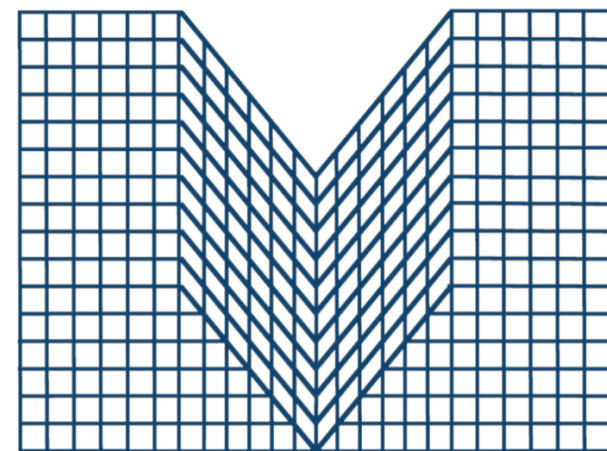




M I R O
ESTABLISHED 1980

2026 Embodied Carbon Action Plan



STRUCTURAL
ENGINEERING
INSTITUTE



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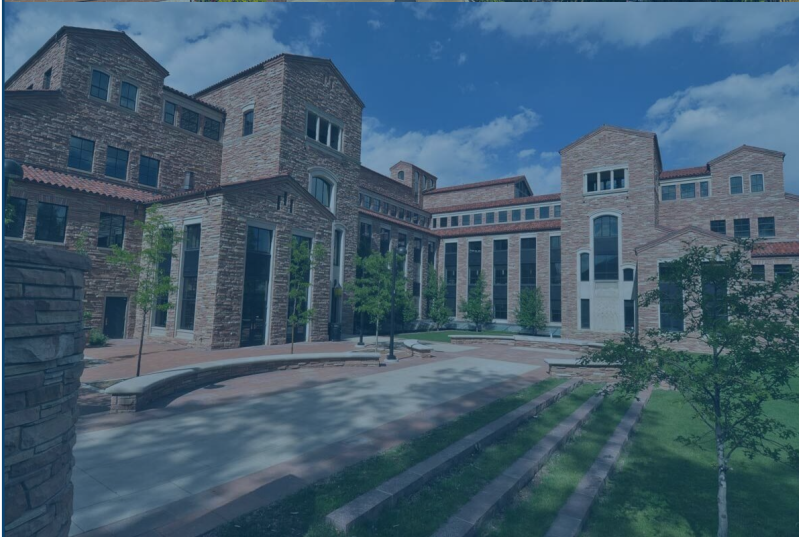
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Introduction

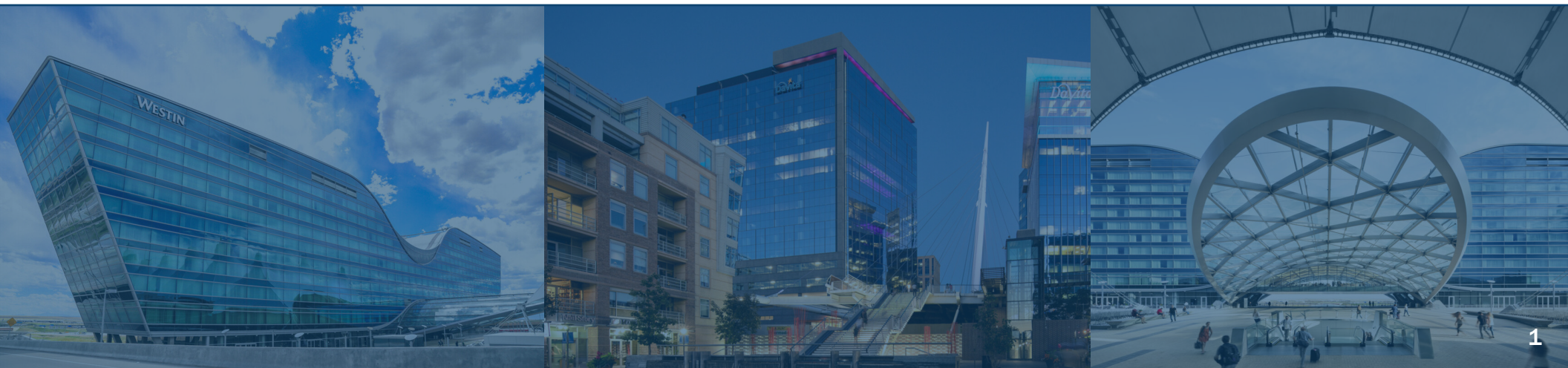


According to Architecture 2030, the built environment alone is responsible for over 40% of annual global CO₂ emissions. Cement alone is one of the highest CO₂ emitting materials, and the built environment makes up 100% of our cement carbon emissions. For iron, steel, and aluminum, the built environment accounts for approximately 50% of those material emissions. The built environment is clearly a large factor in global warming and other impacts of carbon emissions.

It was a common misconception that all buildings emitted more carbon during their operation than any other phase of their lifetime. With more research done, we now know that the early stages of a building's life can have a greater carbon emissions than its entire operational life. The A1 through A5 stages of a building's life cycle is where most of those high emissions come from, these phases are mostly dictated by early design decisions in architecture and structural design. That is why it is so important for structural engineers to be informed and educated about embodied carbon.

