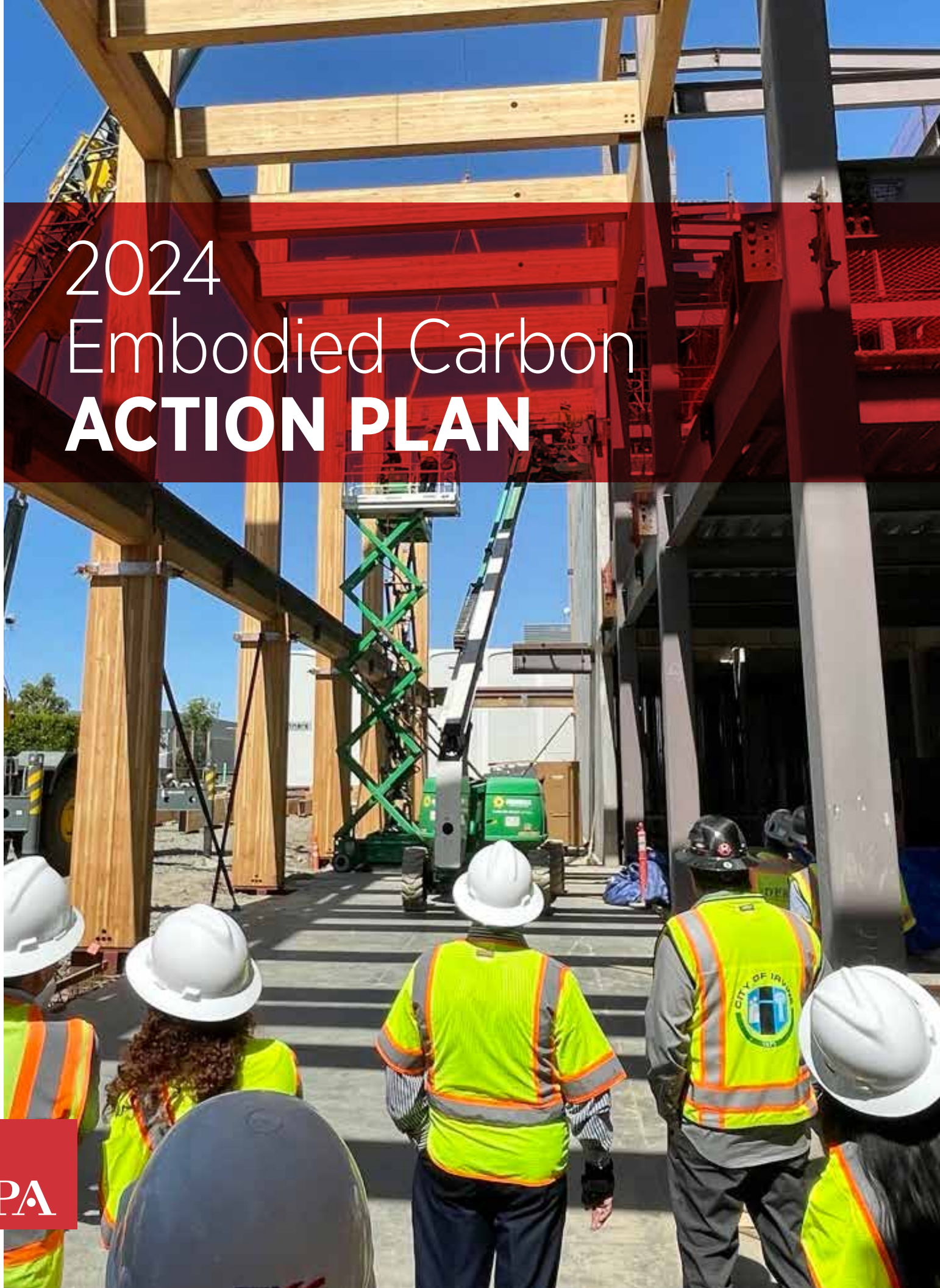
