MECLA Western Australia Event

In-Person event in Perth

Speakers and Presenters

Susan Kreemer Pickford
General Manager, Engineers Australia

Monica Richter
Program Director, MECLA

Ross Donaldson
WA-based architect and lecturer

Dena Jacobs
Executive Director, Infrastructure NSW

David Kelly
A/Director Engineering, -Sustainable Infrastructure Program, TfNSW

Tyrel Momberg
Technical Manager, IS Council

Linda van Achterbergh
Sustainability Manager, Public Transport Authority

Greg Ryan
Sustainability Manager, Development WA

Mark Taylor
Sustainability Manager, Hesperia

Speakers and Presenters

Susan Kreemer Pickford
General Manager, Engineers Australia

Monica Richter
Program Director, MECLA

Ross Donaldson
WA-based architect and lecturer

Dena Jacobs
Executive Director, Infrastructure NSW

David Kelly
A/Director Engineering, -Sustainable Infrastructure Program, TfNSW

Tyrel Momberg
Technical Manager, IS Council

Linda van Achterbergh
Sustainability Manager, Public Transport Authority

Greg Ryan
Sustainability Manager, Development WA

Mark Taylor
Sustainability Manager, Hesperia

ENGINEERS
AUSTRALIA

Welcome Wanjoo

Monday 26 June 2023

ENGINEERS
AUSTRALIA

MECLA Western Australia In-Person Event

26 June 2023

Engineers Australia Perth Office

Welcome

Susan Kreemer Pickford

FIEAust CPEng EngExec NER

General Manager WA

ENGINEERS
AUSTRALIA

Acknowledgement of Country

Engineers Australia acknowledges the traditional custodians of the country throughout Australia and recognises their continuing connection to land, waters and community.

We pay our respects to them and their cultures; and to elders past and present and emerging.

Engineers Australia in Perth is based on the home of the Whadjuk Noongar people.

Embodied Emissions in Infrastructure

Embodied Carbon & Embodied Energy in Australia's Buildings
GBCA and ThinkstepANZ

2022 Global Status Report for Buildings and Construction
United Nations Environment Programme (UNEP)

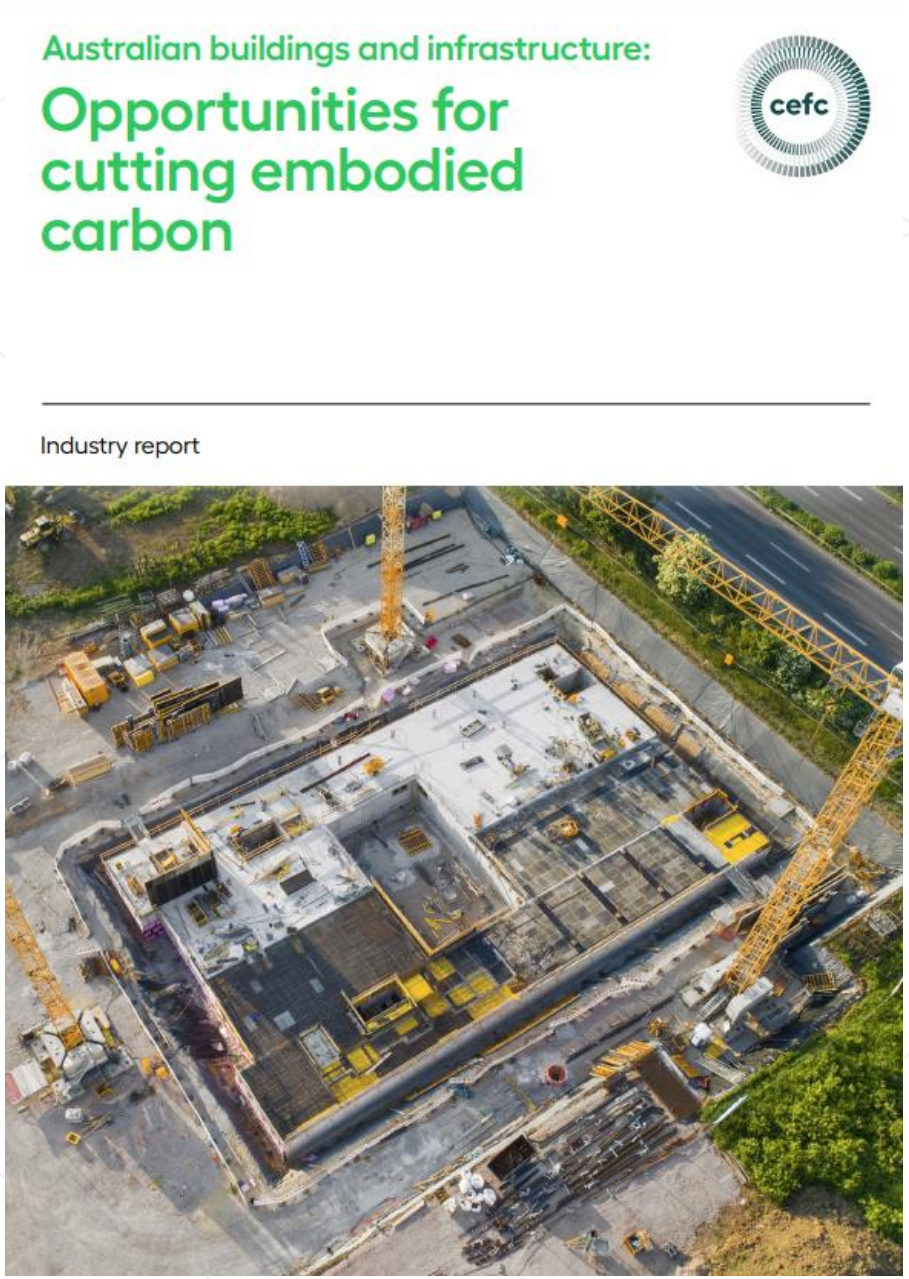
Embodied Carbon & Embodied Energy in Australia's Buildings
GBCA and ThinkstepANZ

Clean Energy Finance Corporation in collaboration with the Green Building Council of Australia and the Infrastructure Sustainability Council.

Governance barriers that exist in Australia that require consideration:

- Lack of regulations and regulatory support
- Lack of incentives – not much focus on embodied carbon in voluntary building rating schemes
- Embodied carbon and Life Cycle Assessments are not adequately considered in building codes or other regulations

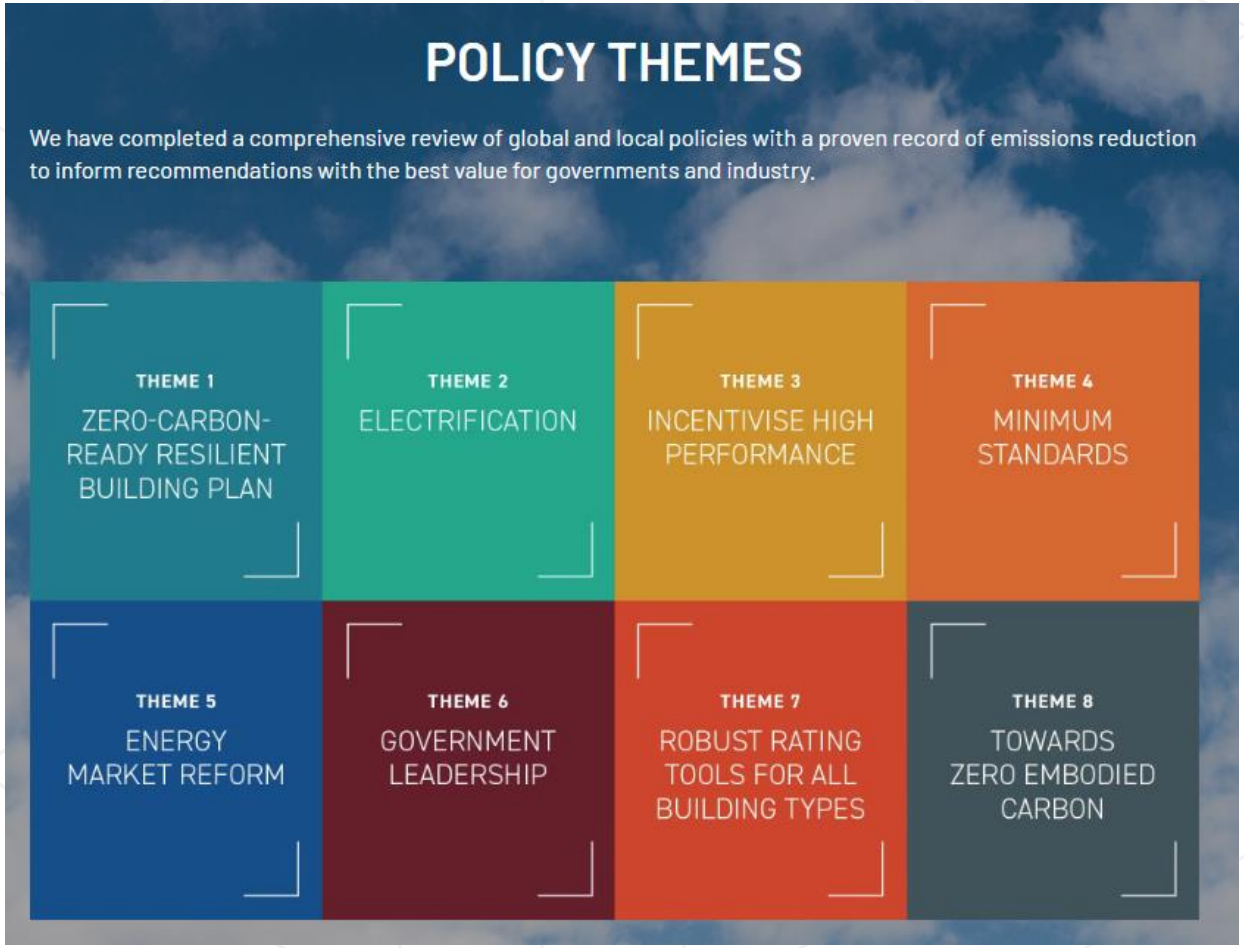
https://www.cefc.com.au/media/ovrkk5l3/australian-buildings-and-infrastructure-opportunities-for-cutting-embodied-carbon.pdf



Every Building Counts

Recommendations relating to embodied carbon include:

1. Adopt a credible national framework for measuring embodied carbon.
2. Introduce embodied carbon targets into the National Construction Code.
3. Create an embodied carbon national database for products and materials.
4. Introduce embodied carbon reductions requirements for government projects.
5. Support Australian product manufacturers and overseas importers to calculate and disclose embodied carbon content.



ENGINEERS
AUSTRALIA

engineersaustralia.org.au

@engaustralia

facebook.com/EngineersAustralia

engineersaustralia.org.au/linkedin

Speakers and Presenters

Susan Kreemer Pickford
General Manager, Engineers Australia

Monica Richter
Program Director, MECLA

Ross Donaldson
WA-based architect and lecturer

Dena Jacobs
Executive Director, Infrastructure NSW

David Kelly
A/Director Engineering, -Sustainable Infrastructure Program, TfNSW

Tyrel Momberg
Technical Manager, IS Council

Linda van Achterbergh
Sustainability Manager, Public Transport Authority

Greg Ryan
Sustainability Manager, Development WA

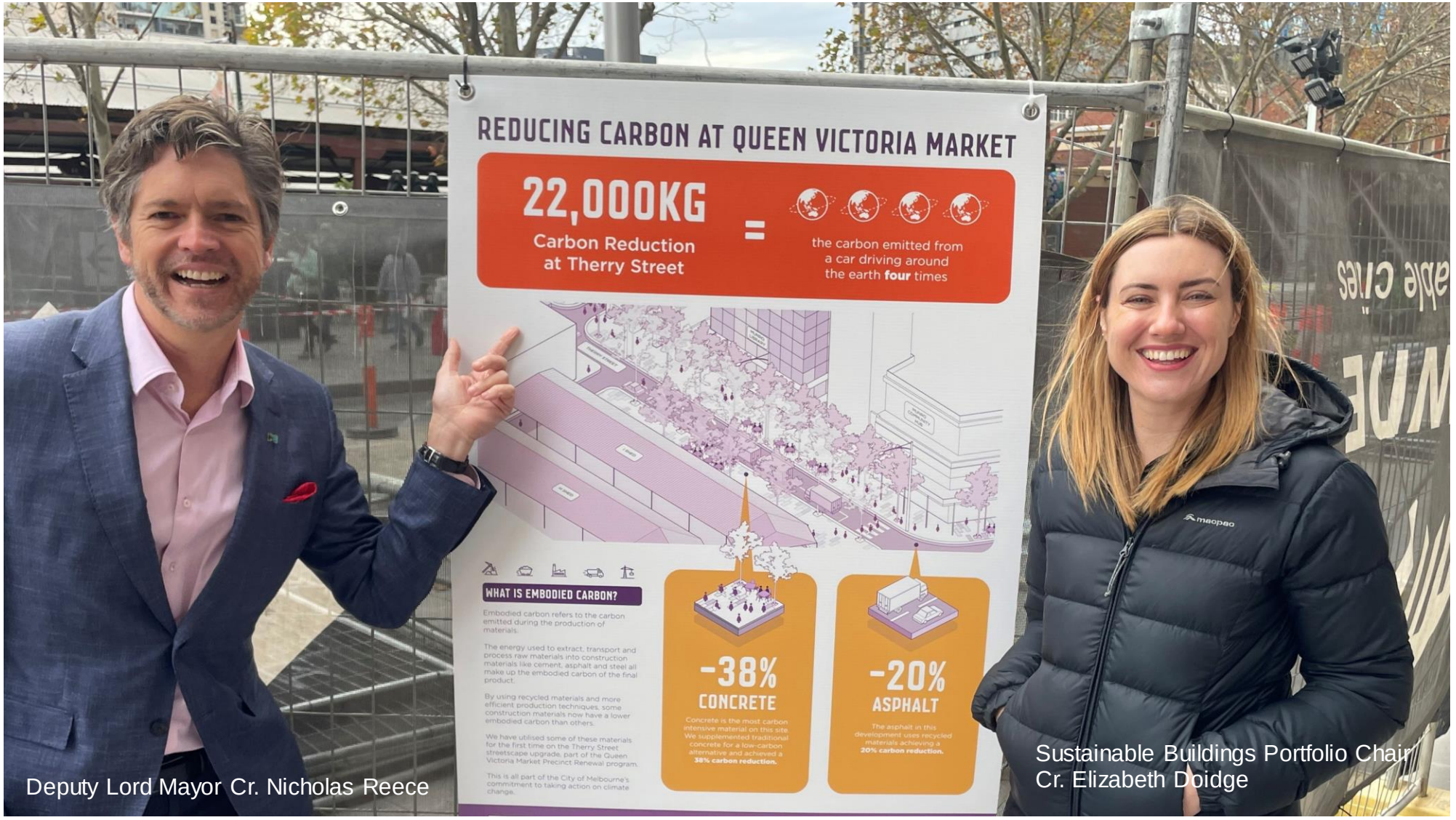
Mark Taylor
Sustainability Manager, Hesperia

