2025

IMEG
The FUTURE. Built Smarter.

WHOLE CARBON ACTION PLAN

WHOLE CARBON ACTION PLAN

Buildings are responsible for nearly **40% of global carbon emissions,** making them a critical focal point in the fight against climate change. As a company deeply committed to sustainability, IMEG acknowledges the urgency of this challenge and embraces its role in reducing carbon emissions through **innovative engineering, strategic planning, and collaborative action.** Our employee-owners are passionate about creating a built environment that is both high-performing and environmentally responsible. We believe that through our expertise in **structural, mechanical, electrical, plumbing, and civil engineering,** we can drive measurable carbon reductions and contribute meaningfully to global decarbonization efforts. We constantly strive to inspire a sustainable future through an innovative and transformative project approach and are committed to educating and collaborating across disciplines to create long-lasting solutions that reduce carbon emissions and benefit generations to come.

The **IMEG Whole Carbon Action Plan** (WCAP) serves as our comprehensive strategy for achieving substantial carbon reductions while aligning with industry-leading initiatives including **MEP 2040** and **SE 2050.** Our plan prioritizes tracking, measuring, and mitigating carbon emissions across all project phases, ensuring that sustainability is seamlessly integrated into our design and engineering processes.

By leveraging **data-driven decision-making, advanced analytical tools, and proactive industry engagement,** we aim to set new standards in sustainable engineering and push for continuous improvements in carbon reduction methodologies.

This strategy aligns perfectly with IMEG's mission to create positive outcomes for people, communities, and our planet.

At the core of our approach are two key objectives: (1) developing a **company-wide carbon tracking dashboard** to consolidate essential carbon data and monitor reductions, and (2) establishing a **transparent annual reporting framework** that aligns with evolving industry standards and best practices.

Through cross-disciplinary collaboration, continuous learning, and proactive advocacy, we are not only designing low-carbon solutions but also leading a transformative movement toward a more **energy-efficient and climate-conscious future.**

Rising to the challenges

In the fall of 2021, the Carbon Leadership Forum issued the MEP 2040 Challenge, a call to the MEP industry to target net zero carbon in their projects. The following year, IMEG became a founding signatory of the MEP 2040 Commitment, the industry's response to the MEP 2040 Challenge. The Commitment targets the primary sources of a building's MEP-related carbon emissions: operational carbon, embodied carbon, and fugitive refrigerant emissions. While it is widely understood that MEP systems, from heating and cooling equipment to lighting and plug loads, greatly impact a building's operational carbon, MEP systems' embodied carbon and fugitive refrigerant emissions are also significant sources of emissions. Together, these carbon sources are responsible for a substantial portion of global greenhouse gases. IMEG is empowered by the influence that we have as designers of MEP systems to study and reduce carbon emissions, eventually taking them to zero—all while serving the well-being and needs of building occupants.

MEP 2040
Committing to Zero

MEP 2040 Goal: Advocate for and achieve net zero carbon in operational carbon projects by 2030 and in embodied carbon projects by 2040

MEP 2040 Commitments:

1) Establish a company plan to reduce operational and embodied carbon across MEP systems on all projects, targeting zero by 2040. Measure and report progress against plan annually.

2) Request low-GWP refrigerants when designing systems to reduce or eliminate GHG emissions from refrigerants

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3) Request Environmental Product Declarations (EPDs) in project specifications for MEP system components

4) Participate in a quarterly MEP 2040 Forum and a CLF Community discussion group to share lessons learned and contribute to a growing body of knowledge

IMEG joined other structural firms across the country in 2021 for the SE 2050 initiative, which targets net zero embodied carbon in structural systems by 2050. Through SE 2050, structural engineers can work to reduce carbon through improving design efficiency and implementing lower carbon materials.

SE 2050 Goal: Achieve net zero embodied carbon in structural systems by 2050

SE 2050 Commitments:

1) Educate the structural engineering profession on the best practices of sustainable structural design and construction that will lead to net zero embodied carbon by 2050

2) Engage in an embodied carbon tracking program within the structural engineering profession, thereby enabling the establishment of appropriate embodied carbon reduction targets until net zero is realized

3) Report on the current embodied carbon impacts and trends of various structural systems for different regions throughout the country

4) Advocate and communicate with clients, the design community, and the public to build an understanding about embodied carbon and impacts of the built environment

The AIA 2030 Challenge launched in 2006 and asked the architecture and building community to drastically reduce the greenhouse gas energy emissions of new and renovated buildings, targeting carbon neutrality by 2030. The resulting AIA 2030 Commitment includes a broadscale initiative for comprehensive reporting of a building's energy metrics in the Design Data Exchange (DDx). IMEG has been a signatory of the AIA 2030 Commitment since 2021.

We have supported our architectural peers in this effort by providing energy model data, namely EUI, to architects of our projects for their reporting. We would like to increase our involvement with AIA 2030 by offering educational resources to our partners, promoting decarbonization within project scopes, and adding modeled data for 20 projects completed in 2025.

While there is not yet a challenge or commitment program in the civil engineering discipline, we know that civil design aspects can affect carbon emissions both positively and negatively. Our goal is to lay the groundwork for beginning to account for and quantify civil embodied carbon in our projects.

Later sections of this report detail IMEG's actions and plans for supporting the goals and commitments of the MEP, structural, and civil disciplines.

Whole-life, whole-building carbon

IMEG is uniquely equipped to address whole-building carbon emissions by considering the interconnected and cross-disciplinary impacts of operational carbon, embodied carbon, and fugitive refrigerant emissions. This approach can be defined as whole-life, whole-building carbon—whole life meaning carbon emissions from all stages of a building's life cycle are considered, and whole building meaning that both the individual parts and the building as an entire system are considered.

For instance, design choices such as heating and cooling systems not only affect energy consumption but also have associated embodied carbon emissions and refrigerant leakage. Furthermore, elements like insulation and structural framing also contribute to energy efficiency and have their own associated embodied carbon. While there may be design decisions known to reduce one source of carbon, it is not always clear if total carbon is similarly reduced or if there are resulting increases in another source of carbon that counteract the intended reduction.

Given these complexities, IMEG will begin utilizing a comprehensive approach to benchmark whole-life, whole-building carbon across all projects, putting us in a unique position in the industry. Our Whole Carbon Action Plan is comprised of four core sections, each of which examines a distinct aspect of the effort to reduce and sequester carbon in the built environment.

EDUCATE: This section provides information on the internal and external educational resources available or in development. These resources will increase our knowledge about whole-life carbon, decarbonization strategies, and other related sustainability topics.

REPORT: The reporting and tracking of carbon data is a key piece of IMEG's WCAP. This section of the plan explains how we plan to calculate, track, and share project-based embodied carbon results.

REDUCE: This section explains IMEG's goals and how we will engage in the effort to make reductions in the operational and embodied carbon of building systems.

ADVOCATE: As IMEG's WCAP is firm-led, it is our responsibility as IMEG employee-owners to advocate for lower whole-building carbon using all means available. This section explains how IMEG plans to share knowledge about operational and embodied carbon and promote reduction within the engineering industry and the adjacent construction and developer industries. We will be encouraging all employees to adopt these actions.

We hope this report will inspire you to learn more, ask questions of your IMEG coworkers, your design teams, and contractors, and share insight on whole carbon reduction and associated sustainability topics.

