AIA Best Practice

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Understanding Carbon Reduction Strategies

Emily Lorenz | Steve Kloos | Kimberly Wacker

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Your Sustainability Panel

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Kimberly Wacker

Senior Vice President / Chief Strategy Officer

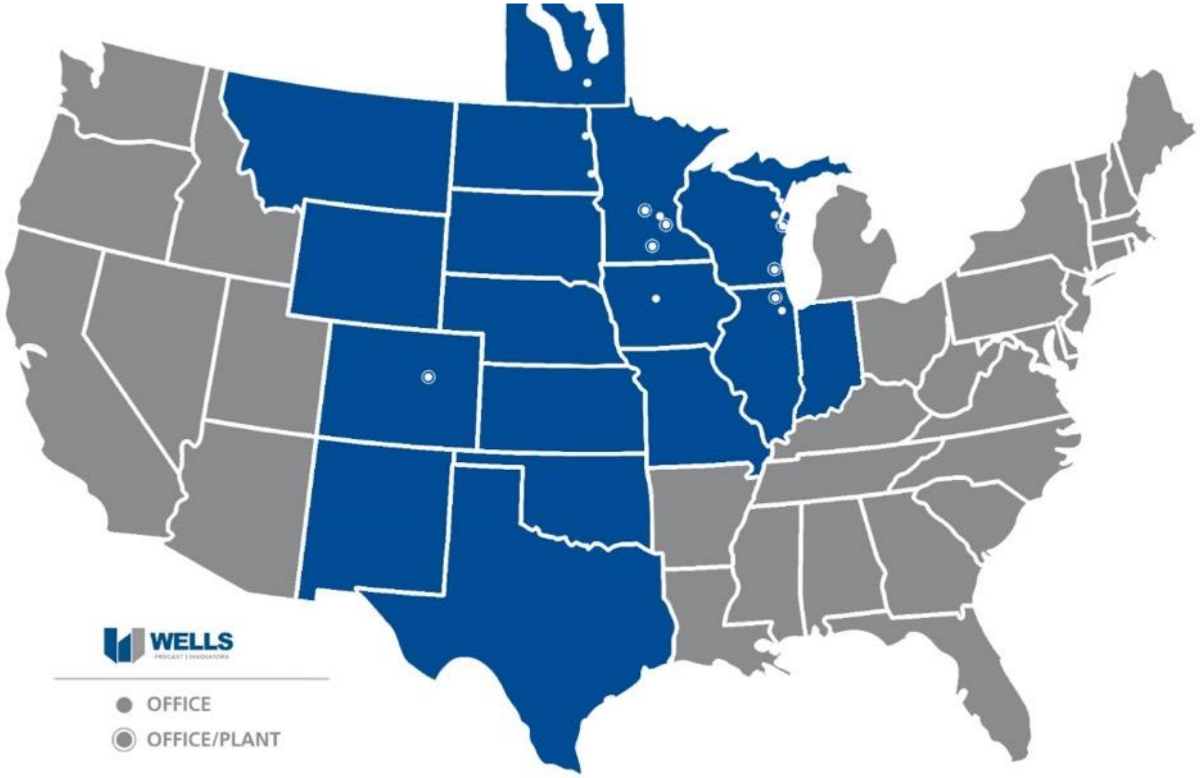
We are Wells.

1300+
employees

500+
Completed projects in 2021

70
years in business

80%+
repeat customer



Learning Objectives

1. Understand embodied and operational carbon in the built environment
2. Learn how more efficient building designs can reduce the carbon and meet sustainability goals
3. Discover current tools and methods utilized in the prefabricated precast concrete industry on the path to carbon neutrality
4. Uncover new technologies and innovations being tested for advancements in the prefabricated building industry

Can you please provide an overview for our audience of **embodied** versus **operational** carbon? And why it is important to know the difference?

Definitions—Terminology

Embodied carbon

- Carbon footprint
- Carbon dioxide emissions
- Carbon dioxide equivalent emissions
- Greenhouse gas emissions

Definitions—Terminology

Embodied carbon (kg CO_2e): Carbon emissions associated with:

- Extraction and manufacturing of materials and products.
- In-use maintenance and replacement.
- End-of-life demolition, disassembly, and disposal.

Including transportation relating to all three.