MECLA

Driving the uptake of low carbon construction materials

Western Australia

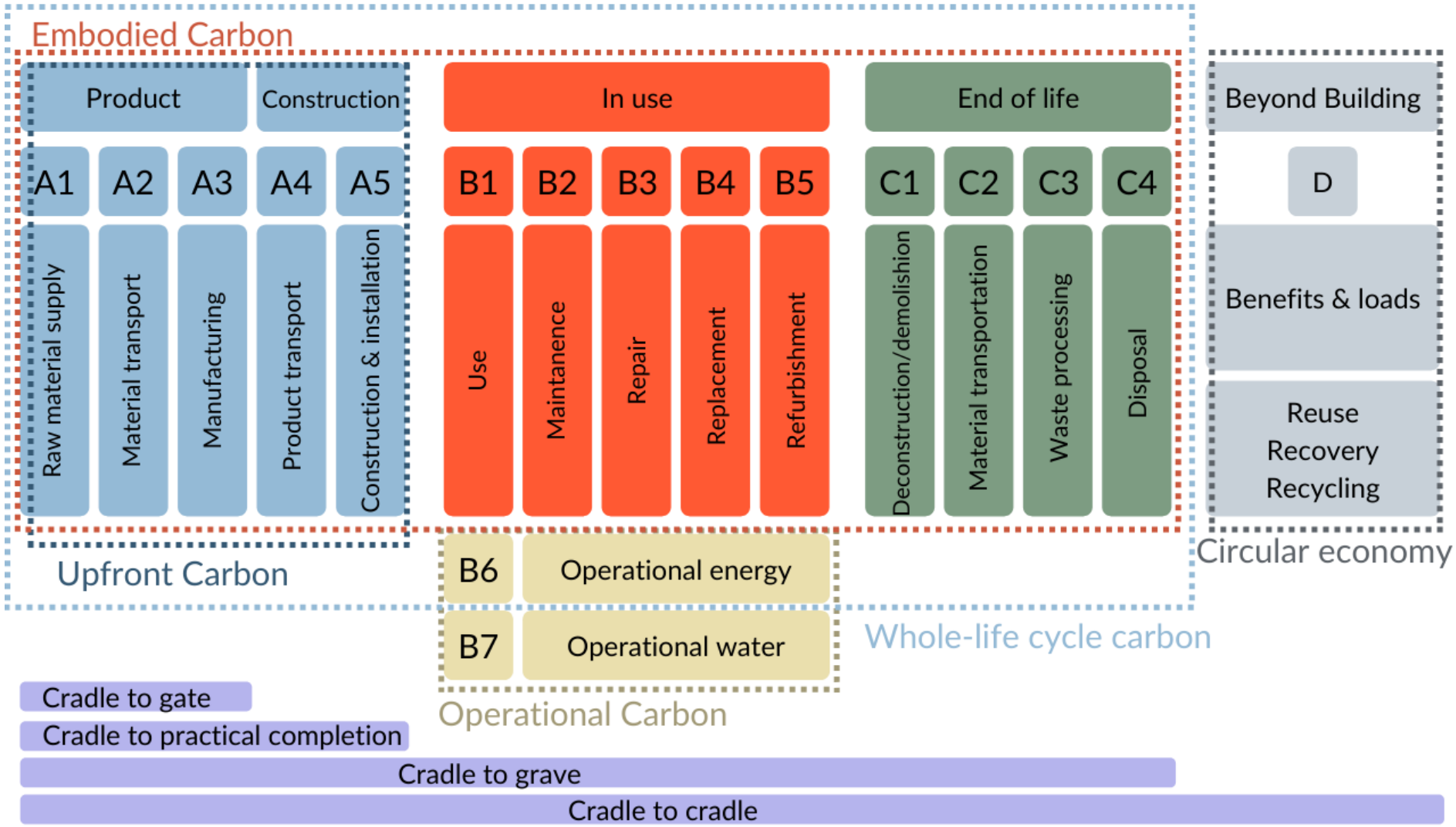
COLLABORATION FOR CHANGE



Deputy Lord Mayor Cr. Nicholas Reece

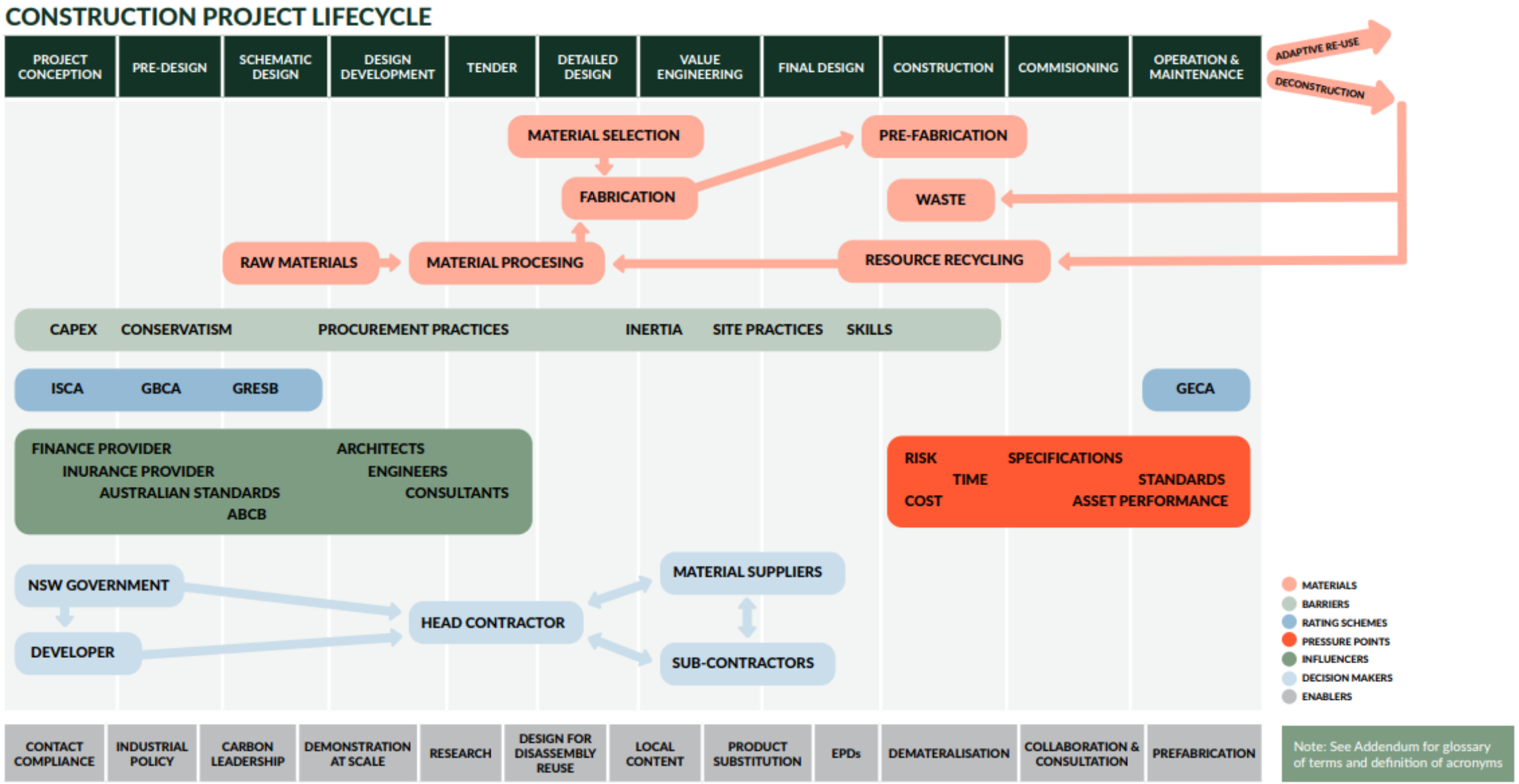
Sustainable Buildings Portfolio Chair Cr. Elizabeth Doidge

The Queen Victoria Market Renewal project in Melbourne is City of Melbourne's first project to measure and reduce and publicly report on embodied carbon.



Ref: BS EN 15978:2011 Sustainability of construction works. Assessment of environmental performance of buildings. Calculation method - European Standards (en-standard.eu)

Systems Diagram – Decarbonising Construction Materials



Source: https://wwfint.awsassets.panda.org/downloads/wwf_decarbonising_building_and_construction_materials_report.pdf

Purpose of the Alliance

This collaboration of organisations comes together to drive reductions in embodied carbon in the building and construction industry. We seek to align with the Paris Agreement targets and principles of the circular economy and recognise that the building and construction sector is a complex ecosystem.

We will do this by:

- **Demonstrating the demand** and activating the supply of materials which meet the needs of net zero carbon goals.
- **Defining a best practice embodied carbon evaluation framework**
- **Knowledge sharing** through best practice education, case studies, myth-busting, demonstrations, and supporting innovation in materials and processes as part of a pre-competitive approach.
- **Developing common language** for design specifications, procurement guidelines and tendering criteria as standard practice for government agencies and companies.
- Helping to manage industry's **climate transition risks, risks associated with adopting innovative materials** and the required skills development.
- **Supporting materials** such as steel, cement and concrete, and aluminium **to reduce their carbon intensity** and giving **visibility to other low carbon and innovative materials incl Engineered Timber & Services/Systems** in the built environment.

What we do

“Do Tank”

- Each Working Group (WG) is chaired and co-chaired by an industry representative and meet monthly.
- Project Control Group (PCG) & Project Leadership Group (PLG) meetings.
- Governance protocol.
- Monthly newsletter, as well as our website– www.mecla.org.au

WG1 - Demand Signal

Send a clear demand signal for low/no embodied carbon materials.

WG2 - Evaluation

Document current approaches to embodied carbon benchmarking.

WG3/4 Knowledge and Language

Enable expansion of knowledge and capabilities in the sector.

Materials Working Groups - Accelerating the Supply Side

WG5a
Steel

WG5b
Concrete/ Cement

WG5c
Aluminium

WG5d
Other Materials

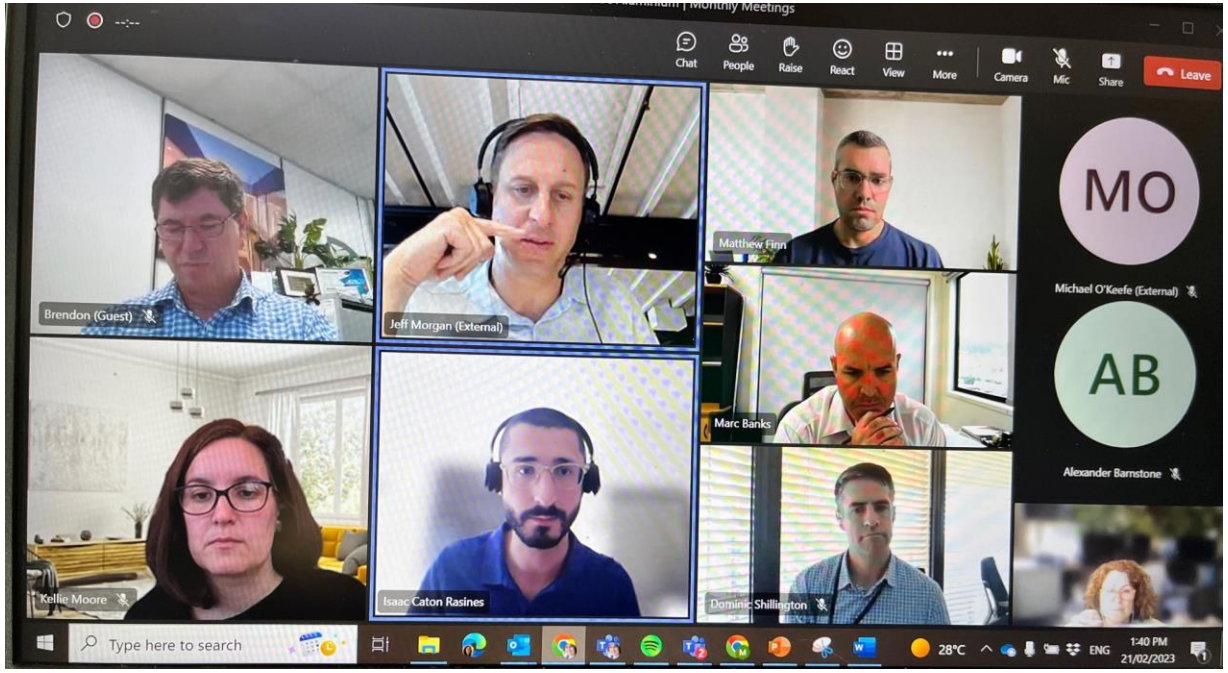
WG5e
Building Services

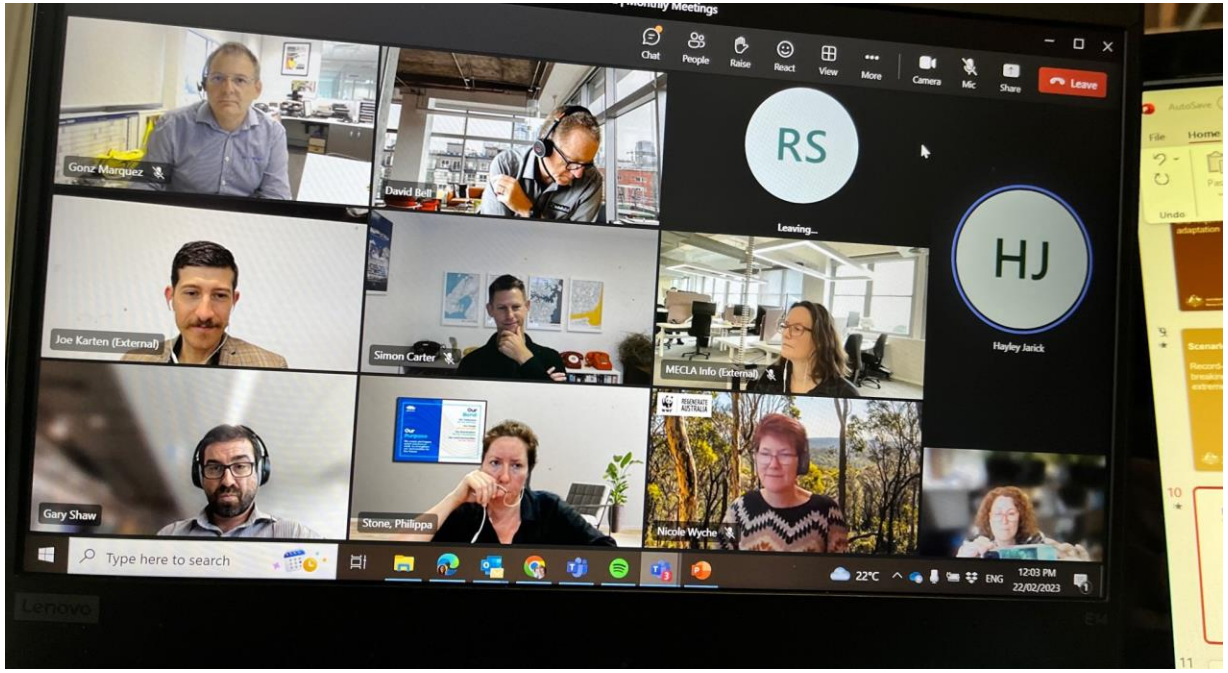
WG5f
Engineered Timber

Evaluate the (technical / funding / standards / capacity) barriers facing industry sectors and possible mechanisms and timeframes for Australian-based companies to overcome these to achieve significant emissions reduction per unit of output.

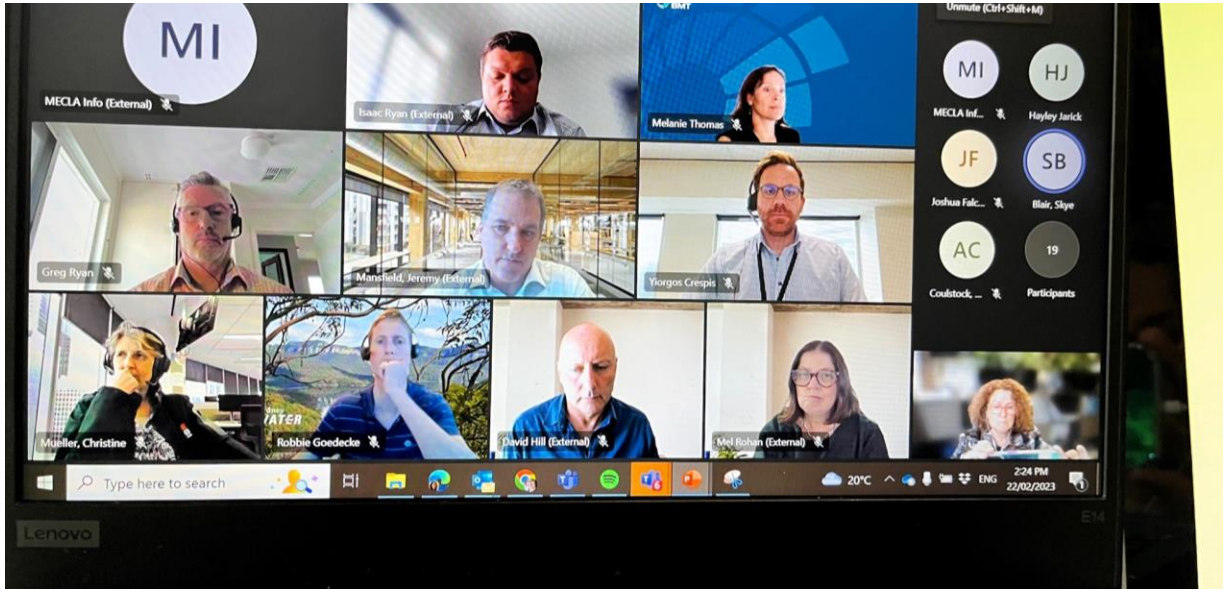
WG6 - Residential

Identify barriers and opportunities for decarbonisation for residential housing development.


Chat
People
Raise
React
View
More
Camera
Mic
Share
Leave
Brendon (Guest)
Jeff Morgan (External)
Matthew Finn
Marc Banks
Kellie Moore
Isaac Caton Rasines
Dominic Shillington
MO
Michael O'Keefe (External)
AB
Alexander Barnstone
Type here to search
28°C
ENG
1:40 PM
21/02/2023


Chat
People
Raise
React
View
More
Camera
Mic
Share
Leave
Gonz Marquez
David Bell
RS
Leaving...
Joe Karten (External)
Simon Carter
MECLA Info (External)
HJ
Hayley Jarick
Gary Shaw
Stone, Philippa
Nicole Wyche
Type here to search
22°C
ENG
12:03 PM
22/02/2023


Meeting now
People
Raise
React
View
More
Camera
Mic
Share
Leave
KB
JD
NP
SB
DF
HA


MI
MECLA Info (External)
Isaac Ryan (External)
Melanie Thomas
Greg Ryan
Mansfield, Jeremy (External)
Yiorgos Crespis
Mueller, Christine
Robbie Goedecke
David Hill (External)
Mel Rohan (External)
Unmute (Ctrl+Shift+M)
MI
MECLA Inf...
HJ
Hayley Jarick
JF
Joshua Falc...
SB
Blair, Skye
AC
Coulstock, ...
19
Participants
Type here to search
20°C
ENG
2:24 PM
22/02/2023
Lenovo


VISITOR
NO
ENTRY

Pledge Pre-requisite Policy

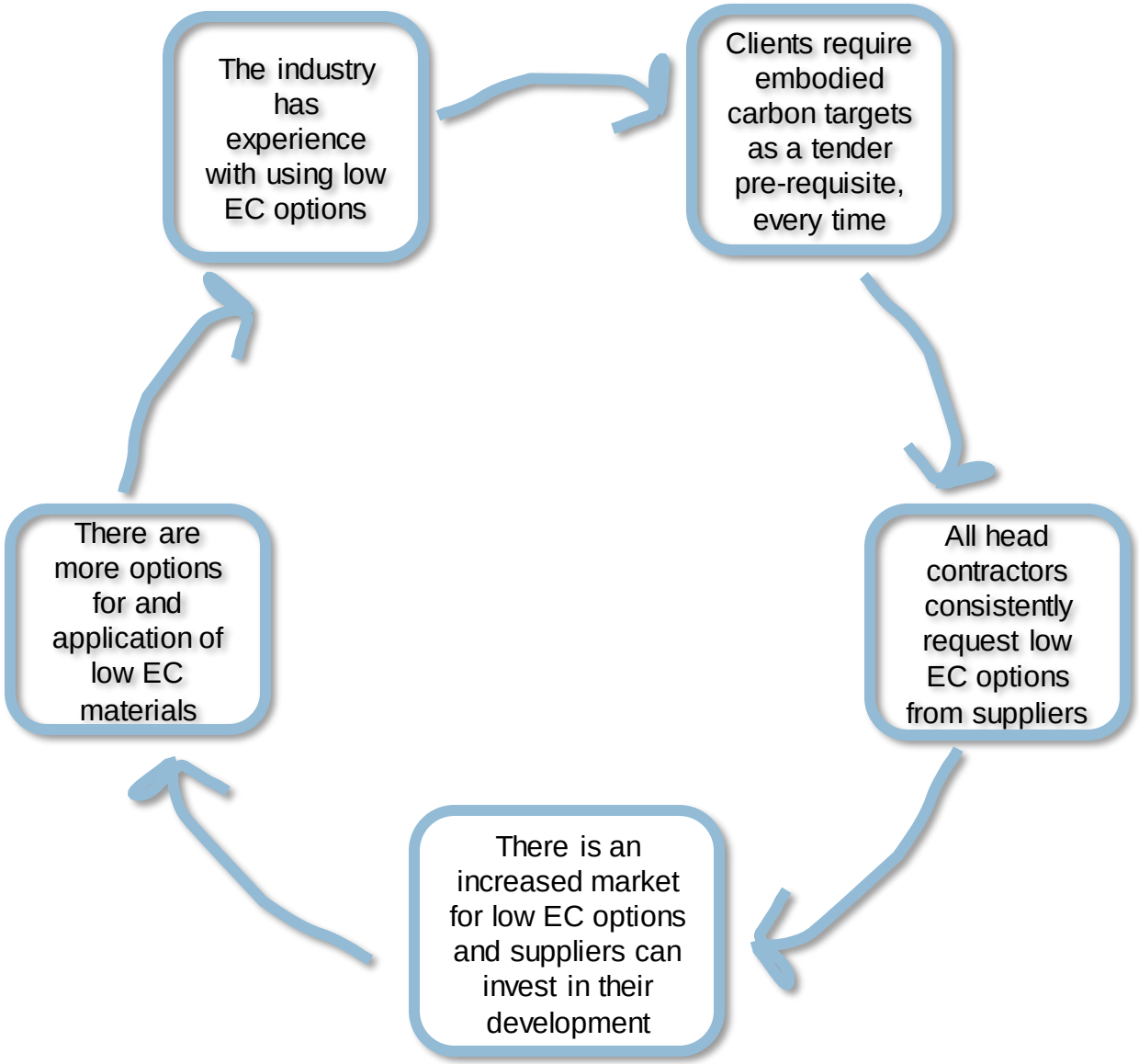
A proposal for policy makers to consider to drive demand for low embodied carbon materials