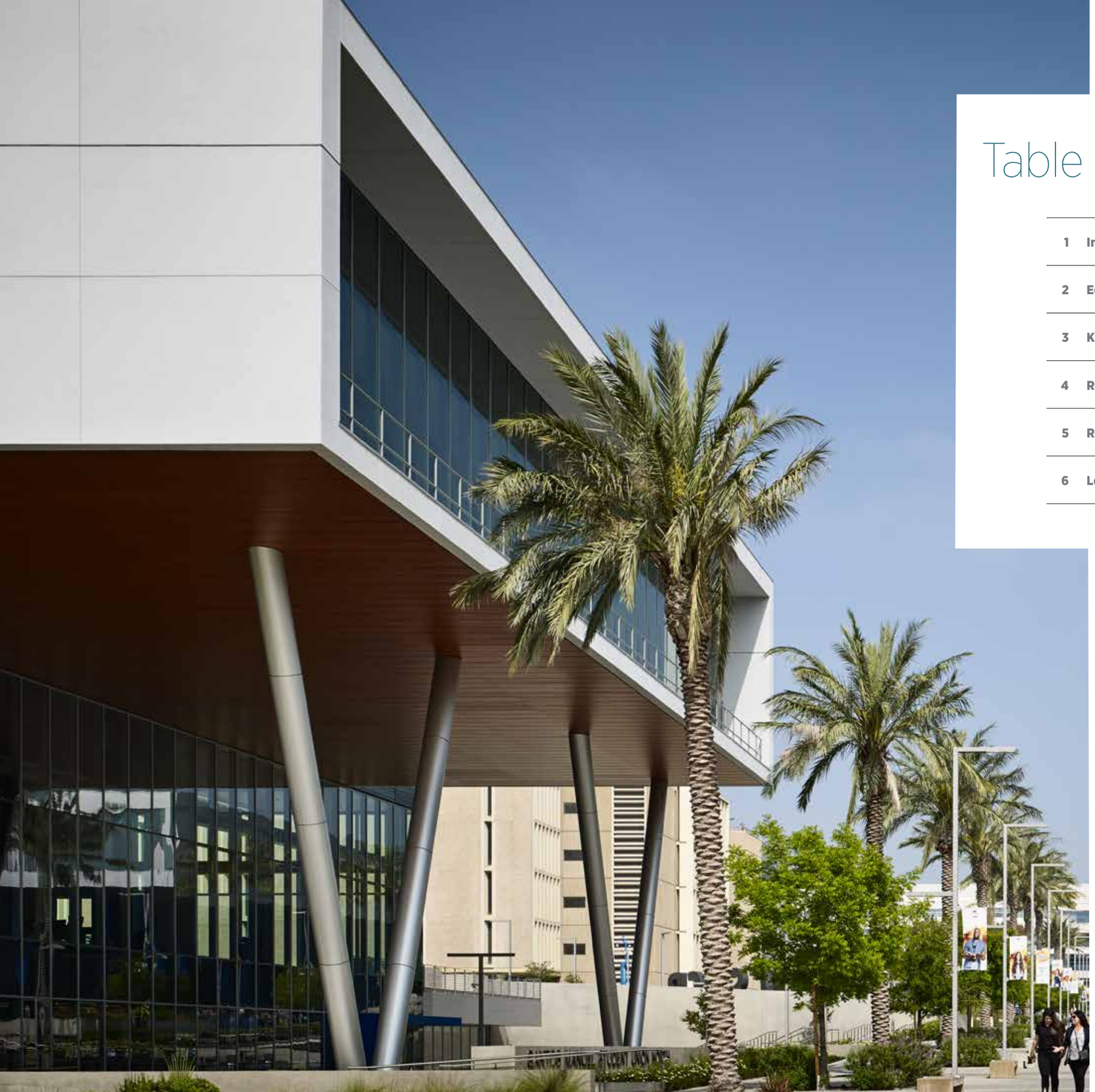