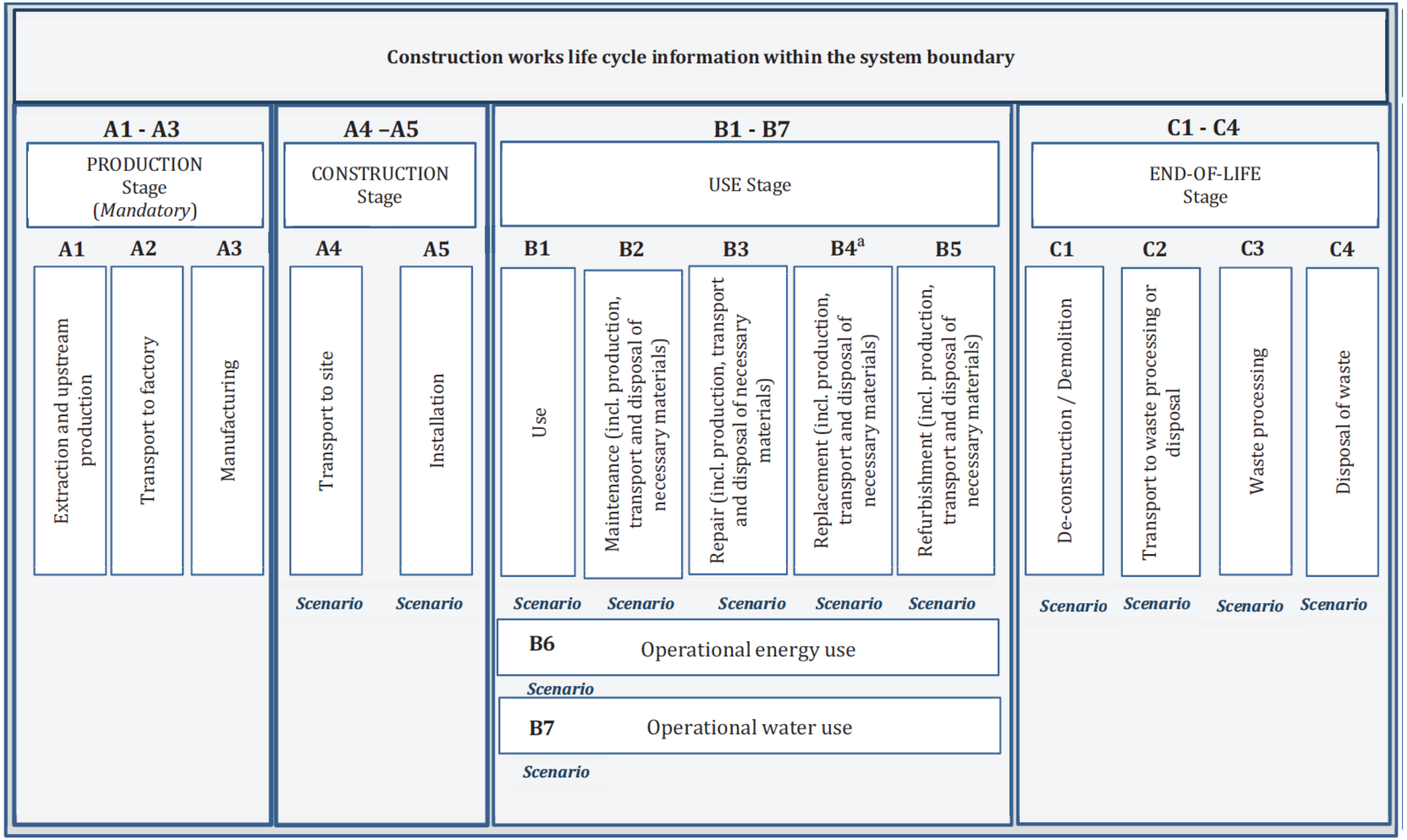
Definitions—Terminology

Embodied carbon

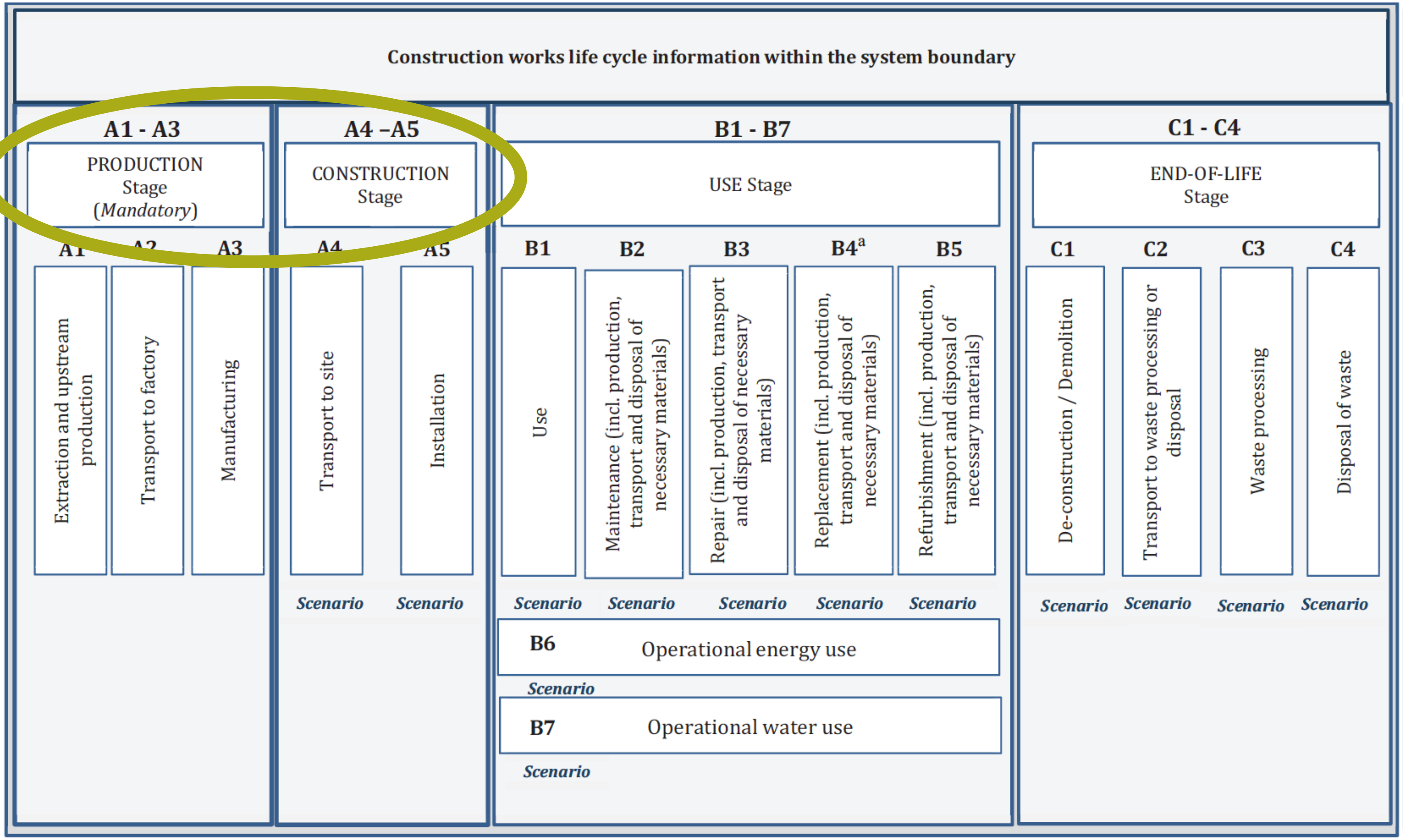
Sum of *GHG emissions* and *GHG removals* in a *product system*, expressed as *CO_2 equivalents* and based on a *life cycle assessment* using the single *impact category* of climate change

From: ISO 14067-18, Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification

