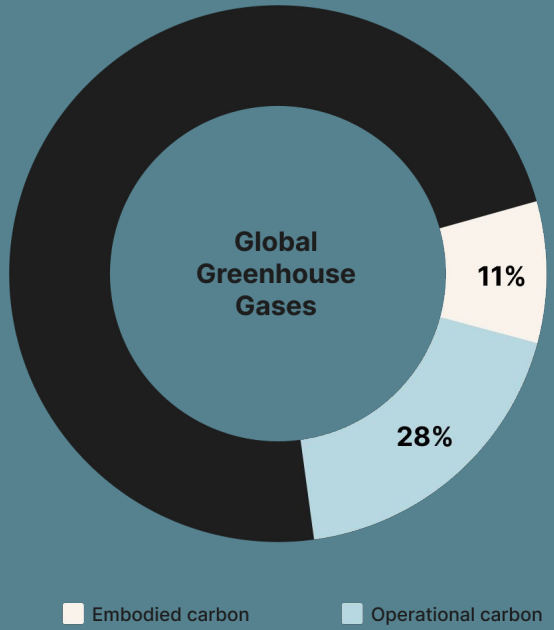
November 2023

TANGIBLE MATERIALS, INC.

Clean Air Partnership Webinar

OUR MISSION

Turn buildings into a climate solution.

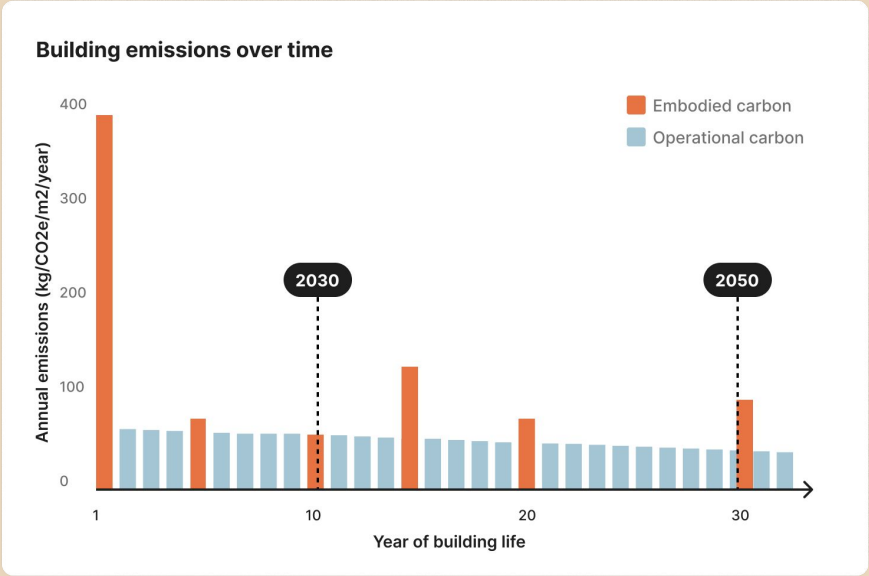


THE PROBLEM

Building materials are responsible for approximately 11% of all global greenhouse gas emissions.

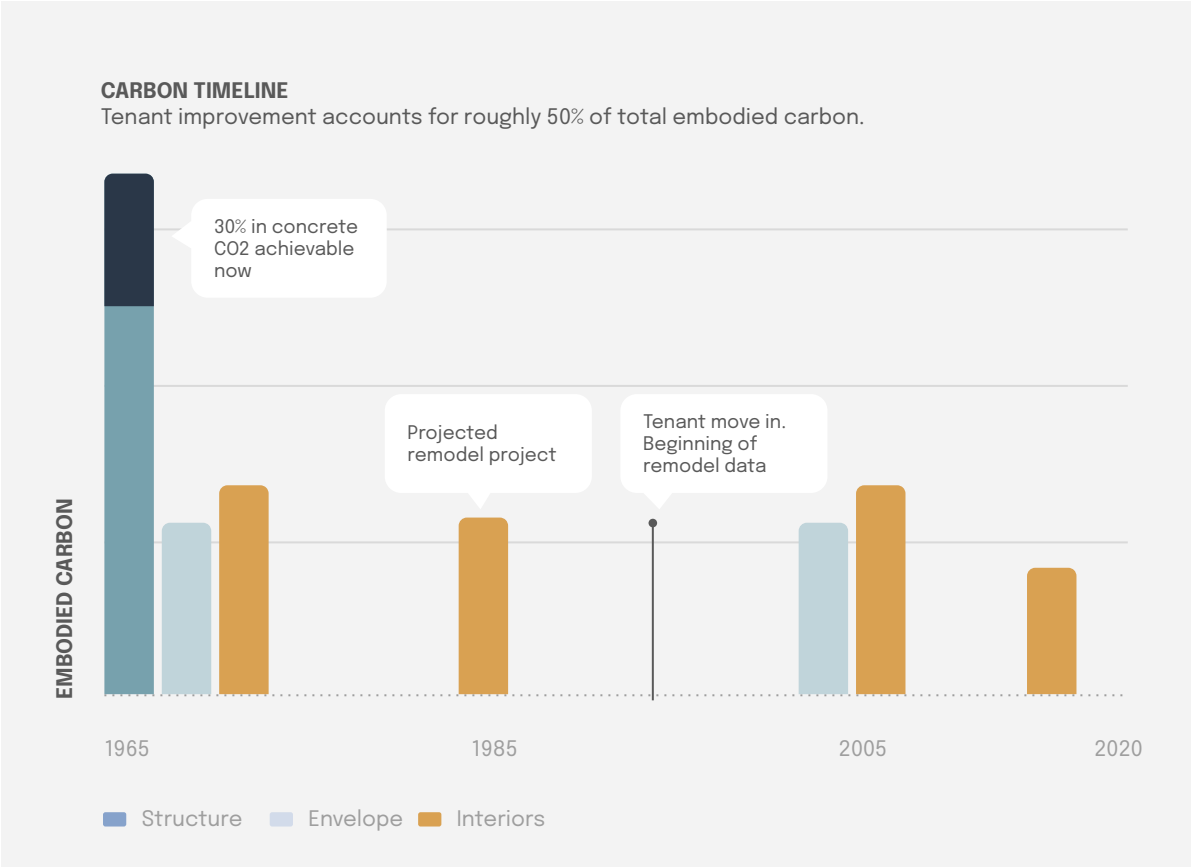
What is embodied carbon?