2024 Embodied Carbon **ACTION PLAN**

LPA



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INTRODUCTION

Climate change is the design challenge of our lives. With 11% of greenhouse gas emissions coming from embodied carbon, structural engineers are on the front lines of climate change.

LPA is proud to be a signatory of the SE 2050 Commitment. With this step, we deepen our leadership role in an industry-wide movement toward decarbonization. The goals of SE 2050 align with LPA's sustainability goals as a firm. We are committed to making sustainability and building performance the foundation of every design, regardless of size, scale, or budget.

The only way to significantly address the challenges confronting us as an industry is to take a holistic, collaborative approach to design, involving engineers, architects, landscape architects, and interior designers at the earliest stages of the process. Our integrated design process breaks down the hierarchy between disciplines and emphasizes the use of actionable research and data.

LPA IS WELL POSITIONED TO MAKE MEANINGFUL PROGRESS IN ELIMINATING EMBODIED CARBON.

- With structural engineers at the table from the very beginning of every project, our process ensures that embodied carbon reduction goals are established early in project development and considered in every design decision.
- With a robust program of internal education, we will align and focus the entirety of LPA on the goals of SE 2050.
- With a reputation for thought leadership in the industry, we will continue to advocate for the elimination of carbon emissions from the built environment and set a high standard for sustainable performance.
- With a track record of success in reducing operational carbon emissions, we will apply the same singleness of purpose to tracking, reporting, and reducing embodied carbon.

Evolving to a zero-carbon built environment is imperative, and we pledge to work with clients from the start of every project to address what we know is the biggest issue of our time.

"If the building industry is really going to tackle climate change, we can't simply talk about energy and building performance. It must be a much broader discussion, encapsulating all aspects of what we do. As an industry, we need to evolve our approach."

Keith Hempel, President of LPA, in "To Address Climate Change, Architects Must Tackle Embodied Carbon" for Common Edge

EDUCATION PLAN

Continuing education is woven throughout our culture and design practice. Each year, LPA invests in approximately 60 hours of education through firmwide LPA+U and Tech Talk courses given during business hours. Annually, these courses amount to $750,000 of billable time committed to advancing sustainable design. Education on reducing embodied carbon emissions concerns not only our structural engineers, but every design professional at LPA.

OUR EDUCATION PLAN INCLUDES:

- LPA+U & Tech Talk in-house presentations integrating embodied carbon topics.
- Presentation of SE 2050 and the LPA ECAP to all staff.
- Development and sharing of sustainability articles and resources on our shared file server.
- Creation of new guidelines related to the use of embodied carbon calculation tools and integration of these guidelines into the on-boarding process.
- Creation of new Sustainability in Structural Engineering multi-studio group meetings. This will extend to a larger interdisciplinary embodied carbon group.
- Team members attending webinars related to embodied carbon reduction and presenting to the firm in scheduled meetings.

EMBODIED CARBON CHAMPIONS

AJ TEZVEREN-JOHNSON
Design Coordinator - Irvine

JACOB GOTTLIEB, PE
Project Engineer - San Diego

SUSTAINABILITY IN STRUCTURAL ENGINEERING GROUP

BRYAN SEAMER, SE
Director, Structural Engineering - Irvine

ELLEN MITCHELL, AIA
Director, Sustainability & Applied Research - Dallas

DANIEL WANG, SE
Design Director, Structural Engineering - Irvine

JOHN HOENIG, PE
Managing Director, Structural Engineering - Dallas

DANIEL STONE, SE
Project Manager, Structural - San Jose

ETHAN POWELL
Designer, Structural - Sacramento

BEN NESS, SE
Lead Engineer - Irvine

JOSE HERNANDEZ OCAMPO
Designer, Structural - Irvine

APOORVA PRADHAN
Building Performance Specialist - San Jose

DENISE MENDELSSOHN, AIA
Managing Director - Irvine

KNOWLEDGE SHARING & ADVOCACY

LPA's knowledge sharing and advocacy plan has two parts: internal and external.

Internally, our structural engineers are key advocates on the project, studio, and firm levels in elevating the priority of embodied carbon reduction. Our structural engineers are core, trusted members of the design team who impact the direction of each project from its inception.

Externally, LPA places a great emphasis on thought leadership to influence the industry and educate our clients and will continue to stress the importance of embodied carbon reduction in our efforts. Catalyst Magazine is a quarterly publication that highlights trends, innovations, and forward-thinking ideas in design, and is distributed to 4000 of our clients and partners each quarter. We also emphasize speaking and publishing in external venues, including professional trade journals, conferences, and mainstream media outlets.

