

# BALA

SE 2050

## EMBODIED CARBON ACTION PLAN





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Bala Consulting Engineers is pleased to submit the following Embodied Carbon Action Plan outlining our commitment towards reducing the embodied carbon of our structural designs to net zero by 2050.

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# INTRODUCTION

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Structural engineering is the backbone of every building and on the front lines of design and construction in every project. With concrete and steel, comprising a significant portion of a building's total emissions, Structural Engineering plays a paramount role in addressing embodied carbon within the built environment. Bala is dedicated to transforming structural design and advancing towards a more sustainable future. Substantive embodied carbon reductions in the design and construction of structural systems will require a collaborative effort amongst engineers, manufacturers, contractors, and designers; and we are excited to be a part of advancing this multi-industry effort.

## About Bala

Bala Consulting Engineers is a multi-discipline engineering and design organization comprising over 200 engineers, designers, and support personnel. Bala unifies structural engineering with our other engineering disciplines, enabling us to provide a wide range of services spanning all project phases and various industries including: corporate office buildings, healthcare facilities, municipal buildings, residential structures, religious institutions, parking structures, educational facilities, warehouse facilities, pharmaceutical manufacturing and laboratories.

***We believe sustainable design is essential design. As engineers we take our role seriously in influencing a more sustainable standard of structural design for the built environment.***

## Our Embodied Carbon Champions



**DYLAN J. LEE**  
**STRUCTURAL ENGINEER**

As a key member of our structural engineering team, Dylan enthusiastically leads our internal research, documentation and advocacy on reducing embodied carbon in structural designs. He has developed our internal Embodied Carbon Calculator tool which will be used alongside EC3 to track and report embodied carbon in our designs.



**ELIZABETH K. LARSEN,**  
**LEED GREEN ASSOCIATE**  
**SUSTAINABILITY ENGINEER**

Elizabeth shapes Bala's services in the sustainability consultancy market and supports projects across our portfolio by providing design best practices and research. She will drive the implementation of embodied carbon education and advocacy as well as overseeing reduction strategies and reporting for SE 2050.



**STEVEN M. ANASTASIO, PE,**  
**SE, LEED AP**  
**DIRECTOR OF STRUCTURES**

As our Director and Growth Leader, Steven is committed to growing relationships and strengthening our operations as we strive to eliminate embodied carbon in our projects. He will drive client advocacy, education, and our project implementation to accelerate reduction of embodied carbon.



# EDUCATION

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At Bala, we believe that education and knowledge sharing is a lifelong pursuit. This comes in various forms – ranging from formal mentorship programs and enterprise-wide Knowledge Center presentations to team bonding and internal Lunch & Learns.

**We are promoting firm-wide education and understanding on embodied carbon through the following actions:**

- In August 2021, we hosted an enterprise-wide Knowledge Center presentation on the SE 2050 Commitment and announced our involvement internally.
- Currently, our Embodied Carbon Champions attend Carbon Leadership Forum education sessions. We will broaden this to all Structural Engineers in our firm.
- Upon completion of this ECAP, we will publish our plan on our internal SharePoint page for all staff to reference.
- We currently participate in the Carbon Leadership Forum Philadelphia hub and plan to expand that participation to NYC as well.
- We will be playing the Embodied Carbon 101 Webinar in December during one of our regularly scheduled Lunch & Learns. This training session will also be required for all new-hires as part of their training process.
- Beyond the Embodied Carbon 101 Webinar, all Structural Engineers will attend a minimum of 2 additional seminars or educational sessions on embodied carbon per year.
- By January 1st, 2023, we will roll out and share the SE 2050 Library of Resources with all Structural Engineers.
- We will present the “How to Calculate Embodied Carbon” document and presentation, in addition to educating all Structural Engineers on using our internally developed Embodied Carbon Calculator.





