

De-Risking Lower-Carbon Concrete

The importance of innovation and the value proposition of leadership

Don Davies



James Murray-Coleman



Sara Neff



ACCELERATING THE ADOPTION AND USE OF LOWER CARBON CONCRETE IN COMMERCIAL DEVELOPMENT



Presented to the Climateworks Foundation

By Davies-Crooks Associates, in collaboration with the Climateworks Lower Carbon Concrete Task Force



Locations of Proposed Case Study Projects

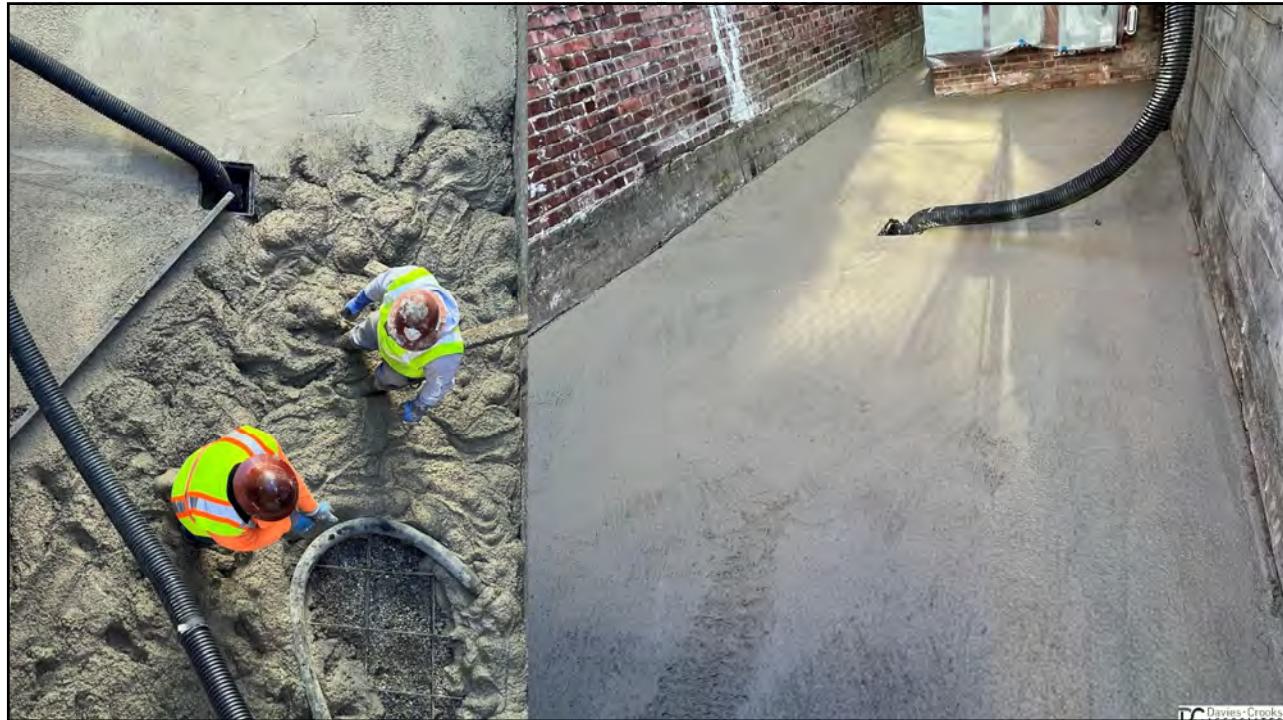


Walk before you run

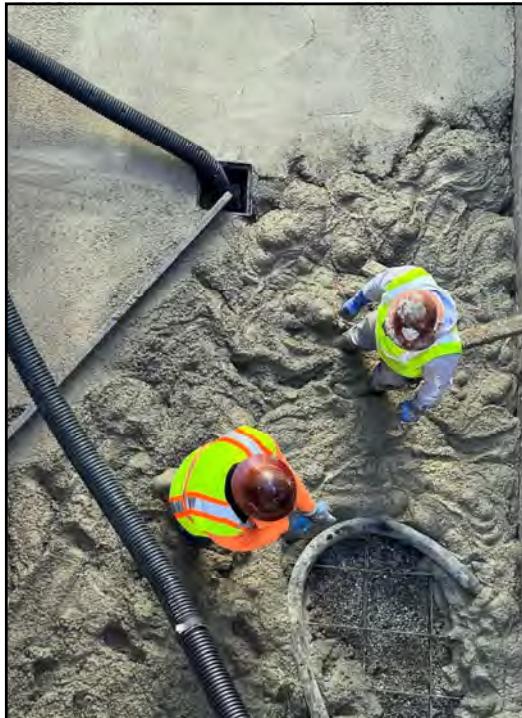
Transitioning from:

- Novel materials
- ↓
- Pilot Ready
- ↓
- Market Ready
- ↓
- Project Ready

DC Davies-Crooks
ASSOCIATES



DC Davies-Crooks



Every Project is an Opportunity!