Prepared by members of MECLA

March-December 2022

MECLA

‘The Pledge’ seeks to drive consistent demand



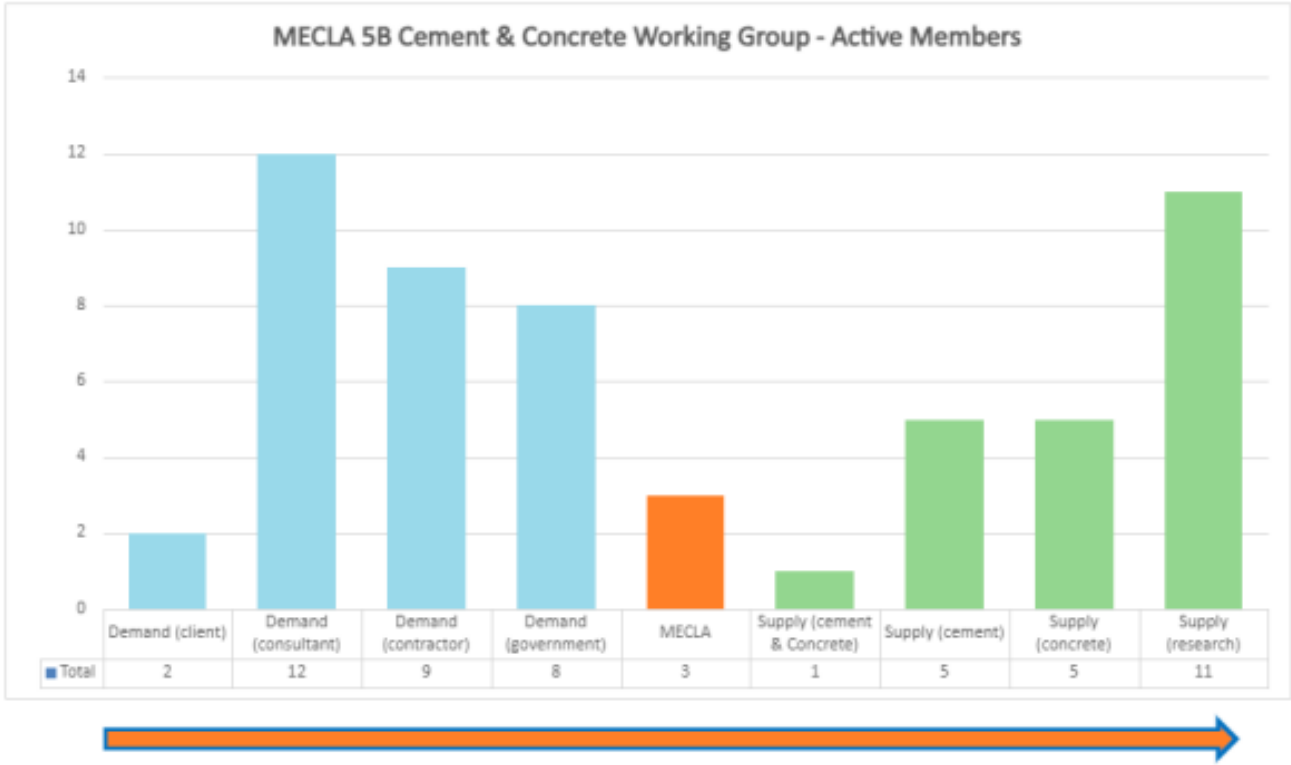
Working group 5B

Co-Chairs:

- Ali Kashani UNSW - Senior Lecturer (Assistant Professor)
- Evan Smith Holcim - National Sustainably Lead

Purpose:

- Concrete & Cement working group
- Approximately 50 active members across the supply chain.
- Approximately 50:50 split between demand side and supply side
- Active participation is required to maintain involvement
- Concrete supply chain is complex and multifaceted
- The road map to zero requires levers involvement both the supply and demand side of the supply chain



Scope 3 emissions: We are ready to move with our supply chain

TASK 2: USES IN CONSTRUCTION?

MECLA

What is aluminium used for in the built environment?

What % does this 'secondary' market make up over the entire construction sector?

Is this where the demand will come from? ...is this where we should target?


Perforated Screens


Window Systems


Sliding Doors


Balustrades


Louvres


Cladding


Fencing


Window Systems


Sun Screens / Shading


Unitised Facades

TASK 3: DOMESTIC PRODUCTION MARKET

MECLA

Billet Suppliers

%?

RioTinto

ALCOA

%?

Australian Extruders

G.JAMES

CAPRAL ALUMINIUM

alspec ALUMINIUM SYSTEMS SPECIALISTS

ULLRICH ALUMINIUM

extrusions australia

%?

Small to Medium Projects - Typically Australian made?

Extrusion
Sheet
Plate
Window Systems
Door Systems
Facades
Balustrades
Sun Shading
Louvres

TASK 3: DOMESTIC PRODUCTION MARKET

MECLA

Who are the key primary / secondary aluminium manufacturers?

What do they see at the biggest opportunity for / challenge to low carbon aluminium in Australia?

What are their capabilities to produce low carbon aluminium / recycled aluminium?

Primary Market

Secondary Market

TASK 5: OVERSEAS MARKET BENCHMARKS

MECLA

Hydro CIRCAL® Recycled Aluminium

Hydro REDUXA® Low-Carbon Aluminium

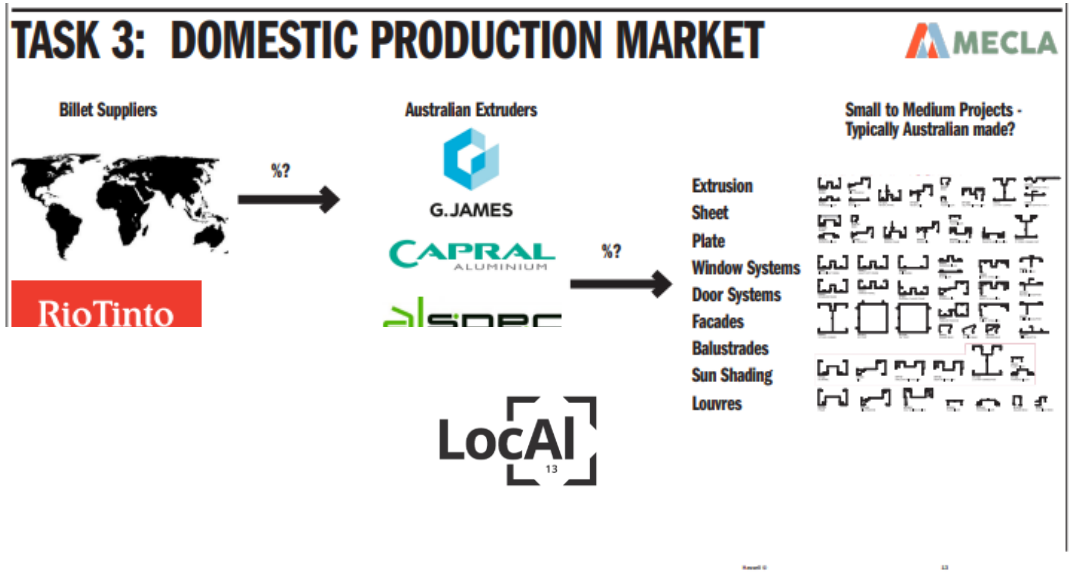
A good model - but means that 90% of the circal billet is supplied directly to their subsidiary... very little left for the rest of the market

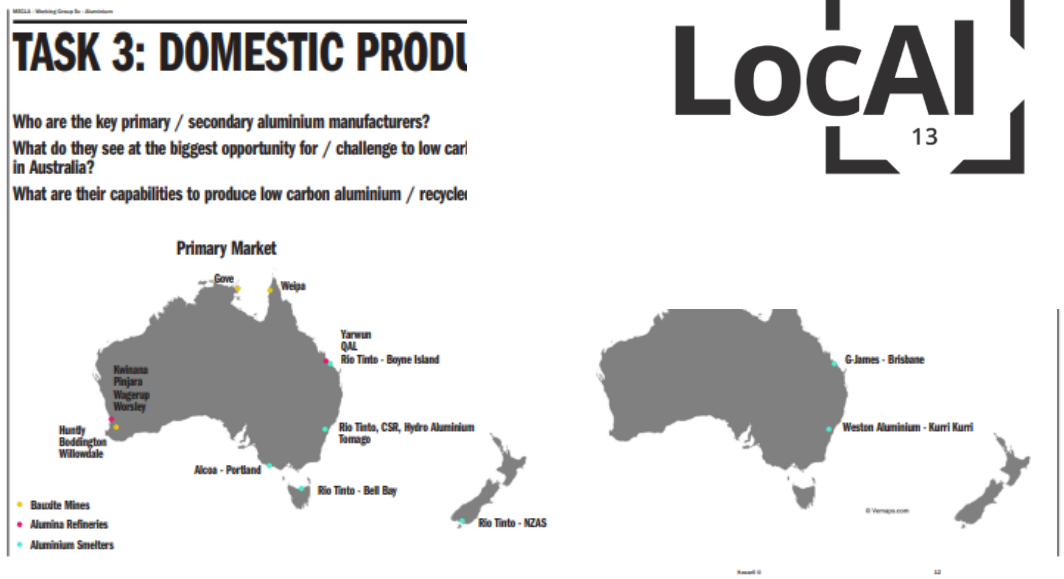
90% of Circal Billet

WICONA® By Hydro

Hydro owned subsidiary

MILESTONE REACHED FOR WICONA AS A PART OF HYDRO - 100+ LARGE BUILDING PROJECTS WORLDWIDE WITH HYDRO CIRCAL ALUMINIUM





LocAl 13

Introducing LocAl

LocAl® Aluminium is our new market offer of locally extruded, lower-carbon aluminium for projects in construction, engineering, marine, transport, defence, renewable energy or general fabrication industries.

A good model - but means that 90% of the circal billet is supplied directly to their subsidiary... very little left for the rest of the market

Government as a *driver* of change

- Procurement policies that reward and require embodied carbon reductions through low emission construction materials and practices.
- *Race to the top*

Government as an *enabler* of change

- Supporting the development of required tools, such as taxonomy laws, inventories and calculators and an independent carbon database.
- Supporting skills development of professions, trades and researchers.
- Supporting the development of circular economy structures.

Financial Supporters

Proudly funded by:

NSW Government

Government of South Australia

Founding Partners

Members

Managed by:

CLIMATEKIC Australia

Presync

WWF

Who we are - MECLA Secretariat

Hudson Worsley
MECLA Chair

Presync

Monica Richter
MECLA Project Director

WWF

Kathy Verheyen
MECLA Project Manager

CLIMATE KIC AUSTRALIA

Alexi Barnstone
MECLA Project Officer

CLIMATE KIC AUSTRALIA

Speakers and Presenters

Susan Kreemer Pickford
General Manager, Engineers Australia

Monica Richter
Program Director, MECLA

Ross Donaldson
WA-based architect and lecturer

Dena Jacobs
Executive Director, Infrastructure NSW

David Kelly
A/Director Engineering, -Sustainable Infrastructure Program, TfNSW

Tyrel Momberg
Technical Manager, IS Council

Linda van Achterbergh
Sustainability Manager, Public Transport Authority

Greg Ryan
Sustainability Manager, Development WA

Mark Taylor
Sustainability Manager, Hesperia

Speakers and Presenters

Susan Kreemer Pickford
General Manager, Engineers Australia

Monica Richter
Program Director, MECLA

Ross Donaldson
WA-based architect and lecturer

Dena Jacobs
Executive Director, Infrastructure NSW

David Kelly
A/Director Engineering, -Sustainable Infrastructure Program, TfNSW

Tyrel Momberg
Technical Manager, IS Council

Linda van Achterbergh
Sustainability Manager, Public Transport Authority

Greg Ryan
Sustainability Manager, Development WA

Mark Taylor
Sustainability Manager, Hesperia

Infrastructure NSW

Government decision making and decarbonising infrastructure delivery

Dena Jacobs, Executive Director, Strategy, Planning & Innovation, Infrastructure NSW

David Kelly, A/ Director Engineering Sustainable Infrastructure Program, Infrastructure & Place, Transport for NSW

26 June 2023

Image: NorthConnex, March 2022, Transport for NSW

Decarbonising Infrastructure Delivery

Industry feedback

INSW hosted six industry roundtables and invited other iBodies.

Key takeaways were:

- **Consistent carbon measurement** must be the priority.
- **Clear mandate and incentives** are needed to drive industry action.
- **Consider carbon very early in design** and engage with market.
- **Prescriptive specifications** can pose a barrier in the civil sector, alongside risk aversion.

INSW's Key Workstreams

1. **Whole of Government Policy:** to set a clear mandate and provide guidance to agencies on how to consider embodied emissions through project development

2. **Regulation (Protection of Environment Policy):** to require infrastructure projects to report embodied emissions and maximise the use of recycled materials

3. **Measurement:** Consistent approach to measuring embodied emissions across public infrastructure in NSW and ideally nationally

We are working as one NSW Government

- **Joint Roadmap with Transport:** Integrated roadmap of milestones released to provide industry the clarity sought on policy mandate and direction.

https://www.infrastructure.nsw.gov.au/media/3821/decarbonising-infrastructure-delivery-roadmap.pdf

Implement across Transport for NSW portfolio

Operational changes

- Sydney Trains first to transition to net zero
- Metro offsets 100% of its operational electricity
- Zero Emission Buses

Modelling best practice

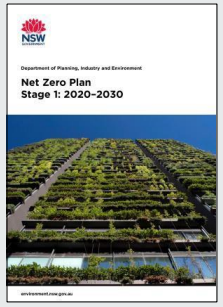
- Recycled glass
- Recycled concrete
- Reclaimed asphalt pavement

Sustainable Procurement

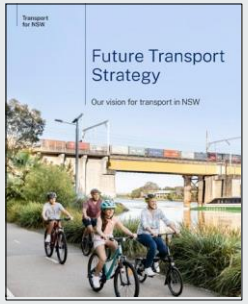
- Discussion paper
- Industry consultation
- Codesign solutions with industry

Policy

NSW Net Zero Plan



Future Transport Strategy



NSW State Infrastructure Strategy

Sustainable Procurement in Infrastructure

Co-creating solutions to overcome industry-wide challenges

- Accelerated pilot program
- Driving change at scale
- Understanding supply chain barriers
- Two-phase engagement approach
- *Co-creating solutions with industry*
- Embedding sustainability into the full lifecycle of every project

Our co-creation workshops

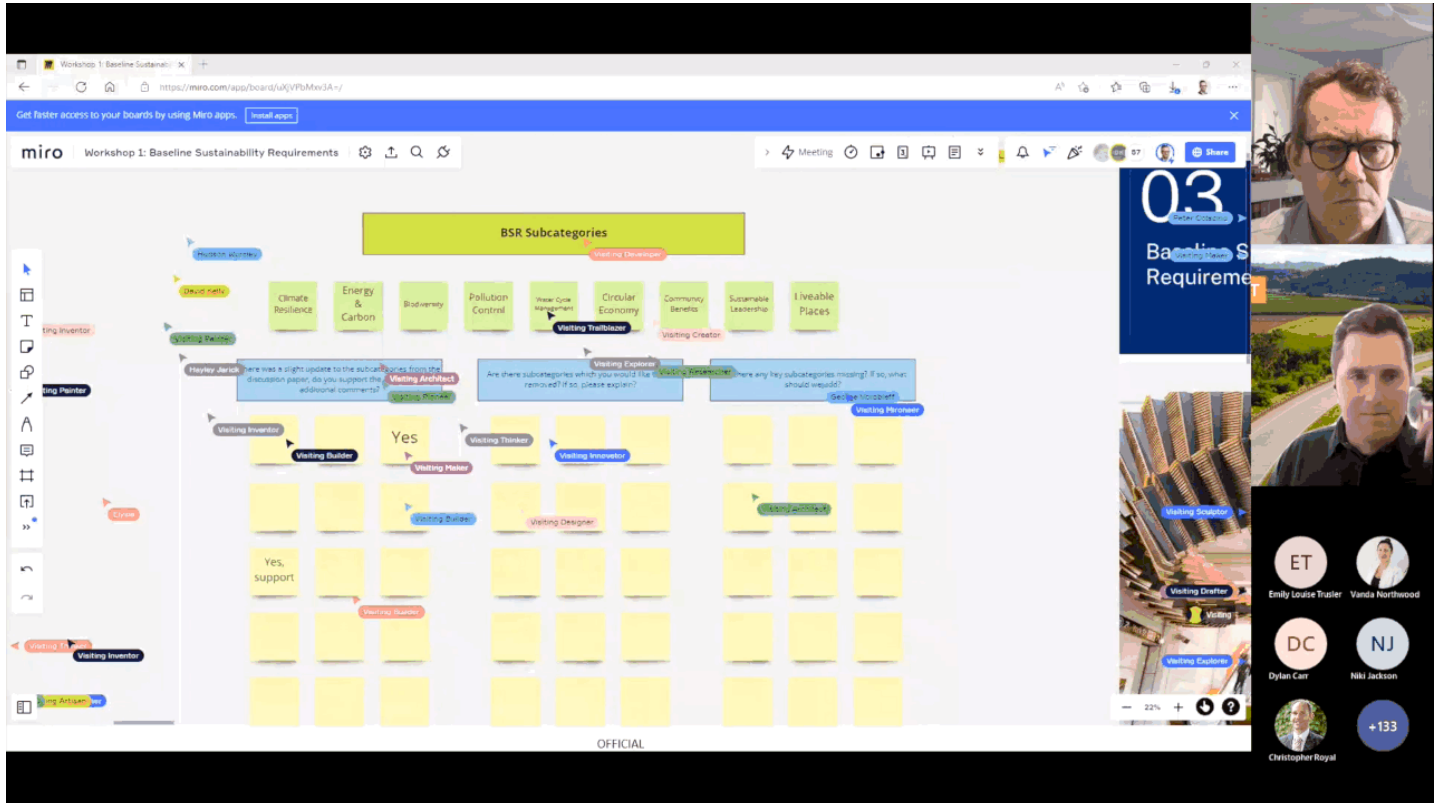
Workshop 1:
Baseline Sustainability Requirements

