IS INSIGHTS
By the INFRASTRUCTURE SUSTAINABILITY COUNCIL

Introducing IS Insights – Embodied Carbon Benchmark

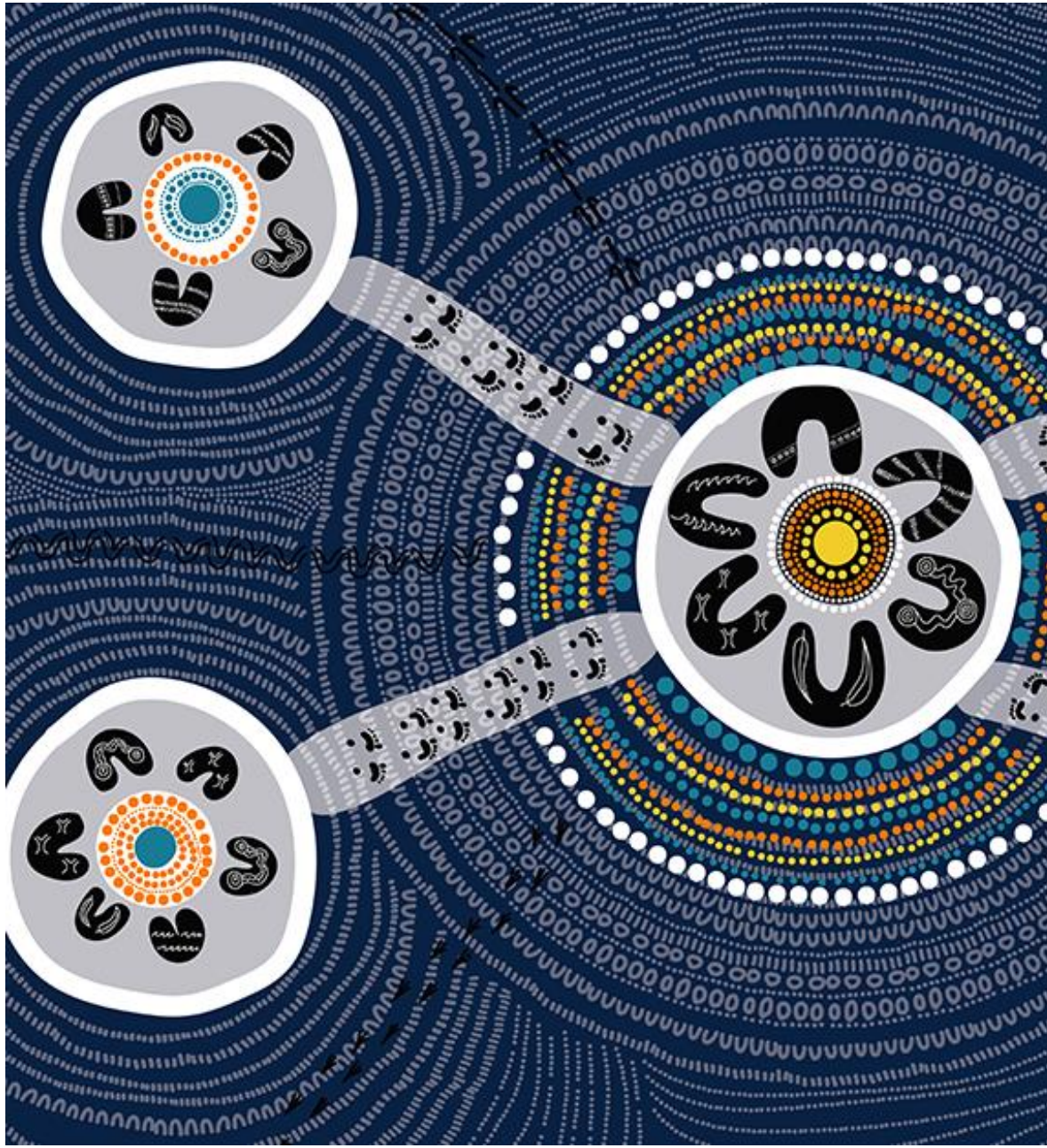
Wednesday 14 October 2026

Acknowledgement of Country

Tēnā koutou, tēnā koutou, tēnā koutou katoa

The ISC would like to begin by acknowledging the Traditional Custodians of the land on which we meet today.