S. A. Miro, Inc. is pledging to participate in SE 2050, a program created by the Structural Engineering Institute whose mission is to ensure, "substantive embodied carbon reductions in the design and construction of structural systems by the collective structural engineering profession." That mission is led by the goal of achieving net zero embodied carbon structures by 2050.

Miro is a structural and civil engineering consulting firm with its main office in the Denver Tech Center in Colorado and another office in Cairo, Egypt. Since our second office is outside of the United States, only our Denver office is formally participating in the program but we plan to implement our reduction strategies company wide. Our structural engineering work varies through several different sectors of the built environment. Some examples being; mid to high rise, hospitality, health care, education, corporate, and residential. With access to this large variety of projects both local and internationally, we pledge to take action and hopefully have a growing impact on carbon emission reductions every year.



Commitment Letter



Denver

Civil
Structural
Integrated Services

10/03/2025,

Laura Champion, Director
Structural Engineering Institute

LETTER OF COMMITMENT TO THE SE 2050 PROGRAM

Dear Laura:

S. A. Miro, Inc. a 60-person firm located in Denver, CO, 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.

As structural engineers, we are the best suited for reducing embodied carbon with respect to construction materials and methods. Whether through the reduction of volume of cement in concrete mixes or the use of more sustainable materials such as mass timber. We can optimize our designs to minimize the effect on the already changing climate, while advocating and communicating to our clients embodied carbon's impact on climate.

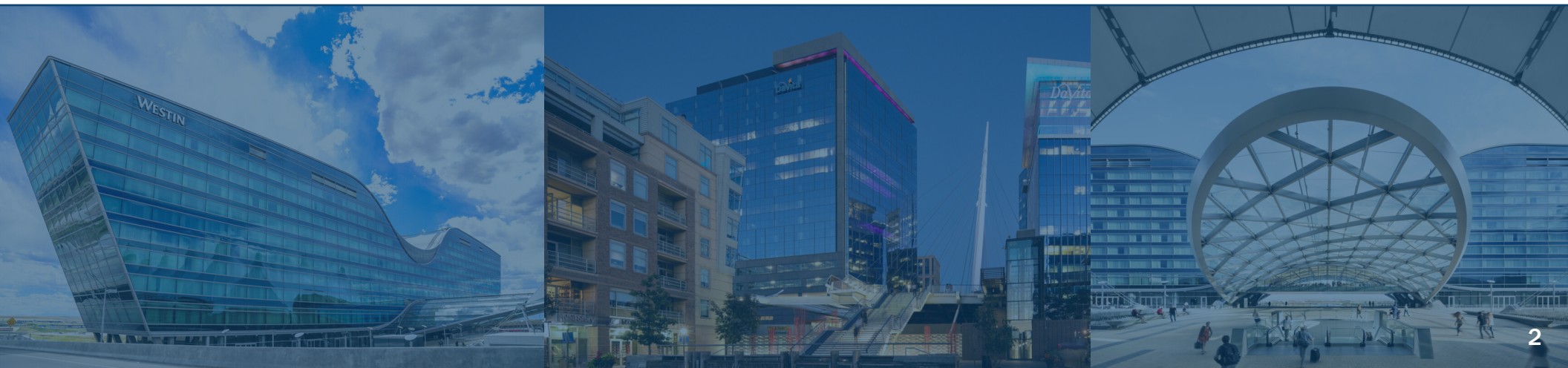
We therefore commit S. A. Miro, Inc. to take the following steps which are part of the SE 2050 Commitment Program:

- Within six months and annually henceforth, we commit to reporting an Embodied Carbon Action Plan (ECAP) and permitting the ECAP document or form to be made public on the SE 2050 website.
- Within one year and annually henceforth, we commit to submitting 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,

Kevin L. Owens, P.E.
Associate Principal



Internal Announcement



OUR COMMITMENT TO REDUCE EMBODIED CARBON

Our ECAP:

Embodied Carbon Action Plan

This document houses all our efforts for embodied carbon reduction and our electives for SE2050.

This document can be found in the structural drive under Admin, SE2050, in the ECAP folder.

What is SE2050?

"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."

Program Requirements

- Education**
 - Select an embodied carbon champion (owner)
 - Create a plan for the champion to engage embodied carbon reduction in the office
 - Present at least one webinar focused on embodied carbon to employees
 - Include embodied carbon education in onboarding for all new employees
- Reporting**
 - Submit a minimum of two projects with structural engineering services to the SE app platform
 - Compare embodied carbon emissions from multiple projects across your firm
- Reduction**
 - Set clearly stated firm-wide reduction targets for short term and long term (10 year and 100 year)
 - Submit a carbon economy narrative
 - Update plans to incorporate embodied carbon performance
 - Compare different design options with embodied carbon as a performance metric in the concept phase
 - Collaborate with concrete suppliers to reduce embodied carbon
- Awareness**
 - Describe the value of SE app to clients
 - Publish a letter from firm as a committed member of SE app
 - Educate young engineers on the importance of embodied carbon reduction

Program Goals

SE 2050 Commitment Program

Also structural engineers and structural engineering firms to accelerate the embodied carbon reduction in structural systems and materials through three main activities:

- EDUCATE**
 - Develop and deliver educational programs to all staff that are not yet embodied carbon aware
 - Develop and deliver educational programs to all staff that are not yet embodied carbon aware
- ENGAGE**
 - Develop and deliver educational programs to all staff that are not yet embodied carbon aware
 - Develop and deliver educational programs to all staff that are not yet embodied carbon aware
- REPORT**
 - Develop and deliver educational programs to all staff that are not yet embodied carbon aware
 - Develop and deliver educational programs to all staff that are not yet embodied carbon aware
- ADVOCATE**
 - Develop and deliver educational programs to all staff that are not yet embodied carbon aware
 - Develop and deliver educational programs to all staff that are not yet embodied carbon aware

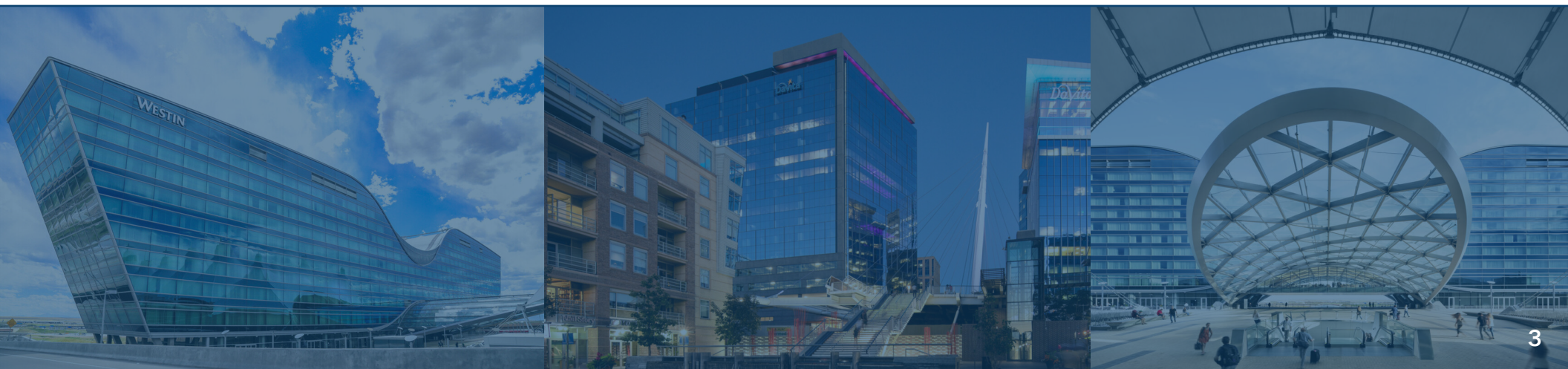
Embodied Carbon Committee

Miro now has an embodied carbon committee that will be the leaders in carrying out this plan and finding other ways we can help reduce embodied carbon!

Thank you, Daryl, Goonsung, Libby, and Jordan!

If you are interested in joining us, please reach out to anyone in the committee ☺

Our internal announcement of participation in the program was executed in one of our weekly department meetings where our embodied carbon committee members presented the slides shown in the imaged to the left, explaining what SE2050 is and how we are participating as a company.



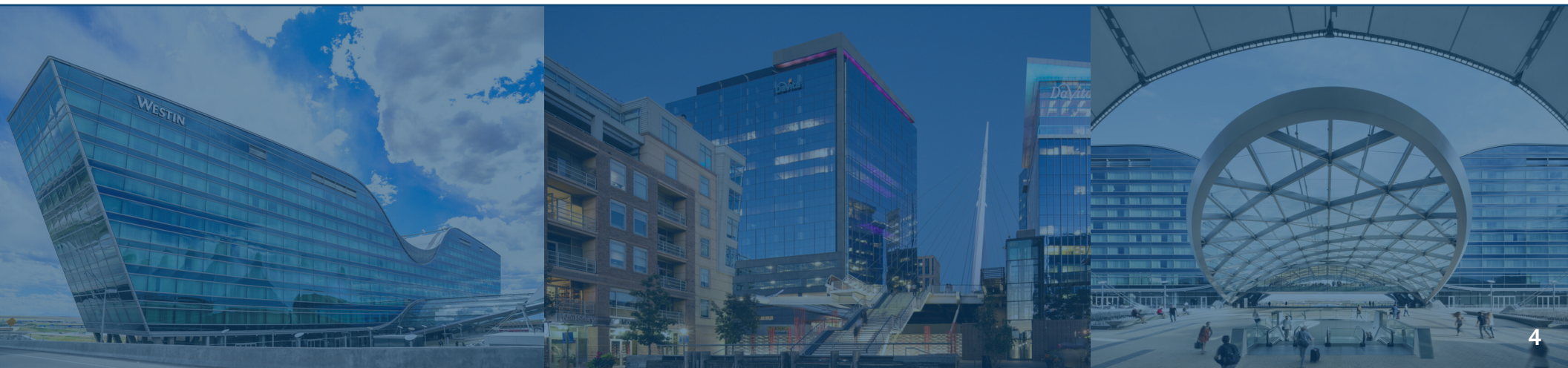
Embodied Carbon Champion



The representative for S. A. Miro, Inc. in our efforts towards SE 2050 will be Jocelyn Gonzalez-Franco. Jocelyn is a Design Engineer 1 at Miro, she just completed her Master's in May of 2025 at CU Boulder. Embodied carbon was a big part of her studies, including courses like, Sustainable Building Design and a Life Cycle Analysis course.

Our embodied carbon champion (ECC) will engage the company in carbon reduction efforts by leading our embodied carbon committee. This committee will be in charge of educating our employees and clients on embodied carbon, advocating for reductions in emissions, recording and reducing emissions, and making sure we are complying with this program's mission and requirements.