Workshop 2:
Roadmap to net zero infrastructure at Transport

Workshop 3:
Design for decarbonisation and circularity

Workshop 4:
Environmental sustainability – standards and specifications

Workshop 5:
Education, capability building and sustainability



Industry Engagement Workshop Report

- All content from the co-creation workshops collated into an Industry Workshops Engagement Report that was released on 20th December 2022
- **Over 370 attendees representing 135+ organisations engaged in the process**
- The document outlines a series of **priority actions** which are being progressed
- **Priority actions** integrated into the Transport for NSW and INSW integrated 2026 Decarbonising Infrastructure Delivery Roadmap

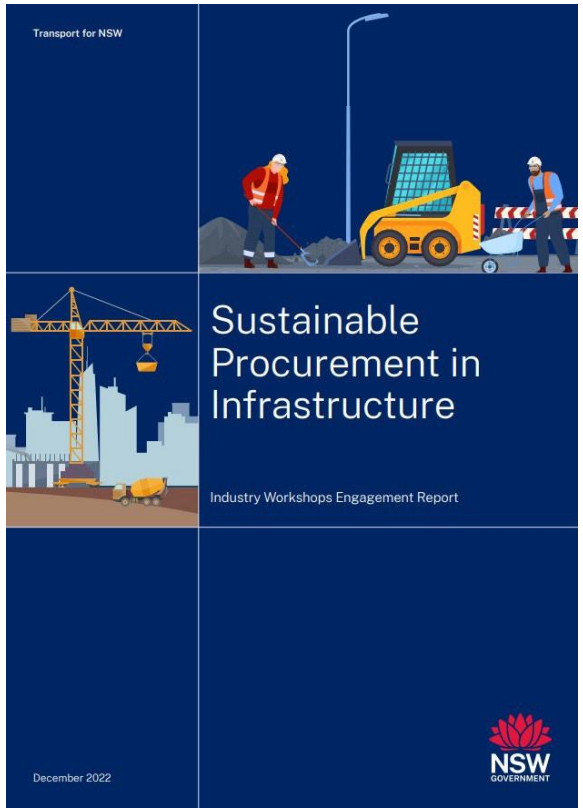
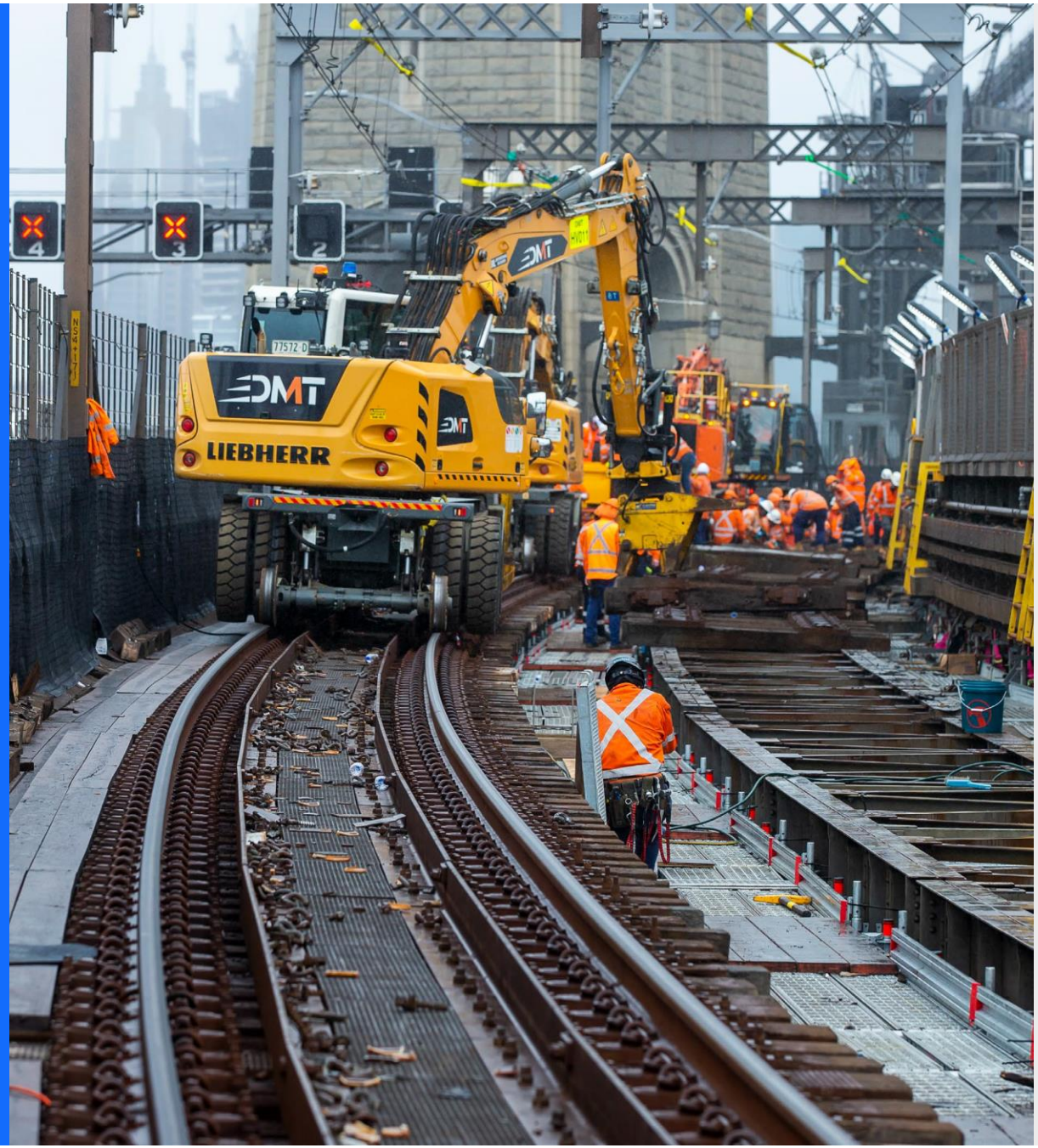


Image: The Sustainable Procurement in Infrastructure Industry Workshops Engagement Report was released on the 20th December 2022



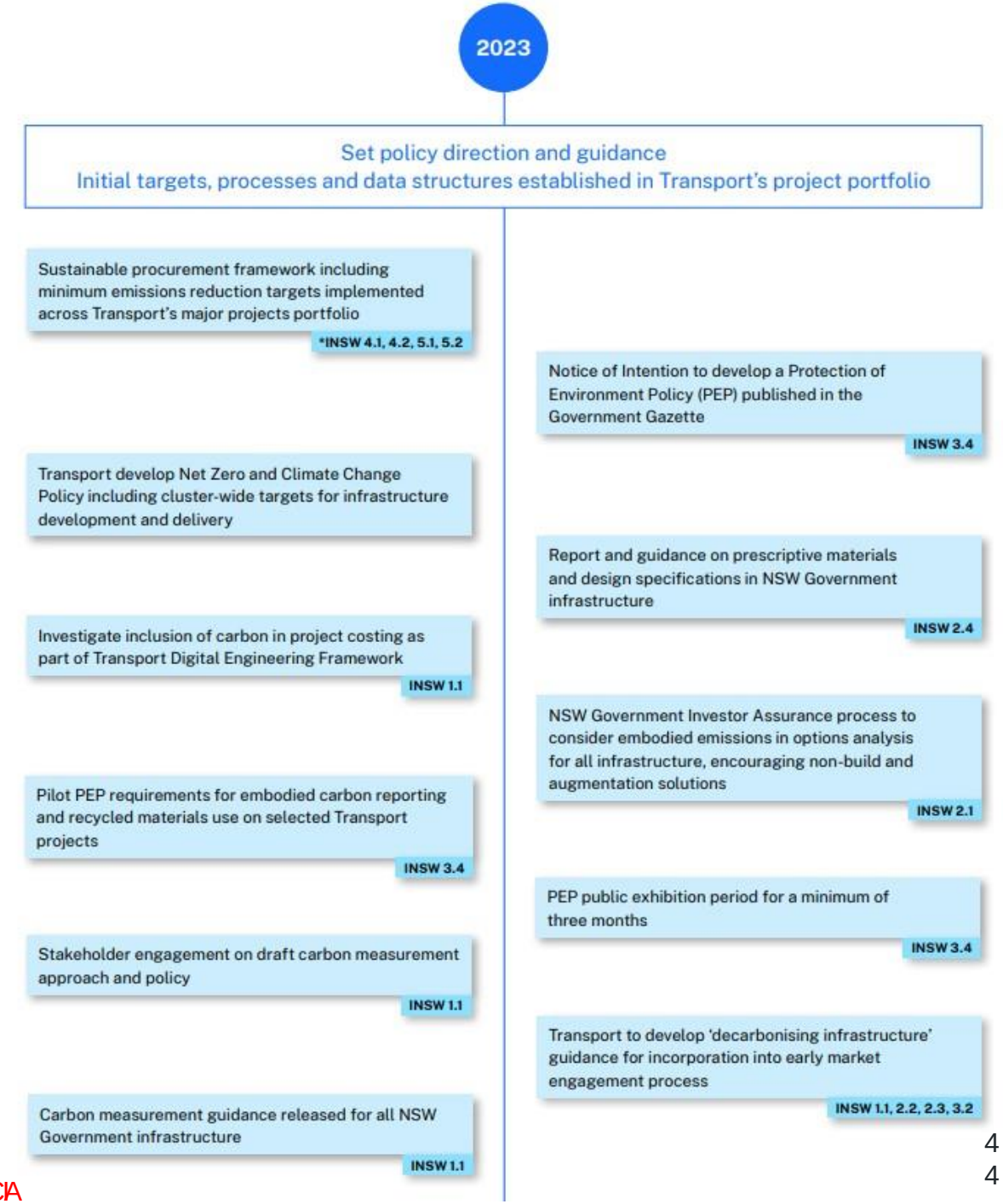
Our co-creation workshops

Key themes industry raised

- Requirements and measures
- Management and consistency
- Materials and design
- Capability and skills

Transport's integrated roadmap with INSW

- 2026 Decarbonising Infrastructure Delivery Roadmap with Infrastructure NSW (INSW) launched
- Sustainable procurement framework including minimum emissions reduction targets implemented across Transport's major projects portfolio
- Transport to develop 'decarbonising infrastructure' guidance for incorporation into early market engagement process
- Drive decarbonisation in infrastructure with our industry partners



The Challenge

Carbon Management in Infrastructure

- Leaders such as High Speed 2 (program) and National Highways UK (portfolio) have moved to a certified Carbon Management System
- A need to shift the conversation to carbon management, not just quantification
- Transport has a public commitment to move our portfolio to a certified Carbon Management System set out in the 2026 Decarbonising Infrastructure Delivery Roadmap
- New and different obligations will be set for Asset Owners/Managers, Designers, Constructors and the broad supply chain

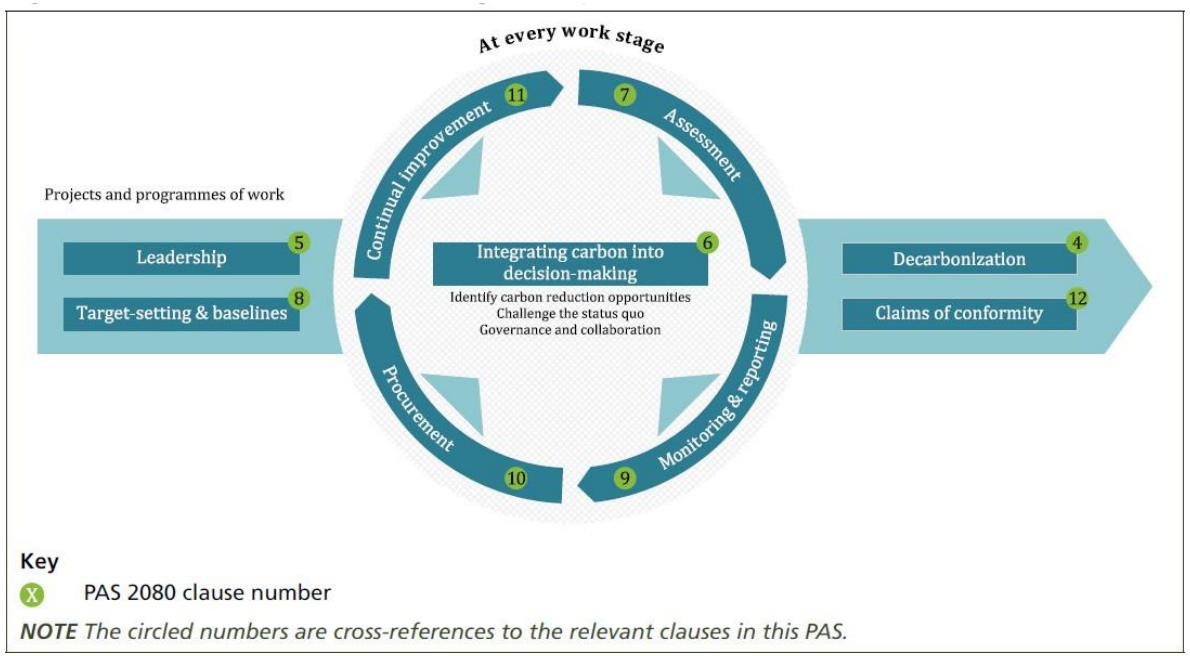


Image: The carbon management process as defined in PAS 2080 (BSI Standards).

Transport's path to decarbonising infrastructure

Key actions on the Transport/INSW roadmap

- A need to get the fundamentals right defining consistent **whole life** assumptions
- **Linking cost, carbon and engineering design:** Cost, 'base carbon', and specifications build up aligned to PAS2080
- Carbon to be a core component along with cost, schedule, risk, and other project functions
- Contractors to produce **quantified decarbonisation plans** analogous to cost plans, using assured lower carbon alternatives from a central library

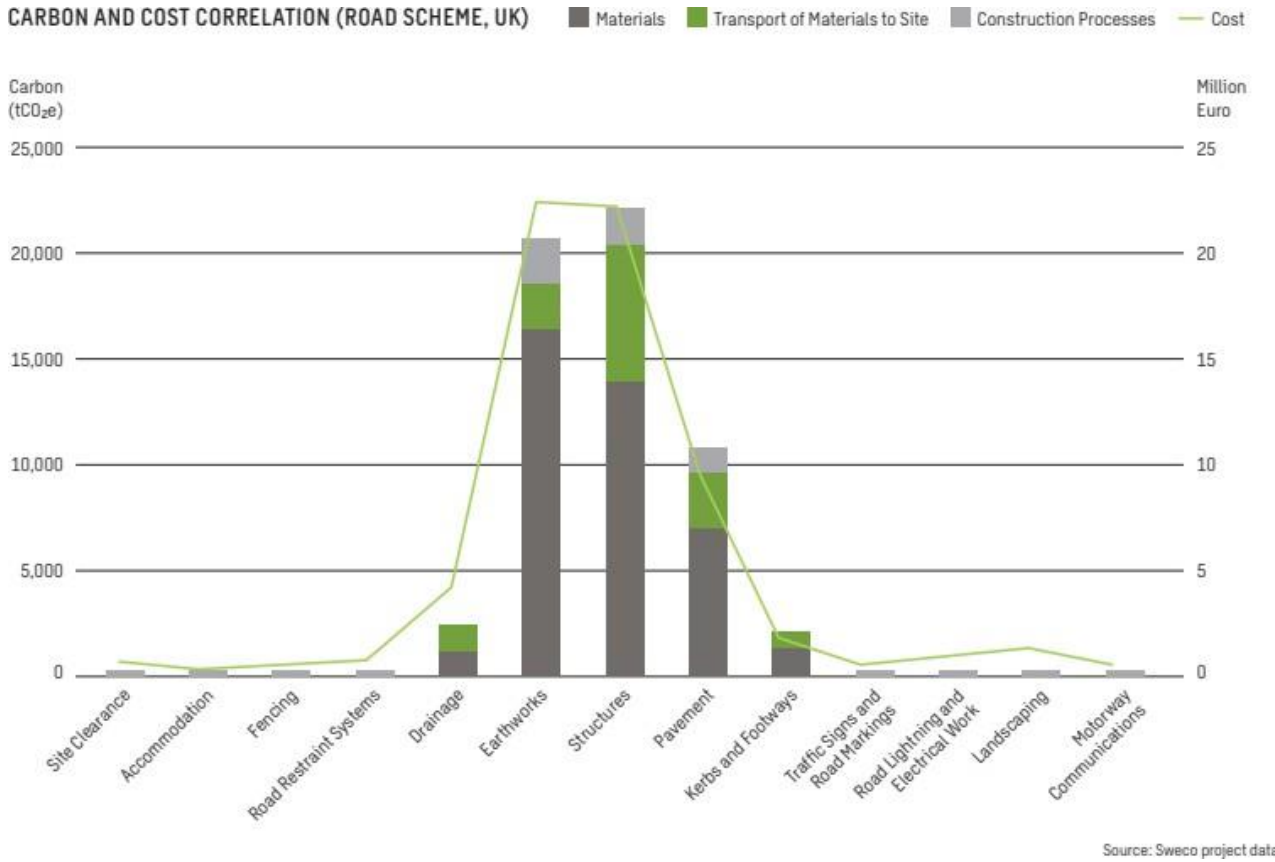


Image: Idealised outputs from carbon cost management applied to a road project in the UK (source Sweco)