# ADVOCACY

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A critical component to the success of the SE 2050 commitment is buy-in from clients and other design professionals. As part of our advocacy efforts, we plan to start every project off with a discussion about embodied carbon, educate clients on the importance of and strategies to achieve sustainable design, participate in local structural engineering working groups, and promote our program via email, social media, and through proposals.

**Our initiatives regarding external knowledge sharing and advocacy are below:**

- >> Since committing to the SE 2050 Challenge, we have joined a local Structural Engineering consortium dedicated to discussing embodied carbon.
- >> We plan to host a client roundtable in 2023 focused on embodied carbon and other key issues facing the Structural Engineering and built environment industry.
- >> On all projects moving forward, we plan to start conversations about embodied carbon early and bring it up often. We shall talk to architects, owners, general contractors, manufacturers, and other stakeholders about our commitment to this challenge.
- >> Our commitment to the SE 2050 Challenge is already highlighted on our Sustainability and Structures webpages.
- >> We plan to add language to our Structural proposals to highlight our commitment to the SE 2050 Challenge.
- >> Annually, we will report our progress toward our SE 2050 goals on LinkedIn and other social media platforms.
- >> In addition to publishing annual progress, we will highlight projects that focus on embodied carbon on LinkedIn and other social media platforms.
- >> All Structural Engineers' email signatures will include our commitment to SE 2050.



# REPORTING

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The old adage that “what’s measured gets managed” applies heavily to our success in reducing the embodied carbon of our designs. To truly reduce, we have to measure and report our emissions and iterate over time. An established baseline is essential in these efforts and we see our first year as critical for our path to reduce embodied carbon.

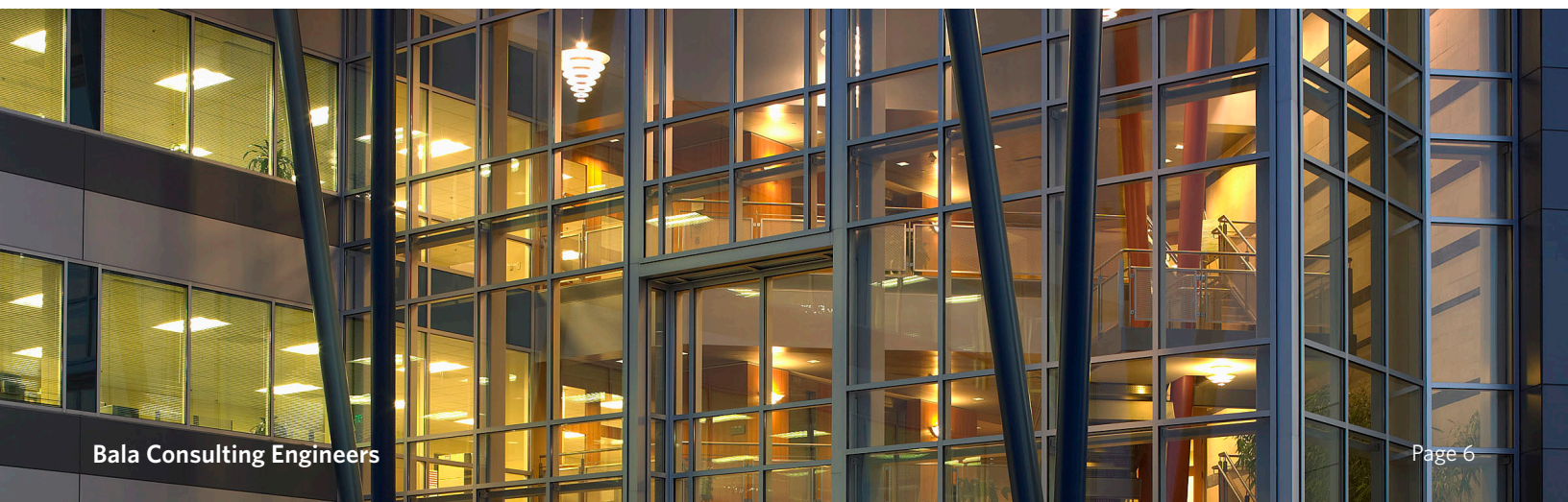
## Overall reporting methods are as follows:

- >> We will utilize EPDs and the EC3 tool to estimate the embodied carbon emissions of each project. Our scope will include stages A1-A5, unless otherwise requested by a client.
- >> We will contact and suggest that concrete suppliers to provide product-specific data, rather than relying on region-specific data when possible.