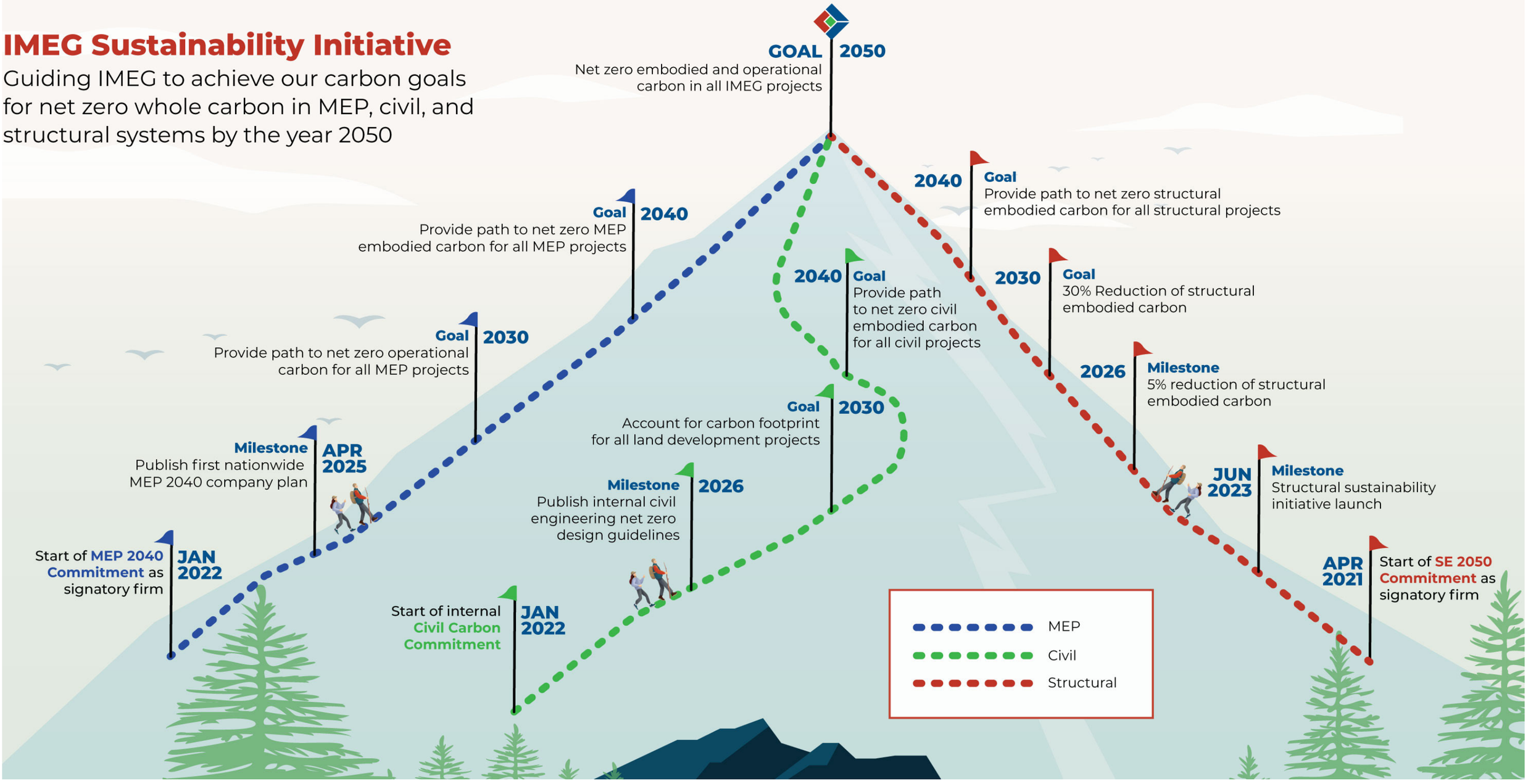
OPERATIONAL AND EMBODIED CARBON DEFINED

Operational carbon refers to greenhouse gas emissions due to building energy consumption. This includes heating, cooling, ventilation, water heating, lighting, and other energy-consuming systems.

Embodied carbon refers to greenhouse gas emissions due to the manufacturing, transportation, installation, maintenance, and disposal of all building materials and equipment that go into a building.

IMEG Sustainability Initiative

Guiding IMEG to achieve our carbon goals for net zero whole carbon in MEP, civil, and structural systems by the year 2050



The IMEG Sustainability Initiative is a bold, cross-disciplinary effort designed to propel us toward a sustainable future. Our goals include achieving net-zero operational carbon by 2030, net-zero embodied carbon in MEP and civil projects by 2040, and net-zero whole carbon across all IMEG projects by 2050. This graphic outlines key milestones that will guide our journey. To see expanded graphics on the individual structural, MEP, and civil journeys, click on the links at right.

MEP JOURNEY (EXPANDED)

CIVIL JOURNEY (EXPANDED)

STRUCTURAL JOURNEY (EXPANDED)

1 EDUCATE

IMEG's corporate educational philosophy is one of continual learning and frequent sharing of knowledge and experience with each other. We continue learning about sustainability and carbon through our internal education and training programs and actively share our experiences and findings with industry partners and other external outreach. These multidisciplinary internal and external initiatives blend our passion for people and engineering with our passion for the planet.

INTERNAL EDUCATION

IMEG's internal education initiatives consist of three main goals and related tasks. *Throughout this guide, a green check mark (√) indicates a completed task.*

Goal: Develop task force support

IMEG's Sustainable Design Task Force (SDTF) encompasses an interdisciplinary group who strive to evolve our design practice toward low carbon solutions by finding synergies among disciplines in design. On the forefront of innovation and industry knowledge, the task force curates tools and resources for the firm .

Task: Create MEP and Civil task forces | As a result of their MEP 2040 plan, the Seattle office has an MEP 2040 committee that has stayed active throughout their integration with IMEG. This year, we will begin to expand this committee into an MEP Task Force throughout IMEG. A Civil Sustainability Task Force also will be created to develop content and coordinate internal training on embodied carbon and the impact civil engineering can play on it.

√ Task: Structural Sustainability Task Force | The SSTF is primarily responsible for emboldening the structural embodied carbon reduction effort and driving IMEG's commitment to SE 2050. This group continues to develop and share useful guidance and reference documents regarding embodied carbon, share embodied carbon project data through benchmarking efforts, and enhance sustainable design strategies and resources for structural staff. Key actions include continuing to provide, expand, and update comprehensive design guides toolkits; expanding our library of highly successful structural action items of the Making Change Action Plan (MCAP) implemented in 2023 as part of the Sustainable Structural Initiative (SSI); and maximizing opportunities for embodied carbon reduction considerations across as many projects as possible.

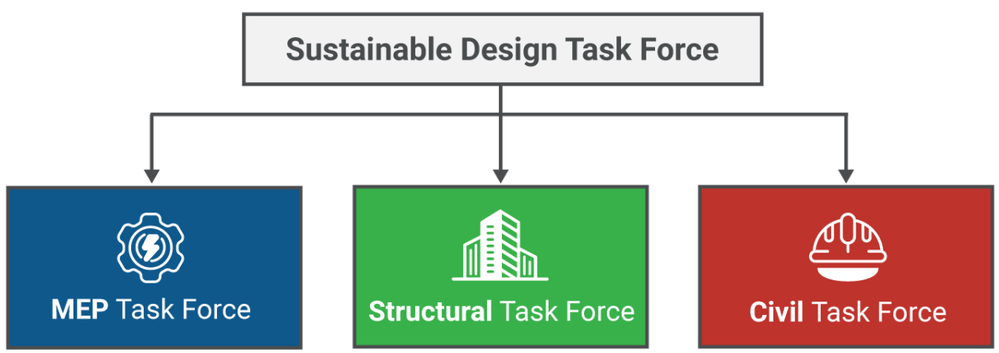
Goal: Expand the MCAP into a multi-disciplinary initiative

Task: Strengthen and broaden the MCAP | Incorporating a multi-disciplinary approach for the MCAP will ensure alignment for broader decarbonization efforts. For MEP, the plan will implement and refine specification updates to enhance sustainability in mechanical, electrical, and plumbing designs. For structural, targeted action items include specification updates, strategies to challenge conventional design assumptions, and advocacy guidelines. For civil, sustainable site development will be improved through exploration of recent advancements in innovative paving materials that provide lighter and stronger options that could be integrated into future projects.