Operational versus Embodied Carbon

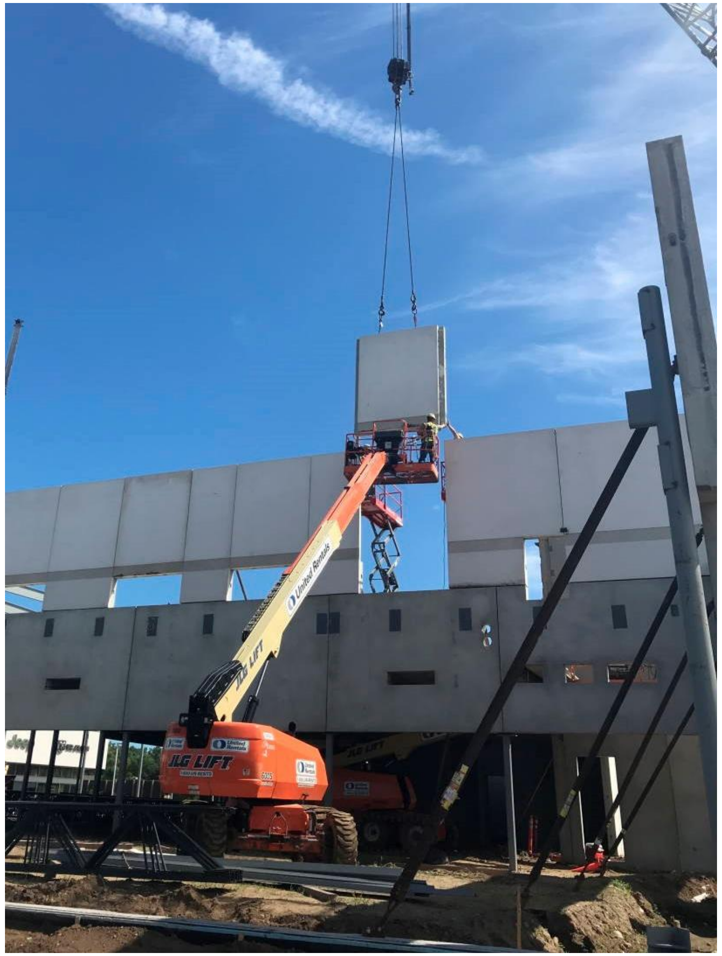


Immediate Precast Manufacturing Focus



Advantages of Prefabrication

- Plant efficiency
- Jobsite efficiency
- Recycle and reuse of components



Efficient Building Design Facilitates Sustainability Goals

Preconstruction and Design

Sales & Estimating supports customer with virtual design to establish project scope.

- Project kick-off
- Pre-design assistance
- Finish selection
- Project finalization
- Legal & Finance complete paperwork

Outputs

Design / Estimate

Contract

Design + Engineering

Project transitions to internal teams to come to life.

- Design & Engineering creates final Revit drawing for approval
- Construction Services coordinates the schedule

Outputs

Drawings Finalized

Project Placed in Mfg Que

Prefabrication Manufacturing

Product is manufactured.

- Quality reviews throughout manufacturing
- Materials stored on-site until project onset
- Project Management & Scheduling coordinate project timing

Outputs

Prefabricated Building Solution

Construction Services

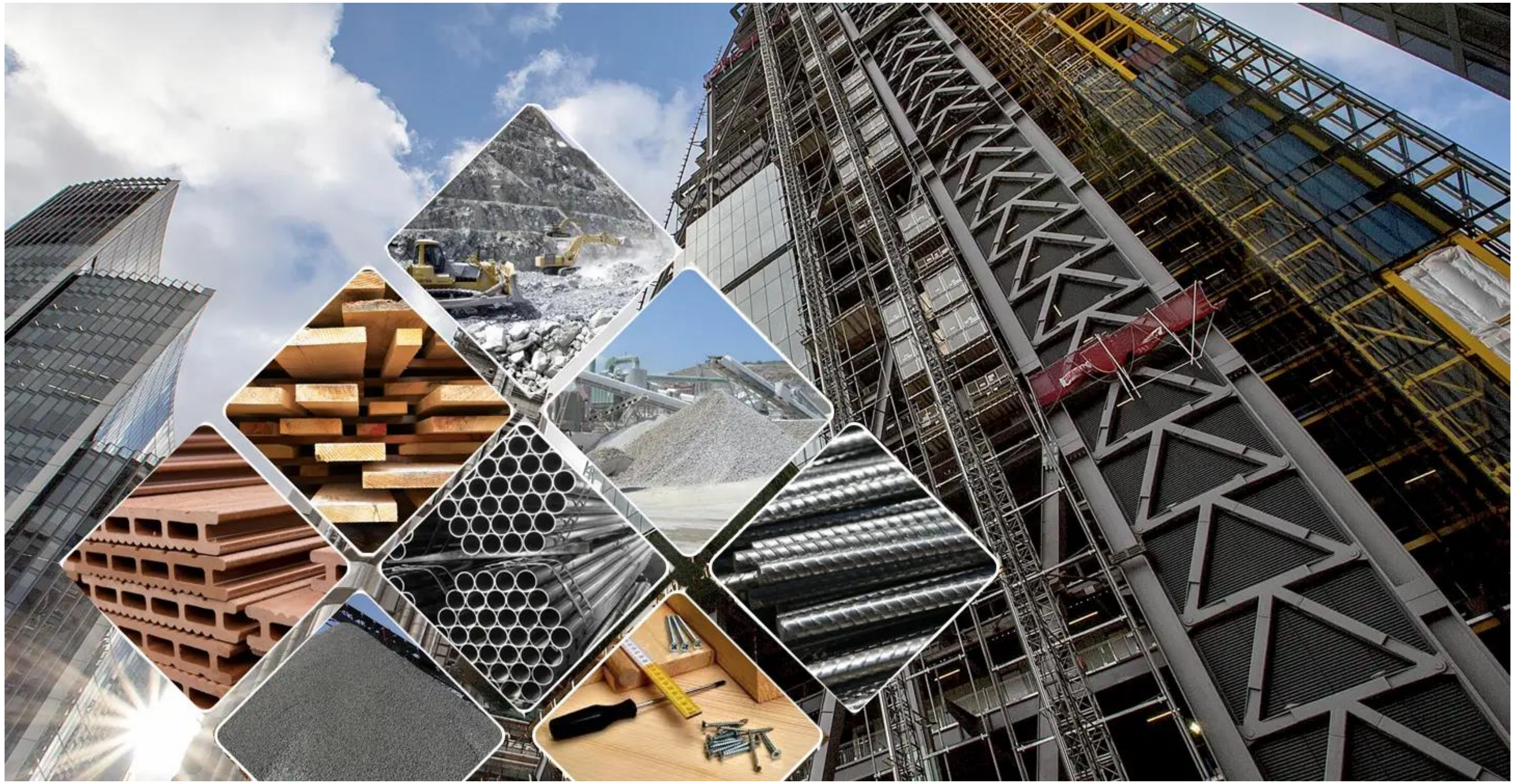
Product is delivered and project is built.

