Eckersley O'Callaghan

SE 2050

Embodied Carbon Action Plan

April 2024

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Commitment

Since forming in 2004, Eckersley O'Callaghan (EOC) has established an international reputation for rigorous and creative engineering methods. Sustainability has increasingly become a key driver in our work. Today, we strive to embed sustainable thinking in all our projects.

EOC committed to the SE 2050 initiative, led by the Structural Engineering Institute in 2023. This commitment acknowledges that structural engineers play a critical role in the reduction of construction industry emissions. As such, our structural engineers shall understand, reduce, and work towards eliminating embodied carbon in our projects by 2050.

This Embodied Carbon Action Plan (ECAP) outlines our strategy for achieving the objectives set forth by SE 2050 through Education and Knowledge Sharing, Reduction Strategies, Reporting, and Advocacy.

Climate Action Charter

1. Assess the embodied carbon of all our construction projects
2. Challenge the briefs to reduce their environmental impact
3. Optimise designs to be inherently efficient
4. Challenge the industry and traditional practices
5. Specify low carbon materials and systems
6. Facilitate reduced energy consumption and increased internal comfort
7. Develop resilience strategies
8. Maximise the service life of the buildings and challenge the need for new build projects
9. Integrate circularity principles as a basis of our projects
10. Share knowledge and experience

Eckersley O'Callaghan

Laura Champion
Director
Structural Engineering Institute

31 March 2024

LETTER OF COMMITMENT TO THE SE 2050 PROGRAM

Dear Ms. Champion,

Eckersley O'Callaghan, an international multi-disciplinary engineering firm with an office in New York, is hereby signing on to the SE 2050 Commitment Program. We support the vision that all our structural engineers shall understand, reduce, and work towards eliminating embodied carbon in our projects by 2050.

The 2015 Paris Agreement was a pivotal moment in setting the global warming limit to +2°C. Our London and Paris offices promptly committed to the Engineers Declare Movement. Our New York office is now aligning with the SE 2050 initiative. Together, we acknowledge our planet's environmental crisis and pledge to direct our engineering practices towards a positive impact on our environment.

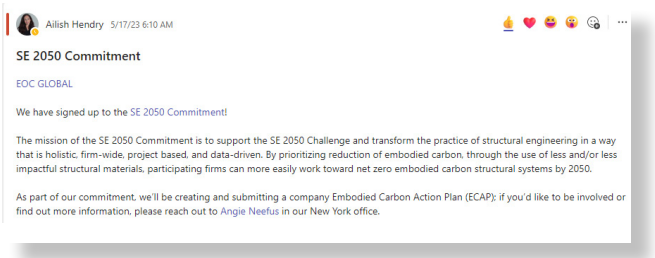
We commit to taking the following steps which are part of the SE 2050 Commitment Program:

- Within six months and annually henceforth, we commit to reporting an Embodied Carbon Action Plan (ECAP) and permit the ECAP document be made public on the SE 2050 website.
- Within one year and annually henceforth, we commit to submit data to the SE 2050 project database in a collaborative effort to understand embodied carbon in structural engineering projects and to set attainable targets for future projects.

We look forward to joining this coalition and industry effort to achieve the goals of the SE 2050 Program.

Yours sincerely,

Phil Khalil, P.E.
Principal



Ailish Hendry 5/17/23 6:10 AM

SE 2050 Commitment

EOC GLOBAL

We have signed up to the SE 2050 Commitment!

The mission of the SE 2050 Commitment is to support the SE 2050 Challenge and transform the practice of structural engineering in a way that is holistic, firm-wide, project based, and data-driven. By prioritizing reduction of embodied carbon, through the use of less and/or less impactful structural materials, participating firms can more easily work toward net zero embodied carbon structural systems by 2050.

As part of our commitment, we'll be creating and submitting a company Embodied Carbon Action Plan (ECAP); if you'd like to be involved or find out more information, please reach out to Angie Neefus in our New York office.

Top left:
Our commitment letter to the SE 2050 program from Principal Phil Khalil

Top right:
Internal announcement from our London office

Education & Knowledge Sharing

Embodied Carbon Reduction Champion

Our Embodied Carbon Reduction Champion will compile and disseminate educational resources, coordinate lectures, lead discussion groups, and interface with our global sustainability leadership team to advance the understanding of embodied carbon topics in our US and international offices.

