Why we need EPDs
A Contractor's View

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SUSTAINABLE BUILDING SOLUTIONS

Agenda

1. Sustainability and the Climate Challenge

2. Drivers for Decarbonization

3. Clients Requesting EPDs

4. Questions

SUSTAINABILITY

ESG

Environmental

Social

Governance

- Greenhouse Gas Emissions
- Energy Efficiency
- Green Building Certifications
- Climate Risk

- Water and Waste Management
- Environmental Management System
- Biodiversity
- Circular Economy
- Emergency Preparedness

- Health and Safety
- Diversity & Inclusion
- Working Conditions
- Employee Benefits
- Equal Opportunities
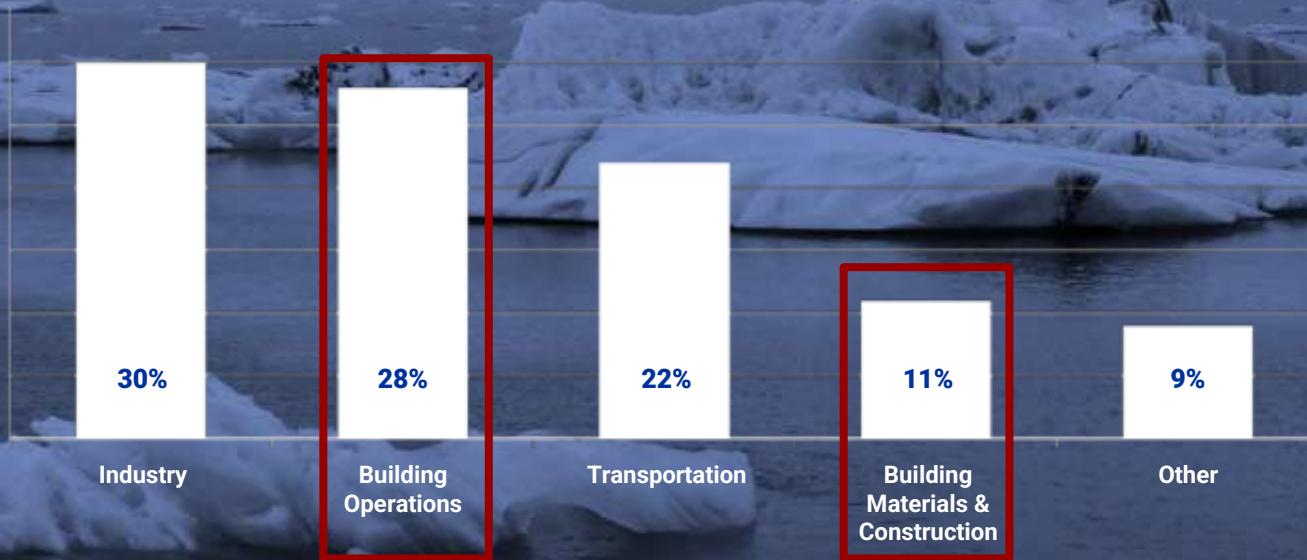- Human Rights
- Impacts on Local Communities

- Business Ethics
- Compliance
- Board Diversity and Governance
- Executive Compensation
- Shareholder Rights
- Pay for Performance

THE CHALLENGE
Climate change is a crisis.

GLOBAL CO^2 EMISSIONS BY SECTOR

| Industry	Building Operations	Transportation	Building Materials & Construction	Other
30%	28%	22%	11%	9%

Our work has clarified that, while many of us know that change is coming, we are collectively underprepared.

Infrastructure Futures Report
Global Infrastructure Hub
World Economic Forum, 2020