OUR KNOWLEDGE SHARING & ADVOCACY PLAN INCLUDES:

- Project coverage of embodied carbon reduction strategies in *Catalyst* articles.
- In our monthly newsletter, inclusion of articles on technology and new methodologies related to embodied carbon in "What we're reading."
- Participation in speaking engagements and presentations for industry events.
- Targeting clients with roadshow presentations covering LPA's abilities and knowledge of implementing carbon reduction strategies.
- Working with contractors and material suppliers to increase the development and accessibility of EPD and low-carbon material options.
- Advertising project successes with Carbon Use Intensity (CUI) reduction/target goal graphics.

"We are at a point when being 'less bad' is not good enough. Our design and construction process can't simply be about reducing the potential harm; we must be part of the solution. Collaboration is the only way to achieve meaningful results."

Dan Heinfeld, Principal

PRESS

Renovations vs. New Construction
August 9, 2021

To Address Climate Change, Architects Must Tackle Embodied Carbon
May 18, 2023

LPA Signs SE 2050 Commitment to Eliminate Embodied Carbon from Structures
April 11, 2023

CATALYST

An Office Made of Wood
March 23, 2021

Reducing Carbon Emissions on a Corporate Campus
December 22, 2021

Answering the Epic Challenge
July 27, 2023

Expanding Our Performance Metrics
November 6, 2023

Class B Metamorphosis
February 5, 2024

REDUCTION STRATEGY

Structural systems account for about half of the embodied carbon in a typical building project, with steel and concrete being the greatest contributors. Working as a core part of an integrated design team, our structural engineers will gradually raise our targets for embodied carbon reduction until carbon is completely replaced in projects sequestering materials and renewable/recyclable sources by or before 2050.

OUR REDUCTION STRATEGY INCLUDES:

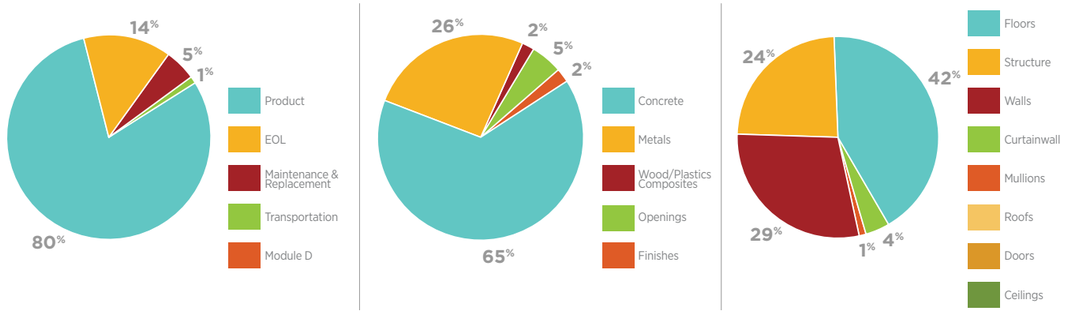
- Collaborating with local and national material suppliers.
- Material specification revisions, including:
  - EPDs for all structural project materials.
  - Limiting the sum total Global Warming Potential (GWP) of all project concrete to 90% of the NRMCA regional benchmark with no individual mix exceeding the benchmark.
  - Requiring structural steel and steel reinforcing production through EAF facilities and meeting the applicable AISC/CRSI benchmarks.
- Integrated design approach to carbon reduction at early phases of project design, informing other disciplines on the impact of design decisions to the carbon budget of a project.
- Development of an in-house database of structural systems and CUI for informed design discussions at the project concept phase.
- Focus on increasing structural efficiency and avoiding higher carbon output alternatives for framing layouts and material specs.

"It's going to take an integrated design process, partnerships throughout the supply chain, and innovations both existing and not-yet-invented to achieve the kind of progress SE 2050 demands."