Introduction to Embodied Carbon

We consider both calculating embodied carbon and devising reduction strategies as part of our engineers' fundamental skill set. We have developed pages dedicated to embodied carbon principles and calculation methods on our internal Wiki. This is a living document where knowledge resources will be updated and expanded. Current EOC team members are notified of updates via our Global Teams Group. New employees will be informed of resource availability during on-boarding orientation.

Continuing Education

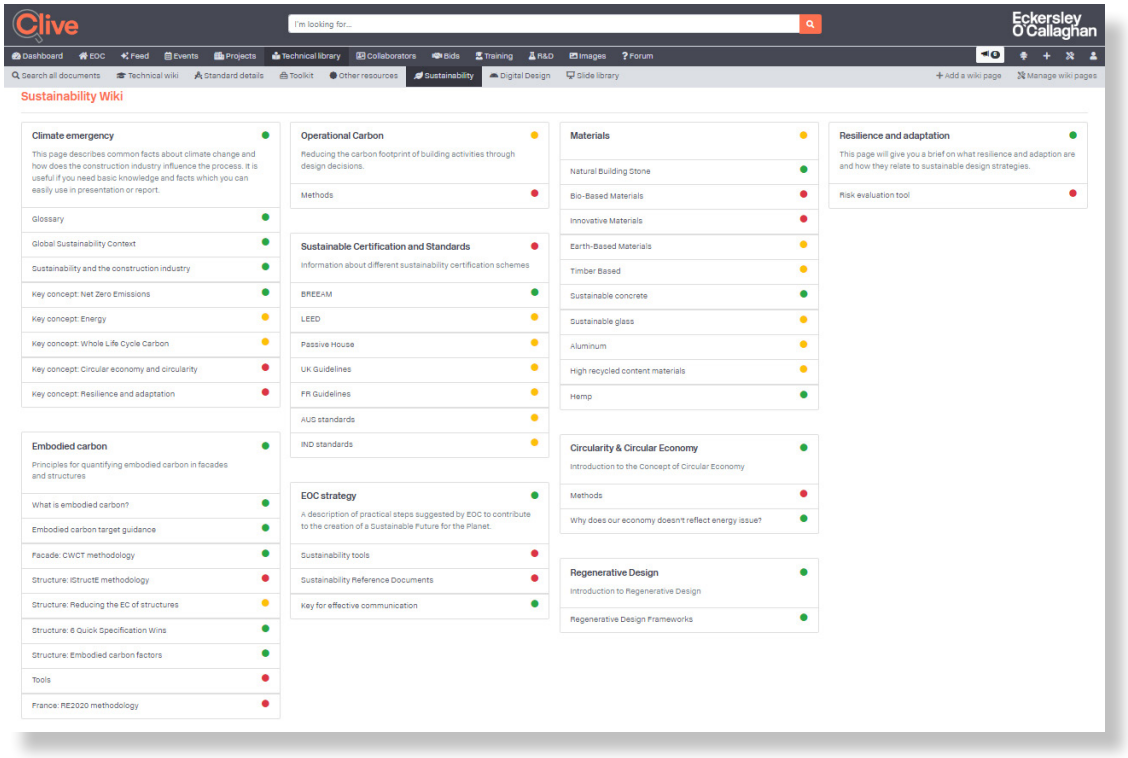
To facilitate a global office dialogue dedicated to Sustainability, we have created the 'Sustainability Hub' on Microsoft Teams. This platform is used to share articles, lectures, team member expertise, and project developments. Additionally, our Sustainability Knowledge Share Collection provides detailed workflows to implement sustainable design strategies into projects.

Embodied Carbon Interest Group

The EOC Sustainability Network was established in 2023 to guide our firm's commitment to promoting sustainable use of materials, implementing circularity, integrating resilience, and reducing embodied and operational carbon. The Sustainability Leadership Committee meets monthly with sustainability representatives from each office to review R&D progress, discuss building industry policy developments, and share educational resources.

