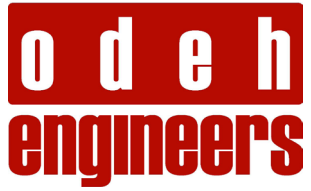


**SE2050**

# **EMBODIED CARBON ACTION PLAN 2022**







## COMPANY OVERVIEW



### innovative



Odeh Engineers is a full-service structural engineering consulting firm specializing in the design, analysis and evaluation of building structures. Founded in 1978, the company has a diverse portfolio of award winning projects throughout the eastern United States. With expertise in all major structural materials and systems, Odeh Engineers' work includes new design as well as renovation, expansion, and preservation of existing structures.

The company brings an **innovative approach to design**, solving challenging structural issues in a **collaborative** and **responsive** manner. Our capabilities include:

- Structural design
- Testing
- Construction supervision
- Structural investigations
- Evaluation of existing structures
- Peer review
- Forensic engineering
- Structural consultations for facilities management and insurance-related purposes

### collaborative



Odeh Engineers leverages **innovative technology** to develop and implement more efficient design solutions, and to improve the quality of construction documentation. The firm is a recognized leader in the application of computer technology and three dimensional building information modeling (BIM) in structural engineering. We use this technology to improve the efficiency, accuracy, and accessibility of our work. Since 2006, most major projects executed by the firm have been delivered using BIM (Revit Structure). To date, we have completed more than 1000 projects of varying sizes in BIM, often with architectural and MEP models for fully-integrated coordination.

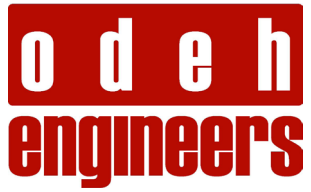
### responsive



Odeh Engineers is a service-oriented firm with a focus on **collaborative teamwork** to complete projects. The company's principals are directly involved in all projects. Our team is large enough to handle the most challenging assignments, but is organized so that the expertise and resources of the company's top engineers are always directly accessible to clients. Based in North Providence, RI with a branch office in Boston, the company currently has 40+ employees, including 18 registered Professional Engineers.

In late 2022, Odeh Engineers joined the WSP family of companies, which is also signatory to the SE2050 initiative.

Odeh Engineers has built its reputation as a leading structural engineering firm by bringing its innovative, collaborative, and responsive approach to clients.



## SUSTAINABILITY COMMITMENT

Odeh Engineers has pledged 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 innovative designs and the use of structural materials and those made with less impactful components.

In 2019, the Carbon Leadership Forum formally issued the challenge to structural engineers to understand, reduce and ultimately eliminate embodied carbon in their projects by 2050 and in December 2019, the SEI Board of Governors (of which David J. Odeh served as president in 2016) endorsed the challenge. At Odeh Engineers, we then asked ourselves how we could be better stewards of the environment and engage in the mission of structural engineers to achieve these goals.

Over the past few years, we have taken the time to educate ourselves individually and as a company by participating in Carbon Leadership Forum workshops and attending industry specific presentations to better understand the sustainability related shortcomings of our projects. When possible, we've used the available industry resources to help our clients understand the environmental impacts of the different structural systems being considered for a project. In that time, we've seen the resources and tools continue to grow and develop from niche to mainstream and we're incredibly excited about this trajectory.

The availability of educational resources and industry wide adoption of some best practices have also given us comfort that we can start to enact real change in our projects. We have always embraced the use of sustainable construction materials, but we also believe that using structural materials as efficiently as possible is the best way to reduce structural costs while also reducing embodied carbon. To help drive change, we've also been hard at work rewriting our specifications to eliminate prescriptive language that could increase the embodied carbon of our projects without providing benefit to the project. We have also begun to require Environmental Product Declarations (EPD) be submitted for our projects.

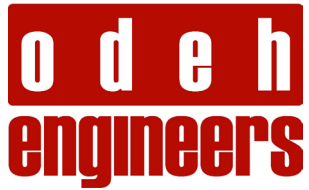


*Brown University Brook Street Housing while under construction - a sustainable project designed by Odeh Engineers.*



*Groton Hill Music Center while under construction - a sustainable project designed by Odeh Engineers.*





## EDUCATION PLAN

### INTERNAL EDUCATION

Odeh Engineers believes there are three important steps to embodied carbon education for our firm. Internally, we must continue to educate ourselves – this includes our sustainability champions, but also includes the rest of our team members. It is important that we are all constantly evolving and improving. Externally, we must educate our clients and our community to help them make decisions that will have a positive impact on the sustainability of their projects.

