

Data-Driven Decarbonization

Next generation tools to spur climate action
on every project

Technology in Architectural Practice (TAP)
+ Professional Practice Committees



Jack Rusk

CEO, co-founder



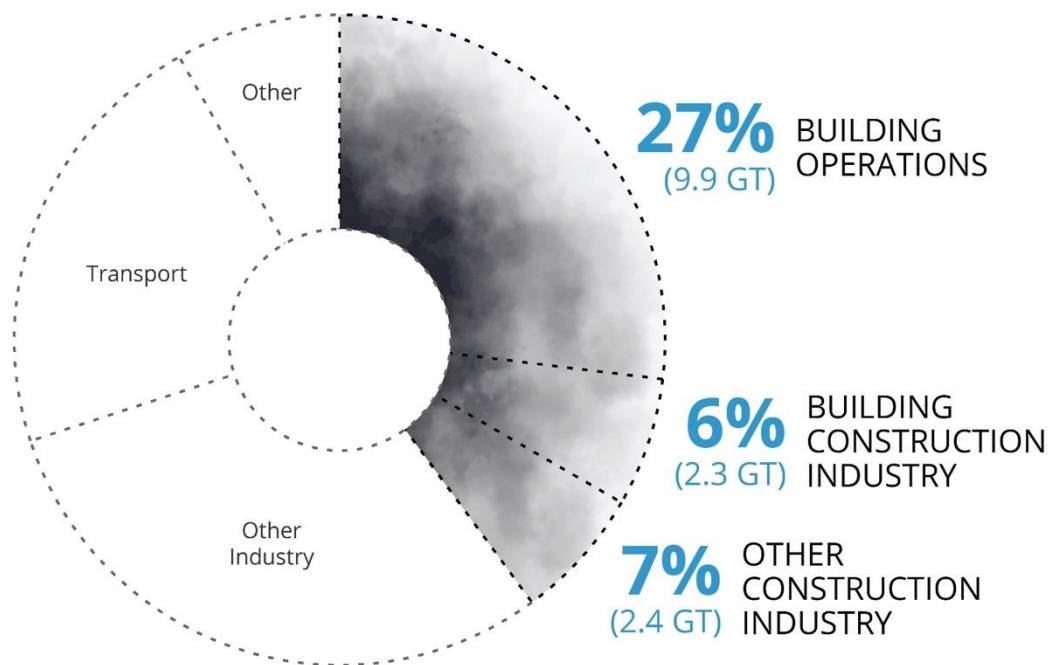
WELL, I DON'T KNOW ABOUT ANYONE ELSE, BUT **c.Scale** spun out of EHDD, is a small but mighty software company, and we're democratizing access to whole life carbon assessments



c.scaleTM

The dreaded statistic

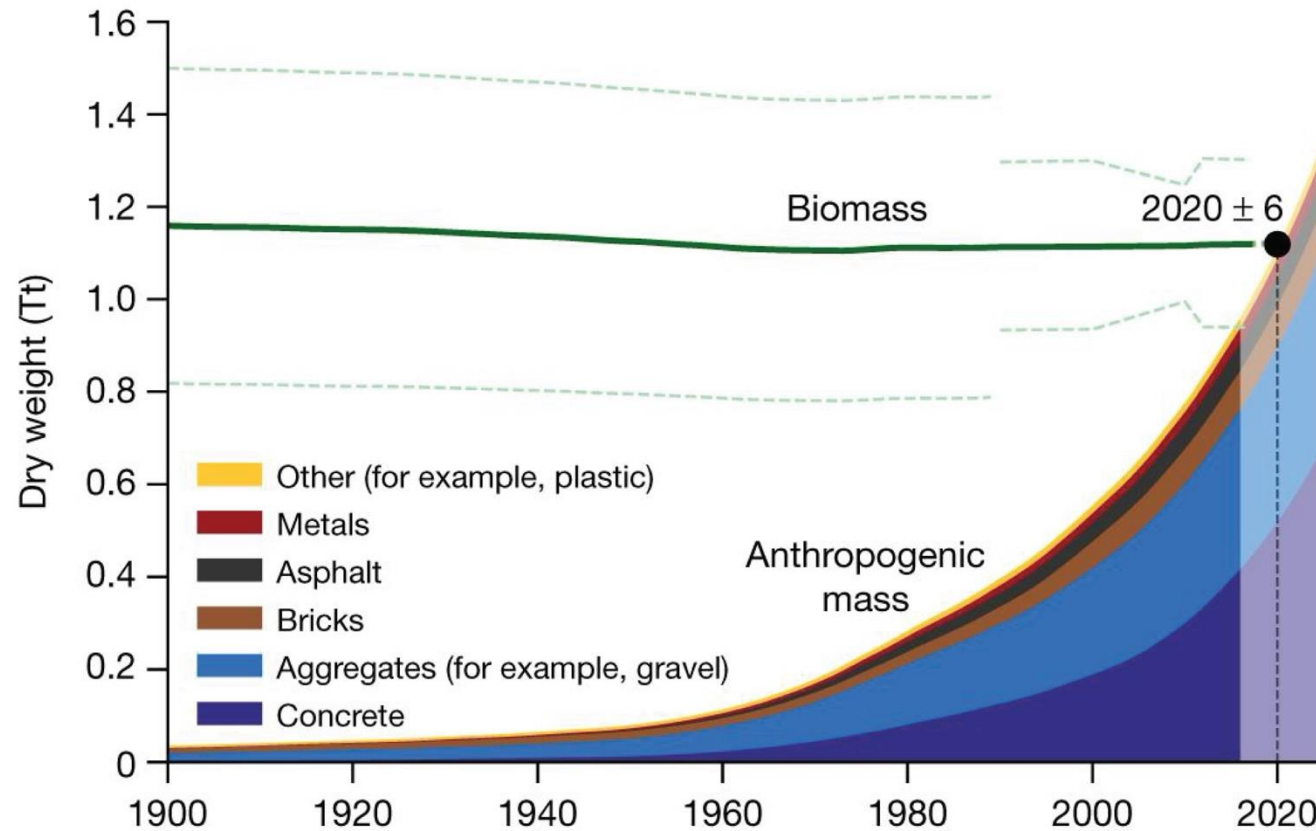
~40% of global emissions are attributable to the building industry