- **Emissions associated with the production of building materials** and the process of constructing or demolishing a building.
- The upfront embodied carbon of a building can be **equivalent to the carbon emissions of 10 years of operating the building**.

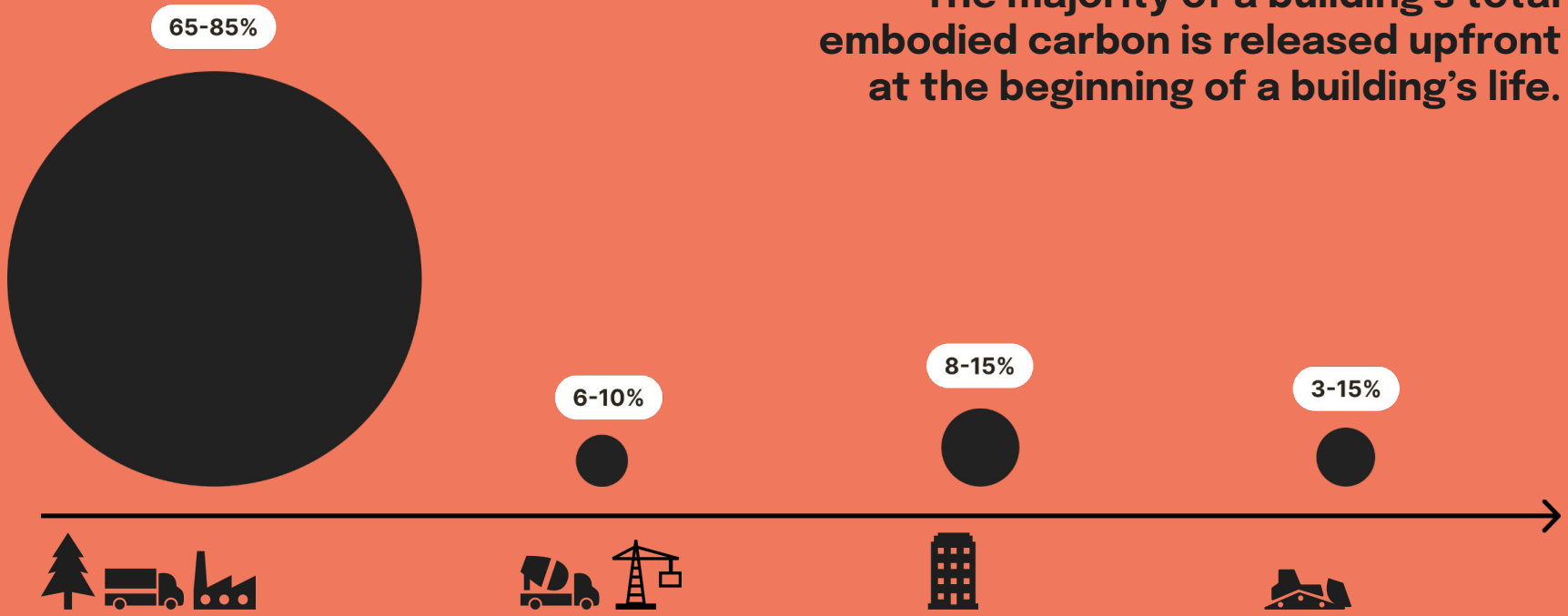


It’s not just structures

While the structural materials often get the most focus, interiors and renovations make up a sizable portion of a building’s carbon emissions over the life cycle of a building - **often** >50%.



The majority of a building's total embodied carbon is released upfront at the beginning of a building's life.