We acknowledge their deep connection to land, water and culture, and pay respects to Elders past and present.



IC-8 IS INSIGHTS

Phase

- IS v1.2, v2.1 & v2.2 Design & As Built
- IS Essentials (Design & As Built)

Aim

IS Insights aims to transform how infrastructure projects are benchmarked and how performance outcomes are measured and reported. In partnership with the University of Melbourne and SPARK North East Link, the Infrastructure Sustainability Council has developed a Construction Phase Carbon Metric based on historical carbon data collected through the IS Rating Scheme.

This Innovation Challenge seeks to trial a new type of credit within the IS Rating Scheme that leverages the IS Insights Embodied Carbon Metric, while also supporting ongoing data collection to further enhance the IS Insights platform. As the platform matures and its dataset expands, the ISC intends to integrate IS Insights more broadly into the rating process by introducing additional and alternative credits beyond the Innovation Challenge category.

IC-8.1 IS INSIGHTS - CARBON METRIC

Criteria

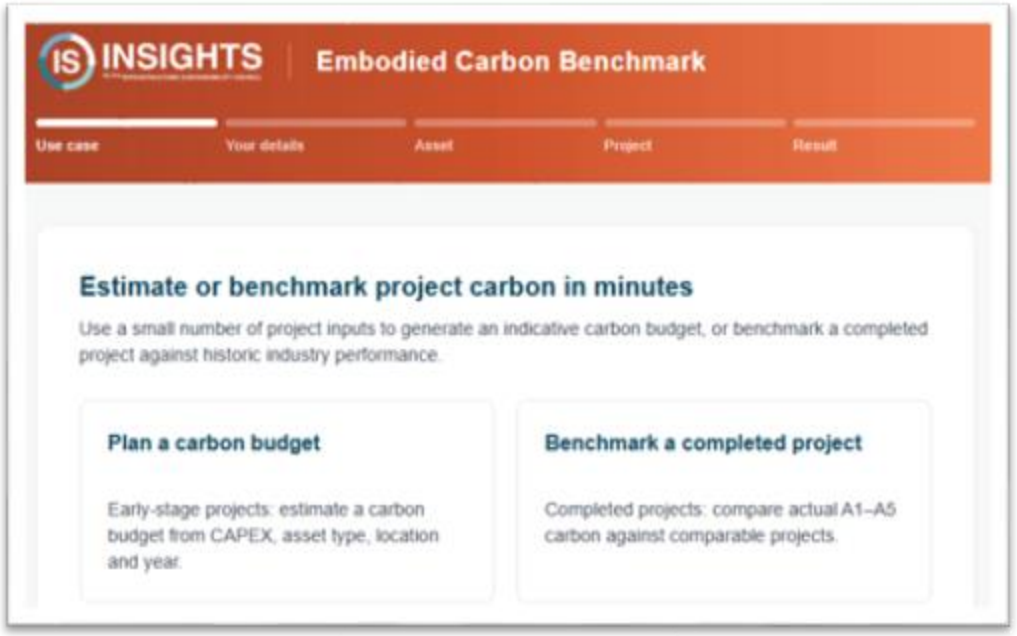
Up to 1.5 Innovation Points Available

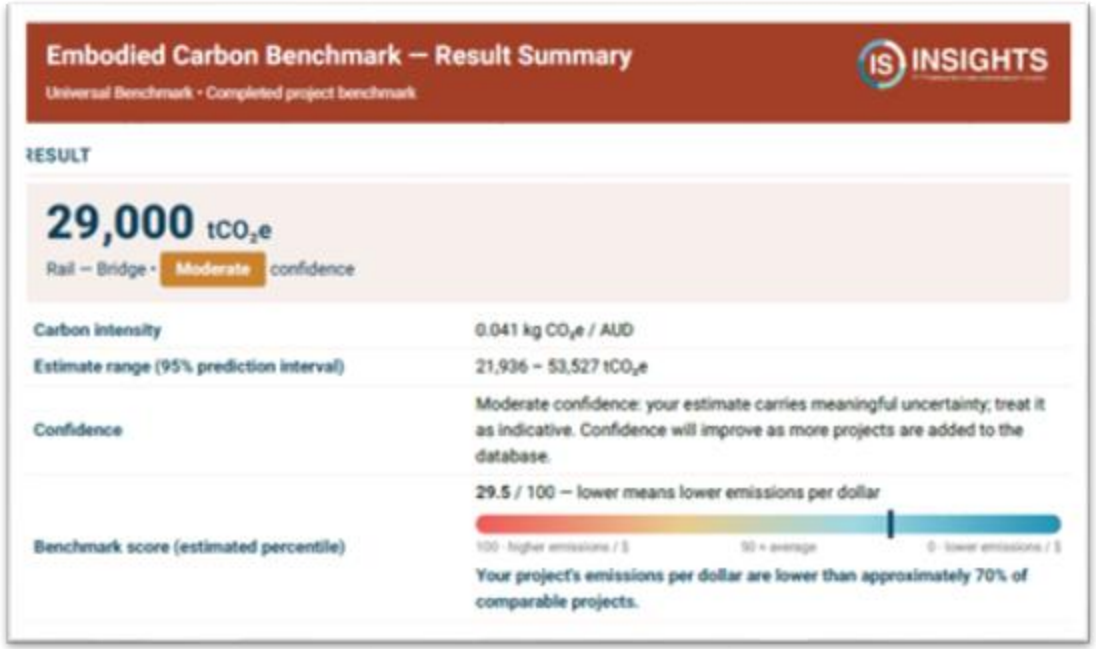
Benchmark	Innovation Points
Reporting: Achieve a benchmark score (percentile) between the 100 and 84.1 percentile of the relevant carbon benchmark.	0.5
On Track: Achieve a benchmark score (percentile) between the 84.1 and 15.9 percentile of the relevant carbon benchmark.	1.0
Exceeding Benchmark: Achieve a benchmark score (percentile) between the 15.9 and 0.1 percentile of the relevant carbon benchmark.	1.5

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Accompanying Credits

- Being tested through Innovation Category
- Provide alternative options to resource intensive Base Case credits
- Provided as an alternative option or addition to existing credits





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Aiming to expand available metrics to incorporate:

- Water consumption.
- Potable water substitution.
- Waste/Resource output volumes.
- Waste/Resource output diversion rates.
- Project Circularity (WOL)
- Biodiversity impacts/enhancements.