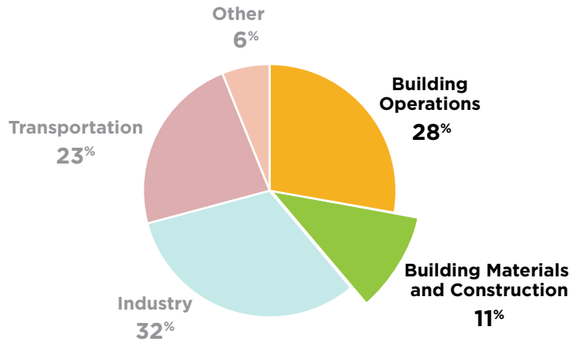
Daniel Wang, Design Director, Structural Engineering

RESEARCH CASE STUDY

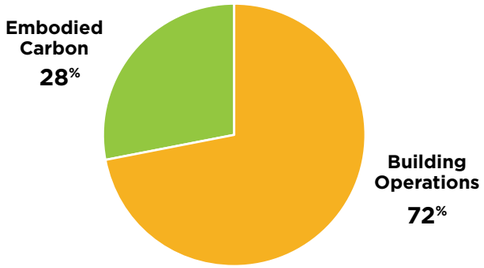
The Sustainability + Applied Research team team conducted a whole-building life-cycle analysis for a recent project. The Tally LCA tool was used in conjunction with the BIM model for the analysis. The team was able to obtain results based on different environmental impact categories, including the global-warming potential and carbon emissions of the project. The team then utilized this information to inform design decisions and looked at different siding options to lower the embodied carbon of the envelope.



Buildings generate nearly 40% of annual global greenhouse gas (GHG) emissions.



Embodied carbon accounts for more than one-quarter of annual building-sector emissions.



Full report click here

Developed through LPA Sustainability and Applied Research – the firm's in-house research group.

REPORTING PLAN

LPA was an early supporter of the AIA 2030 Commitment. Since 2012, we have led the industry in progress toward net zero energy use and are one of the few large firms to have met the AIA 2030 Commitment energy reduction targets. Last year LPA reduced predicted fossil fuel use in its projects by 78.7% from baseline.

We will address embodied carbon reduction with the same resolve that has characterized our approach to operational carbon, using lessons learned and best practices that successfully achieved a firmwide transformation of design process.

OUR REPORTING PLAN INCLUDES:

- Running LCA on all feasible projects at CD phase including a baseline building analysis comparison.
- Setting CUI reduction goals at the beginning of a project and documenting after project completion.
- Commitment to submitting a minimum of 5 projects to SE 2050.
- Cataloging EPD data of common specified products and adding requirements for EPD data to be incorporated in submittals.

LESSONS LEARNED

Our first year since signing the SE2050 Commitment has been full of learning opportunities. The following “lessons learned” will inform our evolving efforts to understand, measure and reduce embodied carbon in structural systems.

