

embodied carbon action plan

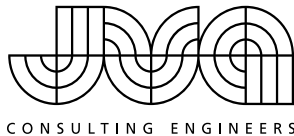
2025



mission statement



JVA provides our clients with the highest quality engineering services while operating a profitable business and maintaining our inclusive and cohesive culture.



our plan

As reductions to operational carbon emissions continue to improve, the embodied carbon contribution from a building's materials and construction plays an increasing role in a building's whole life carbon footprint. JVA is a member of the US Green Building Council and is an active participant in SEAC and NCSEA. JVA is committed to safe, sustainable design practices with participation in LEED accredited projects. SE 2050's goal to reduce embodied carbon in the design and construction of structural systems directly aligns with our company's vision of improving our communities through engineering excellence. JVA's 69-year tenure as an engineering firm is a valuable addition to SE 2050, thanks to the large repertoire of projects across the country with varying building materials and construction. JVA intends to promote sustainable design practices by informing and educating about embodied carbon both internally and through our professional relationships. JVA will also be contributing to the database of embodied carbon accounting in buildings to reach the ultimate goal of net-zero embodied carbon in buildings. We believe knowledge sharing is one of the most valuable tools in our planet's fight against climate change, and SE 2050 is the ideal platform for JVA to do just that.

education

JVA's embodied carbon reduction champion engages in several initiatives to keep the office informed and up to date on the strategies and developments of embodied carbon reduction in the structural engineering industry. This includes membership in the Structural Engineers Association of Colorado (SEAC) Sustainability Design Committee and representation in their monthly meetings. Participation in SEAC has provided a variety of embodied carbon related information sessions which have been relayed to the JVA structural team. This year the champion attended the Carbon Leadership Form's (CLF's) Sustainable Specification Series and made the recording available to all staff members. Internal webinars from previous years, including a TallyLCA tutorial for lifecycle assessment and an "Embodied Carbon Basics" kickoff meeting presented by Jay Arehart, PhD remain accessible to all staff and are included in the onboarding agenda for new hires in the structural department. Additionally, as part of the

onboarding process, the embodied carbon champion meets with new hires to discuss JVA's Structural Sustainability Committee activities, our commitment to SE 2050, and ways to get involved. The Embodied Carbon Champion will continue these initiatives in the coming year and continue to report back to JVA with relevant information from external webinars and committees.

This year, three members of our Structural Sustainability Committee are giving a one-hour presentation to the structural department on Embodied Carbon. This presentation will be recorded and available as a resource for new and existing staff. We will continue to provide at least one embodied carbon related continuing education session to all structural staff each year.

The Structural Sustainability Committee is preparing an "Embodied Carbon Handbook" for the structural engineering staff to have easy access to consolidated embodied carbon information most pertinent to our projects. This year, sections on definitions/jargon, relevant local codes (Denver Green Code and Buy Clean Colorado Act), ECAP resources, and building certifications were added to the handbook. In the coming year, we will continue to develop the handbook and add sections related to materials, specifications, and lifecycle assessment tools.



knowledge sharing

JVA has various strategies to communicate embodied carbon reduction works externally and internally. A prime example is the Q'anapsu Dispensary in Ridgefield, Washington that was recognized with the 2024 Honor Award in Engineering excellence by ACEC Colorado. This project showcased novel construction techniques as a tool for sustainability, despite design challenges and a tight project schedule. The nature of this shipping container commercial building and design-build project delivery allowed for a concept to completion timeline of less than a year, reducing carbon emissions from both materials and construction. In addition, JVA is organizing a SEAC tour of the Macy's Renovation and Office Conversion project in Boulder, Colorado. By organizing this tour, JVA is able to reach more engineers in the area and communicate the importance of reusing existing buildings as a carbon reduction strategy. This project presentation and tour will showcase the benefits and challenges of adaptive reuse. Success stories like this help inspire other engineers to consider reusing existing buildings in our effort to meet client needs and reduce carbon emissions.

Another sustainability sector JVA contributes to is renewable energy through rooftop PV verifications. JVA continues to work on PV installation projects and has been expanding its reach in this fast-paced industry. These PV installations enable us to meet JVA's commitment to sustainability and improving our communities through engineering excellence. One of our recognized local PV projects was the Vaisala Colorado Headquarters project in Louisville, Colorado where a case study article was written on altenergymag.com by S-5!. The article highlights how this building achieved net-zero energy through its rooftop PV array and energy efficient design. JVA is committed to continuing its work in sustainable design and expanding renewable energy infrastructure.



reduction

JVA is committed to reducing embodied carbon in structural design through performance-driven innovation and sustainable material selection to encourage owner buy-in and meet project and budget requirements. One of our primary initiatives is the transition from prescriptive to performance-based concrete specifications. By focusing on performance outcomes rather than rigid material requirements, we create opportunities for optimizing concrete mixes with lower carbon footprints. This approach allows for greater flexibility in mix designs, encouraging the use of alternative cement types and supplementary cementitious materials (SCMs). JVA has adapted our structural general notes and master specifications to allow for innovative cement types and concrete mixes to be used on our projects.

