Embodied Carbon Action Plan

HOPE FURRER ASSOCIATES, INC.

HOPE FURRER
ASSOCIATES

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Our Company

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Nicole Baer
Associate Principal
Embodied Carbon Champion

Sherri Meisel
Executive Administrator

In our first year of SE2050 commitment, each of us learned that we have a key role in reducing carbon emissions.

We continue to learn and develop our knowledge as we enter Year Three.

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Introduction

Sustainable Goals

As Hope Furrer Associates enters our third year of commitment to SE2050, we continue to support the vision that all structural engineers shall understand, reduce, and ultimately eliminate embodied carbon in our projects by 2050, as stated in our initial Commitment Announcement.

We are making progress modifying our internal tools, processes, and details to reduce carbon emissions, and we are learning from our colleagues who have shared their case studies and best practices in SE2050 meetings.

We are advocating the re-use of existing structure when possible, which often includes strengthening and structural retrofit for lateral systems. For example, the structure pictured was built in stages, and retains portions that were built in 1955. The current renovation will transform this old university building into a modern one, even though many parts of it are more than three times the age of its student inhabitants!

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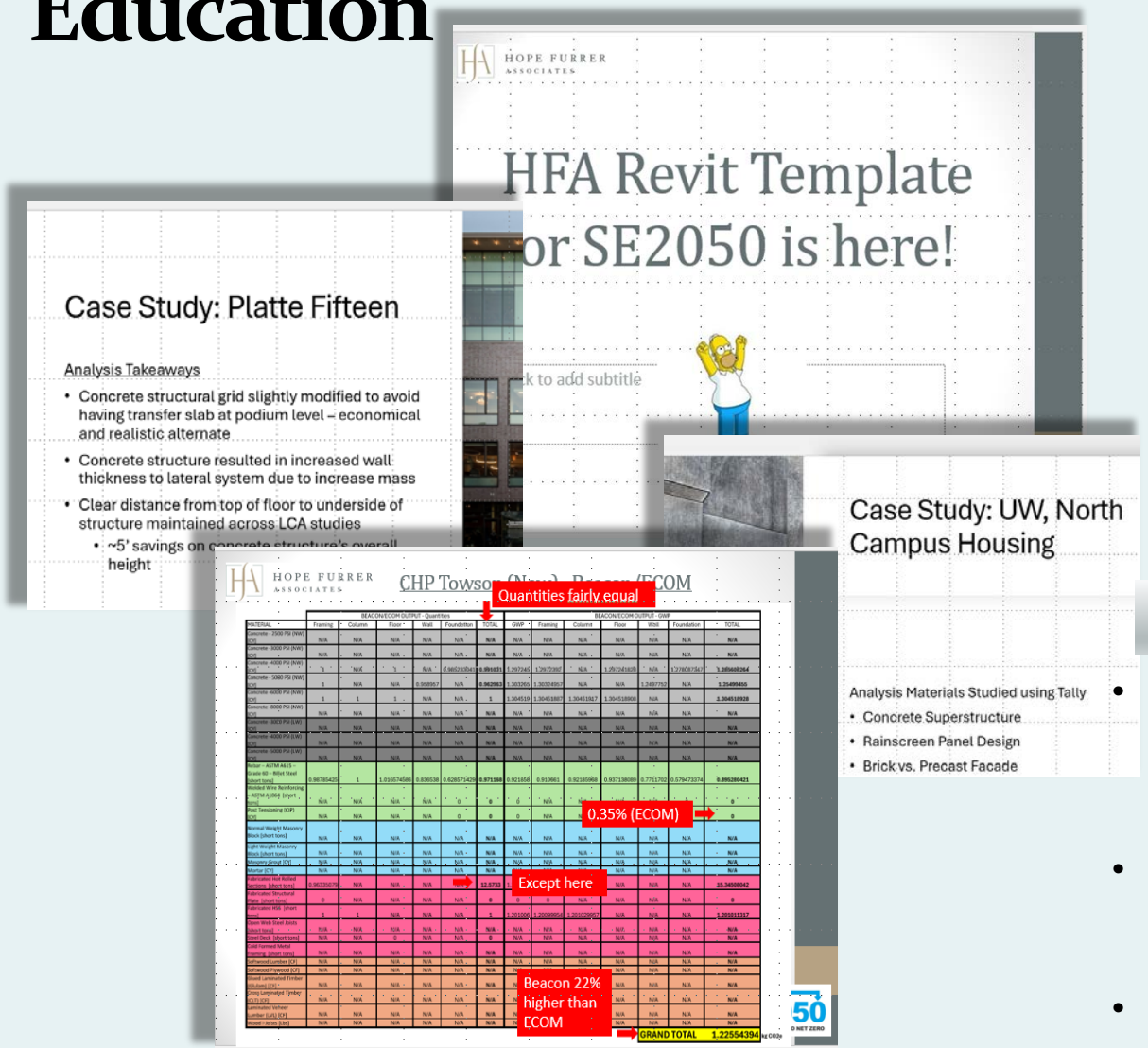
2 Education