LCA MODELING

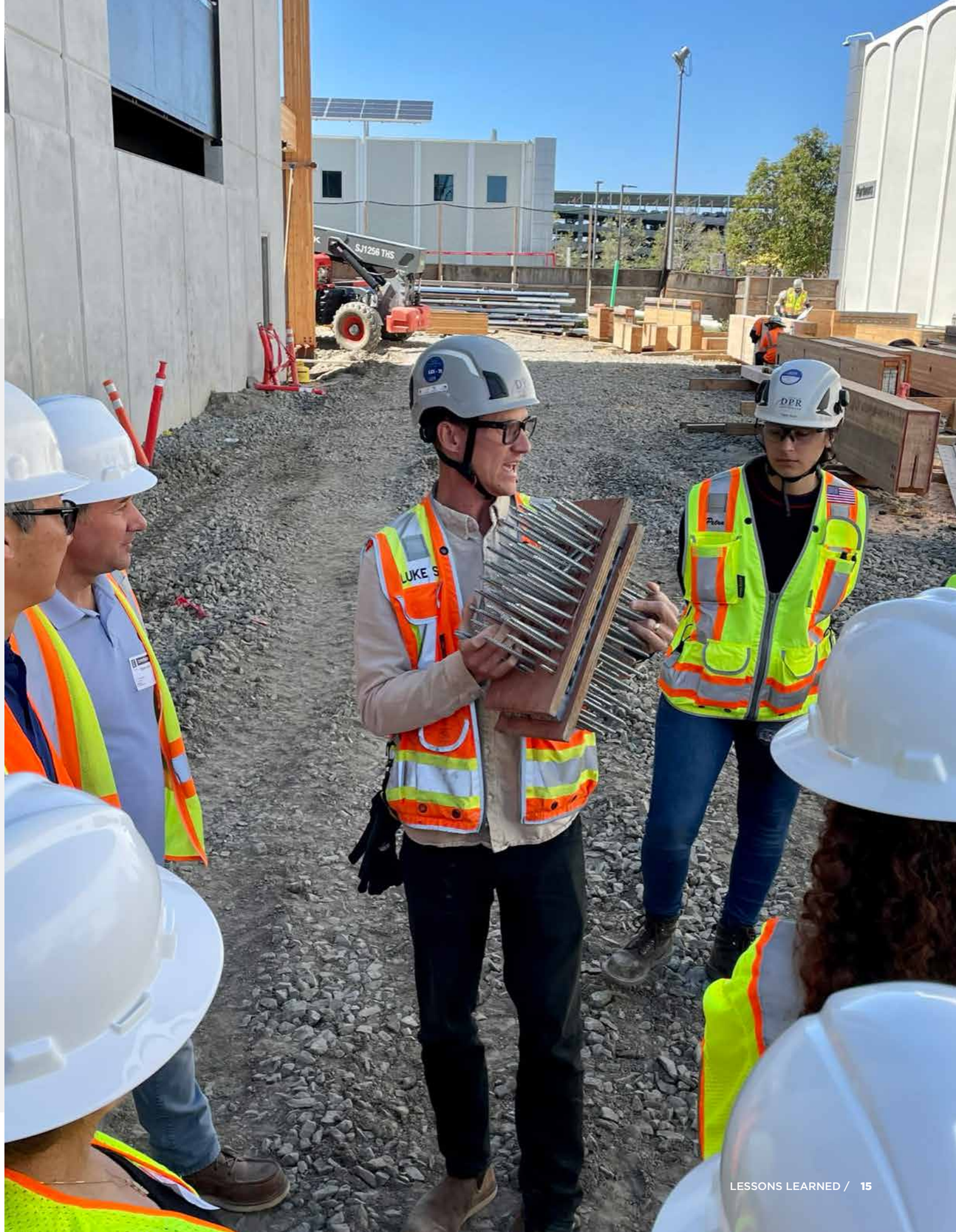
- Developing appropriate modeling guidelines for all unique building elements and material types is key to an accurate Life Cycle Assessment.
- We are working to understand the best practices when assigning regional EPDs and communicating with local suppliers on the availability of reduced carbon concrete mixes.
- There needs to be a higher level of detail in the LCA output regarding unmodeled elements such as plates and bolts for steel connections and reinforcing ratios for concrete elements. We are developing strategies to accurately estimate this bill of materials for future life cycle assessments.
- We understand global warming potential (GWP) intensity will vary for similar structures depending on multiple factors for a project, including site location, authority having jurisdiction and client specific requests. These other factors will need consideration when developing baselines to compare with future projects.
- We need to establish baselines more accurately and uniformly and push into 2024 with greater intensity for conducting LCAs on our new construction. Developing an accurate database of projects is critical to reducing embodied carbon intensity from a true baseline.

MATERIALS SPECIFICATIONS

- We have incorporated the CalGreen and Buy Clean California Act (BCCA) requirements into our material specifications and are familiarizing ourselves with the nuances between fabricated and unfabricated GWP limits.
- Concrete GWP limits are particularly complicated to specify and vary widely depending on locality. Additional work will be required to develop appropriate limits for our different studios and project sites.
- When we have specified GWP limits for concrete, we have often heard from contractors that the required materials are not available, despite what we have been told by our Ready-Mix partners. While we are seeing some improvements, there is still a lack of education in the industry about embodied carbon reduction, product availability, and material cost.

PROJECT REPORTING

- We are still learning how and when to have the conversations needed to reduce embodied carbon when setting project design goals. Most of our effort so far has been identifying and revising structural features contributing to large carbon sinks and using lower-emitting materials. A more effective approach is simplification—using regular building geometry and not pushing materials outside of their sweet spot for efficacy. This requires a deeply integrated design process and needs to happen very early.
- Incorporating LCAs into the design workflow so that they are conducted more regularly is pivotal for building our project database. If not appropriately budgeted and scheduled for, conducting a life cycle assessment can be challenging during the close out of design.
- Comparing our project performance to baselines requires accurate baselines. We need this information to set appropriate design goals for embodied carbon reduction.



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