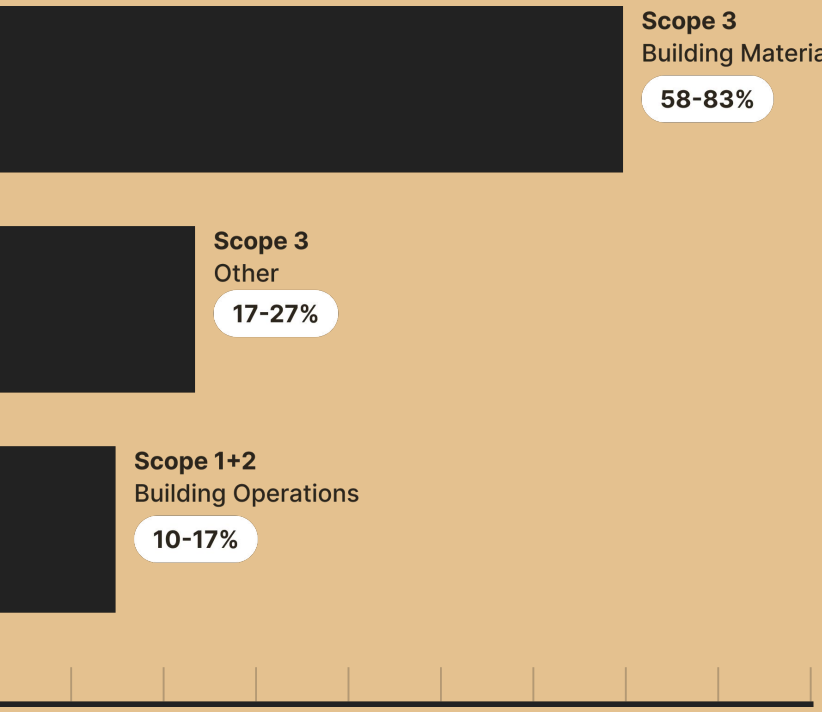
Material Manufacturing
Raw material supply, transport and manufacturing.

Construction
Transportation to the site and installation.

Use and maintenance
Use, maintenance and operational energy.

End-of-life
Deconstruction, demolition and waste processing.

Source: RMI Embodied Carbon 101

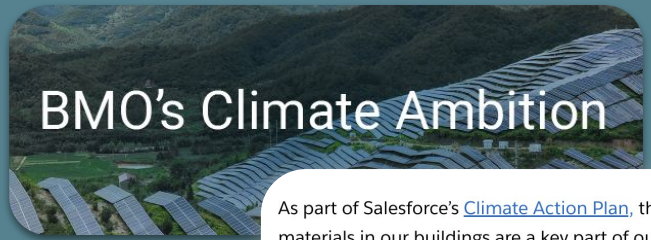


83%

Building materials are responsible for up to 83% of emissions for a real estate developer and owner.

Sources: Equinix 2022 Sustainability Report, Hudson Pacific Properties 2022 Corporate Responsibility Report, Derwent London 2022 Responsibility Report

Investor pressure and **market pressure** are pushing the construction industry to build more sustainably.



As part of Salesforce's Climate Action Plan, the healthy and sustainable materials in our buildings are a key part of our net zero achievement. We have made a commitment to pursue Zero Carbon Certification on our new major building projects and reduce our embodied carbon impact by 80% by 2030. Through our efforts to date, we've already achieved a 20% reduction in embodied carbon. By focusing on our
o drive down our impact even

CalPERS United Nations Net Zero Asset Owner Alliance Partnership

We joined the United Nations (UN) Net Zero Asset Owner Alliance (Alliance) in 2019, committing to accelerating decarbonization in line with limiting global warming to 1.5 degrees Celsius (°C) by 2050.

Our strategy emphasizes:

- A holistic sustainable investment approach
- Incorporating climate change risks and op
- A focus on reducing greenhouse gas e

Hines Embodied Carbon Reduction Guide

Through the years, we have endeavored to bring responsible, sustainable practices to Hines projects, and we will continue to lead our industry by creating sustainability guides that set and raise the bar as we build for the future.

THE GOOD NEWS

There are pathways to reduction.

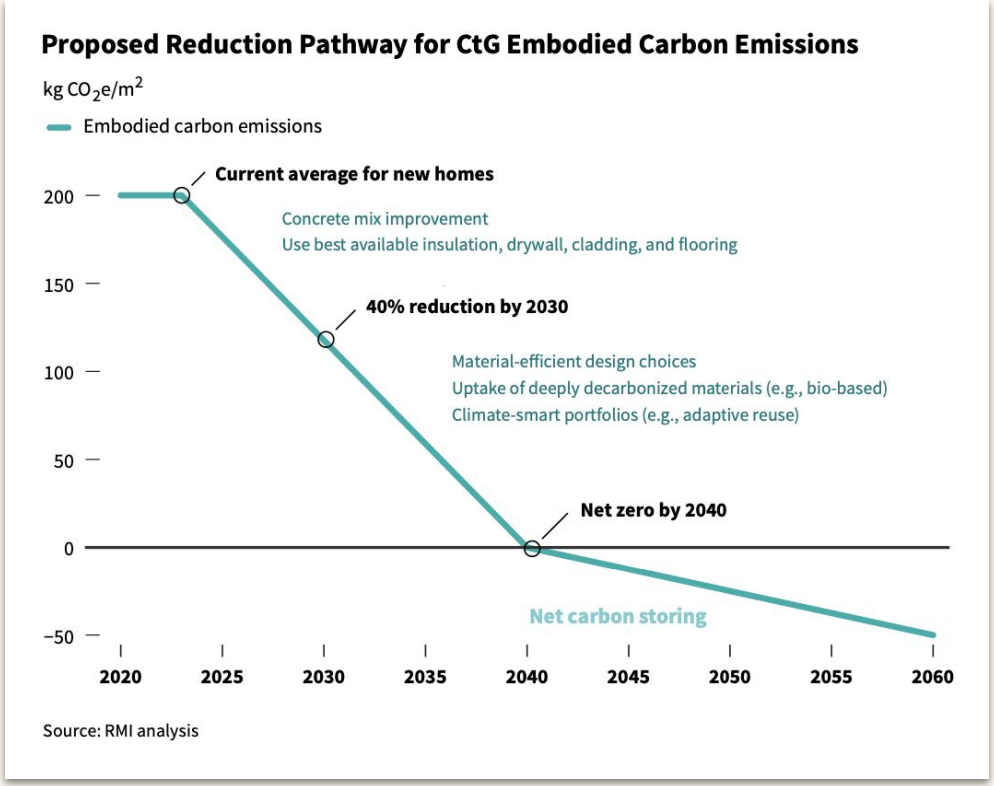
Table 6.1. Upfront embodied GHG emission intensities using a grandfathering downscaling approach, corrected for renovation (kg CO_2-eq/m^2)

