

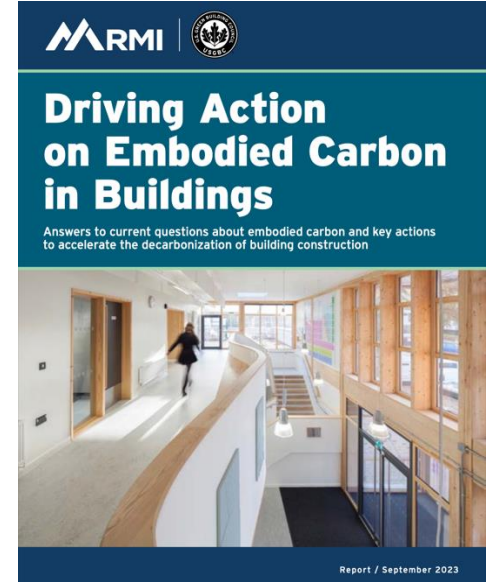
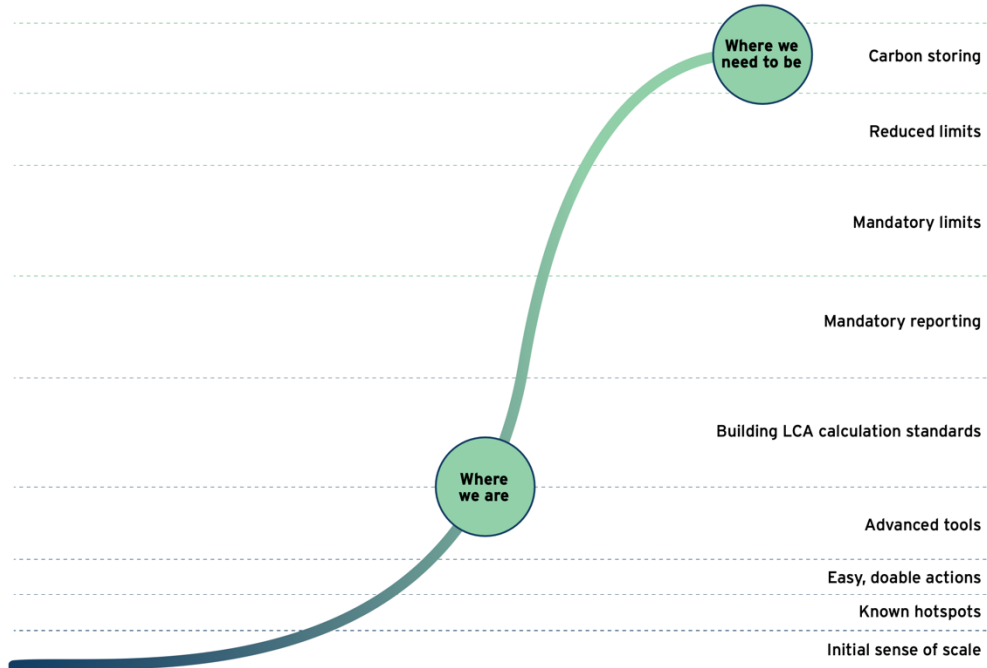


Megan White
Firecrown + USGBC-CA

The Climate Spectrum

Unlocking the Potential of Ultra-Low Carbon Materials & Buildings

Importance of Embodied Carbon



The Potential



EARTH

2025

<u>Water</u>	<u>71%</u>
<u>Land Mass</u>	<u>29%</u>
<u>Population</u>	<u>8,221,800,000</u>
<u>Atmosphere Carbon</u>	<u>428 ppm</u>



New Delhi Air Quality 2023



New Delhi Air Quality 2023



North America Heat Wave 2024



New Delhi Air Quality 2023



North America Heat Wave 2024



East Africa Floods 2024



New Delhi Air Quality 2023



North America Heat Wave 2024



East Africa Floods 2024



Los Angeles Wildfires 2025



1.5C

IPCC

220 Gt

Earth's remaining atmospheric carbon budget as of 2025



185
kgCO₂e/m²

The per project embodied carbon budget we need to hit at the global scale if we are to keep the planet **under 1.5 degrees of warming.**

Absolute Carbon Target

This metric includes both core & shell and interior materials.
Assuming an 85% / 15% carbon split, our targets should be:



Concrete is the **2nd** most produced material on earth after processed water, and emits 3 gigatons of carbon – roughly **8%** of global emissions annually



