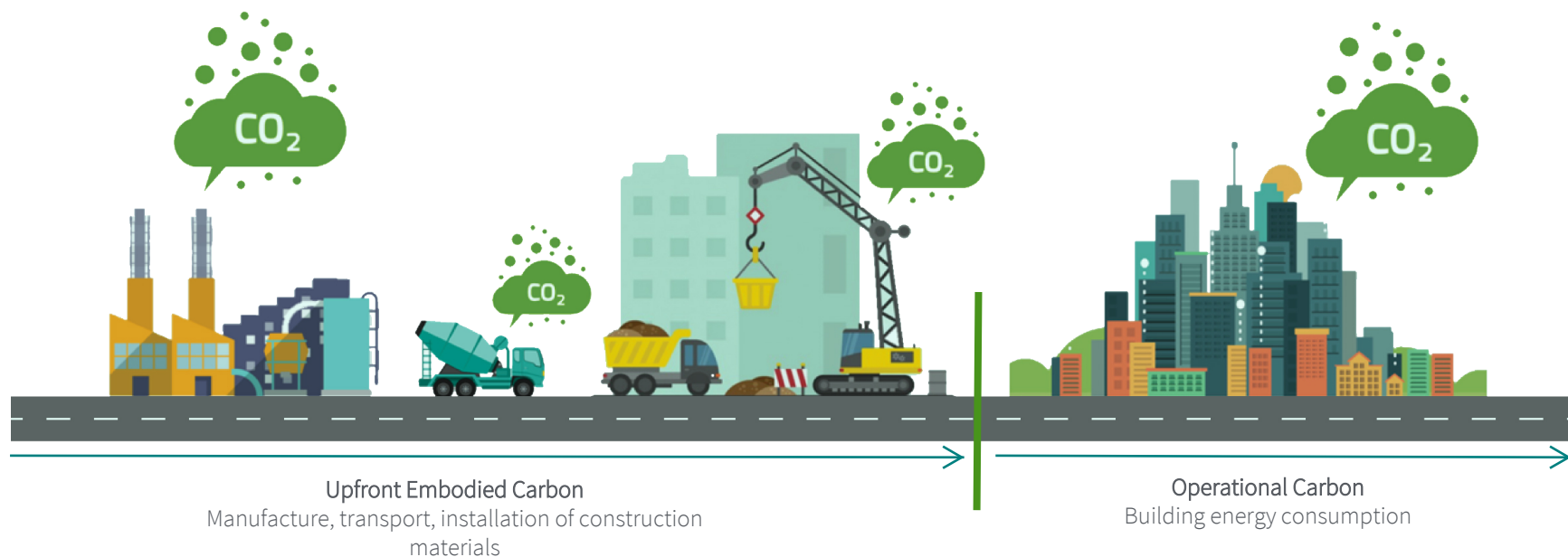


IMPACTS OF CONSTRUCTION

There are two major points in a building's life cycle that have carbon impacts, operational carbon and embodied carbon.

Operational carbon refers to the greenhouse gas emissions released into the atmosphere during a building's operation.

Embodied carbon refers to the amount of greenhouse gas emissions associated with the raw material extraction, transport, manufacture, and installation of materials. This case study focuses on embodied carbon impact.