© Architecture 2030. All Rights Reserved. Data Source: IEA (2022), Buildings, IEA, Paris

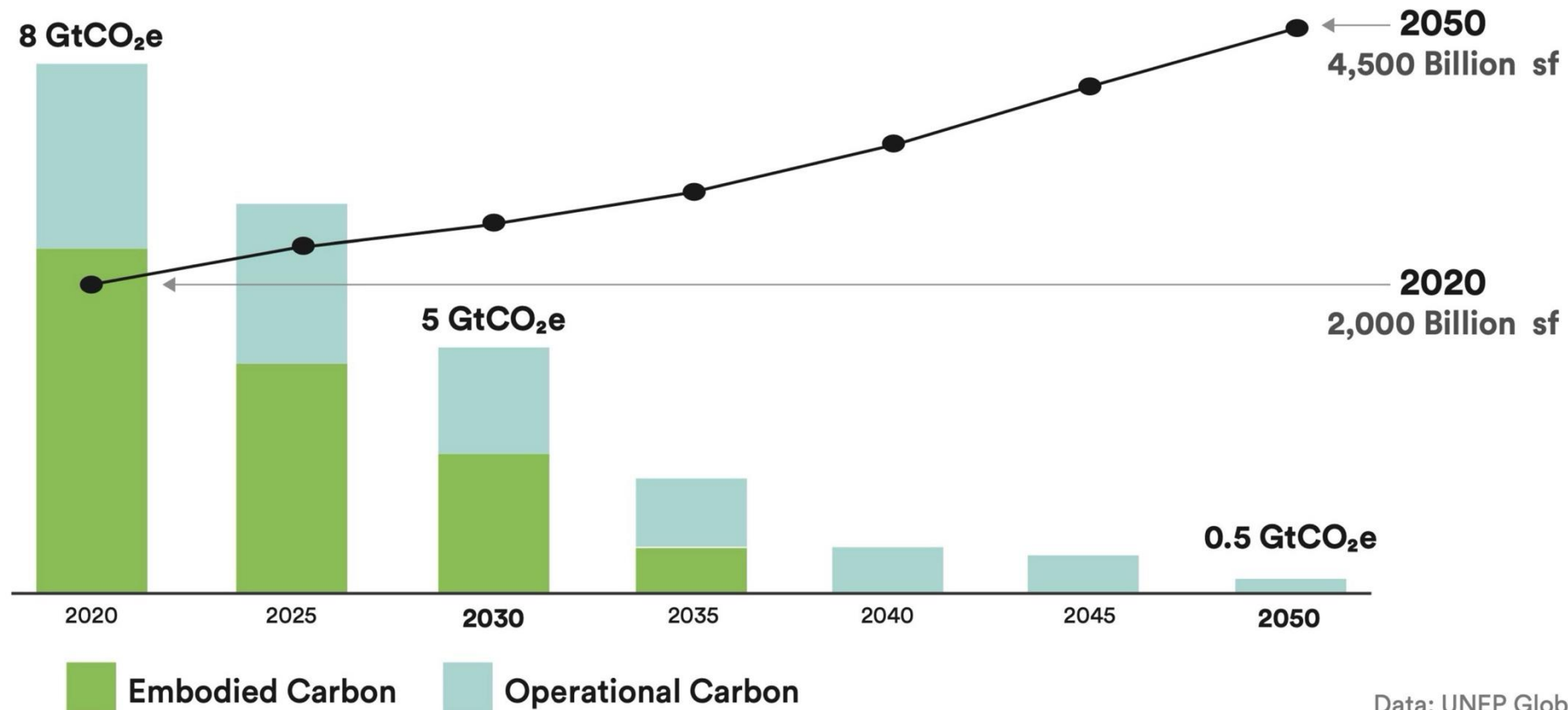
Building Construction Industry and Other Construction Industry represent emissions from concrete, steel, and aluminum for buildings and infrastructure respectively.

The built environment weighs more than all life of earth



Elhacham, E., Ben-Uri, L., Grozovski, J., Bar-On, Y.M. and Milo, R., 2020. **Global human-made mass exceeds all living biomass.** *Nature*, 588(7838), pp.442-444.