Lower carbon concrete roadmap

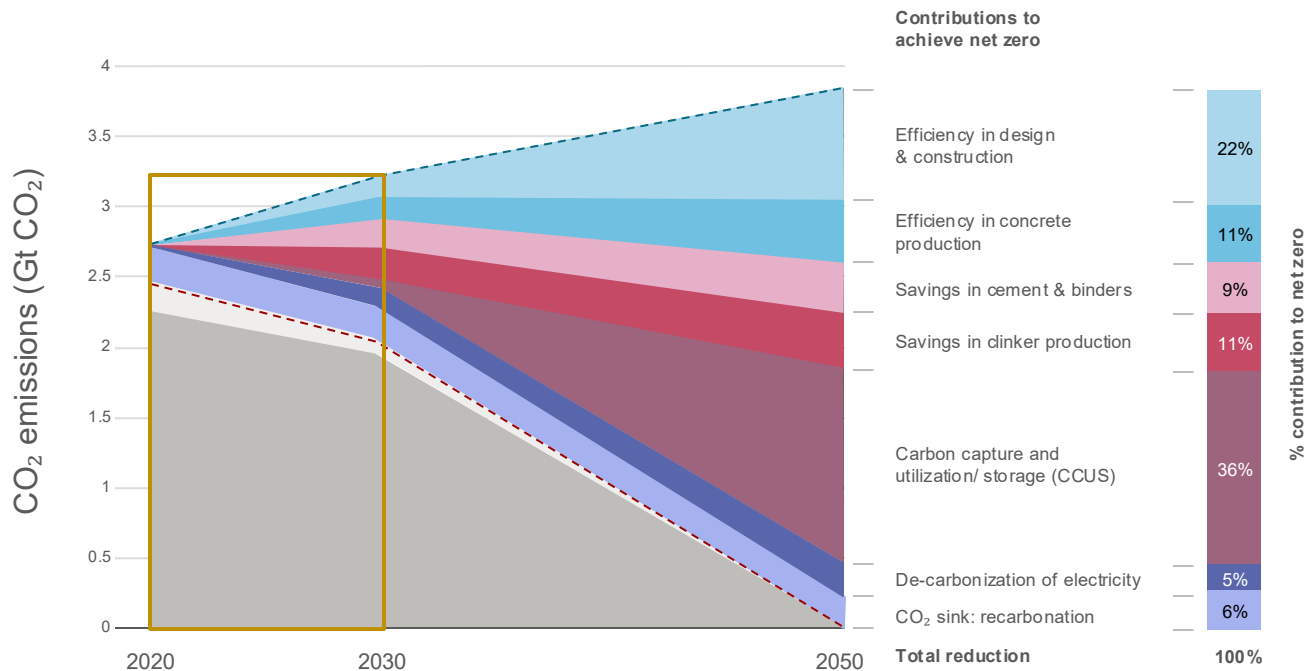


Global Cement and Concrete Association

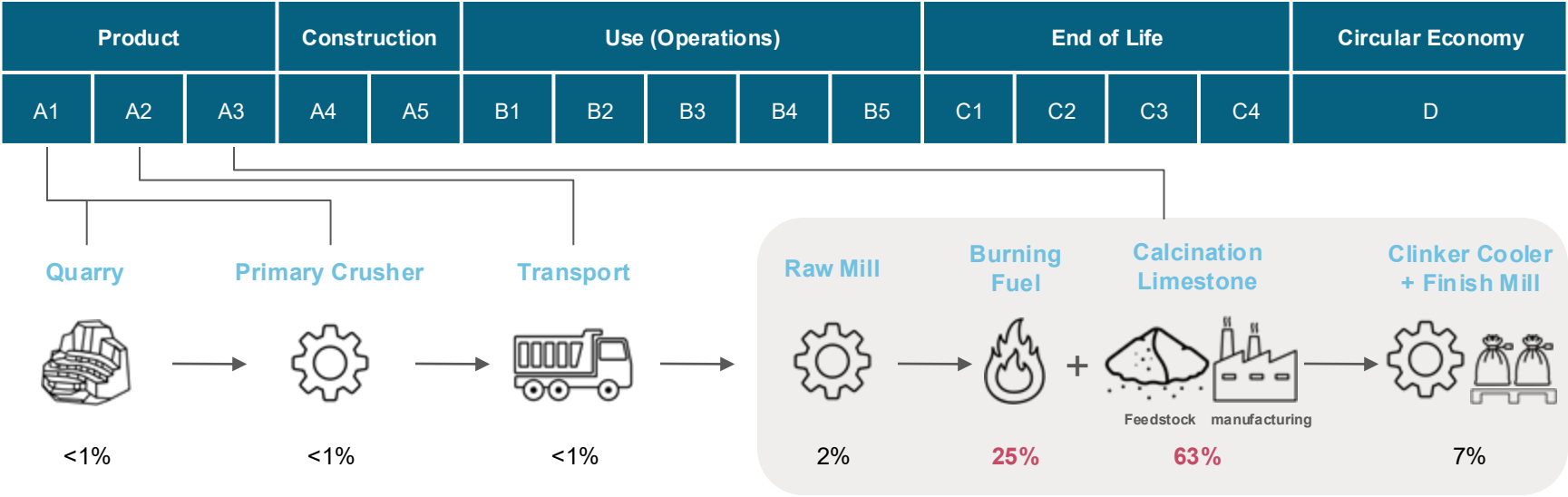
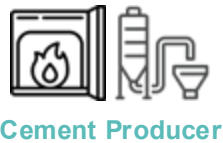
Net zero pathway

CO₂ emissions from electricity

Direct net CO₂ emissions (Direct CO₂ emissions minus re-carbonation)



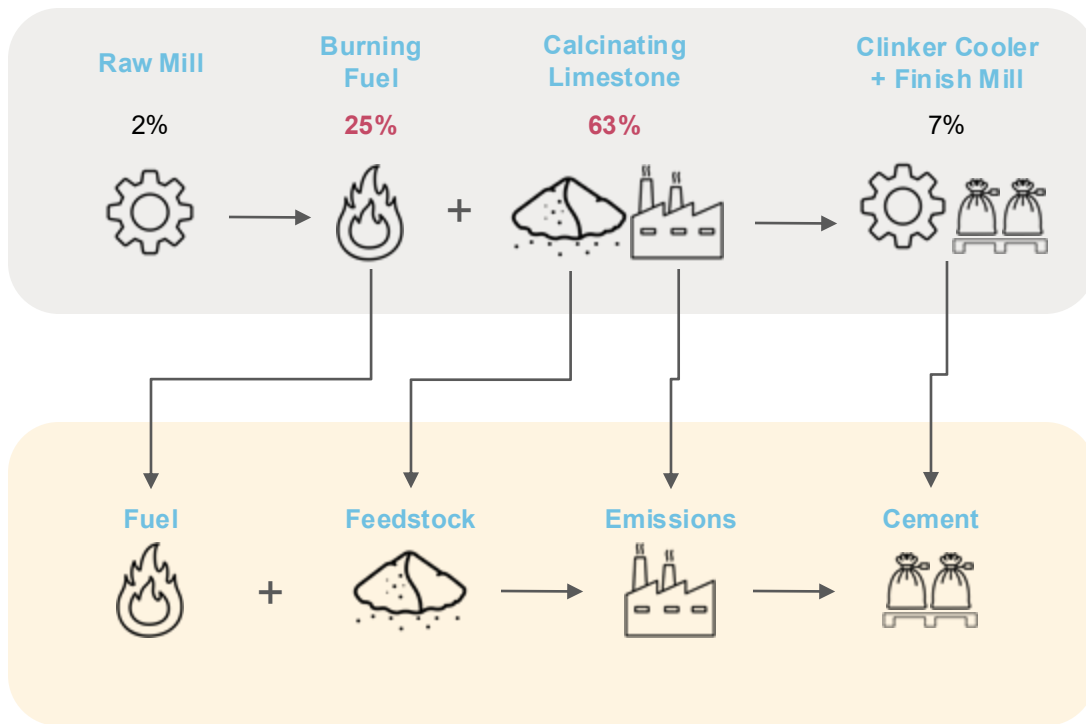
Where do the carbon emissions come from?