- Risk managed pilot pours
- Prototype Options
- Evolution for the Next Project

DC Davies-Crowe ASSOCIATES

Trammell Crow Company

Decarbonizing Development

Concrete Innovations Panel
15 May 2024

TCC COMPANY OVERVIEW

Global Footprint

A map of the United States and Europe highlighting various cities where Trammell Crow Company has operations. Major US cities include Seattle, Portland, San Francisco, Los Angeles, Newport Beach, Phoenix, Denver, Austin, Houston, Dallas, Atlanta, Charlotte, Raleigh, and Orlando. In Europe, locations include London, Hamburg, Frankfurt, Paris, Madrid, and Barcelona. A small inset map shows additional European cities like Berlin, Vienna, and Prague.

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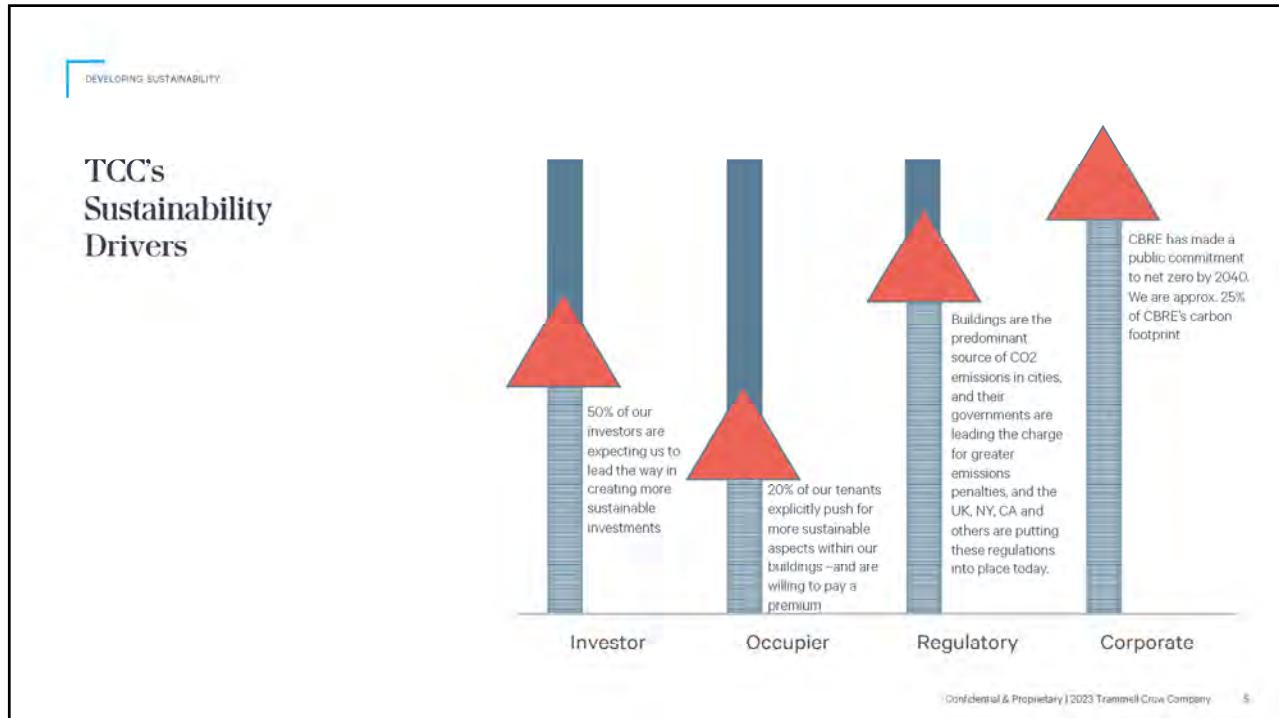
TCC COMPANY OVERVIEW

