



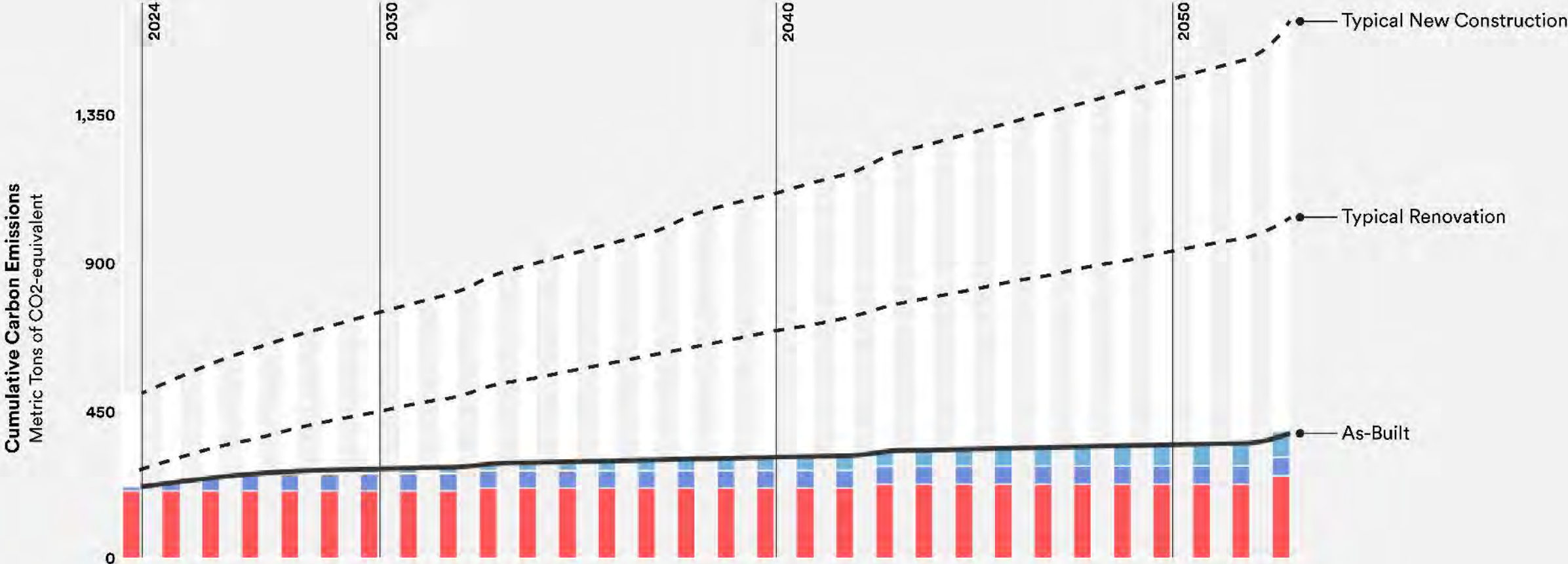
## Case Study #3

### Hubbard's Corner

Is Absolute Zero  
Possible Today?

# 30-year Whole Life Carbon Analysis

Hubbard's Corner



- Reduction from base case
- Operational carbon emissions
- Embodied carbon emissions
- Stored and avoided emissions
- Net emissions after reductions
- Climate Positive threshold









# **Lower Carbon Concrete - walk before you run**

**Transitioning from:**

**- Novel materials**



**- Pilot Ready**



**- Market Ready**



**- Project Ready**













**Hubbard's Corner Project Quantities Summary: As-Built from BrightStreet Construction Receipts**

3/20/2024

DWD

Note: \* This worksheet will not sum up to the total project \$'s spent...this list is focused on materials and does not include labor.

\*\* "Spend based" cost data is used to approximate quantities, only when measured quantities are not available.

\*\*\* Use the quantity numbers in bold for each material category, to advance from quantities to embodied carbon.

**ENVIRONMENTAL PRODUCT DECLARATION**

In accordance with ISO 14025 and EN 15804

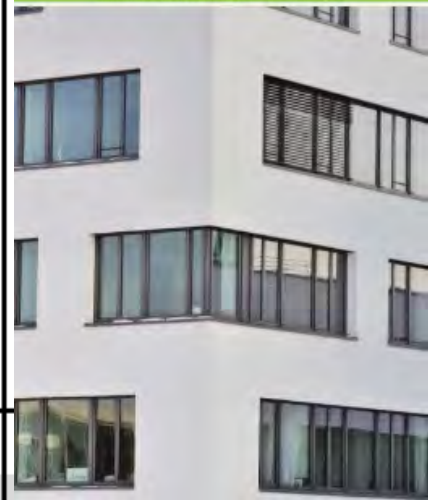
Owner of the Declaration:	Schüco International KG
Programme holder:	Institut Bauen und Umwelt e.V. (IBU)
Publisher:	Institut Bauen und Umwelt e.V. (IBU)
Declaration number:	EPD 20231-202303-20230503100213-EN-System
Issue date:	03.05.2023
Valid to:	02.05.2028

Schüco AWS 75.SI+AD UP 75 W x H: 5472 mm x 1016 mm

for project: AWS 75.SI+ - Item: C2

Schüco International KG

[www.ibu-epd.com](http://www.ibu-epd.com) / <https://epd-online.de>



**Concrete Anchors CSI Masterspec Section: 03 16 06**

(Spend based method used for quantity reporting in this section) - for carbon reporting, assume Hilti HIT-HY-

