Embodied Carbon Action Plan

2021-2022

MEYER | BORGMAN | JOHNSON

STRUCTURAL DESIGN + ENGINEERING

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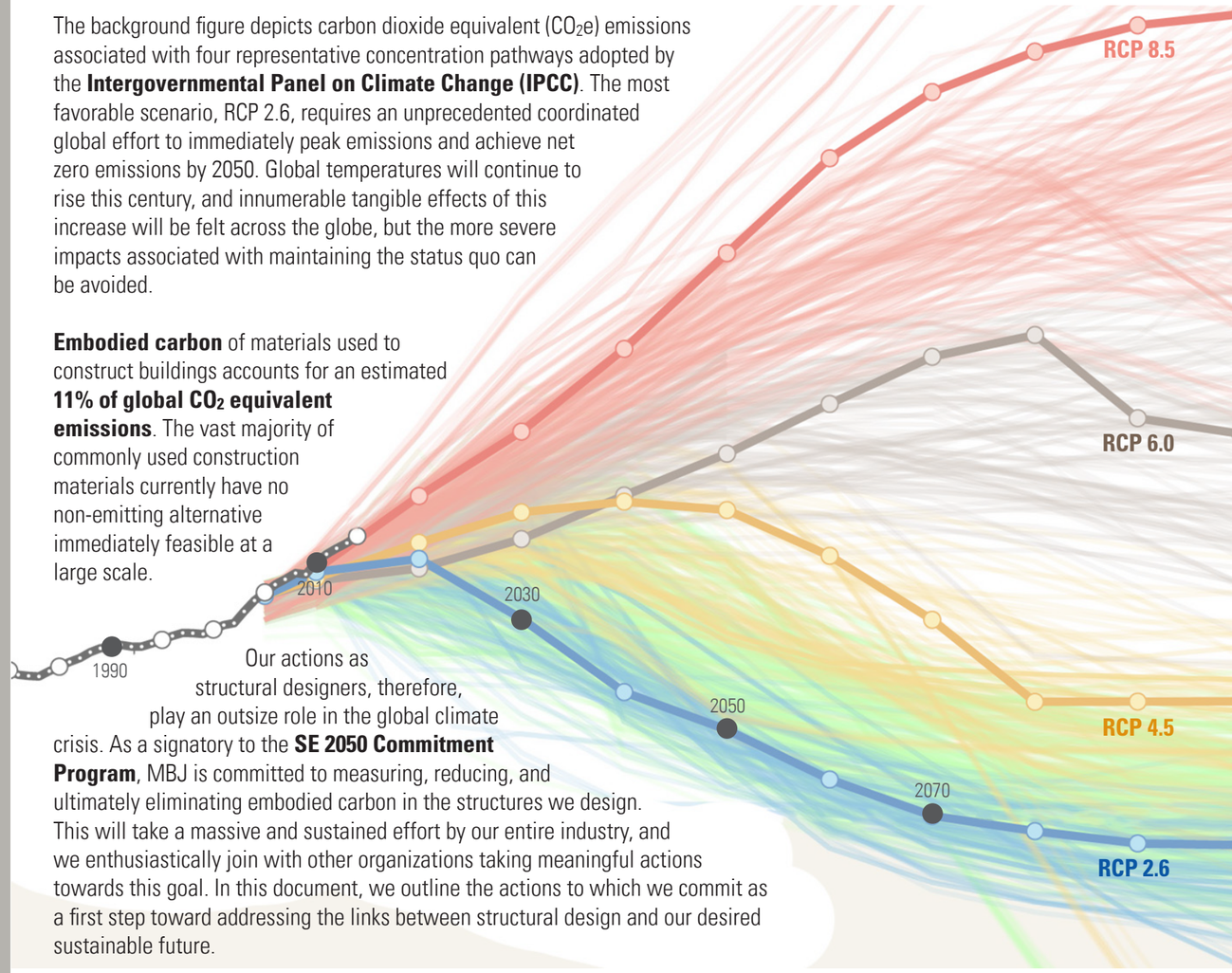
About Us

MEYER BORGMAN JOHNSON is a structural design practice pursuing innovative structures with curiosity and imagination. We listen, learn, and commit ourselves to discovering what is unique about each project and necessary for its success, then follow through to creatively addresses all concerns. We seek design solutions within the context of optimizing the whole project in collaboration with our teams. Our experience on projects across the U.S. and abroad provides a knowledge basis to apply timely insight at all stages of the construction process from inception to completion. By sharing our knowledge and remaining curious, we seek to structure places that shape peoples' lives for years to come.