EMBODIED vs OPERATING EMISSIONS

Embodied carbon impact grows as operational efficiency increases

Time

Embodied carbon, (materials)   Operating carbon (energy)
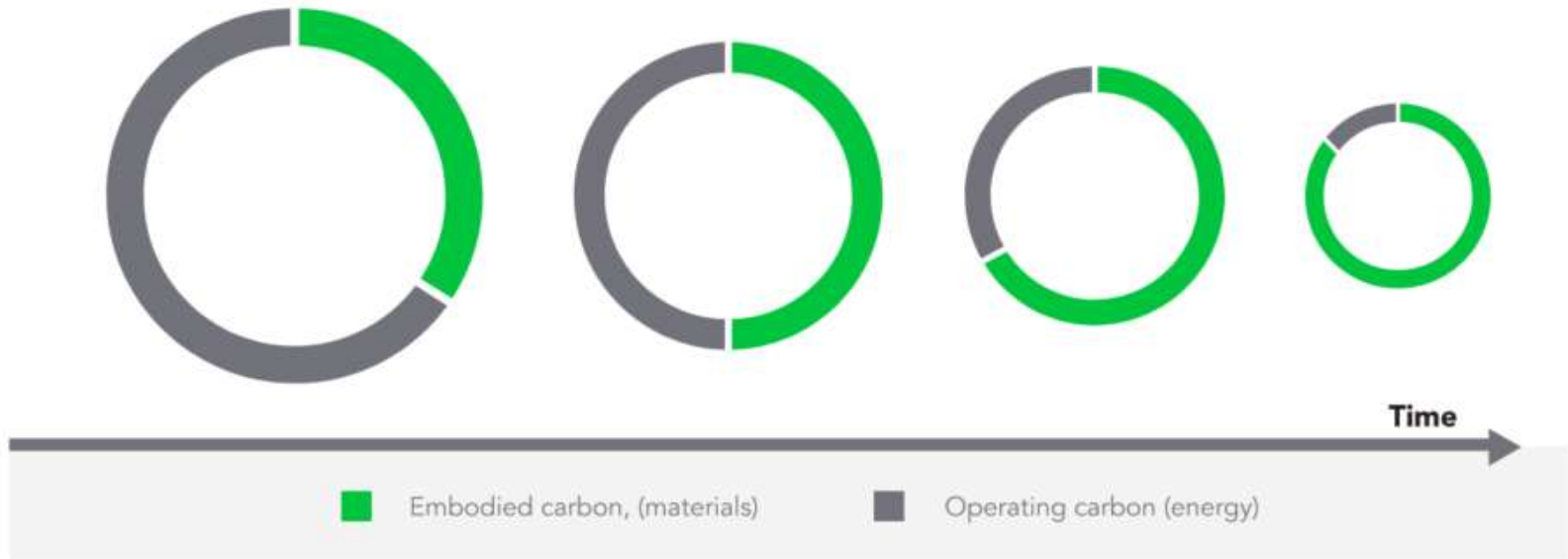
Source: Embodied Carbon Review

ELLISDON'S CLIMATE COMMITMENT

SCIENCE BASED TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

- Net Zero by 2050

- Minimum 42% reduction by 2030

- Must rely on reduction strategies (not offsets)

1 — **2** — **3** — **4** — **5**

COMMIT   **DEVELOP**   **SUBMIT**   **COMMUNICATE**   **DISCLOSE**

ELLISDON'S EMISSIONS PROFILE

EllisDon Corporate Emissions Baseline (2021)

- Direct Emissions
- Materials
- Building Operation
- Capital Goods
- Waste/Demo
- Other
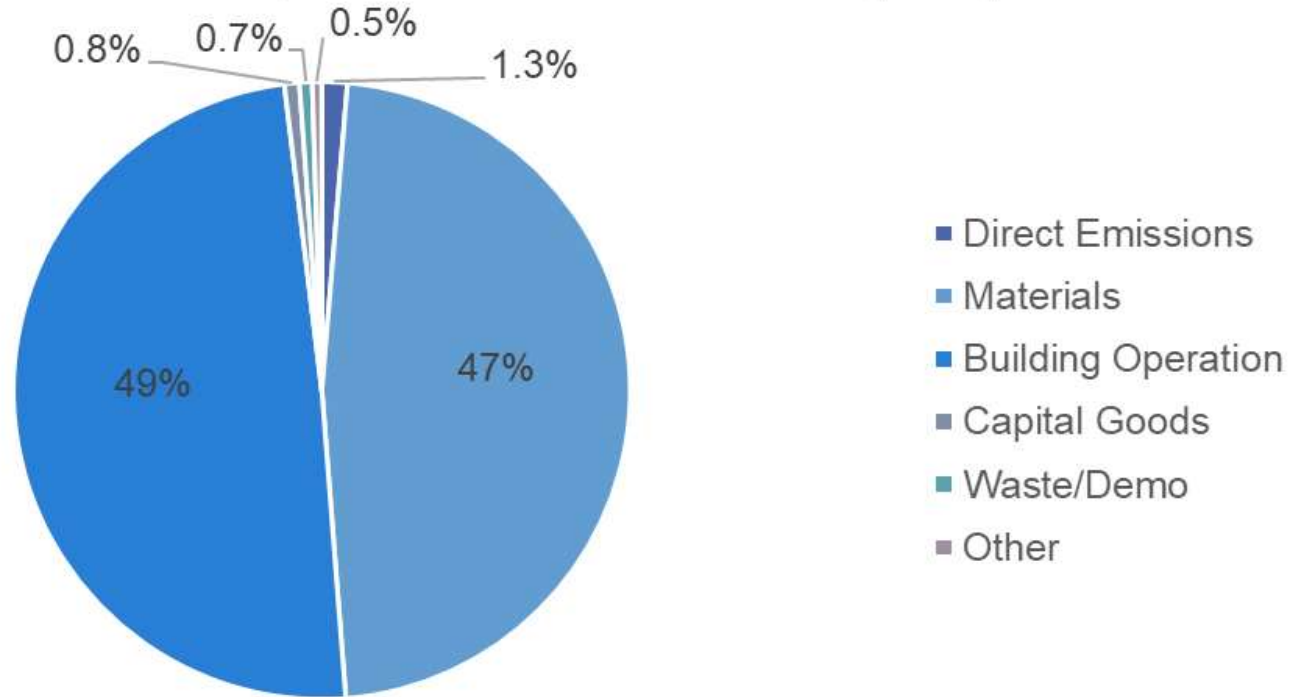
Drivers for Decarbonization