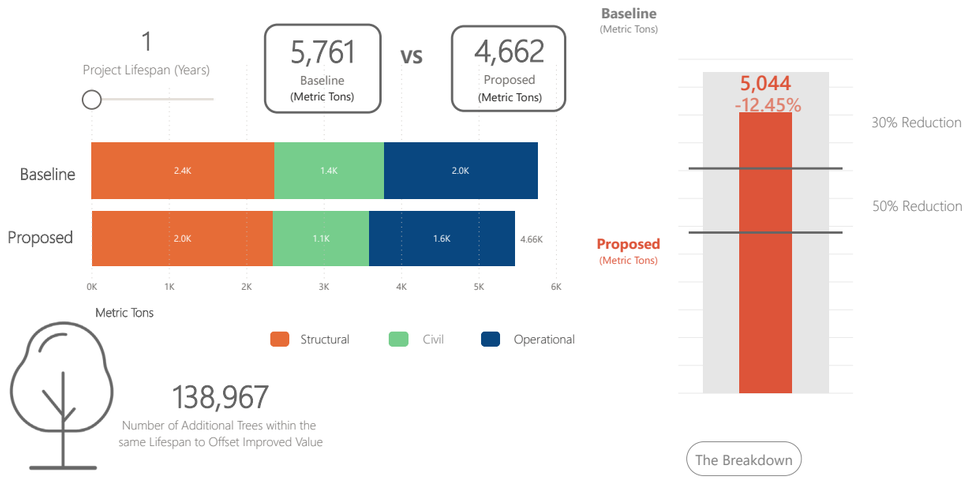
The Lark Hotel in Bozeman, MT, utilized cross-laminated timber.

Goal: Create and gather education resources and tools

IMEG strives to ensure our education program accommodates all types of learning styles and all design disciplines. Driven by the SDTF, this growing resource includes presentations, on-demand videos, written guides, handouts, blogs, and articles. Many of them are discipline focused.



ECOMETER TOOL



MULTI-DISCIPLINARY EDUCATION INITIATIVES

√ **Task: The Ecometer |** IMEG developed this tool to increase knowledge about sustainable development and for incorporation into the conventional workflow of designing and consulting. **The Ecometer** is an interactive dashboard designed to estimate early carbon emissions for structural, MEP, and civil design attributes. It also provides a high-level understanding of what carbon is and how simple alternatives can make a substantial difference in reducing our carbon footprint.

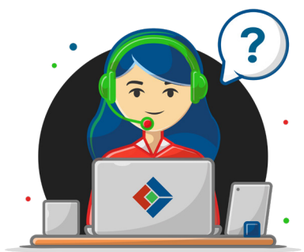
√ **Task: IMEG chatbot |** IMEG's AI chatbot assistant, "Meg," is used internally as an evolution of search and designed to find answers from across IMEG's data through a single natural language interface. It can suggest relevant links to sustainable design documents and easily connect employees with the right materials and people.

Task: Create required sustainability training

IMEG plans to develop a required curriculum on foundational knowledge across all engineering disciplines. This will be integrated into our existing mentorship and leadership programs and will include topics such as carbon emission effects, energy grid basics, introduction to LCAs, MEP embodied carbon, and carbon sequestration.

Task: Create several comprehensive courses

These courses will build on previous educational resources provided to staff. The curriculum will provide participants with certificates of completion if not included with other formal internal training programs.

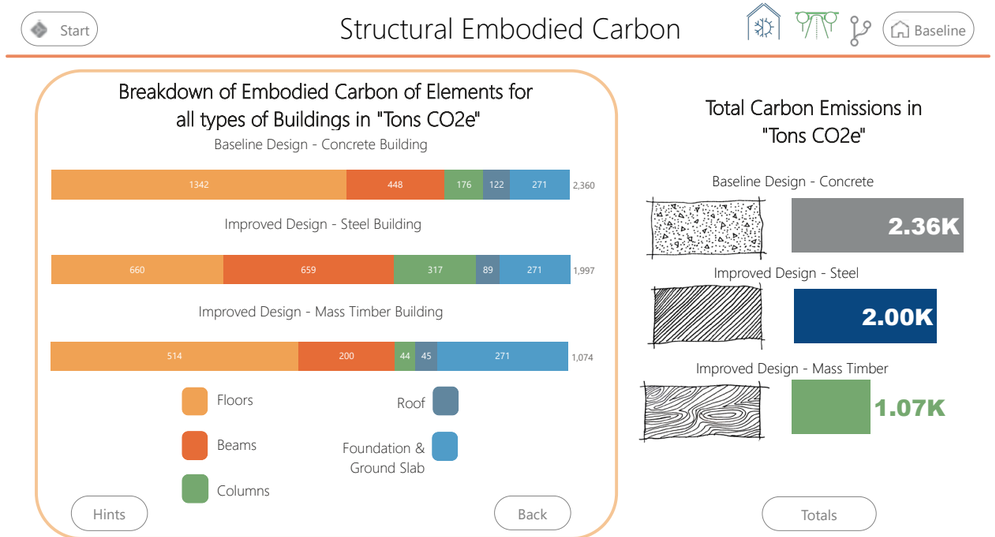


STRUCTURAL EDUCATION INITIATIVES

Task: Utilize IMEG's Structural Embodied Carbon Database to record LCAs | This data will be used as references for future LCAs and establish a baseline for embodied carbon by material and building type. *(See REPORT section for more information.)*

Task: Innovate a Parametric Rhino Tool | We are developing parametric engineering models to assess structural performance, cost, and environmental impact for entire buildings by outputting real-time structural checks, cost, and CO_2 estimates. These models allow us to quickly compare alternative designs and identify the most efficient solutions. The intention is to use this tool internally and externally to assist IMEG staff in making educated decisions quickly and exemplify the impact of preliminary planning or modifications to clients.

√ **Task: EcoFrame Tool |** To compare thoughtfully, frame sustainably, IMEG's EcoFrame presents a high-level understanding of how structural system choices contribute to embodied carbon emissions and guides users to select structural alternatives that can significantly lower a building's carbon footprint. This tool can be used at any point during a project and is especially useful for comparing proposed and baseline structural systems. Users can adjust the selection of materials and structural elements to get the embodied carbon emissions for the five highest typical contributing structural elements and see how changes to selections effect embodied carbon.



MEP EDUCATION INITIATIVES

Task: Checklist of MEP 2040 items | Incorporate MEP 2040-related actions into workflows to help projects stay on track and adhere to our goals. A pilot version of the checklist will be released to begin to train staff. Examples of items in the checklist include:

- Inform project owner and team of IMEG's overall carbon reduction goals.
- Send EPD and low-GWP advocacy letters to specify manufacturers
- Calculate estimated refrigerant emissions
- Report EUIs and operational carbon emissions

√ Task: Refrigerant Tool | This tool will quantify a project's expected fugitive refrigerant emissions, based on their design, to promote educated decisions on refrigerant-containing equipment such as heat pumps and chillers.