Miro has already been making efforts to reduce emissions like encouraging carbon cure on our projects, having conversations with clients about efficiency of systems and materials, and advocating for adaptive reuse of buildings as opposed to demolitions. With our ECC in charge of the committee we can now keep track of these efforts and their impacts, as well as begin to implement more or different strategies.

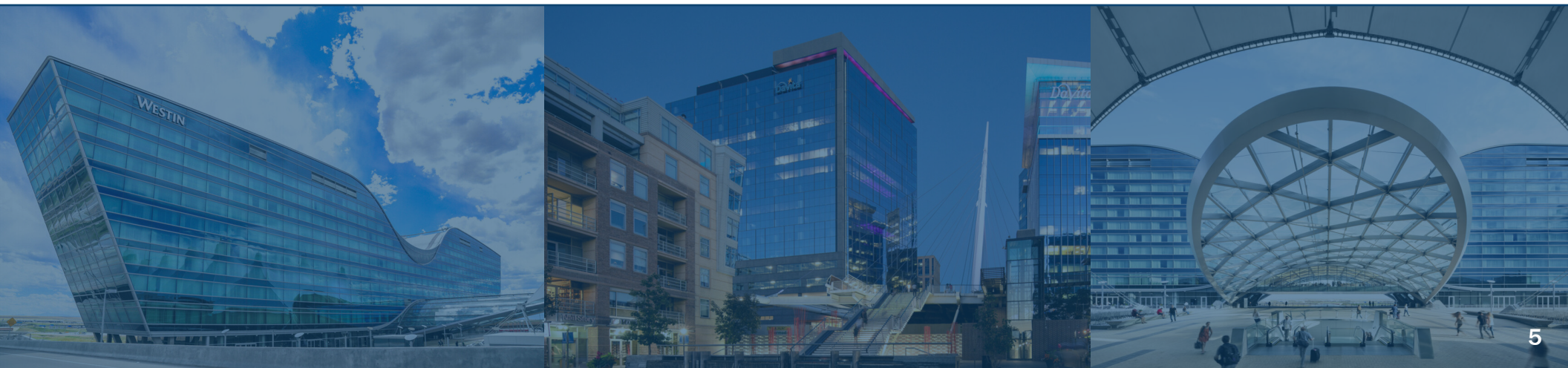


Education Plan



We need assistance from all of our engineers if we are going to be successful in this program which is why it is crucial that we start off by educating our employees about embodied carbon. We plan to ensure that all of our engineers are familiar with what embodied carbon is, how it is measured/tracked, and how we can reduce the amount we emit through our structural engineering design. This includes educating on life cycle analysis (LCA), environmental product declarations (EPDs), and terminology associated with the process of measuring and tracking CO₂ emissions from the built environment. This education will be done through in office presentations and webinars.

In order to implement all that we learn as a company, we also must provide our employees with the tools they need to track, assess, and reduce embodied carbon. This will be elaborated more in the reporting section of this plan but we will be providing guidance in how to use Pre-Optima to conduct large scale life cycle analysis, as well as other programs. It is crucial that our engineers are well versed in embodied carbon and all of the pieces that go along with tracking its impacts. Conducting life cycle analysis throughout the design phase of a project can help reduce emissions by comparing different alternatives to structural systems and making informed decisions early on.



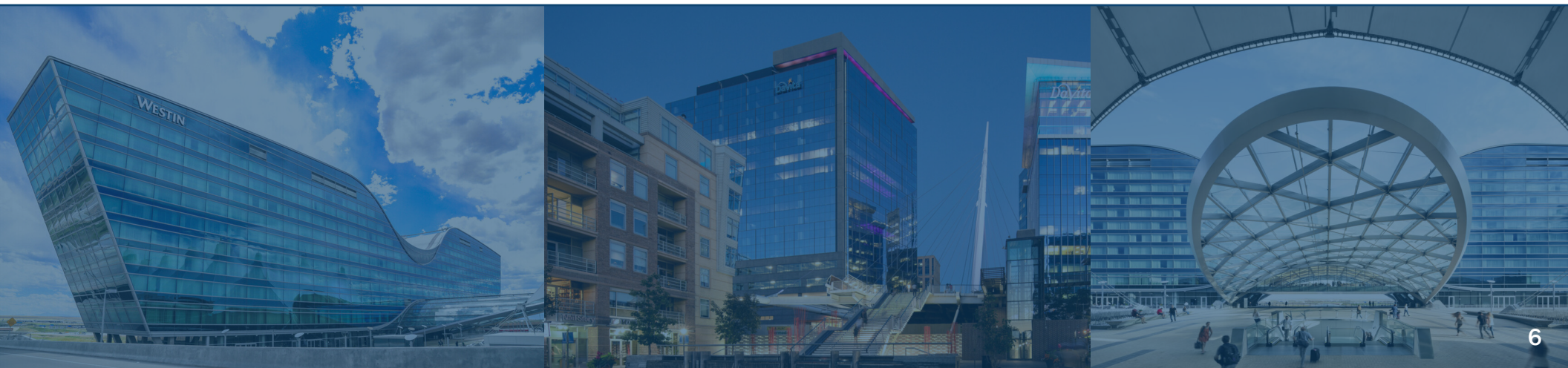
Knowledge Sharing Narrative



Advocacy is one of the most important aspects of this program in our opinion, educating our peers and bringing awareness to the problem is what will get more people intrigued and motivated to make a difference. Even just educating others about the consequences of high embodied carbon emissions can motivate people to be more conscious of their decisions. This not only applies to our employees but outside of Miro as well. Our main focus for knowledge sharing will be with clients and students/young engineers.