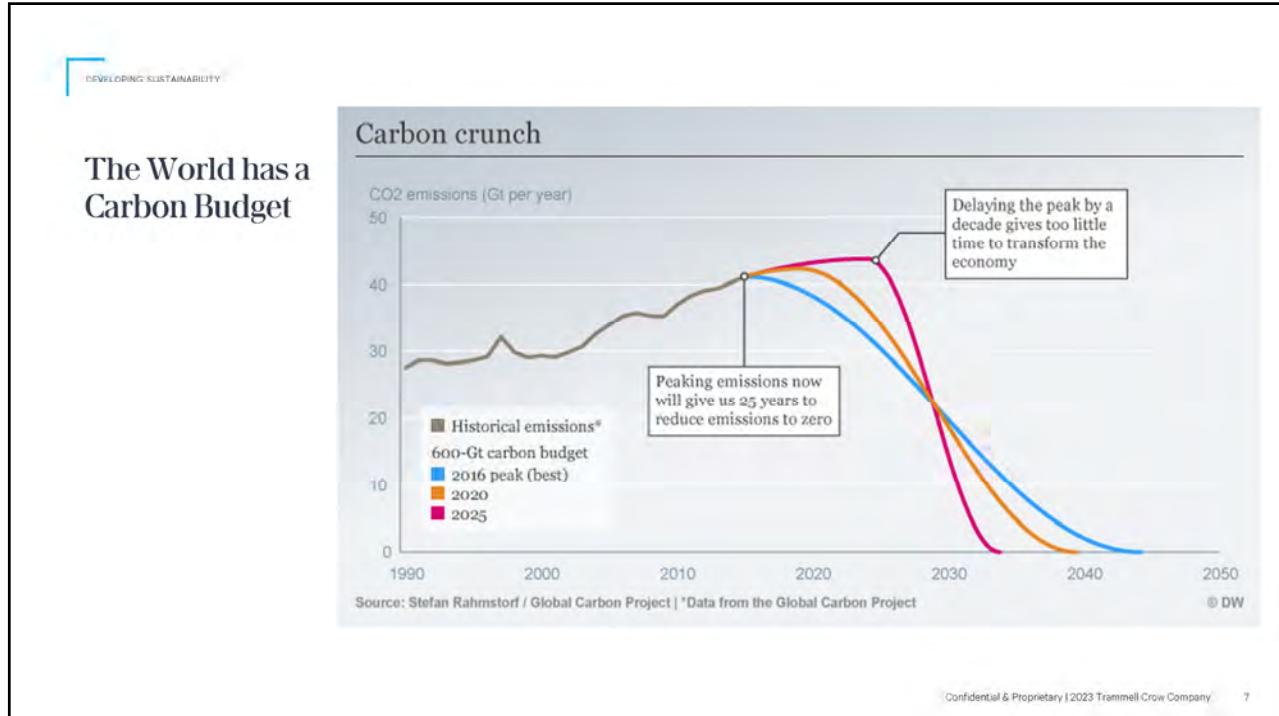
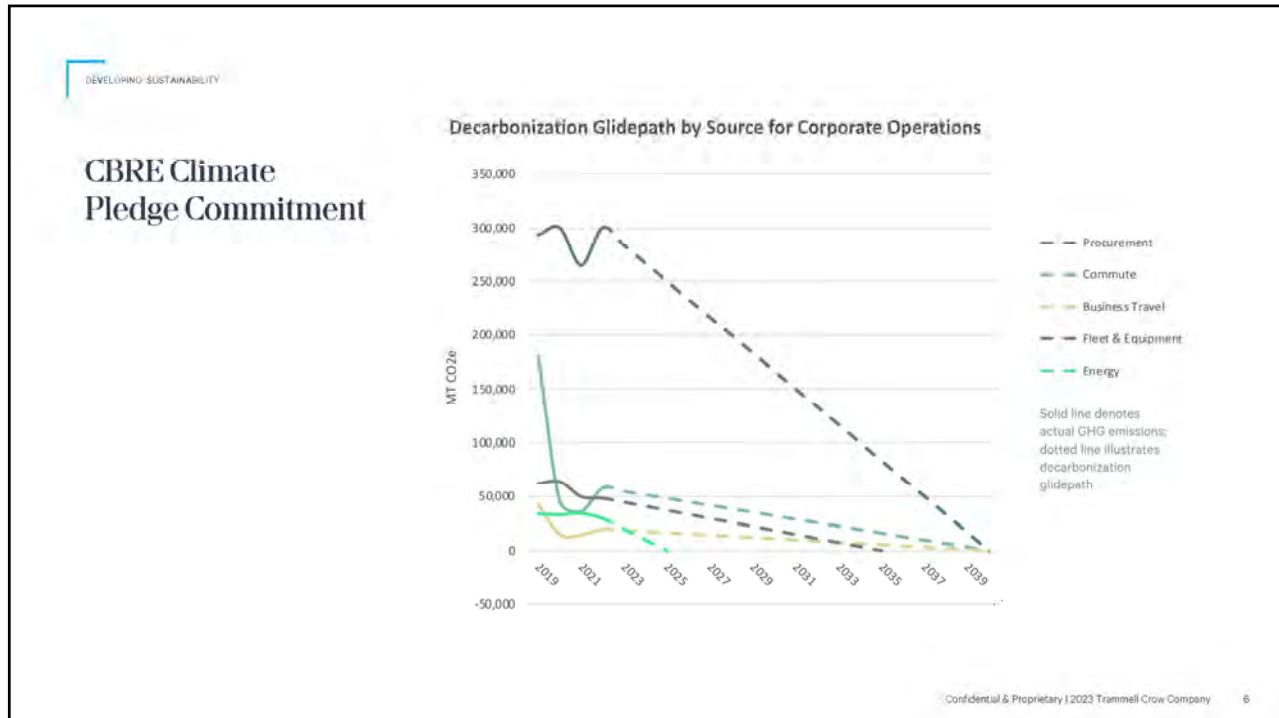
Core Product Types