Task: Add carbon to equipment schedules for any equipment that utilitizes refrigerant | Existing information on refrigerant type and charge will be used to calculate a carbon emissions value. This will increase awareness and and provide a better understanding of the carbon impact of refrigerants among various equipment types and manufacturers.

√ Task: MEPS Embodied Carbon Calculator | IMEG developed this tool for estimating MEP embodied carbon emissions based on existing literature and rules of thumb. As we participate in the MEP Whole Life Carbon Pilot (see page 23), we will be able to understand how the MEPS Embodied Carbon Calculator compares to a more detailed LCA approach and how the two approaches can benefit our projects.

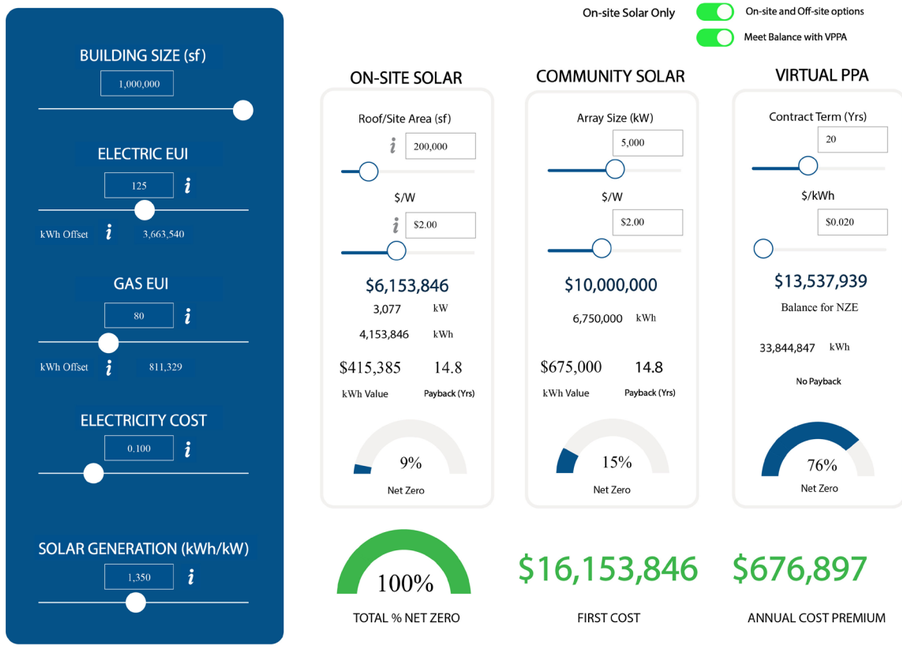
√ Task: EUI Analysis Tool | This tool (pictured at right) provides estimates of a building's energy use intensity (EUI), derived through a comprehensive averaging process of data from reputable sources such as CBECS, ASHRAE 100, PNNL, and Energy Star. The resultant EUI provides a realistic value to use as a benchmark for the project's energy performance and carbon emissions goals and can be used to better understand operational energy use.

CIVIL EDUCATION INITIATIVES

Task: Civil Carbon Project Checklist | Create a carbon checklist and reporting log for civil engineers to complete and reference during each stage of a project, providing them with daily reminders of the impact of embodied carbon on a project

Task: Explore Civil Materiality | Produce materials for civil engineers on low-carbon material options, including low-carbon, high-strength pavement

EUI ANALYSIS TOOL



EXTERNAL EDUCATION

Goal: Develop external education materials

Tools created for designers are assisting us in developing material to share knowledge with clients and other firms. Our intent is to continue this outreach and create additional public resources that help educate and guide all project stakeholders toward more sustainable designs. IMEG has developed the following tools to help clients and staff understand various sustainability-related topics:

√ Task: The Inflation Reduction Act (IRA) Estimation Tool provides project teams with insights into the tax benefits that align with their project. It facilitates the calculation of estimated savings for the project based on optimal tax reduction strategy.

√ Task: The Net Zero Tool helps with early planning and feasibility of solar PV for a building site. Many owners want to see what solar PV means for their project—the feasibility, how big it needs to be, how much it will cost, and the ROI. This tool provides a pathway to coordinate faster and easier.

√ Task: The Embodied Carbon Webinar Series was presented last year to various clients, partners, and owners. It started with the basics (sources of building carbon emissions, why this is important, what is and why conduct an LCA), discussed the principles of carbon reductions, and concluded with embodied carbon and LCA innovations and challenges (e.g., quantifying embodied carbon of MEP systems).

Goal: Participate in external working groups and communities | Participation in groups such as MEP 2040, SE 2050, ASHRAE, ASCE, SITES, and ASLA provides industry opportunities to collaborate, share project findings, and learn from obstacles.

√ Task: Attend and participate in MEP 2040 quarterly forums and working groups | In 2024, IMEG presented at the 11th Quarterly MEP 2040 Forum, along with seven other signatories. We shared our process and insights into the making of the Seattle IMEG office's Company Plan. (We have used those insights in this WCAP.) This year, MEP 2040's Data, Analytics, and Reporting working group is offering the MEP Whole Life Carbon Pilot program. Participants will assess MEP embodied and whole life carbon using the forthcoming "Beginner's Guide to MEP Embodied Carbon." By participating in this program, IMEG aims to complete our first MEP LCA and contribute to the pioneering field of MEP embodied carbon data.

Task: Join Carbon Leadership Forum hubs | IMEG is encouraging staff who live near Carbon Leadership Forum hub locations to join the local hub. This will provide opportunities to connect with carbon professionals, expand LCA expertise, explore low-carbon projects and materials, and stay informed on CLF's latest carbon research.

2 REPORT

IMEG's approach to whole life carbon tracking features the development of a company-wide dashboard, automation of carbon calculations, and standardization of annual reporting in alignment with SE 2050, MEP 2040, and the Embodied Carbon Harmonization and Optimization (ECHO) Project. Our efforts focus on enhancing data transparency, integrating automation, and implementing targeted carbon reduction strategies across structural, MEP, and civil engineering disciplines. By leveraging internal tools, AI-driven reporting, and industry collaboration, we aim to streamline carbon assessments and drive meaningful emissions reductions across all our projects.

MULTIDISCIPLINARY INITIATIVES

Goal: Incorporate carbon metrics into our enterprise-level data repository | We will use these metrics and quantities from BIM models to benchmark total carbon for each project. This will allow us to break down carbon from each discipline and start tracking a whole carbon number for each project.

Task: Create a pilot version of a whole carbon dashboard | IMEG will develop new tools and consolidate them with existing resources, such as the Sustainability & Energy Team's Project Portal, to support its carbon goals. This new dashboard will provide the foundation for operational and embodied carbon reporting.

Goal: Report carbon emissions annually

Task: Report carbon emissions in alignment with its commitments | While reporting guidelines are established for SE 2050, they are not yet defined for MEP 2040. To address this, we will develop a temporary reporting approach for MEP-related carbon emissions and closely monitor updates from the ECHO Project to ensure compliance with future reporting requirements. The ECHO Project, launched in 2023, aims to standardize and align carbon reporting frameworks across organizations. Participating groups include SE 2050 and MEP 2040, as well as Architecture 2030, Building Transparency, the Carbon Leadership Forum, the International Living Future Institute, USGBC, and ASCE. In 2024, ECHO released recommendations for LCA alignment and the ECHO Reporting Schema, which IMEG is commited to meeting. Currently, a description of the ECHO Schema fields has been published, with further development and implementation pending.