Transport's path to decarbonising infrastructure

Key actions on the Transport/INSW roadmap

- Civil standards and specifications will h
  'base carbon' at an item level (specifica

Transport develop consistent carbon footprint models by asset type that utilise historical data to inform early decision making

INSW 1.1, 2.2, 2.3, 3.2

- Carbon intensity thresholds form the b
  net zero trajectory

Apply upper carbon thresholds for standards, specifications and technical requirements on key Transport projects

INSW 1.1

- After delivering a **robust and assured whole life** carbon Management System TfNSW has a commitment to incentivise lower carbon outcomes

Incentivise lower carbon and circularity outcomes on Transport's projects

INSW 4.1, 4.2, 5.1, 5.2

- Key: *continue to work with our industry partners*

Image: Extracts from the 2026 Decarbonising Infrastructure Delivery Roadmap

Speakers and Presenters

Susan Kreemer Pickford
General Manager, Engineers Australia

Monica Richter
Program Director, MECLA

Ross Donaldson
WA-based architect and lecturer

Dena Jacobs
Executive Director, Infrastructure NSW

David Kelly
A/Director Engineering, -Sustainable Infrastructure Program, TfNSW

Tyrel Momberg
Technical Manager, IS Council

Linda van Achterbergh
Sustainability Manager, Public Transport Authority

Greg Ryan
Sustainability Manager, Development WA

Mark Taylor
Sustainability Manager, Hesperia

IS Rating Scheme & Embodied Carbon

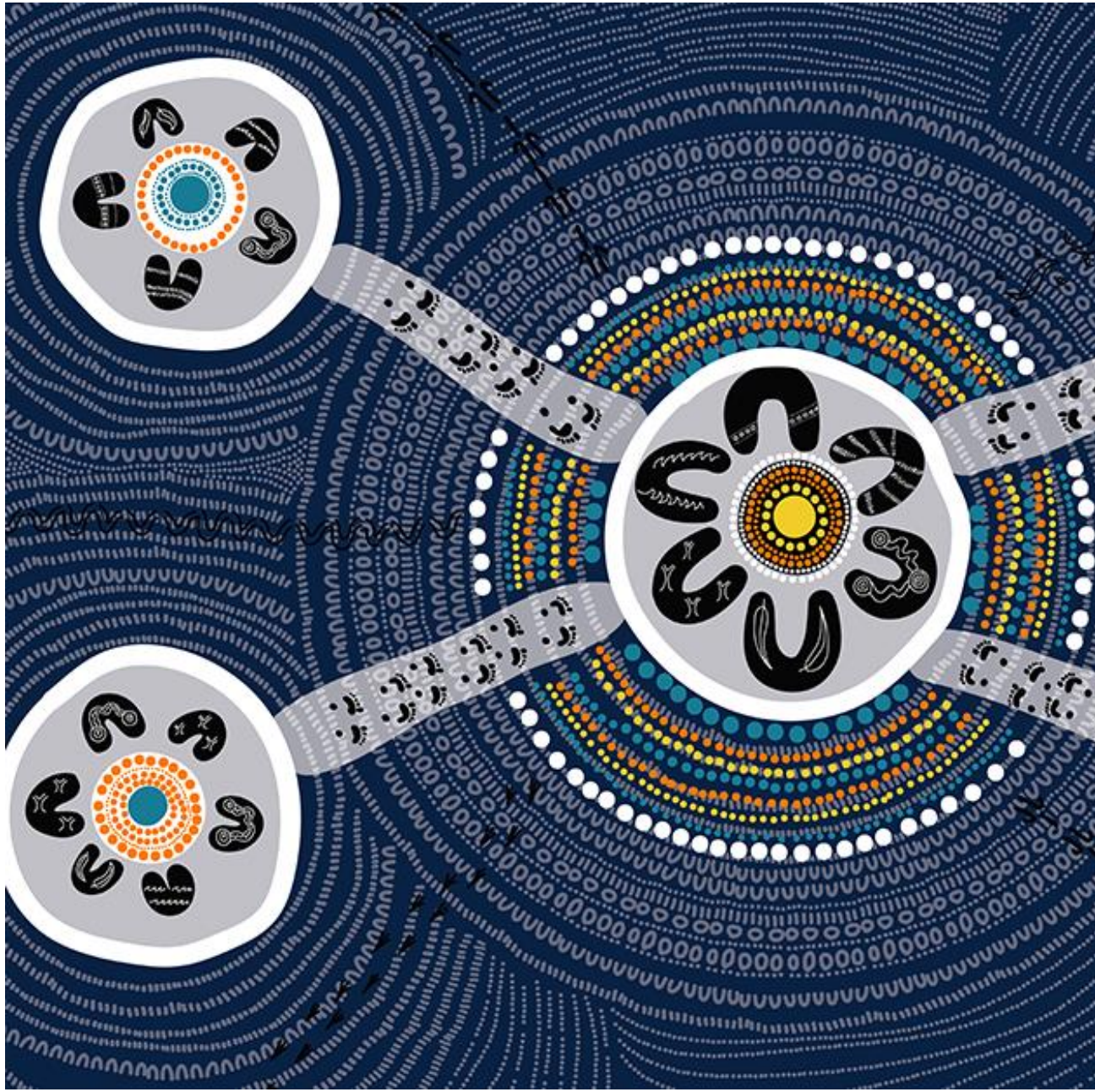
MECLA WA event 26th June, 2023

Acknowledgement of Country

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

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

Tēnā koutou katoa to our attendees in New Zealand.



ISC Products and Services

Events
Conferences
Awards

Thought Leadership
Case Management
Publications

The IS
Rating
Scheme

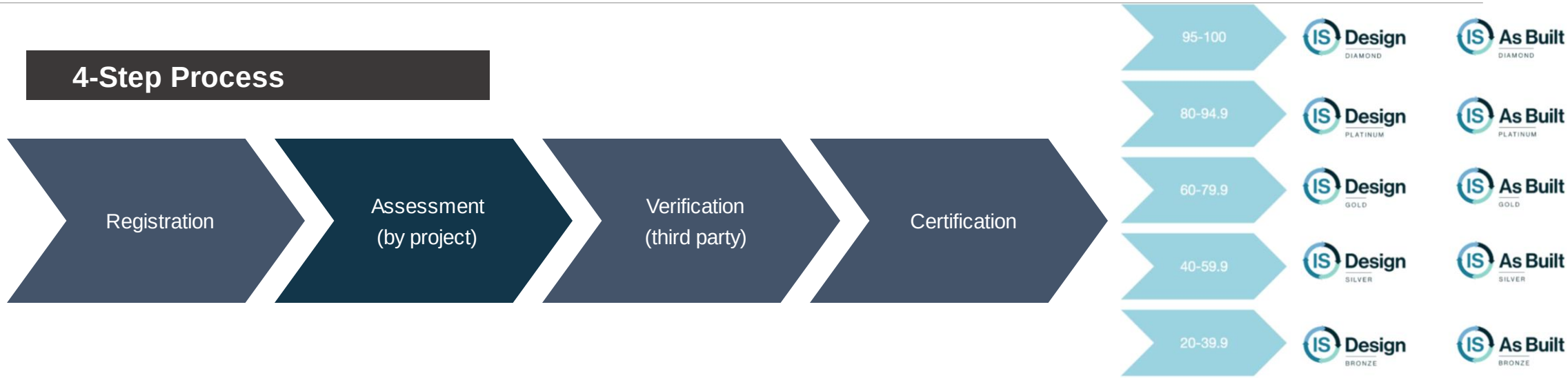
Partnerships
Influence
Leadership

Training
Accreditation
Development

How IS ratings work

Whole of life consideration

4-Step Process



IS ratings: Quadruple bottom line impact

IS rating categories and credits are aligned with the Sustainable Development Goals to foster impact using a systems approach.

Governance	Environment	Social	Economic
Place	Energy & Carbon	Stakeholder engagement	Options Assessment & Business Case
Leadership & Management	Environmental Impacts	Legacy	Benefits Realisation
Sustainable Procurement	Resource Efficiency	Heritage	
Resilience	Water	Workforce Sustainability	
Innovation	Ecology		

Rating Scheme Traction Across ANZ

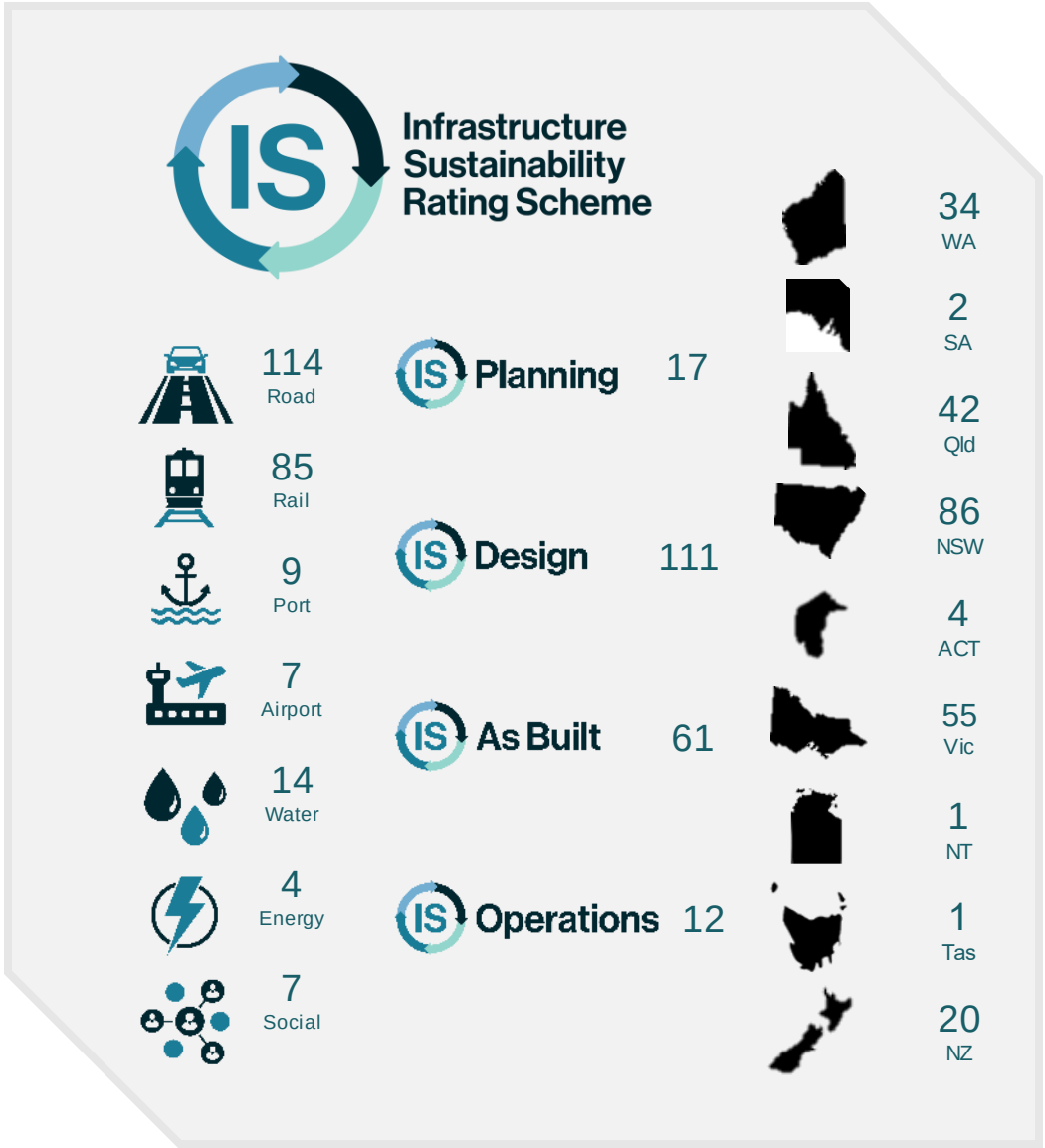
245 Active Ratings

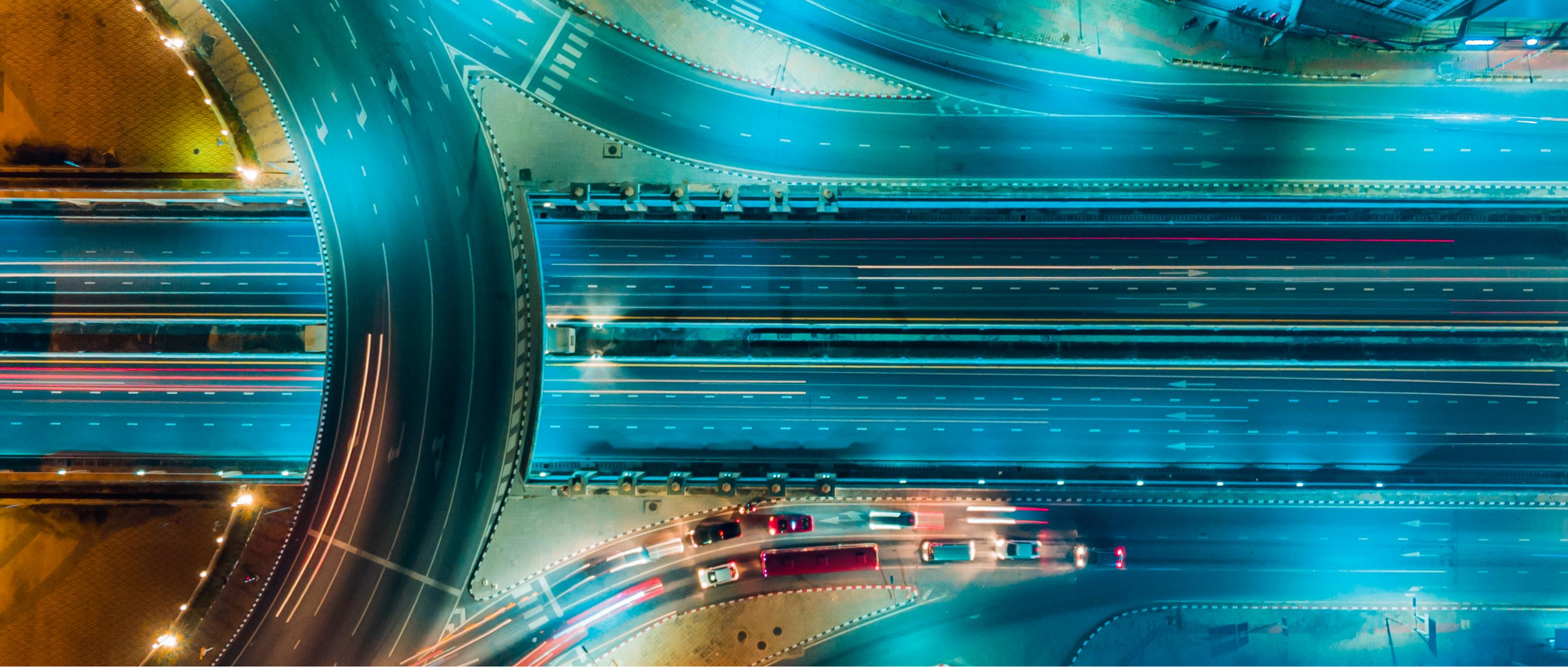
$190.30 Billion Capital

NZ Ratings

$21.80b

20 Ratings





Embodied Carbon in IS Rating Scheme

Embodied Carbon credits in Rating Scheme

IS Rating Tool – focus area	Relevant IS v1.2 Credits	Relevant IS v2.1 Credits
Sustainable procurement	• **Pro-1** Commitment to Sustainable Procurement • **Pro-2** Identification of Suppliers • **Pro-3** Supplier Evaluation and Contract Award • **Pro-4** Managing Supplier Performance	• **Spr-1** Sustainable Procurement Strategy • **Spr-2** Supplier Assessment and Selection • **Spr-3** Contract and Supplier Management
Options assessment		• **Ecn-1** Options Assessment and Significant Decisions

IS Rating Tool – focus area	Relevant IS v1.2 Credits	Relevant IS v2.1 Credits
Materials use and Resource efficiency	• **Mat-1** Materials lifecycle impact measurement and reduction • **Mat-2** Environmentally labelled products and supply chains	• **Rso-1** Resource strategy development • **Rso-6** Material life cycle impact measurement and management • **Rso-7** Sustainability Labelled Products and Supply Chains
Innovation	• **Inn-1** Innovation strategies and technologies	• **Inn-1** Innovation
Energy and Carbon		• **Ene-3** Offsetting

IS Materials Calculator

Infrastructure Sustainability Materials Calculator
23 March 2023

Charts >>

Release date: 23/03/2023
Original release date: 1/02/2018

	Base Case		GHG (t CO2-e)	IS EnviroPoints v2.0 (Pt)	Actual Case		GHG (t CO2-e)	IS EnviroPoints v2.0 (Pt)	Reductions	GHG (t CO2-e)		IS EnviroPoints v2.0 (Pt)	
Total			201.09	2,060.20			28.31	306.24		172.78	86%	1,753.96	85%
1 Component type:	Bridge				Bridge								
Sub-component type:	Road Bridge		201.09	2,060.20	Road Bridge		28.31	306.24		172.78	86%	1,753.96	85%
bridge span		km	Detail			km	Detail						
number of lanes		nr				nr							
2 Component type:													
Sub-component type:			-	-			-	-		-	0%	-	0%
			Detail				Detail						

Infrastructure Sustainability Materials Calculator

<< Home | Copy to Actual | Charts >>

Component 1: Asphalt | RM concrete | Precast concrete | Binders | Aggregates | Piping | Steel | Aluminium | Coatings | Timber | Glass | Plastics | Composites | Cabling | Chemicals | EPD (other)

Component:	Bridge	
Sub-component:	Road Bridge	
bridge span	0.00	km
number of lanes	0.00	nr

Total Materials + Transport Component 1: 201.1 2,060

per lane.km of road:

	GHG (t CO2-e)	EnviroPoints v2.0 (Pt)

Define component properties on 'Home' tab

Asphalt & bitumen

Asphalt products (modelled using generic data)	Amount	Unit	Transport mode(s)	Distance(s)	*Material related* GHG (t CO2-e)	*Material related* EnviroPoints v2.0 (Pt)	*Transport related* GHG (t CO2-e)	*Transport related* EnviroPoints v2.0 (Pt)
Hot mix asphalt, 5.25% virgin bitumen (5% RAP)	100	tonnes	Articulated Truck	100 km	6.1	105.5	0.7	7.7
Select asphalt type		tonnes	Select transport mode		0.0	0.0	0.0	0.0

Case Studies - Impact Report

Circular Economy Outcomes

		Tonnes	%
Sourcing / Use	Materials with sustainability credentials		70% of projects; range from <1% to 42% of material spend
	Recycled asphalt (RAP) content		7%
	SCM content in concrete		21%
	Recycled aggregate content		30%
Efficiency	Reduction in asphalt from base case	106,344	8%
	Reduction in concrete from base case	140,272	6%
	Reduction in steel from base case	402	<1%
Resource Outputs	Resources (waste) diverted from landfill	6,492,289	96%
	Spoil re-used on or off site	6,081,477	96%
	Material (inert & non-hazardous) reused or sent for further treatment	410,183	93%
	Office waste further processed	630	44%

Recycled aggregate includes crushed blast furnace slag, crushed concrete and masonry, crushed glass, recycled asphalt used as fill and general fill or spoil. Recycled aggregate content varied from 2% to 97% across the As Built projects, with an average of 30%.

