

2023–2024
Climate Action Report

SOM





SOM Chicago Green Wall
Chicago, Illinois

Committed to Climate Action

We are proud to present our third annual Climate Action Report—a survey of our ongoing work to confront the climate crisis through action, innovation, and collaboration. Over the past year we have continued to reduce embodied and operational carbon emissions in our projects, to pursue high-impact partnerships and research, and to leverage our influence in the industry to accelerate the transition to a zero-carbon built environment.

The Climate Action Group was formed to harness the collective expertise of SOM's interdisciplinary practice in order to develop and promote best practices for a resilient, carbon neutral built environment. By sharing knowledge to develop and implement high-impact and holistic strategies, we are advancing toward our goals: to design all of our projects to achieve net zero operational carbon by 2030, and net zero whole life carbon by 2040.

At the core of these efforts is our Sustainable Engineering Studio (SES), a global team of specialists that brings deep, interdisciplinary expertise to every project we design. Working as an agile in-house consultancy, the SES team empowers our clients to navigate the complexities of achieving meaningful reductions in carbon emissions. This year we have scaled up our whole life carbon consulting services, with a special focus on reducing hard-to-abate embodied carbon emissions in design and construction. Expanding our role, we have begun to advise on projects designed by other firms; our team is now positioned to serve as an expert third-party reviewer for carbon assessments.

As architects, engineers, planners, and designers, we have the opportunity to make a significant impact in reducing carbon across the entire building life-cycle. Projects

completed and underway this year demonstrate this commitment. In Redwood City, California, the new county headquarters—a net-zero energy building with a hybrid timber structure—reflects the municipality's leadership on the environment. At UC Berkeley, our transformation of the Grimes Engineering Center achieves significant savings in embodied carbon by repurposing an existing structure. Likewise in Milan, where the reimagined Corso Italia complex balances heritage conversation with a circular economy approach to material reuse. We have brought a focus on whole life carbon to our own offices, too: the recent fit-out of our new London studio centered on a comprehensive approach to reduction and reuse, showing that cost and carbon savings go hand-in-hand.

Beyond our client work, we remain deeply engaged in research and advocacy. From helping to develop the world's first Net Zero Carbon Building Standard, recently launched in the UK; to advising on city policy to incentivize building reuse in San Francisco; to sharing expertise at COP29; we are dedicated to furthering a global dialogue on accelerating the transformation of the built environment toward a post-carbon future.

Collaboration across disciplines and geographies is inherent to the way we work at SOM. As we continue to refine strategies to reach our 2030 and 2040 climate targets, we remain steadfast in our belief that meaningful climate action is a shared endeavor, requiring partnership across the public, private, and academic sectors. More than celebrating progress, this report is an invitation to collaboration. We hope you will join us.

—
**SOM Climate
Action Group**



The New York Climate Exchange
Governors Island, New York

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YEAR IN REVIEW: 2023-2024

Over the past year we've continued to accelerate our progress in reducing embodied and operational carbon in our projects, to forge high-impact partnerships, and to leverage our influence in the industry to advocate for change. Here are some of the highlights. →



Highlights from a Year of Climate Action



SOM's Carbon Goals Validated by Science-Based Targets Initiative

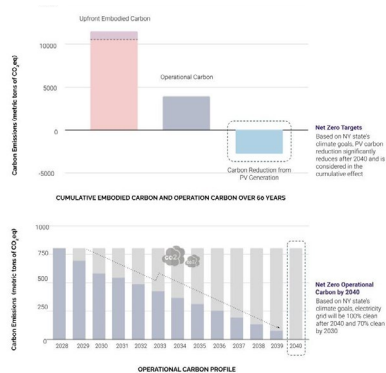
SOM's climate action goals were validated this year by the **Science Based Targets initiative (SBTi)**, an organization that defines and promotes best practice in emissions reductions and net-zero targets in line with climate science. As one of very few design firms recognized by SBTi, SOM has set rigorous and measurable goals to reduce carbon emissions in both our business operations and in the buildings that we design.

[→ Learn More](#)

Launching a New Service: Third-Party Verification of Carbon Assessments

As third-party verification is increasingly becoming a requirement for local and international sustainability certifications, our team is poised to assist our clients as an expert independent reviewer and advisor. This year, our team of carbon specialists conducted a rigorous verification of a consultant's work on life-cycle embodied carbon assessments for a major building project in the UK. Through this service, we empowered our client to meet European sustainability standards and provided evidence to support the pursuit of embodied carbon-focused BREEAM credits.

[→ Learn More](#)



San Francisco Adopts Guidelines to Facilitate Retrofit and Reuse

Led by **Lisa Follman**, SOM Adaptive Reuse Practice Leader and Associate Principal, the SF Commercial-to-Residential Adaptive Reuse Task Group brought together members of the Department of Building Inspection, Fire Department, Planning Department, Mayor's Office of Economic and Workforce Development, community partners, and industry experts. "By establishing clear guidance, we hope to enable architects, engineers, and developers to find innovative design solutions to unlock the potential of these historic buildings," Follman said.

[→ Learn More](#)



Genesis Marina Earns World's First TRUE for Construction Gold Certification

Designed to harmonize with its natural setting on the San Francisco Bay, the new **Genesis Marina** biotech campus achieved a significant sustainability milestone: it is the world's first building to earn TRUE Construction Gold Certification. The program, short for Total Resource Use and Efficiency, is the premier global standard for zero waste and recognizes projects that achieve outstanding levels of resource efficiency through waste reduction, reuse, and recycling practices. Unlike other certifications, TRUE focuses exclusively on waste and circular economy principles, setting the most rigorous standard for waste diversion from landfills.

[→ Learn More](#)

Mina Hasman Presents at COP29

SOM Sustainability Director **Mina Hasman** took part in multiple sessions at the United Nations Climate Change Conference in Baku, Azerbaijan. Hasman presented the UK Net Zero Carbon Buildings Standard, which SOM has helped to steer, alongside leading built environment organizations and industry experts. She took part in two additional panels during the conference: a talk exploring complex challenges in the built environment with a focus on indigenous knowledge, resilience, and equitable design; and a discussion on net zero and resilient buildings and solutions for effective transformation.

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Exhibition in New York Presents SOM's Approach to Climate Adaptation

An exhibition organized by Pratt Institute's Center for Climate Adaptation presented climate adaptation strategies in architecture and planning, featuring two island campuses designed by SOM. The exhibition took place on Governors Island, where the **New York Climate Exchange** is taking shape—a campus that embodies the institution's sustainable mission in its architecture. The project is presented in dialogue with SOM's Campus Framework Plan for Cornell Tech on nearby Roosevelt Island. Coinciding with New York City Climate Week and the UN Summit of the Future, the program included a talk with Partner **Colin Koop** in conversation with civic leaders on the challenges and opportunities for waterfront development.

[→ Learn More](#)

Our Climate Leaders in Action

2023

SOM Women’s Initiative Leads Sustainability Workshop for Undergraduates

SOM Women’s Initiative partnered with AIA Chicago and Chicago Women in Architecture to give a workshop on sustainable design strategies for undergraduate architecture students. Co-led by **Marzia Sedino**, Senior Associate Principal and a leader of SOM’s Sustainable Engineering Studio, the workshop covered essential strategies for sustainable building design, followed by an exercise in strategic positioning and facade design. Students from Illinois Institute of Technology, the School of the Art Institute of Chicago, and the University of Illinois Chicago attended the event at SOM’s office.



Sigal Shemesh Speaks on Circular Economy at New York Design Week

An event hosted by Dezeen and furniture manufacturer Carl Hansen & Son gathered a panel to discuss the circular economy in architecture, interiors, and furniture design. SOM Sustainability Lead **Sigal Shemesh** shared insights on the firm’s approach to considering the environmental impact of materials and furniture at every stage of a project’s life cycle.

[→ Learn More](#)



Luke Leung Shares Expertise on Decarbonization

A leader of our Sustainable Engineering Studio, **Luke Leung** has advised on strategies to reduce embodied carbon with experts around the world—from Building Department officials in Hong Kong to the annual meeting of the U.S. Department of Energy’s HESTIA program, which focuses on transforming buildings into net carbon storage structures. He also advised the National Renewable Energy Laboratory (NREL) and Wells Fargo on funding clean energy startups.



Sharing Innovative Strategies to Reduce Carbon in Facade Design

A panel of technical design and sustainability experts from SOM presented their work at the 2024 Facades+ Conference, focusing on innovative strategies to manage embodied and operational carbon in building enclosures. Principal **Francesca Oliveira**, Associate Principal **John Kuchen**, Senior Associate Principal **Alex Welsh**, and Sustainability Director **Shona O’Dea** shared a broad range of research findings, with a deeper dive on two large scale projects in China: the “fish net” canopies of the Jiuzhou Bay project on the Pearl River Delta in Zhuhai, Guangdong Province, and the 470-meter-tall landmark China Overseas Suzhou Supertall Tower in downtown Suzhou.



Stefano Tronci Presents Across Asia-Pacific Region

As our Asia-Pacific sustainability lead, Associate Principal **Stefano Tronci** participated in conferences throughout the region. At the Shanghai Design Forum in June and the Hong Kong WELL Summit in July, Tronci shared SOM’s WELL certified projects and insights on the future of health and wellness in workplace architecture. At the ULI Hong Kong conference in October, he presented on adaptive reuse strategies for sustainability and placemaking. In November, Tronci spoke at the ULI REImagine Conference in Ho Chi Minh City, addressing interconnected themes of resiliency, climate change adaptation, regeneration, and livability.



SOM Experts Contribute to Publication on Integrated Design

SOM Sustainability Director **Mina Hasman** authored a chapter in the publication *Intelligent Buildings and Infrastructure with Sustainable and Social Values*. Focusing on SOM’s integrated and iterative design process to improve building performance, the chapter illustrates our approach through two project case studies.

Mirko Farnetani, SOM Embodied Carbon Lead, also contributed to the book as a peer reviewer for the chapter “The Circular Economy in Action.” Farnetani is recognized as an expert on circular economy principles in the construction industry.

[→ Learn More](#)



Chris Cooper Shares Strategies for Decarbonization at New York Climate Week

During New York Climate Week, building materials manufacturer Holcim convened a conversation between architects and city officials to discuss solutions for reducing carbon impact in the building sector. Partner **Chris Cooper** spoke about how architects can be part of the solution to addressing climate change. With a focus on embodied and whole life carbon in every project, SOM is implementing circular economy strategies to make buildings more resilient and sustainable.

[→ Learn More](#)



Kent Jackson Contributes to Economist Impact Research on Resilient Cities

A new research partnership between Economist Impact and Zurich Insurance Group assesses city-level approaches to climate risk and adaptation. Partner **Kent Jackson** was invited to contribute to the research, published in October 2024. Based on surveys of residents in 10 global cities, the report emphasizes the need for increased preparedness for climate risks, improved water management, and greater support for vulnerable populations. It also highlights the barriers individuals face in taking action, such as cost and lack of information, and presents actionable insights for building resilient cities.

[→ Learn More](#)

Peter Kindel Gives Keynote Lecture at Circular Cities Summit

Architect and urban planner **Peter Kindel**, SOM's Cities and Climate Lead, delivered the keynote lecture at the Circular Cities Summit in Dubai. The conference focused on the future of sustainable urban development in the Middle East and the application of circular design principles in urban planning to address the region's environmental challenges. In his lecture titled "Biomorphic Urbanism: Cultural and Ecological Circularity for a Sustainable Middle East," Kindel showcased four scales of circularity—the region, the city, the district, and the buildings.

[→ Learn More](#)



Using BIM to Advance Decarbonization

Sustainability and digital design experts from SOM worked with a cross-industry research group this year to develop a proof of concept for integrating carbon analysis into BIM modeling. By adding environmental data—especially the carbon footprint of materials and construction methods—into the BIM process, this initiative allows project teams to assess and reduce a building's environmental impact right from the design phase. SOM's BIM and carbon experts, **Eric Stimmel** and **Mirko Farnetani**, presented the work at a series of events including the Autodesk University Conference.