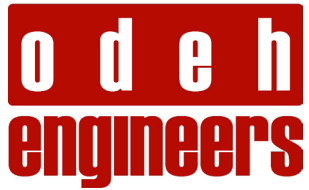
Internal education is a two-step process for us. We will begin by expanding our group of sustainability champions who will then share that knowledge with their project teams through the Odeh communities. At Odeh Engineers our engineering and design communities provide the foundation of our internal education system. Along with our other technical and material-specific communities, our sustainability community is one of many aimed at building and sharing knowledge within our company. Community leaders and members are responsible for gathering and maintaining resources (including educational resources), developing company standards and best practices and providing a forum for conversation across all levels of the company. Each community maintains a dedicated page to provide easy access to these internal resources and external educational materials. In addition to providing this resource to the rest of the company, each community is responsible for delivering a minimum of one presentation each year to the entire company and sharing major updates and trending topics within their community. Prior to our commitment to the SE2050 challenge, Odeh Engineers formed a sustainability community to work with the other communities on sustainability-focused initiatives.



*Employees attending an internal sustainability webinar at our North Providence office.*

To expand the knowledge base of the sustainability community members, we have developed a reading and watch list of published papers and webinars to assist new members in the community to gain a fundamental understanding of embodied carbon. All community members are expected to watch and read this standard set of materials to develop a baseline understanding of embodied carbon topics. Members are then asked to focus on a specific topic or area of interest to further their studies. Topics range from collecting material specific data sources or reduction strategies to specific areas of action like learning and implementing LCA tools or reviewing and updating standards and specifications.

Once educated, our community members will organize and share the information they have gathered, making it more accessible for all members of the company. All sustainability community members are active in other technical and material-specific communities within our company and are expected to act as liaisons to those communities to implement the goals of the sustainability community.



## EDUCATION PLAN

EXTERNAL EDUCATION

External education needs to target many audiences. As structural engineers, we have a responsibility to educate architects and owners about how their decisions impact the sustainability of their structures. Additionally, we have a responsibility to educate all members of a project's design team how their decisions may have an impact on a building's embodied carbon. Operational carbon and embodied carbon should not be competing interests; rather, we should work together to understand the carbon associated with a building's entire lifecycle and make holistic decisions. We also have a responsibility to educate other structural engineers about our successes and our shortcomings while also learning from those same engineers where they have been successful.

### Educating Clients

While we can make decisions to make our projects more sustainable, we feel that it is equally important to help educate our clients about the impacts of their decisions. Sustainability-based concepts and goals are often discussed with owners and architects early in a project, particularly when multiple structural systems are being considered.

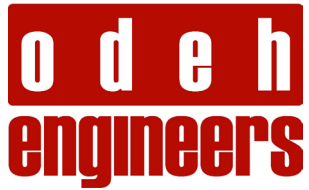
At Odeh Engineers, we often rely on a decision-making tool called Choosing By Advantages (CBA) to help clients select the best structural system for their project. CBA studies look to identify all the attributes of a particular option and reward the most positive attributes. Individual attributes are weighted depending on their importance. Cost is only considered after all solutions have been scored. While clients have the option to control whether sustainability is included in their CBAs, we must strive for its inclusion as a consideration in all CBAs, not just those comparing timber to other materials. By including sustainability as a default attribute, teams will have the ability to give it a weight as they see fit or determine it to be an attribute where no option presents an advantage. The goal is to ensure that it has been considered.

These conversations are important in the planning stages of a project, but must also continue throughout all phases of design and construction. While sustainability may play a role in decision-making, structural systems are often chosen for many reasons driven by market conditions. After a structural system has been selected, there are still many decisions that can impact the sustainability of that choice. A material traditionally considered to be more sustainable can result in a building with higher embodied carbon when used inefficiently compared to a more carbon intensive material used efficiently. Therefore, it is important to make sustainability-minded decisions throughout all phases of a project. Making decisions to use structural materials as efficiently as possible almost always results in lower embodied carbon while also resulting in lower costs for the structure. These types of decisions should be made as often as possible.