About Our Climate

The background figure depicts carbon dioxide equivalent (CO_2e) emissions associated with four representative concentration pathways adopted by the **Intergovernmental Panel on Climate Change (IPCC)**. The most favorable scenario, RCP 2.6, requires an unprecedented coordinated global effort to immediately peak emissions and achieve net zero emissions by 2050. Global temperatures will continue to rise this century, and innumerable tangible effects of this increase will be felt across the globe, but the more severe impacts associated with maintaining the status quo can be avoided.

Embodied carbon of materials used to construct buildings accounts for an estimated **11% of global CO_2 equivalent emissions**. The vast majority of commonly used construction materials currently have no non-emitting alternative immediately feasible at a large scale.



Our actions as structural designers, therefore, play an outsize role in the global climate crisis. As a signatory to the **SE 2050 Commitment Program**, MBJ is committed to measuring, reducing, and ultimately eliminating embodied carbon in the structures we design. This will take a massive and sustained effort by our entire industry, and we enthusiastically join with other organizations taking meaningful actions towards this goal. In this document, we outline the actions to which we commit as a first step toward addressing the links between structural design and our desired sustainable future.

Data: CDIAC/GCP/IPCC/Fuss et al 2014

Education

Northern Arizona University, Flagstaff, AZ - LEED Platinum | Net Zero Energy

Meyer Borgman Johnson is committed to providing firm-wide education on embodied carbon reduction and our involvement with SE 2050 regularly through several methods of communication. MBJ's Sustainability Knowledge Community will be responsible for disseminating sustainability education materials and ensuring that MBJ is informed of the latest sustainability news, methods, and trends from leaders in sustainability across all industries. Firm-wide sustainability education will be provided through intranet posts, presentations by the Sustainability Knowledge Community, and seminars from external organizations. Embodied carbon education will also be provided during the company's onboarding process. In addition to internal education, MBJ will provide education about embodied carbon as it relates to structural engineering to architectural clients, building owners, material producers, and other stakeholders.

Provide External Education
We will educate architectural clients and building owners on embodied carbon in structural systems by offering presentations and project workshops so that sustainability becomes a project design metric.

Attend External Education
Members of the Sustainability Knowledge Community will attend external educational programs put on by CLF, ASCE-SEI, or other industry organizations on a quarterly basis.

Provide Internal Education
The Sustainability Knowledge Community presented a Tech Talk on 12.16.20 to announce our commitment to SE2050 and educate all employees on embodied carbon in structures. One additional in-depth sustainability Tech Talk will be presented to the entire firm, and an external vendor will provide one presentation.

The Sustainability Knowledge Community has shared the Top 10 Things Every Structural Engineer Should Know About Embodied Carbon, highlighting one action per week via an intranet post.

Reporting

Meyer Borgman Johnson is committed to leveraging effective data reporting tools and our decades of experience in structural design to track and report embodied carbon data for the benefit of the profession and our own design process.
To broaden our tracking experience and seed the database with useful inputs, we will measure and report embodied carbon for projects reflecting a range of material types and end uses and scale. By developing standards and rolling out training, we will lower the effort required to produce quality embodied carbon data and make this data more accessible to all staff so that embodied carbon considerations may influence decisions throughout the life of a project.

LCA Methodolgy
We will primarily use Tally to perform life cycle assessments (LCA) covering the whole building life cycle but may use other tools periodically as deemed appropriate. Projects reported to the database in 2021 will only include a single LCA performed either during design or after project completion.

Internal Training on LCA
Tally has been rolled out to a subset of engineers and BIM specialists and will be rolled out to 80% of engineers and BIM specialists by the end of 2021. An informal session on Tally has been presented to staff. An internal Tally standards document and database of project reports are in development and will be completed in 2021.