Date	Supplier	Spent	Description	Quantity	Units
1/10/2023	Hilti	\$ 2,000.83	epoxy HIT-HY 270	9.69	kg
1/12/2023	Hilti	\$ 168.72	materials	0.82	kg
1/13/2023	Hilti	\$ 61.40	tools	0.30	kg
1/13/2023	Hilti	\$ 138.25	tools	0.67	kg
5/26/2023	Hilti	\$ 207.38	tools	1.00	kg
7/28/2023	Hilti	\$ 1,203.71	materials / tools	5.83	kg
8/21/2023	Hilti	\$ 892.59	materials	4.32	kg
8/28/2023	Hilti	\$ 340.24	materials	1.65	kg
8/30/2023	Hilti	\$ 19.60	supplies	0.09	kg
8/30/2023	Hilti	\$ 3,022.32	materials	14.63	kg
9/15/2023	Hilti	\$ 3,562.11	materials + tools	17.24	kg
9/27/2023	Hilti	\$ 311.84	epoxy sleeves	1.51	kg
6/29/2023	Home Depot	\$ 79.36	insulation glue	0.38	kg
7/10/2023	Home Depot	\$ 267.84	insulation glue	1.30	kg
8/24/2023	Lowe's	\$ 105.36	adhesive	0.51	kg
9/18/2023	Amazon	\$ 521.36	materials: EPS glue	2.52	kg

**Exopy & Adhesives**

**71.16 kg**

**REBAR CSI Masterspec Section: 03 20 06**

(Spend based method used for quantity reporting in this section) - for carbon calculations, assume ASTM A615, 60ksi rebar, using mill specific EPD

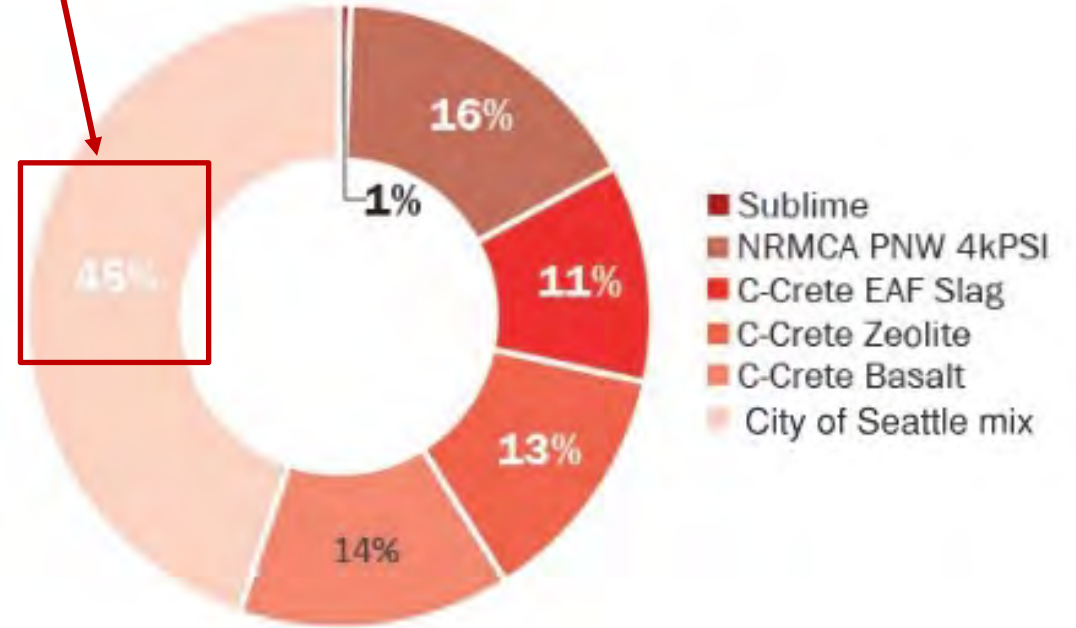
Date	Supplier	Spent	Description	Quantity	Units	\$	Est. Cost/Unit	Carbon E
2/27/2023	Astrof Concrete	\$ 3,532.83	rebar	707	lbs			
3/8/2023	Astrof Concrete	\$ 676.34	rebar	135	lbs			
5/8/2023	Astrof Concrete	\$ 76.58	rebar	15	lbs			
5/8/2023	Astrof Concrete	\$ 21.88	rebar	4	lbs			
5/22/2023	Astrof Concrete	\$ 276.84	form panels	0	lbs			
5/24/2023	Astrof Concrete	\$ 381.25	rebar	76	lbs			
5/25/2023	Astrof Concrete	\$ 580.32	rebar	116	lbs			
5/25/2023	Astrof Concrete	\$ 151.66	form panels	0	lbs			

Product Stage		Assumptions
A1-A3 - Product	INCLUDED	Included in EPD values
A4 - Transport	INCLUDED	OneClick LCA assumptions for the transportation type and region for the baseline. Product-specific distances for the as-built.
A5 - Waste	INCLUDED	OneClick LCA waste rate assumptions for baseline. Project-specific waste values for as-built.
A5 - Construction	ESTIMATED	40kgCO2e/m <sup>2</sup> based on ASHRAE 240p guidance (to be updated based on project-specific data).
B1-B5 - Use	INCLUDED	Service life based on ASHRAE 240p guidance
B6-B7 - Operations	EXCLUDED	
C1-C4 - End of Life	INCLUDED	OneClick LCA assumptions by material type
D - Reuse	EXCLUDED	
Building Element		Service Life
Foundation	MEASURED	60 Years
Structure	MEASURED	60 Years
Enclosure	MEASURED	20 - 35 Years
Interiors	MEASURED	Material-specific 5-50 years
MEP	MEASURED	30 years
FF&E	EXCLUDED	
Landscape	EXCLUDED	