The Parkes to Narromine section of the Inland Rail Project: *52% (2,580,586 tonnes) recycled aggregate used during construction. This $300 million rail project in NSW attained an Excellent IS v1.2 rating with a score of 72.2.*

Rooty Hill Station Upgrade: *97% use of recylced aggregate. This NSW Rail project acheived a leading IS v1.2 rating with a score of 87.5.*

Reduction in asphalt from the base case was 8% overall; however, this ranged widely across the projects. One project reduced asphalt use by more than 99%; two further projects used between 65% and 70% less asphalt.

Parkes Water Treatment Plant: *99% (12,330 tonnes) reduction in asphalt requirements. This $72 million water infrastructure project achieved a Leading IS v1.2 rating with a score of 83.*

Regency to Pym Project: *66,486 tonnes reduction in asphalt. This $354 million road project in South Australia attained a Gold IS v2.0 rating with a score of 66.7.*

Reduction in concrete from the base case was 6% overall, with the top performer achieving 71% reduction and the next two at 47% and 34% respectively.

Ipswich Motorway Upgrade (Rocklea to Darra): *34% (61,063 tonnes) reduction of concrete against projected base case.*

ACT Healthy Waterways: *47% (12,442 tonnes) reduction in concrete use. This $60million water infrastructure asset achieved an Excellent IS V1.2 rating. This project achieved an Excellent IS v1.2 rating.*

Resource Efficiencies

Resource Efficiencies across IS Certified As Built certified projects FY18-FY22 (60 projects)[1]

	FY18	FY19	FY20	FY21	FY22	ALL	ALL
Lifecycle materials emissions avoided (tCO2e)	29%	7%	5%	10%	16%	12%	1,004,131

THANK YOU!

Contact: Tyrel.Momberg@iscouncil.org

Speakers and Presenters

Susan Kreemer Pickford
General Manager, Engineers Australia

Monica Richter
Program Director, MECLA

Ross Donaldson
WA-based architect and lecturer

Dena Jacobs
Executive Director, Infrastructure NSW

David Kelly
A/Director Engineering, -Sustainable Infrastructure Program, TfNSW

Tyrel Momberg
Technical Manager, IS Council

Linda van Achterbergh
Sustainability Manager, Public Transport Authority

Greg Ryan
Sustainability Manager, Development WA

Mark Taylor
Sustainability Manager, Hesperia

Sustainability and decarbonisation in rail infrastructure projects

Linda van Achterbergh

Sustainability Manager

Public Transport Authority (PTA) / Office of Major Transport Infrastructure Delivery (OMTID)

Contents

1 | Context

METRONET

Program of rail projects adding 72 km of new passenger rail and 23 new train stations

Single largest investment in public transport in Perth

Projects < $100 million

Public Transport Authority

Projects > $100 million

OMTID

Office of Major Transport Infrastructure Delivery

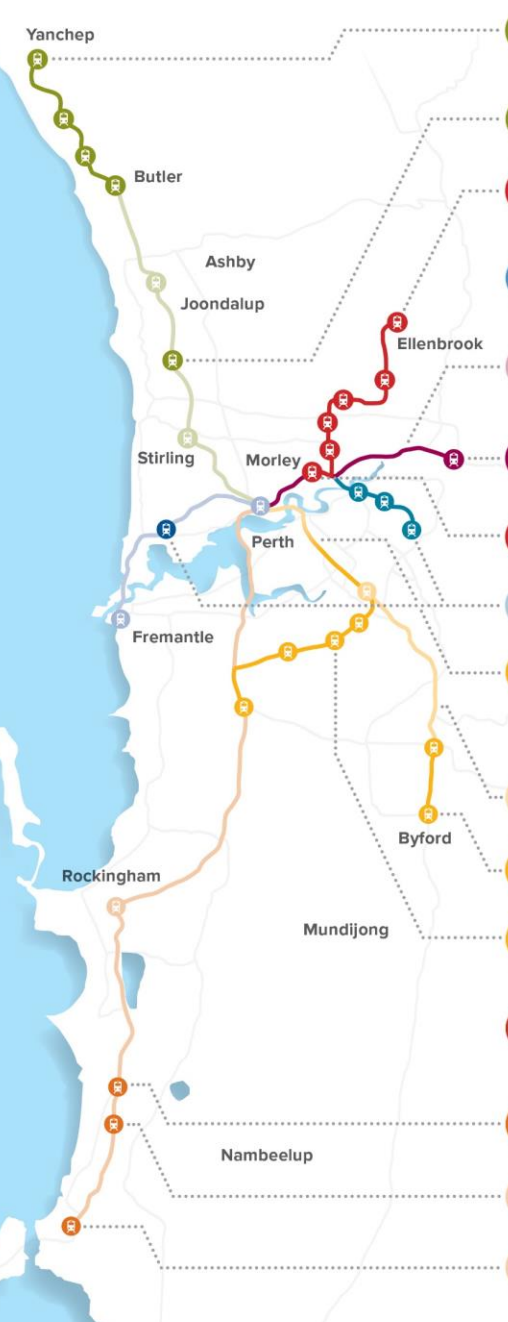
Public Transport Authority

mainroads WESTERN AUSTRALIA

Est May 2020 as centre of excellence for major transport project delivery, allowing a faster streamlined rollout

mainroads WESTERN AUSTRALIA

METRONET



Yanchep Rail Extension
14.5km extension with stations at Alkimos, Eglinton and Yanchep

Greenwood Station Multi-Storey Car Park

Morley-Ellenbrook Line
21.3km line with stations at Morley, Noranda, Malaga, Whiteman Park and Ellenbrook

High Capacity Signalling
Upgrades to the rail network's signalling and control systems to allow more trains to run more often

Caledonian Avenue Level Crossing Removal
Completed

New Midland Station
The new station, in a new location, to better integrate and connect the area

New Bayswater Station
New major station

Forrestfield-Airport Link
Completed

Victoria Park-Canning Level Crossing Removal
Elevated rail solution to remove level crossings at Mint Street, Oats streets, Welshpool Road, Hamilton Street and Wharf Street

Denny Avenue Level Crossing Removal
Completed

Byford Rail Extension
Extending the Armadale Line to Byford

Thornlie-Cockburn Link
First east-west connection with stations at Nicholson and Ranford roads in Canning Vale

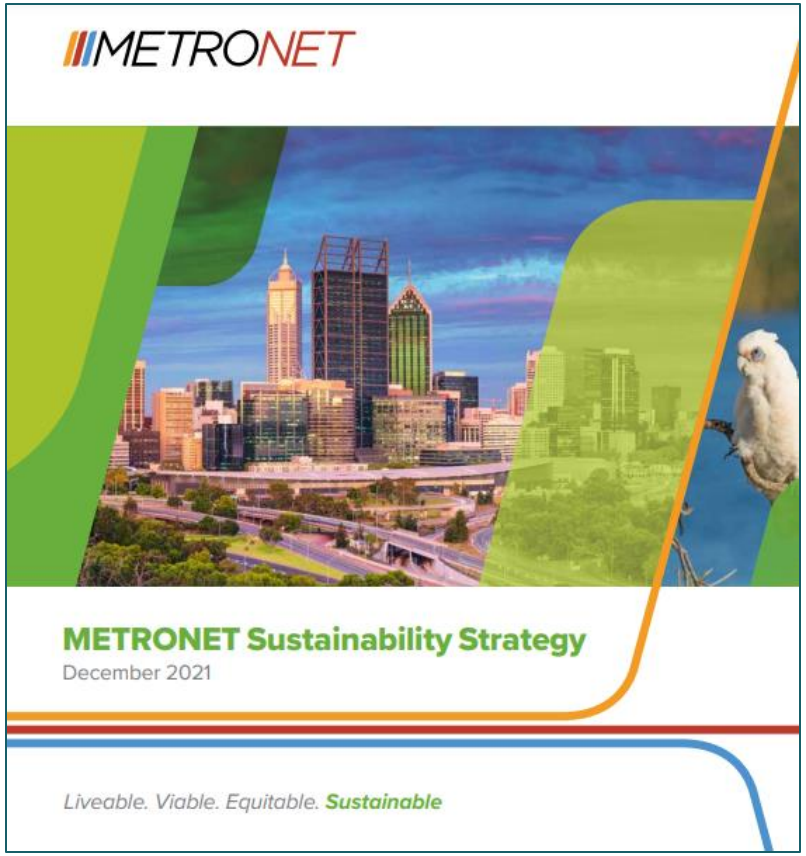
WA Railcar Program
246 new C-series railcars manufactured locally

Karnup Station
Future station on the Mandurah Line

Lakelands Station
Completed

Mandurah Station Multi-Storey Car Park
Completed

1 | Context


METRONET
METRONET Sustainability Strategy
December 2021
Liveable. Viable. Equitable. Sustainable


People & Place
Deliver adaptable, accessible and connected places for people
Equitable
Liveable
Sustainable
Economy
Support equitable economic development opportunities
Viable
Environment
Conserve and protect natural ecosystems and resources

METRONET

Yanchep Rail Extension

14.5km extension with stations at Alkimos, Eglinton and Yanchep

Morley-Ellenbrook Line

21.3km line with stations at Morley, Noranda, Malaga, Whiteman Park and Ellenbrook

New Bayswater Station

New major station

Victoria Park-Canning Level Crossing Removal

Elevated rail solution to remove level crossings at Mint Street, Oats streets, Welshpool Road, Hamilton Street and Wharf Street

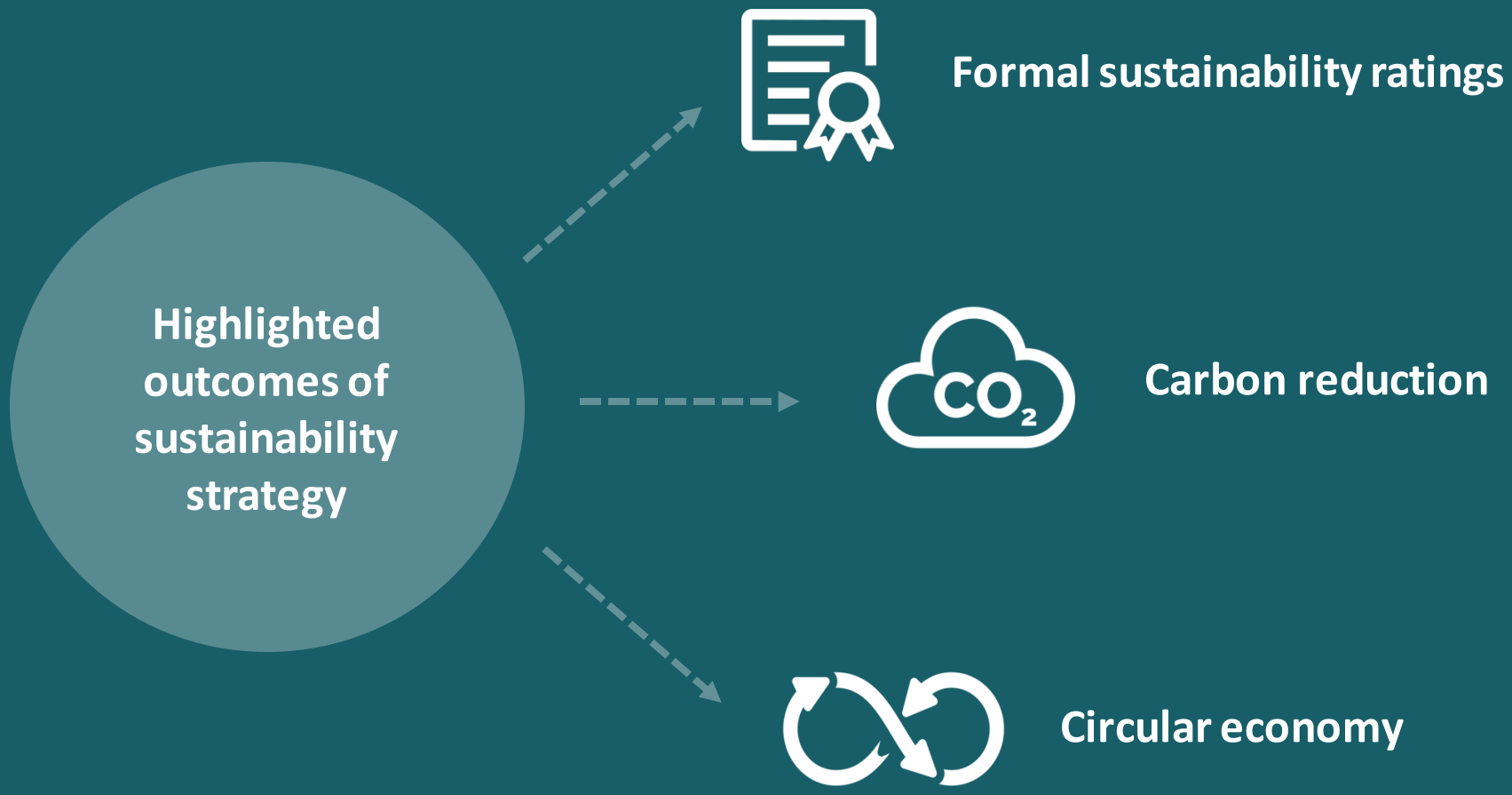
Byford Rail Extension

Extending the Armadale Line to Byford

Thornlie-Cockburn Link

First east-west connection with stations at Nicholson and Ranford roads in Canning Vale

2 | Project sustainability outcomes



Sustainability ratings

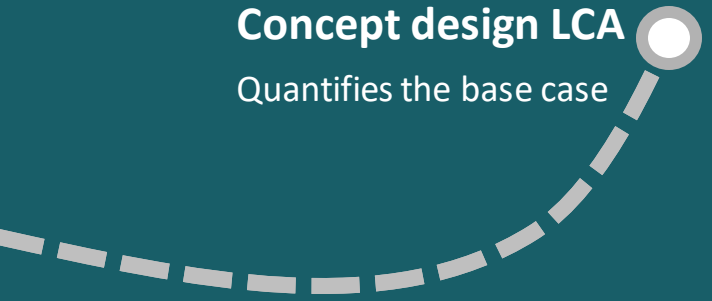
Morley-Ellenbrook Line	**IS Rating** Silver	**GBCA Rating** Ellenbrook Station – 4 star Malaga Station – 4 star	**GBCA Design Review** Ellenbrook Station – 5 star Malaga Station – 5 star
Victoria Park-Canning Level Crossing Removal	**IS Rating** Silver	**GBCA Rating** Cannington Station - 5 star Beckenham Station - 4 star	
Byford Rail Extension	**IS Rating** Silver	**GBCA Rating** Armadale Station - 5 star Byford Station - 4 star	
New Bayswater Station		**GBCA Rating** Bayswater Station – 4 star	**GBCA Design Review** Bayswater Station – 5 star