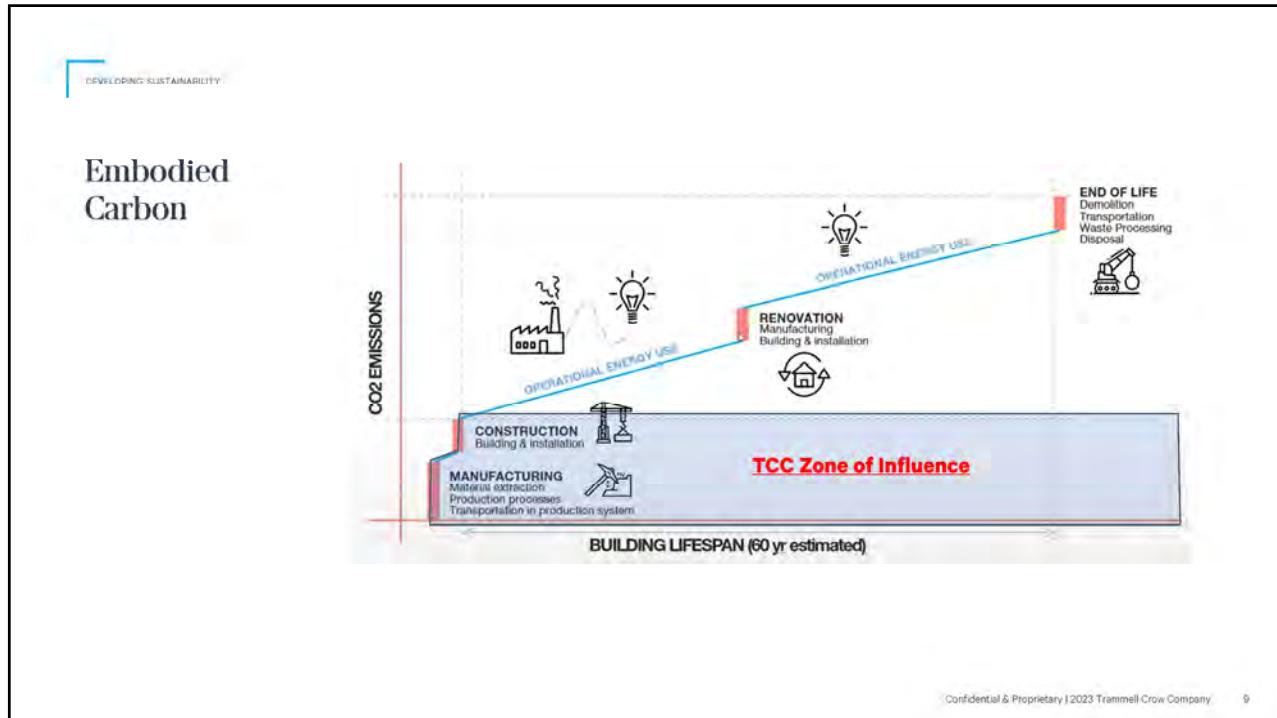
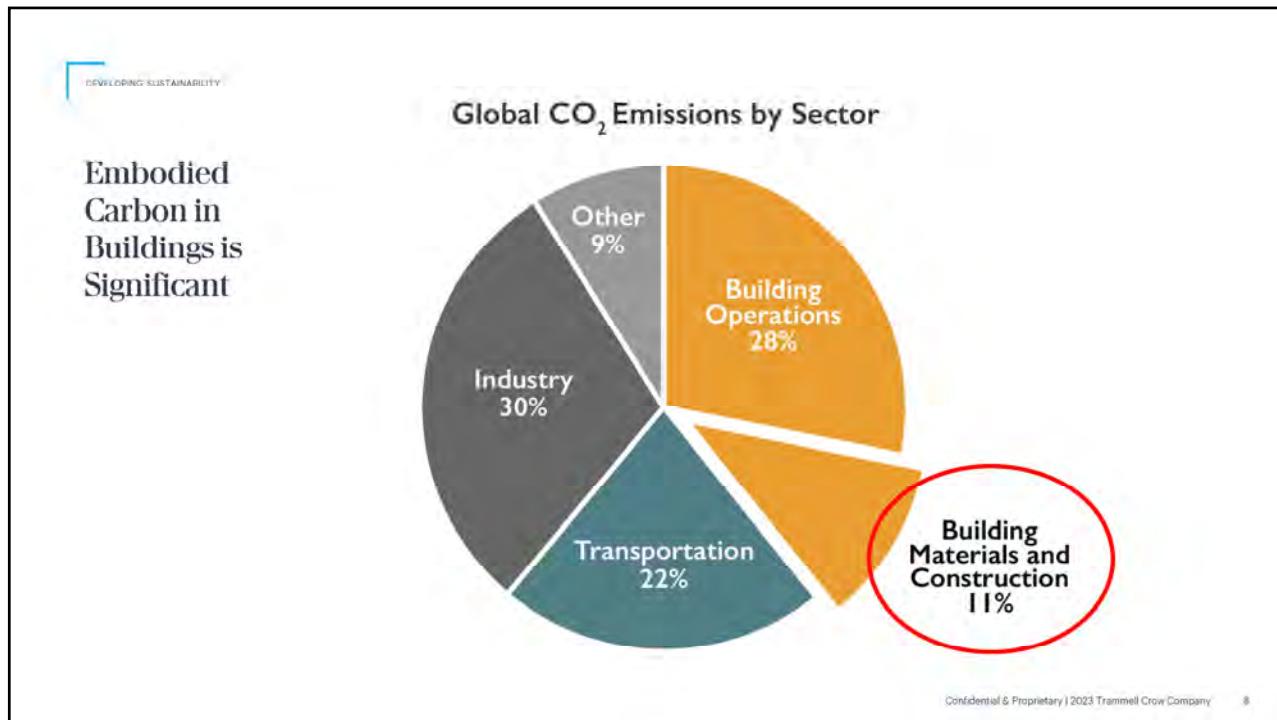
Four photographs illustrating Trammell Crow Company's core product types:

- Office:** A modern office building at night with illuminated windows and a glass facade.
- Industrial & Logistics:** An aerial view of a large industrial building complex with multiple units and parking lots.
- Life Science:** A modern life science facility with a distinctive red and blue angular design.
- Residential:** An interior view of a modern residential kitchen featuring a central island, pendant lights, and a sign that reads "HIGHSTREET RESIDENTIAL".