We need to half total emissions even as the building stock doubles



Data: UNEP GlobalABC



**Designers have a purchasing power of
up to 111x an average consumer**

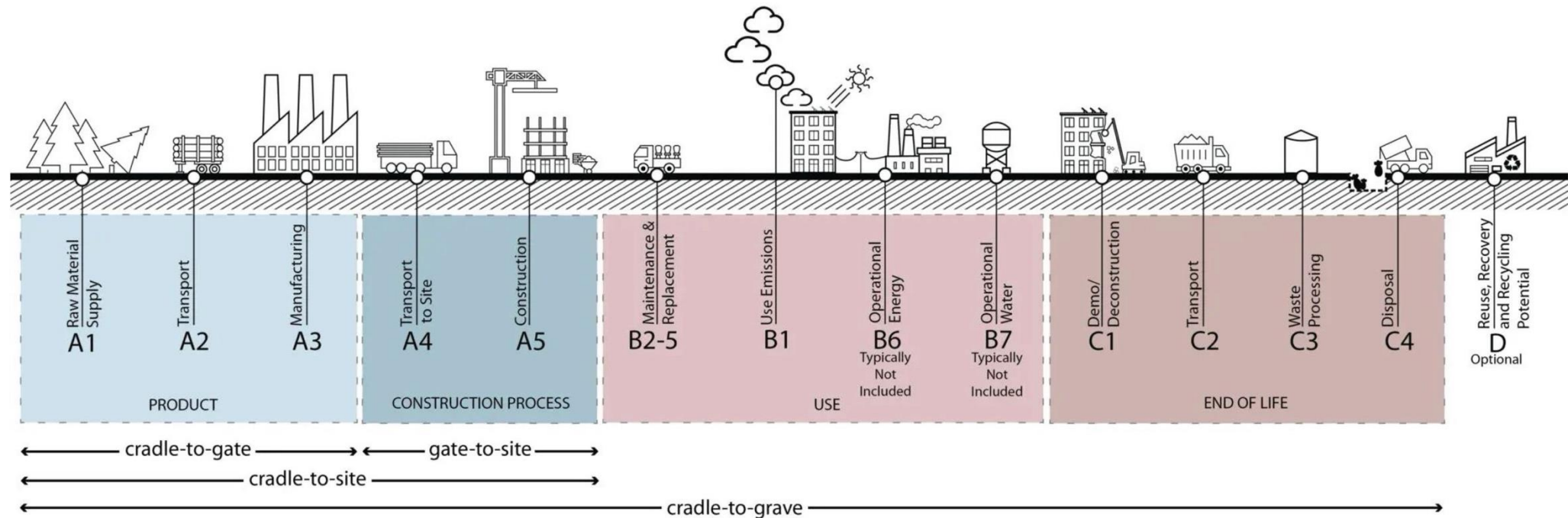
Our decisions (literally) move mountains



An aerial photograph of a lush, dense forest. A winding river or stream flows through the center of the image, its brownish water contrasting with the vibrant green of the trees. The forest canopy is thick and textured, with varying shades of green indicating different tree species or perhaps the onset of autumn. The river meanders from the upper left towards the lower right, with some smaller tributaries visible. The overall scene is one of natural beauty and ecological richness.

Our decisions can regenerate forests

Life cycle assessment helps us tell the difference



LMN Architects, 2025. **07 - Embodied Carbon 101**. Path to Zero Carbon.

Emissions assessment is becoming a need-to-have

Building Reuse Section 5.105, Deconstruction and Reuse of Existing Structures	Life Cycle Analysis Section 5.409, Life Cycle Assessment	Prescriptive Path Section 5.409.3, Product GWP Compliance
<p>Components: Existing primary structural elements, enclosure, (roof framing, wall framing, and exterior finishes).</p> <p>Exceptions: Additions 2x the area or more of the existing building.</p> <p>Exclude: Window assemblies, insulation, portions structurally unsound or hazardous, and hazardous materials that are remediated as part of the project shall not be included in the calculation.</p>	<p>Scope: 60-year cradle-to-grave WB LCA (ISO 14044), excluding operating energy. Show GWP analysis.</p> <p>Components: Primary and secondary structural members, glazing, insulation, exterior finishes.</p>	<p>Components: Structural steel, rebar, flat glass, light and heavy-duty mineral wool insulation, and ready mix concrete.</p> <p>Exception: Concrete mixes can use a weighted average for all mixes.</p>