CONCRETE COMPARISON A1-A3  
HUBBARD'S CORNER



Site concrete not typically measured in building LCA



# Analysis and Results

GWP Comparison of Baselines and As-Built

**+/- 61% GWP reduction from new re-build**

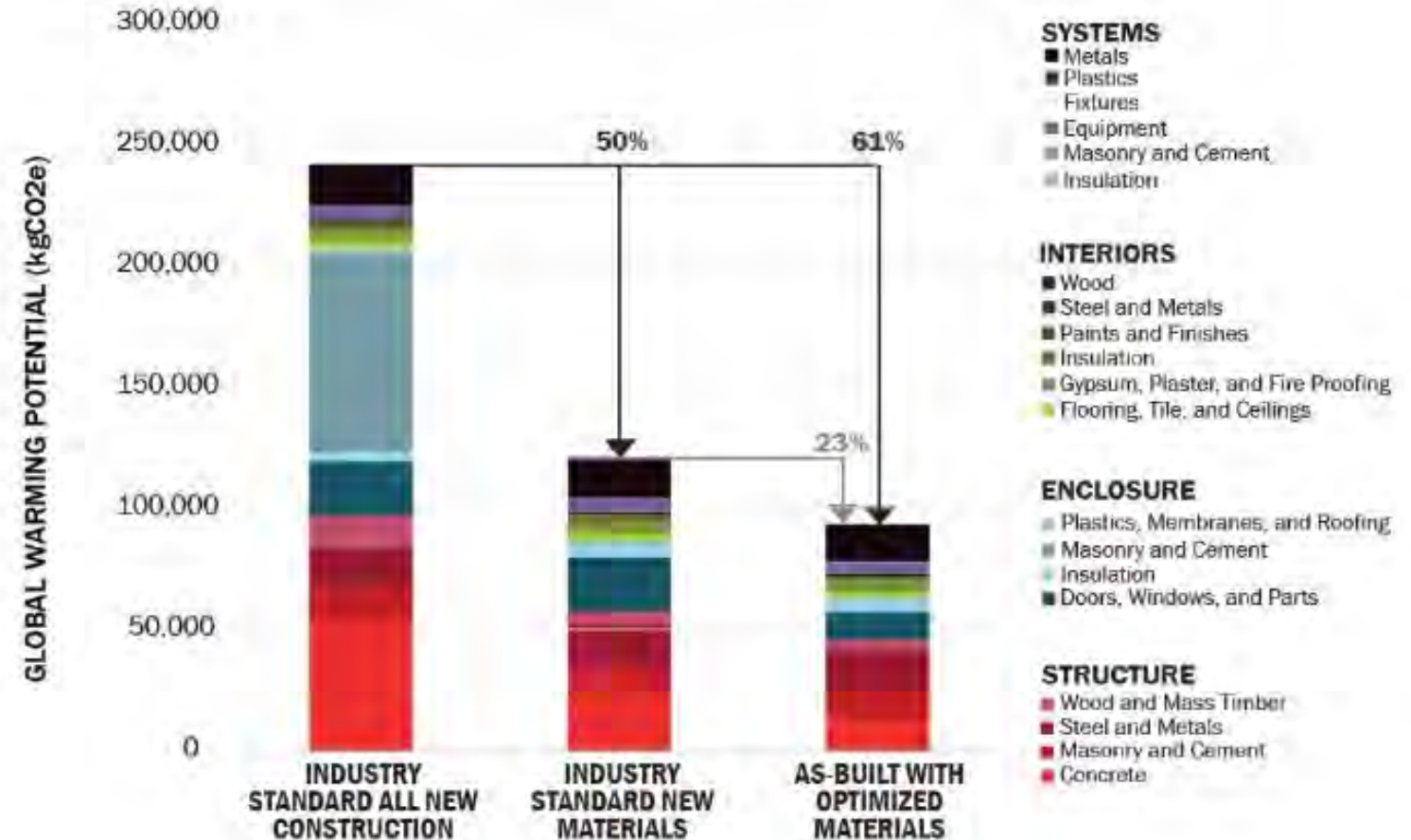
**....after measuring everything above \$50 receipts A1-A5**

