Embodied Carbon Action Plan (ECAP)

Lamar Johnson Collaborative 7 + DE

CLAYCO DESIGN & ENGINEERING



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Lamar Johnson + CLAYCO Collaborative 7 + CESION & ENGINEERING



Clayco is a full-service, turnkey real estate, architecture, engineering, design-build and construction firm that delivers clients across North America the highest quality solutions on time, on budget and above and beyond expectations.

Founded in 1984 by Executive Chairman Bob Clark, then 25 years old, Clayco has dramatically set new standards for collaborative design, construction quality and craftsmanship, while completing all projects safely.

With \$5.8 billion in revenue for 2023 and 3,500+ employees across the country, we are one of the nation's largest privately-owned real estate, architecture, engineering, design-build and construction firms.

Clayco is the "Art and Science of Building" and we build "Beyond These Walls."

Our Mantra: Beyond These Walls

At Clayco, it's been our culture from the very beginning to do more than build: to create, to innovate and to do it with a holistic, intelligent balance of art and science that's unmatched anywhere.

In the process of creating and innovating, we tear down obstacles, old methods and outdated thinking, and we replace them with new ideas and transformational solutions.

We see our work through the eyes of the people who will use our buildings every day. Through their eyes, we see places of healing, nourishment, progress, technology, science, research, industry and entertainment. The results? Powerful structures with impacts that reach far beyond these walls. Because it's not about the walls we plan and the buildings we put up — it's about the people and their purpose within them every day.

Without them, our walls have no purpose, and with them, our purpose has no limits. We build for a cure, for a scientific breakthrough, for a family that's safe and healthy, for a cleaner world and for a better future. That's the art and science of building. **That's Clayco.**



Our Integrated Approach

Develop. Design. Build. It's not just the steps in the design-build process that set us apart: it's how we connect each step to make every project better. We do this through our distinct, yet collaborative, businesses.

DEVELOP

DESIGN

CRG

Site Selection, Development, Financing and Asset Management

CRG is a real estate development and investment company with deep expertise in delivering industrial, office, residential and mixed-use projects. LJC

Urban Design and Planning, Architecture, Interior Design, Landscape Architecture and Sustainability

Lamar Johnson Collaborative (LJC) is a full-service design and architecture firm committed to enhancing the quality of the human experience and improving how design and architecture can impact each individual's emotional being. CLAYCO DESIGN & ENGINEERING

Commercial and Industrial Engineering and Industrial Plant Code Safety Compliance

The Clayco Design and Engineering team applies engineering expertise to a wide array of industrial segments such as food and beverage, consumer products, manufacturing and lifescience products, ensuring that clients can deliver their marketmoving products in a safe, reliable and efficient manner.

BUILD

CLAYCO

Design-Build, CM@Risk, Self-Perform and a Culture of Safety

A full-service, turnkey real estate, architecture, engineering, design-build and construction firm that delivers clients across North America the highest-quality solutions on time, on budget and above and beyond expectations. CLAYCO SYSTEMS & EQUIPMENT INNOVATIONS

Through Systems & Equipment Innovation (SEI), we leverage our in-house mechanical, electrical and process capabilities to tackle the most technical aspects of our customers' projects from conceptual estimating to field execution.

CONCRETE STRATEGIES

A leading edge, full-service design-build concrete contractor.

CONSOLIDATED DISTRIBUTION COMPANY

Strategic sourcing and procurement opportunities for construction equipment, architectural materials, interior finishes, fixtures and furnishings.

VENTANA

A building enclosure company that designs, supplies and installs high–performing curtainwall and window wall façade systems.



GSE REPORT CLIMATE BRIEF

For Clayco's Full **GSE Report and** Climate Brief. Scan or Click on the QR codes.

2024 PROGRESS

Energy and Carbon Committed to SBTi, setting Scope 1 and 2 emissions targets. Establish Scope 3 We've made progress in reducing our Scope 1 and 2 emissions, set Scope 1, 2 and 3 emissions targets and developed carbon action plans for the enterprise. emissions targets with an emphasis on embodied carbon. Circular Economy Divert 75% of all Construction and Demolition (C&D) waste from landfill by 2025. We have created a sustainable construction program to enable sustainability efforts on all jobsites. Divert 75% of municipal solid waste (office) from landfill by 2030.