DECARBONIZATION COMMITMENTS
Drivers for Commitment and Action

STAYING AHEAD OF REGULATION

Disclosure Reporting

Carbon Regulations

TALENT RETENTION

Impact

Accountability

CLIENT DEMANDS

Funding

Accountability
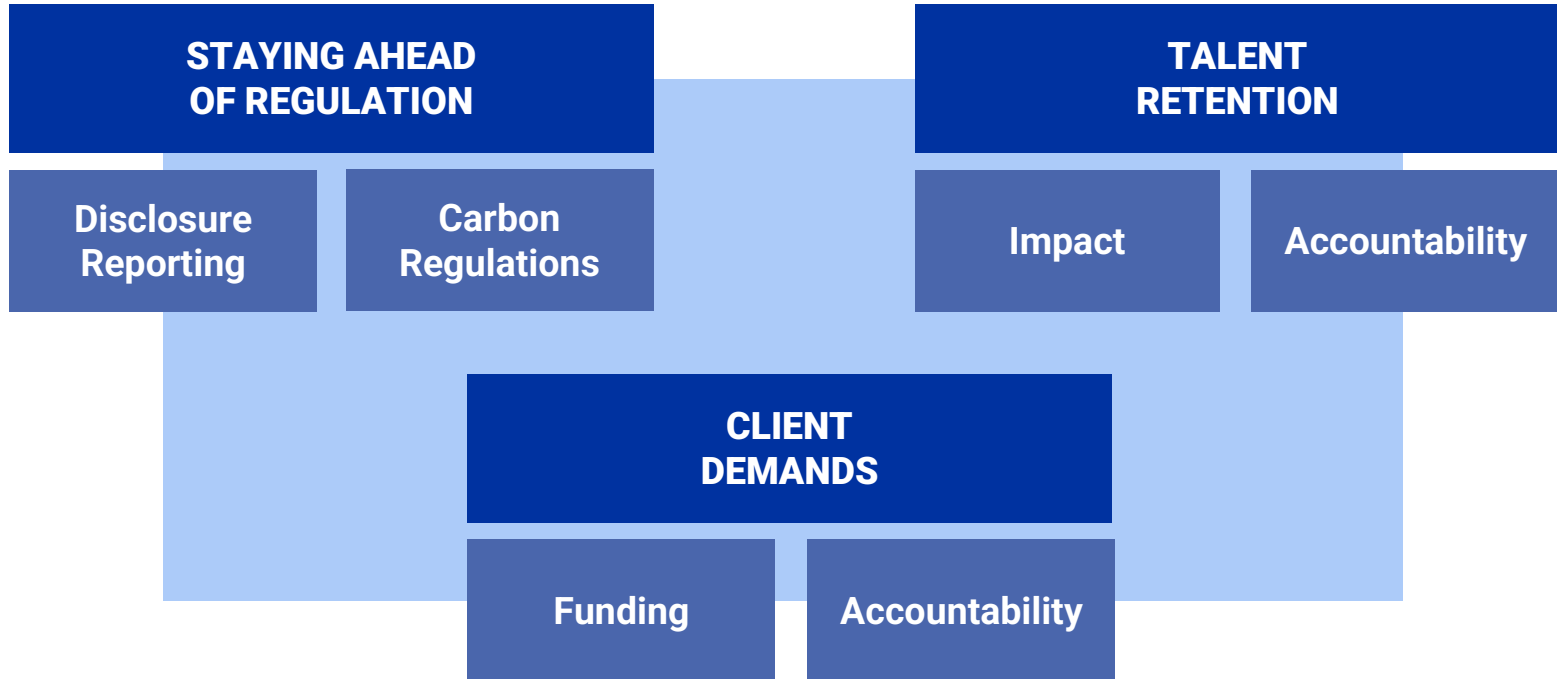
WHY NET ZERO IS IMPORTANT FOR REAL ESTATE
Financial Business Case, Stakeholder Demand,
and Risk of Stranded Assets