- **Shell & Core**
- **Site Work**
- **MEP**
- **Office Interiors**

## UPFRONT GLOBAL WARMING POTENTIAL COMPARISON

A1-A5

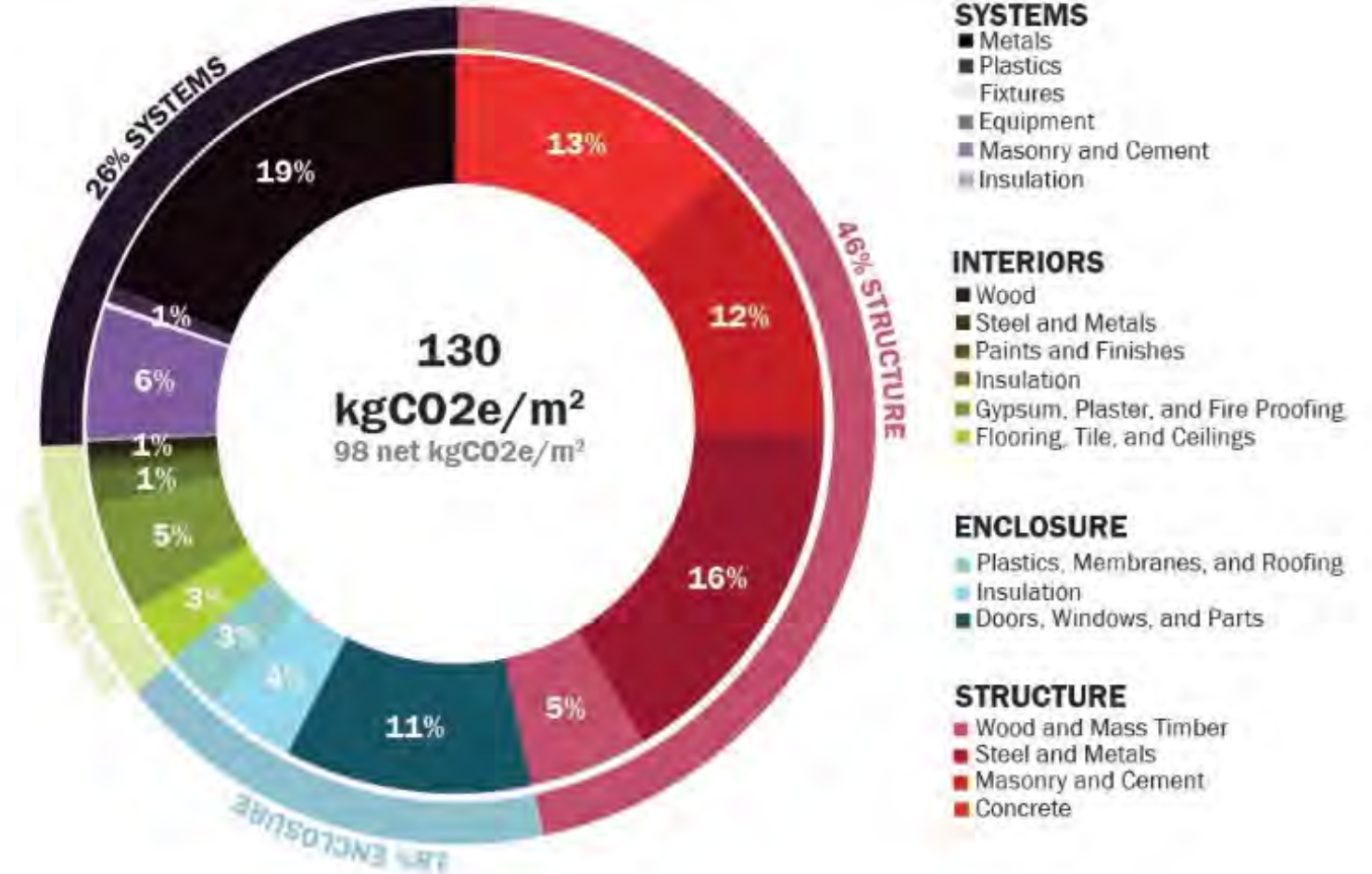
HUBBARD'S CORNER



# Analysis and Results

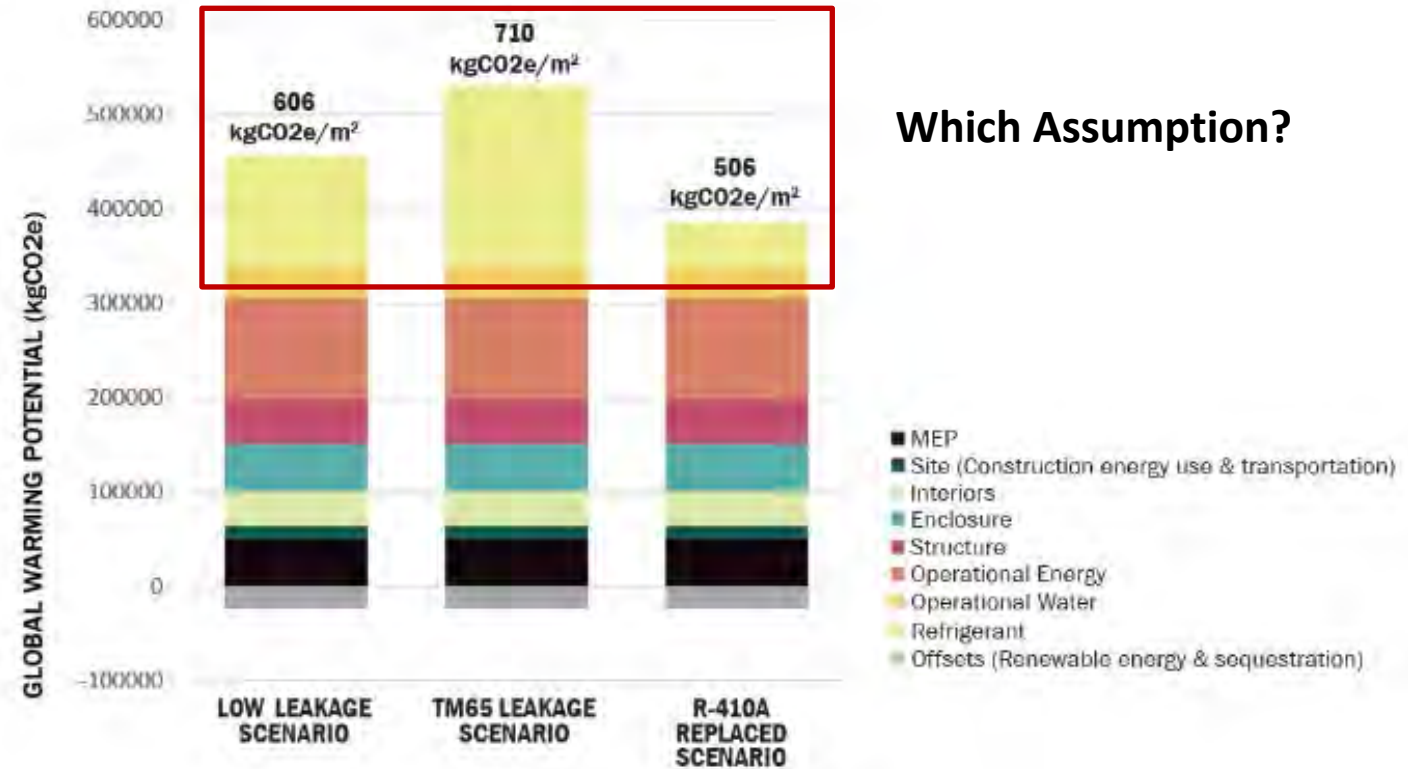
UPFRONT GLOBAL WARMING POTENTIAL CHARACTERIZATION  
AS-BUILT A1-A5  
HUBBARD'S CORNER