Source: Metrics per Heidelberg Materials, November 2024 - Approximate % of CO2e based on Edmonton's 816 GWP for Type GU (CEM 1)

Decarbonizing cement

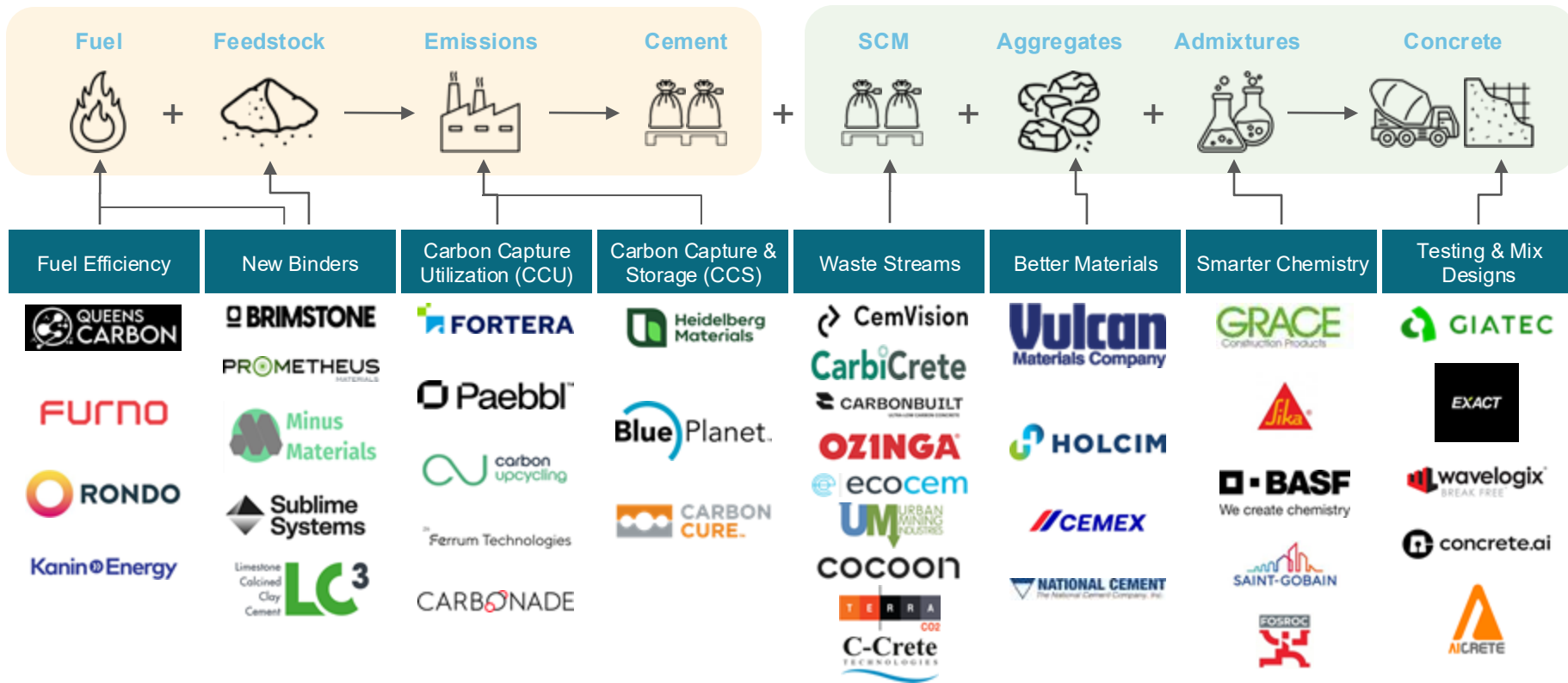
BAU
90% of concrete
carbon emissions
come from cement...



Lower carbon concrete opportunities

Decarbonize

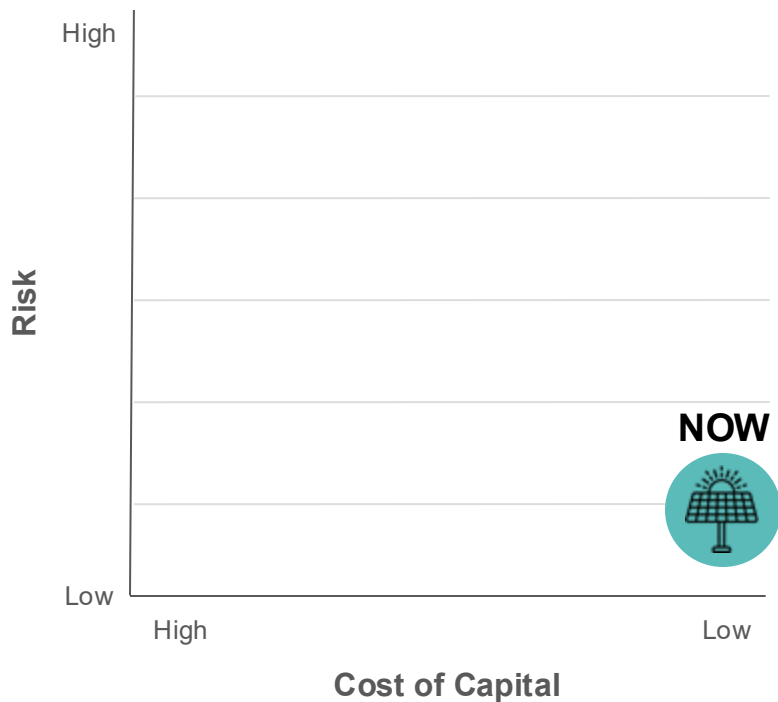
Use Less Cement



FOMO



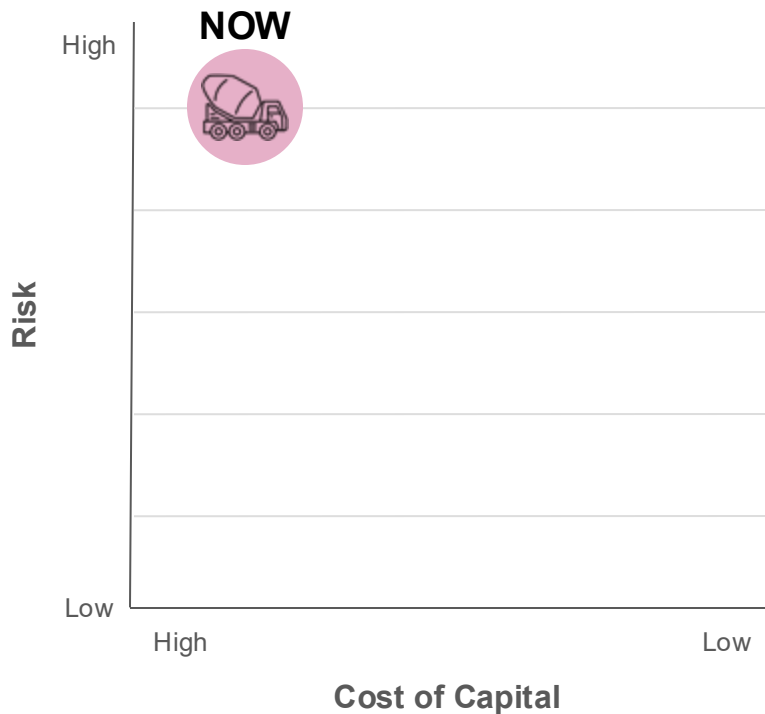
RECs were a Catalyst for making Solar low cost/risk