CalGreen Requirements

**By 2027,
all \$1B+ companies
in California will
need to perform
LCA on every
project at any scale**

SB 253

YouTube Headquarters

Image courtesy EHDD



**By 2027,
all California
projects over
10,000 sf will
require an
LCA**

AB 2446



**Consultant-led LCA can cost upwards
of \$90K for complex projects**

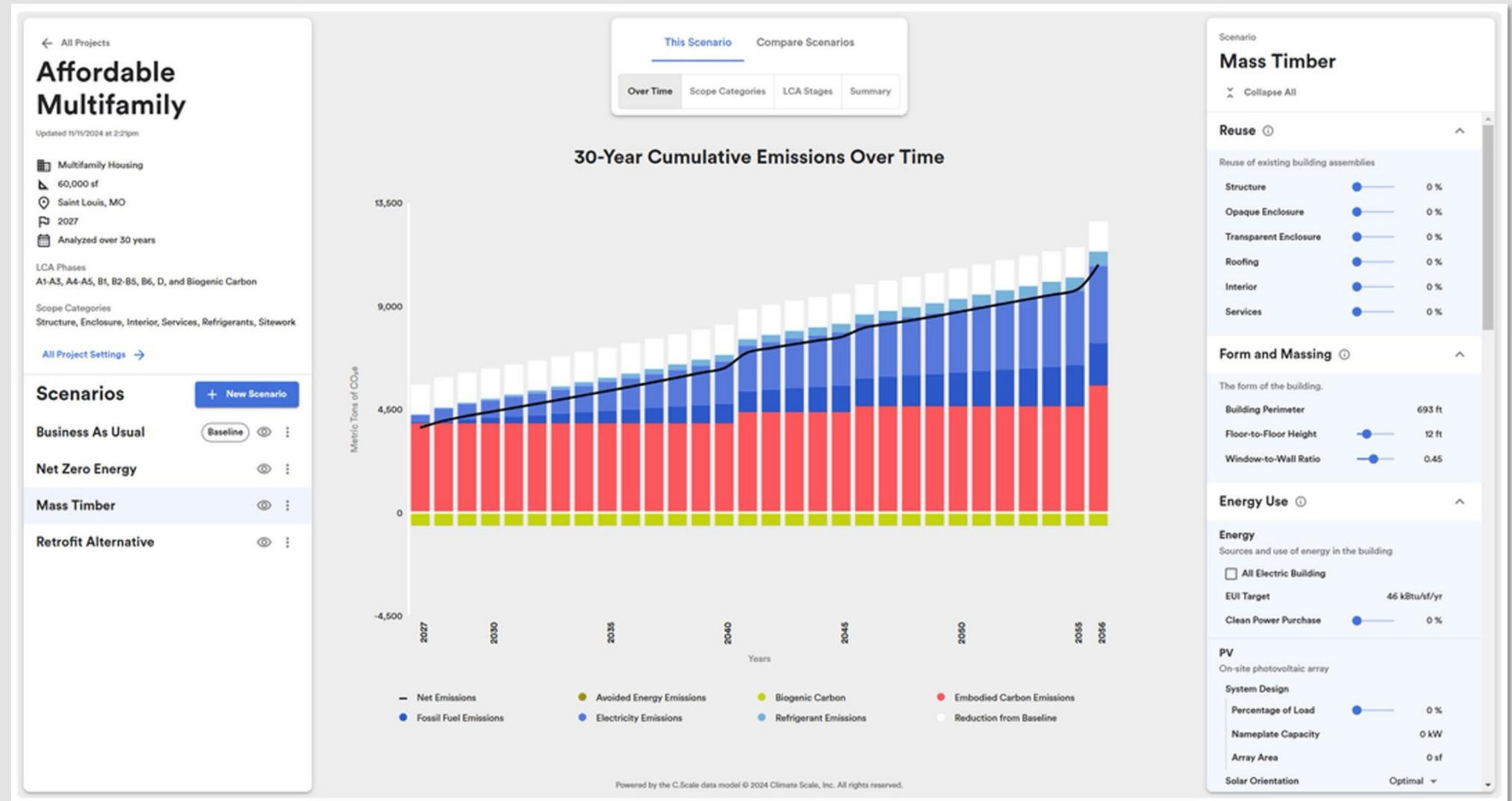
Design-integrated LCA
can **actually reduce emissions**