Focused Trainings & Workshops

To further advance embodied carbon education in our office, we are developing embodied carbon calculation/ visualization tools and team training sessions. These trainings cover embodied carbon principles, material knowledge, tool implementation, results communication, and low carbon products specification.



Above:
Internal Sustainability Wiki with pages dedicated to Embodied Carbon

Reduction Strategies

Short Term Goals

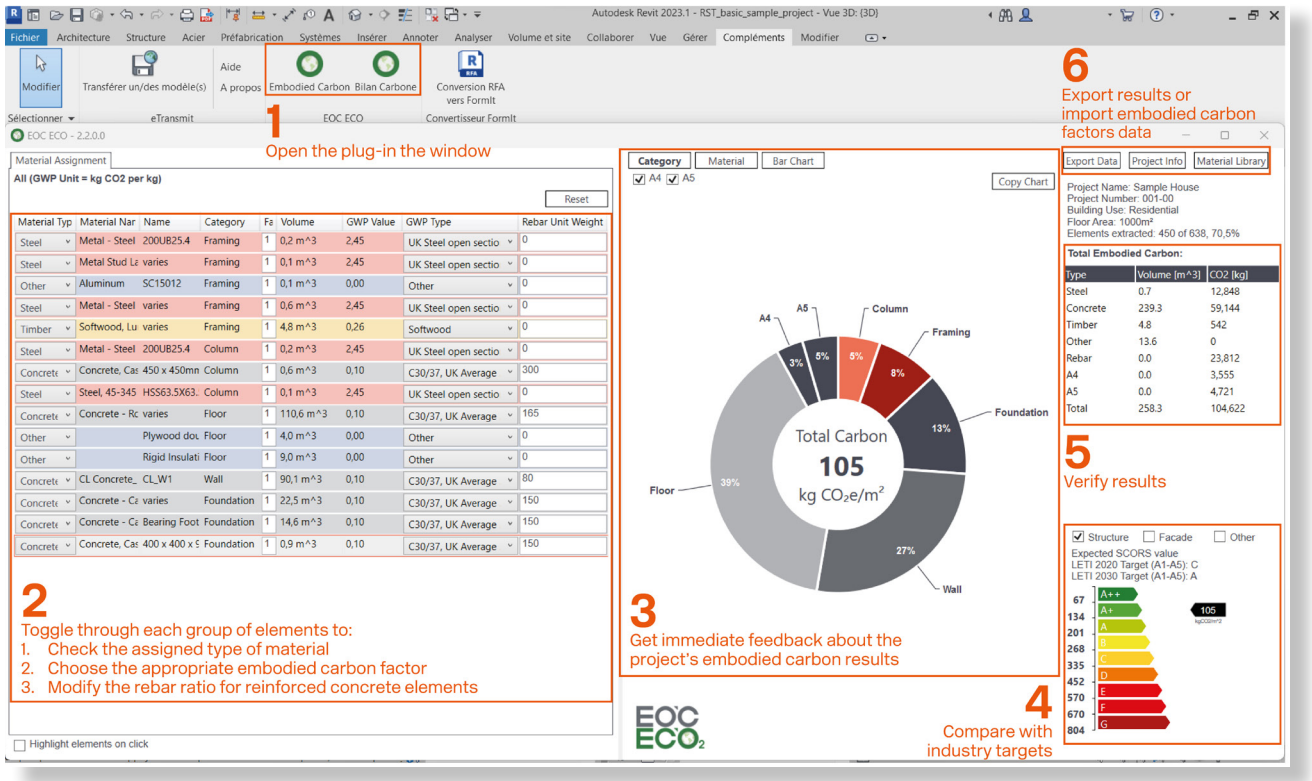
The embodied carbon initiative at EOC is currently focused on the European market. Our short-term goals are to adapt our current tools, workflows, and resources to the North American market. These goals include:

- Develop a palette of low carbon construction materials readily available in the North American market.
- Incorporate embodied carbon factors and Environmental Product Declarations (EPDs) that are specific to the North American market into ECO_2, our custom plug-in for Revit, and Smart Massing Tool (SMT), our custom parametric analysis tool.
- Utilize the CLF's 'WBLCA Benchmark Study' to establish benchmarks for our structural engineering projects.
- Form a working group to develop embodied carbon content for specifications.
- Identify team members to monitor significant advancements in material technology and design for concrete, steel, and timber.