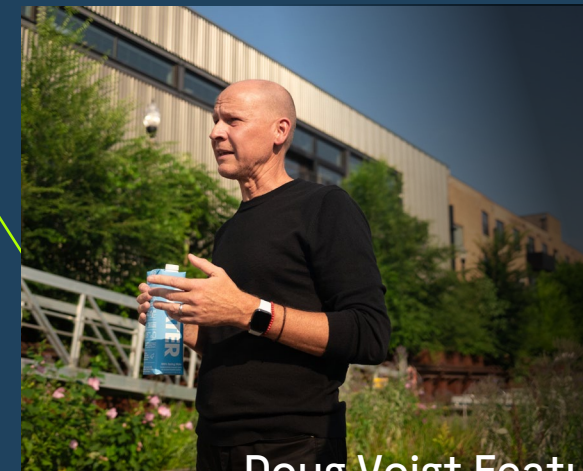
[→ Learn More](#)



Shona O'Dea Juries Sustainable Design Awards

As Sustainability Director based in San Francisco, **Shona O'Dea** was invited to serve as a juror for multiple design awards: the AIA San Francisco COTE Awards, the Center for Built Environment's Livable Buildings Awards, and the ASHRAE Young Engineers Decarbonization Challenge. O'Dea was part of the new class of architects, engineers, preservationists, and other practitioners welcomed by the GSA Design Excellence Program into the National Register of Peer Professionals.

2024



Doug Voigt Featured on Green Urbanist Podcast

Partner **Doug Voigt** was featured on an episode of the Green Urbanist, a podcast dedicated to exploring the role of urban design and planning in fighting climate change. In conversation with host Ross O'Ceallaigh, Voigt discusses the Wild Mile project in Chicago and the importance of rewilding and restoring ecological systems in cities. The project aims to reclaim part of the Chicago River as an ecological and community asset. Voigt and O'Ceallaigh discuss how the Wild Mile inspired an innovative approach to flood resilience in the Pearl River Delta.

[→ Learn More](#)



In the Press

Managing Partner Adam Semel discussed how energy-storing skyscrapers can provide a missing link in the transition to a clean power grid in **New London Architecture**.

[→ Learn More](#)

The Wall Street Journal featured Sultan Haitham City, a 1,500-hectare development in Muscat designed to foster an inclusive future for the country's growing population, as "a new model for Middle Eastern development."

[→ Learn More](#)

ENERGY-STORING SKYSCRAPERS KEY TO CLEAN POWER TRANSITION
Tuesday 22 October 2024



The Architect's Newspaper
Radical Reduction
SOM's new Washington D.C. office prioritizes people and lowers carbon footprint



Using our Washington, D.C. office as a case study, Associate Principal Charles Harris penned an op-ed in **The Architect's Newspaper** on "radical reduction," SOM's holistic workplace design philosophy centered on using resources responsibly.

[→ Learn More](#)

Can Oman's \$2.6 Billion 'Smart City' Break the Dubai Archetype?

03-19-2024 | MOST INNOVATIVE COMPANIES 2024
Accounting for a building's carbon footprint just got a whole lot easier

Fast Company named SOM to its Most Innovative Companies list, citing our Whole Life Carbon Accounting service as a "new frontier" in cutting down the environmental impact of a building throughout its entire life span.

[→ Learn More](#)

CALIFORNIA | WEST | CALIFORNIA CONSTRUCTION PROJECTS
2024 California Best Projects
Best Project, Government/Public Building: County of San Mateo, County Office Building 3 (COB3)

San Mateo County Office Building 3 earned the Best Project Award from **Engineering News-Record** as "the first net-zero-energy, LEED Platinum, mass timber civic building in the U.S."

[→ Learn More](#)

Principal Javier Arizmendi and Associate Principal Michael Oerth took readers on a technical deep dive into the facade design and thermal performance of Rice University's Ralph S. O'Connor Building for Engineering and Science in **Texas Architect**.

[→ Learn More](#)

Brick by Brick
Javier Arizmendi, FAIA, and Michael Oerth, AIA
May/June 2024
TOOLKIT

TOP 10 PUBLIC SPACE

Azure praised the second phase of Wild Mile, the transformation of an industrial canal into an eco-park and habitat for wildlife, as "an artful floating landscape of vegetation and walking paths" on the Chicago River.

[→ Learn More](#)

Why we should build cities of green skyscrapers
Buildings that act like trees could solve urban growth, reduce carbon emissions and create a cleaner environment

Design Partner Kent Jackson wrote an op-ed for **The Times** about Urban Sequoia, urging developers and governments to take a radical approach to reducing carbon emissions.

[→ Learn More](#)

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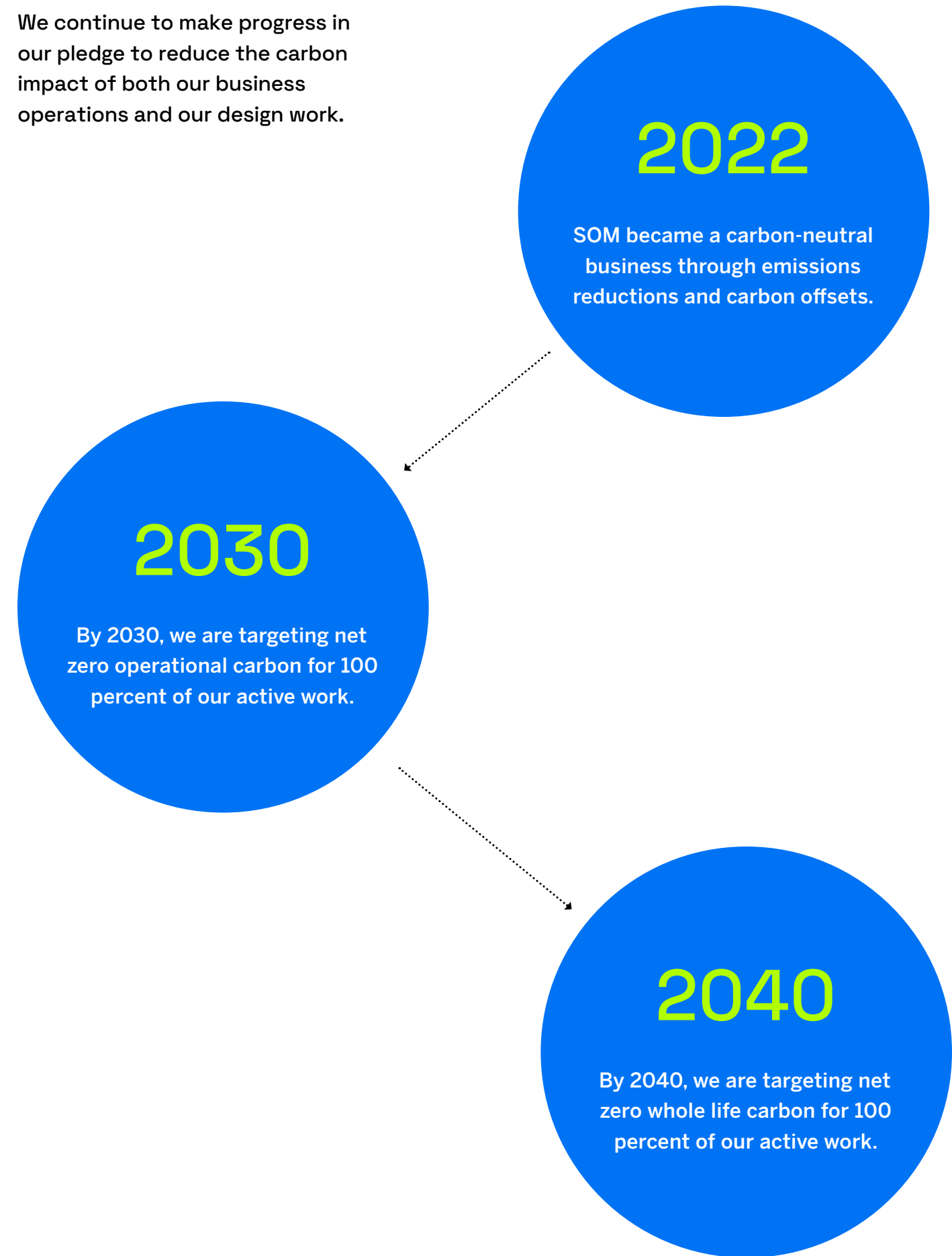
Kempegowda International Airport - Terminal 2
Bengaluru, India

PRACTISE

Our Net Zero Carbon Benchmarks

Rice University – Ralph S. O'Connor
Engineering and Science Building
Houston, Texas

We continue to make progress in our pledge to reduce the carbon impact of both our business operations and our design work.



PRACTICE

Through high-impact partnerships, we are committed to transforming the building industry



John A. Volpe National Transportation Systems Center
Cambridge, Massachusetts

Decarbonizing the built environment requires radical change in the way that buildings are commissioned, designed and constructed. Achieving this goal requires deep collaboration: As we aim to deliver on these goals in our own work, we also continue to forge alliances with organizations and advocacy groups that are pushing for policy and providing resources to accelerate decarbonization.

SOM has committed to:

Science Based Targets Initiative

Near-Term Targets

United Nations Race to Zero Campaign

Business Ambition for 1.5 °C (through the Science Based Targets Initiative)

WorldGBC

Net Zero Carbon Buildings Commitment

AIA2030 Challenge

Net Zero Operational Carbon

Building Health Alliance

COP26 Communique

Architecture 2030 China Accord

Architects Declare UK

We plan to exceed by 2040:

WorldGBC Bringing Embodied Carbon Upfront

Net Zero Embodied Carbon by 2050

MEP 2040

Net Zero Whole Life Carbon by 2040

SE 2050

Net Zero Embodied Carbon Structures by 2050

WorldGBC Advancing Net Zero Built Environment

Sector Decarbonization by 2050

We are involved in shaping climate policy

SOM has played a role in developing proposed and current legislation, citywide strategies, and industry standards. Over the past year we have contributed to the following initiatives:

Resilient America Act; Advisor

California State Assembly Bill 2446; Advisor

ICC/ASHRAE Standard 240P; Advisor

MEP 2040 Standards; Steering Committee Member

White House Office of Domestic Climate Policy – National Definition of a Zero Emissions Building; Advisor with AIA and ASHRAE

Chicago Decarbonization Strategy; Reviewer

Low Embodied Carbon Concrete Leadership Act (LECCLA), signed into law in New York and New Jersey; Advisor

City of Yes – NYC for Carbon Neutrality; Advisor

NY Climate Forward Carbon Leadership and Community Protection Act; Advisor

The Carbon City Property Tax Abatement Act New York City; Advisor

RIBA Climate Literacy and Competency Requirements; Creator

ASHRAE Center of Excellence on Building Decarbonization; Steering Committee

International Living Future Institute; Technical Advisor

Council on Tall Buildings and Urban Habitat (CTBUH); Carbon Initiative Steering Committee

LEED v5. Equity Credits; Advisor

UK Net Zero Carbon Buildings Standard; Technical Advisor and Stakeholder Engagement Lead

UK Construction Industry Council; Climate Change Committee Chair

The Commonwealth Association of Architects; Regional Vice President for Europe

ULI Europe Sustainability Product Council; Group Member

ULI Hong Kong Decarbonisation & Resilience; Group Member

ULI Asia Pacific Net Zero Product Council; Group Member

UK Green Building Council; Corporate Member

US Green Building Council; Corporate Member

Hong Kong Green Building Council; Corporate Member

Singapore Green Building Council; Corporate Member

SOM is a Carbon Neutral Business with Offsets



SOM Melbourne
Melbourne, Australia

Our sustainable values start within our own company. We remain committed to mitigating the environmental footprint of SOM's global business operations, as well as the embodied carbon impact of our workplace fit-outs.