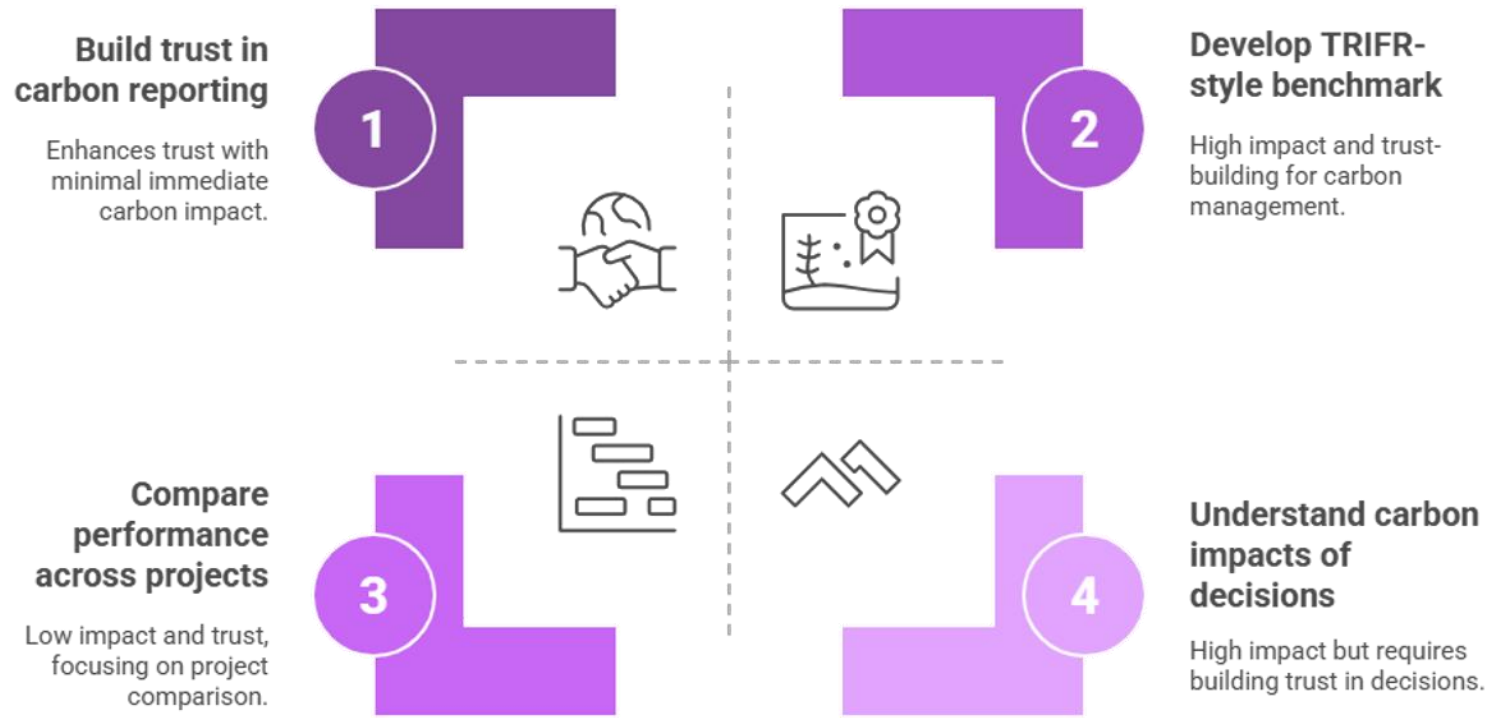
IS Insights Verification Pathway:

Upon the development of additional metrics, the ISC will investigate the feasibility of providing standalone third party verified performance reporting pathways that utilise the metrics available through the 'IS Insights' platform. These pathways may support organisations seeking credible sustainability benchmarking outside the traditional IS Rating process.