- Low construction risk
- Low operations risk
- Low distribution risk
- Contracted revenue
- Widely available market data

= **Lots of financial bidders**

EACs can be Catalyst for Low Carbon Concrete



- New construction risk
- Lack of silo space risk
- Functional risk
- Price and volume risk
- Very little data on pricing

= **VERY few financial bidders**

Where we are

California committed to reducing GHG emissions by 40% below 1990 levels by 2030 & neutrality by 2045

Assembly Bill (AB) 2446 (2022): Requires the California Air Resources Board (CARB) to develop a framework for measuring and reducing the embodied carbon of building materials. The bill sets a target of a **40% net reduction** in GHG emissions from these materials by the end of **2035**.

CALGreen Building Code - Requirements Effective **July 1, 2024**, California became the first state to mandate embodied carbon reductions in its building code

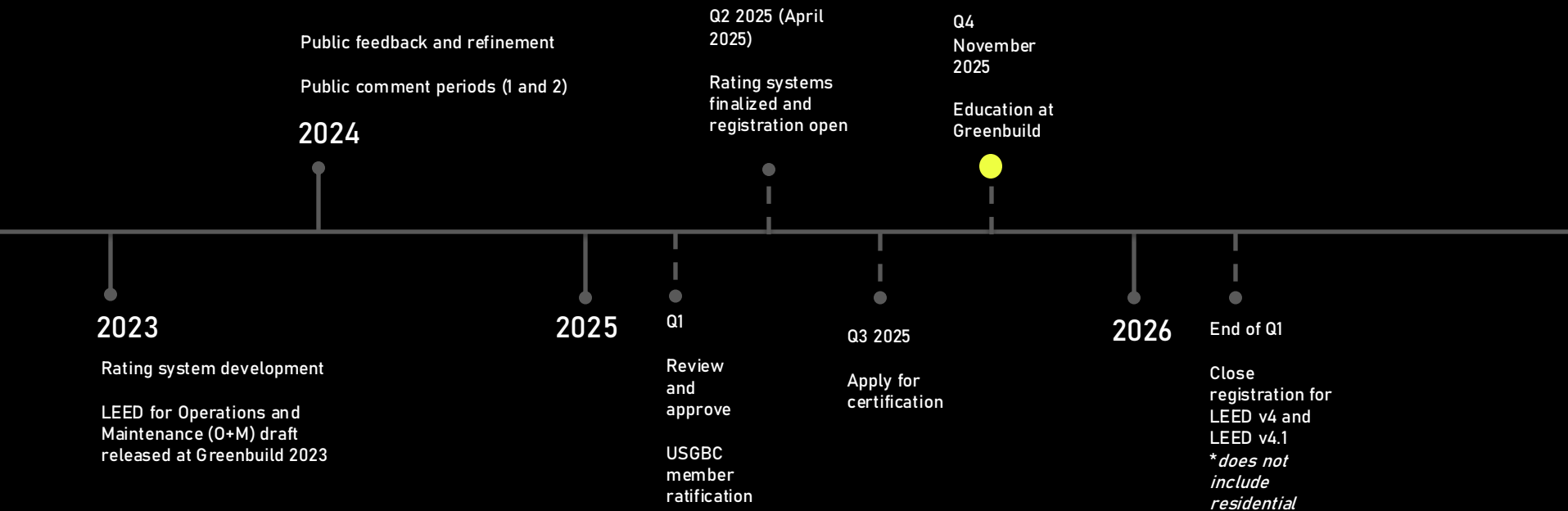
Buy Clean California Act (AB 262): Enacted in 2017, this act sets GWP limits for specific materials used in **state-funded projects**, including structural steel, rebar, flat glass, and mineral wool board insulation. The prescriptive path in CALGreen expands upon this.

Assembly Bill (AB) 43 (2023): Builds on AB 2446 by allowing CARB to explore an **embodied carbon trading system** as a potential method to achieve the reduction targets.

SB 253 (Climate Corporate Data Accountability Act) - landmark climate disclosure law, requires large corporations to report their GHG emissions, including Scope 3 embodied carbon from construction and materials. The bill was signed into law in October 2023 - CARB developing detailed regulations for implementation.

- **2026:** Companies **>\$1 billion in annual revenue** doing business in CA must report Scope 1 and 2 emissions (FY25 data).
- **2027:** Reporting expand to include Scope 3 emissions (based on 2026 data).
- **2030:** More stringent "reasonable assurance" for Scope 1 and 2 emissions will be required, with "limited assurance" for Scope 3 emissions.

LEED v5 TIMELINE





A market ready rating system that will drive the built environment toward a near zero carbon future that is equitable, resilient, and promotes the wise, safe utilization of all resources.

What is new in LEED v5?

Greater flexibility for projects and more opportunities to respond to a rapidly changing market