After implementing a range of strategies to reduce carbon emissions across all our offices, we have sourced meaningful and verifiable offsets for the 8,837 metric tons of carbon from our global operations from July 2023 to June 2024.

Our approach to carbon reduction is comprehensive and quantifiable: We are committed to reducing Scopes 1, 2, and 3 emissions in alignment with the Science Based Targets (SBTi) initiative to support the global effort to limit global warming to 1.5°C. Our ongoing goal is to continue to lower our

firm's whole life carbon footprint, while addressing any unavoidable emissions through high-quality offsets that align with the Oxford Offsetting Principles, maintaining our status as a carbon-neutral business.

Measuring carbon emissions year-to-year brings our attention to areas where we need to improve. Notably, we saw an increase in carbon emissions in 2023-2024 related to business travel. While virtual meetings still play an important role in our work, we and our clients are still adjusting to a post-pandemic global business environment. We have seen a growing need for site visits and in-person meetings and a return to more face-to-face collaboration. Travel for business development has increased, as we pursue projects in many parts of the world. Aware that travel is currently the largest category of emissions related to our firm's business operations, we are closely monitoring our business travel each quarter and are taking meaningful steps to reduce emissions by limiting non-essential trips and optimizing travel plans.

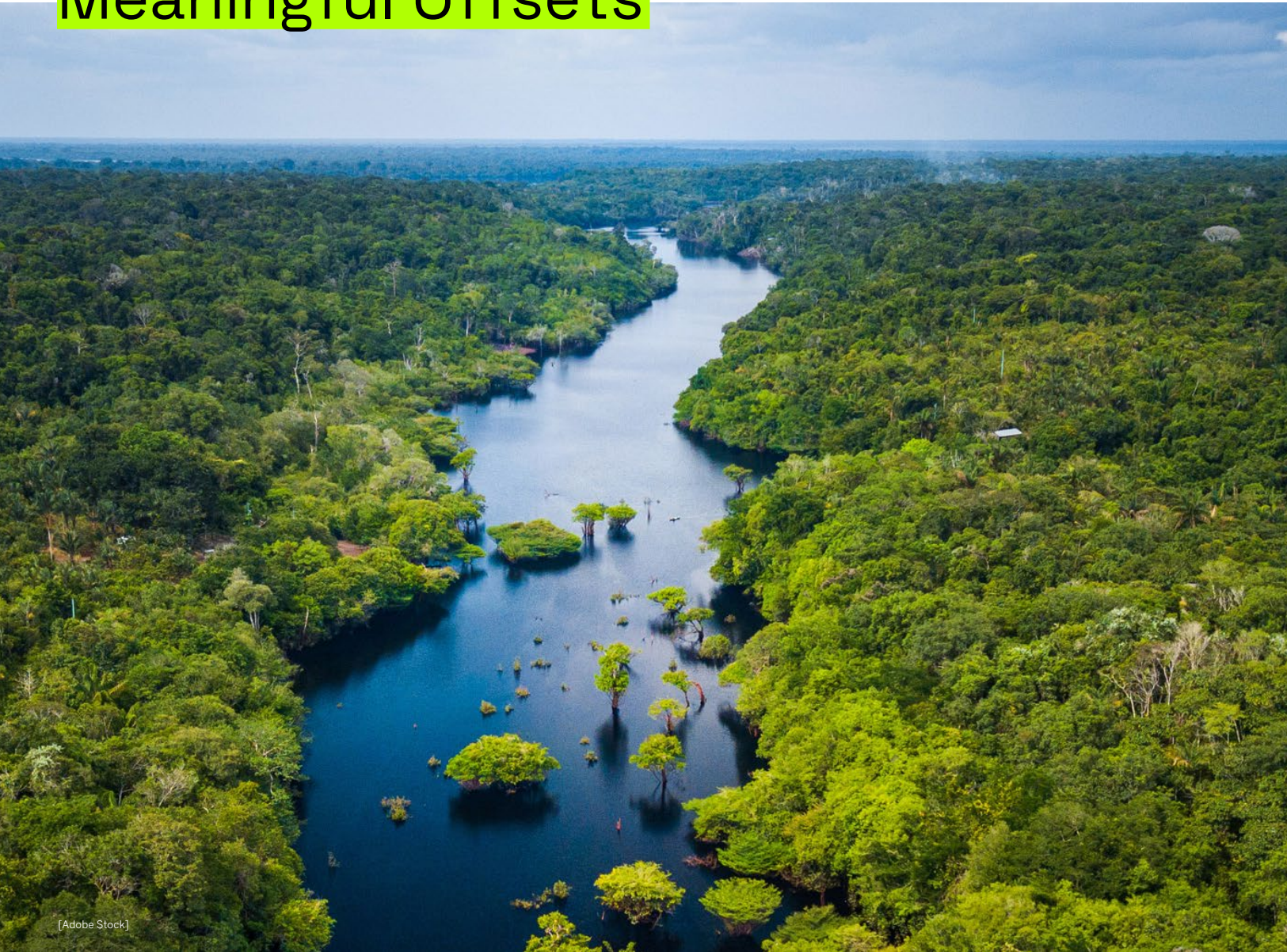
Carbon reduction efforts have continued within our workplace. Our offices are equipped with smart technologies, such as daylight-controlled lighting, automatic blinds, CO₂ sensors to regulate air intake and plug load controls that help cut down on standby power consumption. We've also minimized the use of single-use materials, reduced printing, and enhanced our recycling and waste reduction efforts. These initiatives to reduce operational emissions complement a continuing focus on the embodied carbon impact of our workplace interior fit-outs. Over the past year, our design teams completed renovations or retrofits of our offices in London, Melbourne, Guangzhou, and Dubai, informing design decisions with upfront and life-cycle embodied carbon assessments against cost. By reducing material use, and by prioritizing local, recyclable, healthy, and low-carbon materials, our approach to our workplace interiors reflects our firm's values and the commitment to sustainable design that we seek to bring to every project.

Emissions in Business Operations, July 2023–June 2024



PRACTICE

Selecting Meaningful Offsets



SOM conducts thorough assessments to choose carbon offsets that are meaningful and verifiable.

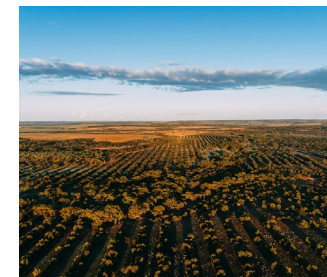
Our carbon offset methodology is aligned with the approach adopted in the Oxford Offsetting Principles, which emphasize transitioning to carbon removal rather than relying solely on carbon avoidance credits. Our current mix of offsets includes approximately 20 percent carbon removal, with 80 percent carbon avoidance credits. One percent of the offsets provide permanent carbon removal through biochar (these offsets are located in India, a priority region for accelerating progress toward a 2050 net zero goal).

We gave care and attention to selecting offsets that align with our firm’s work and values. Our offsets span six continents, reflecting SOM’s international presence and commitment to making a global positive impact. Our carbon removal effort includes a carbon net-negative cellulose fiber insulation used in construction, making a direct impact in our industry. We are also supporting a shift from high emissions fuels. In Kenya, we are supporting a project to transition from charcoal to a cleaner bioethanol gas in cooking stoves—a move that reduces carbon emissions but also addresses wellbeing by reducing household air pollution and the risk of respiratory diseases. Another project addresses the innovative capture and use of landfill gas in order to generate electricity in Panama.

SOM is supporting a number of projects for ecological conservation and forestation efforts in strategic places such as the Amazon and the Yarra Yarra Biodiversity Corridor. Additionally, our support for biochar is bringing benefits to tropical agriculture and communities; biochar helps in the storage of nutrients, increases crop yields, and raises the organic carbon content of degraded soils, thus helping farming communities to move out of poverty.

The offsets are taken from verified and certified programmes within widely recognized registries including the Gold Standard, the American Carbon Registry, Carbon Neutral Australia, Puro.Earth, Natural Forest Standard, Carbon Standard International, EcoRegistry, and Icontec.

A selection of carbon offset projects we’ve supported in 2024



Yarra Yarra Biodiversity Corridor, Australia

Habitat restoration and biodiverse reforestation

[Caron Neutral Pty Ltd, Australia]



Carboneers Biochar, India

Conversion of biomass into biochar for carbon dioxide removal

[First Climate]



Advanced Refrigeration CAN, United States

Transitioning refrigeration units from high to low global warming potential (GWP).

[Adobe Stock]



Troceno Araretama Conservation Project, Brazil

Amazon forest protection and biodiversity conservation

[Troceno Araretama Project]



CarbonApp Igloo, France

Carbon net-negative cellulose fiber insulation

[Igloo Cellulose]



Carbono Rancho Victoria, Colombia

Reforestation and sustainable forestry

[Rancho Victoria]



Cerro Patacón Landfill Gas Usage, Panama

Capture and use of landfill gas for electricity generation

[Carbon Divest]



KOKO Renewable Fuel Switch, Kenya

A national-scale energy transition from deforestation-based charcoal to bioethanol

[KOKO Networks]

By 2030, Targeting Net Zero Operational Carbon for Every Project



Genesis Marina
South San Francisco, California

In line with our pledge to meet the AIA 2030 Commitment, we are targeting net zero operational energy in all of our future projects by 2030.

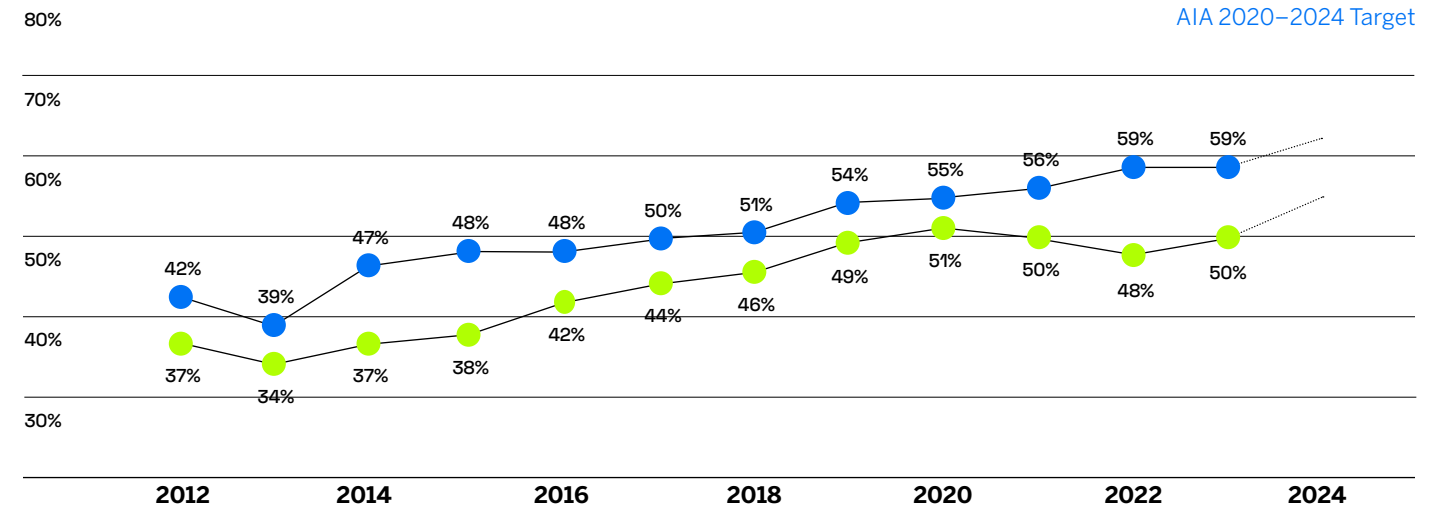
Consistently and accurately calculating the carbon impact of our design work is an essential step toward achieving our net zero goals. Our Carbon Loop Dashboard, an online platform that monitors and displays our progress in producing these calculations—presents the operational energy and embodied carbon performance of all of our active design projects.