Jessamine Welsh – Spark North East Link

The Big Idea

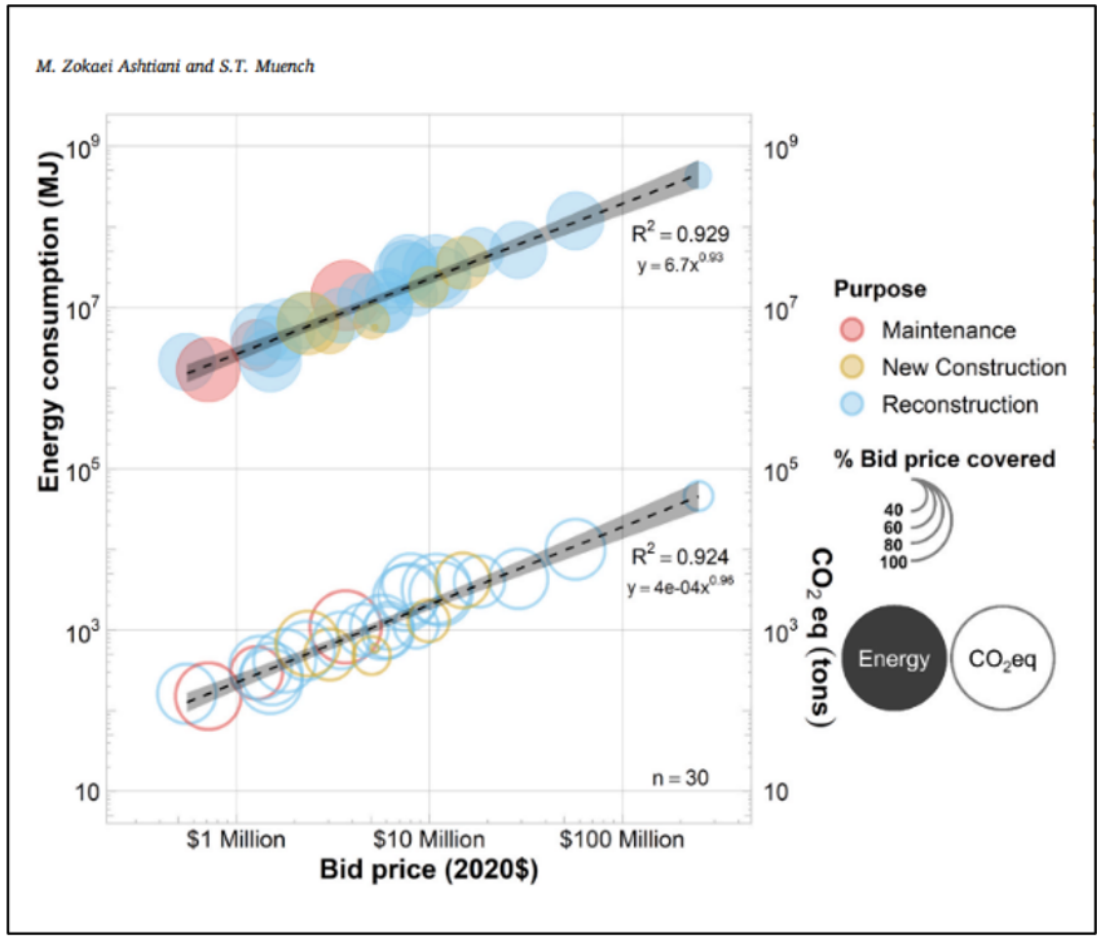
Using historical industry data to create an industry wide carbon metric to set carbon baselines and measure performance