## Our Year 1 Reporting Centers Around:

- >> At project kickoff meetings, we will start the conversation on embodied carbon and optimization, inform client manufacturers about providing EPDs, and ask the architect and/or owner if a carbon budget has been set up for the project.
- >> At a minimum, we will report 4 projects for the SE 2050 Database (2 per office) from our 2023 portfolio.

- >> In line with our reduction strategies, we have also developed a project implementation guide that identifies specific points of advocacy, measurement, tracking and reporting of embodied carbon through the project process, across all stages from pre-design to project completion. *Our project implementation guide is illustrated on the following page.*





# Project Implementation

## In-House Practices

- Adopt sustainable specifications and present them on every single project we work on.
- Educate our structural engineering staff on optimal design and best practices, including miscellaneous metals.
- Offer enterprise-wide knowledge centers, focused on educating all staff on the importance of reducing carbon emissions in buildings.

## Pre-Design & Project Kickoff

- Spark optimization conversation with project owner about best possible construction methods, materials, component weights and material costs.
- Benchmark and set a goal for global warming potential (GWP) based on material choice, project location, size and building classification.
- Discuss GWP goal and sustainable specifications with project owner.
- Propose and outline different carbon counting programs to be used during different phases of the project.

## Schematic Design

- Communicate with architects about sustainable and embodied carbon goals of the project.
- Propose structural system and layout that is appropriately optimized with owner and architectural visions.
- Evaluate and adjust if required the pre-design phase project benchmark.

## Design Development

- Determine building super-structure based on beam, column, slab and bearing wall design.
- Utilize EC3 software tool to gather industry environmental product data.
- Determine GWP of selected products using Bala's internally developed Embodied Carbon Calculator and information from EC3.
- Complete specifications to ensure Low-GWP materials are used and EPDs are requested.

## Construction Documents

- Utilize drafted and vetted project details to calculate GWP of the project.
- Supply additional time allowance in order to factor miscellaneous metals and connections into GWP calculations.
- Complete and share with the client and architect a summary of the preliminary embodied carbon model.

## Contract Administration

- During material purchase, request EPDs from manufacturer or supplier in order to get a more accurate and precise GWP, beyond relying on industry-wide EPDs.
- Incorporate exact material quantity and EPDs (if available) into GWP calculations.
- In specifications, specify locally sourced materials to minimize carbon emitted from the transportation of materials.

## Deconstruction & End of Life Cycle

- Advocate for deconstructability using mechanical connections where possible.
- In the design of connections or during delegated design, specify bolted connections instead of welded connections.
- Consider reuse and/or recycling of structural materials.