TYPOLOGY	2025	2030	2035	2040	2045	2050
Residential	406.8	264.0	154.1	84.2	49.0	11.3
Office	598.6	410.0	247.1	129.9	70.3	14.3
Retail	638.1	414.9	239.2	121.7	64.2	12.9
Other	504.0	350.6	230.3	124.0	69.4	14.9

Source: SBTi Draft Guidelines for Buildings

THE GOOD NEWS

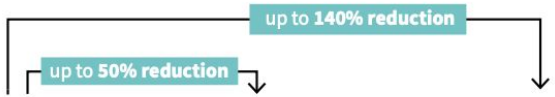
There are pathways to reduction.



THE GOOD NEWS

There are better products out there.

Examples of Material Substitutions and Scale of Possible Embodied Carbon Emissions Reductions



	As-Built Materials	Best Available	Best Possible
Concrete Mix	0%–14% SCM	15%–29% SCM	30%–50% SCM
Cavity Insulation	Fiberglass	Cellulose	Agricultural residue fibers
Exterior Cladding	Brick	Engineered wood	Bamboo or bio-composite
Flooring	Carpet and tiling	Linoleum and cork	Mycelium composite and clay
Interior Cladding	Drywall	Drywall lowest-emitting product	Lime cork plaster

Note: SCM = supplementary cementitious materials.

Source: C. Magwood and M. Trottier, *Material Emissions Benchmark Report for Part 9 Homes in Vancouver*, 2022

THE GOOD NEWS

There are better products out there.