1

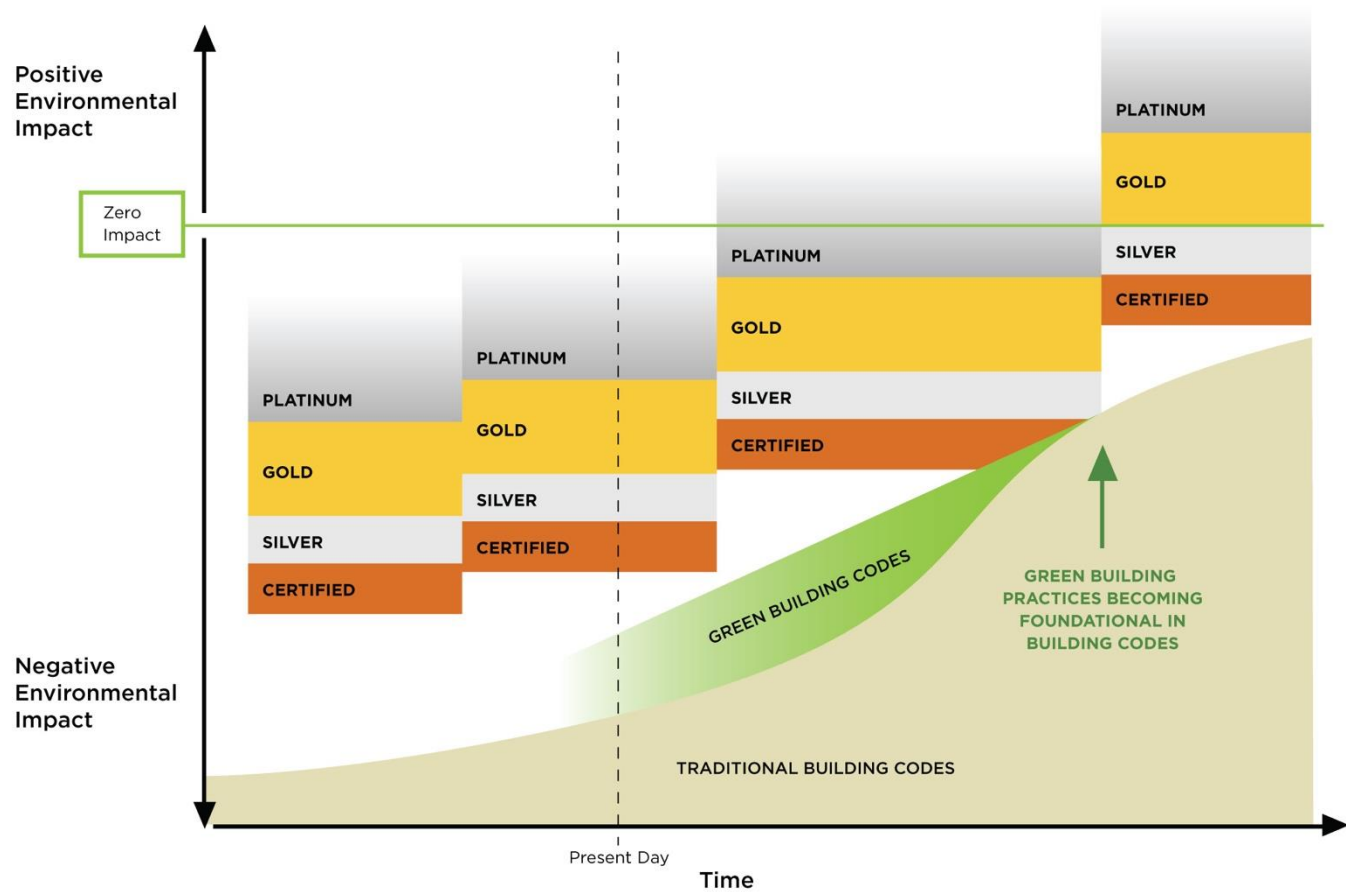
FIVE-YEAR DEVELOPMENT CYCLE
Provides increased predictability for the market

2

PLATINUM REQUIREMENTS
Requirements address energy efficiency, carbon emissions and renewable energy use

3

PROJECT PRIORITY LIBRARY
New credit category and library allows for customization of LEED scorecard



LEEDv5

IMPACT AREAS



DECARBONIZATION

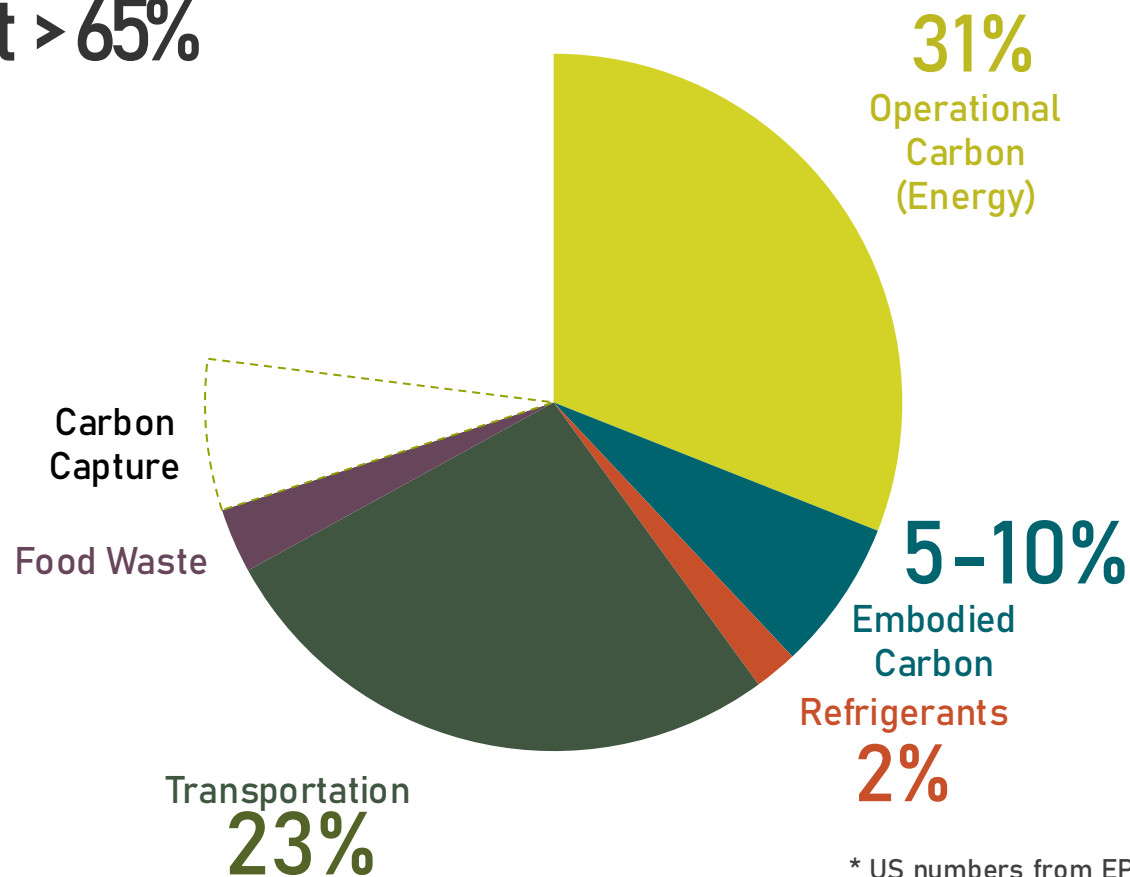
LEED v5 drives the industry towards a decarbonized built environment across all major sources of emissions