Monitoring this data in real-time is just a starting point. With a series of upskilling initiatives across the firm, together with in-house design guides and tools, we are equipping all SOM staff with the knowledge and resources to deliver net-zero-carbon projects.

Toward 2030 Net Zero Operational Energy Goal

● AIA 2030 Commitment Average ● SOM

Average predicted performance of all SOM projects, year-by-year, from 2012 to present



Our Operational Energy Target Ranges

Note: Operational Carbon targets are estimated as an average across the program type. Target ranges are continuously being revised for each project as more data becomes available.

Government + Civic	15–20 kBTU/ft ² /year	Mixed-Use	20–25 kBTU/ft ² /year
Commercial + Office	20–25 kBTU/ft ² /year	Healthcare + Science	45–40 kBTU/ft ² /year
Educational	15–20 kBTU/ft ² /year	Aviation	55–60 kBTU/ft ² /year
Residential	15–20 kBTU/ft ² /year		

Sustainable Engineering Studio: Empowering Environmental Design



The SOM Sustainable Engineering Studio (SES) unites a global team of experts dedicated to tackling climate change through groundbreaking design solutions. SES engages with every project at SOM and pursues innovative partnerships with clients and industry peers.

Building on decades of interdisciplinary collaboration, we have continued to augment our team with specialists, forming a group that effectively operates as in-house sustainability consultancy. Through this work, we continue to identify new opportunities to expand the services we offer. With a focus on data-informed strategies and science-based solutions, we empower our clients to define and achieve ambitious sustainability goals.

True to SOM's interdisciplinary approach, our SES team embeds a deep focus on sustainability and decarbonization into every phase of the design process to create buildings and systems that are both practical and visionary. Our team includes environmental engineers, building systems engineers, sustainability specialists, computational fluid dynamics experts, energy modellers, and carbon assessors. We collaborate with architects, designers and structural engineers, as well as external consultants, clients, researchers and stakeholders, to advance a holistic approach to sustainability.

Our work is grounded in universal sustainable design principles while tailored to each region and project to deliver culturally and climatically responsive solutions. Continuing decades of collective expertise and implementing new tools and technologies, SES is shaping a future where architecture contributes to ecological regeneration and resilience.

Our Sustainability Services



Strategic Visioning

Leadership and facilitation of stakeholder engagement and holistic sustainability goal setting. Sustainability certification assessment and strategic alignment with project success metrics.



Environmental Analysis + Design

Massing and facade design analysis in relation to site and context environmental conditions, including solar and wind, envelope heat transfer, and natural ventilation. Indoor environmental quality analysis and design to optimize visual and thermal comfort and occupant wellbeing.



Whole Building Energy Modeling

Complex energy simulations at all design phases to capture the interdependencies of building design decisions, and to quantify the overall impact on operational energy intensity to identify strategies for operational energy efficiency and decarbonization.



Outdoor Comfort

External microclimate analysis to optimize and expand the duration of favourable conditions for outdoor comfort conditions, with a particular focus on existing wind and radiation conditions and the impact of planned developments towards enhanced outdoor spaces.



Whole Life Carbon Consulting

A comprehensive framework for evaluating, minimizing, and managing carbon emissions throughout the entire lifecycle of a building project. We deliver actionable design insights, advise on reduction strategies, and implement circular economy principles to achieve net zero carbon goals.



Sustainable Urban Planning

Holistic sustainability design assistance at scale—in collaboration with the city design practice—to influence strategies, such as streetscapes, development densities, mutual shading and energy load sharing.



Computational Fluid Dynamics Analysis

Analysis of wind and air flow patterns that would impact external and internal environmental conditions in order to inform design decisions.



Sustainability Certification

Strategic guidance on sustainability certification path determination by considering options, such as LEED, LEED Zero, WELL, BREEAM, Fitwell, ILFI and Passivhaus. Design support and sustainability certification administration based on the selected certification path.



Post-Occupancy Evaluation

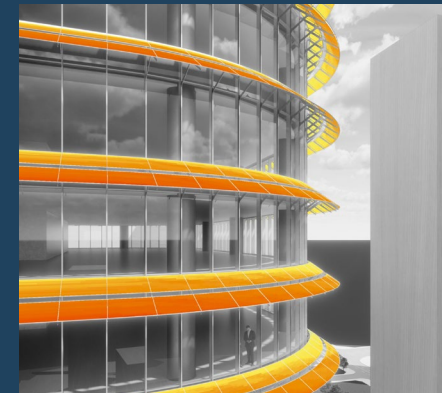
Measurement and verification of energy, carbon and wellness performance of design post occupancy, through analysis of data points, such as utility bills, submeter or interval data, occupant satisfaction surveys, indoor environmental quality measurements and operational carbon data.



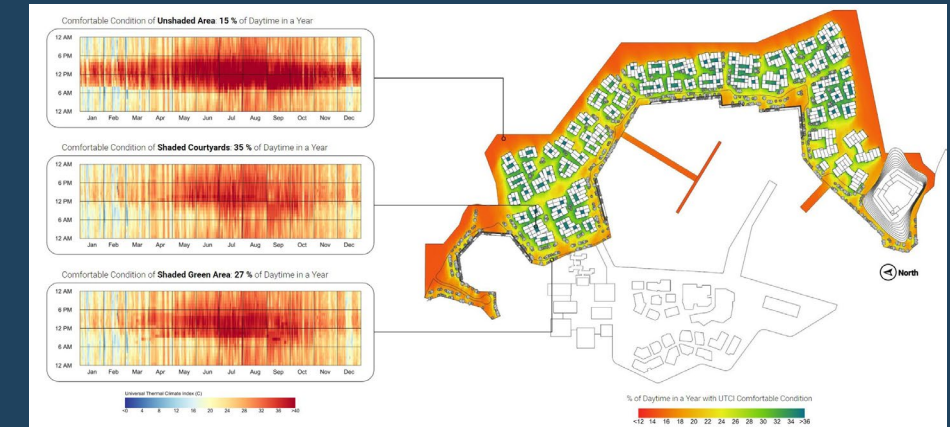
Energy Security + Efficiency Investment Planning

Operational energy performance valuation and optimization strategy for large, existing building portfolios. Data analysis and conditions assessments, impact analysis of energy conservation interventions, and synthesising retrofit bundles towards energy efficiency and resiliency over a 20- to 30-year timeline.

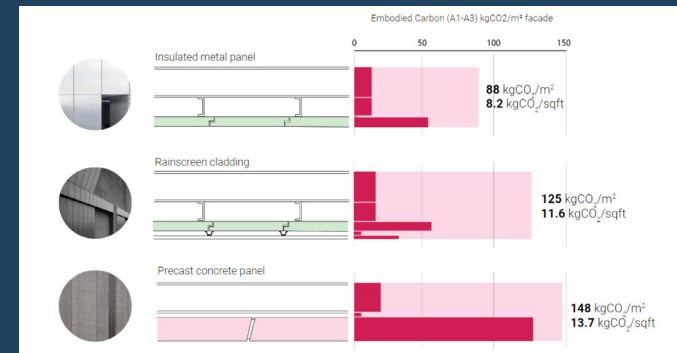
We offer a spectrum of sustainability services spanning from big-picture visioning to detailed performance analysis and engineering calculations.



Whole Building Energy Modeling



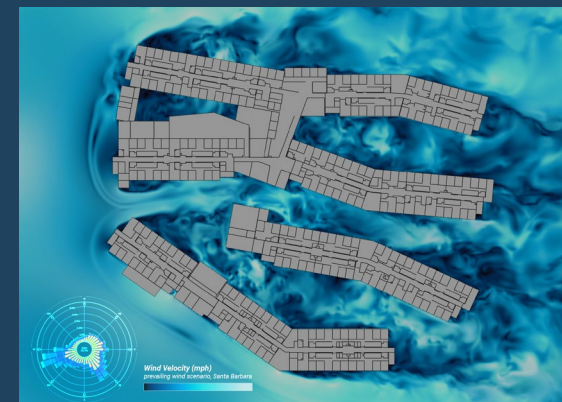
Outdoor Comfort



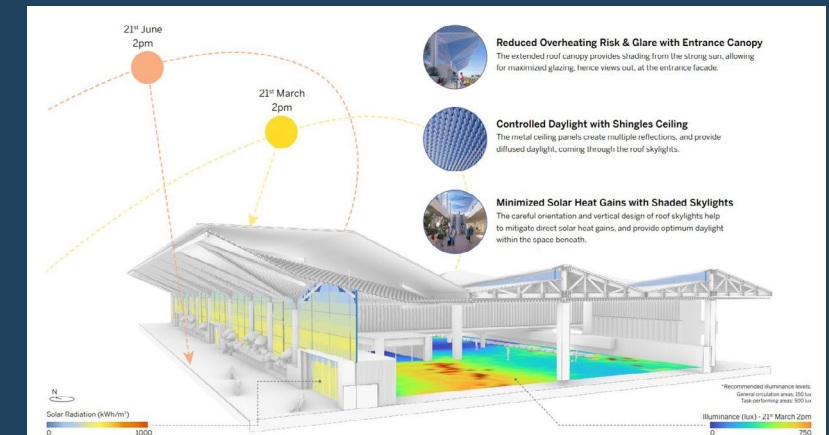
Whole Life Carbon Consulting



Computational Fluid Dynamics Analysis



Computational Fluid Dynamics Analysis



Environmental Analysis + Design

Sustainability Consulting: Spotlight on New Services

Whole Life Carbon Services



A meaningful strategy for reducing carbon in the built environment must address emissions at every stage of a project lifecycle. With a range of carbon consulting services, we help our clients achieve immediate and long-term decarbonization goals for new or existing buildings.

Whole Life Carbon Consulting

Our team of carbon experts has developed a system for evaluating and measuring whole life carbon emissions clearly and comprehensively—from the very start of a project and throughout its lifecycle. By providing a holistic view of a project's environmental impact, this service empowers our clients in the real estate sector to meet predicted, operational energy and embodied carbon emissions targets at construction completion and in-use.

Decarbonization Planning

For clients seeking to retrofit existing buildings to enhance environmental performance, our team provides comprehensive strategy and guidance. We conduct operational carbon assessments through historical data and conditions analysis, brainstorm and evaluate interventions, and synthesize recommended options towards electrification and decarbonization.

Independent Review + Third-Party Verification

As third-party verification becomes a requirement for local and international sustainability certifications, our team is experienced as an independent reviewer and advisor. Our service entails rigorous client-side oversight throughout the project lifecycle, including interim reviews during design stages, construction, and completion. Through this process our team validates carbon assessments, provides reduction insights, strengthens carbon reporting, and advises on compliance with international standards.

Energy Security + Efficiency Investment Planning



For public and private sector clients with large building portfolios, our team provides a scalable set of services to assess and optimize existing assets, with the goal of defining an energy efficiency and security plan to inform future investments.

Our 3-Step Approach

- 1 Discovery**
Our team reviews building documentation and surveys existing conditions to identify end-of-life equipment and opportunities to improve efficiency. A review of utility bills allows us to benchmark and weather-normalize resource consumption. We interview building/facility managers to better understand existing conditions and operational issues. We close out this phase with a series of Energy Conservation Measure (ECM) charrettes.
- 2 Analysis**
Our team calculates the potential operational energy and cost savings associated with each of the ECMs to determine the most effective interventions. We evaluate ECMs in terms of impact, alignment with client sustainability goals, and implementation costs.
- 3 Recommendations**
We bundle ECMs that align with client goals and milestones into a package of complementary and design-appropriate interventions. Each recommendation includes an analysis of estimated energy savings over time.

01

Year in
Review

02

Practice

03

Projects

PROJECTS

San Mateo County Office Building 3 (COB3)

85%

LESS EMBODIED CARBON THAN
A CONVENTIONAL STRUCTURE



Located in Silicon Valley, the new San Mateo County headquarters is the first net-zero-energy civic building constructed with mass timber in the U.S. Achieving an 85 percent reduction in structural embodied carbon, this flexible and contemporary workplace sets a benchmark for civic architecture.