ALL PRODUCTS > COMPOSITE LUMBER > ACCOYA WOOD FROM SCOTS PINE

COMPOSITE LUMBER

Accoya Wood FROM SCOTS PINE

Accsys Technologies PLC
Gelderland, NL

EMBODIED CARBON

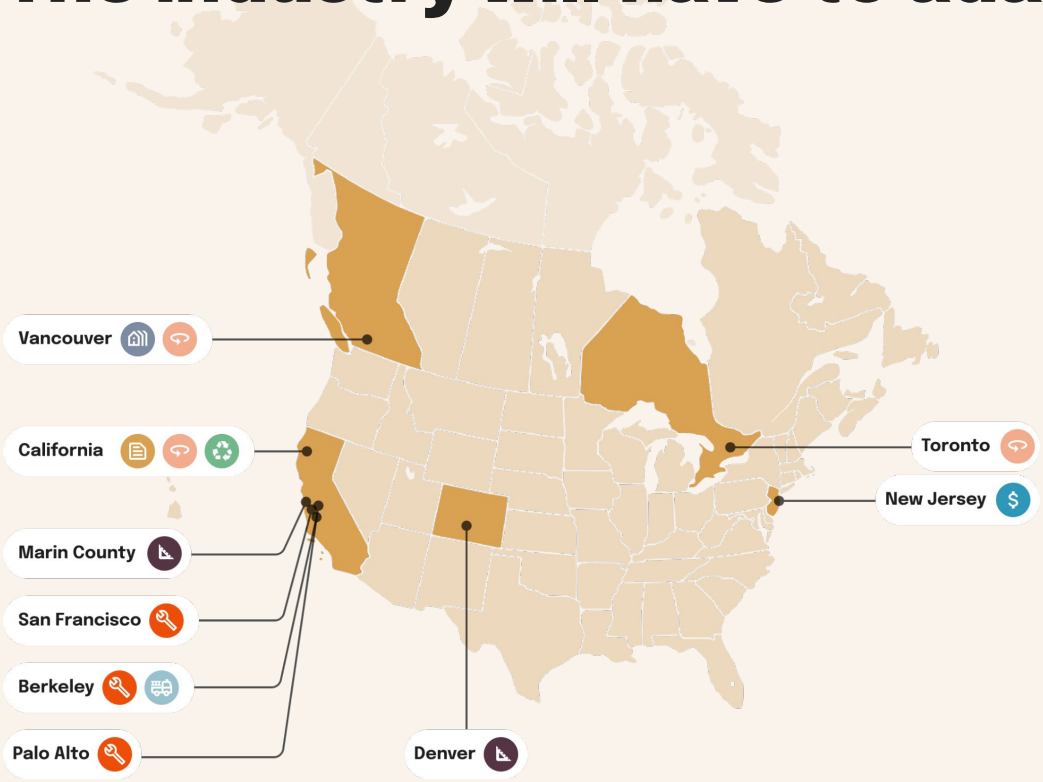
CARBON SINK

Absolute Carbon: -741.00 kg CO_2e / 1 m3

PERFORMANCE ATTRIBUTES

Density: 562.50 kg / m3

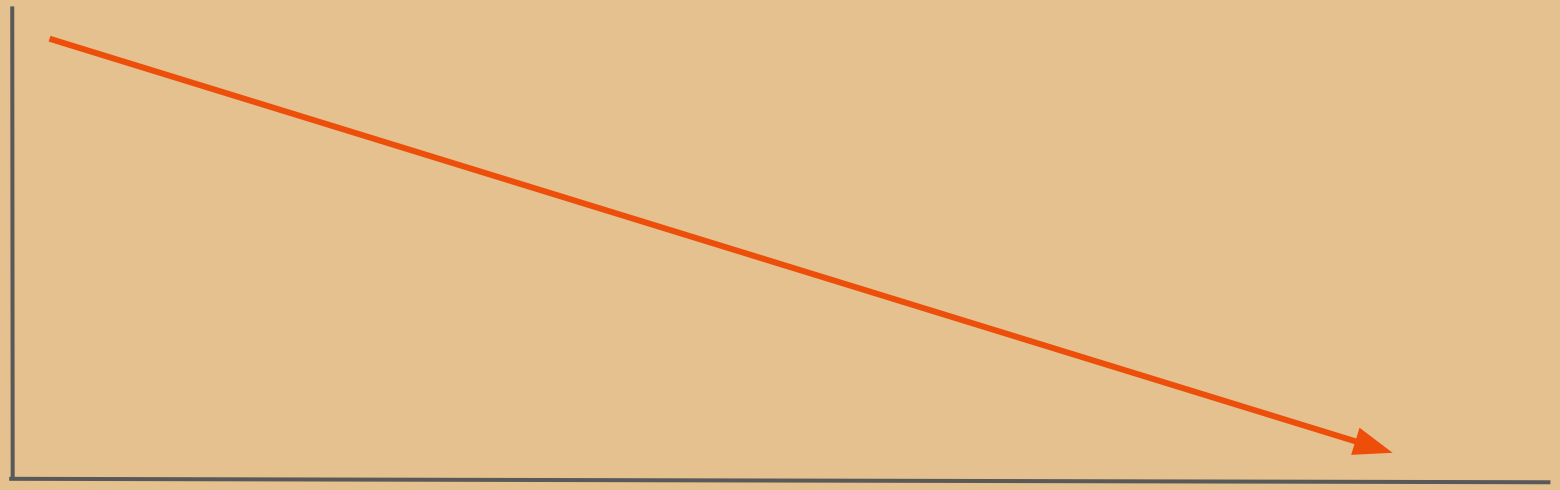
The industry will have to adapt to legislation.



Policy Types
August 2023

- Material Intensity Policies
- Building Intensity Policies
- WBLCA
- EPD Requirements
- Demolition / Deconstruction
- Tax Incentives
- Cement Reduction in Concrete
- Building Reuse

Where the industry needs to be



Now

Sector-wide measurement of embodied carbon

2025

Carbon-emitting materials to carbon-sequestering materials

2030

40-48% reduction in embodied carbon emissions

2050

Office buildings need to be at 10.3 kg CO_2 / m^2

Sources: IPCC, SBTI, RMI

WHAT WE NEED

To fundamentally change what gets built.

Where the industry stands

Don’t know portfolio performance

No idea how individual product data or even reports add up to a cumulative figure.

Static, if any, embodied carbon reports

Have to ask consultants to “redo” a report if anything changes.

No collaboration

If reports are shared, it’s all emailed PDFs.

Unclear next steps

OK this building was high carbon… now what??

What the industry needs

Understand portfolio performance

Track progress across projects and against embodied carbon goals.

Make changes in real time

As projects are updated, reports are reflected accordingly, throughout construction process.

Coordinate across stakeholders

Delegate responsibilities accordingly.

Prompt action

Discover alternative products that help you meet your embodied carbon targets.

HOW IT WORKS

Tangible is an embodied carbon operating system.

OWNER

CONSULTANT

GENERAL CONTRACTOR

ARCHITECT

HOW IT WORKS

Tangible helps measure embodied carbon portfolio-wide.

Measure your impact

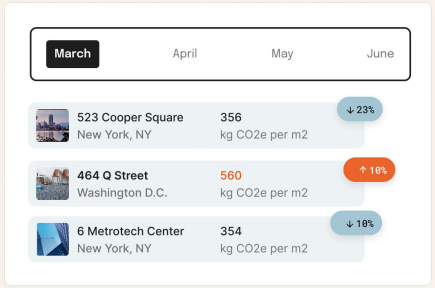
Measure embodied carbon across your portfolio, allowing you to compare projects and make strategic, portfolio-wide decisions.

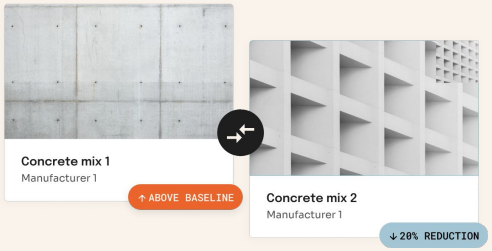
Take action immediately

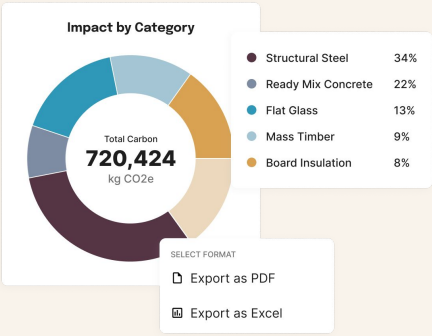
Find opportunities to reduce embodied carbon at all stages to help you meet your goals.