Architect-led workflows to reduce whole life carbon

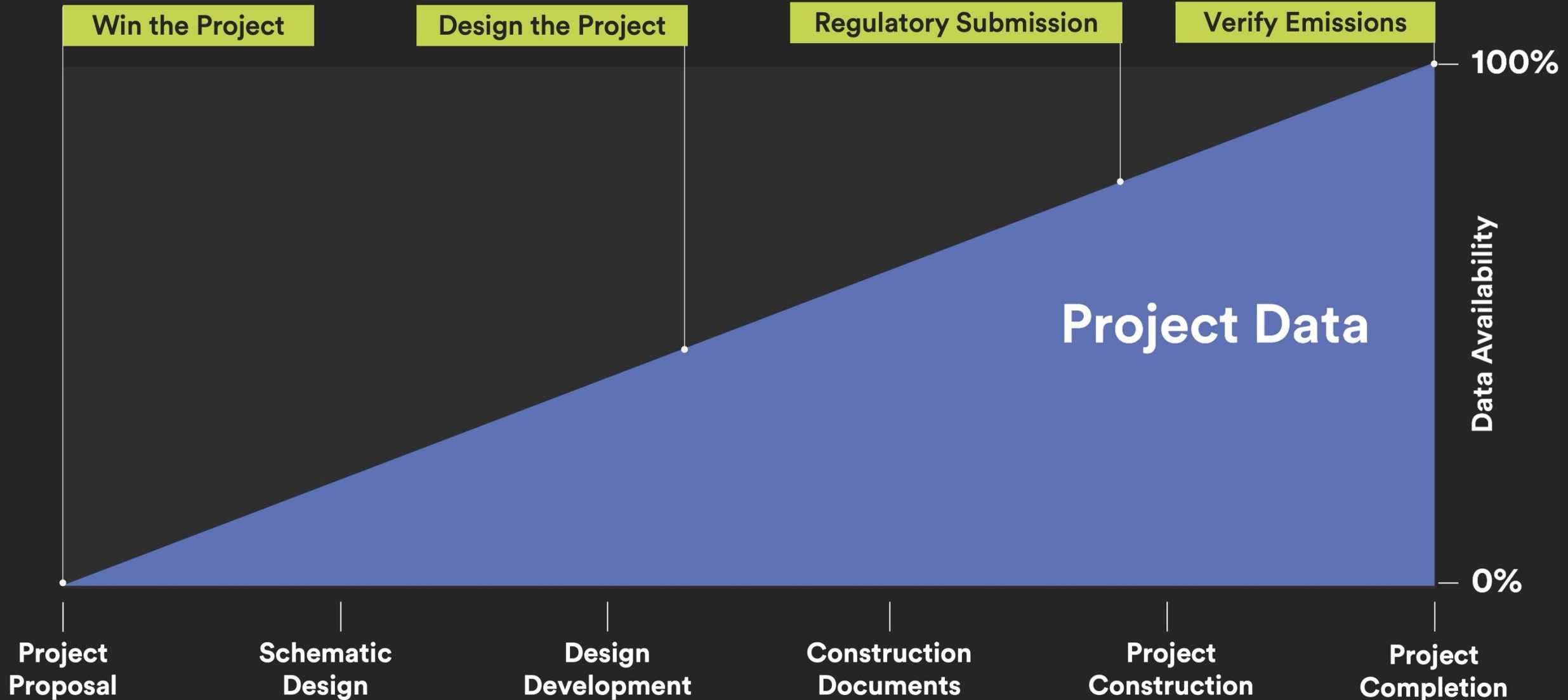
Carbon reduction strategies

- Build less
- Reuse existing structure
- Switch structural system
- Low-carbon materials
- Longer lived interiors
- Low-carbon envelope
- Store carbon in materials
- All-electric building
- Increase energy efficiency
- Add onsite renewables
- Carbon-storing landscape

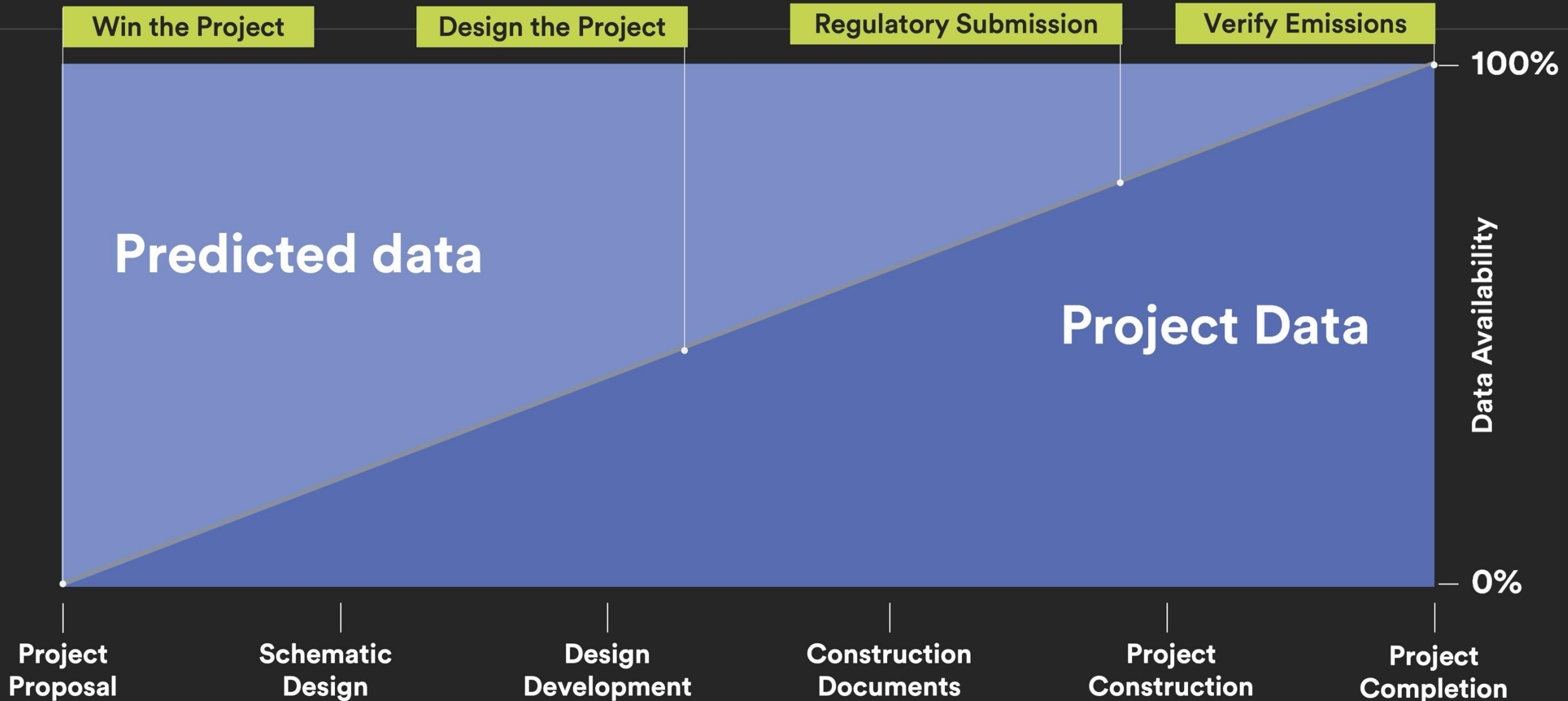
- Material-related carbon
- Energy-related carbon
- Carbon storage