Advocating for strategies that can reduce carbon emissions with clients will consist of conversations we will have in early stages of a project with a client, as well as seeking out adaptive reuse projects or even suggesting that as an option to clients who may have not thought that to be an option in the past. It is easy for people to want to start from scratch with retrofit projects when they are not aware of alternatives and their benefits. Something as simple as a quick conversation can lead to significant change.

To branch out to students and young engineers, advocating will start with outreach within the office from our embodied carbon committee. For our external audience we will be integrating information about reduction of carbon emissions and SE2050 into our career fair material as well as other outreach events.

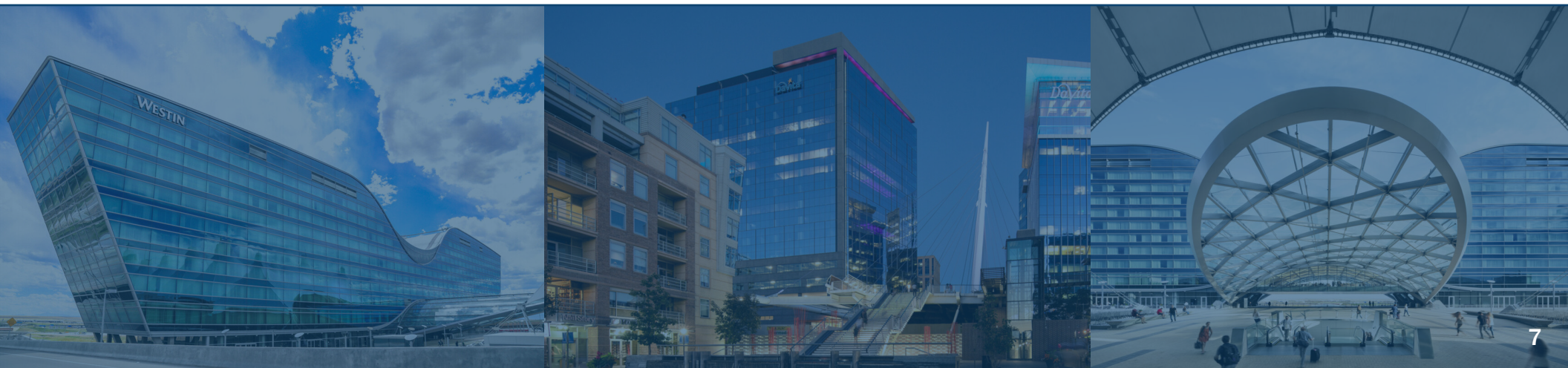


Reduction Strategy

There is no such thing as a waste of efforts when it comes to embodied carbon reductions, even small things like slightly altering our concrete mix specifications for fly content can have large impacts. With that being said, it can be extremely difficult to track those smaller initiatives and analyze their effects. That is why we first need to have a starting point to compare to in order to see those effects in the first place. This being our first year completing an ECAP, we are going to focus on getting a baseline of our embodied carbon data. We will continue to implement simple strategies to slightly reduce carbon emissions on our projects but we will not focus on large scale strategies just yet.

Once we have data for our first year we can start to look into what would be a realistic goal for our carbon reductions. That leaves our long term goal a bit open ended but we would not want to create unattainable goals with no data to back them up. It is important that we keep SE2050 mission in mind and ensure that we are working towards net zero in 2050 through our goals as well.

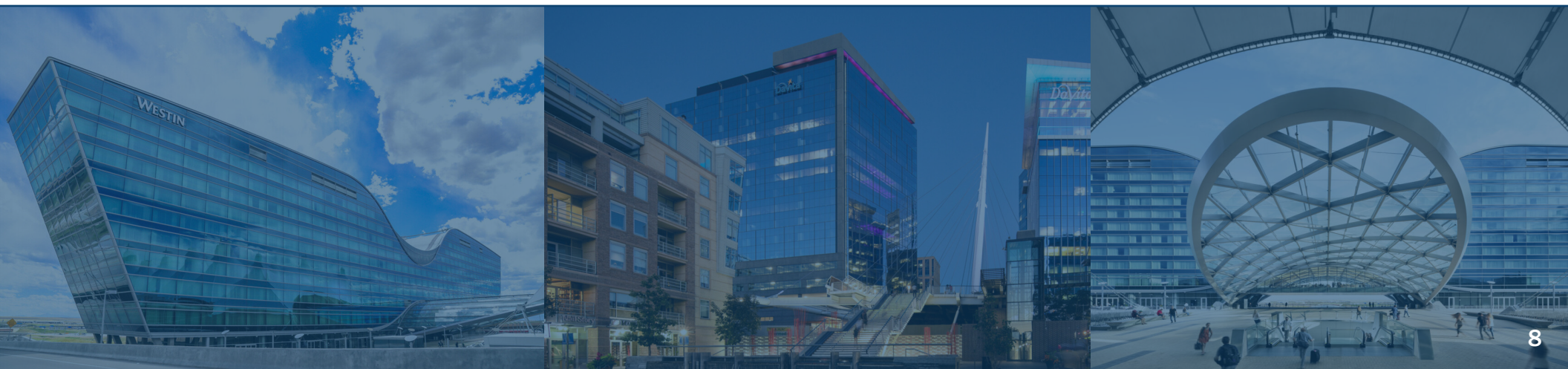
The difficult task will be balancing realistic goals and ambitious goals which is why we will start researching attainable goals now. We will research case studies and other examples in the mean time so that once we have our data we can make informed decisions about our goals.