Demonstrating civic leadership through design

When San Mateo County leaders approached SOM to design a new county headquarters, they had ambitious sustainability goals. Climate leadership is needed now more than ever, and this county on the San Francisco Peninsula is particularly vulnerable to the perils of climate change, including wildfire, drought, and sea-level rise. County leaders were also cognizant of the symbolic weight and long-term impact that this building will have. Civic buildings are built to endure for generations, and when purposefully designed, these structures can convey a municipality's values, identity, and aspirations. With its use of cross-laminated timber to reduce embodied carbon, and an efficient design that targets net zero energy in operations, County Office Building 3 (COB3) stands as a testament to San Mateo County's environmental stewardship.

Reducing embodied carbon with mass timber

Every decision in construction detailing and structural design was motivated by the goal of reducing the building's carbon footprint. Leveraging craftsmanship, engineering knowledge, and insight from the firm's research on mass timber construction, SOM reduced the amount of timber required for the structure and pared down the number of steel components. While a typical mass timber structure has 65 to 75 percent less embodied carbon than a conventional steel structure, COB3's structural timber design archives an 85 percent reduction.

Additional carbon reduction was possible through the elimination of materials—such as conventional hung acoustical ceilings, which were replaced by alternative acoustical solutions—and the specification of low-carbon materials. The prefabricated timber components made the construction process faster and more precise than conventional building processes, further reducing carbon impact.

Strategies for net-zero energy

Targeting LEED Platinum certification, COB3 is also designed to achieve net-zero energy. Solar arrays on site produce the energy needed for the building's operations, while passive design strategies reduce energy use. The glass enclosures on the building's north and south facades are recessed and shaded, while, on the east and west sides, a series of fins protect the windows. These measures minimize heat gain, reduce the need for artificial cooling, and optimize daylighting.

Enlivening downtown

From an urban design perspective, the new County Office Building is configured to link two distinct and previously disconnected neighborhoods of Redwood City: the civic campus to the east, and the



downtown commercial core to the west. The new building completes the sense of a civic campus. The H-shaped building creates two new civic plazas, one facing the eastern campus and the other opening toward downtown. With amenities including a café, a gym, and meeting rooms, the active street frontage on both sides of the building contributes to a strong public realm. The glass-enclosed lobby which links the two plazas serves as a pre-function and event space for the County's Board of Supervisors' Chamber Auditorium.

A healthy and uplifting workplace

Together with the project's environmental goals, the county sought to create a first-rate workplace that elevates the experience for its users. The workplace

design breaks down large floor plates into intimate sections. Relatively narrow, the 65-foot-wide floorplates maximize natural light. At the center of each floor, collaboration spaces are customized to each department. Top floors feature terraces, kitchenettes, conference rooms, and collaboration spaces. Internal stairways link these spaces across floors creating an active and interconnected workplace.

All occupants benefit from a design approach centered on biophilia, creating a sense of connection to nature. Timber wraps the lobby interior, and wood slatting continues as a motif throughout the building, echoing the exposed wood structural frame. The abundance of natural wood creates a soothing, visibly low-carbon environment. Natural ventilation and views toward the surrounding landscape further contribute to well-being.



PROJECTS

Corso Italia 23

70%

OF EXISTING BUILDING STRUCTURE
AND MATERIALS ARE PRESERVED



In central Milan, a 1960s modernist office complex has reopened following a comprehensive upgrade to meet today's highest standards for sustainability and well-being. With an innovative approach to retrofit and renovation, SOM has transformed Corso Italia 23 into a dynamic and verdant campus and reconnected it to the city.

Repositioning a modernist office complex for the future

Defining an entire urban block, the Corso Italia complex comprises three distinct buildings that each relate to the scale and materials of the surrounding historic architecture. Originally designed in the 1960s by the studio Ponti Fornaroli Rosselli with Piero Portaluppi, it represents a unique collaboration among some of the city's leading modernist architects. While innovative in its time, its age had begun to show more than fifty years since its completion; the complex was in need of a retrofit to meet contemporary standards for a world-class workplace. In 2018, SOM was selected to imagine its next chapter.

Taking an innovative approach to retrofit and renovation, SOM sought to preserve the spirit of the original architecture while radically transforming the buildings from within. The design team rediscovered Gio Ponti's intention

to create a sense of connection with the city and within the complex, creating new links within the buildings. The large interior courtyard, previously used for vehicle access and parking, has now become a central garden that unifies the entire campus. With plantings and seating areas, the courtyard is connected to a network of amenities for building tenants. New, glass-enclosed entrance lobbies offer views into the garden courtyard, giving the formerly insular complex a new sense of permeability.

A human-centered, amenity-rich workplace

Our renovation honors the original architects' vision while addressing the needs of the contemporary workplace. New openings in the floorplates accommodate dramatic spiral staircases, creating physical and visual connections between floors. Central hub spaces connect the office floors vertically, offering tenants a range of common areas.



churches of San Paolo Converso and Santa Eufemia. Each intervention was carefully planned to align with conservation requirements. Embracing all facets of sustainability—environment, well-being and digital connectivity—the project has achieved LEED Platinum, WELL Gold, WiredScore Gold, and EPC A+ certifications.

Recycling materials to reduce carbon

With a focus on preservation and upcycling, our strategy for the Corso Italia complex significantly reduced the embodied carbon impact of construction. 70 percent of the existing structure and foundations were preserved. Our team took an inventive approach in repurposing existing facade materials, including portions of original red granite which needed to be replaced due to damage and wear. The granite panels were carefully demounted, processed, and repurposed as aggregate in a new glass fiber reinforced concrete (GFRF) facade system. Composed of 40 percent upcycled granite, the GFRF facade maintains the distinctive hue and texture of the original material, while giving the building a subtly new expression. The recycling strategy resulted in 150 cubic meters of waste being diverted from landfill, reducing the embodied carbon impact of renovation.

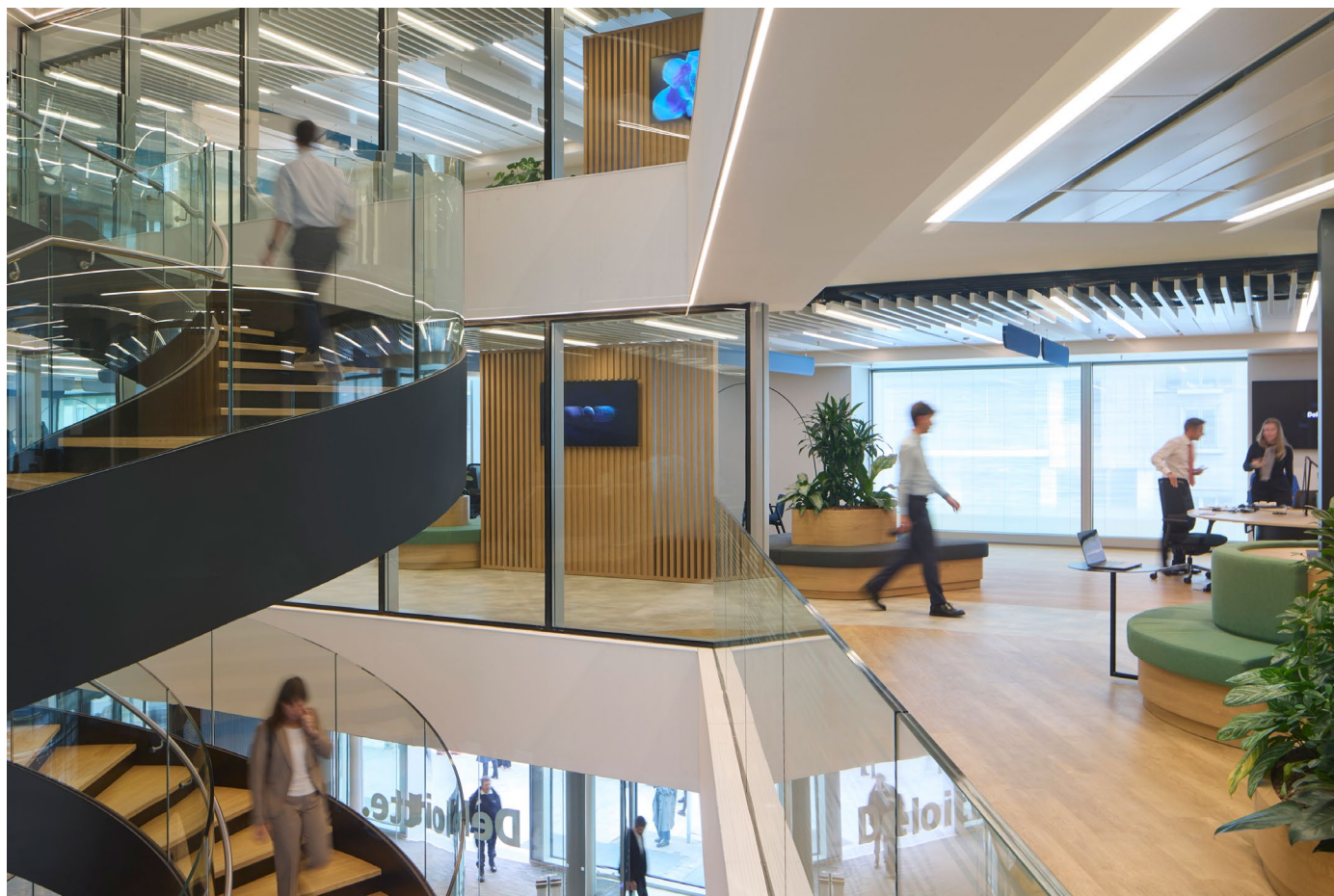
Various work settings, as well, offer choice and versatility. In addition to traditional desks, lounges and breakout spaces provide opportunities for informal gatherings and collaboration, while quieter areas equipped with soundproof booths support focused individual work. The workplaces are complemented by state-of-the-art amenities, including a conference center with a 200-seat auditorium. Additions to the roof offer further amenities including executive office terraces and green spaces with inspiring views above Milan.

Responding to heritage and sustainability

Together with our client, our team facilitated a collaborative design process involving sustainability specialists, structural and facade engineers, heritage consultants, and cost managers who worked together from concept through construction. This team engaged with local authorities and stakeholders to align design strategies with client objectives, regulatory requirements, and heritage considerations. The team worked closely with local heritage authorities from the early stages to navigate the complexity of the campus's protected status and its proximity to historically significant buildings, including the

Energizing a district, enhancing the public realm

The project coincides with a milestone in Milan's urban development: it fronts the newly opened Santa Sofia station on the M4 line, which links the city center with the airport in 20 minutes. SOM's design realizes a historic opportunity to reinvigorate the Corso Italia area as a newly vibrant workplace district. The renovation contributes to a city that honors the past while continually reinventing itself for the future. Just as Gio Ponti and his collaborators revolutionized workplace architecture with their original project, we hope that our sensitive transformation sets a new benchmark for offices and their role in cities.



PROJECTS

University of California, Berkeley – Grimes Engineering Center



lightweight glass and steel pavilion. This transparency—a counterpoint to the solid materiality of the original building—prioritizes access to daylight and outdoor spaces with a skylight at the center of the building, three stories of floor-to-ceiling windows, and terraces at the ground level and second story. Every major structural system in the building will be exposed, proudly exhibiting its resilient engineering and providing an immersive example for students to experience their area of study.

“Berkeley Engineering students will go on to design and build the future; we want the place where they learn, collaborate and innovate together to support and inspire them to make our world more equitable, healthy and sustainable for all.”

Tsu-Jae King Liu
Dean of Engineering

The renovation and expansion of an existing facility will create a dynamic and welcoming presence for the College of Engineering community. Adapting an existing structure, the project advances the university’s goals for environmental responsibility, equity, and inclusion.