Long-Term Goals

Our long-term goals are to develop our services for the North American and European markets in parallel. These include:

- Integrate embodied carbon options in to our proposals and key stage reports.
- Assess life cycle environmental impacts at strategic phases of project development for team evaluation.
- Revise specifications to prioritise performance requirements instead of prescriptive ones. Include EPDs in submittal review requirements.



Above:
Tutorial for ECO_2, our custom Embodied Carbon Plug-in for Revit

Reporting

Methodology
Initial calculations will use the Institution of Structural Engineers (IStructE) Carbon Calculator and Carbon Leadership Forum (CLF) material baselines for North American specific values. Future calculations will implement our custom plug-in for Revit, ECO_2, and project specific Environmental Product Declaration (EPD) data. If project specific data is not available, SE 2050 and CLF embodied carbon factors will be referenced.

LCA Scope
Initial calculations will focus on Practical Completion Carbon (A1-A5). Future calculations will encompass Whole Life Cycle Carbon (A-C) as EPD data becomes more readily available and we gain a greater understanding of the US supply chain.

Design Stages
Preliminary embodied carbon considerations and options will be evaluated and presented to teams at Concept Development and Schematic Design phases for all projects. Embodied carbon calculations will be executed during Design Development and Construction Documents phases to achieve reductions as the design develops for selected projects. Only project data from the Construction Documents phase will be submitted to the SE 2050 database.

Data Visualization
A template will be developed to provide guidance on effectively communicating embodied carbon calculations and options. A custom dashboard to facilitate comparisons across EOC projects will also be developed.

Project Submission
EOC commits to submitting embodied carbon analyses to the SE 2050 database for two projects the first year and aims to increase this number every following year.

Above:
Private residence structural engineering design and construction

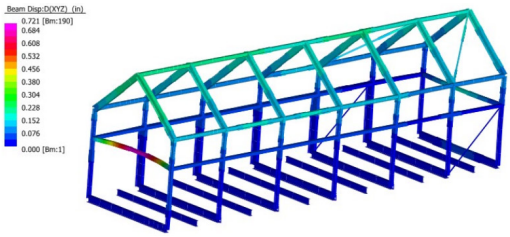


Figure 17 - Deflection under Wind Load Y

Max drift at second level	0.045"	< 193/400*1/0.7 = 0.69"	OK
Max drift at eave level	0.107"	< 63/400*1/0.7 = 0.225"	OK
Max drift at ridge level	0.184"	< 298/400*1/0.7 = 1.06"	OK

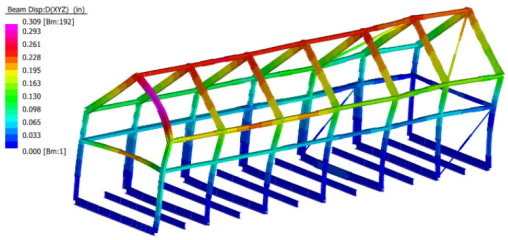


Figure 18 - Deflection under Wind Load Y Torsion

Max drift at second level	0.049"	< 193/400*1/0.7 = 0.69"	OK
Max drift at eave level	0.148"	< 63/400*1/0.7 = 0.225"	OK
Max drift at ridge level	0.226"	< 298/400*1/0.7 = 1.06"	OK

Advocacy

Global Industry Initiatives

Our international offices respond to consultations from industry initiatives like the RICS Professional Standard for Whole Life Cycle Carbon Assessment in the Built Environment and the development of the UK Net Zero Carbon Building Standard. Additionally, we have submitted European project data to the Built Environment Carbon Database. Our US team is committed to learning from and collaborating with our global team to leverage advancements in embodied carbon reduction strategies.

Services

We will integrate LCA services in to our base proposal language to educate clients and promote LCA integration in to project planning.