Reporting Targets
We will report 15 projects to the SE 2050 database in 2021, with the following project parameters represented at a minimum:

- 3 projects with custom mix designs used in the LCA
- 12 projects with design started or completed in 2021
- 3 primarily concrete projects
- 2 primarily timber projects
- 2 projects with structural CMU
- 1 project with structural cold formed steel
- 5 different building uses
- 3 different U.S. states

University of Minnesota Duluth Bagley Nature Classroom - LEED Platinum | PassivHaus

Other Embodied Carbon Reporting
We will use an LCA tool or EPDs to influence design decisions outside of the context of a whole building LCA to compare design options on a project (2 projects minimum) and to create embodied carbon intensity diagrams or similar design guidance for common design decisions (2 ECIDs or other guidance documents minimum). Such use cases are not appropriate for inclusion in the SE 2050 database but are important for driving real embodied carbon reduction on projects.

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Reduction

Tashjian Bee Center, Chaska, MN - 80% natural daylight | structural insulated panels | near Net Zero Energy

Reducing the embodied carbon in all structural systems we design is essential to meeting Meyer Borgman Johnson's commitment to carbon neutral buildings in 2050. It is not just important how much we reduce embodied carbon, but when we do it matters a great deal as well. Design and material strategies for reducing embodied carbon can be incorporated into all of our projects now regardless of building type, ownership structure, or project sustainability goals. Carbon reduction will be a priority on our projects and will be pursued within other project constraints such as budgets and program requirements. In this way MBJ will achieve carbon reduction on all projects.

Develop Strategies for Reducing Carbon
In order to take immediate action on all projects, regardless of client and owner participation, we will study the embodied carbon implications of typical design decisions for at least two common structural components such as slab on grade and spread footings to provide approachable, firm-wide tools and guidance to reduce carbon on projects.

Maximize Impact Through Early Engagement
Multiple structural systems are commonly considered in early phases of project development. On at least 6 projects in the coming year, MBJ will perform embodied carbon estimates for potential structural systems to encourage embodied carbon as a decision parameter during system selection.

Incorporate Carbon Reduction in Specifications
MBJ will work to incorporate consideration of embodied carbon reduction into one major structural specification section such as concrete, masonry, or steel.

Firm Embodied Carbon Benchmark
We will begin the process of establishing firm EC benchmarks by reporting EC intensity for at least three projects of the same project type with reasonably similar structural design criteria. We will compare average EC for overall structural systems and specific systems or materials across these projects to gain insights for future reduction efforts.

Advocacy

Meyer Borgman Johnson recognizes that the path forward for all structural engineers to eliminate embodied carbon in their projects by 2050 requires impactful collaboration. We are committed to sharing our knowledge with our industry partners in order to raise awareness of the need for immediate action across. We plan to closely follow policy actions in our communities at numerous scales and work towards collectively influencing that policy for a carbon neutral future. As we strive towards ensuring carbon neutralization as part of our organization's culture, our clients will be empowered to take the lessons they have learned from working with MBJ forward to their other endeavors such that our work will have lasting impacts beyond the bounds of a project.

Encouraging Embodied Carbon Reduction in Public Policy
We are tracking local and regional sustainability policies and assessing to what extent they address embodied carbon. Where embodied carbon reduction is an explicit goal of proposed policies, we will support their adoption. Where embodied carbon is not addressed, we will advocate its inclusion via public comment and conversations with decision makers.

Owner and Client Advocacy
MBJ will declare our participation in SE 2050 in our project proposals and will work with clients and owners to find opportunities throughout projects to make sustainability-based decisions. We plan to seek opportunities at the onset of projects to offer life cycle assessment services as part of project scope.

Incentivizing Facility or Produce Specific EPDs
MBJ will talk with at least four regional structural material producers and manufacturers about the process of creating facility or product specific EPDs and their plans to create them. On at least two projects in which owners have expressed explicit sustainability or carbon goals, we will discuss requiring a facility or product specific EPD for at least one structural material for which only industry average EPDs are commonly available as a means to incentivize the market toward improved embodied carbon data.