Reporting Plan



There needs to be an agreed upon method to analyze and assess our carbon emissions in order to make and achieve realistic and informed goals. There are many different softwares out there that can help us calculate the emissions of our projects and start generating a baseline. We decided to go with Tally CAT and EC3 to help us conduct life cycle assessments. We will use Tally to get quantities for our systems and EC3 EDP database to calculate the total emissions. We will ensure that we are following the guidelines in the "Prestandard for Assessing the Embodied Carbon of Structural Systems for Buildings" that ASCE published recently.



Education Electives



1. Embodied carbon champion narrative with plan of action (Required)

Our narrative for the ECC at our company is on page 4 and includes details on what their role is. We will have monthly meetings to discuss the narrative and duties of the ECC, that way we can update anything if we see fit or change anything that is not working.

2. Present an embodied carbon focused webinar to company staff & include in on boarding process (Required)

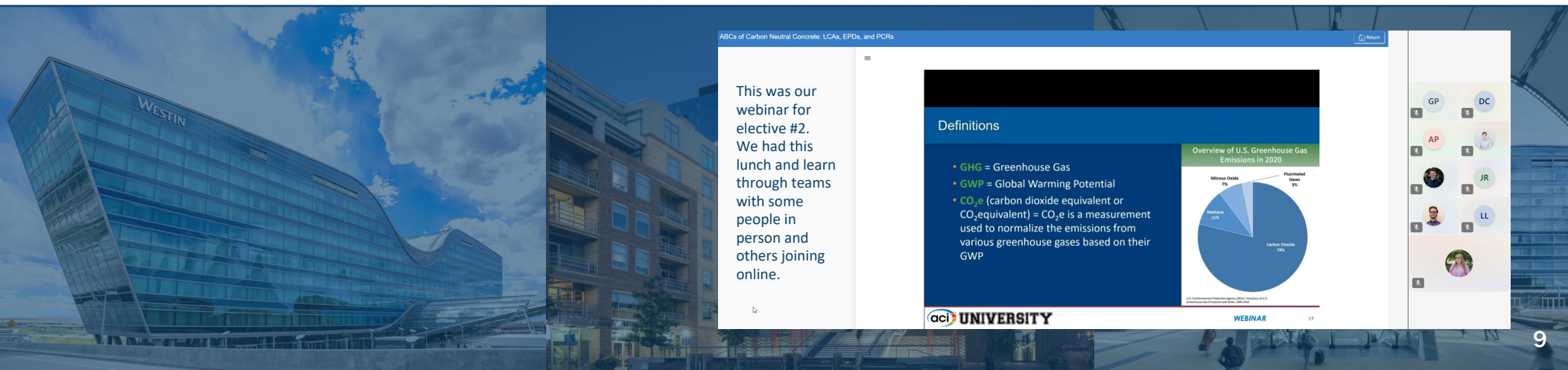
We plan to have multiple learning opportunities, but the one specifically for this elective fulfillment will be a lunch & learn. At Miro, approximately once a month we have meetings during lunch called lunch & learns where an industry expert will come in and talk to our engineers about a specific topic and lunch is provided. Previous topics of focus for these lunches have been pre-manufactured mass timber assembly, and mass timber connections. Those are not carbon specific but they will help us be equipped to work with timber which is one of the most effective materials when it comes to carbon storage. The dedicated lunch & learn for this specific elective was a webinar on the ABC's of Carbon Neutral Concrete presented on November 6th, 2025.

3. Include embodied carbon education in on boarding for all new employees

Our embodied carbon committee created a presentation giving a quick summary of what SE2050 is and a little bit about embodied carbon, LCA and EPD. This presentation was added into our new employee on boarding checklist so every new employee gets some context into SE2050 and our embodied carbon committee.

4. Create a committee that will focus on reducing carbon emissions

As previously mentioned, we created a committee within Miro of employees that are interested in helping accomplish a greener built environment. This will be the people that will track our progress with our ECAP and ensure we always remember to educate, reduce, record, and advocate.