Project data isn't available until late in the process

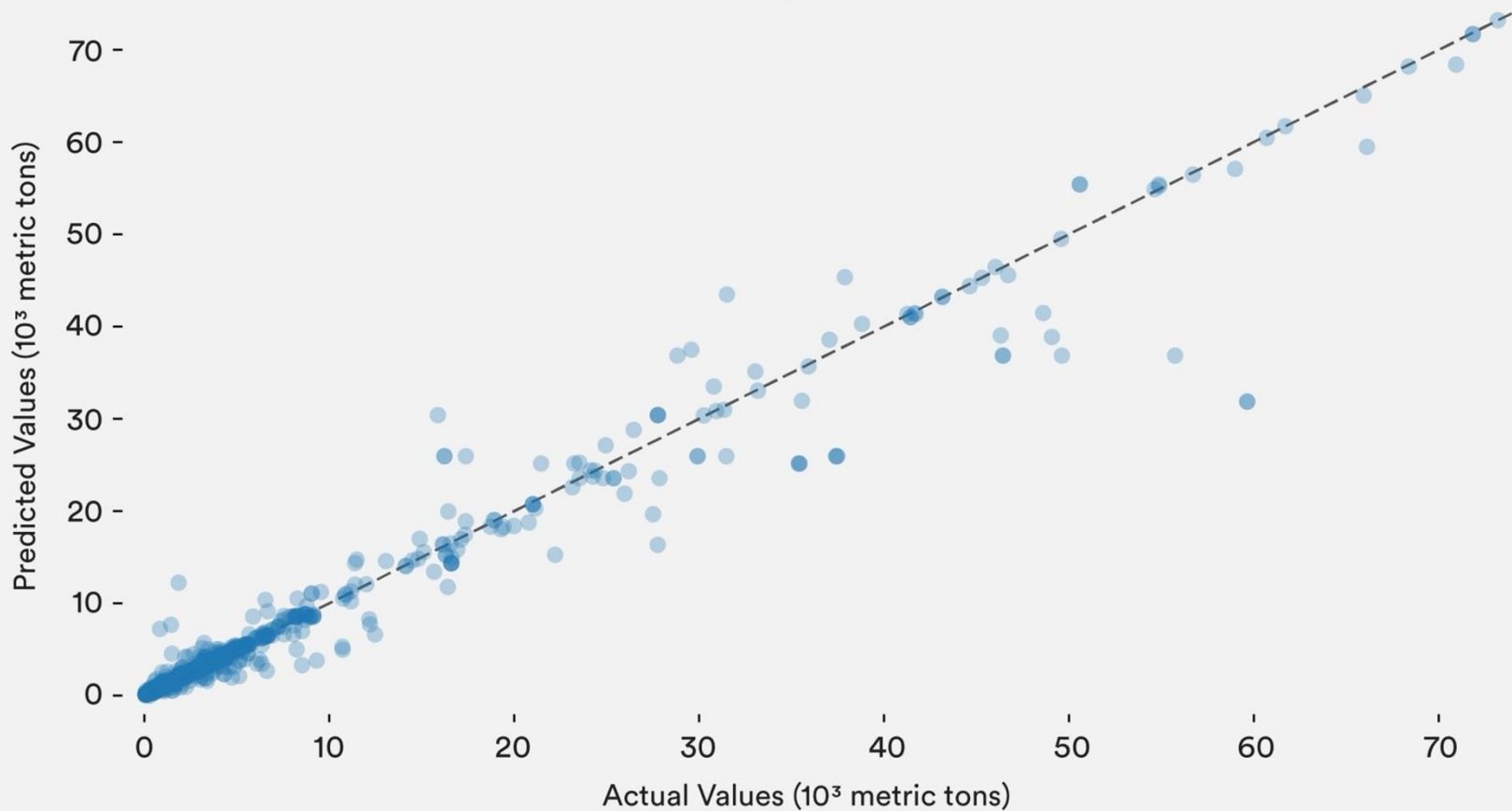


C.Scale fills in gaps to enable better decisions



ML-driven approaches to predicting emissions at the earliest project phase

The closer to the dashed line, the more accurate our prediction



● Building in C.Scale's test dataset

Case Study

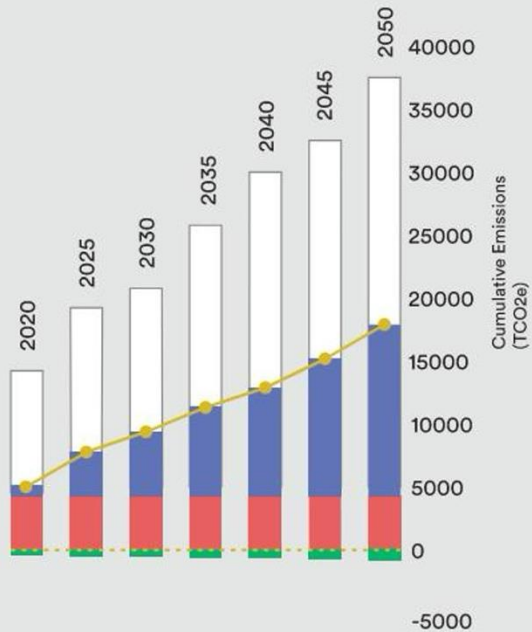
AIA Headquarters Renovation



Target-setting in the proposal phase

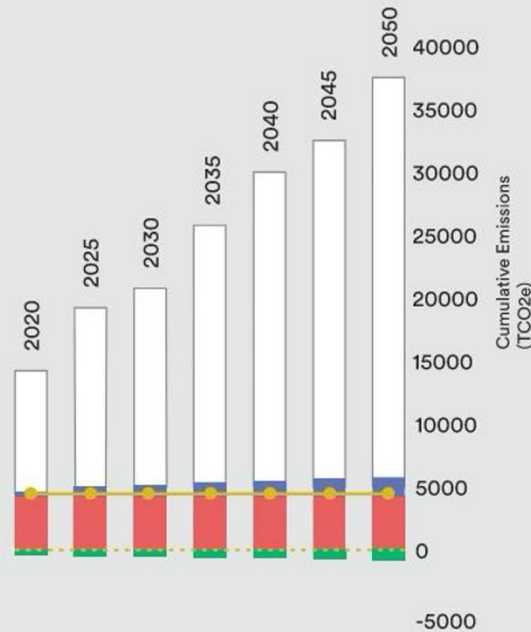
Pathway to Climate Positive Local Carbon Offsets