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Tactics

DEVELOPING SUSTAINABILITY

Tactics

- **Certify Everything**



DEVELOPING SUSTAINABILITY™

Tactics

- **Certify Everything**



Trammell Crow Company
Buttermilk
COMPLETE BUILDING MIX · JUST ADD MONEY

SUSTAINABILITY BUILT IN!
low embodied & operational carbon - certified green
NET WT 32 OZ (2 LB) (907 g)

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DEVELOPING SUSTAINABILITY™

Tactics

- Certify Everything
- **Be Resilient**



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Tactics

- Certify Everything
- Be Resilient
- **Demand Low Carbon Cement**

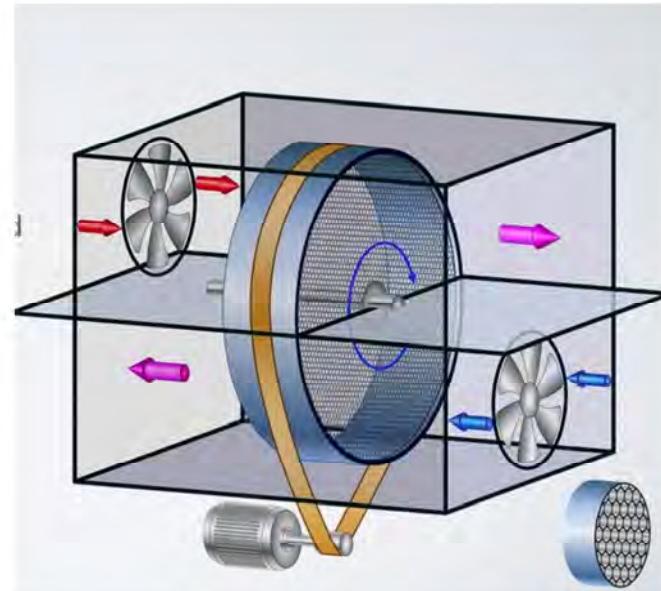
Economics of representative low-carbon cement blends

Material	Composition of cement blend (% of material) ¹	Embodyed carbon reduction vs. OPC cement (%)	Savings from SCM substitution, \$/t cement	Incremental value for 1.5 Mtpa cement plant, \$M/year ²
OPC	5 95	N/A	N/A	N/A
PLC (Portland Limestone Cement)	15.5 80	-10%	6	9
Blended cement with fly ash	30 5 65	-32%	7	11
Blended cement with steel slag	45 5 50	-42%	6	10
LC3 (Limestone calcined clay cement)	30 15 50	-40%	20	31
Blended cement with natural pozzolans	30 5 65	-32%	18	26

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Tactics

- Certify Everything
- Be Resilient
- Demand Low Carbon Cement
- **Invest in Efficiency**
 - **Energy Recovery Systems**
 - **Envelope Focus**
 - **Windows and Curtain Walls**



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DEVELOPING SUSTAINABILITY™

Tactics

- Certify Everything
- Be Resilient
- Demand Low Carbon Cement
- Invest in Efficiency
- **Make Energy on Site**

Solar installations
(new installations, worldwide)

GW

Region	2010	2015	2020	2023est
Sub-Saharan Africa	~5	~10	~25	~30
Middle East, N. Africa	~5	~10	~20	~25
Central, S. America	~5	~10	~20	~25
North America	~5	~10	~20	~25
Europe	~5	~10	~20	~25
Asia (other)	~5	~10	~20	~25
India	~5	~10	~20	~25
China	~5	~10	~20	~200

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DEVELOPING SUSTAINABILITY™

Tactics

- Certify Everything
- Be Resilient
- Demand Low Carbon Cement
- Invest in Efficiency
- Make Energy on Site
- **Futureproof for the Energy Transition**
 - EV's

EV's

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DEVELOPING SUSTAINABILITY

Tactics

- Certify Everything
- Be Resilient
- Demand Low Carbon Cement
- Invest in Efficiency
- Make Energy on Site
- Futureproof for the Energy Transition**

- Batteries

The U.S. grid battery boom isn't slowing down

Cumulative installed battery storage capacity, in gigawatts

Year	Cumulative Installed Capacity (GW)
2015	~1
2016	~2
2017	~3
2018	~4
2019	~5
2020	~7
2021	~12
2022	~20
2023	~30
2024	~50
2025	~150

Source: U.S. Energy Information Administration

Estimated

CANARY MEDIA

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DEVELOPING SUSTAINABILITY

Tactics

- Certify Everything
- Be Resilient
- Demand Low Carbon Cement
- Invest in Efficiency
- Make Energy on Site
- Futureproof for the Energy Transition**