Financial business case
- Lower OpEx
- Lower M&R
- Increased NOI
- Increased Asset Value

Investors are Valuing It

Tenants are Asking for It

Increased energy reliability/ grid resilience

Regulations are Coming

Source: Urban Land Institute Net Zero Commitments for Real Estate, Getting to Zero Forum, October 2021

CLIMATE COMMITMENTS: UNDER SCRUTINY

Overview of company climate commitments. Assessed by corporate Climate Responsibility Monitor - 2022.

HIGH INTEGRITY	PLEDGE	TRANSPARENCY	INTEGRITY	PAGE
No companies achieved a high integrity rating				

REASONABLE INTEGRITY	PLEDGE	TRANSPARENCY	INTEGRITY	PAGE
MAERSK	Net-zero by 2040	◔	◔	p. 86

MODERATE INTEGRITY	PLEDGE	TRANSPARENCY	INTEGRITY	PAGE
APPLE	Carbon neutral by 2030	◕	◑	p. 56
SONY	Zero emissions by 2050	◕	◑	p. 95
VODAFONE	Net-zero by 2040	◕	◑	p. 102

LOW INTEGRITY	PLEDGE	TRANSPARENCY	INTEGRITY	PAGE
AMAZON	Net-zero carbon by 2040	◔	◔	p. 54
DEUTSCHE TELEKOM	Net-zero by 2040	◕	◔	p. 68
ENEL	Net-zero by 2050	◑	◔	p. 70
GLAXOSMITHKLINE	Net-zero by 2030	◑	◔	p. 74
GOOGLE	Carbon-free 2030	◔	◔	p. 76
HITACHI	Carbon neutral by 2050	◔	◔	p. 79
IKEA	Climate positive by 2030	◕	◔	p. 81

Changing Project Requirements

EVALUATING EMISSIONS

WHOLE BUILDING
LIFE CYCLE ASSESSMENT

PRODUCT SPECIFIC EPD
(ENVIRONMENTAL PRODUCT DECLARATION)
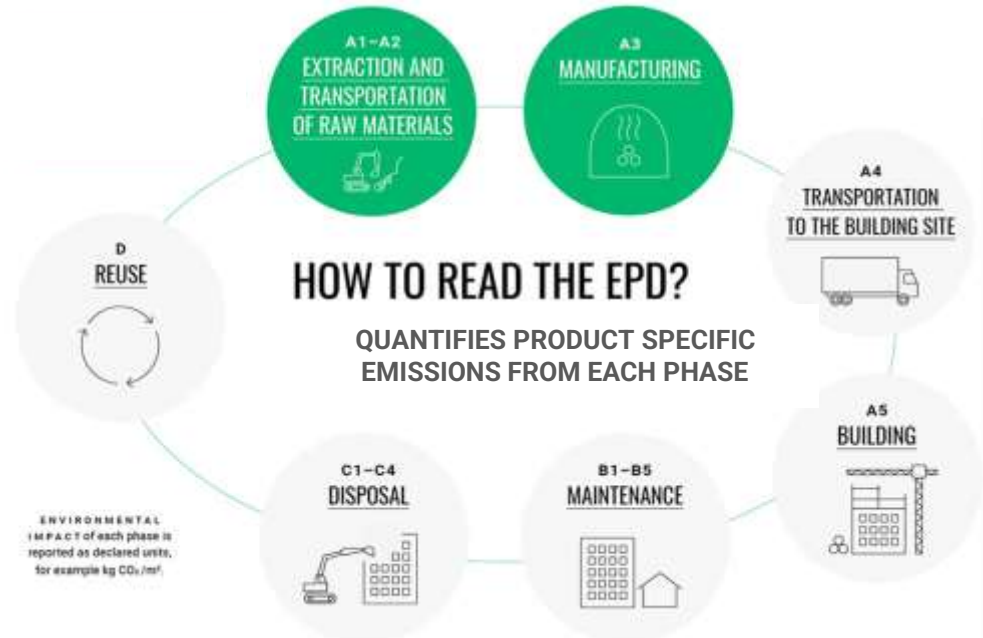
HOW WE EVALUATE
ENVIRONMENTAL PRODUCT DECLARATIONS (EPDS)