**+/- 100,000 kgCO<sub>2</sub>e  
from "True Zero"**



Product Stage		Assumptions
A1-A3 - Product	INCLUDED	Included in EPD values
A4 - Transport	INCLUDED	OneClick LCA assumptions for the transportation type and region for the baseline. Product-specific distances for the as-built.
A5 - Waste	INCLUDED	OneClick LCA waste rate assumptions for baseline. Project-specific waste values for as-built.
A5 - Construction	ESTIMATED	40kgCO <sub>2</sub> e/m <sup>2</sup> based on ASHRAE 240p guidance (to be updated based on project-specific data).
B1-B5 - Use	INCLUDED	Service life based on ASHRAE 240p guidance
B6-B7 - Operations	INCLUDED	Measured energy and water data, Seattle City Light carbon intensity, and average water carbon intensity.
C1-C4 - End of Life	INCLUDED	OneClick LCA assumptions by material type
D - Reuse	EXCLUDED	
Building Element		Service Life
Foundation	MEASURED	60 Years
Structure	MEASURED	60 Years
Enclosure	MEASURED	20 - 35 Years
Interiors	MEASURED	Material-specific 5-50 years
MEP	MEASURED	30 years
FF&E	EXCLUDED	
Landscape	EXCLUDED	

REFRIGERANT IMPACT ON HOLISTIC GWP  
AS-BUILT A1-C4  
HUBBARD'S CORNER

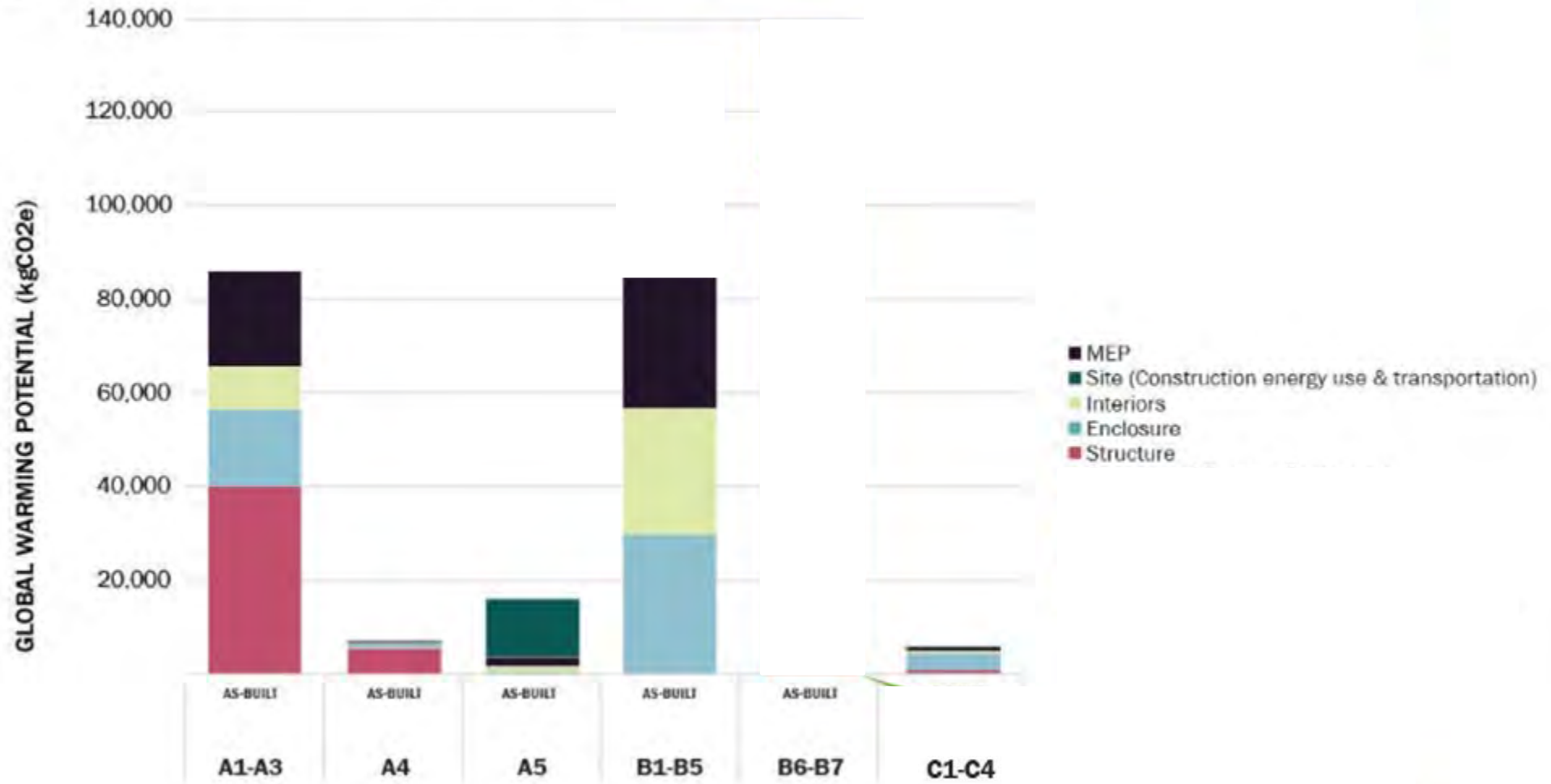


Which Assumption?



