

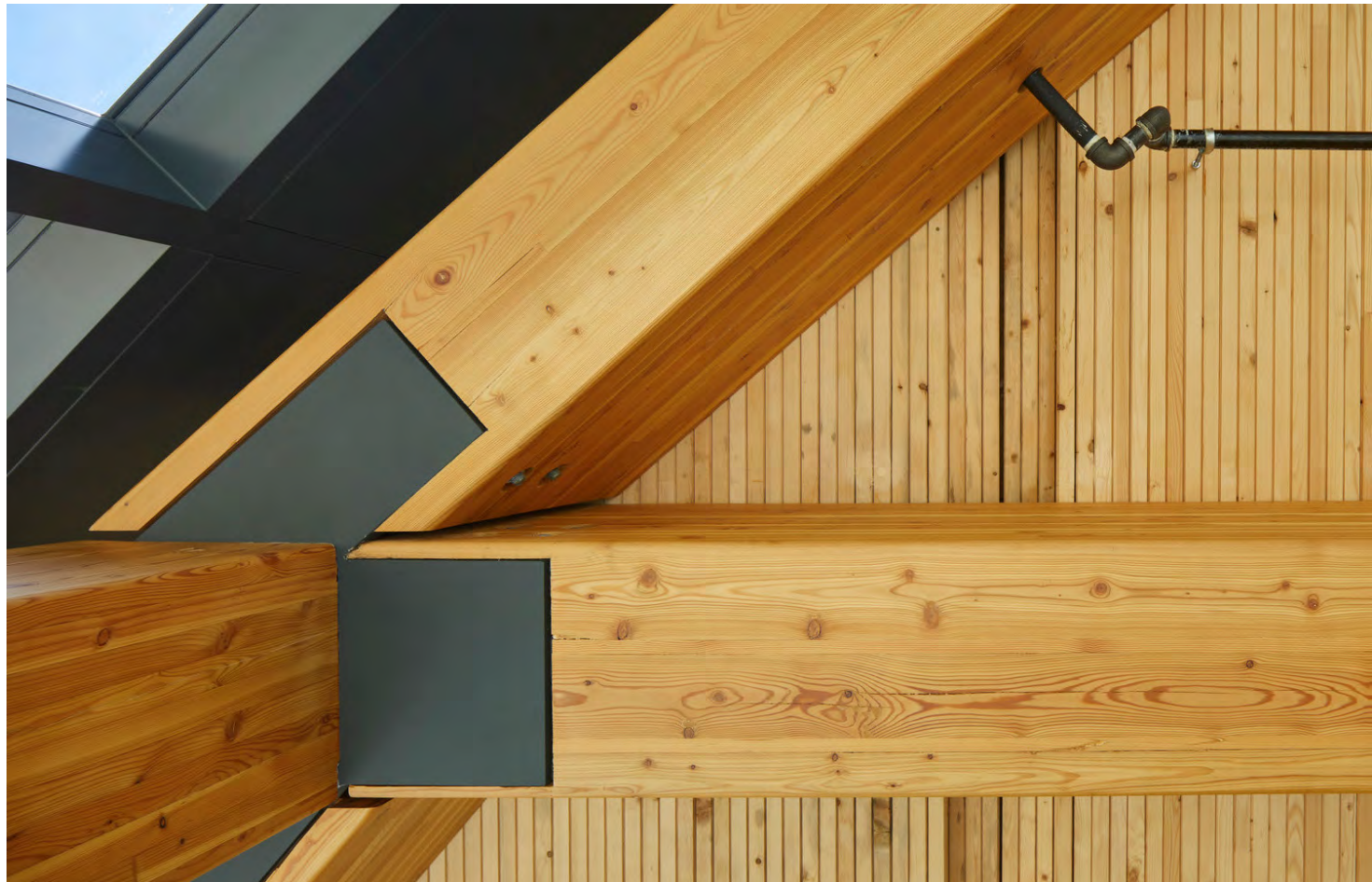


## setting the bar higher

Saying we “think like an owner” means that on every project we endeavor to create designs that are material-use efficient, easy to build, and fully aligned with the project goals. We don’t over-design — it’s bad for the budget and bad for the planet.

Coughlin Porter Lundeen has been involved in delivery of sustainable design solutions since inception through various iterations of initiatives like LEED, LBC, WELL, etc. We have supported teams and kept current with these programs as they evolved (focusing on any structural or civil nuances) and understand the value they bring to the industry and to the world.