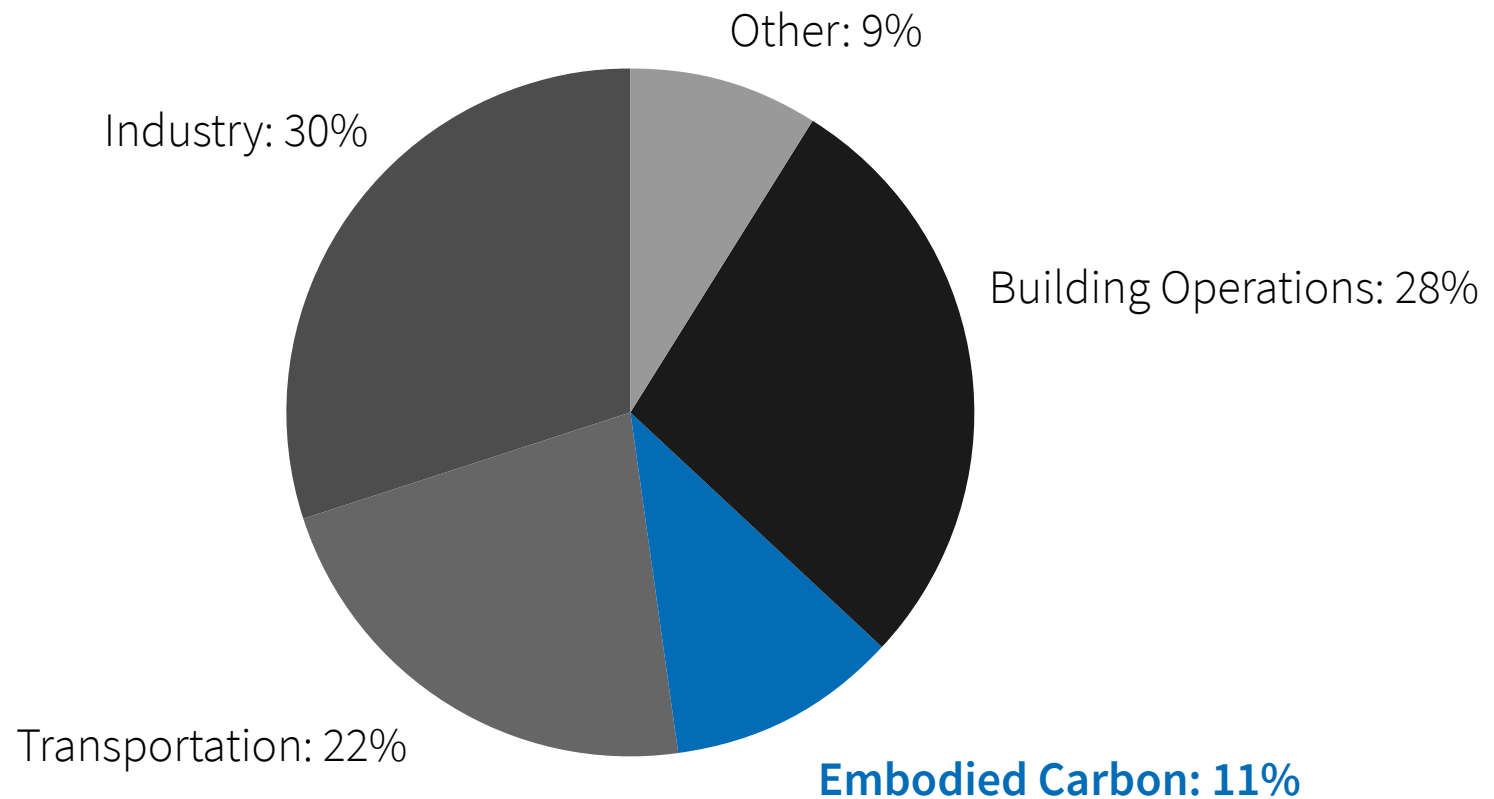


EMBODIED CARBON: DEFINITION

For the purposes of this case study, embodied carbon refers to the impacts associated with the raw material extraction, transport, and manufacture of materials. “Carbon” is used to indicate all greenhouse gas emissions, not just carbon dioxide.



ANNUAL GLOBAL CO₂ EMISSIONS BY SECTOR





OUR PROCESS

1. Data Collection

For LEED v4 Platinum documentation, we tracked cost-based metrics. Most of the quantity information was available from the contractor. We tracked all of the information in smartsheet.

2. Calculations

Adobe Acrobat was used for space take-offs to calculate the quantity information for bricks and glass. We used RSMeans data to convert price to quantity.