Water and Ecology

GOAL

Study environmental impacts of construction site grading using a science-based approach and determine relevant KPIs for measuring impact in 2023. Identify and implement impact mitigation processes.

Conduct a thorough water usage inventory of our operational activities in 2025, with a focus on work in water-stressed regions.

Our waste diversion practices have improved, however we will be conducting a formal study related to this in 2025.

A preliminary study was conducted in 2023, which included development impacts on ecology and operational water consumption at our offices.

Where available, we collected data on water consumption at offices. We plan to conduct more comprehensive studies in 2025.

Sustainability Integration

The pillars and focus areas of our sustainability strategy are implemented within operations, on business units and projects across Clayco.

FOCUS AREAS	CLAYCO Construction	LJC	CRG	DESIGN AND ENGINEERING	CONSOLIDATED Distribution Company	CONCRETE Strategies	VENTANA
Scope 1 and 2 - Office emissions ¹	•	•	•	•	•	•	•
Scope 1 and 2 - Jobsite emissions ¹	•		•			٠	٠
Scope 3 - Embodied carbon in materials (concrete, metals, and insulation); operational carbon (sustainable design) ¹	•	•	•	•		•	•
Divert 75% of all C&D waste by 2025	•					•	•
Divert 75% of office waste by 2030	•	•	•	•	•	•	•
Impacts of construction grading, determine relevant KPIs and identify and implement mitigation processes	•		٠				
Water usage inventory of our operational activities in 2024	٠	•	٠	٠	٠	٠	•
Healthy spaces while prioritizing local community engagement and economies (air, water quality, policies, incentives)	•	•	•	٠	٠	٠	•
Innovate for future sustainability risks/opportunities, technology challenges and transparent reporting practices	•	•	•	•	•	•	•
Energy and Carbon Oircula	ar Economy	Water	and Ecology	Heat	alth and Wellness	😑 Inn	ovation and Data

¹ We are following SBTi guidance as of March 2024 for how we implement and track targets.

Action Across the Business



Clayco Enterprise Carbon Emissions

This diagram is published in Clayco's Carbon Brief and outlines the enterprise Scope 1, 2, and 3 emissions. Scope 3 (Use of sold products) is 99% of our enterprise carbon footprint. Roughly 40% of our Scope 3 footprint is attributable to materials - of which structural materials are the majority. This highlights the key role CDE structural plays in decarbonizing our enterprise.



ECAP: Education

ANNUALLY: PRESENT WEBINAR TO EMPLOYEES (MINIMUM 1)

Objective: Require a one hour minimum annual training for all employees on embodied carbon reduction.

Action Plan

- Identify a relevant webinar (e.g. SEI's Sustainability Symposium) or create an internal one tailored to the CDE's projects and processes.
- Schedule and present the webinar (or Lunch and Learn) to CDE.
- Record the webinar for future team member onboarding / training purposes, publishing to Clayco AXIS internal network and assigning as annual refresher for existing team members.
- Collect participant feedback and assess the webinar's impact on employee understanding and engagement in regards to reducing embodied carbon and the SE2050 commitment.

Timeline Goal

- Select or develop the webinar content within 3 months.
- Present the webinar to all existing and new team members within 6 months of ECAP initiation as part of mandatory team member learning.

NEW EMPLOYEES: INCLUDE EMBODIED CARBON EDUCATION IN ON-BOARDING

Objective: Ensure new hires are educated on the importance of embodied carbon reduction and principles when starting with CDE.

Action Plan

- Develop a dedicated module on embodied carbon for the onboarding process.
- Include information on CDE's commitment to SE2050 and how new employees can contribute.
- Incorporate this module into the existing onboarding curriculum.

Timeline Goal

- Develop the onboarding module within 4-5 months.
- Implement it for new hires within 6 months.