NUTRITION LABELS = FOOD NUTRITION REPORTING

Nutrition Facts

16 servings per container

Serving size   1 Tbsp. (21g)

Amount per serving

Calories   60

	% Daily Value*
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 0mg	0%
Total Carbohydrate 17g	6%
Dietary Fiber 0g	0%
Total Sugars 17g	
	34%†
Protein 0g	
Vitamin D 0mcg	0%
Calcium 0mg	0%
Iron 0mg	0%
Potassium 0mg	0%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.
† One serving adds 17g of sugar to your diet and represents 34% of the Daily Value for Added Sugars.

EPDs = PRODUCT & SERVICE ENVIRONMENTAL IMPACT REPORTING PLUS PRIMARY ENERGY

EPD "Nutrition" Label

Your Building Product

Amount per Unit

LCA IMACT MEASURES	TOTAL
Primary Energy (MJ)	12.4
Global Warming Potential (kg CO^2 eq)	0.96
Ozone Depletion (kg CFC- 11 eq)	1.80E-08
Acidification Potential (mol H⁺ eq)	0.93
Eutrophication Potential (kg N⁻ eq)	6.43E-04
Photo-Oxidant Creation Potential (kg O3 eq)	0.121

Your Product's Ingredients: Listed Here

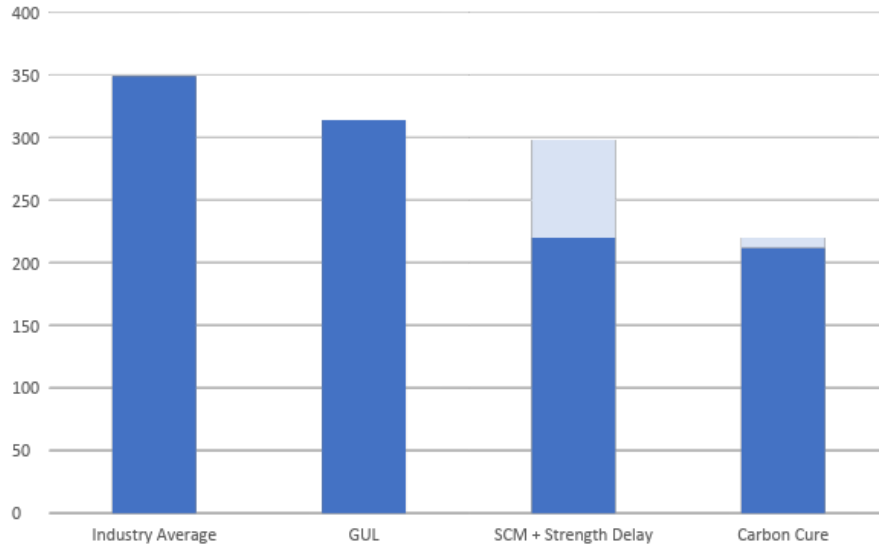**EPD "nutrition label" for concrete mixes**

- Declaration of environmental impacts of product
- Transparency in manufacturing process
- Third party verified
- Provides baseline for improvement