FOCUS ON:

- Operational Carbon
- Embodied Carbon
- Transportation Carbon



Buildings impact about > 65%
of all emissions



* US numbers from EPA

LEED v5 Prerequisites for Decarbonization

EA Prerequisite:

Operational Carbon Projection & Decarb Plan

EA Prerequisite:

Refrigerant GWP

MR Prerequisite:

GWP of upfront emissions from structure, enclosure & hardscape

LT Credit:

Projected transportation emissions

Prerequisite:

Carbon Assessment

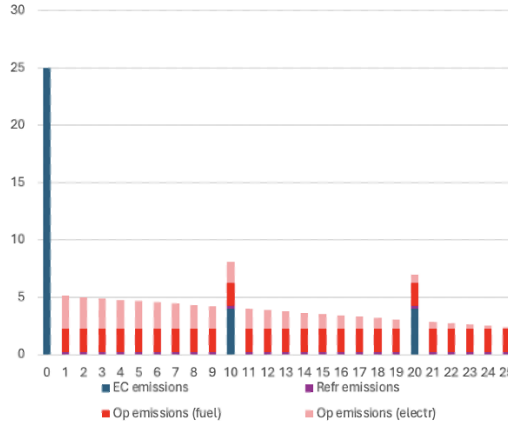
Intent: To understand and reduce long term carbon emissions including onsite combustion, grid-supplied electricity, refrigerants, upfront embodied carbon, and transportation.

LEED v5 D+C Cross-categorical carbon assessment (25 years)

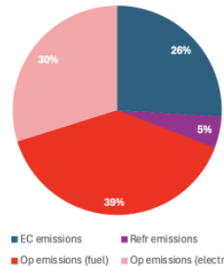
Data inputs:

- Energy Pre-req
 - Estimate fuel & electrical use
- Refrigerant Pre-req
 - Refrigerant inventory + estimate 5% leakage
- Embodied Carbon Pre-req
 - Measured upfront carbon from Struct+ Encl , MEP and Interiors
 - Interior Renovations

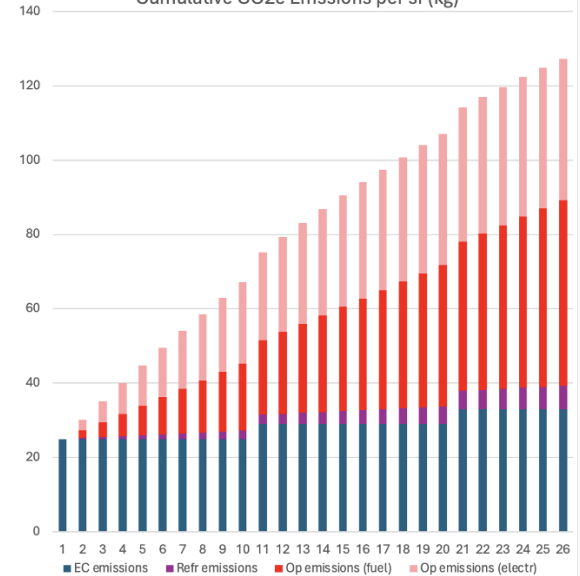
Annual CO2e emissions per sf (kg)



% of 25 year CO2e emissions



Cumulative CO2e Emissions per sf (kg)



Notes:

- Eventually cover EC of sites and sequestrion.

LEED v5 BD+C and ID+C MR Credits Addressing Embodied Carbon

Quantify and Assess Embodied Carbon (Prerequisite)	Reduce Embodied Carbon (6 points)	Building & Material Reuse (1-3 points)	Building Product Selection and Procurement (5 points)	Construction & Demolition Waste Diversion (2 points)
• Structure • Enclosure • Hardscapes	• Option 1: Whole Building LCA • Option 2: EPD Analysis • Option 3: Track Carbon Emissions from Construction Activities	• Building reuse • Material reuse • Targets specific materials for recovery and preservation: • Carpet • Drywall • Ceilings • Furniture	• Nonstructural materials by 9 product categories • Multi-attribute assessment of products • Rewards products with EPDs and reduced embodied carbon • “Other” category can include MEP	• Create a C&D waste management plan • Diversion: 50% with 10% source separated (1 pt), 75% with 25% source separated (2 pts) • Mixed capped at 35% • Salvaged materials worth 2x

PLATINUM REQUIREMENTS

New construction

- 1 EAc1: Electrification
Five points required
- 2 EAc3: Enhanced Energy Efficiency
Eight points required
- 3 EAc4: Renewable Energy
100% of site energy use from any combination of Tier 1, Tier 2, and Tier 3 renewable energy
- 4 MRc2: Reduce Embodied Carbon
20% reduction in embodied carbon

PLATINUM REQUIREMENTS

Core and shell

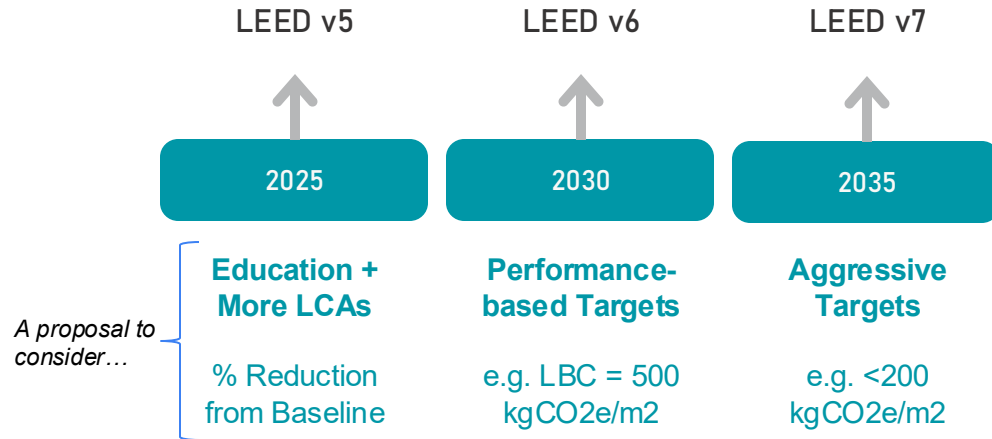
- 1 EAc1: Electrification
Four points required
- 2 EAc3: Enhanced Energy Efficiency
Five points required
- 3 EAc4: Renewable Energy
100% of base energy use from any combination of Tier 1, Tier 2, and Tier 3 renewable energy
- 4 MRc2: Reduce Embodied Carbon
20% reduction in embodied carbon