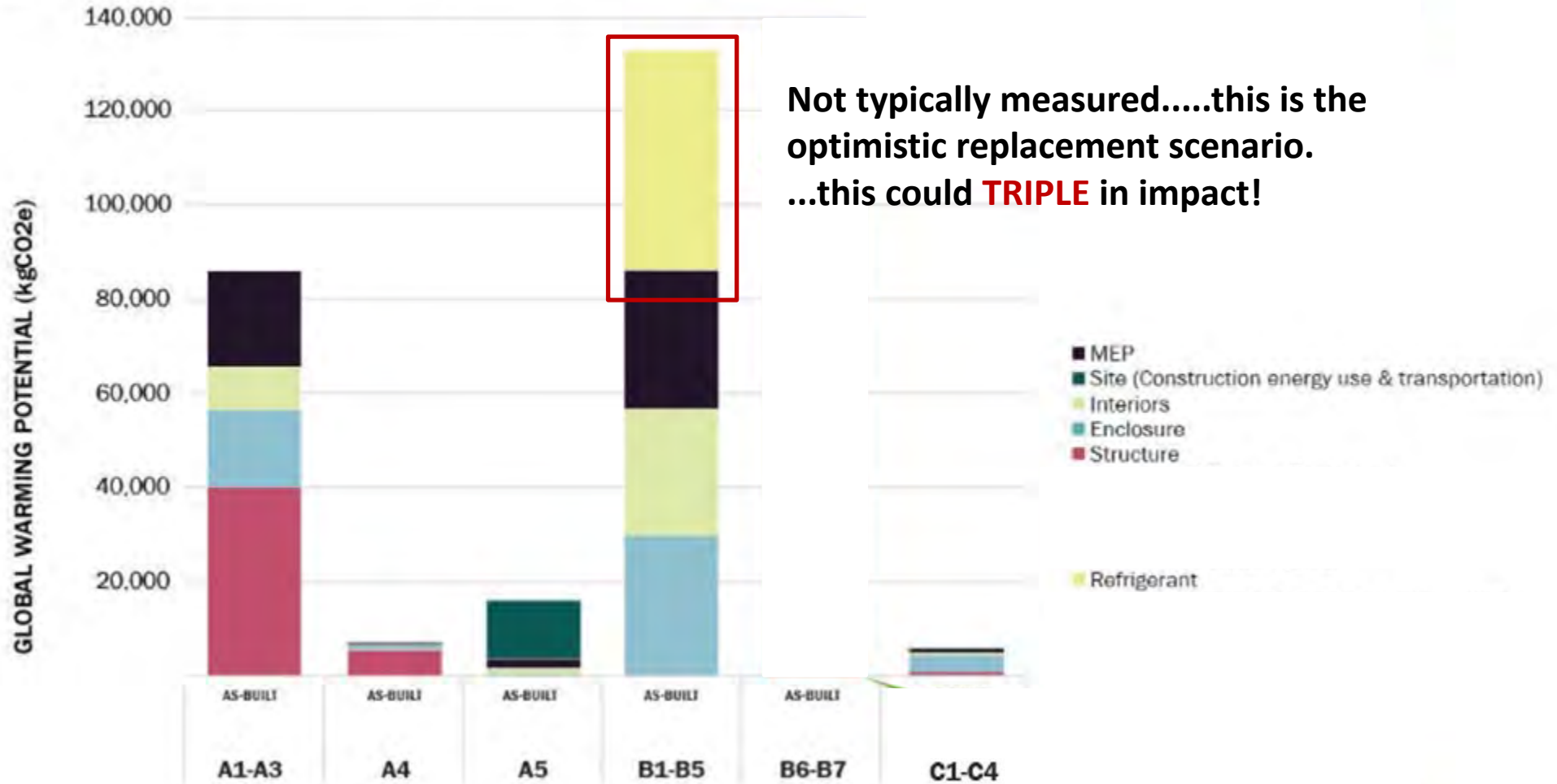
# HOLISTIC GLOBAL WARMING POTENTIAL BY LIFECYCLE STAGE