*A client participating in a virtual reality walk-through of the Groton Hill Music Center project during the design process.*





## EDUCATION PLAN

EXTERNAL EDUCATION

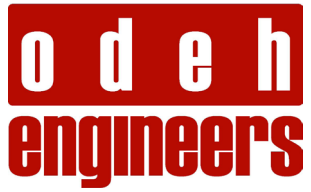
Minor changes in material specifications can also have significant impacts on the embodied carbon of the materials. While some projects have owners or architects who have their own sustainability standards or may choose to engage a sustainability consultant, many owners and architects are unaware of some of these opportunities. As engineers, we should take a more proactive approach to sustainability in our specifications by including sustainability requirements as a baseline, instead of only adding these items upon request. We have already revised most of our specifications to include a sustainability-forward approach. Our process must also include in our process an opportunity for educating clients on each requirement and give them time and resources to make decisions in their best interest while promoting sustainability.

### Educating the Public

At Odeh Engineers, we have developed a blog on our public website where we share updates and news about our company and our projects and the ways we innovate. This blog is promoted on our social media channels, and we encourage those who see it to share it to their networks. For our sustainability community, the infrastructure is in place to communicate what we are doing to a broader audience. As part of our commitment to the SE2050 challenge, we will be collecting and sharing data from our projects to the SE2050 database. When this data is collected and compiled, we intend to share this with the public in the form of case studies shared via our blog. We will also use our blog as a place to share and celebrate sustainability related successes and achievements on our projects when they are under construction.



A screenshot of Odeh Engineers' public blog post announcing our commitment to SE2050. Visit [www.odehengineers.com/blog](http://www.odehengineers.com/blog) for additional information.



## REDUCTION PLAN

It is important to learn how we can make our projects more sustainable, to educate the rest of the project team about ways they can contribute and to share the results – both positive and negative - with the construction industry. However, education without impact does not accomplish the full vision of our goals and the goals of the SE2050 challenge. To make change happen, it is important that we can demonstrate tangible and quantifiable improvements in our projects.

The first step towards measurable change is understanding our current baseline. We must start by collecting the embodied carbon data needed to understand where we are as an industry right now, study where we can make improvements in how we create buildings and attempt to understand the areas where we are struggling to improve.

At Odeh Engineers, we know how many timber, steel, concrete and masonry projects we work on each year, but we don't have data on the materials which have been supplied for those projects. To help inform this gap, we have begun requesting product specific EPDs for all primary structural materials. While we do not expect all suppliers to be able to comply immediately, we hope that this small step sends a signal to the market that we value EPDs, and in time EPDs will be submitted for all projects. In 2023, we intend to develop a tracking system to understand which projects have requested EPDs and which projects received EPDs. We will contribute these EPDs to the EC3 database or develop our own internal database as appropriate

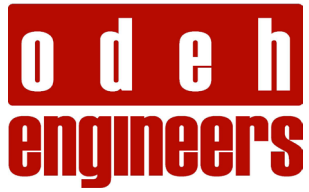
While we do not have data about the specific materials used on our projects, Odeh Engineers works almost exclusively in 3D BIM software. These tools provide a significant amount of data about our projects that we leverage during the design phase, but which often goes unused after project completion. We intend to expand and organize our database of information for projects that have been completed so that when we do get EPDs, we can begin to correlate the data. We will also use the next year to develop standards that ensure new project models will work more seamlessly with the tools we will use to track embodied carbon.

By the end of 2023, we hope to have collected enough data to understand where our sustainability efforts are trending. With this data in hand, we hope to set meaningful goals for improvement in 2024. We intend to evaluate our success on achieving these goals throughout the year to be able to set new direction for the following year on an annual basis.