Report on-demand

Export reports with one click at a portfolio or project level, to meet local and global regulatory standards.

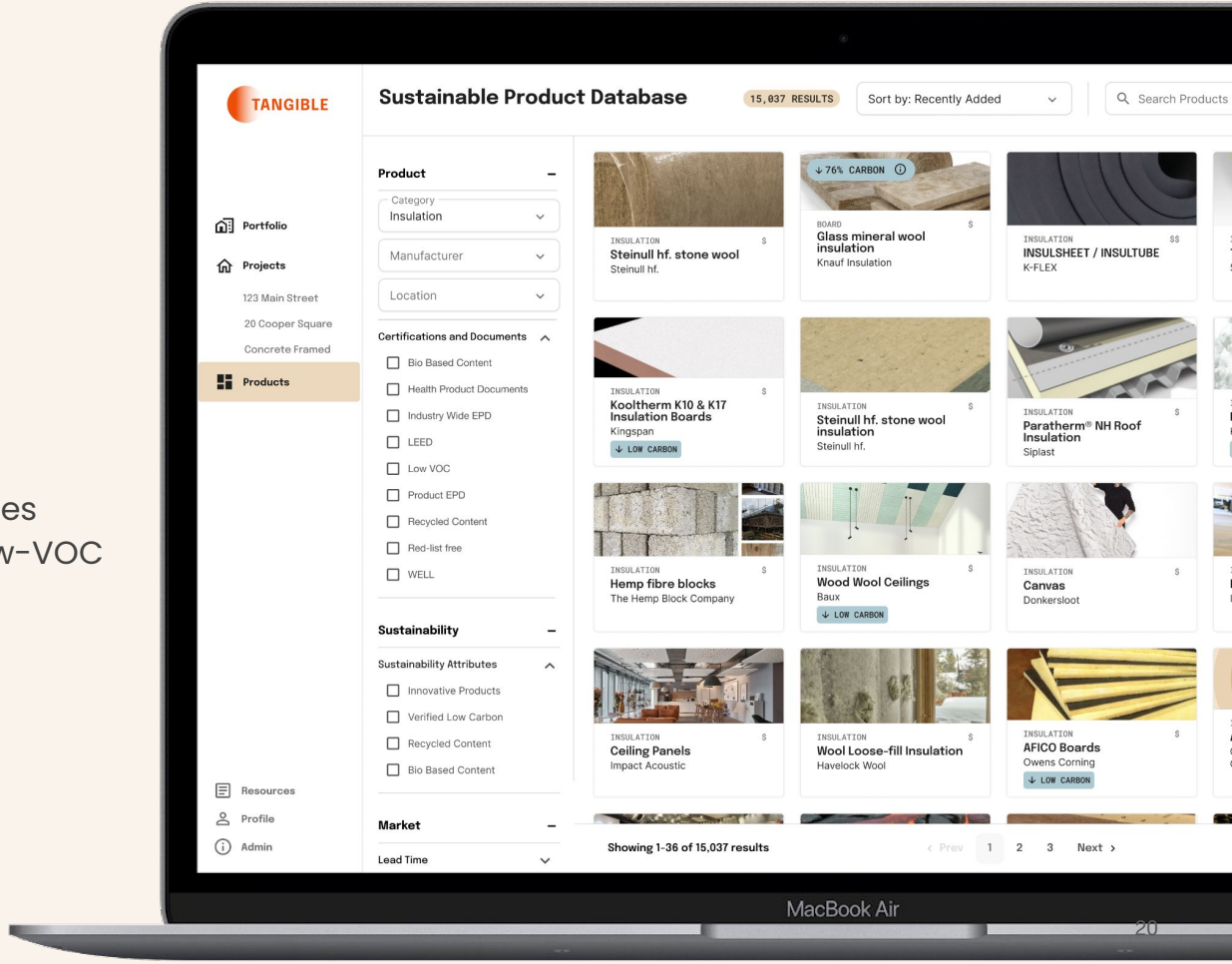






Rich database of materials

Tangible product database includes EPDs, HPDs, Declare labels, and Low-VOC Certifications.



HOW IT WORKS

Tangible helps measure embodied carbon over time.