- Reduction from Baseline
- Operational Emissions
- Embodied Emissions
- Sequestration & Energy Production
- Net Emissions
- Cumulative Carbon Offsets



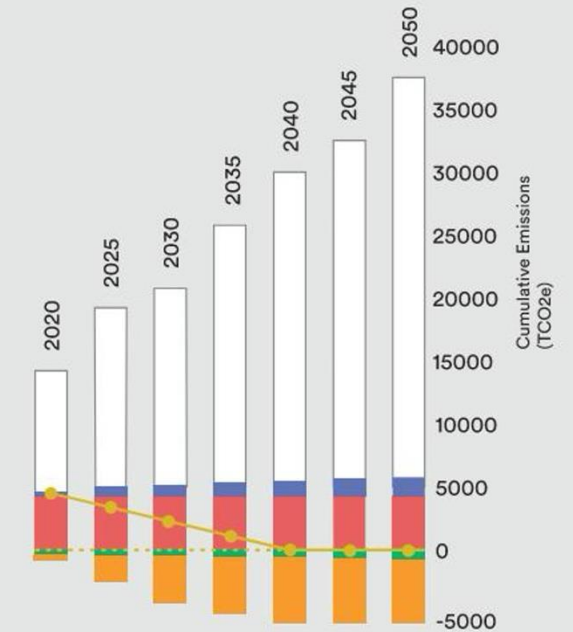
Energy Efficiency Only

- Mixed Fuel: Gas and Electric
- EUI: 44 kbtu/sf/yr
- No PV
- No purchased Green Power



Clean Electrification

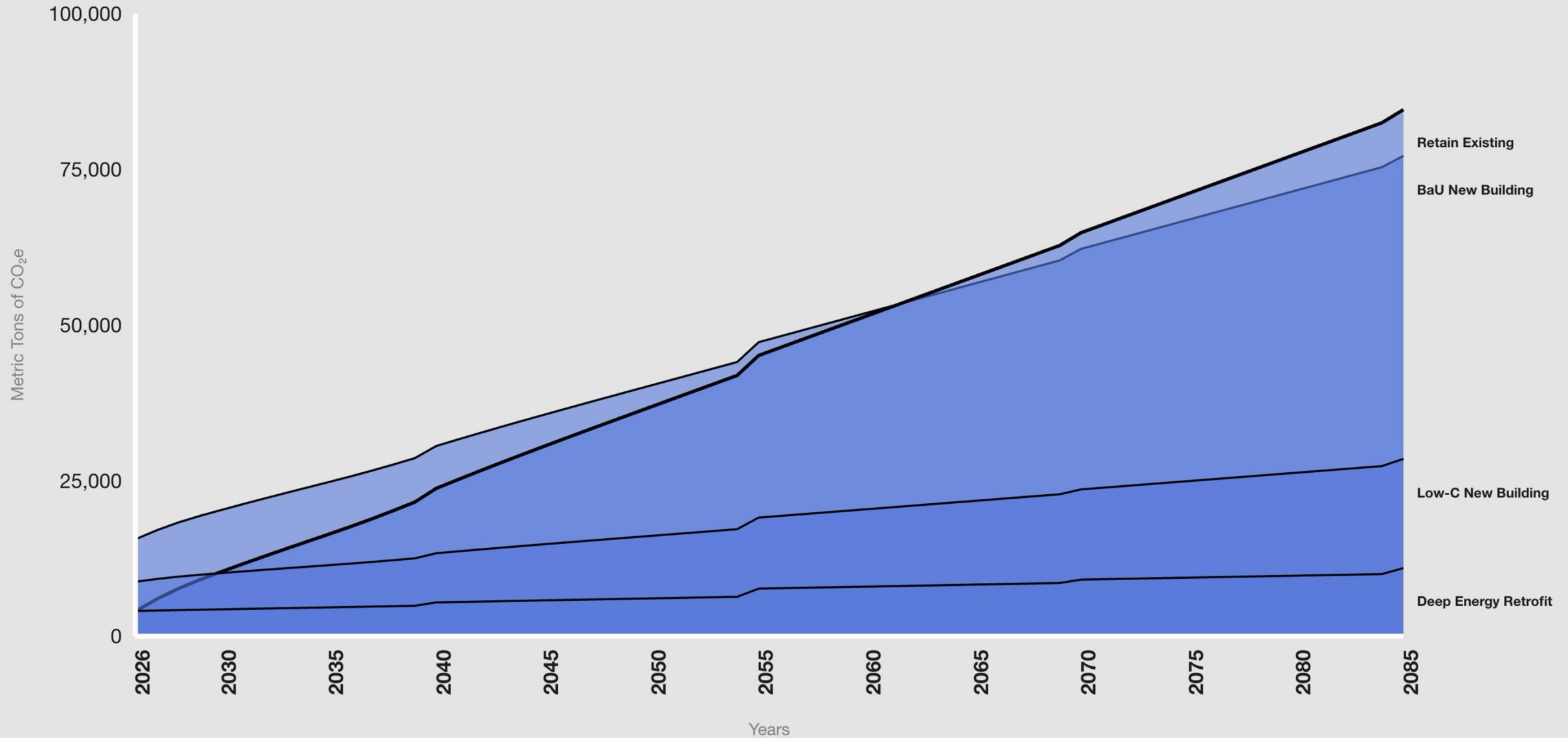
- All Electric
- EUI: 40 kBTu/sf/yr
- Embodied carbon reduction measures
- 170 kW PV array on roof
- Purchase 100% Green Power