Reducing Carbon Impact

Projects deliver life cycle assessments (LCA) at stage gates

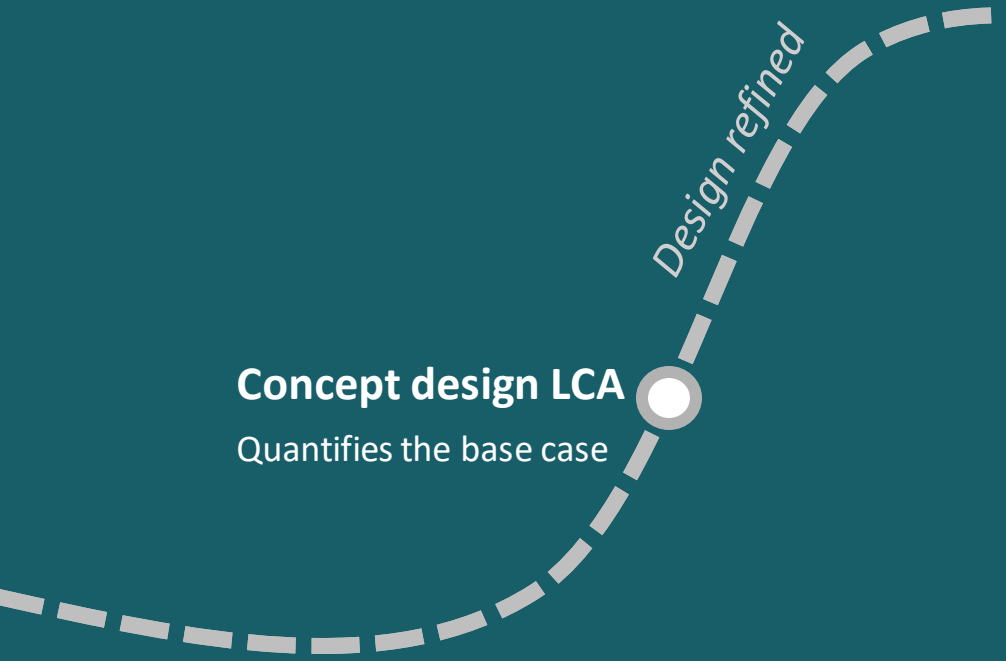
Reducing Carbon Impact

Projects deliver life cycle assessments (LCA) at stage gates



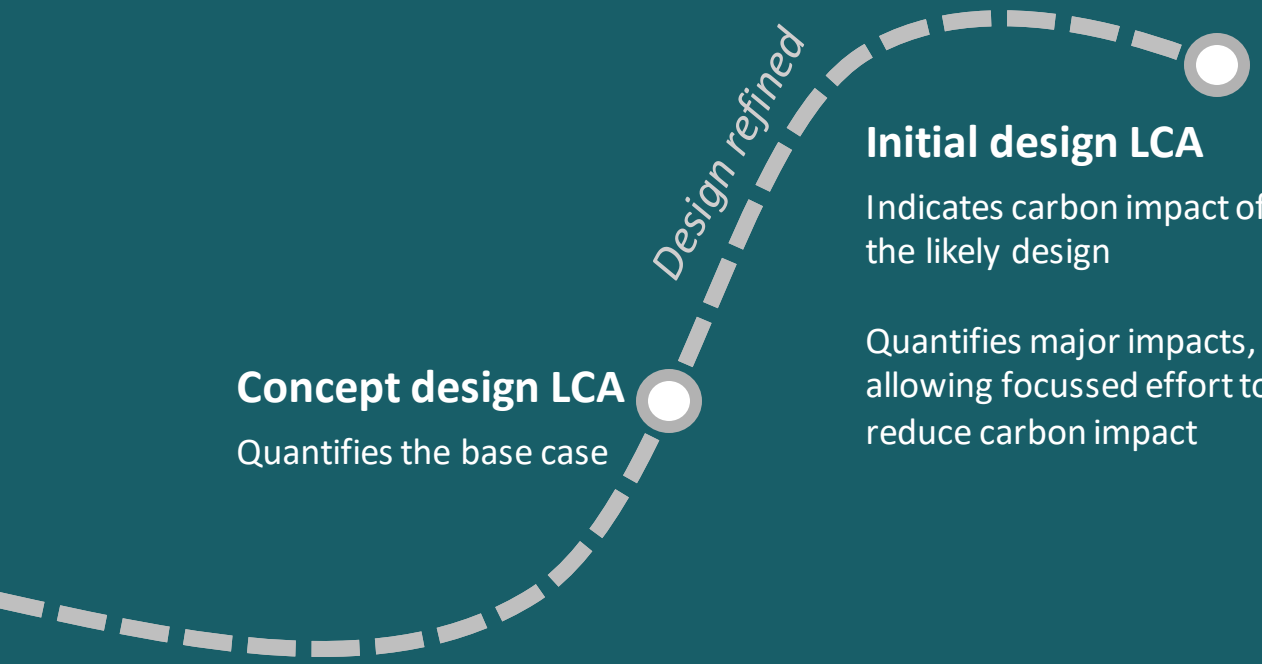
Reducing Carbon Impact

Projects deliver life cycle assessments (LCA) at stage gates



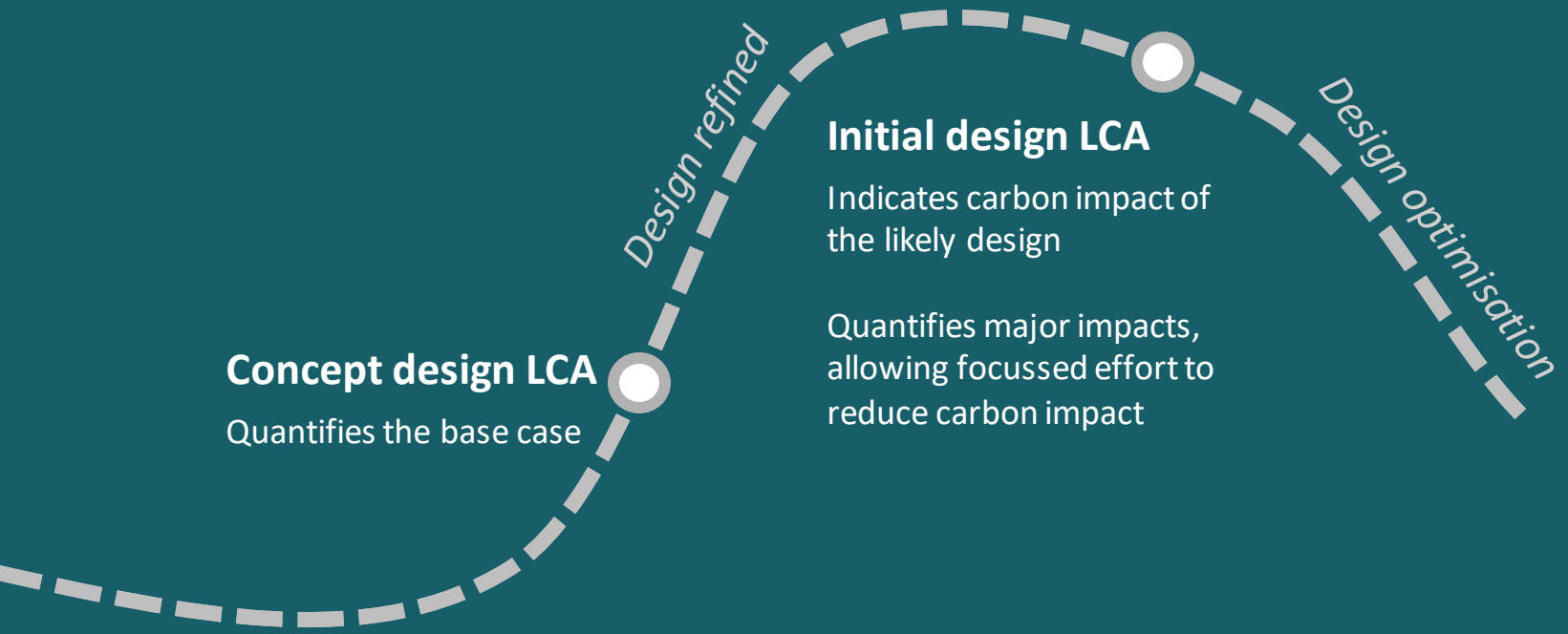
Reducing Carbon Impact

Projects deliver life cycle assessments (LCA) at stage gates



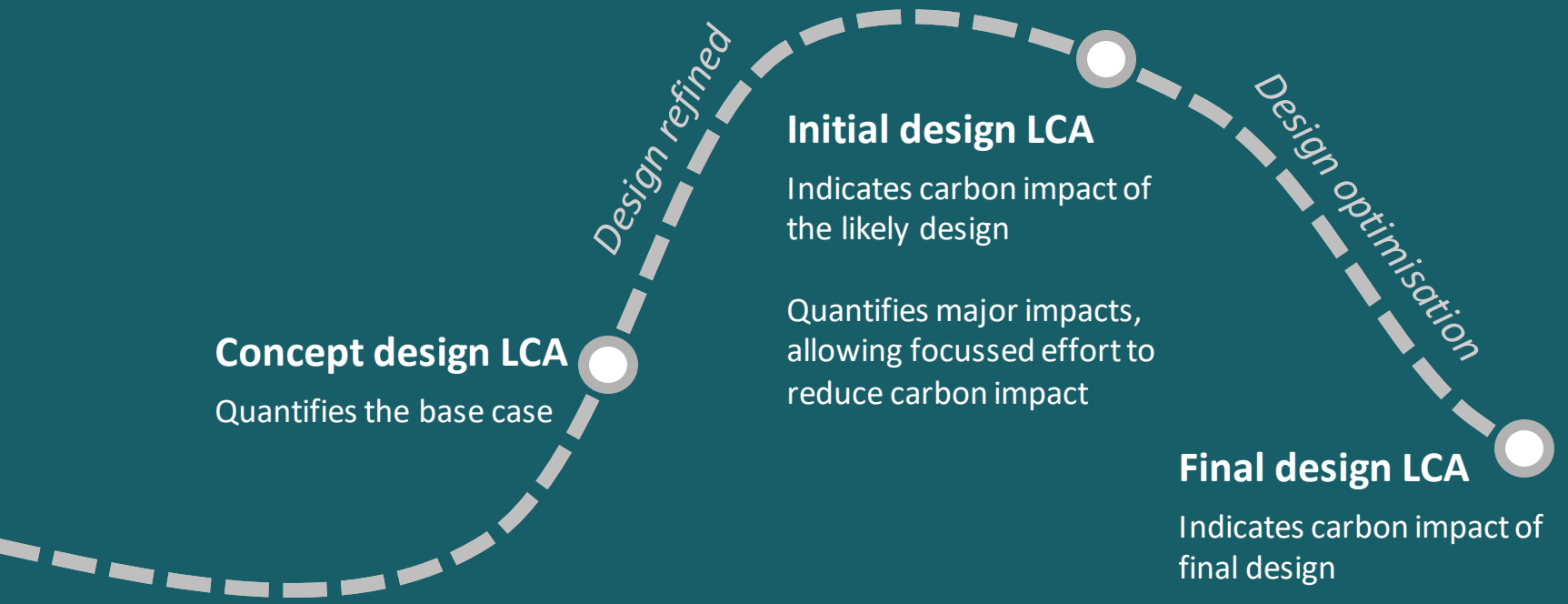
Reducing Carbon Impact

Projects deliver life cycle assessments (LCA) at stage gates



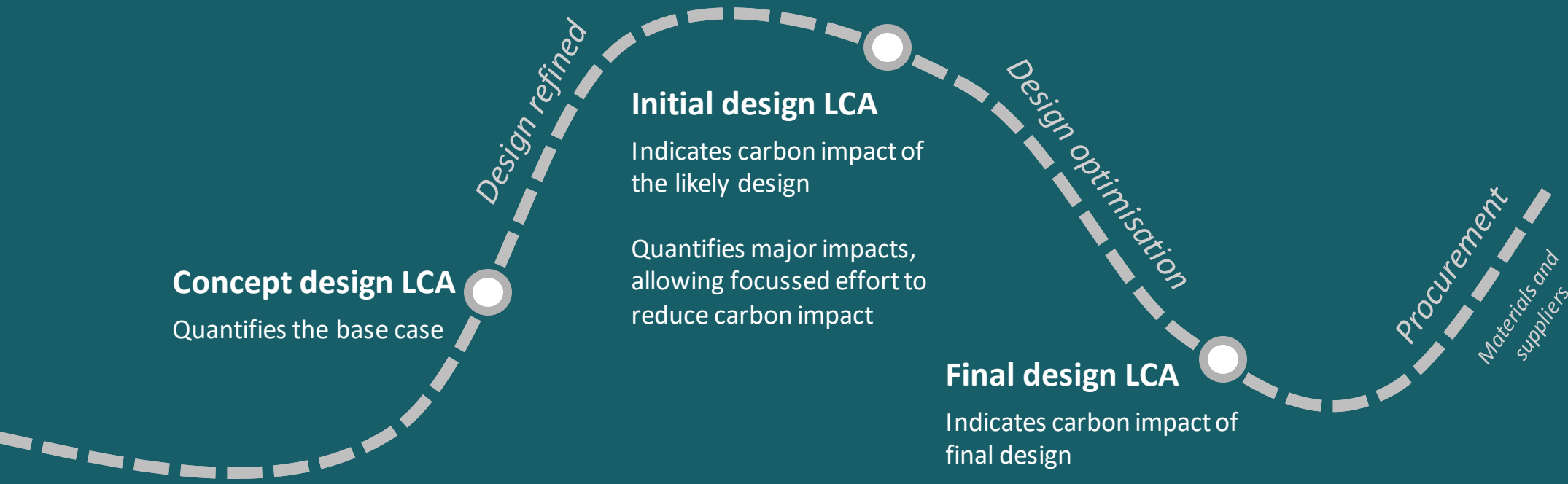
Reducing Carbon Impact

Projects deliver life cycle assessments (LCA) at stage gates



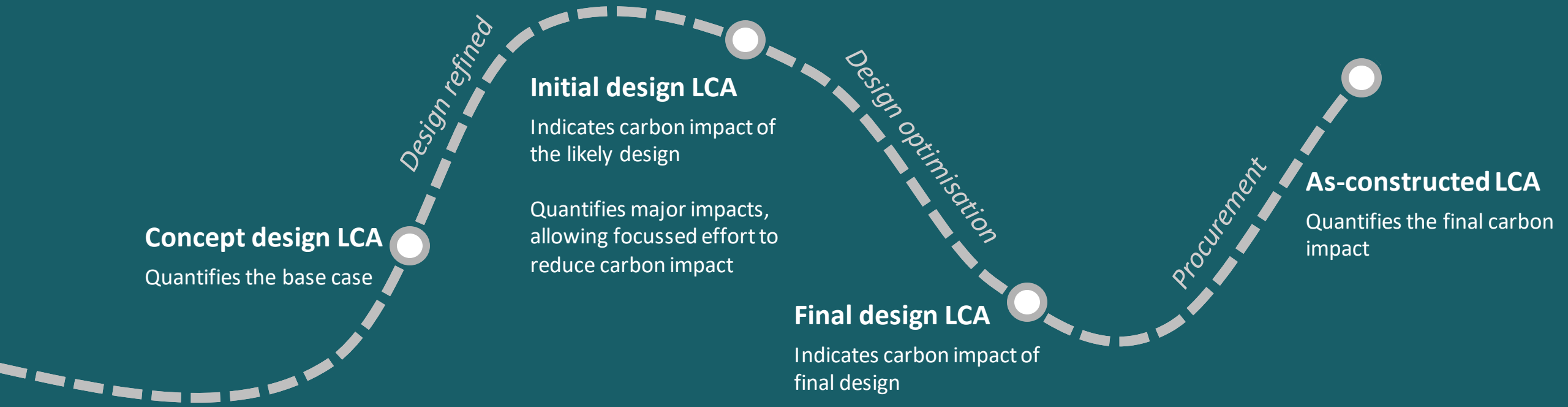
Reducing Carbon Impact

Projects deliver life cycle assessments (LCA) at stage gates



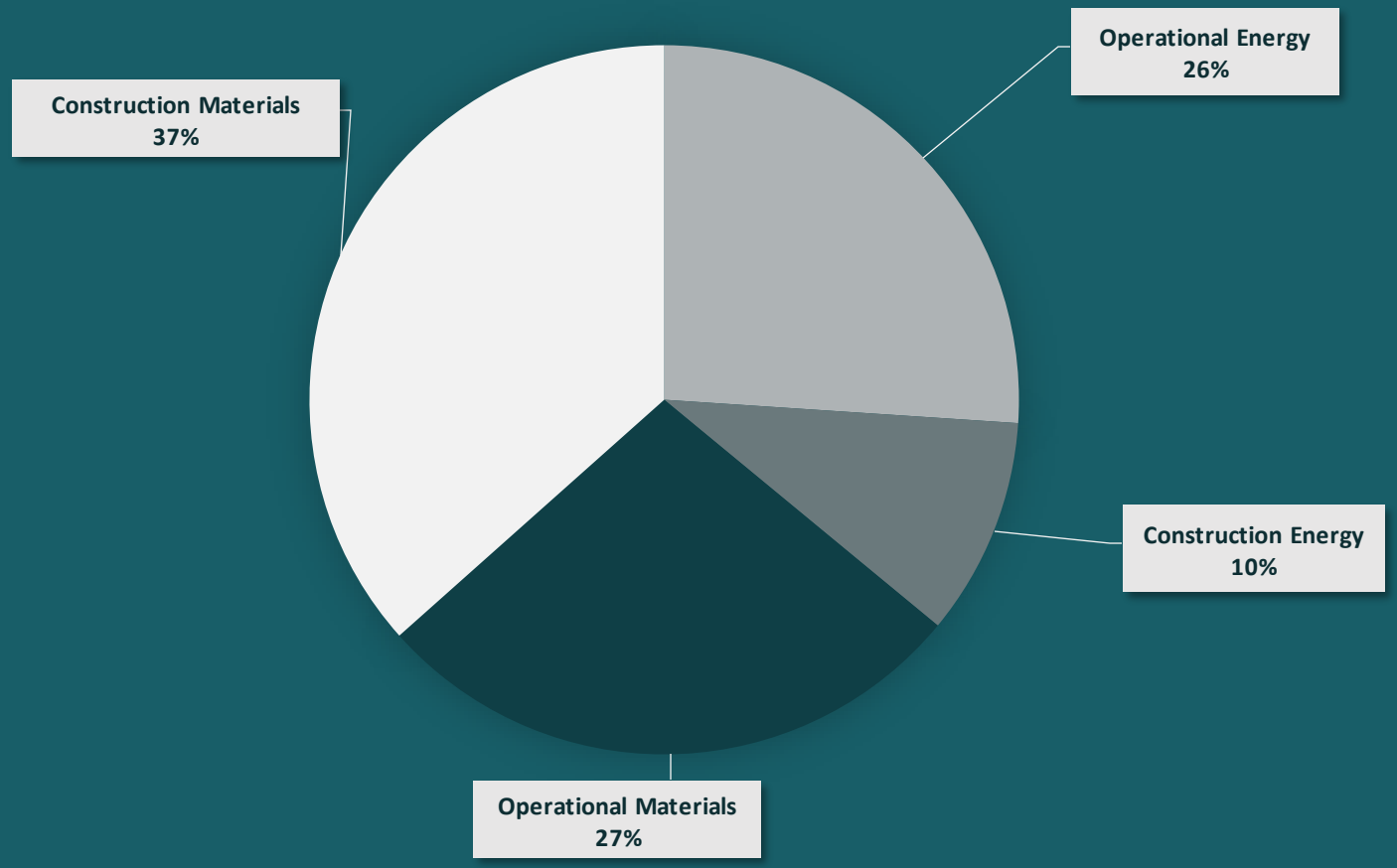
Reducing Carbon Impact

Projects deliver life cycle assessments (LCA) at stage gates



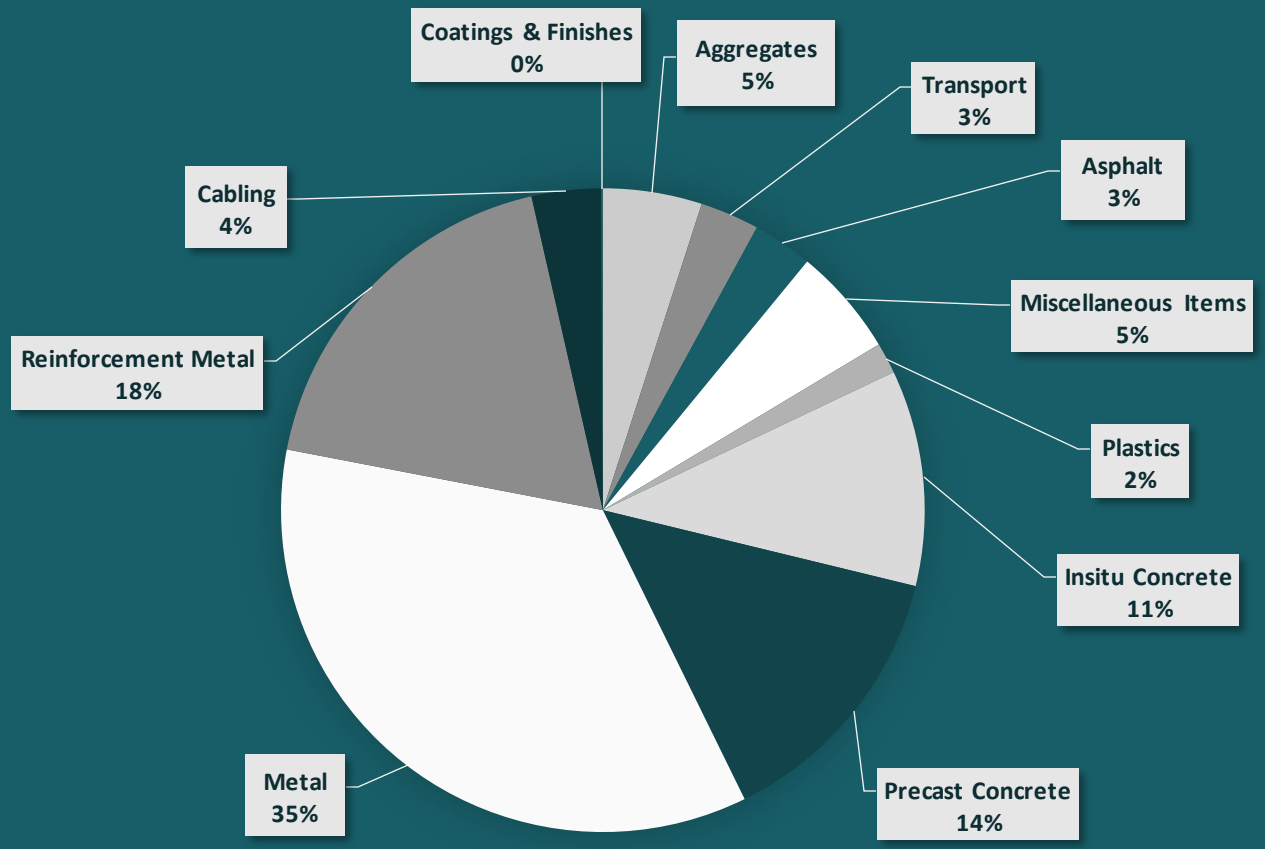
Reducing Carbon Impact

Average project whole of life carbon impact [tCO_2e]



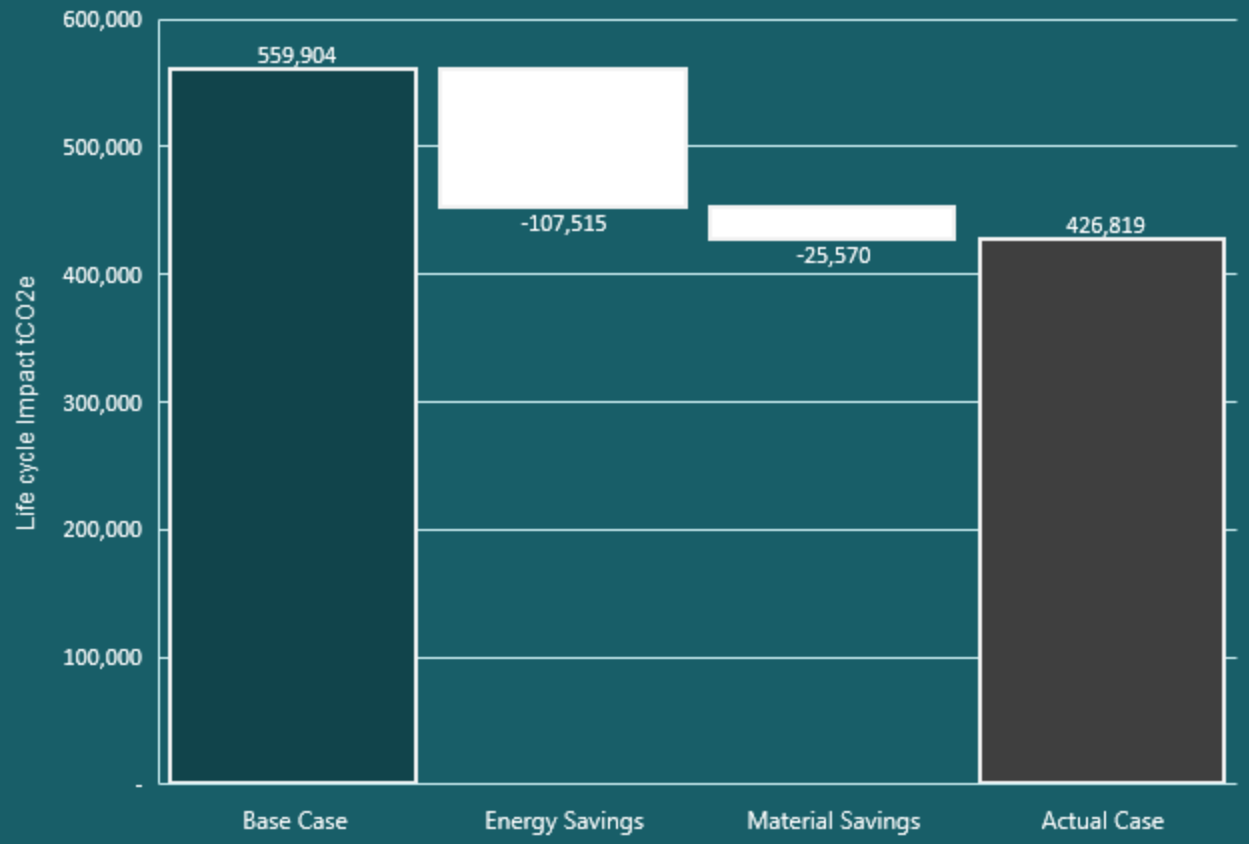
Reducing Carbon Impact

Example project embodied carbon [tCO_2e]



Reducing Carbon Impact

Example carbon reduction from concept to final design [tCO_2e]



Carbon reduction initiatives:

- Portland cement replacement
- Reduction in material quantities through design optimisation
- Construction methodology efficiencies reducing transport

Circular Economy

Two recent initiatives

PTA Specification updates

Materials Reuse Platform

Circular Economy

PTA Specification updates

Specifications updated to encourage increased use of recycled materials

- Food Organics, Garden Organics (FOGO) → Stations and Buildings - Landscape Architecture [8803-000-009]
- Crushed Recycled Concrete (CRC) → Roads, Busways and Paths [8880-450-067]
- Reclaimed Asphalt Pavement (RAP) → Roads, Busways and Paths [8880-450-067]
- Crumb Rubber Modified Binder → Roads, Busways and Paths [8880-450-067]
- Crushed Recycled Rail Ballast → Roads, Busways and Paths [8880-450-067]
- Recycled plastic pipes → Design of Drainage for PTA Infrastructure [8880-450-090]
- Recycled and reused sands as fill
- Low carbon concrete

Circular Economy

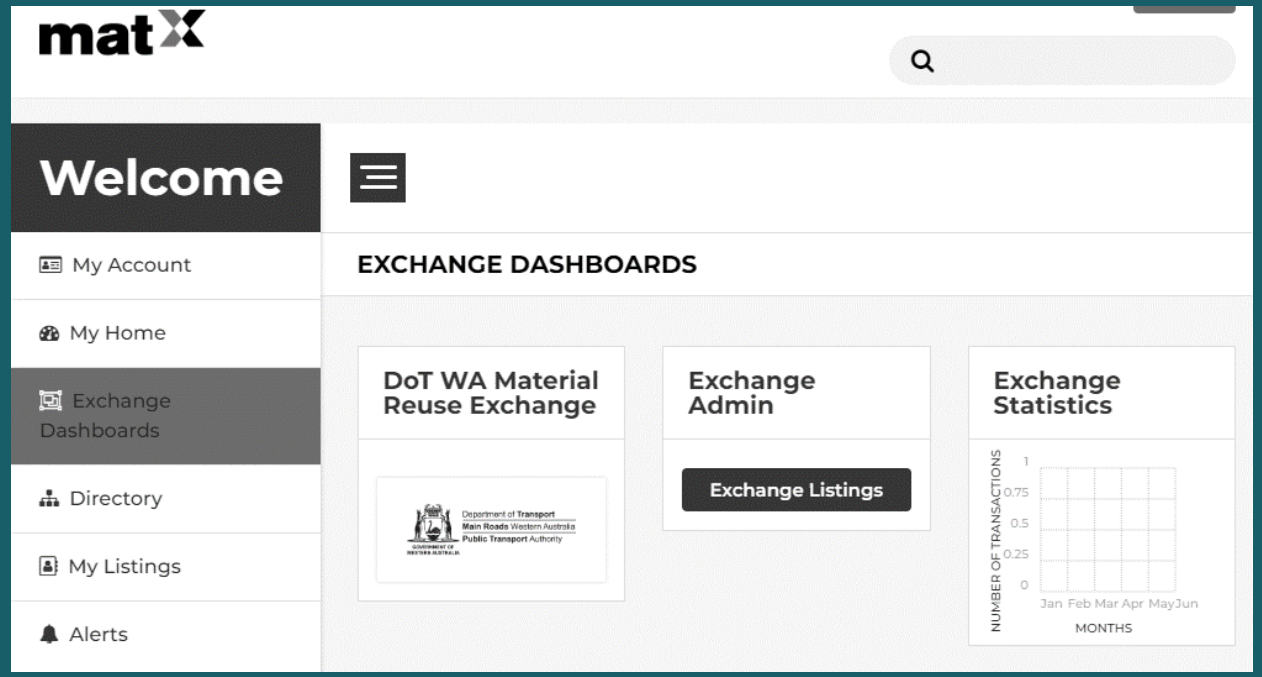
Materials Reuse Platform

Online marketplace for excess materials (e.g. spoil, ballast, temp works, furniture)

Projects list excess materials, or materials wanted

Platform to encourage the reuse of materials between projects

Divert material from landfill

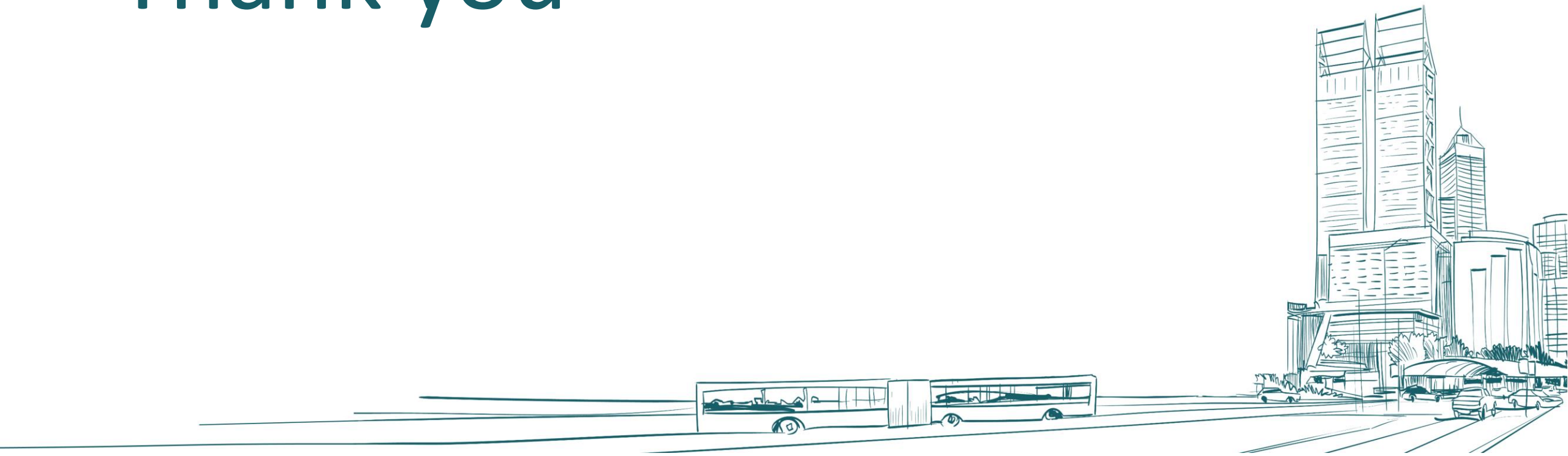


Circular Economy

OMTID goal: to drive a circular economy and promote resource efficiency

Reduce raw material demand	Contractual targets and LCA					
Promoting the use of recycled materials	Contractual targets	Active engagement	Updating specifications	Demonstration projects	Materials reuse platform	
Support recycling industry	Government setting example of materials reuse Build confidence in suitability of materials Create demand to grow industry capacity					

Thank you



Speakers and Presenters

Susan Kreemer Pickford
General Manager, Engineers Australia

Monica Richter
Program Director, MECLA

Ross Donaldson
WA-based architect and lecturer

Dena Jacobs
Executive Director, Infrastructure NSW

David Kelly
A/Director Engineering, -Sustainable Infrastructure Program, TfNSW

Tyrel Momberg
Technical Manager, IS Council

Linda van Achterbergh
Sustainability Manager, Public Transport Authority

Greg Ryan
Sustainability Manager, Development WA

Mark Taylor
Sustainability Manager, Hesperia

Speakers and Presenters

Susan Kreemer Pickford
General Manager, Engineers Australia