- Product is delivered
- On-site installation
- Sealants & restoration services performed
- Client Feedback program

Outputs

Project Completed

Given your background and years of experience in both Redi-mix and Precast, how do the two industries differ in relation to their approach to carbon and sustainability?



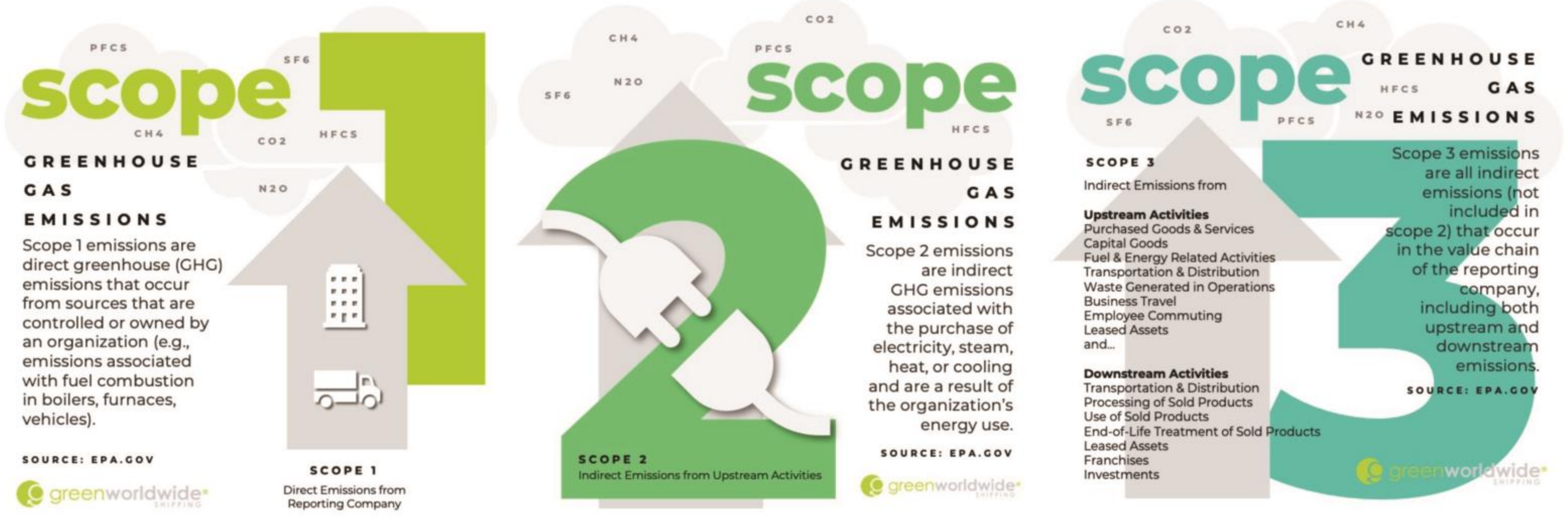
What are some industry best practices you have seen in the past couple of years to understanding your carbon footprint?