Clean Electrification with Local Carbon Offset

- Same as Clean Electrification measures
- Offset all remaining emissions with local offsite decarbonization/energy efficiency project

Understanding complex tradeoffs



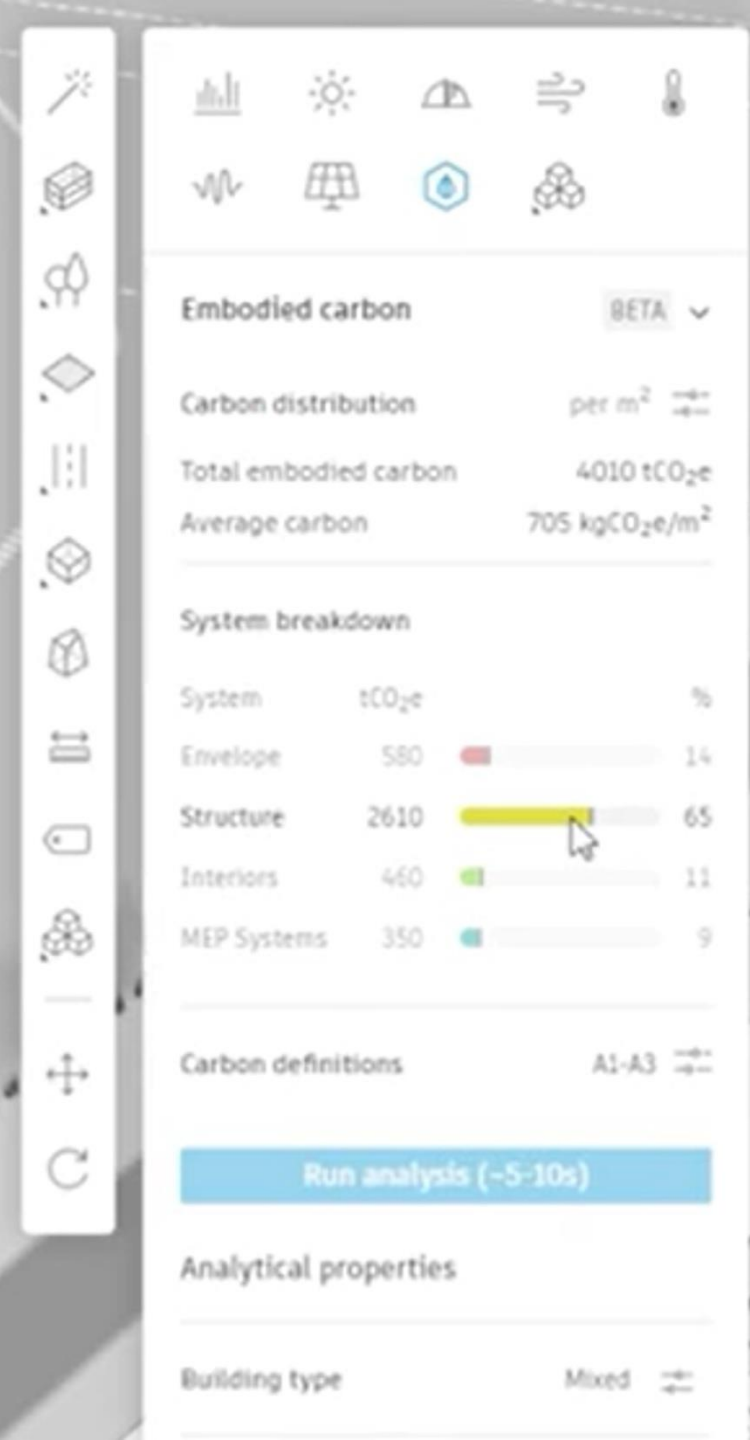
AUTODESK Forma

How to reduce embodied carbon

in early stage planning

concrete, steel or wood, and 27% from the operational carbon cost

“Forma's Embodied Carbon Analysis, realized through collaboration with the [C.Scale](#) team ... provides near-instant results, detailing life cycle embodied carbon data with accessible visualizations”



**C.Scale is available open access
at app.cscale.io**

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