HUBBARD'S CORNER



# HOLISTIC GLOBAL WARMING POTENTIAL BY LIFECYCLE STAGE

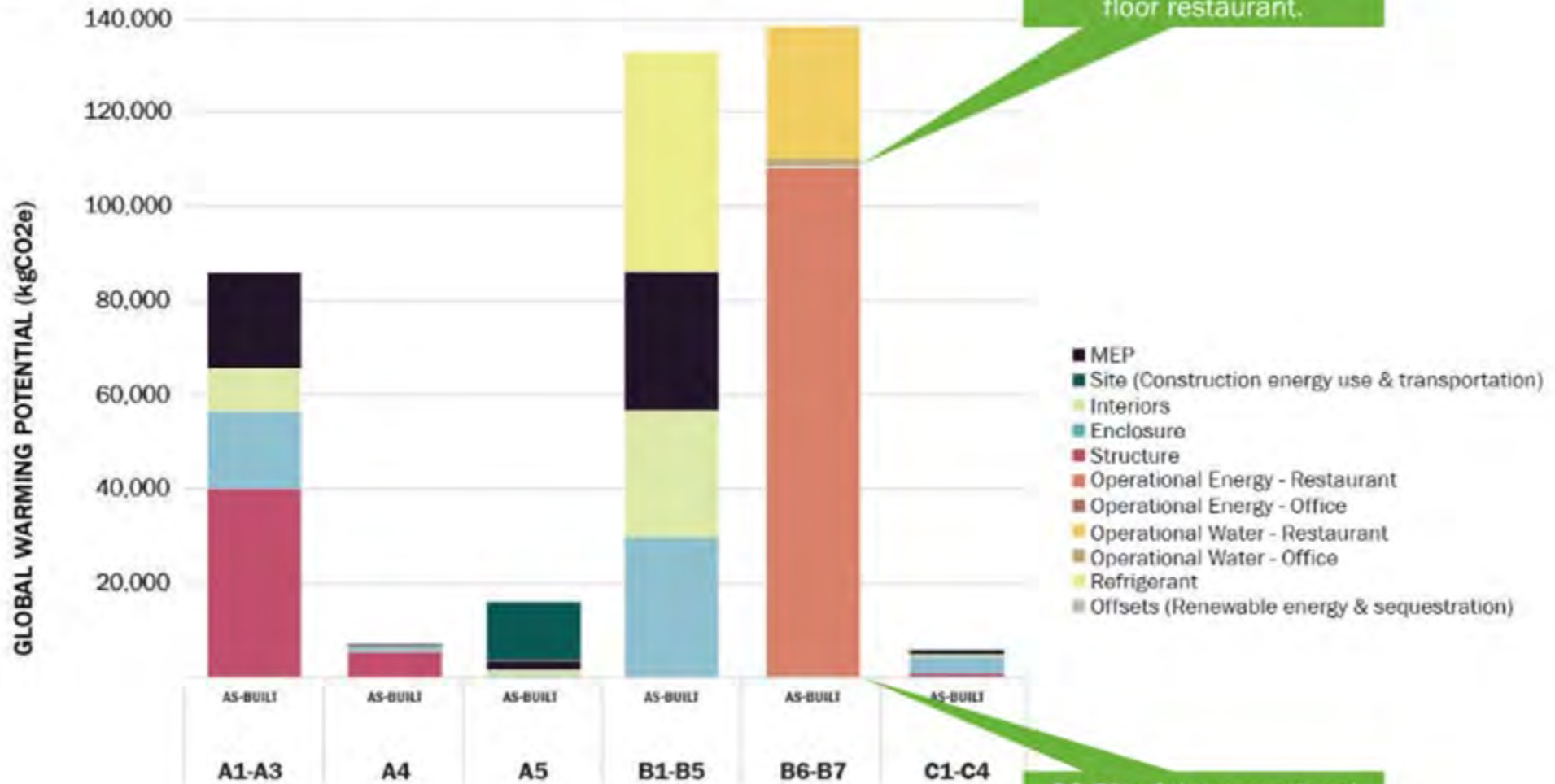
HUBBARD'S CORNER



Not typically measured....this is the optimistic replacement scenario. ...this could **TRIPLE** in impact!

# HOLISTIC GLOBAL WARMING POTENTIAL BY LIFECYCLE STAGE

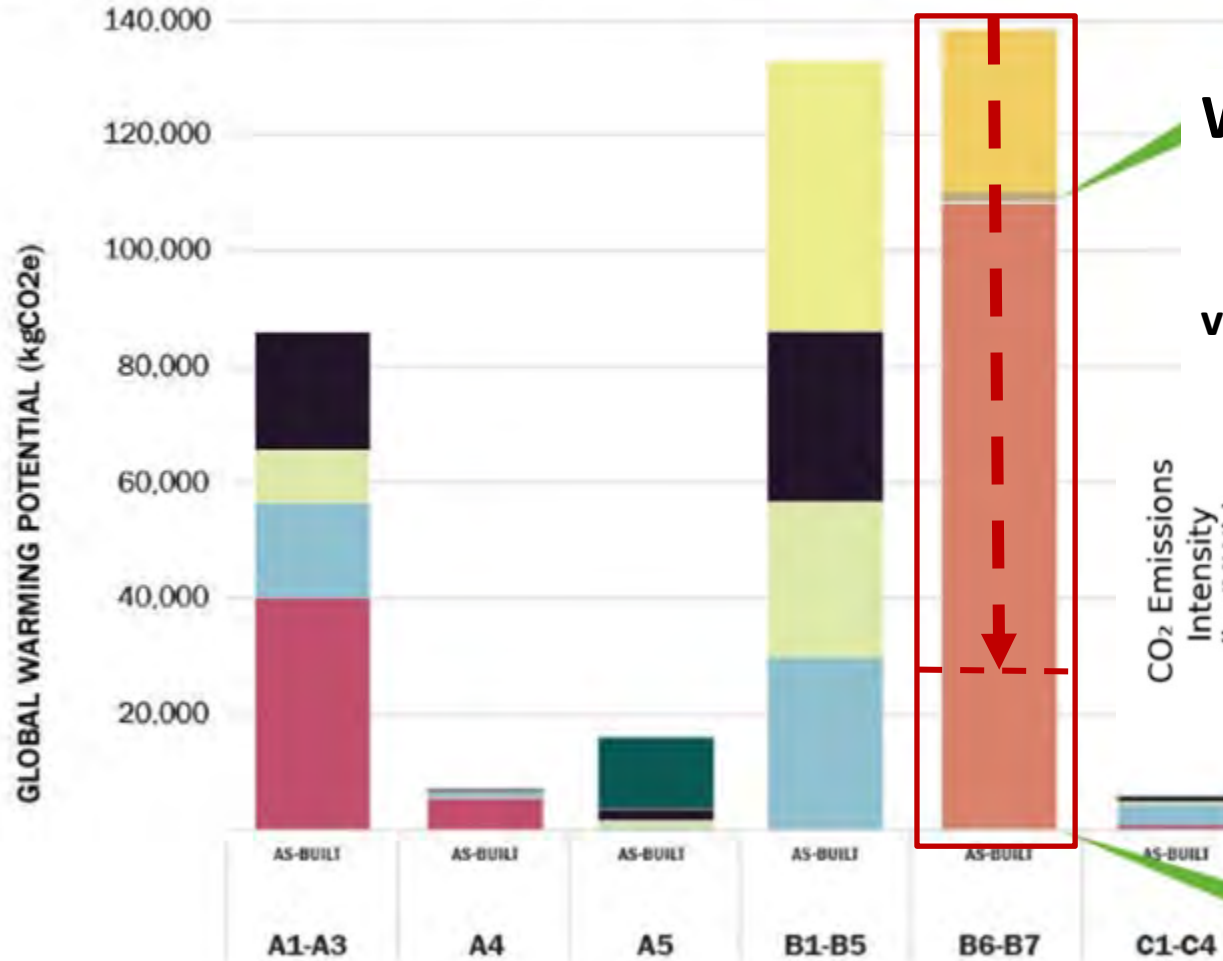
HUBBARD'S CORNER



95% of the operational water emissions are attributed to the ground floor restaurant.