EXISTING EMPLOYEES: TRAIN ALL STRUCTURAL EMPLOYEES ON THE IMPORTANCE OF EMBODIED CARBON REDUCTION

Objective: Ensure all CDE Structural department team members understand the significance of reducing embodied carbon, and our Enterprise's commitment to SE2050 and other industry targets.

Action Plan

- Develop a training program (workshop, seminar, webinar, etc.)
- Launch the program on Clayco AXIS and have all CDE employees trained within 12 months
- Offer updates to course as new technologies and methods emerge and add an annual refresher to mandatory employee learning module.

Timeline Goal

• Achieve full participation and completion of recurring program within 12 months.

ECAP: Education

CREATE AN EMBODIED CARBON REDUCTION TEAM

Objective: Establish a dedicated team to oversee CDE's embodied carbon reduction efforts.

Action Plan

- Form a multidisciplinary team with representatives from Engineering and Sustainability.
- Set regular meetings to review progress, discuss challenges, and update / track goals
- Encourage team members to attend local presentations, work sessions, and conferences on embodied carbon
- Task the team with quarterly reports for management on CDE's progress
- Empower the team to recommend adjustments to the training and measurement process as needed

Timeline Goal

• Establish team and begin regular meetings and reporting within 6 months.

SE 2050 Focus Team



Erika Winters-Downey

Director, Sustainable Structures

Anthony Augustine

Associate Principal, Structural Engineering

Drew Hennessy

Senior Structural Engineer

Keiko DeClerck

Structural Engineer II

ECAP: Reporting

Reporting is at the heart of the SE 2050 commitment. Gathering and interpreting structural quantity and carbon footprint data will provide insights for our team both internally and externally. Internally, we will be able to identify carbon-intensive outliers in our project portfolio. Externally, we are contributing to a knowledge base which will serve our profession.

Clayco Design and Engineering's SE 2050 leaders will:

- Meet quarterly to designate/maintain the list of projects we will report quantities for.
- We will aim to identify projects which overlap with LEED or other embodied carbon reporting requirements, to provide robustness of data.
 - For 2025, our inaugural year, we will report on the minimum required two projects.
 - For 2026 and beyond, we commit to reporting on a minimum of four (4) projects per year.

Individual Project Responsibilities Matrix	CDE Lead Engineer	CDE Leadership	Clayco Sustainability Team	CDE SE 2050 Committee
Alert individual project managers at the outset of design that we will need to gather structural system quantities.		•		
Provide a template for gathering quantities.				•
At outset of project, create basic material quantity and associated embodied carbon estimate based on previous project quantities and industry average product impacts.	٠		•	٠
During project bidding/buyout, ask party procuring bids to request quantity breakouts which will be provided to CDE.	٠		•	•
Request concrete/rebar quantities from Civil team/Civil bid for hardscape/ retaining structures.	٠		٠	٠
For data center projects, a significant amount of non-structural concrete is involved with duct bank construction. CDE project manager to relay quantity request to electrical contractor procuring duct bank concrete.	•		•	٠
Project quantities and associated carbon footprint will primarily be tracked with EC3 or a simple spreadsheet (similar to ECOM by SE 2050). Data from life cycle stages A1-A3 (Cradle-to-Gate) will be assessed at a minimum.			•	
If a Whole Building Life Cycle Analysis is being performed, we aim to evaluate with EC3 in tandem to provide robustness of data.			•	
Upload project quantities to SE 2050 Database.				•

ECAP: Reduction



Revise general notes and specifications to establish a minimum SCM criteria in lieu of current practice of establishing maximum only.

Revise Concrete Mix Design Table within the Structural General Notes to allow differentiation of SCM's for various structural concrete applications within strength and usage class.

Revise structural specifications to include reduction goals from established benchmarks, along with inclusion of annual reduction step function over time.

Revise structural specifications to include requirements for Environmental Product Declarations (EPDs) to be submitted formally to advance data gathering abilities.

Increase annually the number of projects in which an early carbon estimate is performed on, to ensure increased focus on carbon reduction, leading to reductions.

Create internal processes for proposing, approving, and implementing sustainability improvements, embodied carbon reductions, etc.