PLATINUM REQUIREMENTS

Commercial Interiors

- 1 EAc1: Electrification**
Do not install new on-site combustion equipment in the project scope of work
- 2 EAc2: Enhanced Energy Efficiency**
Seven points required
- 3 EAc3: Renewable Energy**
100% of tenant annual site energy use from any combination of Tier 1, Tier 2, and Tier 3 renewable energy
- 4 MRc2: Reduce Embodied Carbon**
10% reduction in embodied carbon

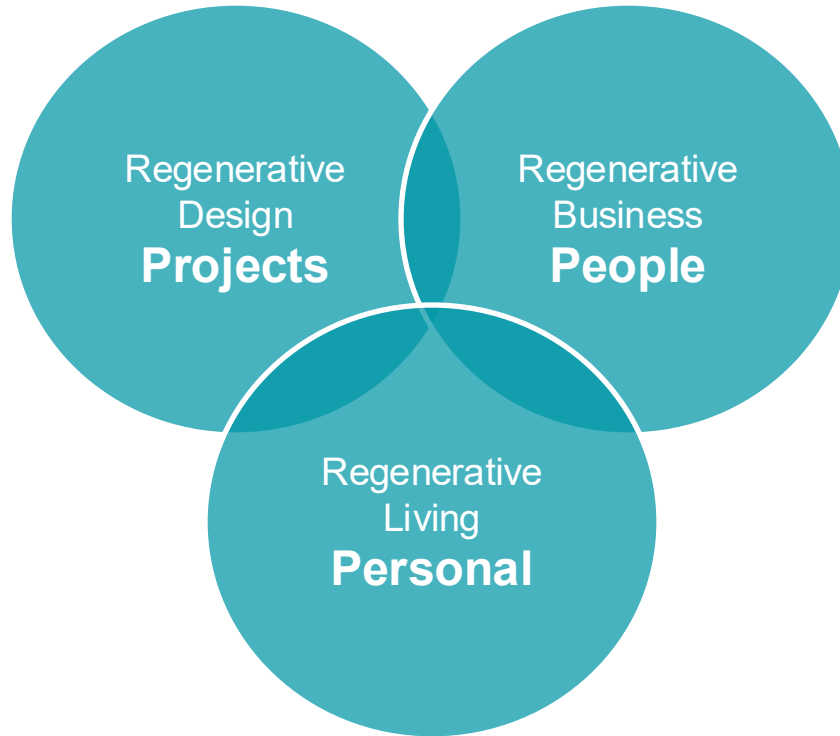
The cycle of LEED rating system updates will now be once every 5 years



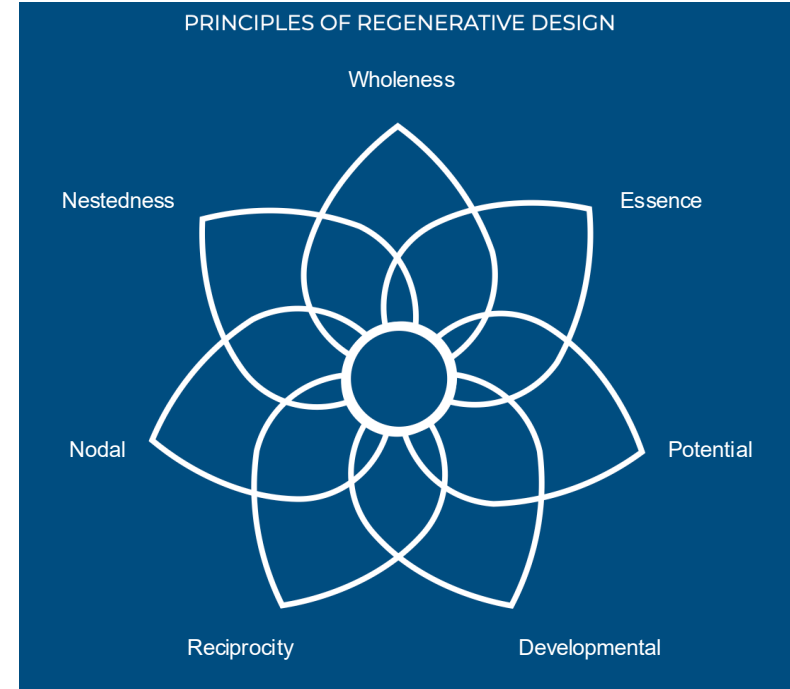
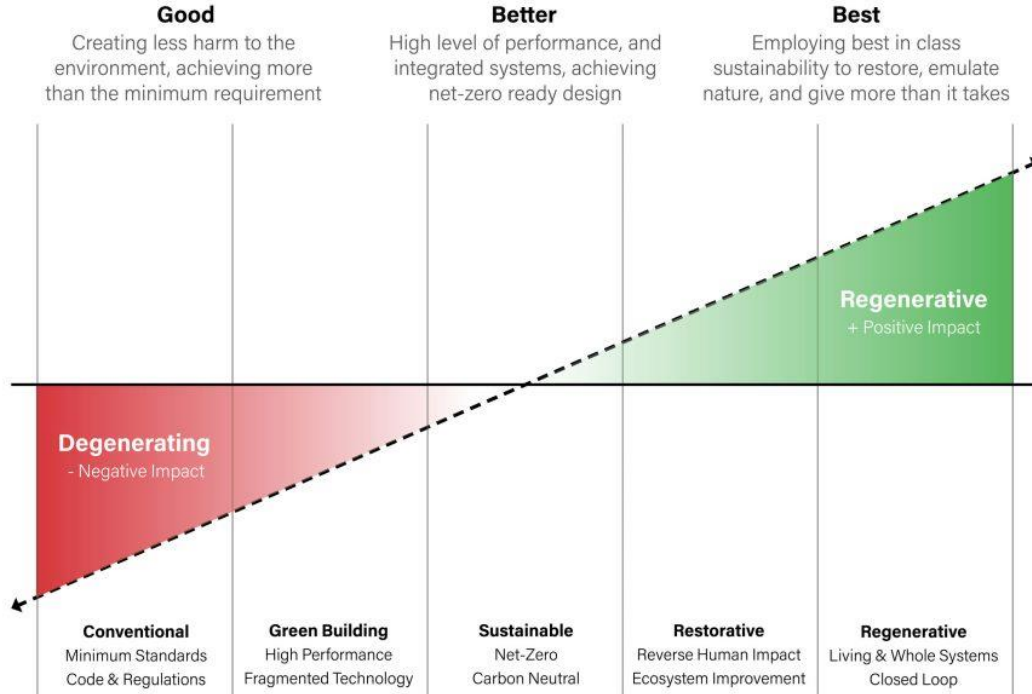
185 kgCO₂e/m² (2022)