Year 2 Review

Last year, we completed the following program aimed at basic education for our engineers and designers.

- ✓ April 2024: Distributed our Embodied Carbon Action Plan to all staff
- ✓ June and October 2024: Held (2) Webinar Presentations for all technical staff, (1) from each office, summarizing the findings of several Case Studies from the SE 2050 Database
- ✓ August 2024: Created an HFA Tech memo called "SE2050 Database using HFA Template". This includes instructions for HFA employees to generate LCA's and upload the data to the SE2050 database. Lunch N Learn held to introduce our new Templates and Spreadsheets for consistent EC Tracking and Reporting.
- ✓ December 2024: Involved all technical staff in reviewing our current typical details to be further in line with lowering embodied carbon.

Lessons Learned

- We created LCA's using our new template, for comparison with older LCA's generated using Beacon, which is not supported on Revit 2024 and later. This resulted in some takeaways for best practices in quantifying materials such as metal bar grate and deep foundations.
- We see opportunity for discussion with Clients about EC by making changes to some typical details.
- Choosing to review case studies of projects similar to those we design often in our office helped us to make decisions on our projects.

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Education Program

EMBODIED CARBON REDUCTION FOR STRUCTURAL ENGINEERS

All employees are continually learning more – this includes determining how to revamp specifications to reduce embodied carbon in concrete, how to consider ideal layouts to reduce waste, how to design in new materials, or how to work on better ways to specify structural elements. The objective for education is implementation.

For our third year as a firm committed to the SE2050 movement, we plan to build our library of details and specifications, to standardize our methods of tracking embodied carbon, and to communicate goals to builders and owners.

This is consistent with an SE2050 goal for structural engineers to become leaders in this field.

April 2025: Provide a narrative of how the Embodied Carbon Champion will engage carbon reduction at each office.

September 2025: Review the AIA 2030's most recent report and generate a checklist of some of their achievements to apply to our SE2050 Toolkit.

June 2025: Create (1) webinar focused on embodied carbon to be presented live to all employees and make an externally created recording available to all employees.

October 2025: Present findings from engagement with concrete suppliers. HFA generated a list of past suppliers on HFA projects in Year 02.

3 Reporting

Hope Furrer Associates entered four projects into the SE2050 database for Year 02. We selected representative projects in various stages, for purpose of establishing some baseline data as we look forward to Year 03.

Project	Footprint Area / Stories	Use	Phase	System	GWP Intensity (kgCO2e/m2)
NEW Princeton Schmidt Hall	228,618 SF / 7 stories	Education	Construction Documents	Mass Timber	96.07 (Excluding Bio) -61.58 (Including Bio)
NEW UVA Manning Inst. of Biotechnology	354,929 SF / 5 stories	Education	Construction Documents	Composite Steel	249.6
NEW Virginia Tech Mitchell Hall	306,253 SF / 6 stories	Education	Construction Documents	Reinforced Concrete	343.03
RENOVATION SUBH	29,209 SF / 3 stories	Office	Construction Documents	Steel Frame (Structural Retrofit)	155.01