Include embodied carbon reduction in the design review requirements via addition of criteria and internal reviews to the formal quality control / quality assurance on all projects.

Add Embodied Carbon Reductions to the internal review process at all stages of project, including the initial review to increase awareness and potential impact.

Add embodied Carbon discussion to FEL level narratives and reports within deliverables to clients, to front load the discussions surrounding structural sustainability and lowering embodied carbon.



Clayco Enterprise Portfolio Embodied Carbon Ranges 2022-2024

Clayco Design and Engineering interfaces with the larger Clayco Enterprise to evaluate embodied carbon. This chart represents embodied carbon studies run within the 2022-2024 time frame. While this process was initially incorporated with our construction teams, as part of the SE 2050 initiative CDE is able to incorporate studies like this into our workflow. We plan to add to this data and use it to benchmark an increasing percentage of our projects moving forward.





ECAP: Reduction



Reduction from benchmark step function. (see in short term)

Enhance Capabilities and market structural engineering services in mass timber and other wood construction market segments

Enhance capabilities and market structural engineering services in adaptive structural re-use and renovation, to aid in preserving existing in-place construction and therefore reduce added environmental embodied carbon by extending and repurposing structures.

Continue investigation and research applications of sustainably harvested biogenic materials for structural or non-structural applications (such as Prometheus materials, providers of a bio cement with a zero-carbon footprint, which has been used in Clayco's new office renovation project).

Continue investigation and research of embodied carbon reductions in concrete supplier mix designs. The Clayco enterprise already has been at the forefront of these reductions through the testing of low carbon tilt panels through its Concrete Strategies division, along with enhanced coordination with suppliers across the nation to evaluate, procure, and install reduced carbon mix designs over many projects.

Continually evaluate reported data, lessons learned, and completed project experience to inform future modifications to project structural specifications and design methodologies.



ECAP: Advocacy

Clayco Design & Engineering, as part of the larger Clayco Enterprise, has and will continue to communicate our Enterprise commitment to Sustainability and SE 2050 through internal and external posts. Regular participation in SE 2050 seminars, meetings, and activities.

Action Plan

- Engage with material suppliers the importance of (EPD) Environmental Product Declarations and the reduction of low-carbon material options, including by adding EPD requirements to our standard project specifications.
- Enterprise commitments in addition to SE 2050 (SBTi, AIA2030, MEP2040) which have already been made and will continue to be supported
- Engage with GC, CM, other structural engineering peers/firms the importance of (EPD) Environmental Product Declarations and the reduction of low-carbon material options
- Engaging/presenting to Structural Engineer's Associate of Kansas & Missouri (SEAKM) on sustainability (embodied carbon 101).
- . Involvement within projects when concrete contractors and/or ready-mix suppliers are being vetted to review in terms of not just structural properties and construction, but for sustainability and embodied carbon reduction efforts.







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BRING A GIRL TO CLAYCO DAY!



Lamar Johnson + CLAYCO

ECAP: Materials

Objective: Identify and promote the use of low embodied carbon building materials. The identifying process should contain the entire life cycle ("cradle to grave") of the material. The promotion of low embodied carbon building products should be championed by the entire manufacturing supply chain.

Action Plan

- Provide an Embodied Carbon Analysis on all new building projects deemed as carbon reduction opportunities by the Sustainable structures group.
- Require manufacturers to provide Type III product / facility specific Environmental Product Declarations (EPD's) with third party verification (when possible). If not available, advocate and / or send resources to the manufacturer
- Utilize Life Cycle Analysis tools that allow for accurate comparison between manufactures.
- Work towards consequential carbon variables provided by the manufacturer are "cradle to grave" and not just "cradle to gate" or "gate to gate" information.
- Work towards consequential carbon variables information includes all phases of the material, such as maintenance and end of life.
- Utilize In-house capabilities on the procurement side of the Clayco Enterprise, such as Consolidated Distribution Company (CDC) and Concrete Strategies, to target reduced Embodied Carbon (EC) opportunities in real time on projects.