- Roof Structure

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DEVELOPING SUSTAINABILITY

Tactics

- Certify Everything
- Be Resilient
- Demand Low Carbon Cement
- Invest in Efficiency
- Make Energy on Site
- Futureproof for the Energy Transition
- Measure our Carbon**

BranchPattern

GAIA

STOK

BRIGHTWORKS
SUSTAINABILITY

Turner & Townsend
with LMN

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DEVELOPING SUSTAINABILITY

Tactics

- Certify Everything
- Be Resilient
- Demand Low Carbon Cement
- Invest in Efficiency
- Make Energy on Site
- Futureproof for the Energy Transition
- Measure your Carbon
- Investigate alternate materials**
 - **Structure**
 - **Material Substitutions**



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DEVELOPING SUSTAINABILITY™

Tactics

- Certify Everything
- Be Resilient
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- Invest in Efficiency
- Make Energy on Site
- Futureproof for the Energy Transition
- Measure your Carbon
- Investigate alternate materials
 - Structure
 - Material Substitutions
- **Electrify Everything**



Heat pumps: 10 Breakthrough Technologies 2024
Heat pumps are a well-established technology. Now they're starting to make real progress on decarbonizing homes, buildings, and even manufacturing.

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Recap:

1. Carbon is the focus
2. We have all the tools we need to get started
3. We need our value/supply chain to accelerate their decarbonization efforts

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Trammell Crow Company

Thank You.

Decarbonizing Concrete

Sara Neff
Head of Sustainability,
Lendlease Americas

Lendlease

Our Mission Zero

WE ARE A 1.5°C ALIGNED COMPANY

2025

Net Zero carbon emissions by 2025 for Scope 1 and 2.

2040

Absolute Zero by 2040, a target that includes our Scope 1, 2 and 3 emissions, without the use of offsets.

Our **Absolute Zero target** is industry-leading and ambitious. We are focused on eliminating carbon, **not offsetting it.**

Our Absolute Zero target includes **scope 3 emissions**

We have a **2040 timeframe**

ABSOLUTE ZERO BY **2040**

Embodied Carbon is a huge problem

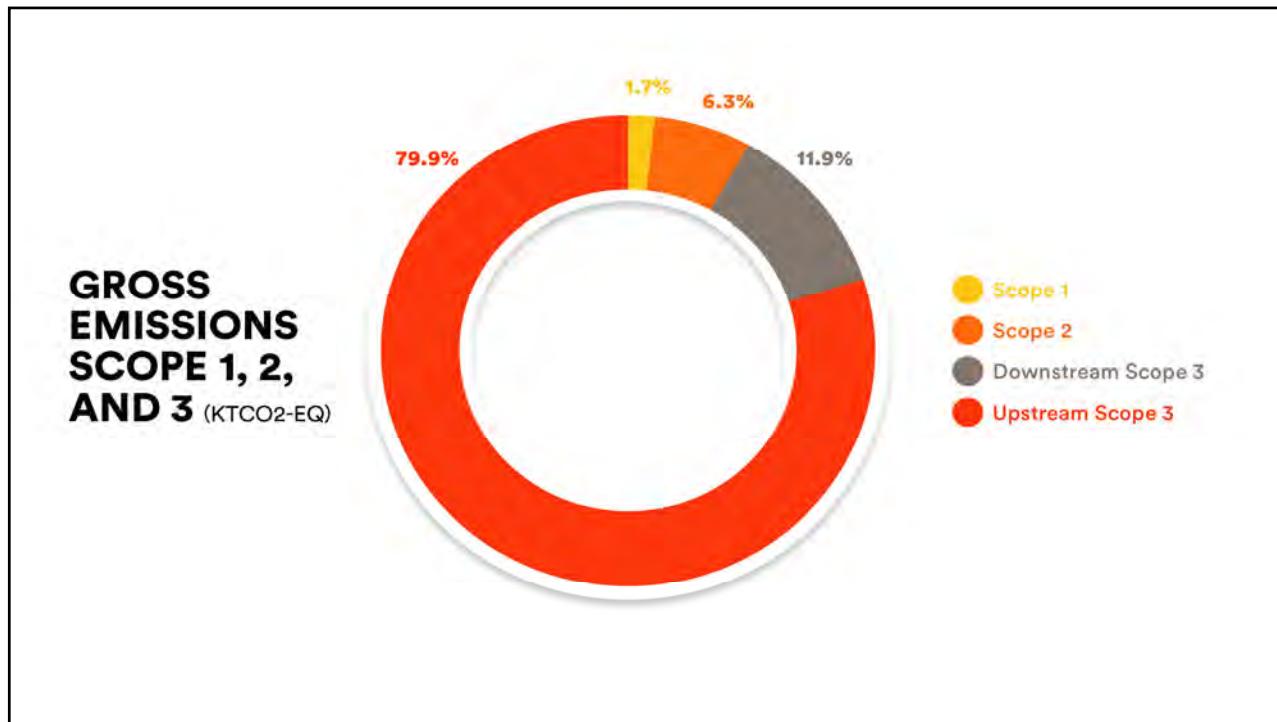
Annual Global CO₂ Emissions

Sector	Percentage
Building Materials & Construction	11%
Building Operations	28%
Industry	~30%
Transportation	~15%
Other	~7%

Source: Architecture 2030

If concrete was a country, it would be the **3rd largest emitter** behind only China and the US.