YEAR 1 AVERAGE: **213 kgCO2e/m2**

-2 kgCO2e/m2

YEAR 2 AVERAGE: **211 kgCO2e/m2**

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Reporting Methodology

EMBODIED CARBON MATERIAL MODELING

HFA used the Revit Add-in Tool, “Beacon” for LCA reporting prior to Year 02. This tool is not supported beyond Revit 2023, and so in Year 02, we generated an internal technical memorandum to aid engineers and drafters in consistent material assignments for modeling and tracking, created spreadsheets for units manipulation to match those needed for ECOM entry, and we added or renamed materials in our Revit template to conform to the naming conventions used in the ECOM. The ECOM Tool developed and maintained by the SE2050 Committee will now be used for EPAs and Embodied Carbon calculations by our office.

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HFA’s Revit Templates include material names that conform to ECOM designations, and include all types of structural elements meeting standard specifications.

Material quantities are exported from Revit into an internal HFA spreadsheet for data entry. The spreadsheet converts units into those used by ECOM, and we will input the results into the ECOM Tool for EC calculations.

In the interest of learning from our “Baseline Projects”, we will attempt to select projects with similar systems, composite steel and concrete to report within the coming year.

Two projects from each office, (four total) will be reported to the Database within the coming year.

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4 Reduction

Year 2 Review

Last year, we completed the following program for Embodied Carbon emission reduction:

- ✓ Short Term Goal: We developed a workflow that makes it easier for make early design decisions in March 2025. The workflow will be presented to all staff in April 2025.
- ✓ Long Term Goal: We contributed to our plan to continue collaboration with concrete suppliers by starting a database of contacts that have been supplying or installing concrete on our projects in the last 5 years.

Lessons Learned

- Adding an “Embodied Carbon Tracking” section to our early design narratives is anticipated as a means to champion the cause to clients and owners, and to clarify the portions of building tracked by HFA vs other team members.
- Many concrete suppliers do not have websites or contact information. We should expand our list to include the concrete installers as well as suppliers.
- The SEI-MD Sustainability Committee is a potential avenue for us to combine our list with those of others, and to assist the state of Maryland in reaching sustainable goals while incorporating the feedback of local suppliers.
- Often, a single person within a company is all it takes to initiate change. Finding that person is sometimes a challenge.

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5 Advocacy

Year 2 Review

Last year, we completed the following program for Embodied Carbon emission reduction:

- ✓ We added the SE2050 logo to our signature files on all staff emails.
- ✓ We updated our website to include our commitment to SE2050 [https://hfurrer.com/about/].
- ✓ BONUS! We presented a case study to Penn State students within the Architectural Engineering program about the Pennsylvania State University Engineering Design and Innovation Building with a focus on Reducing the Carbon Footprint.

Lessons Learned

- Reaching out to students is an excellent way to encourage reducing carbon in design. Providing real world examples showcases what is already being done as well as the current limitations and what more can be done.

OUR COMMITMENT

Hope Furrer Associates, Inc. is committed to providing structural engineering services with sensitivity to the architectural design objective. The firm pursues complete client satisfaction through strong design talent and an understanding of the client's needs. By utilizing a personalized approach to each building type, we provide high-quality services which are designed to meet the requirements of a diversified client base.

As Hope Furrer Associates enters our second year of commitment to SE2050, we continue to support the vision that all structural engineers shall understand, reduce, and ultimately eliminate embodied carbon in our projects by 2050, as stated in our initial Commitment Announcement.

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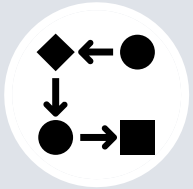
Reduction & Advocacy

REDUCUING EMBODIED CARBON AND SHARING STRATEGIES

HFA plans to build upon the progress and successes of past years, and to develop new strategies as we move forward.

Strive for an average of 203 kgCO2e/m2 for our projects reported in Year 03, putting us on track to reach 190 kgCO2e/m2 by 2030.



Implement our Carbon Emissions Reduction Workflow, which was developed in Year 02 as a reduction elective.

Continue to develop concrete specifications tailored to our local market, to reduce embodied carbon emissions on our projects.

Describe the value of SE2050 to Clients, using our website, LinkedIn, and other social media to publicly declare HFA as a member of the SE2050 Commitment

Volunteer as a Guest Lecturer for students, presenting projects that have a reduced carbon footprint.