OPPORTUNITIES IN CONCRETE
COLLABORATE TO OPTIMIZE REDUCTIONS

Optimized Emissions Example

Categories: Industry Average, GUL, SCM + Strength Delay, Carbon Cure

Contributions to achieve net zero

% Contribution to net zero

| Contribution	%
Efficiency in design & construction	22%
Efficiency in concrete production	11%
Savings in cement & binders	9%
Savings in clinker production	11%
Carbon capture and utilisation/ storage (CCUS)	36%
De-carbonisation of electricity	5%
CO₂ sink: recarbonation	6%
Total reduction	**100%**
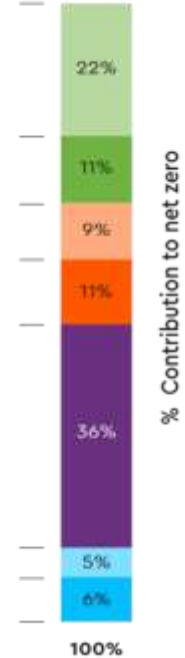
HVSCM SUCCESS

- Precedent for using concretes with slag contents of 70% normal, previous use or trials are required
- Use of SCM at High Volumes increases performance in mass concrete, while reducing emissions
- Technical studies by EllisDon for various projects to optimize SCM content and performance

GWP OF CONCRETE WITH HVSCM

ANNUAL
CO₂ EMISSIONS FROM
39,520,957
PASSENGER VEHICLES
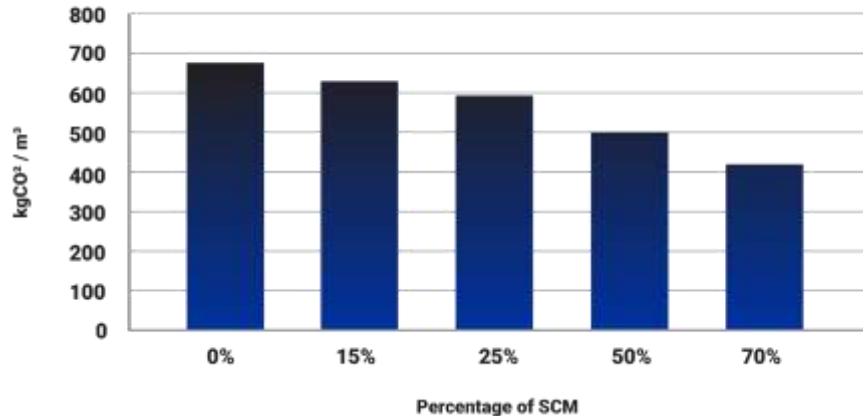
20% GHG savings by increasing SCM from 50 to 70% in mass concrete elements
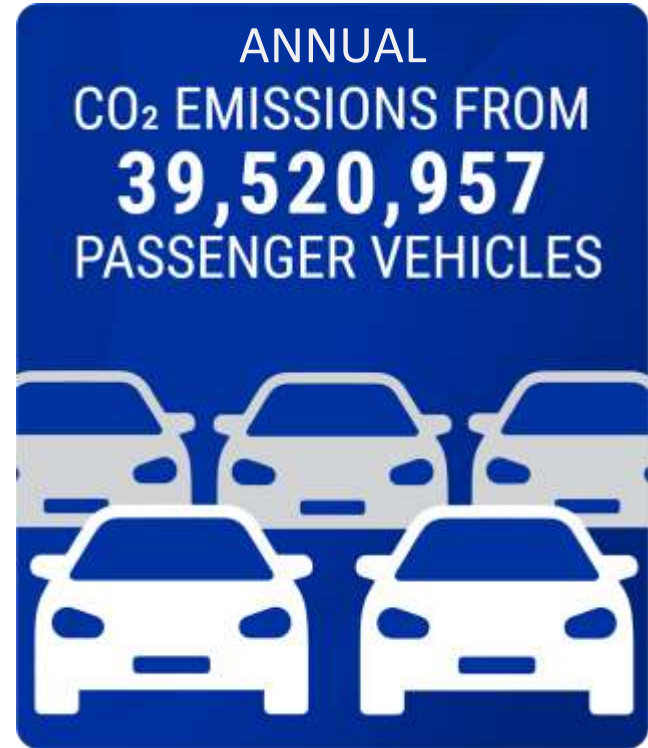
PROJECT REQUIREMENTS

- **Specification Language includes requirements; following a variety of strategies:**
  - Disclose emissions intensity for each mix
  - Product Specific EPDs at bid
  - Max GWP targets by element
  - Max SCM content

- **What they want:**
  - Clients want to understand emissions reductions opportunities
  - Need clarity and data to support options
  - Opportunities to optimize solutions - collaboration