The Challenge & Opportunity

Regenerative Everything – Align to Accelerate



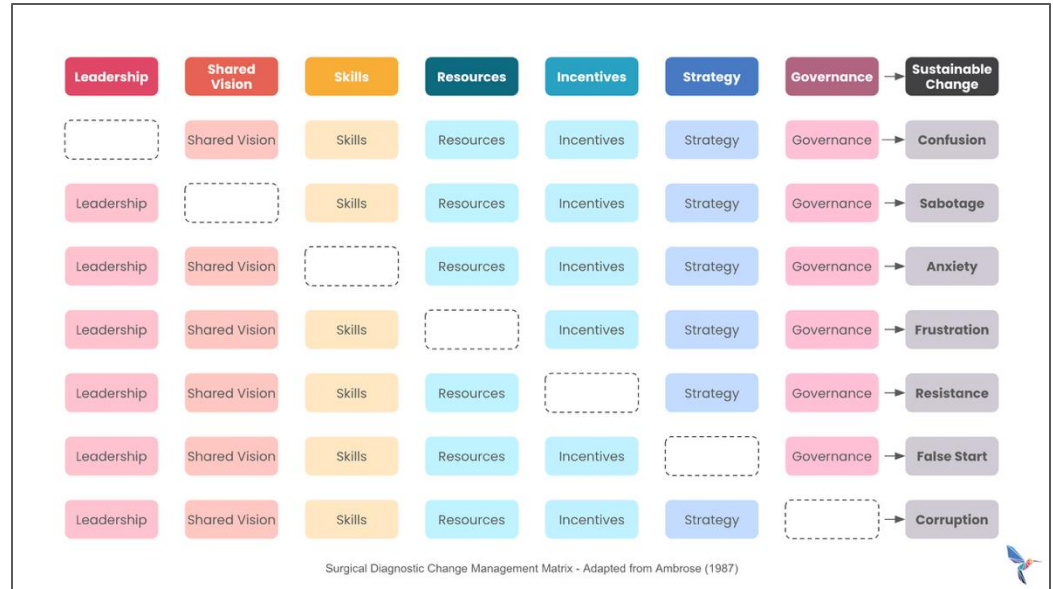
Regenerative Design – The Project Work



Regenerative Business – The Collective Work

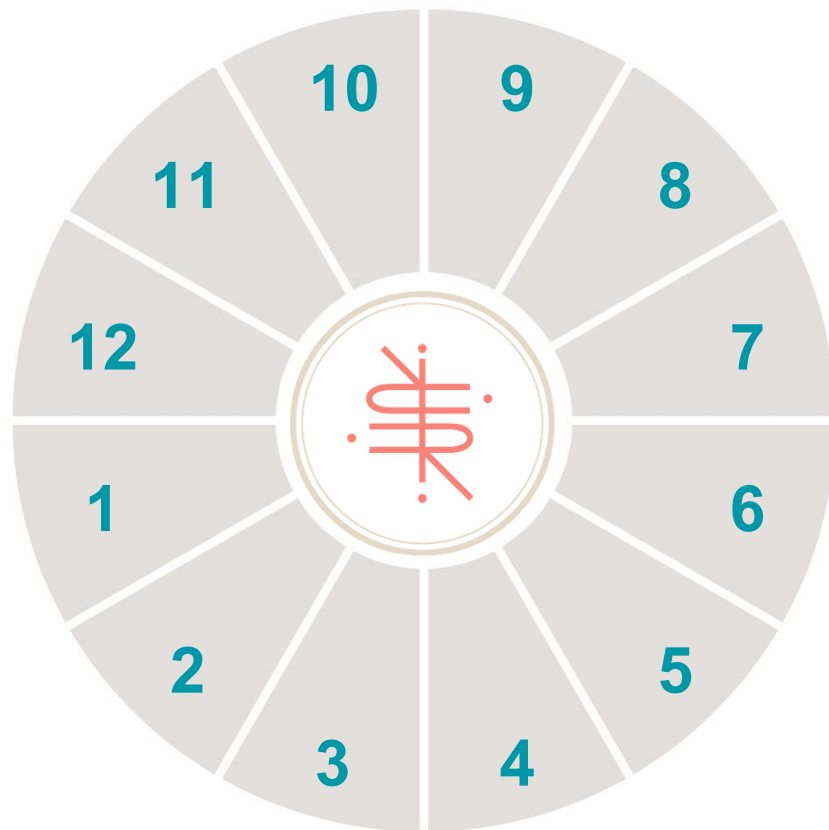
We possess the technology to solve the climate crisis—but addressing the **people-side** of the equation is where the challenge truly lies.

Therefore, we must collectively **upskill** as project **consultants and guides**, placing a strong emphasis on **change management** to dismantle crucial barriers like leadership buy-in, cross-team alignment, and proper resourcing.



Regenerative Living – The Inner Work

1. **Hope & Action:**
Embracing Courage, Taking Initiative
2. **Conscious Consumption:**
Finding Grounding, Cultivating Gratitude
3. **Power of Communication:**
Active Listening, Collaborative Storytelling
4. **Embrace Cycles of Life:**
Nurturing Inner Child & Emotional Intelligence
5. **Redefine Progress:**
Authentic Power and Creativity
6. **Systems Thinking:**
Practicing Discernment & Finding Meaning in Service



7. **Justice & Balance:**
Cultivating Healthy Relationships, Beyond Binary
8. **Death and Rebirth:**
Embracing Transformation and Letting Go
9. **Expansion & Optimism:**
From Understanding to Embodied Wisdom
10. **Limits to Growth:**
Manifesting Goals and Embracing Discipline
11. **Interconnectedness:**
Embracing Individuality; Serving the Collective
12. **Resilience & Adaptation:**
Connecting with Intuition & Accepting Surrender

Key Takeaways

Planetary Boundary

We're not doing enough to align with Earth's boundary (185)

We know where the industry gaps are – so let's focus our efforts where it matters most

LEED v5 & CA

LEED v5 and CA are hyper-focused on closing those gaps

But it will take time, and therefore our 'boundary' will change

Human Potential

We have the technologies to solve the climate crisis; we need to focus on the People side of the equation (Change management)

Embodying a regenerative mindset are at the crux of it all

Thank You!



Megan White

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