Task: Automate the reporting process | Most carbon analysis today is done as an additional service for the owners who are willing to invest additional money to prioritize carbon reduction. Achieving sustainability and decarbonization at scale, however, must be part of design across all projects. We are focused on automating our design processes and storing the metrics in the data repository (mentioned earlier) to achieve the goal of obtaining the carbon benchmark for every project. We are developing Revit tools that will provide automatic quantity takeoff and carbon calculations in real time during the design process to show engineers how even small changes can have big impacts. Real-time data can also be stored and leveraged by AI to suggest changes on future projects. These tools will also allow us to report our project results, benchmarks, and savings to help owners make informed decisions. Reporting at enterprise level will inform decarbonization for both IMEG and the SE 2050, MEP 2040, and AIA 2030 initiatives.

Adobe North Tower, San Francisco, utilized CarbonCure.

Task: Develop and utilize key tools | We plan to scale all our efforts in the future with the help of automation to enable every project to have a carbon calculation and benchmark. To do this, we will develop and utilize:

- In-house Revit tools
- Data repositories of project metrics
- Integration of AI reporting

STRUCTURAL INITIATIVES

Goal: Annual project submission to SE 2050 database |

To support benchmarking efforts, IMEG is expanding its structural embodied carbon database using GWP calculations as the foundation for tracking and analysis. A standardized template has been developed to evaluate 30 past projects, which will be submitted to SE 2050 in 2025. This initiative aims to assess current structural design practices from an embodied carbon perspective, enabling the benchmarking of data across various building types and superstructure materials.

Task: Submit 30 projects to the SE 2050 database

Identify at least 30 projects from 2024 and 2025 to perform calculations for the next round of submission. We will choose projects with geographical diversity and diversity among our structural teams, along with the following project parameters:

- Type/market: Housing, education, or commercial
- Material: Concrete or steel superstructure
- Size: New construction, 20,000 sq ft or greater
- Design phase: Ideally 100% CD, minimum 50% CD

MEP INITIATIVES

Reporting carbon associated with our projects' MEP systems (operational, MEP embodied, and fugitive refrigerant) is integral to understanding and reducing the built environment's carbon footprint. These three sources of MEP carbon are emitted and calculated distinctly, but their interactions make it imperative to consider them concurrently.

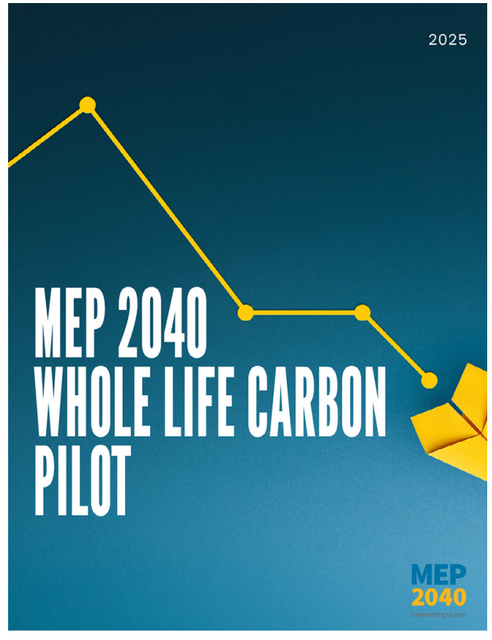
Goal: Measure operational carbon

Task: Create company-wide EUI and operational carbon benchmarks of modeled energy usage | IMEG currently tracks EUI data for Sustainability & Energy Team projects using energy models. The next step is to expand this effort company-wide by collecting modeled EUI data for all projects and calculating associated operational carbon emissions. This will establish a benchmark for projected operational carbon emissions, guiding future reduction strategies. Additionally, IMEG seeks to assess project performance post-construction by exploring methods to collect actual EUI and carbon emission data. Comparing real-world outcomes to energy model projections will provide valuable insights into the accuracy of forecasts and the true carbon impact of our projects.

Goal: Measure MEP embodied carbon

Measuring embodied carbon in the MEP industry remains a significant challenge due to the limited availability of EPDs, system complexity, and the need for integration with existing LCA software. IMEG is actively developing MEP LCA methodologies to help drive broader industry adoption. To advance this effort, we have created an Embodied Carbon Calculator for MEP systems, utilizing common rules of thumb and estimates to provide insight into the embodied impacts of our MEP designs. We also are exploring options to quantify duct and piping materials in real time for every Revit project. This will allow us to benchmark quantity and carbon estimates for every project, with the metrics also collected in our data repository for reporting and education purposes.

Task: MEP Whole Life Carbon Pilot | IMEG's next step is to participate in the MEP 2040 Whole Life Carbon Pilot, conducting an MEP whole carbon assessment using One Click LCA and MEP 2040's forthcoming Beginner's Guide to MEP Embodied Carbon. This pilot will help refine MEP LCA processes with the goal of integrating MEP carbon assessments into engineer training and project workflows. By quantifying MEP contributions to embodied carbon and identifying key impact areas, IMEG will be well-positioned to develop effective reduction strategies for future projects.



Task: EPD Advocacy | IMEG will send letters to a list of commonly used MEP equipment manufacturers requesting that they publish EPDs—an initiative that began in 2024 that will be expanded and tracked. Increased availability of EPDs will enhance access to MEP embodied carbon data, supporting more comprehensive MEP LCAs and improving the accuracy of embodied carbon calculations.

Goal: Calculate and reduce project carbon emissions due to refrigerants |

Refrigerant leakage, particularly from fugitive emissions, is increasingly recognized as a significant contributor to a building's carbon footprint. It is essential to quantify these emissions and integrate this data into design decisions using a whole life carbon approach to minimize environmental impact. We plan to add this metric to our Revit schedules for all refrigerant-using equipment.

√ Task: Develop a fugitive refrigerant tracking tool and create a benchmark | In 2024, IMEG developed a pilot Fugitive Refrigerant Calculator to estimate the lifetime greenhouse gas emissions from refrigerant-containing equipment. This year, we plan to use the calculator on 10 to 15 projects to establish a benchmark for projected emissions, gather feedback for further tool development, and create a standardized approach for calculating and documenting fugitive refrigerant emissions.

Goal: Report carbon emissions annually

No standard process exists for reporting emissions to MEP 2040. IMEG plans to publish annual updates in future iterations of the Whole Carbon Action Plan.

Task: Stay current on the ECHO project | Adhere to reporting guidelines as they are adopted by MEP 2040.