Understanding Carbon Footprint

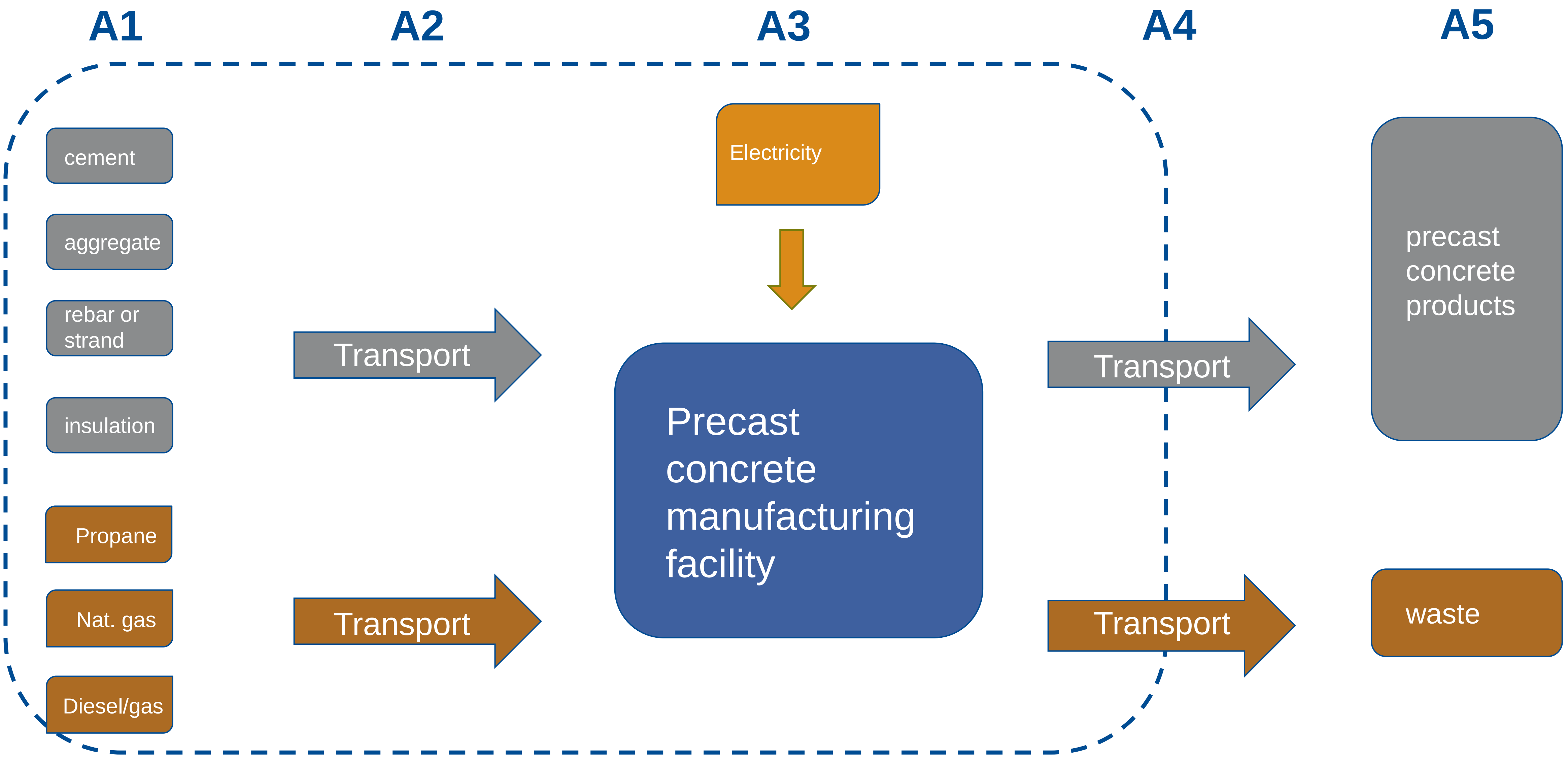
You can’t know if you are improving if you don’t measure!

- Full LCA of precast production
- Development of PCR
- Industry-average EPD
- Plant-, Producer-, or Product-specific EPDs

what are the scopes of carbon emissions?



Where do GHG emissions come from?