Transformation at the heart of campus

Engineering is a core academic focus at the University of California, Berkeley, and since the Engineering Center’s establishment in 1980, enrollment in the discipline has grown by more than 80 percent. As Berkeley Engineering anticipates continued growth, the importance of the Engineering Center is clear: it is the social core, interdisciplinary nexus, and entrance to the college. Through a project that adapts and builds upon the former structure, the new Grimes Engineering Center will expand capacity and foster a dynamic culture of collaboration.

Adaptive reuse as a strategy for sustainable growth

Repurposing the original structure as the foundation for a new building, the redesigned Engineering Center adds 35,570 square feet to the former facility with a

SOM conducted a whole carbon life cycle analysis, comparing the impacts of retrofitting the existing building with the demolition and construction of a new building of the same size and materials. The analysis demonstrated significant carbon savings, including a 45 percent reduction in the structural system, a 29 percent reduction in the new exterior enclosure, and more than a 90 percent reduction in demolition and off-hauling. The analysis affirmed the university’s decision to build upon the existing building, consistent with the University of California’s broader sustainability goals.

PROJECTS

Kempegowda International Airport, Bengaluru – Terminal 2

380,000 m²

WORLD'S LARGEST LEED PLATINUM
PRE-CERTIFIED AIRPORT



Reimagining the travel experience through biophilic design, the new gateway to one of India's largest cities transports passengers through a landscape inspired by Bengaluru's "garden city" heritage.

Transforming a major travel hub

The new addition to Kempegowda International Airport, Bengaluru, marks a major moment in the growth of one of India's largest cities. It conveys a unique sense of place, providing travelers with a meaningful civic gateway that emphasizes the city's rich culture and natural landscape. In a sequence of distinctive spaces, this bamboo-clad, densely planted transit hub and terminal create a calm oasis within the bustle of

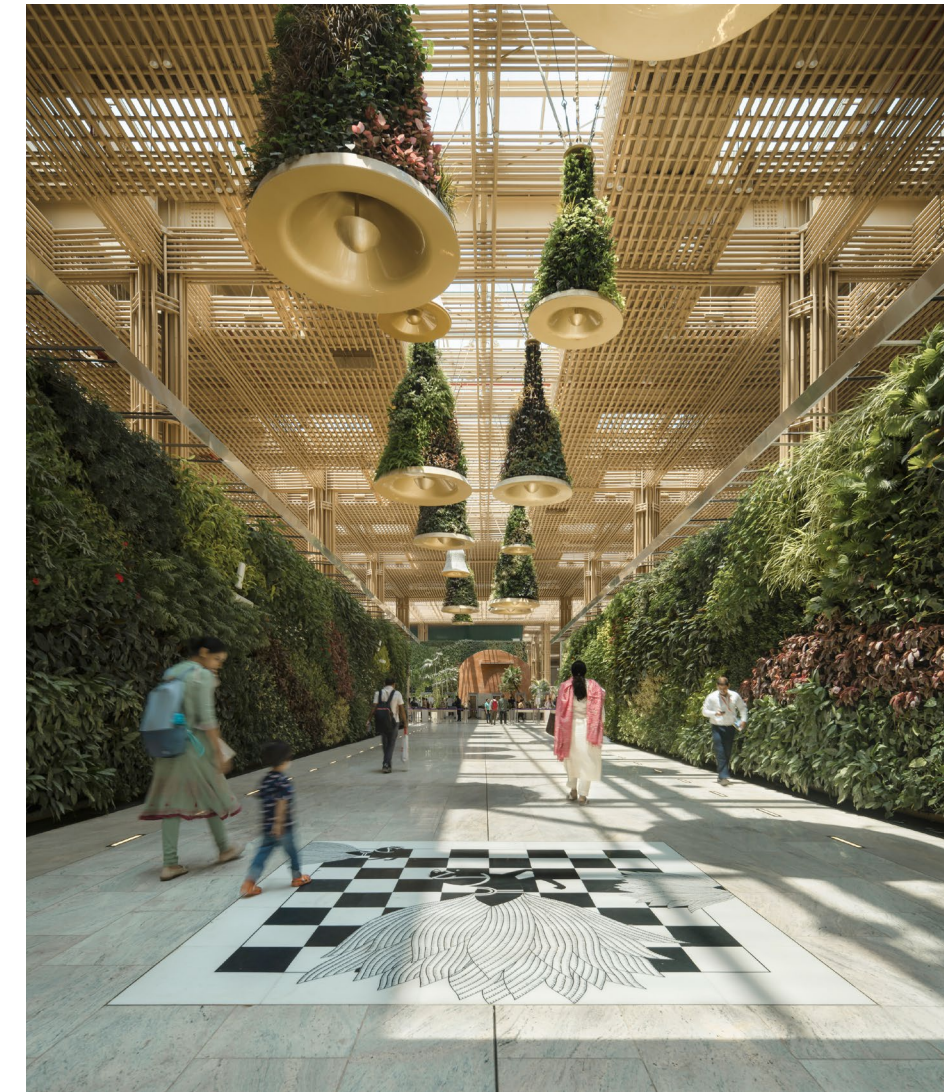
an international airport—all while doubling its capacity from 25 million to 50 million passengers per year.

Inside, travelers are surrounded by green walls and hanging gardens. The ceiling, made of layers of cross-laid engineered bamboo, filters light as though it were a garden pavilion. Between the gate concourses and the terminal building is the "forest belt"—a 90-meter-wide, outdoor swath of lush landscape. To reach the gates, passengers cross covered, open-air bridges, which provide a dramatic experience of immersion in nature.



“Airport terminals are essentially machines for processing travelers and often glorify notions of speed and efficiency. ‘Don’t worry, we’ll get you there as fast as possible,’ they try to say. The new building at Kempegowda Airport has a different message for passengers: ‘Relax, go outside, enjoy a bit of nature.’”

Clifford A. Pearson
Architectural Record



Ambitious sustainability goals

Terminal 2 is the largest airport building in the world to have been pre-certified LEED Platinum prior to commencing operations. Beyond the gardens, the architecture implements sophisticated, holistic sustainability strategies that enable the facility to run entirely on renewable energy. These strategies include extensive solar sharing and intelligent building systems. Many of its materials are renewable, and its abundant vegetation is irrigated with rainwater that is harvested on site. Inside, the retail area's waterfalls cool the terminal's temperature.

Engineered for efficiency and adaptability

SOM's engineering team designed the project's structure to accommodate changes over time—an important consideration in the ever-evolving aviation industry. All the gates are equipped with "swing" capacity, or the flexibility to handle different wide-body and narrow-body aircrafts. This forward-looking plan will allow the terminal to thrive as an international travel destination well into the future, and will allow the airport to increase annual passenger capacity by another 20 million passengers in the coming years.

PROJECTS

Massachusetts Institute
of Technology, Schwarzman
College of Computing

31%

ENERGY REDUCTION FROM
DOUBLE-SKIN FACADE



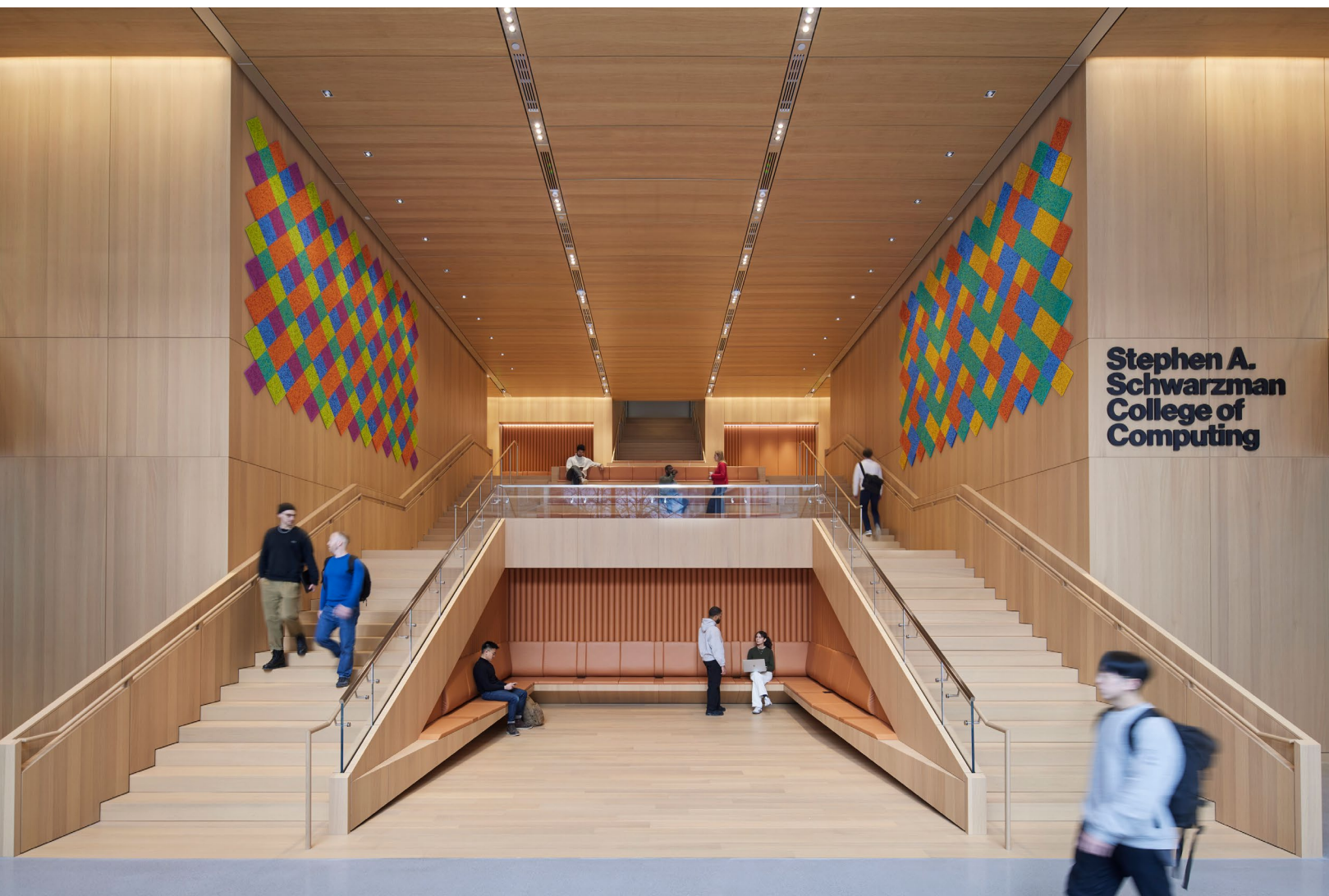
With nearly half of the undergraduate student body majoring or minoring in computer science, this new building provides a dynamic and flexible home for the Institute's new Schwarzman College of Computing.

A new presence on Vassar Street

The Schwarzman College of Computing (SCC) brings a welcoming and versatile environment to students and faculty. Situated on Vassar Street, the SCC is conceived as twin pavilions clad in large glass shingles—a counterpoint to its brick and concrete neighbors—that establishes a monumental presence. The shingles, which extend beyond the building's enclosure, likewise play a major role in the architecture's sustainability strategy. They comprise a closed cavity system, creating a thermal buffer during the winter and, with a solar-controlled fabric shade, reflecting the sun in the summer.

A future-proof structural solution

The site of the SCC presented a complex structural engineering challenge, as the Grand Junction Railway runs across the north side of the parcel. SOM explored several arrangements for the columns and load distribution before designing a clear 44-foot-long span over the tracks, with the three-story communicating stairs rising



above. This placement of the columns required incredible precision to navigate the railway's utilities, with only two inches of clearance. By pushing the columns to the edge of the structure, each floor can be modified as educational needs evolve, and will retain the flexibility to accommodate an expansion from the back in the future.