Reporting Electives

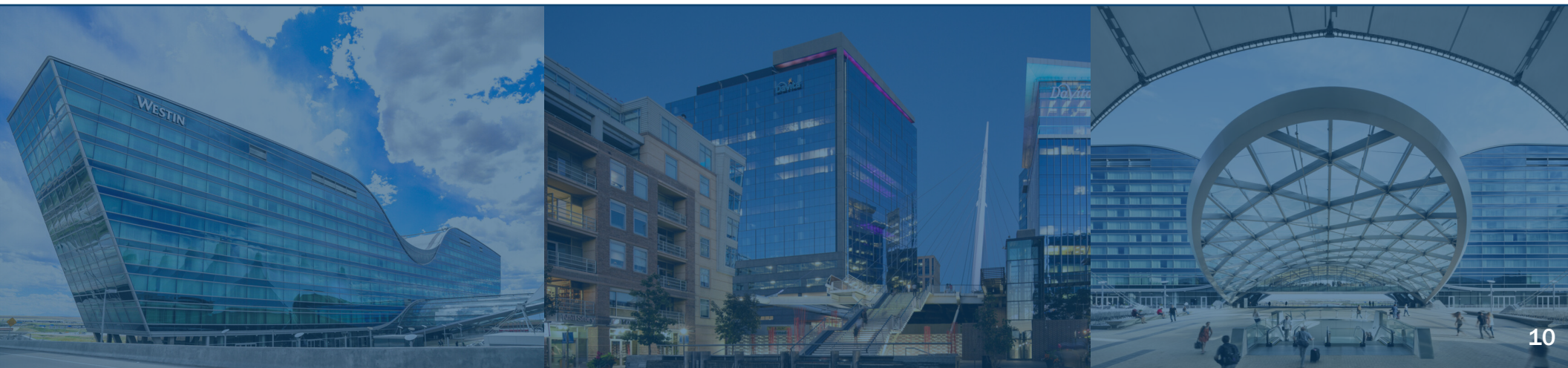


1. Submit an annual minimum of 2 projects per U.S. structural office to the SE 2050 Database (Required)

These two projects will be submitted to the database by our embodied carbon committee.

2. Compare the embodied carbon emissions from multiple projects across your firm. Analyze and document what data or pieces of information are most important and communicate findings with your firm.

Once we have a baseline and goals set for our company, we will be able to see what actions yield results, and maybe which ones do not, or what steps we have to take to get better results. After analyzing our results and progress we can come up with ways to improve and adjust our strategy or even create a new strategy if needed. We will have update meetings where the embodied carbon committee will present results to our structural department.



Reduction Electives

1. Set clearly stated, firm-wide reduction targets in the short term and long-term (Required)

As of now, our short term goal is to get enough data to create a baseline for our company and carbon emissions on our projects. Our long term goal is to once we have that baseline, create informed and realistic goals that we will ideally begin to achieve in the next couple of years.

2. Submit a Circular Economy Narrative describing how a project supports the circular economy

Narrative is on the following page.

3. Update your specifications to incorporate embodied carbon performance

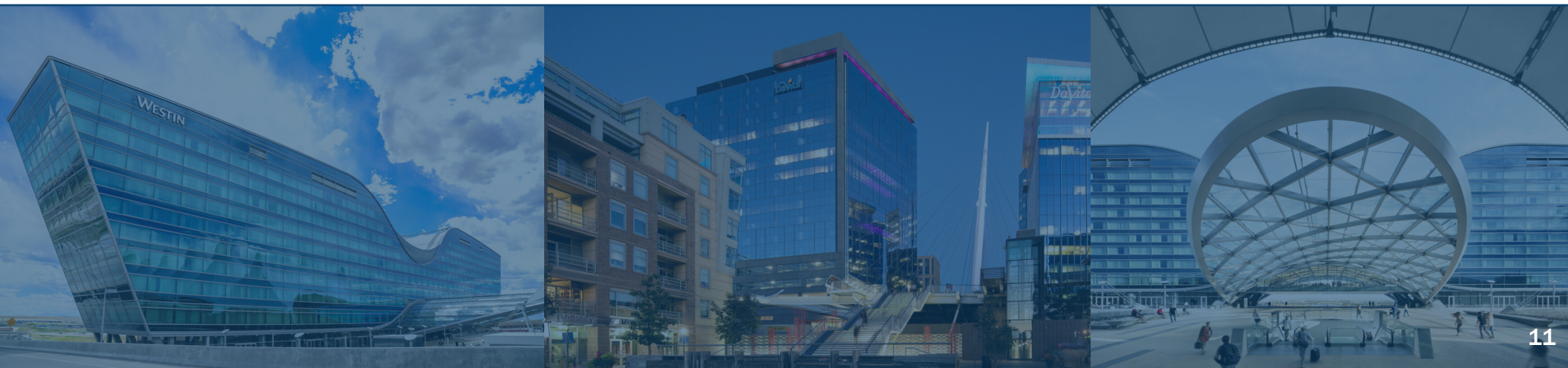
Our concrete specifications have a maximum GWP to meet based on SEAC recommendations from NRMCA industry standards.

4. Compare different design options with embodied carbon as a performance metric during the project concept phase, explain what you did and the effects of those changes

Our committee will be available to consult on projects early on to suggest alternatives with lower carbon emissions.

5. Collaborate with your concrete supplier to reduce embodied carbon in a mix design below an acceptable market

Making informed changes to fly ash requirements, cement strength requirements, and even incorporating carbon cure. As well as the GWP requirement in our specs.