Early-stage estimations

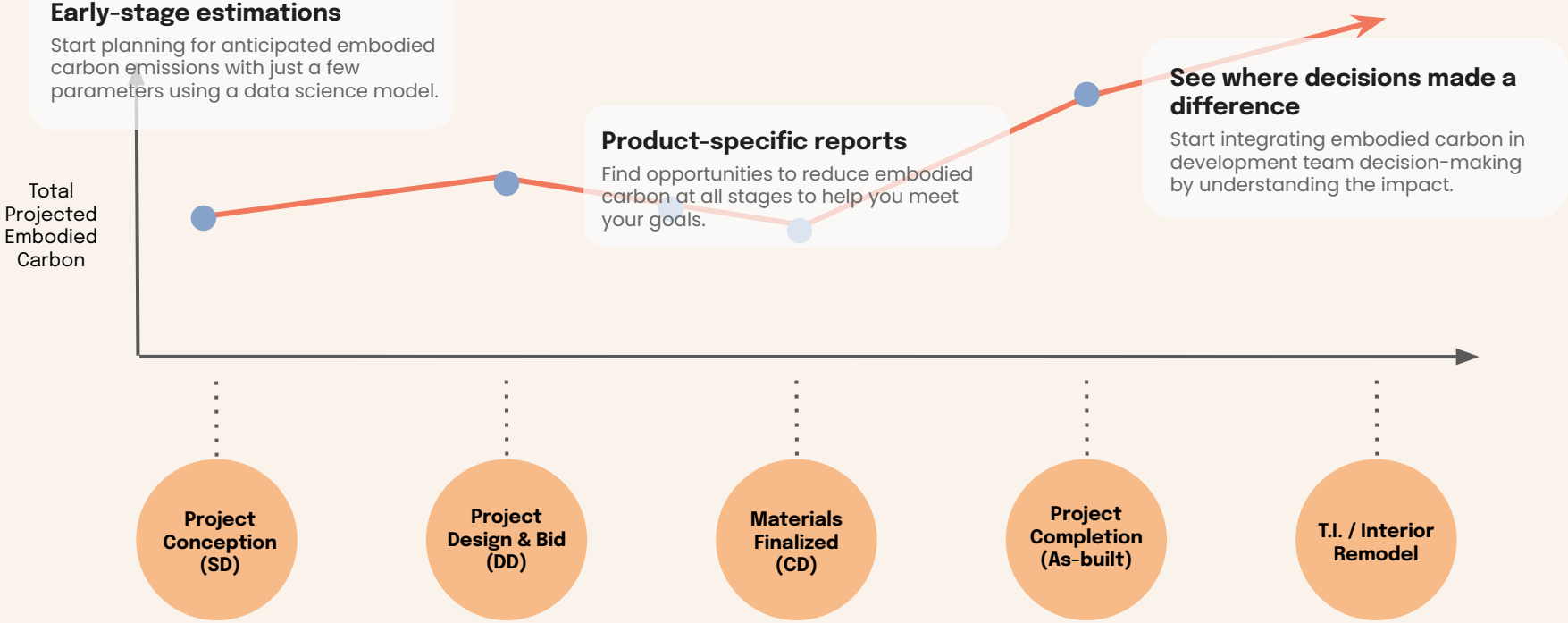
Start planning for anticipated embodied carbon emissions with just a few parameters using a data science model.

Product-specific reports

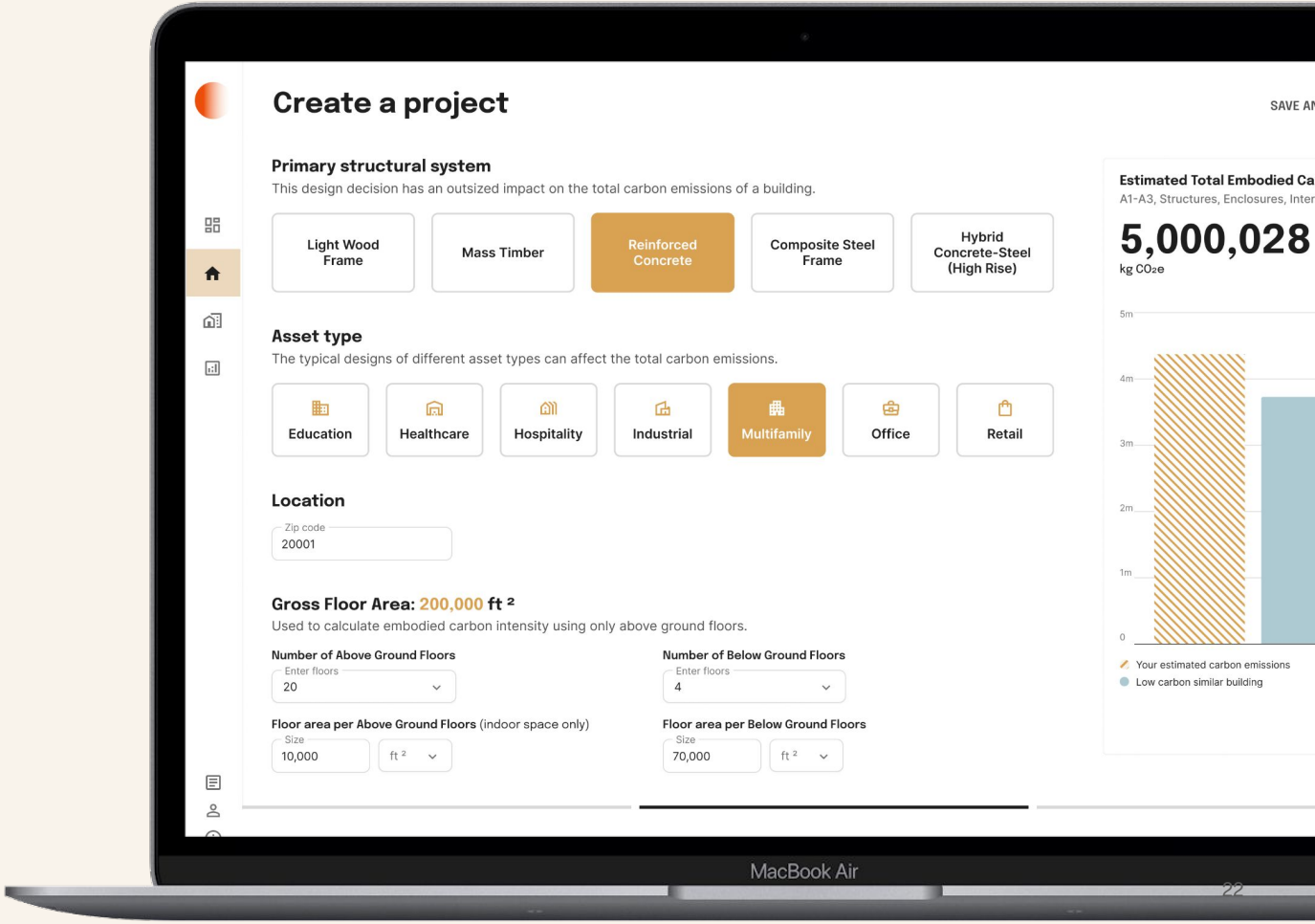
Find opportunities to reduce embodied carbon at all stages to help you meet your goals.