University of Minnesota Masonic Children's Hospital, Minneapolis, MN - LEED Gold

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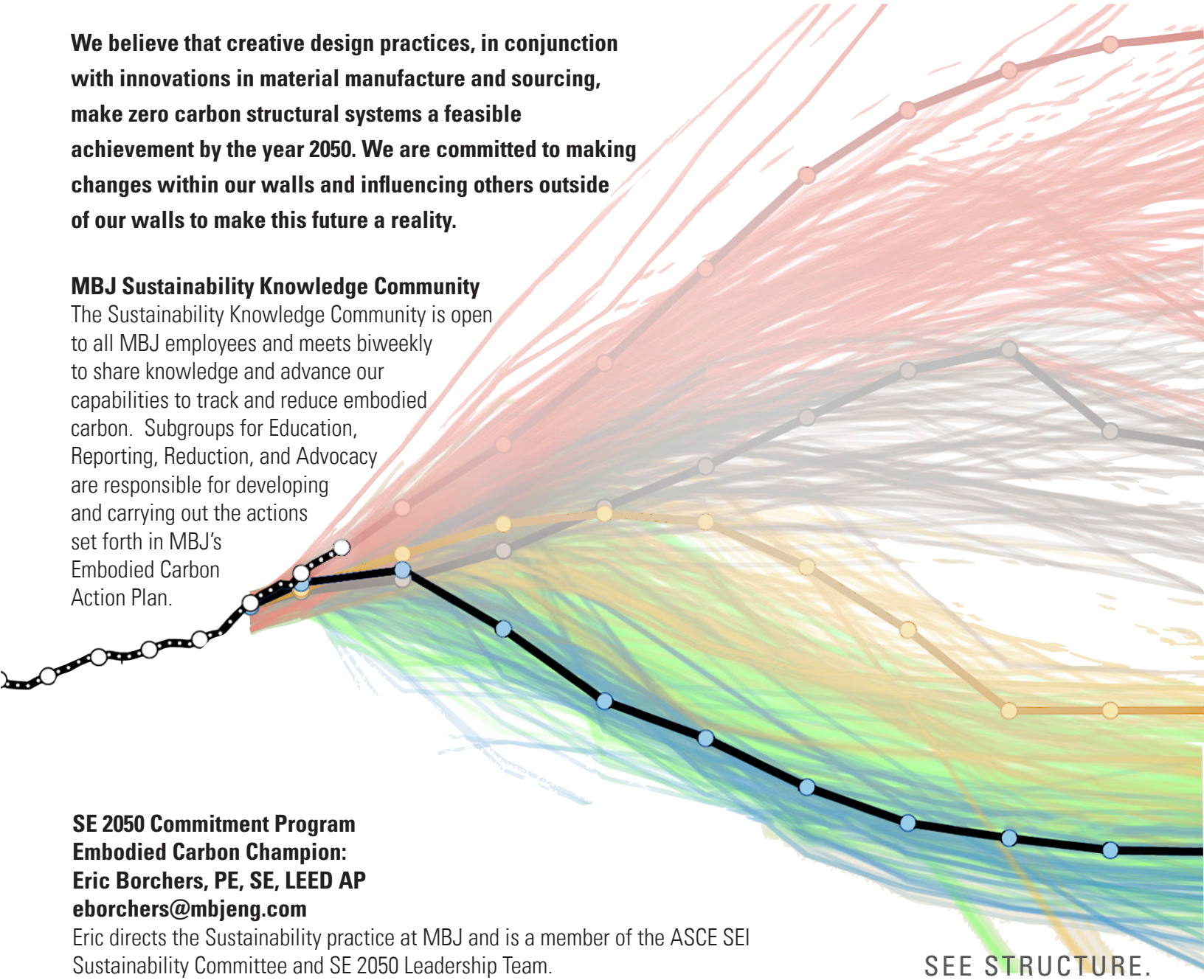
We believe that creative design practices, in conjunction with innovations in material manufacture and sourcing, make zero carbon structural systems a feasible achievement by the year 2050. We are committed to making changes within our walls and influencing others outside of our walls to make this future a reality.

MBJ Sustainability Knowledge Community
The Sustainability Knowledge Community is open to all MBJ employees and meets biweekly to share knowledge and advance our capabilities to track and reduce embodied carbon. Subgroups for Education, Reporting, Reduction, and Advocacy are responsible for developing and carrying out the actions set forth in MBJ's Embodied Carbon Action Plan.



SE 2050 Commitment Program
Embodied Carbon Champion:
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Eric directs the Sustainability practice at MBJ and is a member of the ASCE SEI Sustainability Committee and SE 2050 Leadership Team.

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