Addressing sustainability and wellness

The project is targeting LEED Platinum certification through several strategies that, concurrently, create a healthy interior. The double-skin facade, working in tandem with solar-controlled fabric shades to bring in light and maintain indoor temperatures, reduces energy use by an estimated 31 percent below the LEED v4 baseline. SOM prioritized Red List Free materials, which contribute to a more social sensibility in meeting spaces throughout the building. Potable water use has been reduced by nearly 40 percent below the Environmental Protection Agency's baseline through efficient fixtures, and that strategy is supplemented by onsite stormwater management and a large green roof. To remain resistant to floods, the building rises two feet above the street—a design move that also elevates its presence on Vassar Street.

PROJECTS

Sinochem Headquarters Tower

75%

ENERGY USE REDUCTION RELATIVE
TO STANDARD CONSTRUCTION



Designed to achieve net zero energy in operations through a combination of onsite and offsite renewables, the signature tower for China's sustainable "city of the future" sets a standard for future development.

Anchoring the city of the future

In Xiong'an, 100 kilometers south of Beijing, a new model city is taking shape. Having led the urban design for the Xiong'an New Area—prioritizing low-carbon development centered on transit and pedestrian mobility—SOM has designed the district's architectural centerpiece.

The tower, a headquarters for the conglomerate Sinochem, is an emblem for the next generation of sustainable architecture in China. Taking a holistic approach to sustainability, our team implemented a range of strategies to allow the building to achieve net-zero carbon in operations, a significant benchmark for a tall building.

Engineered for energy efficiency

The building facade embodies the project's ambition to define sustainable high-rise architecture. The innovative design combines photovoltaic (PV) panels, angled for optimal energy generation, with a system for natural ventilation. The PVs provide approximately nine percent of the building's predicted operational energy needs,



“Demonstrating a holistic approach to sustainability and human health, the new Sinochem Headquarters shows the way forward for China to achieve a net-zero-carbon built environment.”

Luke Leung
Principal, Sustainable
Engineering Practice Leader



with remaining energy needs supplied by offsite renewable energy sources. The building's distinctive octagonal geometry is configured to manage solar exposure and therefore minimize energy needs for cooling. Shading panels reduce solar radiation by 22 percent compared to a rectangular building.

The interior of the building features a vast central atrium that serves as a hub for collaboration. Architects and engineers worked together to optimize the building's structural span, thereby reducing the carbon impact of building materials.

A workplace centered on health and well-being

Care for human health and well-being informs the architecture and interiors. Walkways along the perimeter of the atrium provide employees with opportunities to enjoy natural light and views, while a porous floor plan increases connectivity and improves ventilation. Building control systems enhance indoor air quality, and sky gardens throughout the tower contribute to well-being and delight in the workplace.

PRACTICE

SOM's London Studio Gets a Low-Carbon Renovation

94%

OF THE FURNITURE IS REUSED



The recent fit-out of our new London studio shows how a strategic design process can drive meaningful carbon reduction without compromising on design excellence or cost efficiency.

By embracing a circular economy approach and applying our Whole Life Carbon Accounting methodology, we achieved a 28 percent reduction in embodied carbon emissions, while delivering 12 percent cost savings—proving that sustainability and economy can go hand in hand.

Embracing a circular economy approach

Prompted by the need for more space for our growing team in London, we saw our office move as an opportunity to demonstrate our values. Moving two floors up within the same building meant that our team could embrace a circular approach to design, reusing existing materials, furniture and fittings from our former studio. Ninety-four per cent of the furniture in our new space is reused. Where new furniture or fittings were required, we carefully sourced

FSC-certified furniture and all new joinery was built with zero-added-formaldehyde MDF. Where fittings, furnishings or equipment were no longer required, we donated these to local schools, upcycling schemes, and charitable organisations. Nothing went to landfill.

Optimizing carbon, cost, and design

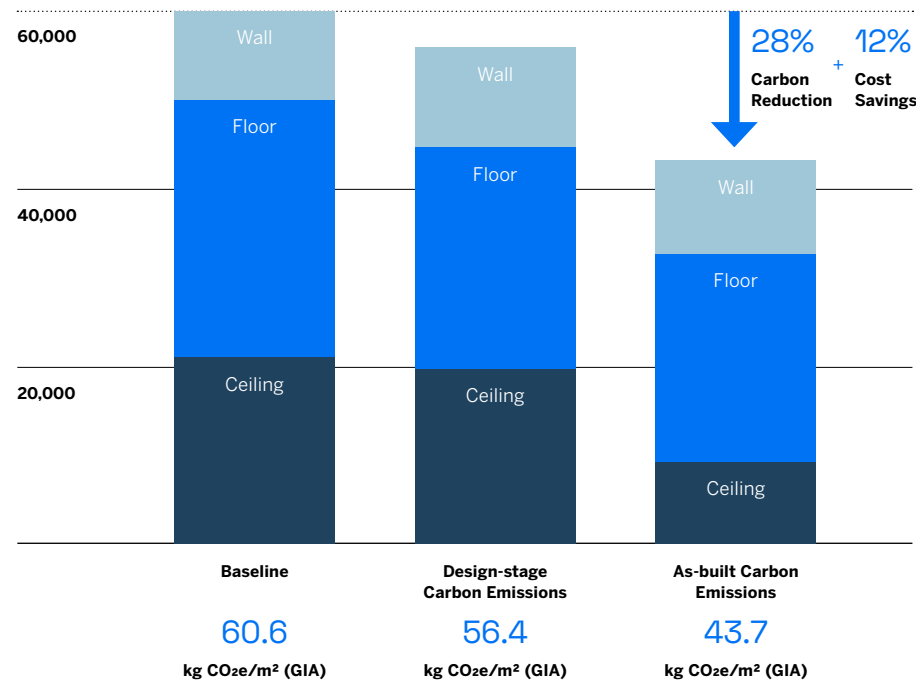
At the start of the project, we conducted a detailed material quantity assessment using the project's Revit model to establish a baseline carbon budget. This provided a clear understanding of the materials' impact and allowed us to identify key areas for reduction.

Carbon reduction isn't just about choosing the lowest-carbon option—it's about aligning sustainability, cost-effectiveness and aesthetic aspirations. Through a rigorous and iterative design process, we worked hand-in-hand with contractors and manufacturers to explore material alternatives that are both lower-carbon and cost-efficient. A key aspect of our approach was direct collaboration with material suppliers and manufacturers. Instead of simply selecting materials from a range of existing low-carbon options, we worked closely with industry partners to develop bespoke solutions that aligned with our sustainability goals without inflating costs. For example:

- **Carpet Selection** Our initial carpet choice, selected for aesthetics and durability, was found to have a high embodied carbon impact. By partnering with manufacturers, we identified an alternative that reduced emissions by 79%, while also maintaining design integrity and durability—at a lower cost.
- **Flooring** We transitioned from terrazzo slab to resin flooring, achieving a 54% carbon reduction and significant cost savings.
- **Worktops** Instead of Corian, we selected a durable laminate finish, reducing embodied carbon by 42%.
- **MDF Panels** Rather than standard



Embodied Carbon Emissions [kgCO₂e/m² of GIA] [GWP, Modules A1–A3]



MDF, we opted for no-added-formaldehyde MDF. This choice lowered carbon emissions by 15% while avoiding adverse impacts to indoor air quality—an important factor in working towards our WELL Platinum certification goal.

A model for sustainable office fit-outs

The cumulative environmental impact of office retrofits is substantial, and the need for industry-scale transformation is clear. In London alone, approximately 27 million square meters of built office

stock gets fitted out on a seven-to-ten-year cycle. We hope that our London studio fit-out offers a replicable model for future office refurbishments. Beyond the cost and carbon savings, as part of our broader commitment to sustainability and wellbeing, we are also targeting LEED Platinum and WELL Platinum certifications for this project. By prioritising low-carbon materials, optimising design for efficiency and embedding sustainability at every stage, we have created a workspace that not only supports wellbeing, but also contributes to shifting our industry towards responsible, low-impact building practices.



PROJECTS-RESEARCH + COLLABORATIONS

Our design and research teams are developing groundbreaking approaches to change how we build.

Engineering the Future of Renewable Energy



In partnership with the company Energy Vault, SOM is designing and engineering the next generation of gravity-based energy storage systems—a technology with the potential to make renewable energy grids more resilient and achieve record carbon paybacks in tall buildings.

In May 2024, Energy Vault, a company specializing in long-duration, grid-scale energy storage, announced an exclusive global partnership with SOM. Having made strides in gravity energy storage systems (GESS)—which hold the potential to store and supply renewable energy to the power grid safely, for long periods, and without degrading—the global company sought out our architecture and engineering expertise to develop the next generation of this technology. When integrated into tall buildings, GESS can maximize sustainability, accelerate carbon payback of building construction, and lower the levelized cost of energy consumption. It can also bring sustainable energy storage to natural landscapes with minimal environmental impact.

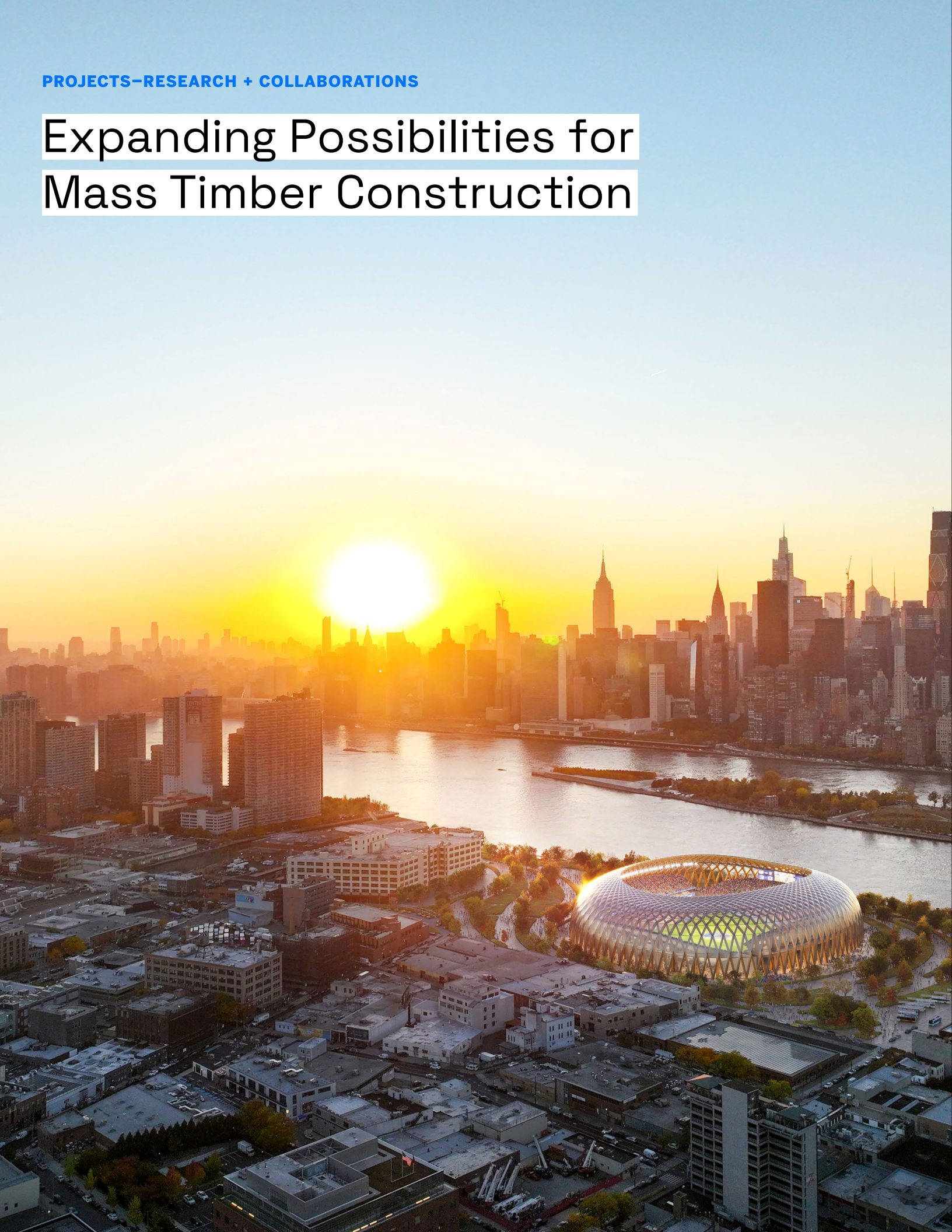
Gravity energy storage systems operate using similar principles as pumped

hydro storage, which is currently the largest source of grid storage. Unlike pumped hydro facilities, GESS installations can theoretically be constructed anywhere, opening up wide new possibilities for clean energy storage and distribution.