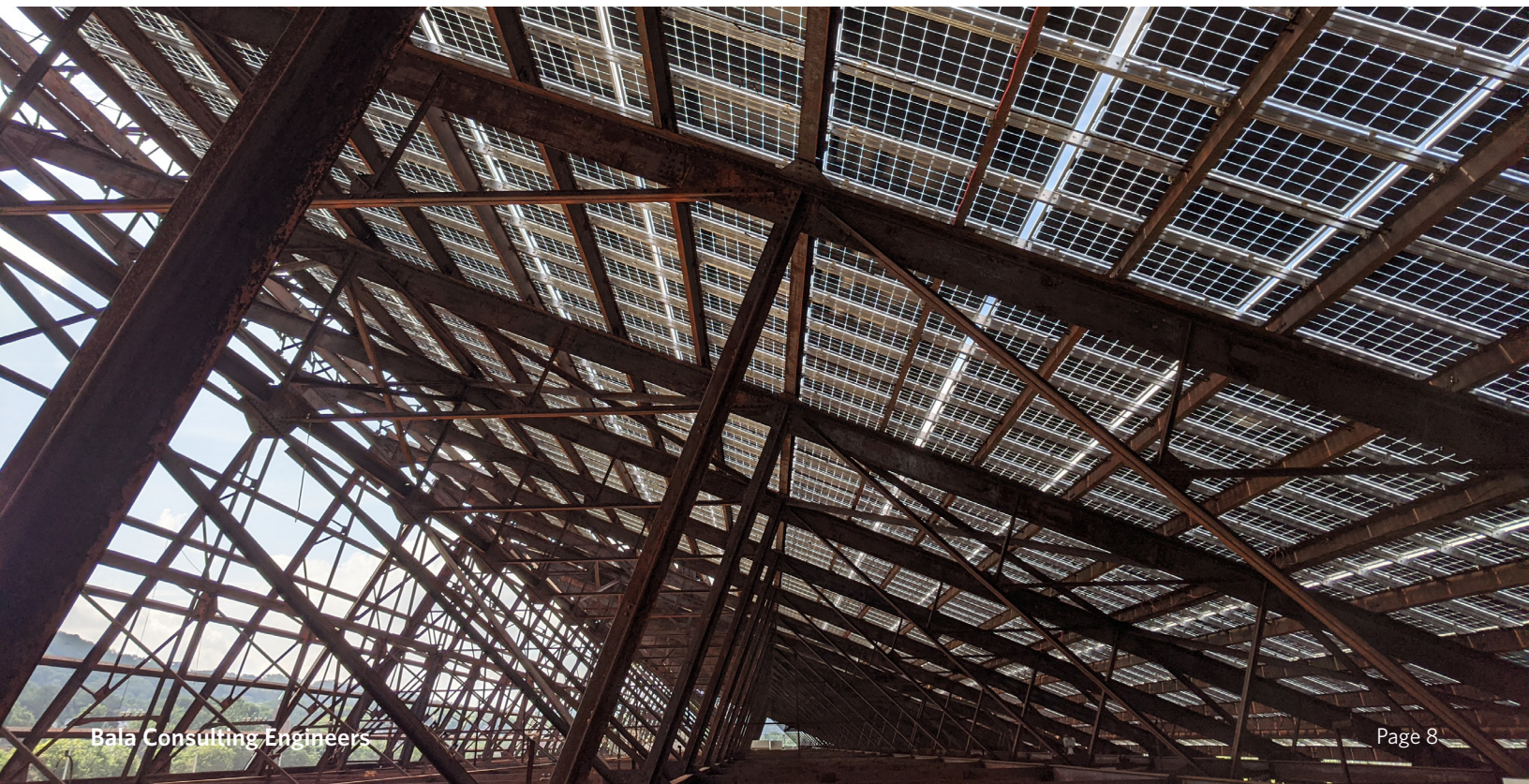


# REDUCTION

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As Structural Engineers, we have a unique opportunity to make a direct and lasting impact on the future of our planet. It is estimated that embodied carbon will be responsible for almost half of new construction emissions between now and 2050. Through implementing strategies focused on reducing these emissions, we can help to significantly mitigate the climate crisis. **Our reduction strategies are as follows:**

- Our Year 1 goal is to identify a baseline of embodied carbon on select previously completed projects. By the end of 2022, we plan to have a baseline set.
- Once our baseline is set, we will work to identify a reduction target for future years.
- A key goal is to educate owners using case studies and by providing low-carbon alternatives.
- Going forward, all concrete specifications will request Environmental Product Declarations (EPDs) as a submittal for review.
- We plan to conduct outreach regarding local concrete suppliers and collaborate on a low-carbon mix design.
- We will pull together carbon reduction case studies regarding our previously completed adaptive reuse projects.