*A representation of our 3D BIM software usage. This, paired with regular design meetings ensures all appropriate design types are explored and the best option is selected for the specific sustainability goals of each project.*





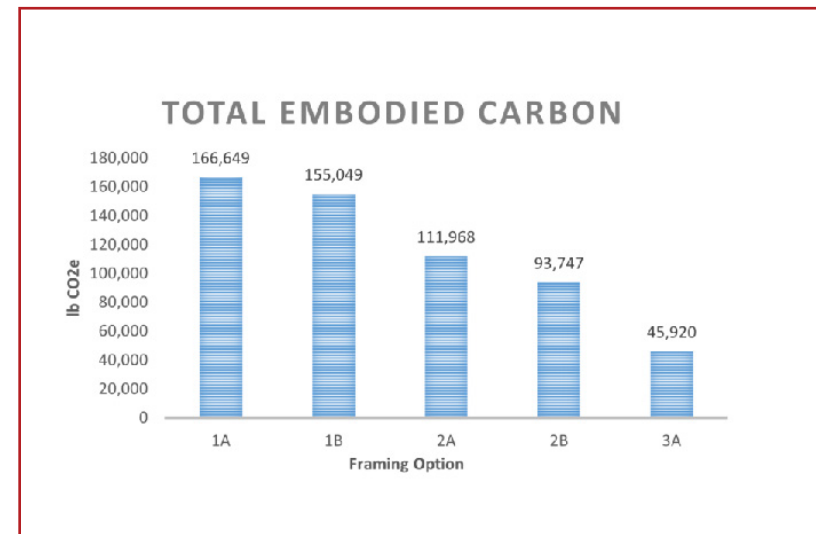
## REPORTING PLAN

We have committed to providing embodied carbon data to the SE2050 database for at least two of our active projects from both our Providence and Boston offices. Both offices work collaboratively on most of our projects, so we will choose a minimum of four projects representing the collective work of the company. While we frequently use the SE2050 ECOM tool in the early stages of a project, we intend to use the Revit Plug-in 'Tally' to collect and report data for the submitted projects. Initially, this data will capture only the product stage (A1-A3 phases) of the structural materials. While our ability to capture the subsequent stages of a product's lifecycle is limited, we will strive to work with contractors and owners to facilitate their continued study of the building through the end-of-life phase. In this way we can work towards creating more complete embodied carbon assessments.

During the first year, it is our intent to select projects for inclusion that have reached the Design Development stage at a minimum. At this stage of a project, we have begun to capture enough valuable data in our BIM software to describe the structure. When possible, we also intend to review projects that have design options for different structural approaches or systems. By selecting projects early in the design stage, it is more likely that we will have the opportunity to make insightful comparisons when multiple design options are still under consideration. In future years, we intend to add project data at an increasing rate. We also intend to track the projects through the Construction Document phase to understand how the types and quantities of structural materials evolve and how the amount of embodied carbon changes as design progresses.

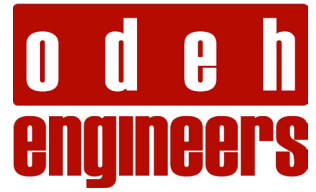


Comparison of embodied carbon for multiple building options on a recent project.



Comparison of total embodied carbon by framing type on a recent project.

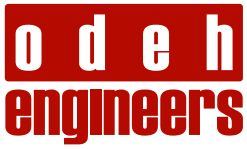




## ADDITIONAL DOCUMENTATION







1223 Mineral Spring Avenue  
North Providence, Rhode Island 02904

332 Congress Street, 6<sup>th</sup> Floor  
Boston, Massachusetts 02210

## LETTER OF COMMITMENT TO THE SE 2050 PROGRAM

**DATE:** May 27, 2022

**TO:** Laura Champion, Director, Structural Engineering Institute

**FROM:** David J. Odeh, Principal, Odeh Engineers, Inc.

**SUBJECT:** Letter of Commitment to the SE 2050 Program

Dear Laura:

Odeh Engineers, Inc., a 45-person firm located in North Providence, RI and Boston, MA, 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 path to a more sustainable future is not a problem that any of us can solve individually so we must work together to achieve these goals. Joining this commitment program provides us a forum to work with our peers to share resources and data so that we can all make more informed decisions. As part of the commitment, we will continue to not only pursue education for our sustainability community and our company as a whole, but also to engage with our clients and educate them on the impacts of their decisions. The program will provide resources to help us not only implement our goals, but also provide a forum for data sharing in our joint mission. This effort will lead to better benchmarking data and ultimately better accountability for the materials that comprise our buildings.

We therefore commit Odeh Engineers, Inc. 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,

A handwritten signature in black ink, appearing to read "DJO", is written over a faint, light blue circular watermark.

David J. Odeh, S.E./P.E.  
Principal

Phone: 401.724.1771

Fax: 401.724.1981