Energy Vault collaborated with SOM to find efficiencies in their existing EVx™ platform, enabling the design and engineering of several new typologies—including towers over 300 meters and up to 1,000 meters tall—which would be able to achieve a carbon payback within accelerated timeframes of 3 to 4 years. SOM's partnership with Energy Vault demonstrates a commitment to accelerate the transition away from fossil fuels, and also to explore how the architecture of renewable energy can enhance natural landscapes and urban environments.



Expanding Possibilities for Mass Timber Construction



Formed of interlocking timber beams, SOM's innovative Woven Timber Shell structure demonstrates the strength and versatility of wood as a low-carbon material for sports stadiums and other large-scale buildings.

The Queens Braid is a conceptual design that shows how timber, a renewable and sustainable material, can be used as the primary structural material for a sports stadium. Designed for a prominent waterfront site in Queens, New York, it is conceived as an emblem for the next generation of low-carbon architecture. The building is composed of interlocking wooden beams, applying SOM's research on self-supporting structures. With a memorable form that evokes a woven basket, the highly efficient design—named the Woven Timber Shell—dramatically reduces the upfront carbon impact of construction.

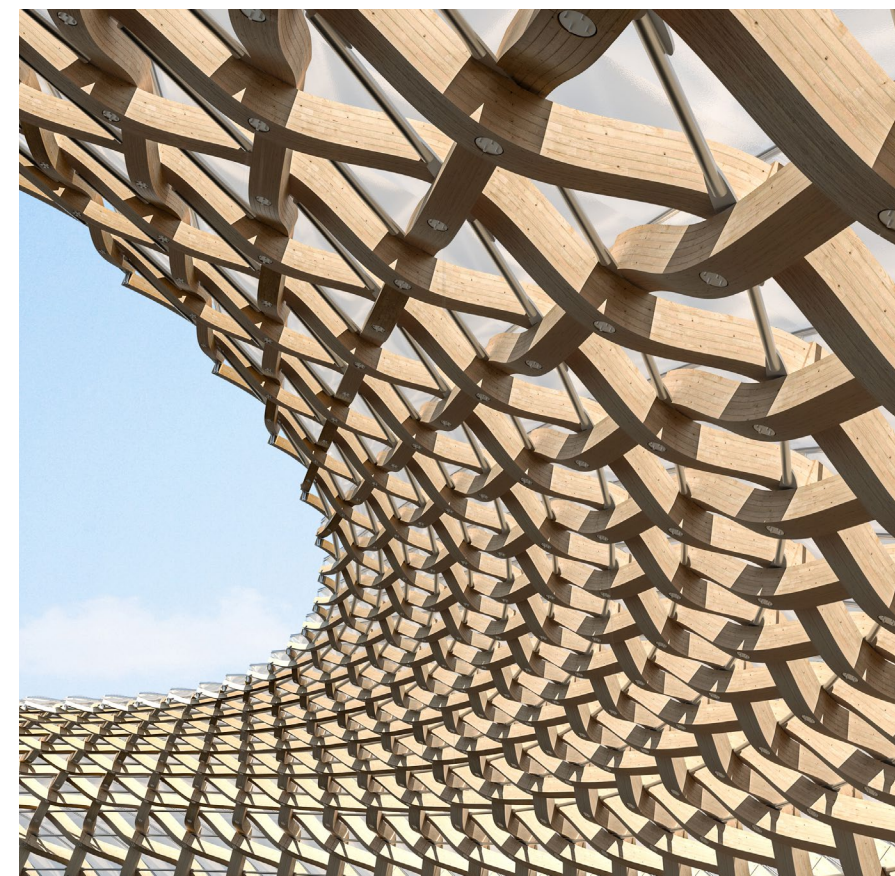
The Queens Braid aims to set a precedent, showing that timber can be a beautiful, sustainable, and cost-effective alternative for steel and concrete in large structures. The structural efficiency of the woven system reduces material use by leveraging reciprocal structure principles, further contributing to the stadium's low-carbon profile.

Our design proposes a hybrid system: concrete slabs on CLT forms are

supported on a conventional post-and-beam system, with CLT shear walls as lateral system. Through the extensive use of timber for the building's structural components—which typically account for more than half of a stadium building's embodied carbon—our design can reduce upfront carbon by 25 to 30 percent.

“One of the essential qualities of mass timber is structure made visible. SOM challenged itself and the city to create a building large and bold enough that it couldn't be ignored, one that would proclaim its woodiness to viewers across the East River or airline passengers on their landing glide path.”

Justin Davidson
Architecture Critic,
New York Magazine



Beyond reducing embodied carbon, a key advantage of using mass timber is its ability to store biogenic carbon captured by trees during their growth. This carbon remains stored in wood products even after the timber is processed. Furthermore, mass timber can be recycled or reused at the end of a building's life cycle, which helps continue carbon storage. These carbon reduction benefits could potentially lead to outcomes that exceed net zero or even achieve net-negative carbon emissions.

Industry-leading Collaborations

Hosting the next generation of decarbonization leaders

Our New York studio welcomed the Holcim Foundation Fellows for an intensive, two-week course designed to bridge education and the practice of sustainable construction. The diverse cohort of graduate students and young professionals brought a wealth of perspectives to the Fellowship's central theme, "Decarbonization at Scale." As a partner firm, we hosted the Fellows for four days in August, during which Chas Peppers, SOM Research and Innovation Leader, participated in a panel discussion co-hosted by Holcim and the Urban Land Institute at the AIA Center for Architecture.



[Bottomley Photography, Copyright Holcim Foundation.]

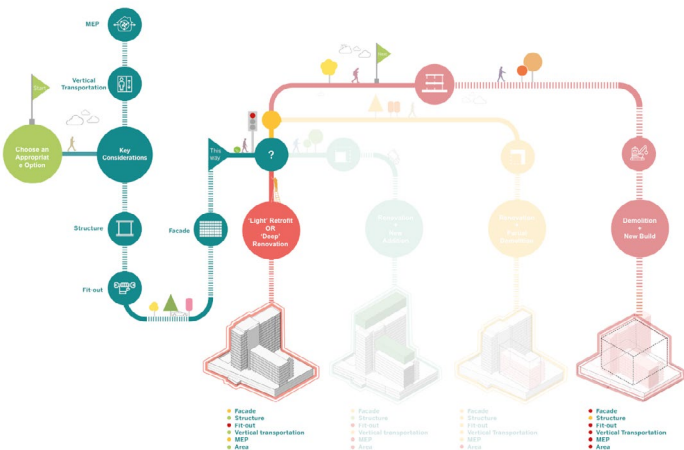
A framework for evaluating and designing sustainable workplaces

Addressing the post-pandemic evolution of business districts and aligning development with decarbonization goals, this research study creates a guideline for rethinking new and existing office buildings.

This research study establishes a science-based methodology for rethinking office buildings in the context of post-pandemic workplace evolution and decarbonisation goals. Developed through Imp'Act—a collaborative effort between BNP Paribas Real Estate, SOM, and PCA-STREAM—the approach provides architects, engineers, and developers with multiple pathways to achieve carbon neutrality in both new construction and renovation.

Using a 1960s structure in Europe as a case study, we applied an iterative design process to compare the impact of renovation and new construction at an equivalent scale. Our methodology integrates material selection, construction techniques, and energy-saving measures to identify the most effective strategies for carbon reduction, while accounting for adaptability, occupant well-being, and cost.

Our study builds upon the methodology that project teams at SOM are already using to evaluate and achieve carbon reduction goals in our client projects. By focusing on evaluation, decision-making, and design strategies, this framework offers a practical guide for aligning workplace development with the Paris Agreement and the United Nations 2030 Sustainable Development Goals.



Innovation happens through dialogue and exchange. We are always looking for opportunities to partner with organizations and companies who share our commitment to decarbonizing the built environment.

Lowering embodied carbon using organic waste as an aggregate

If scaled globally, biochar-enhanced concrete could remove 450 million tonnes of CO₂ annually—a transformative opportunity for the construction and waste management sectors.

In the U.S., nearly one third of biosolids end up in landfills, releasing methane, a potent greenhouse gas. Bioforcetech has developed a process to transform organic waste, including sewage sludge and food waste, into a carbon-negative material called OurCarbon®. The material is a form of biochar—a stable solid that is produced when organic waste is heated to extremely high temperatures in the presence of limited oxygen. When used

in concrete, every pound of the resulting biochar material stores over one pound of CO₂e durably, directly contributing to a building's overall embodied carbon reduction.

Serving as the architect and structural engineer, SOM identified key areas where biochar-enhanced concrete could be incorporated into an under-construction project. We worked closely with the concrete supplier, contractor, and the client, facilitating months of conversations and testing to navigate the complexities of using novel carbon removal technologies, making this groundbreaking project both achievable and replicable for future developments.



[↑] Testing OurCarbon® enhanced concrete

Contributing to pivotal research on building material life cycles



A study led by the Carbon Leadership Forum provides an in-depth analysis of the ways we can measure the carbon impact of building materials at the end of their service lives—a critical aspect often overlooked in sustainability assessments—and better position designers to incorporate reusable materials.

At the end of their service lives, building materials are either recovered or disposed of in landfills. The environmental impact of these decisions, however, is not always accounted for in whole building life cycle assessments (WBLCA).

Through interviews, a survey, and a workshop, the Carbon Leadership Forum teamed up with SOM, the National

Renewable Energy Lab, Building Transparency, and the University of Washington to create models that can best represent a material's end-of-life (EOL) stage. The research explores the functionalities of our existing tools and provides recommendations and future research directions to improve WBLCA processes.

Published in April 2024, the report identifies data gaps and opportunities to develop and test an open-access EOL database. The vision is to enable WBLCA tools to draw from this database and establish a universal method of analyzing EOL impacts across the industry—ultimately helping designers make better decisions on material selection in a project's early stages.



SOM London Office
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**We are working
together to build
a better future.**

Our role as architects, designers, engineers, and planners brings both unique privileges and profound responsibilities. As projects advance from concept to completion, it can be thrilling to see our sustainability aspirations emerge in built form. We hope that the work featured in this report exemplifies a new generation of low-carbon and regenerative architecture.

Facing the immense challenges of a transition to a zero-carbon built environment, SOM remains steadfast in our belief that meaningful change is within reach—but it will only be possible through deep and sustained collaboration and a commitment to radical change. Outcomes that today are considered progressive must become the norm; what is needed is nothing less than a wholly transformed building industry, where carbon is reduced across the entire life-cycle of building design and construction.

As the effects of climate change are increasingly felt in the cities where we live and work—from severe typhoons in Hong Kong to destructive wildfires in California—we remain committed advocates for our shared environment. In a challenging political and economic climate, we must redouble our efforts to push for lower-carbon materials, lower-energy designs, and innovative technologies that will enable us to surpass regulations and set new benchmarks.

None of this would be possible without our clients, collaborators, and peers who share our commitment. We are deeply grateful to our clients for pursuing record-setting goals, and to the organizations pushing our industry to do better. Progress is not always linear, but we will continue to push boundaries, advance bold ideas, and set new benchmarks for decarbonization, equity, prosperity and resilience. Together, we are committed to creating a future where the built environment meets the challenges of our time and inspires generations to come.

SOM

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