99.5% of the operational energy emissions are attributed to the ground floor restaurant.

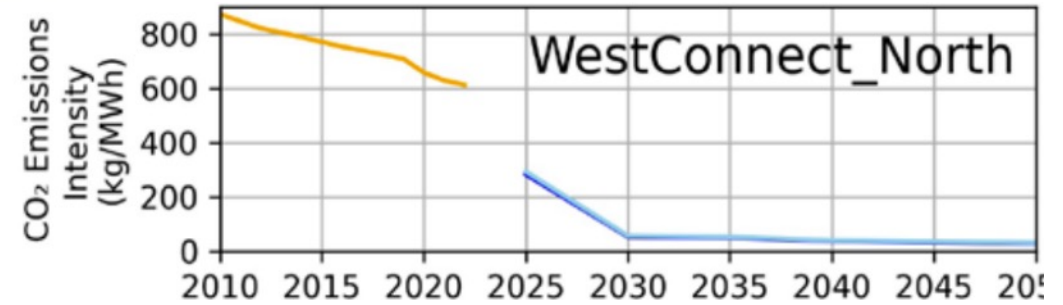
HOLISTIC GLOBAL WARMING POTENTIAL BY LIFECYCLE STAGE  
HUBBARD'S CORNER



95% of the operational water emissions are attributed to the ground floor restaurant.

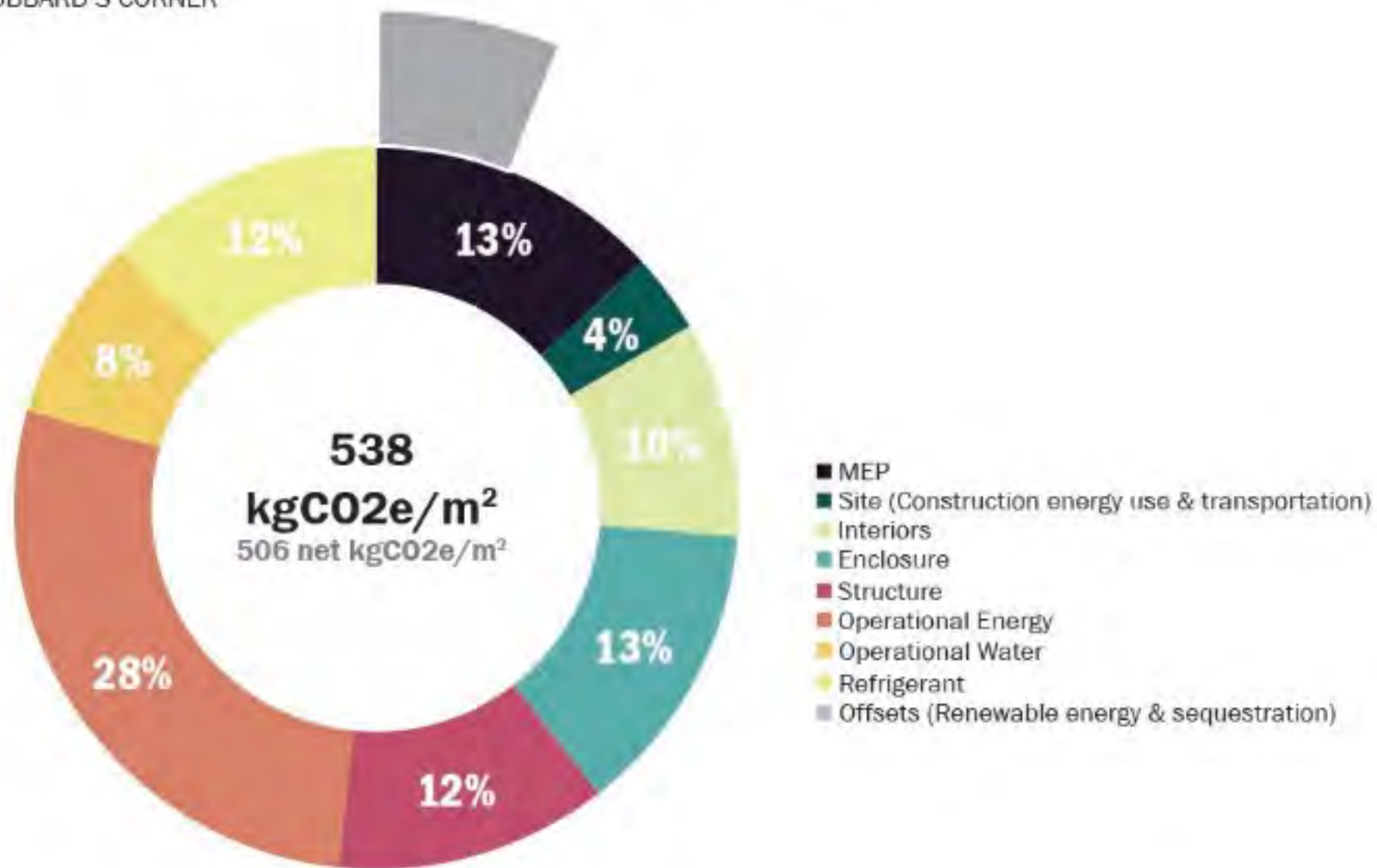
**Which Future Energy Assumptions?**

- Cambium kg/MWh reduction est. (Epic) vs no kg/MWh change w/ time (One Click)



99.5% of the operational energy emissions are attributed to the ground floor restaurant.

HOLISTIC GLOBAL WARMING POTENTIAL CHARACTERIZATION  
AS-BUILT A1-C4  
HUBBARD'S CORNER



# Every Project is a Climate Opportunity