JVA supports the adoption of novel concrete technologies and alternative cements. By remaining open to innovative materials, we can incorporate lower-carbon options that maintain strength and durability while significantly reducing environmental impact. As part of our long-term strategy, across several building materials, we plan to integrate global warming potential (GWP) limits into product specifications within the next five years. This will include requiring the submittal of Environmental Product Declarations (EPDs) to ensure transparency in material sourcing and selection. The success of this initiative is dependent on the continued development of EPDs across the industry, and we will monitor advancements in this area.

Beyond material selection, JVA will consider designing for deconstruction where the opportunity presents itself, ensuring structural components can be easily disassembled and reused rather than becoming construction waste. To support this, we are prioritizing bolted over welded connections and have standard details for braced and moment frame connections in steel construction that incorporate this approach.

Another key consideration in our carbon reduction strategy is minimizing transportation emissions. Sourcing materials from locations closer to project sites helps reduce the environmental impact associated with transportation. By specifying locally available materials whenever possible, we aim to lower embodied carbon while supporting regional supply chains.

Through these strategies, JVA continues to align with industry best practices and the core mission of SE 2050. By integrating innovative material solutions, optimizing structural designs, and prioritizing sustainability in our specifications, we are making meaningful progress toward reducing the environmental impact of our projects while maintaining the highest standards of structural performance.





reporting

JVA is committed to reporting a minimum of five (5) projects to the SE 2050 Database across our 5 Colorado-based offices. As all of our project designs are completed in Autodesk Revit, we have used TallyLCA or bimCAT to calculate the structural embodied carbon for our submissions. This required some revisions to our standard modeling practices internally to better estimate quantities within the Revit program. Training on embodied carbon measurement tools has been implemented firm-wide to enable us to incrementally increase the number of submittable projects to the SE 2050 Database.

The lifecycle inventory database provided by Tally is the primary source of product data when assigning environmental impacts to the modeled structural elements in Revit. Modeled elements are assigned to families respective of their material and structural properties; these families are then associated with regional average LCI data provided by Tally. The embodied carbon from life cycle stages A1-A3 is quantified from the bill of materials generated in Revit and reported as a total value in kg CO₂e and normalized by gross floor area in kg CO₂e per square foot. When available, life cycle assessments are conducted using the as-built bill of materials provided by the contractor to provide a more accurate carbon footprint of the project.

advocacy

JVA is committed to sharing the values and mission of SE 2050 along with the importance of reducing the embodied carbon in the structural design of projects. We will be publishing a news article to our company website and social platforms declaring our commitment to SE 2050. During the early phases of a project, we will explain both the importance of reducing the embodied carbon in a building and the best steps to do so to our client. Long term success in reducing embodied carbon contributions in our structures will require collaborating with the architects, contractors, and other design disciplines early in the project design. We will use case studies and education on efficient design practices to bust misconceptions of the “green tax.” This will allow us to optimize our structural layout and material types while incentivizing other disciplines to reduce the building’s embodied carbon. Construction means and methods can also play a large role in carbon reduction, especially when determining the concrete mix design requirements and material availability. For example, HSS steel shapes have approximately double the embodied carbon footprint of rolled steel shapes by weight. By working with architects early in the schematic design phase of a project, we can advocate for an efficient design. On the other hand, reducing structural embodied carbon at the cost of increasing the material and energy requirements of architectural and MEP elements is counter-productive and highlights the important of early education and coordination with the project team.

Our sustainability committee will continue to improve standard proposal language so that we are better able to inform our clients of our commitment to reducing embodied carbon in our projects and the tools and knowledge our firm has available to help achieve that goal. We will be creating an embodied carbon handbook to hand out at client meetings and conferences to educate the AEC community on sustainable materials and embodied carbon.



lessons learned

JVA's first full year as an SE 2050 signatory firm has come to a close, and we are excited to incorporate mindfulness of structural embodied carbon into our design work. Embodied carbon considerations are constantly evolving in the AEC industry, and keeping up with the standards of practice is a priority for JVA. Seeking clarification from new codes such as the Denver Green Code and Buy Clean Colorado Act has been one area of focus as this has a direct impact on our projects that fall under these policies. Key requirements of these policies are providing EPDs in our specifications that meet embodied carbon limits set by the office of state architects (OSA).

Participation in the SEAC sustainable design committee has been instrumental for knowledge sharing and navigating changes in local codes. This also gives us industry professionals a chance to provide feedback to the OSA for achievable embodied carbon limits for construction materials. Setting realistic benchmark values is a critical step in carbon reduction which requires industry-wide collaboration. Accurate EPD data needs to be produced to form a robust life cycle inventory, from which life cycle assessments can be conducted. Only after environmental impact data is collected can conclusions be drawn regarding sustainability.

Data collection is imperative for enacting policies that are attainable and impactful. Environmental policy also requires industry feedback and buy-in, which is why knowledge sharing is so important for the success of these programs. Making owners, designers, and contractors aware of the importance of sustainability early in the project will provide the largest reductions in environmental impacts. Story telling is a powerful tool for encouraging client buy-in. Providing case studies and making comparative assertions between products helps overcome myths such as the "green tax." All disciplines need to work together to achieve a sustainable industry. Owners need to buy into a sustainable project and designers need to put in the work by specifying sustainable products and running life cycle assessments. Contractors must comply with embodied carbon benchmarks and provide a bill of materials so there is accurate accounting for the environmental impacts upon project completion.

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