To Achieve this, we needed **Radical Collaboration**

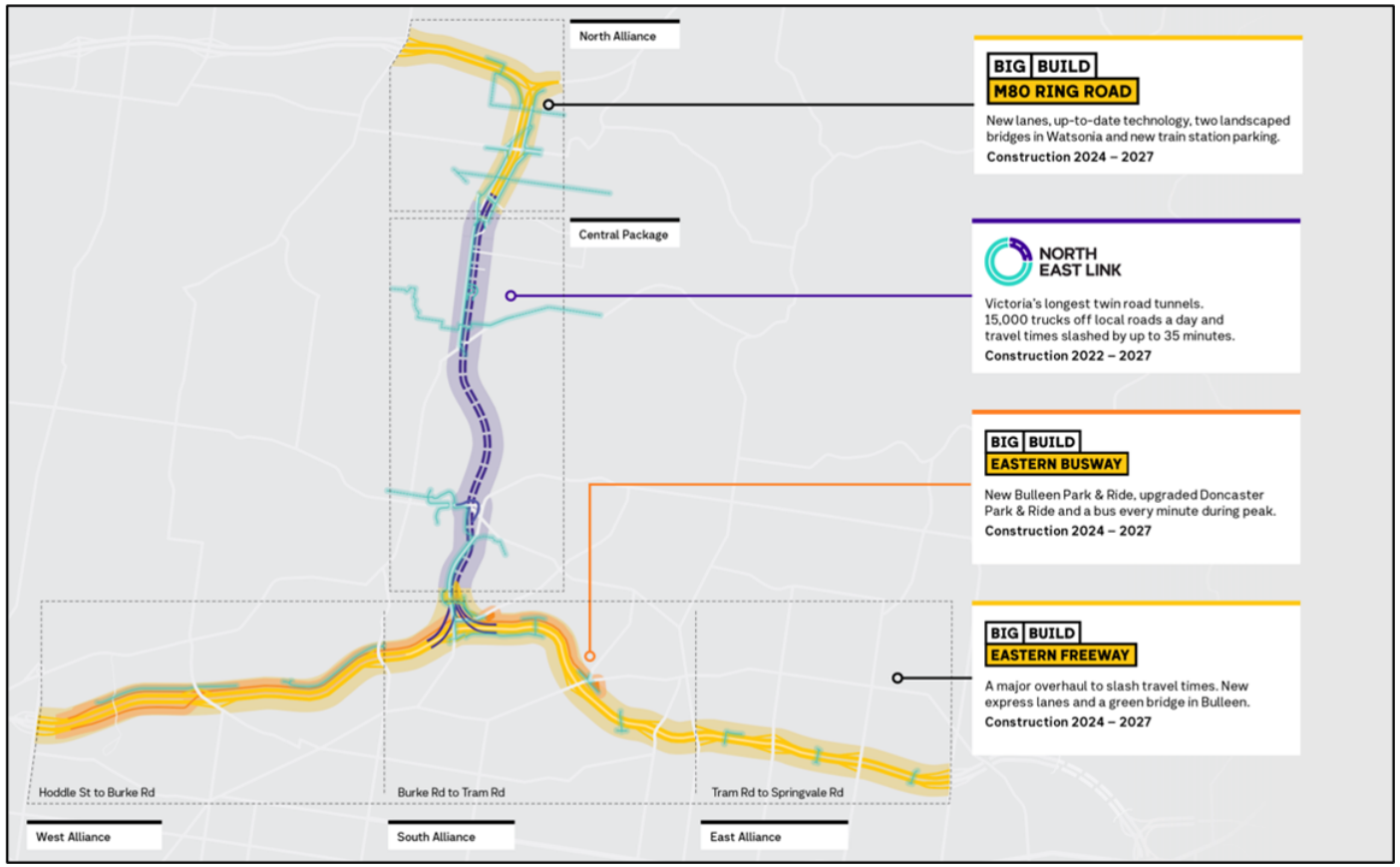
The Research

- The concept is based upon a peer-reviewed analysis in the US, where construction data demonstrated a clear correlation between carbon emissions and dollars spent.
- The idea: If we know what a project costs, we can predict its carbon footprint with a high degree of accuracy.
- Studies by the University of Washington show strong correlation between CAPEX and carbon
- We are testing whether this principle can hold true in the Australian context.
- Carbon performance = productivity indicator



Why Now? Why Spark?

- North East Link when awarded was Australia's largest infrastructure project
- 8-year program enables long-term study
- Involves almost every major contractor
- Ideal platform to drive national collaboration



André Stephan –
The University of Melbourne |
Beyond EPiC

Why estimate from cost?



GHG

Emissions lock in early

$

Cost is always there



Detailed LCA comes late

So: how much embodied GHG does a project of this type and cost typically carry — and how honestly can we say so?
can we say so?

Data made comparable before anything is fitted

Step 1

Certified projects

Dozens of infrastructure projects with measured embodied GHG emissions and final cost.



Step 2

One price basis

Costs CPI-adjusted to Q4-2025 2025 using state-specific indices.



Step 3

Comparable groups

Grouped by asset type and subtype: roads, rail, bridges, tunnels, surfaces.