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Summary

Lessons Learned

IN OUR INAUGURAL YEAR OF SE2050

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How did Year 02 Go?

Our Year 02 Elective Topics	Description	Status	Lessons Learned
Education	Create an HFA Tech Memo on Embodied Carbon Tracking for use by all employees.	☑	The process included updates to our drawing template and development of a new spreadsheet, but it is not too difficult to determine quantities even for projects completed before the update to our internal resources.
Education	Create a task group dedicated to creating new or editing our current typical details to be more in line with lowering embodied carbon.	☑	Reviewing HFA's typical details has highlighted several instances where collaboration with architect and contractor may encourage carbon reduction when adding typical structural details to a new project's drawing set.
Reporting	Submit a minimum of (2) projects per office (total of 4) to the SE2050 Database	☑	By delving into the tools in more detail, we have discovered some mapping issues with the Beacon tool and were able to correct these in the database.
Reporting	Analyze & document the data from Year 01 Projects to determine what pieces of information are most important and communicate the findings to all employees.	☑	Composite steel project LCAs are less variable across methods and designers, suggesting EPDs may be more predictable than other materials. The overall best strategy is to reduce material volume, regardless of structural system.
Reduction	Continue to collaborate with concrete suppliers to reduce embodied carbon in a mix designs.	☑	General emails are not very productive in getting responses. We have generated an internal list of suppliers and contact information in order to begin more meaningful engagement.
Reduction	Develop & implement a workflow that makes it easier to make early design decisions based on embodied carbon.	☑	Adding an "Embodied Carbon Tracking" section to our early design narratives is anticipated as a means to champion the cause to clients and owners, and to clarify the portions of building tracked by HFA vs other team members.
Advocacy	Add the SE 2050 logo to our signature files, and add language noting our continued participation and commitment to SE 2050 to our website	☑	This has generated the occasional question from a client or design team member. We may be ready to take a more directed step towards advocacy.

Year 03 Electives

Topic	Description	Status
Education	Provide a narrative of how the Embodied Carbon Champion will engage carbon reduction at each office. (required)	★★★
Education	Create (1) webinar focused on embodied carbon to be presented live to all employees and make an externally created recording available to all employees. (required)	☆☆☆
Education	Review the AIA 2030's most recent report and generate a checklist of some of their achievements to apply to our SE2050 Workflow and Details.	☆☆☆
Education	Engage and present findings from engagement with concrete suppliers. HFA generated a list of past suppliers on HFA projects in Year 02.	☆☆☆
Reporting	Submit a minimum of (2) projects per US office (total of 4) to the SE2050 Database (required)	☆☆☆
Reporting	Include all structural material quantities in our SE2050 Database submissions.	☆☆☆
Reduction	Short term – Clearly stated reduction target to meet by 2026: Our reduction from Year 01 to Year 02 was 2 kgCO2/m2, approximately 1%. We would like to double this reduction in Year 03. (required)	★☆☆
Reduction	Long term – Clearly stated reduction target to meet by 2030 or later: Our reduction from Year 01 to Year 02 was 2 kgCO2/m2, approximately 1%. We will aim for a 10% reduction by Year 07 (2030), or approximately 190 kgCO2/m2 average. (required)	★☆☆
Reduction	Begin implementation of our Carbon Emissions Reduction Workflow, which was developed in Year 02 as a reduction elective.	☆☆☆
Reduction	Continue to develop concrete specifications tailored to our local market, to reduce embodied carbon emissions on our projects.	★☆☆
Advocacy	Describe the value of SE2050 to Clients. Attach any associated marketing materials. (required)	★★★
Advocacy	Publicly declare HFA as a member of the SE2050 Commitment using our website, LinkedIn, or other social media. (required)	★★★
Advocacy	Continue to volunteer as a Guest Lecturer for the Architectural Engineering program at Penn State, presenting projects that have a reduced carbon footprint.	☆☆☆

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KEY:

☆☆☆ *Scheduled – refer to topic slide for date*

★☆☆ *Partially complete*

★★★ *Completed*

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