CIVIL INITIATIVES

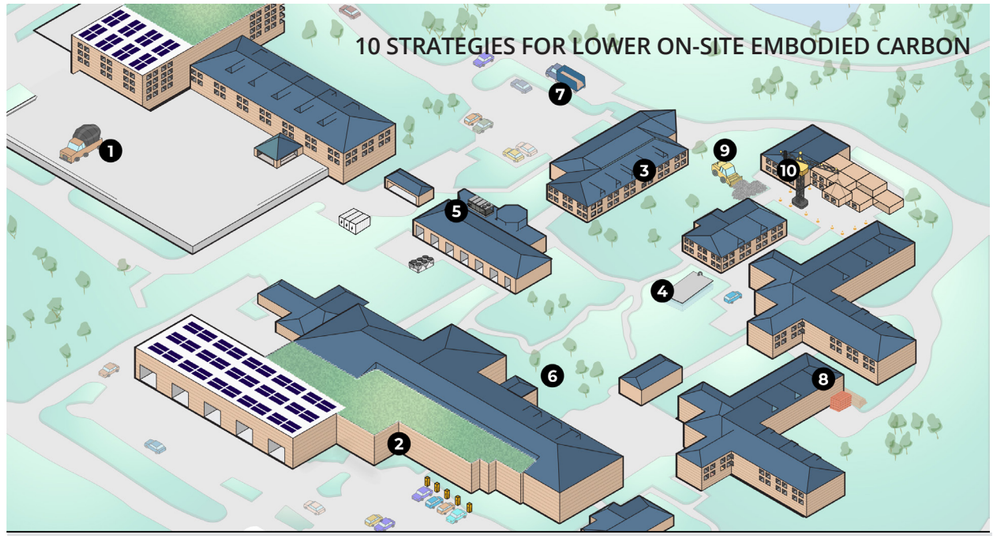
Goal: Bring civil/site embodied carbon to the forefront |

Embodied carbon is not being tracked or reported for civil engineering site design. Our goal is to ensure it is added to the entire conversation. Through strategizing ways to quantify embodied carbon for site design, we can determine how best to make informed decisions in the design and construction process.

Task: Create a carbon checklist and reporting log that engineers can complete and reference, providing dashboard with informed project data.

Task: Explore low-carbon material options, particularly pavement and other hardscape elements

Task: Explore effects of landscaping on carbon sequestration efforts



1. Low-embodied carbon concrete for pavement, roads, structures
2. Mass timber or recycled steel for buildings and structures
3. Strategic building orientation to optimize solar gain in winter
4. HDPE piping and retention for stormwater systems
5. Low/zero-carbon refrigerants
6. Trees, shrubs, rain gardens, and green roofs
7. Use of local building materials
8. Reuse of materials such as brick, metal, and wood
9. Site optimization (e.g., minimizing idle truck and pump time and on-site transportation)
10. Modular construction

REDUCE 3

REDUCE

IMEG is committed to reducing carbon in the built environment through innovative design, advanced tools, and the dedication of our passionate employee-owners. Our approach integrates sustainability at every stage of our projects, leveraging cutting-edge resources and expertise to drive impactful change. By continuously developing and refining tools that enhance carbon-conscious decision-making, we empower our teams to create high-performance, low-carbon solutions. Through collaboration, knowledge-sharing, and a steadfast commitment to progress, we turn our collective passion for engineering and the planet into meaningful action.

MULTIDISCIPLINARY INITIATIVES

Goal: Reduce emissions through early project benchmarking

Task: Utilize existing IMEG carbon databases | Utilizing carbon benchmarks from past projects provides IMEG's designers with valuable insights that drive more informed and strategic decision-making in achieving and exceeding carbon reduction targets. By analyzing real-world data on embodied and operational carbon across structural, MEP, and civil disciplines, our teams can identify trends, set realistic performance expectations, and apply proven low-carbon strategies to new designs. These benchmarks serve as a roadmap for continuous improvement, allowing

Heat pumps are utilized at the Poudre School District's new middle/high schools in Timnath and Wellington, CO.

designers to compare proposed solutions against past successes and refine their approaches for even greater impact. By leveraging this historical data, we ensure projects align with industry best practices and empower our teams to push to deliver increasingly sustainable, high-performance designs.

Goal: Reduce emissions through updated project specifications

Task: Update structural, MEP, and civil specifications to include sustainable, energy-efficient options | In 2025, we will review all mechanical, structural, and civil specifications to align with current decarbonization best practices. Practices that carry tangible cost premiums will be included for designers to select easily. Our goal is to simplify the implementation of decarbonization strategies by removing the need to find the sustainable option yourself. This effort will coincide with general notes, flow diagrams, details, and schedules. Structural specifications have already been preliminarily updated with sustainability language added; further revisions based on industry updates will be reviewed and incorporated annually. Mechanical specification updates are in progress and should be completed by Q2, with updates to other design standards to be completed by Q4. Civil specifications will be reviewed and updated by Q4 of 2025.

Goal: Investigate how MEP and structural disciplines can support each other for holistic reductions

Task: Prioritize actions with whole carbon synergies and greatest impact | Carbon reduction is typically discipline focused; we will search for a greater, whole-carbon impact through the interplay of embodied and operational carbon. For example, specifying smaller mechanical equipment may reduce the weight of required structural components, therefore reducing both MEP and structural embodied carbon. However, the effects of the equipment's refrigerant selection as well as the long-term fugitive emissions also should be investigated to better understand carbon tradeoffs.

STRUCTURAL INITIATIVES

Short-term Goal: 5% reduction in structural embodied carbon by 2026

Task: Establish benchmarks for project types and material types by the end 2025 | Overall, we maintain the desire and the need to increase IMEG's embodied carbon database to create a standard embodied carbon baseline that will encompass typical building types and superstructure materials. To do this, we are looking to encompass concrete and steel for the primary superstructure building materials and three different building use types. (See the REPORT section for more details about the project parameters). We strive to ensure that our benchmarks will be comprehensive and consistent to ensure reliability for all future reduction efforts.

Task: Quantify 5% reduction through tools (Revit, Excel, Power BI) | Summarize and share with the IMEG structural group

Long-Term Goal: 30% reduction in structural embodied carbon by the year 2030

Task: Identify and share strategies to implement increasing reductions | Provide strategies to IMEG staff through quarterly action items in the MCAP

Task: Create method to ensure scalable reductions for the next five years and beyond

Task: Establish a process for calculating true structural embodied carbon reductions against the IMEG project benchmarks

Goal: Update sustainability language in specifications

√ Task: Specifications for concrete and steel | Our concrete and steel specs now include Portland Limestone Cement as the preferred option; language to request or require EPDs; and options for GWP maximums for concrete mixes or steel members.

Task: Monitor updates | Include new sustainability specifications guidance, such as forthcoming Specification Strategies for Structural Steel Embodied Carbon Reduction from AISC

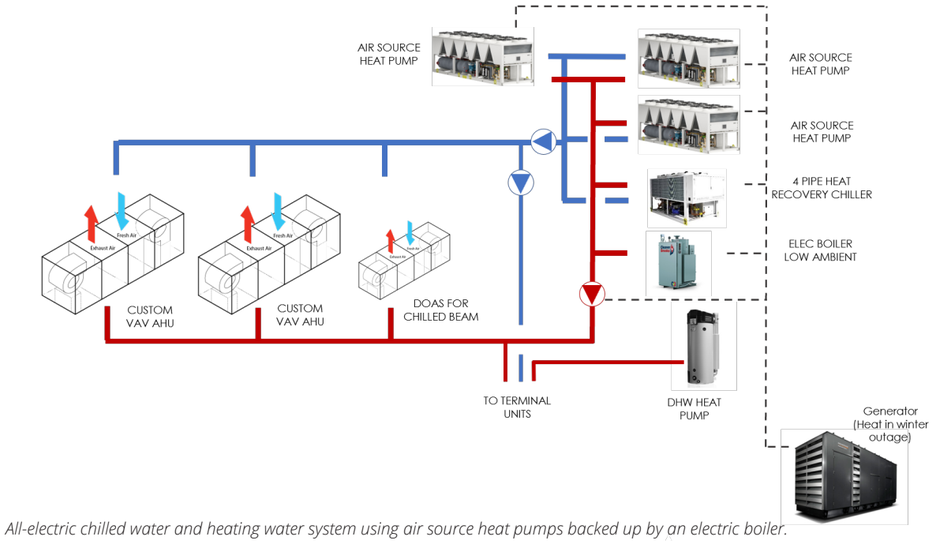
Task: Finalize and implement maximum concrete GWP table for the general notes and specifications

Goal: Create material & project phase design guides

Task: Develop material-specific embodied carbon reduction design guide

Task: Develop design phase embodied carbon reduction design guide

Mass timber, as used on the project pictured above, contains one-fourth the embodied carbon of steel and concrete.