PROJECT REQUIREMENTS

Schedule Impact
1-2 days/pour

Schedule Impact
1-2 days/pour
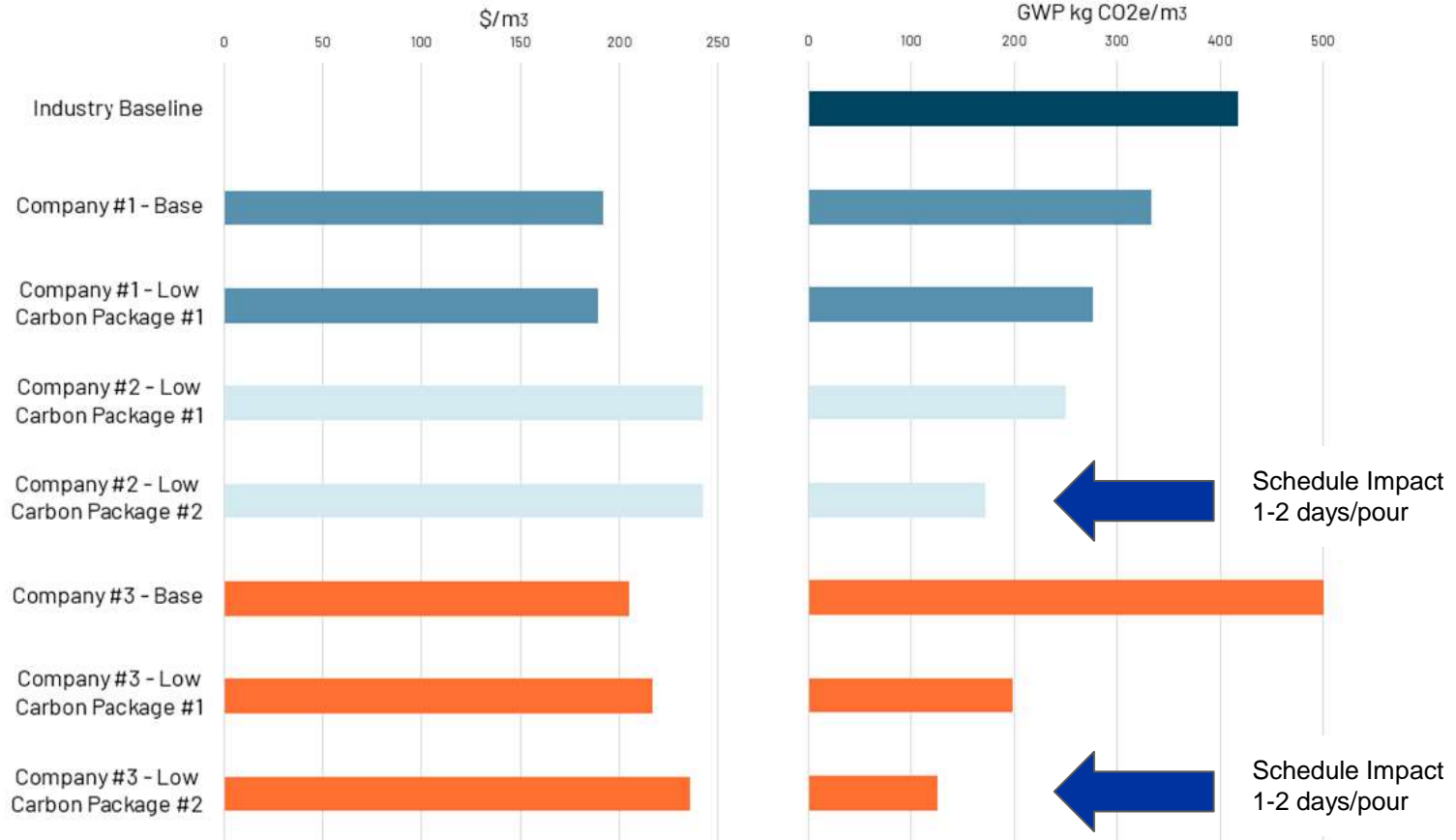
PROJECT REQUIREMENTS - Regulations

Federal Government - Disclosure of Embodied Carbon in Concrete

- o Treasury Board driven; projects over $10 million
- o Report on "as built" supply, minimum 10% reduction from Industry Average

What we know:

- ○ Opportunities to optimize solutions – requires collaboration
- ○ Report on actual data – and need industry support to do so
- ○ Reductions expanding to 30% in 2025
- ○ Concrete leading the way to meet targets
- ○ Learning together to continue to evolve and improve

Questions