Construction's emissions are **3X** aviation's.



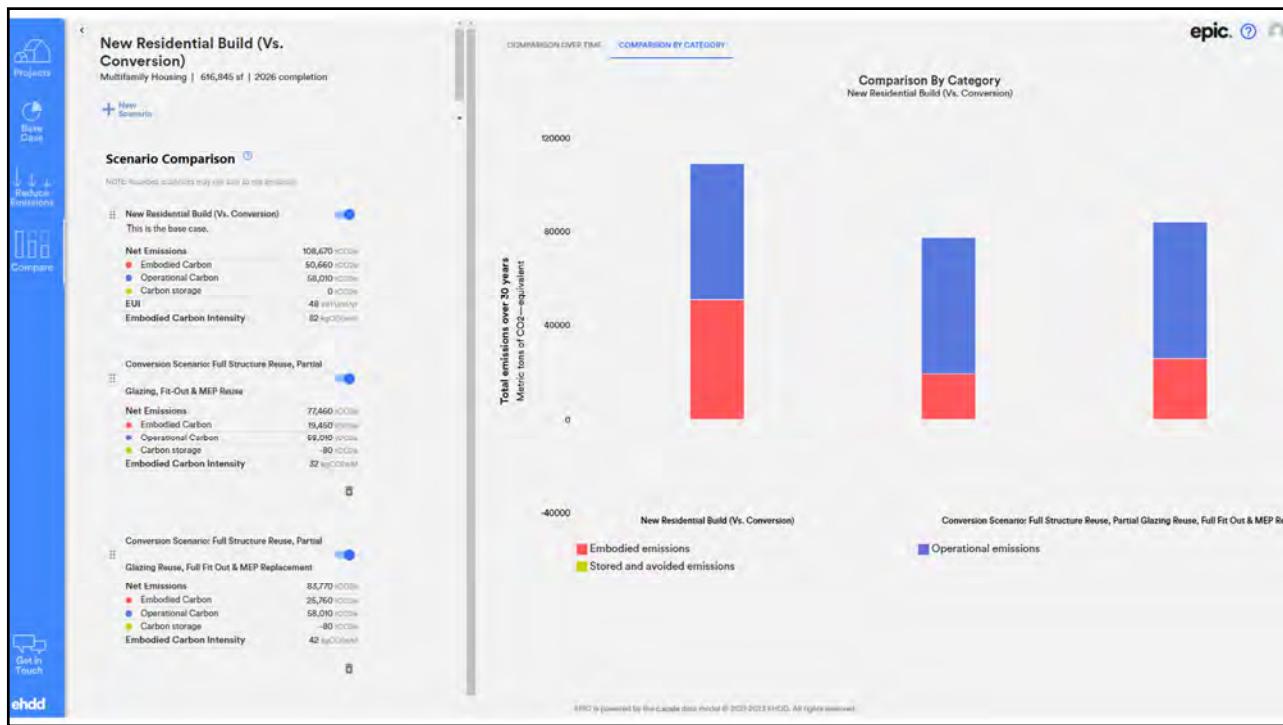
What will it take to reduce Scope 3 emissions across our value chain?