3. Research

We already had 20 Environmental Product Declarations from the LEED documentation. We found Product-Specific and Industry average EPDs on the EC3 calculator, UL Spot, the manufacturers websites and when needed, we contacted manufacturers directly by phone and email. When there was no product-specific information available, we used industry averages from EC3.

4. Implement

We calculated embodied carbon per product, specifically A1-A3 or cradle to gate, by using the Global Warming Potential (GWP) on the EPD. We calculated a “Baseline Case” with industry average GWP information and compared this to “Base Camp”

MEASURING EMBODIED CARBON OF EXISTING BRICKS

Reusing materials can dramatically reduce a project's embodied carbon.

Space take-offs of area covered by bricks on Adobe Acrobat: *1586 sf.*

Surface area of 1 brick: $3\frac{5}{8} \times 7\frac{5}{8}$ in Square
footage covered in bricks: 1586 ft²

$$7 \frac{5}{8} \text{ in} \times 3 \frac{5}{8} \text{ in} = 27.64 \text{ in}^2 = 0.19 \text{ ft}^2$$

$$1586 \text{ ft}^2 / 0.19 \text{ ft}^2 = 8262 \text{ bricks}$$

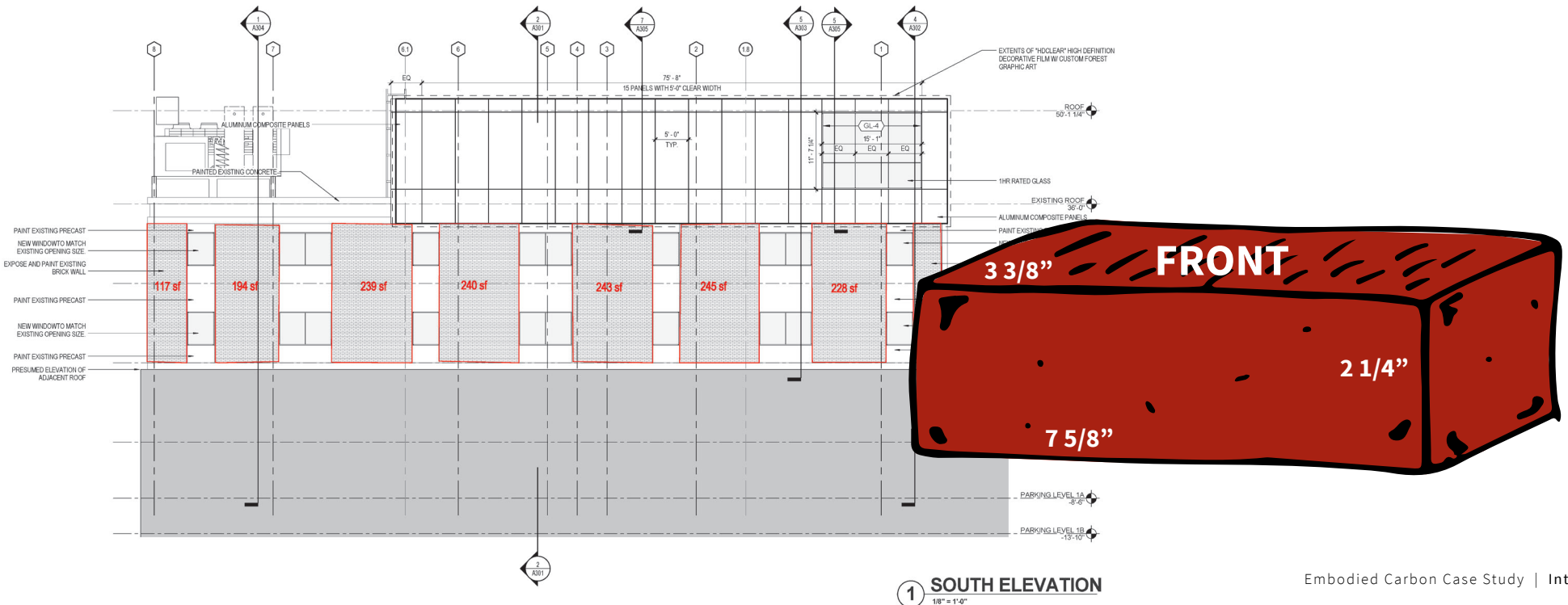
Embodied Carbon: 0.127 kgCO₂e/1 brick

$$.127 \text{ kgCO}_2\text{e/brick} \times 8262 \text{ bricks} = 1049.274 \text{ kgCO}_2\text{e}$$