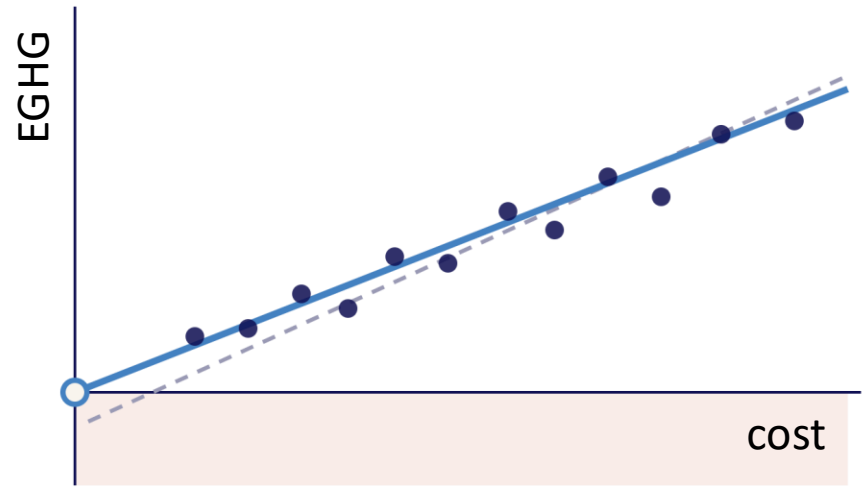
Step 4

Cleaned

Two-pass IQR outlier removal on intensity, plus documented manual exclusions.



One line per asset type, through the origin



Illustrative - The dashed free fit dips below zero at low cost; every published line passes through the origin.

EGHG = slope × adjusted cost

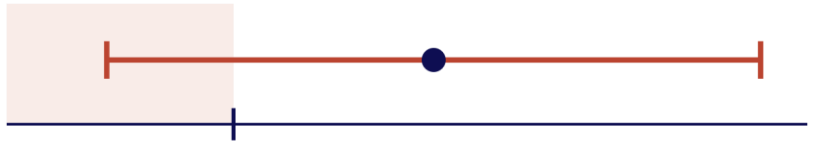
- Zero spend means zero emissions — negative estimates become impossible by construction
- R^2 from 0.58 to 0.97 across the seven published asset-type models

What we refused to publish

- Asset types with fewer than five usable projects
- Stations: in the current sample, cost does not drive emissions

Uncertainty: a 95% range that respects physics

⚠ The textbook way: estimate ± margin



Symmetric around the estimate. Can yield negative values

✓ Our way: estimate ÷ F … × F



Multiplicative, in log space: always positive, and deliberately wider upward — the shape right-skewed emissions data actually take.

The factor F grows with (1) fewer projects, (2) a poorer fit, and (3) distance from the data — three reasons for doubt, one honest number.

Confidence: one label a non-specialist can act on

Built from: Sample size · Fit quality · Distance from the data · Local data density

High

The cost sits in a well-populated part of the model, with a tight range.

Moderate

Meaningful uncertainty — the estimate is indicative, not precise.

Low

Few or scattered projects, or a cost outside the data behind the model.

Today, most asset types honestly sit at Low to Moderate. That is the data speaking, not the method failing — and every added project lifts it.

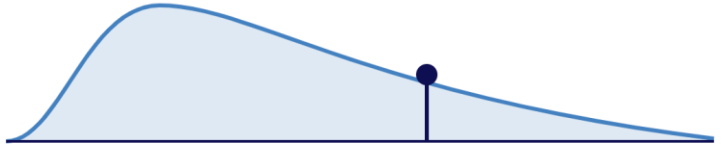
Benchmarking: Score measured performance, not model output

Why not score the estimate?



Through the origin, estimated intensity is the same at every cost. It says nothing about *your* project.

What we score instead



- The project's **actual** emissions per dollar, placed as a comparable projects — 50 is typical
- Small-sample aware, and **no score** at all below a projects in the sample

The score is about emissions intensity per dollar, never the total footprint — a large project can still score well.

What the user actually sees

RESULT — ILLUSTRATIVE

Estimated embodied GHG	**12,400 tCO_2e**
95% range	**6,900 – 22,300 tCO_2e**
Confidence	**Moderate**

Plain-language explainers, everywhere

"Treat the score as a guide rather than a verdict … small differences are within the noise, while larger differences are worth investigating."



IS Insights Embodied Carbon Benchmark



- Honest statistics beat confident noise : uncertainty is information, not
- Physical constraints beat chasing fitness: zero spend, zero emissions
- Benchmark measured performance, not model output
- Transparency is what makes small samples usable at all
- **Every project added sharpens every estimate**

Infrastructure Sustainability Council

Q&A

Scan QR code to complete

1 min feedback form