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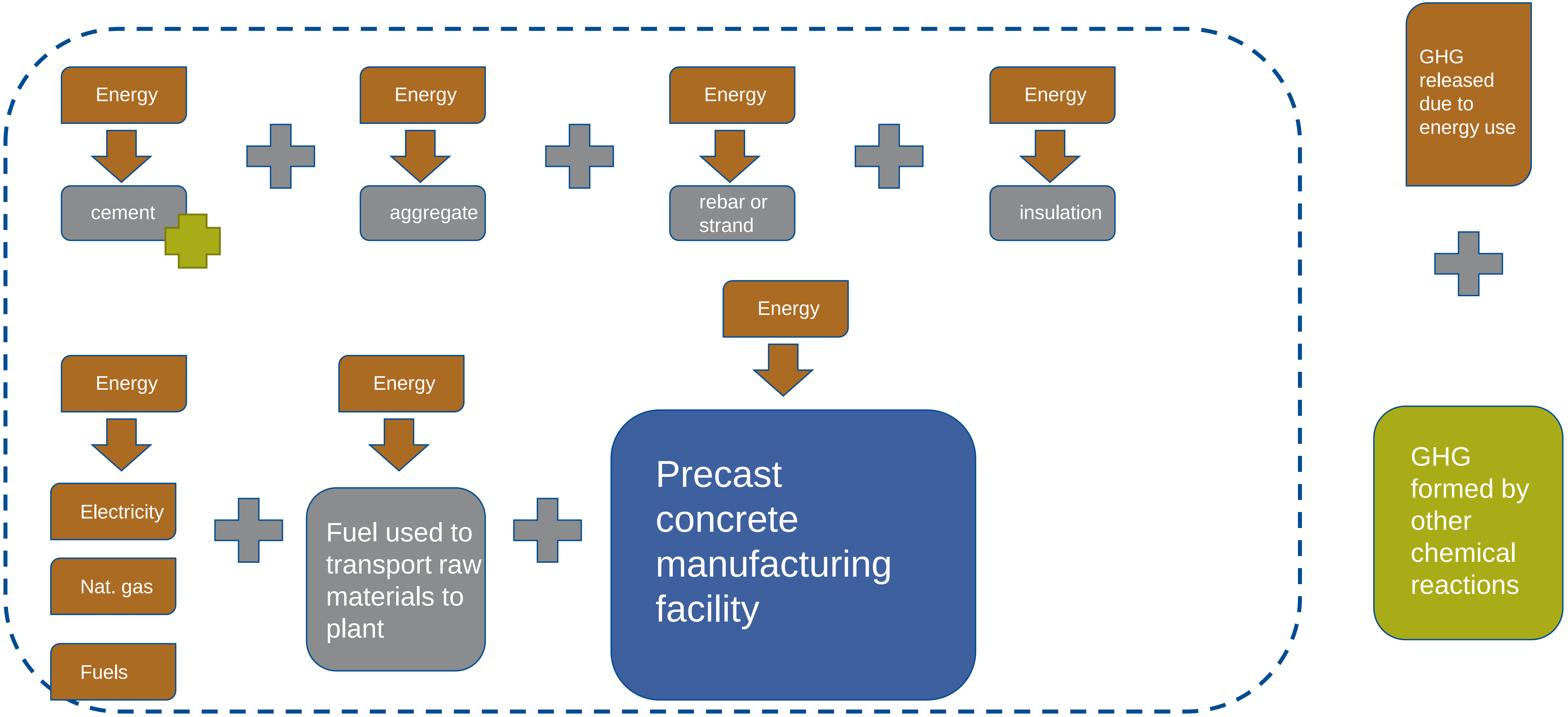