Since the brick was not bought, it was reused:

“Base Camp” = 0 kgCO₂e

“Baseline Case” = 1049.274 kgCO₂e



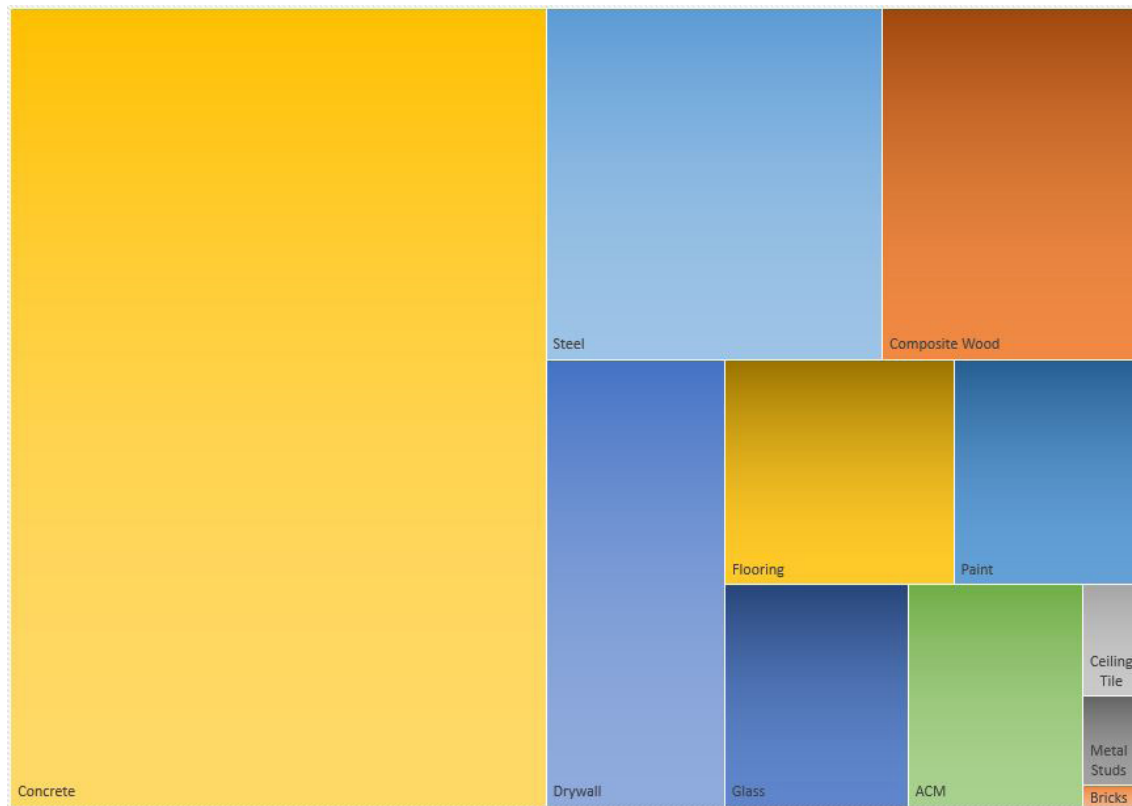
NEW CONSTRUCTION VS. EXISTING BUILDING

Interface originally anticipated building a 70,000 square foot headquarters. Instead, they found a 40,000 square foot existing building and fully renovated it. By utilizing this smaller footprint, the building impact was 42% less than if they had developed the larger size building. Through implementing work choice seating, Interfacers enjoy enhanced collaboration and improved space utilization, resulting in embodied carbon reduction. For the purposes of this analysis, the embodied carbon calculations compare two 40,000 square foot buildings: one with optimized materials and one with industry average materials.