See where decisions made a difference

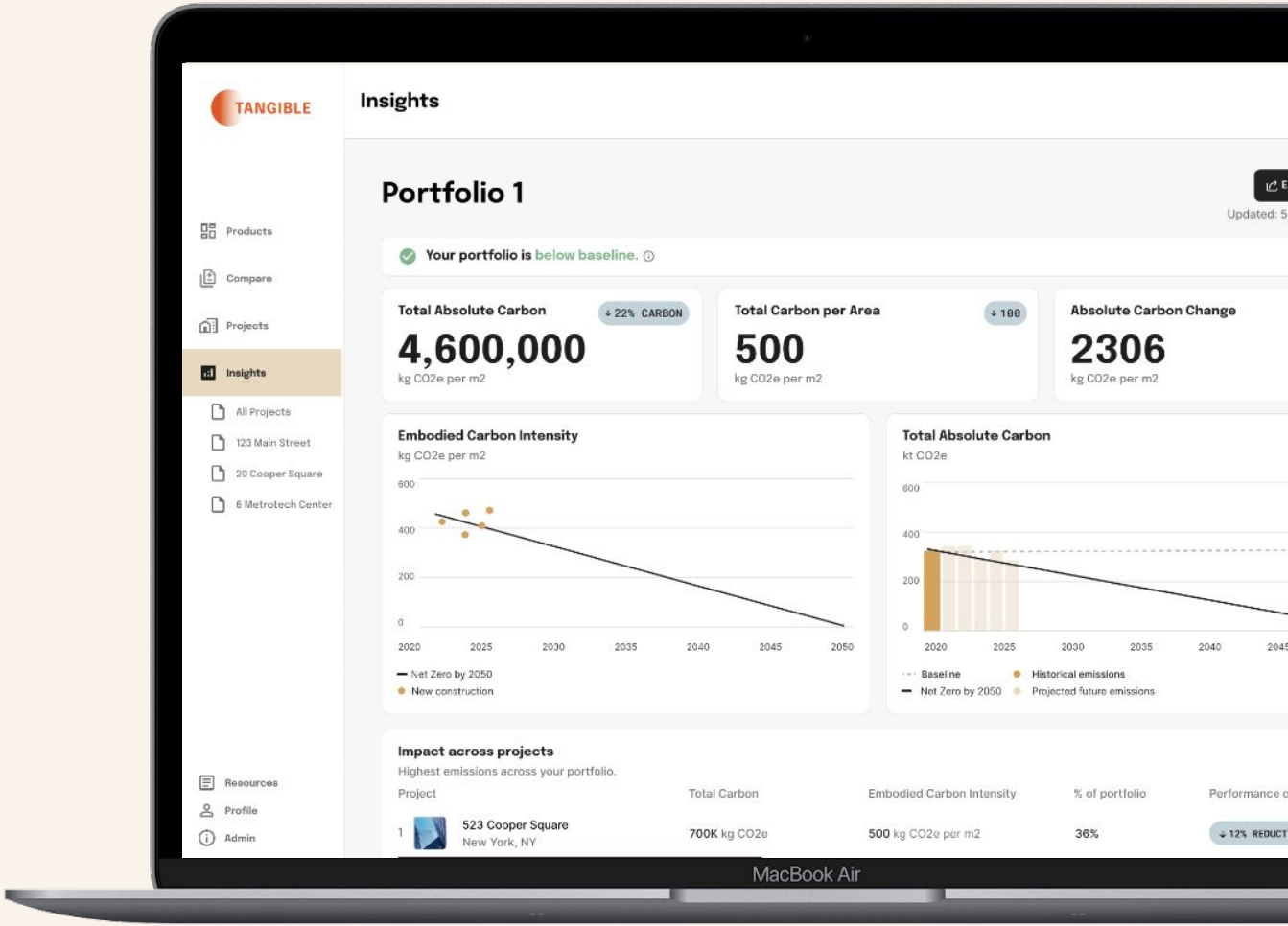
Start integrating embodied carbon in development team decision-making by understanding the impact.



Early-stage estimation



Portfolio dashboard



WHAT IS POSSIBLE

To reduce embodied carbon at scale.

TANGIBLE

Thank you!

Reach out with questions

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