- Focus on the two most widely used structural materials which have the highest embodied carbon content, hence the greatest potential for initial reduction impact (steel and concrete).
- In the steel section of the specifications and contracts add verbiage requiring vendors and subcontractors to provide feedback as to the process used for manufacturing the steel. Structural steel that is produced in Electric Arc Furnaces (EAF), with its high use of recycled steel, is advantageous over the Basic Oxygen Furnace (BOF) Steel. Especially BOF's that use virgin iron base materials. Propose revising specifications to stipulate a minimum recycled content for structural steel.
 - Identify the country of origin for the steel. Different countries have different mixes of recycled materials, producer will be able to provide environmental product declaration (EPD) specifications
- In the concrete section of the specifications and contracts add verbiage requiring vendors and subcontractors to provide feedback as to the process and materials used for manufacturing concrete.
 - Specify Supplementary Cementitious Materials (SCM's) in place of the clinker portion of the design mix.
 - Write specifications to be a more performance-based criteria which will allow the producer to be more flexible to utilize local lower carbon materials (ex. Locally available crushed stone aggregates).
 - Look for low energy intensive cement kilns in the local area of the project.
 - Look for ways to reduce the quantity of concrete on a project.
- Establish a means to pass the information to the Clayco sustainability group.

Timeline Goal

• Identify and draft the specifications with the required verbiage within 3 months for full review of construction and procurement leadership.

ECAP: Design

Objective: Define targeted areas of embodied carbon reduction in the structural design phase.

Action Plan

- Train and mentor structural staff in sustainable design approaches such as material selection, optimization of member utilization, constructability and modularization to reduce waste, etc.
- Create internal processes to formalize these considerations as part of internal design progress and quality assurance procedures.
- Review and consider applications of performance-based design criteria
- Challenge traditional design philosophies of standardization where appropriate to allow more optimization of material to reduce embodied carbon.
- Work with internal partners in other design disciplines to formalize loads from their designs earlier and more accurately.
- Work with internal partners in other design disciplines to consider adjustments to detailing and material selections which may allow for additional deflection tolerance in structural designs.

All without sacrificing safety, constructability, and longevity.

Timeline Goal

Establish team and begin regular meetings to revise the Engineering Quality Checklist to incorporate items that steer towards general sustainable design approaches and practices.

Is it measurable? Does this edit align with the Clayco Enterprise Sustainability goals? Comments: Does this edit align with the SE2050 Sustainability Program goals? Does this edit generate a benefit aside from Sustainability? What other benefits does this edit generate Comments: Are there any known potential risks from this edit? Are any CDE documents impacted by this proposed edit? If yes, what documents? Comments If approved, should this edit be applied to existing projects as well as new projects? If approved, should this edit be excluded for any type of specific project/client/region? Comments What Enterprise entities, outside CDE Structural, could be impacted by this change? Has this proposal been discussed with these entities? List any other information which may aid in determining validity/necessity of this proposed change Signature (SSC Proposer): Date Signature (SSC Approver): Date Final Approval Signature (Structural Principal): **Example Tracking Log** Upon 3 signatures route to Implementation SSC Standards Edit Proposa Rev. 0 05.10.202

Clayco Design & Engineering STRUCTURAL SUSTAINABILITY COMMITTEE (SSC) STANDARDS EDIT PROPOSAL

What Specific revision(s) are proposed? (Attach file next page as necessary)

What benefits does this edit generate in terms of Sustainability

TITLE:

CSI DIVISION(S)

Comments

Detailed Info/Checklist:

SSC PROP #: 2024-001

PROPOSAL STATUS PROPOSED

REV A

Yes No N/A

Reducing Embodied Carbon within the built environment in which CDE and the Clayco Enterprise participates will take a holistic and everevolving effort. In an effort to continually improve and learn from our shared experiences, documenting and openly discussing learned lessons and applying corrective action will be essential. The CDE Structural Sustainability team will generate a lessons learned tracking log, similar to logs utilized for design and construction lessons. Recognition and training regarding this log will be incorporated into the CDE Structural team member on-boarding and annual refresher programs.

Future updates to the Clayco Design & Engineering ECAP will highlight updates from this Lessons Learned Log annually, including identification and adjustment examples.

Lessons Learned



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