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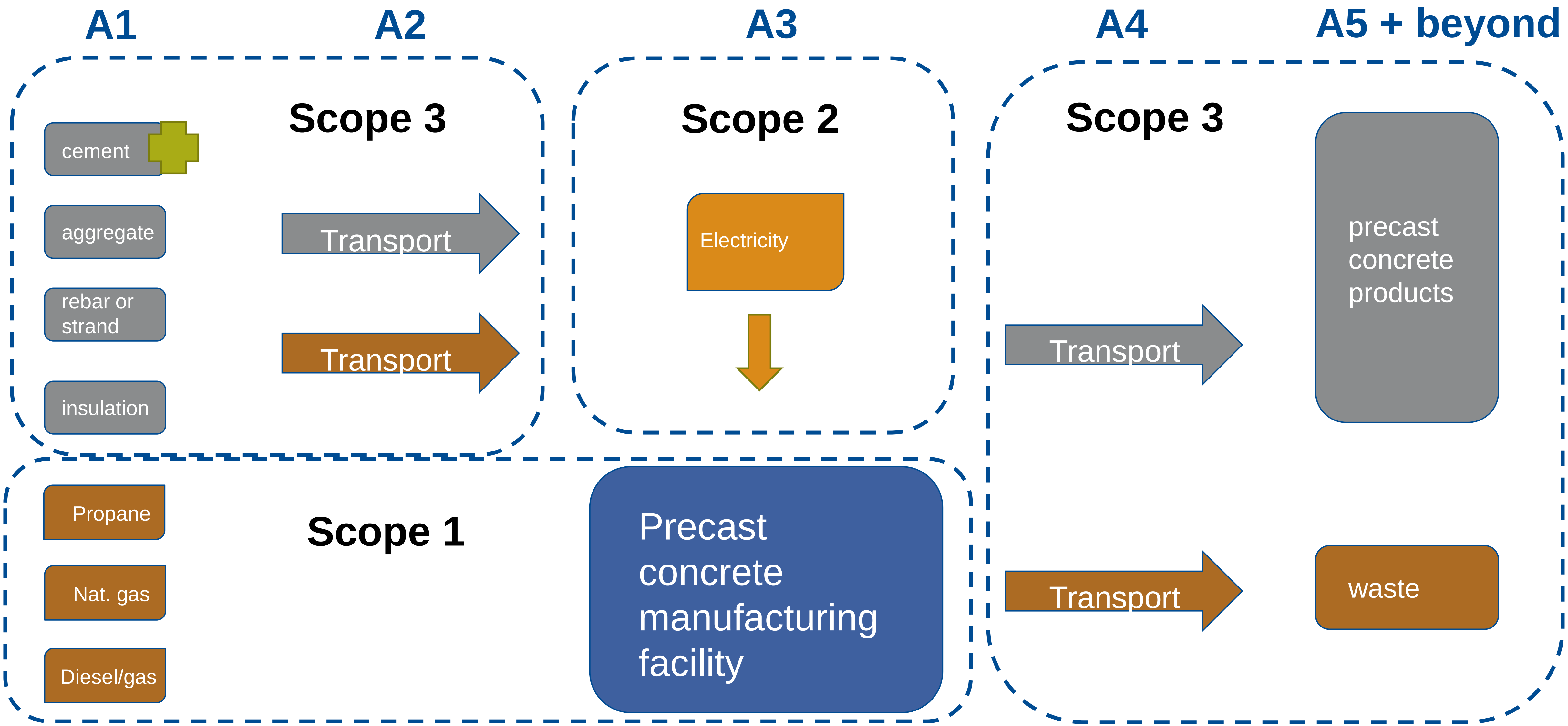

What are some innovations, technology advancements and other changes you see within the built community to address carbon emission reduction?

Industry Trends

- Product and plant-specific EPDs for constituent materials are more-readily available.
- More tools that allow for project-specific EPDs.
- Greater focus on repurpose or reuse of structure.

Industry Trends

- Optimized mix design and manufacturing process (operational carbon reduction)
  - Investing in improvement in outdated production facilities
  - Capacity replaced with newer facilities - energy efficient, automated and focused on reduction in raw material waste.
    - L1 Cement, Admixture
- Reduction/Replacement of Portland Cement (embodied carbon reduction)
  - Slag, Metakaolin, Silica Fume, Natural Pozzolans, Geopolymer Mixes
  - Our production facilities using fly ash as portland cement substitute to reduce the amount of embodied carbon in the concrete mix by up to 15%
  - Our production facilities are also using a ready-mix cement that has additional limestone added to the mix which reduces the portland cement content by 10%

Industry Trends

- Leadership focus and commitment to process improvements
- Carbon capture and sequestration
- Energy management
- Water management
    - Recycling and repurposing process water
- Recycling methods for waste concrete, steel, rebar, insulation and other consumable materials

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Questions? Please contact.

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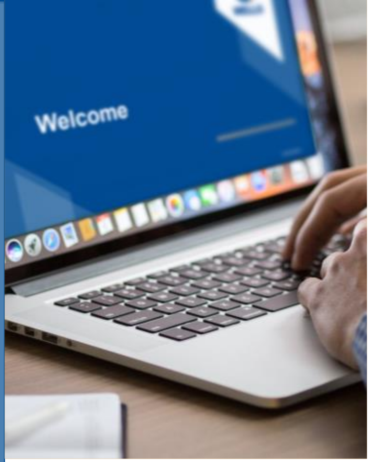
Thank you.



K12 Design Solutions

Upcoming Webinar

An integral part of educational building design is providing a safe learning space. Precast offers unique and resilient structural and architectural solutions that not only provide protection, but also meet budget restrictions and ensure on-time completion. Even though these structures are built to be safe, it doesn’t mean they need to look uninviting; an evolving variety of finishes are creating modern K-12 school designs, that are woven into the fabric of their communities.

Speakers: Reid Mordhorst | Jace Rossow

October 19, 2022 at 11am CDT