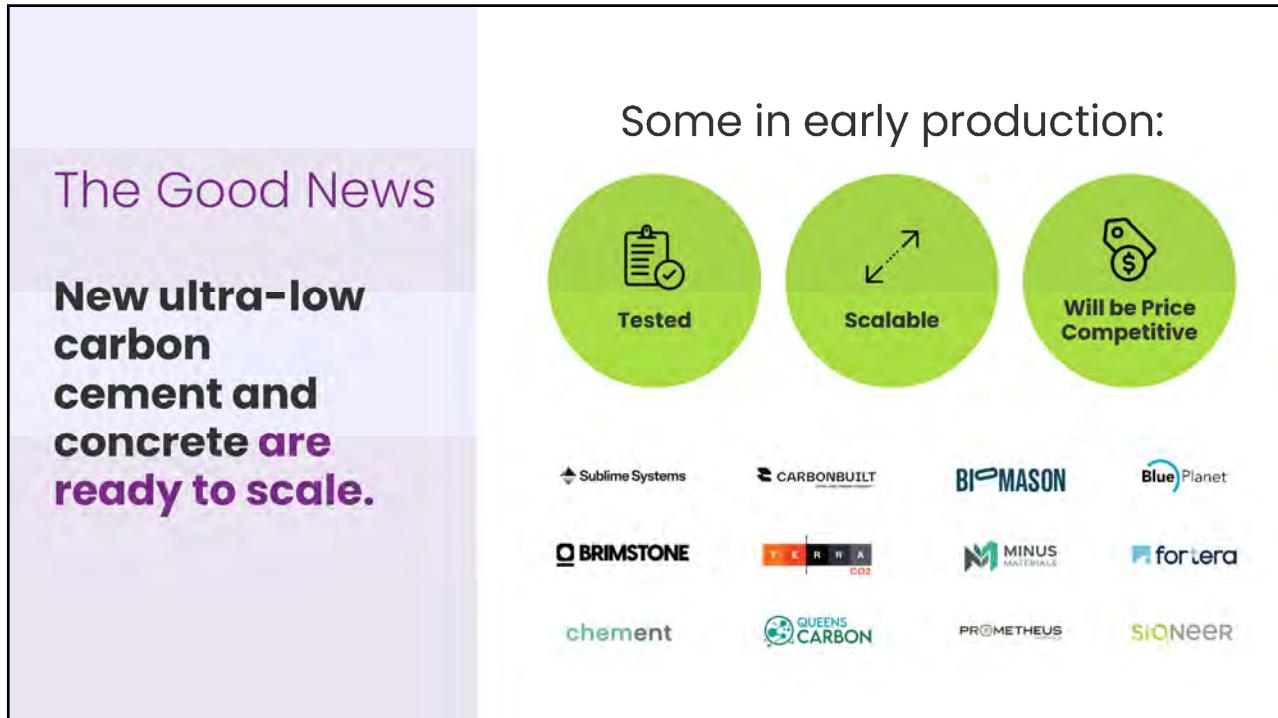
1 Decarbonise hard to abate sectors

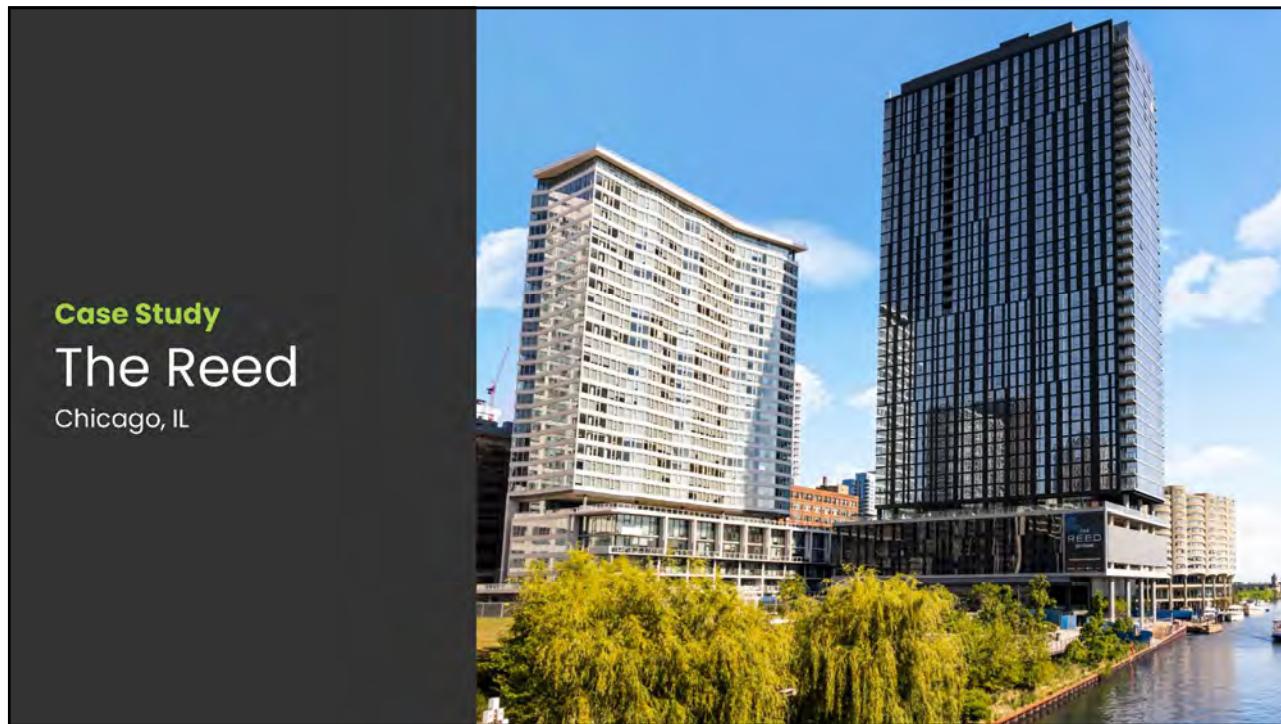
Focus on the 4
• Steel
• Cement
• Aluminium
• Glass

2 Align + Automate Scope 3 emissions data sharing

There are
2 key
problems
we need to
solve for:







Case Study
The Reed
Chicago, IL



Case Study
1 Java Street
Brooklyn, NY

Case Study
Habitat
Los Angeles, CA



Coalitions working on concrete

DOE Demand Signal Letter



AvalonBay
COMMUNITIES

CP
Group

MILL CREEK
COMMUNITIES

PROLOGIS®

AECOM

CRESCENT
COMMUNITIES

L LOGISTICS
PROPERTY CO.

nuveen

Transitioning to performance specs

nuveen

Alphabet

climate earth

Institute for
Sustainable
Infrastructure

HOLCIM

Hines

Brookfield
Properties

INTERNATIONAL
LIVING FUTURE
INSTITUTE™

AvalonBay
COMMUNITIES

UNIVERSITY OF
MICHIGAN

COLUMBIA

ESF

WHERE
THE FUTURE
IS BUILT



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