We have watched and applauded as our regional leaders and AEC partners aim to lower the EUI target for buildings. **When we collectively raise the bar the market responds.** We are eager in our commitment to the SE 2050 Challenge and the impacts we can make on the built environment.







## a measured approach

The building sector accounts for nearly half of greenhouse gas emissions — as structural engineers we can contribute in a pivotal way by modeling the materials we use in our structures to dial down carbon intensity. With the adoption of SE2050, we help project teams create whole building Life Cycle Assessments (LCAs).

Coughlin Porter Lundeen played a pioneering role with the implementation of the Embodied Carbon in Construction Calculator tool (EC3). Like LEED in its infancy, the EC3 tool gained traction and saw a significant rise in the number of manufacturers submitting Environmental Product Declarations (EPDs) so there is more transparency in our industry.

With enticing eco-conscious options like mass timber and more transparency with older materials like concrete, coupled with modeling tools like Athena and Tally, we model and measure to reduce embodied carbon in our structures.

## sustainability task force

Coughlin Porter Lundeen's **Sustainability Task Force includes 30 team members.** They leverage the latest trends and technologies and inspire an internal culture that encourages exploration and discovery of ways in which to improve design.

**Laura Lindeman** uses her strong analytical and design skills to provide effective and appropriate sustainable solutions for Coughlin Porter Lundeen projects.

She participated in the early adoption of the EC3 tool for the 3 million SF Microsoft Redmond campus modernization and leads integration of this tool as a firm-wide standard for carbon tracking.

In support of the firm's commitment to the SE2050 Challenge, Laura coordinates the tracking and reporting of project embodied carbon levels. She manages the assessment and calculation of the embodied carbon footprint for current projects and is responsible for setting future reduction goals. Her advocacy efforts include leadership of the firm's Sustainability Task Group and active involvement with the Carbon Leadership Forum Seattle Hub.



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# West Main

**MARKET:** Mixed-Use Office  
**SIZE:** Two 16-story and one 17-story | 1,087,228 SF  
**COMPLETION:** 2023

Our team studied the global warming potential of different lateral systems for the West Main Bellevue office towers. This table shows the sustainability impact gained in each tower from using a low cement mix for the original concrete core or from switching to a steel BRB system. We regularly perform similar studies as desired by ownership and design teams, incorporating optimal building performance into our typical system selection process.

ENVIRONMENTAL IMPACT	CONCRETE CORE (STANDARD CEMENT MIX)	CONCRETE CORE (LOW CEMENT MIX)	BRACED FRAMES (BRBS)
% CO2e Reduced	Baseline Structure	<b>30% Reduction from Baseline</b>	<b>40% Reduction from Baseline</b>
Kilograms CO2e Saved	0	500,000	750,000
Greenhouse Gas Equivalent Savings	N/A	Energy Used by 64 Homes in 1 yr	Energy Used by 87 Homes in 1 yr
U.S. Forest Sequestration Equivalent	N/A	720 Acres of Forest (1 yr)	980 Acres of Forest (1 yr)



## Microsoft TEC

**PROJECT TYPE:** Thermal Energy Center

**SIZE:** 3 Stories | 90,000 SF

**COMPLETION:** 2022

Aligning with Microsoft's goals to be carbon free by 2030, this fully electric plant is expected to reduce energy consumption on campus by over 50% compared to a typical utility plant.

By centralizing the heating and cooling into one location (rather than having individual units on each building), Microsoft anticipates an energy cost-savings of roughly 30%.

Annual water savings will total over 8 million gallons – enough water to fill over a dozen Olympic-sized swimming pools. Yearly carbon savings will be equivalent to removing roughly 1,000 passenger cars from the road.



## Kaiser Borsari Hall

**PROJECT TYPE:** Life Science Facility

**SIZE:** 4 Stories | 56,000 SF

**COMPLETION:** 2024

This visionary STEM facility inspires interdisciplinary science students by merging the technical, business and policy aspects of clean energy systems within a net zero building.

Using early Revit modeling and LCA analysis tools Athena and Tally, our team provided embodied carbon comparisons data of conventional building systems against mass timber. This analysis was critical in the decision to break from tradition on campus by using mass timber for the construction of Kaiser Borsari Hall.





## 35 Stone

**PROJECT TYPE:** Office

**SIZE:** Office | 5 Stories | 177,399 SF

**COMPLETION:** 2024

This eco-conscious building in Fremont rises to the City of Seattle's Living Building Challenge, a program that allows departures from the Seattle Land Use Code by integrating advanced sustainability measures.