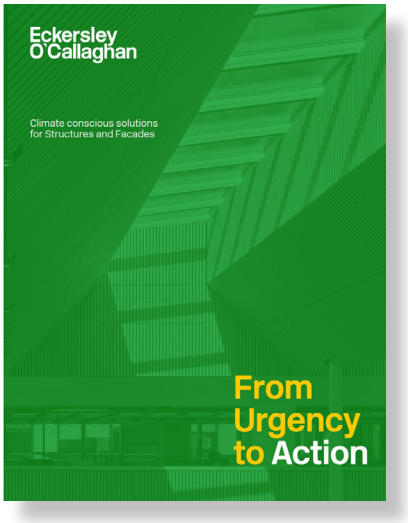
Marketing

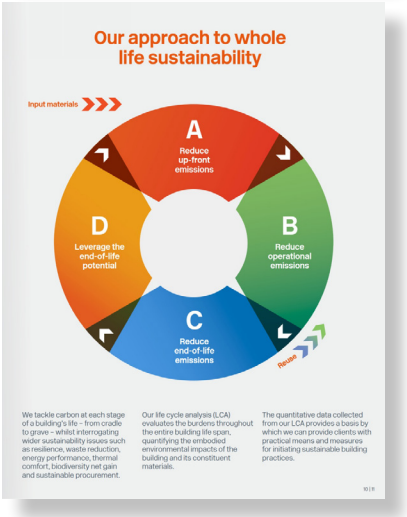
EOC's Sustainability Brochure outlines our unwavering commitment to sustainability and details our approach to climate conscious solutions for structures and facades. We will continue to update this document and online materials with US focused embodied carbon reduction work.

The current document is available at https://www.eocengineers.com/from-urgency-to-action/

Social Media & Climate Friday Posts

EOC announced its commitment to SE 2050 via LinkedIn - thereby sharing our pledge to carbon reduction practices and the resources to do so with over 15,000 followers. We will share embodied carbon tool development and project implementation via our social media platforms and Climate Friday posts on the EOC website.





Above:
EOC LinkedIn SE 2050 Commitment Post and EOC Sustainability Brochure

Ashley Reed RA
Senior Engineer | SE 2050 Embodied Carbon Champion

- **Master of Architecture – Cornell University, New York**
- **Master of Science in Biomedical Engineering – Tulane University, New Orleans**
- **Bachelor of Science in Engineering – The Cooper Union, New York**
- **Registered Architect in the States of Massachusetts and Florida**
- **Certified Passive House Consultant**
- **National Fenestration Rating Council (NFRC) Certified Simulator**

Ashley is a Senior Facade Engineer based in our New York office with over 10 years of professional experience in façade consultancy, computational design, and building science.

As a Certified Passive House Consultant and Certified NFRC Simulator, Ashley specializes in energy efficient building practices. Her experience at EOC has focused on commercial new construction, adaptive reuse, and prefabrication projects.

Chiara Bariviera BEng
Senior Engineer

- **Bachelor of Civil Engineering – University College London**
- **Minor in Sustainable Building Design - Bartlett School of Architecture**

Chiara joined Eckersley O'Callaghan in 2018 following the achievement of her First-Class Honours in her Bachelor of Civil Engineering. She is part of our structural engineering team and has worked on a range of projects from commercial, cultural, residential and education sectors.

Chiara is passionate about sustainable design. At EOC she is an integral part of our sustainability team where she has designed a Carbon and Energy Tool which enables us to assess and quantify the embodied carbon and energy emitted for the different elements of a building.

She has also designed a timber spreadsheet that allows a quick assessment of the capacity of screwed connections by collating information from different design guides for CLT and BauBuche.

Douraya Kessaria MEng
Sustainable Development Engineer

- **Master of Civil Engineering, University College London**

Douraya joined Eckersley O'Callaghan in 2023 to further the sustainability practices and efforts of the company, while closely supporting the global teams in this approach.

After earning her degree, she worked at Foster + Partners in London as a sustainable development consultant, allowing her to combine her passion for design with her determined commitment to finding solutions to the challenges of climate change.

She had the opportunity to work on projects of various scales and typologies in the UK, France, and abroad. Douraya particularly focuses on issues of carbon footprint and circularity and seeks to harmonise architectural development, technical feasibility, commercial relevance, and sustainable growth.

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