# Commitment Letter

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April 12, 2022

Ms. Laura Champion  
Director  
Structural Engineering Institute

Re: Letter of Commitment  
SE 2050 Program  
Bala Consulting Engineers, Inc.

Dear Laura:

Bala Consulting Engineers, Inc. (Bala), a 200-person firm with offices in Philadelphia, Boston, New York City, Baltimore, and Washington, D.C., is hereby signing on to the SE 2050 Commitment Program. We support the vision that all structural engineers shall understand, reduce, and ultimately eliminate embodied carbon in their projects by 2050.

The SE 2050 Commitment will educate and remind us to be more conscious of our design decisions and processes and prioritize sustainability as a new primary stakeholder on our projects. The commitment will also prompt us to keep sustainability and technology top of mind and ultimately make us not only more efficient engineers, but also more aware of the carbon footprint created by our designs. Bala is excited to sign this commitment and contribute to a future with carbon-free designs.

Bala commits to take 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 or form 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.

Sincerely,

BALA CONSULTING ENGINEERS

A handwritten signature in black ink, reading "Kimberly D. Burkert".

Kimberly D. Burkert  
CEO

# Internal Announcement

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**From:** [Steven M. Anastasio](#)  
**To:** [BalaNYCEveryone](#); [BalaWASEveryone](#); [BalaPHLEveryone](#); [BalaBOSEveryone](#); [BalaBALEveryone](#)  
**Cc:** [Dylan J. Lee](#); [Elizabeth K. Larsen](#)  
**Subject:** SE 2050 Commitment  
**Date:** Monday, October 10, 2022 12:17:30 PM  
**Attachments:** [image001.png](#)  
[image002.png](#)  
[image004.png](#)  
[image006.png](#)  
[Bala SE 2050 ECAP 2022.pdf](#)  
[image008.png](#)  
[image009.png](#)  
[image010.png](#)

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The Structures group is pleased to announce that we have joined the [SE 2050 Commitment](#), a program which challenges the Structural Engineering community to reduce embodied carbon emissions within their designs to zero by 2050. We are proud to be joining other prominent engineering firms as one of the first 100 firms to sign onto this industry leading initiative.

By committing to the challenge, we demonstrate to existing and potential clients that we share a common sustainability aspiration. Building structures are a major contributor to Embodied Carbon Emissions. These are the emissions attributed to the whole life cycle of a material or product, ranging from taking the raw materials out of the ground through manufacturing use and all the way to disposal. Embodied carbon from the building industry makes up approximately 11% of the world's total global emissions.

Joining SE 2050 will highlight Bala's commitment to Sustainability in ALL practice groups of our business. It will continue to define us as a leader in the field of sustainability and more specifically Bala Structures' thought leadership within the structural engineering industry. In the coming months, we will be focused on internal and external education – hosting the Embodied Carbon 101 Presentation internally, utilizing the resources in the SE 2050 Library for education on design principles, and adding embodied carbon language into proposals and project documents. Additionally, we are in the process of developing an embodied carbon baseline from our 2021 projects. Once a baseline is established, reduction goals and strategies, such as optimization, design for deconstruction, and improved specifications, will be evaluated for projects in 2023 and beyond.

For more information on our embodied carbon reduction goals, check out the attached Embodied Carbon Action Plan. We are excited to join the SE 2050 Commitment to further tell our sustainability story and differentiate ourselves as sustainable leaders across the Bala enterprise. If you have questions about this commitment, please feel free to reach out to our group.

**Steven M. Anastasio, PE, SE, LEED<sub>AP</sub>**

Senior Associate | Director of Structures | Direct: 610 994 9378 | Cell: 610 574 7025 | [sma@bala.com](mailto:sma@bala.com)

BALA CONSULTING ENGINEERS, INC.



We are creating lasting change  
by joining together. We are  
committed to achieving net zero  
embodied carbon structures by  
2050.



BALA