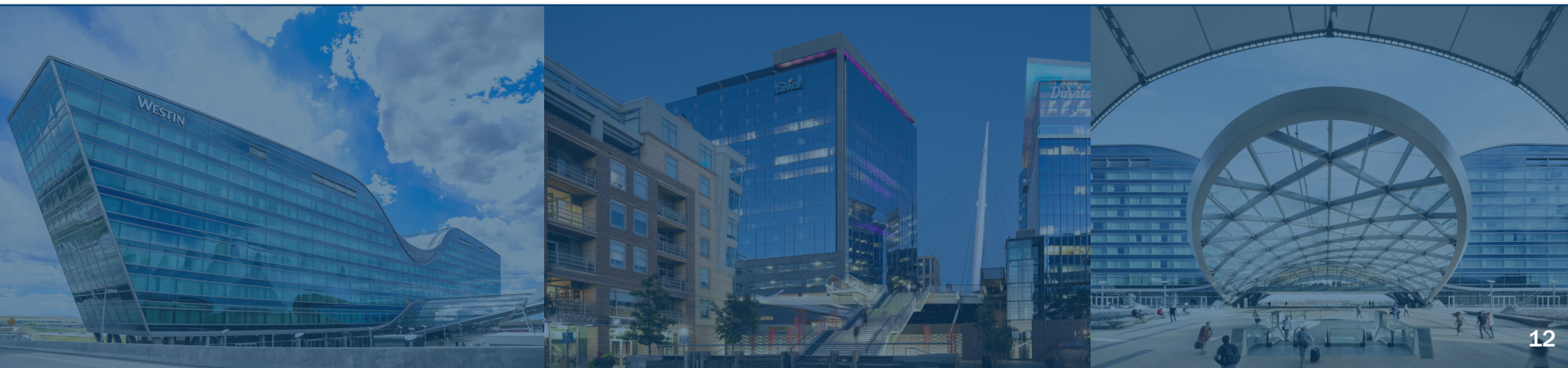
Reduction Electives

Circular Economy Narrative

S. A. Miro worked alongside a Colorado real estate developer to convert an empty 124,000 square-foot office space into affordable housing. The office space, located in the Denver Tech Center, was designed in 2000 as a 4-story pre-cast building. The retrofit to convert the space from commercial to residential consisted of reuse of the pre-cast structure, with added penetrations through each level to accommodate mechanical, electrical and architectural needs. The existing screen wall structure at the roof was reused with minimal added steel to support the new mechanical units to serve the new use of the building. By re-purposing the existing structure and the minimal addition of structural material, the embodied carbon emissions were drastically reduced in comparison to a new build structure.

Awards:

We received two recognition awards for embodied carbon reductions in 2024. One of those awards was a Slag Cement Association 2024 Project of the Year award for Testing and Implementation of Low-Carbon ASTM C1157 Slag Cement Mix for a Data Center in Indiana. As well as a Concrete Innovations Award from NRMCA for another Data Center in Indiana.



Advocacy Electives



1. Describe the value of SE 2050 to clients (Required)

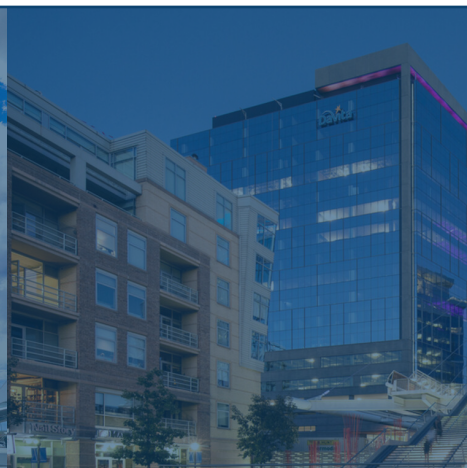
Miro was already talking to our clients about ways in which we could reduce emissions, whether that be alternatives that would help or designing to the specific application to prevent over designing and using more material than necessary. We also advocate for adaptive reuse with our clients whenever we can. We will continue to do this and additionally strive to bring up carbon reduction and SE 2050 in more meetings with clients.

2. Publicly declare your firm as a member of the SE 2050 Commitment (Required)

On our company web site's homepage, we have an announcement about our proud participation in this program as well as a small description of what we hope to accomplish.

3. Propose alternative methods for advocacy and describe their value

Miro is a frequent participant in a lot of university events like career fairs, project expos, and even mentoring programs with students. We believe that ensuring we advocate for carbon reduction in those situations can have great impacts. Students especially are just now getting into this industry and it is crucial that they know what embodied carbon is and how we can do our part in reducing emissions. Our proposal for alternative advocacy methods is to have embodied carbon information built into our marketing materials for career fairs as previously mentioned, and possibly even presenting on the importance of embodied carbon awareness for a class of students.



ABOUT US



At S. A. Miro, Inc., we specialize in providing structural and civil engineering solutions to both public and private sector clients. Founded by renowned structural engineer Sami A. Miro, our firm has built a reputation for pushing the boundaries of what is possible in engineering. For over four decades, we've delivered results that are not only cost-effective but also innovative, setting new standards in the consulting engineering industry.

Civil Engineering Expertise That Shapes Communities

Our civil engineering team is a trusted partner in phased campus planning and infill site development. With a deep understanding of the complexities of municipal infrastructure, we help institutions and municipalities navigate the challenges of stormwater management, roadway design, drainage systems, and regional land use. We prioritize collaboration with key stakeholders, ensuring that each project meets local criteria while addressing long-term regional infrastructure needs.

Our Legacy of Structural Engineering Excellence

Since 1980, Miro's structural team has been at the forefront of legacy projects. Our reputation is built on providing solutions that balance design integrity, cost-efficiency, and constructability. With nationwide expertise in both traditional and non-traditional building systems, we ensure each project remains viable, cost-effective, and built for success.

We are proud participants in the SE 2050 Commitment Program, an initiative of the Structural Engineering Institute (SEI) of ASCE. Through this commitment, we are actively working toward achieving net-zero embodied carbon in our structural designs by 2050. By educating, tracking, reporting, and reducing the carbon impacts of our projects, we aim to advance sustainable design practices and contribute to a more resilient, low-carbon future for the built environment.



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Sources

Architecture 2030. (n.d.-a). Why the built environment?. Architecture 2030.

<https://www.architecture2030.org/why-the-built-environment/>