The design focused on reducing energy use by 25% from that of a comparable mixed-use office building. Multiple structural options considered carbon sequestration, cost, and complex programming needs – ultimately integrating a DLT mass timber system.

The building qualified for an additional 15 feet of height through integration of additional LBC sustainable design elements, including salvaged and locally sourced building materials, a 250,000-gallon rainwater cistern, rooftop beehives, and a 100-kilovolt-ampere solar panel array, for total building height of 60 feet.



## 5501 Lakeview

**PROJECT TYPE:** Office

**SIZE:** 2 Stories | 46,075 SF

**COMPLETION:** 2021

Lakeview is one of the first modern mass timber office projects to be constructed in Washington.

The concrete core lateral load resisting system with Douglas Fir DLT roof and floor panels is supported by a glulam post and beam frame. A unique framing layout underpins the structure's challenging radial geometry, with impressive 30-ft. plus long-span timber beams.

Early design decisions minimized column locations, provided optimal mechanical routing, and avoided beam penetrations, resulting in a streamlined, open office concept.

Environmental design elements include a green roof and a large bio-retention planter for onsite stormwater treatment.

# 2022 embodied carbon action plan

## EDUCATION

- ☒ Present to the company how we are promoting a firm-wide education program for embodied carbon reduction and the firm's commitment to SE 2050. The recorded presentation will be provided as a resource in our orientation/on-boarding programs.
- ☒ Share embodied carbon reduction strategies with Coughlin Porter Lundeen as outlined in Top 10 Carbon Reducing Actions for Structural Engineers document produced by SE 2050.
- ☒ Continuously update and distribute the SE 2050 library of resources to Coughlin Porter Lundeen technical staff.
- ☒ Attend monthly external education programs provided by the Carbon Leadership Forum (CLF) and continue ongoing participation in the CLF Seattle Community Hub
- ☒ Sustainability Task Group will meet in-house periodically to learn and share sustainable practices on projects.

## REPORTING

- ☐ Establish an internal training guide for embodied carbon measurement, including access to EC3 and EPDs, when/how to use Tally, and how to accurately derive material quantities from REVIT.
- ☐ Submit a minimum of three projects to the SE 2050 Database.

## EMBODIED CARBON REDUCTION STRATEGIES

- ☐ Set qualitative embodied carbon reduction goals for Coughlin Porter Lundeen focused on education for the coming year.
- ☒ Modify standard structural calculations to allow longer concrete curing times for foundations, shear walls, and columns where possible.
- ☐ Calculate Coughlin Porter Lundeen's average benchmark for embodied carbon.
- ☒ Increase use of mass timber in projects.
- ☒ Request EPDs from MFRs to make more informed decisions.

## ADVOCACY

- ☒ Describe the value of SE 2050 to clients focusing on how Coughlin Porter Lundeen and our clients can collaborate to drive adoption.
- ☒ Share Coughlin Porter Lundeen's commitment to SE 2050 on our company website and include in proposal language.
- ☒ Start an embodied carbon community of practice and mentorship program at Coughlin Porter Lundeen.



### *On Microsoft's Campus*

*Modernization the team was able to achieve a 30% reduction in embodied carbon as compared to the baseline building by specifying performance-based concrete mix designs and allowing for mixes to reach their design strength at 56 or 90 days instead of the industry standard 28 days.*

*Using a low-cement concrete mix reduced the carbon footprint by 595,000 kg CO<sub>2</sub>e, equal to CO<sub>2</sub> emissions from burning 1,400 barrels of oil.*



## lessons learned

As our team conducts more carbon studies and compares the results between several project types, we're able to quantify structural impacts to a project's carbon footprint more effectively. This understanding of sustainable design has allowed Coughlin Porter Lundeen to better inform client decisions at early stages of the project.

Our biggest opportunity to make an impact on the carbon footprint of a project is by selecting more sustainable materials. Specifying longer cure times to reach concrete strength has allowed us to procure more sustainable concrete and significantly reduce their environmental impact. When cost, performance or program limit the use of mass timber, we've helped clients incorporate timber-steel hybrid floor systems and multi-story, mass timber gathering spaces within traditionally constructed concrete floor plans – another positive for carbon tracking.

A growing catalogue of manufacturer EPDs has led to wiser decisions as we compare information about the life cycle of various products available through local construction resources.



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