All-electric chilled water and heating water system using air source heat pumps backed up by an electric boiler.

MEP INITIATIVES

Goal: Reduce project carbon emissions through incorporating life-cycle-based decision-making into the MEP design process. | IMEG aims to make whole life design decisions by individually calculating operational, embodied, and refrigerant emissions, then considering them holistically to drive meaningful carbon reductions. We are committed to researching, advocating for, and implementing reduction strategies for each source of MEP carbon, validating reductions through whole life carbon assessments. Our vision is that we will one day provide all projects with a path to net zero carbon by first minimizing all sources of carbon as much as possible and providing data-based carbon emissions values that a client may choose to balance through renewable energy production or responsible carbon offsets.

Task: Research low-GWP refrigerant equipment | The market for equipment that contains refrigerants is evolving, partly due to new policies and market demand for low-GWP refrigerant. As a leading MEP engineering firm, we must stay up to date on the latest low-GWP refrigerant equipment so we can provide our projects with the lowest carbon options available.

Task: Advocate for proper refrigerant management on projects, per EPA's Significant New Alternatives Policy (SNAP) requirements | Provide low- or lower-GWP refrigerant equipment options to clients

Task: Continue incorporating energy conservation measures into project workflow for all projects | IMEG is committed to delivering energy-efficient solutions that reduce operational carbon emissions and clients' operating costs. We will continue to prioritize low-operational carbon designs, making energy efficiency the standard in all our projects.

Task: Research/incorporate MEP embodied carbon reduction strategies into project workflow I The MEP industry is still refining processes for measuring embodied carbon, with the goal of reducing it once it can be accurately quantified. In the interim, strategies such as optimizing equipment placement to minimize duct/piping/refrigerant runs and downsizing equipment offer ways to lower MEP embodied carbon. By reducing material weight in MEP systems, we can likely reduce embodied carbon. Once our methodology for MEP whole carbon assessments is finalized, we aim to validate these strategies with empirical data.

Task: Participate in the MEP 2040 Whole Life Carbon Pilot | The MEP Whole Life Carbon Pilot is an exciting step toward accurately assessing our MEP systems' embodied carbon and will help inform embodied carbon reduction strategies.

CIVIL INITIATIVES

Four main civil engineering strategies can be implemented to help reduce carbon for a project. These are reflected in the following goals.

Goal: Create standard civil specifications that provide the design engineer with information to easily select low-emitting carbon products

Task: Detail the initial specifications

Goal: Educate civil engineers and local governments on the impact civil engineering can have on the carbon footprint of projects

Task: Create educational content that summarizes the impact of site design on the carbon footprint of a project | This content can then be shared by our civil engineer with the local government.

Goal: Incorporate landscape design to maximize the carbon sequestration potential for a project

Task: Establish a protocol for quantifying carbon sequestration potential as standard practice on our projects

Goal: Explore low-carbon materials, particularly for paving

Task: Provide new, lower-embodied carbon materials in general notes and specifications

HDPE products provide a lower-embodied carbon option for piping and retention systems.

ADVOCATE 4

ADVOCATE

To achieve our sustainability goals, IMEG should keep advocacy at the forefront of our actions. It is important for us to share the goals and intentions of SE 2050, AIA 2030, and MEP 2040 with our clients, internal staff, and suppliers, and encourage them to act. We also must include outreach about what IMEG is doing to track and reduce carbon emissions in the various building systems and site components of our projects.

MULTIDISCIPLINARY INITIATIVES

Goal: Advocate for whole building carbon emissions reductions with clients | Educate clients on IMEG's commitments and goals

Task: Develop standard language for client advocacy

Goal: Leverage marketing opportunities

Task: Update marketing materials to better represent decarbonization and our multi-disciplinary approach

STRUCTURAL INITIATIVES

We must request the tracking, reporting, and sharing of structural embodied carbon data and propose reductions where it makes sense. An opportunity exists on every project to reduce embodied carbon and possibly sequester carbon. IMEG will continue to encourage project teams to measure embodied carbon and implement reduction strategies where possible, with the following goals to support these efforts.

Goal: Continue to converse with our clients about opportunities to reduce embodied carbon in their projects, with the goal of six touchpoints per structural office per quarter

Task: Formulate method for tracking touchpoints in Salesforce and share findings

Goal: Publicly declare IMEG as a member of the SE 2050 Commitment whenever possible

√ Task: A podcast and blog have been posted on the IMEG website and shared on LinkedIn

Goal: Create a structural sustainability brochure to send to clients to share IMEG's structural sustainability approach

√ Task: Two one-page documents were issued in Q1 2024 as a part of the MCAP and the SSI | One document explained IMEG structural groups' general approach for sustainability and embodied carbon reductions and the other outlined housing-market-specific structural embodied carbon reduction strategies for residential projects.

MEP INITIATIVES

Goal: Advocate for industry-wide development of EPDs | This aligns with one of the four MEP 2040 commitments, with the intent that if almost 100 MEP 2040 signatories request EPDs from MEP manufacturers, the industry will hear our collective voice and respond to the market demand by publishing EPDs for MEP equipment and materials.

Task: Send EPD advocacy letter to common manufacturers | Keep track of advocacy with an internal tracking system

Task: Incorporate EPD spec language in IMEG spec standards

Goal: Advocate for industry-wide development of equipment that uses low-GWP refrigerants | This aligns with another one of the MEP 2040 commitments, with the intent that the industry will respond to our collective advocacy and prioritize development of equipment that uses low-GWP refrigerants.

Task: Develop an IMEG refrigerant advocacy letter and send it to common manufacturers | Keep track of advocacy with an internal tracking system.

CIVIL INITIATIVES

Goal: Advocate at industry-wide events

Task: Encourage our civil engineers to speak at industry events | Explaining the impact of effective site design may deepen others' understanding of the embodied carbon contribution civil engineers can have on a project.

Goal: Advocate with clients on implementing low-carbon options and focus on carbon sequestration

REFLECTIONS ON OUR EFFORTS

During the past year at IMEG, we have focused on aligning disciplines to unify our decarbonization approach. Through project data tracking, we have enhanced our ability to articulate the interplay between embodied and operational carbon across building systems and their surroundings.

IMEG's structural group continued the strengthening of the SSI in 2024 through the issuance of additional action items via the MCAP. One key area was our development of structural GWP calculations. Previously, we had planned to do a Whole Building Life Cycle Assessment in One Click LCA for 30 projects. However, we found that to make benchmarking more efficient, it was better to track GWP on projects through custom tools. This led to the creation of the EC benchmarking template spreadsheet and submission of information for 30 projects to the SE 2050 database. This also allowed us to establish the data set on which we will benchmark by market type and superstructure material. Knowing how we're currently designing enables us to use targeted embodied carbon reduction strategies and progress toward net zero embodied carbon emissions in structural systems by 2050.

The MEP industry is at a pivotal moment with respect to understanding and addressing the significant impact on climate change caused by its emissions. For too long, the MEP industry has been excluded from WBLCAs. The data wasn't available. There was no methodology for MEP embodied carbon. The industry wasn't ready. MEP systems are incredibly complex. Despite these challenges, we must act now and aim to pave the way to standardizing MEP embodied carbon quantification and reduction.