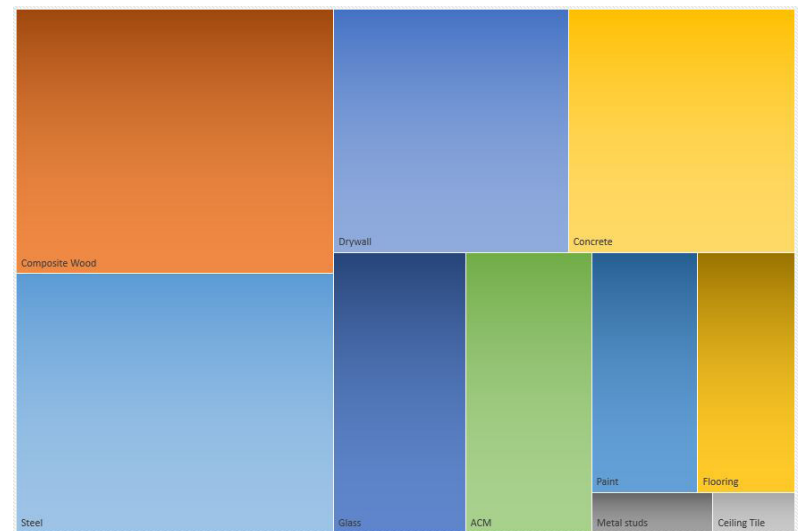
THE RESULTS

New Construction Baseline for
Comparison: 721,651 kg CO₂e



Actual Interface Base Camp:
357,358 kg CO₂e

**50.48% OVERALL
REDUCTION**



Scope: 40,000 square foot office building and 30,000 square foot parking deck
Note: This representation, called a tree diagram, was created with Microsoft Excel

TOTAL CO₂e REDUCTION: 364,293 kgCO₂e (50.48% REDUCTION!)

Resources:

spot.ul.com - This site was very helpful in finding Product-Specific EPDs and Industry-Wide EPDs



EC3 Tool - This tool helps construction professionals efficiently quantify, report, and reduce embodied carbon in the materials they select.

For us, this tool was helpful in finding CO₂e industry averages to create the baseline case.

For materials that were not in EC3 at the time of our analysis, we got EPDs directly from manufacturers.



THE TEAM



Rex Hamre
Vice President

Rex Hamre is JLL's Sustainability Director for the Southeast Central Region and is a LEED Accredited Professional. Rex leads a team of sustainability professionals managing local and national sustainability projects, including sustainability master planning, efficiency programs, the WELL Building Standard and all LEED Rating Systems.

Rex has served as sustainability director in nearly all major asset classes, leading the development of operational sustainability and efficiency projects in commercial office, K-12, higher education, multifamily residential, and professional sports. His work focuses on leveraging the bottom-line benefits of sustainability initiatives to achieve positive environmental impact.



Kat West
Senior Project Manager

Kat West is a Senior Sustainability Manager with JLL's Project and Development Services group based in Atlanta, Georgia. She has twelve years of sustainability consulting and project management experience, focused on leveraging the bottom-line benefits of sustainability initiatives to achieve positive environmental impact. As Sustainability Manager, Kat provides project support on a number of LEED New Construction (NC) and Commercial Interiors (CI) certification projects.

She works with various design teams to deliver cost effective, high performance buildings. She specializes in the development of sustainable strategies for corporate headquarters ranging from 10,000 s.f. - 500,000 s.f. Her responsibilities include space planning, water efficiency recommendations, and overall sustainability management.



Alexandra Bull
Project Coordinator

Alexandra Bull is a Sustainability Coordinator with JLL's Project and Development Services group based in Atlanta, Georgia. She assists with local and national sustainability projects including LEED and WELL documentation and execution.

Her work focuses on connecting people to the environment. She focuses on converting technical economic and scientific data to everyday terms to expand the green building industry.