IMEG has long worked to actively reduce the operational emissions of our projects and recognizes that immediate action is needed on embodied and refrigerant emissions. We can no longer delay taking the actions needed to achieve net zero MEP embodied and operational carbon by 2040 and net zero structural embodied carbon by 2050 and all intermediate goals between now and then.

The inclusion of civil embodied carbon in project discussions is yet another step toward achieving wider adoption of carbon reduction strategies on projects as we formalize the carbon accounting needed for benchmarking and future reduction.

Looking to the future

IMEG will continue to reflect and build upon this WCAP each year, evaluating our progress and identifing both successes and setbacks. We will update our WCAP based on our annual evaluation and per MEP 2040 and SE 2050 program requirements, including new information on sustainability and our expanding technological expertise.

Hopefully, this WCAP has piqued your interest in decarbonization and lowering carbon emissions, and inspired you as an IMEG employee-owner, engineer, and steward of the planet. We are all in this together, and we look forward to working with you in doing our part to make a difference in this monumental sustainability movement.

MULTI-DISCIPLINARY GOALS & TASKS

1 EDUCATE

Goal: Develop task force support

Task: Create MEP and Civil task forces

√ **Task:** Structural Sustainability Task Force

Goal: Expand the MCAP into a multi-disciplinary initiative

Task: Strengthen and broaden the MCAP

Goal: Create education resources and tools

Task: Create required sustainability training

Task: Create several comprehensive courses

√ **Task:** The Ecometer

√ **Task:** IMEG chatbot

Goal: Develop external education materials

√ **Task:** Inflation Reduction Act (IRA) Estimation Tool

√ **Task:** Net Zero Tool

√ **Task:** Embodied Carbon Webinar Series

Goal: Participate in external working groups

√ **Task:** Attend and participate in MEP 2040 quarterly forums and working groups

Task: Join Carbon Leadership Forum hubs

2 REPORT

Goal: Incorporate carbon metrics into our enterprise-level data repository

Task: Create a pilot version of a whole carbon dashboard

Goal: Report carbon emissions annually

Task: Report carbon emissions in alignment with its commitments

Task: Automate the reporting process

Task: Develop and utilize key tools

3 REDUCE

Goal: Reduce emissions through early project benchmarking

Task: Utilize existing IMEG carbon databases

Goal: Reduce emissions through updated project specifications

Task: Update structural, MEP, and civil specifications to include sustainable, energy-efficient options

Goal: Investigate how MEP and structural disciplines can support each other for holistic reductions

Task: Prioritize actions with whole carbon synergies and greatest impact

4 ADVOCATE

Goal: Advocate for whole building carbon emissions reductions with clients

Task: Develop standard language for client advocacy

Goal: Leverage marketing opportunities

Task: Update marketing materials to better represent decarbonization and our multi-disciplinary approach

GOALS & TASKS BY DISCIPLINE

1 EDUCATE

STRUCTURAL INITIATIVES

Task: Utilize IMEG's Structural Embodied Carbon Database to record LCAs

Task: Innovate a Parametric Rhino Tool

√ **Task:** EcoFrame Tool

MEP INITIATIVES

Task: Checklist of MEP 2040 items

√ **Task:** Refrigerant Tool

Task: Add carbon to equipment schedules for any equipment that utilitizes refrigerant

√ **Task:** MEPS Embodied Carbon Calculator

√ **Task:** EUI Analysis Tool

CIVIL INITIATIVES

Task: Civil Carbon Project Checklist

Task: Explore Civil Materiality

2 REPORT

STRUCTURAL INITIATIVES

Goal: Annual project submission to SE 2050 database

Task: Submit 30 projects to the SE 2050 database

MEP INITIATIVES

Goal: Measure operational carbon

Task: Create company-wide EUI and operational carbon benchmarks of modeled energy usage accuracy and the true carbon impact of our projects

Goal: Measure MEP embodied carbon

Task: MEP Whole Life Carbon Pilot

Task: EPD Advocacy

Goal: Calculate and reduce project carbon emissions due to refrigerants

√ **Task:** Develop a fugitive refrigerant tracking tool

Goal: Report carbon emissions annually

Task: Stay current on the ECHO project

CIVIL INITIATIVES

Goal: Bring embodied carbon to the forefront

Task: Create a carbon checklist and reporting log

Task: Explore low-carbon material options, particularly pavement and other hardscape elements

Task: Explore effects of landscaping on carbon sequestration efforts

GOALS & TASKS BY DISCIPLINE

3 REDUCE

STRUCTURAL INITIATIVES

Short-term Goal: 5% reduction in structural embodied carbon by 2026

Task: Establish benchmarks for project types and material types by the end 2025

Task: Quantify 5% reduction through Revit, Excel, etc.

Long-Term Goal: 30% reduction in structural embodied carbon by the year 2030

Task: Identify and share strategies to implement increasing reductions

Task: Create method to ensure scalable reductions for the next five years and beyond

Task: Establish a process for calculating true structural embodied carbon reductions against the IMEG project benchmarks

Goal: Update sustainability language

√ **Task:** Specifications for concrete and steel Task: Monitor updates

Task: Finalize and implement maximum concrete GWP table for the general notes and specifications

Goal: Create material & project phase design guides

Task: Develop material-specific embodied carbon reduction design guide

Task: Develop design phase embodied carbon reduction design guide

MEP INITIATIVES

Goal: Reduce project carbon emissions through incorporating life-cycle-based decision-making into the design process

Task: Research low-GWP refrigerant equipment

Task: Advocate for proper refrigerant management on projects, per EPA's SNAP requirements

Task: Continue incorporating energy conservation measures into project workflow for all projects

Task: Research/incorporate MEP embodied carbon reduction strategies into project workflow

Task: Engage in the MEP 2040 Whole Life Carbon Pilot

CIVIL INITIATIVES

Goal: Create standard civil specifications for selecting low-emitting carbon products

Task: Detail the initial specifications

Goal: Educate civil engineers and local governments on the impact civil engineering can have on the carbon footprint of projects

Task: Create educational content about the impact of site design on the carbon footprint of a project

Goal: Incorporate landscape design to maximize project carbon sequestration

Task: Establish a protocol for quantifying carbon sequestration potential as standard practice

Goal: Explore low-carbon materials, particularly for paving

Task: Provide new, lower-embodied carbon materials in general notes and specifications

GOALS & TASKS BY DISCIPLINE

ADVOCATE 4

ADVOCATE

STRUCTURAL INITIATIVES

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Goal: Publicly declare IMEG as a member of the SE 2050 Commitment whenever possible

√ **Task:** A podcast and blog have been posted on the IMEG website and shared on LinkedIn

Goal: Create a structural sustainability brochure to send to clients to share IMEG's structural sustainability approach

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MEP INITIATIVES

Goal: Advocate for industry-wide development of EPDs

Task: Send EPD advocacy letter to common manufacturers

Task: Incorporate EPD spec language in IMEG spec standards

Goal: Advocate for industry-wide development of equipment that uses low-GWP refrigerants

Task: Develop an IMEG refrigerant advocacy letter and send it to common manufacturers

CIVIL INITIATIVES

Goal: Advocate at industry-wide events

Task: Encourage our civil engineers to speak at industry events

Goal: Advocate with clients on low-carbon options and focus on carbon sequestration

2025 IMEG

WHOLE CARBON ACTION PLAN