Monica Richter
Program Director, MECLA

Ross Donaldson
WA-based architect and lecturer

Dena Jacobs
Executive Director, Infrastructure NSW

David Kelly
A/Director Engineering, -Sustainable Infrastructure Program, TfNSW

Tyrel Momberg
Technical Manager, IS Council

Linda van Achterbergh
Sustainability Manager, Public Transport Authority

Greg Ryan
Sustainability Manager, Development WA

Mark Taylor
Sustainability Manager, Hesperia

HESPERIA

The Net Zero Journey

Lessons from our efforts to address our climate impacts

Problem Definition and Project Responses

A core environmental ambition of our Sustainability Strategy is to address our impact on climate change.

- Hesperia projects result in the release of greenhouse gases in construction and operation.
  - *Hesperia's objective is to ensure that all of the carbon emissions that our work and projects cause are recaptured by natural systems.*

- Hesperia is a Carbon Neutral Organisation.
- Hesperia projects are required to:
  - *Measure, reduce and 100% offset upfront carbon emissions.*
- Assets operated by Hesperia are required to:
  - *Operate on 100% renewable energy. No gas.*

Net Zero Upfront Carbon construction strategy

Established process beginning to be implemented in our projects.

- LCA early to establish emissions sources to be targeted
  - Before Schematic Design, based on estimates from design team
  - Timing: gathering materials quantities estimates and options is new, and it's a challenge to beat the fixing of design.
- Reduce footprint through design and material selection
  - Use the offset price as a 'shadow-price' on carbon – VE
  - Cost: timber structure is +30%, Low Carbon Concrete can equate to $200 per tonne CO2e.
- Offset using verified offsets
  - Hesperia policy is to use at least 50% biodiversity-based offsets
  - Bottom line: Currently ~$30/TCO2e, typically adds 1% to project cost
  - Uncertainty: An estimated footprint and a forecast offset cost.
- Reporting against the international standards.
  - A formal Climate Active certification standard is in pilot – we haven't used this yet.
  - Clarity and Literacy: presumption of green washing, distrust of offsets.

What is Possible?

And what is being achieved?

Building	Initiatives	Embodied Carbon Reduction
4 Parramatta Square, NSW - BUILT	• Significant materials reduction in structure, façade and services • 31% cement replacement all concrete mixes	33%
3 Parramatta Square, NSW - BUILT	• 31% average cement replacement across concrete mixes – minor structural rationalisations	9%
Barrack Place, NSW - BUILT	• 28% average cement replacement	10%
6 & 8 Parramatta Square, NSW - BUILT	• 31% average cement replacement • Reduced structure (11% less concrete, 15% less rebar, 5% less structural steel)	18%
20 Martin Place, NSW - BUILT	• Retaining 5,500t existing structural steel • 30% cement replacement	40%
Lendlease portfolio	• Net zero 2025 • Absolute zero 2040	Average 30% in 2022 projects
Boola Katijin	• Timber building with concrete cores.	55%

*TAKING ACTION ON EMBODIED CARBON, Built, 2021

What we're working on

Keep pushing reduction in our projects.

1. Structure: LCC, timber and green steel.
2. Non-structural: more innovative, faster changes – hempcrete and hemp panels, timber prefab elements.
3. Site works: waste, electric site vehicles

Combine the desired biodiversity and carbon outcomes into a single self-sustaining program.

1. Invest / Co-invest in re-vegetation projects in WA.
2. Work with First Nations land holders and land managers.
3. Ensure that planting meets a 'best practice' level of revegetation quality (appropriate biodiverse species mix, ecological design).

Thanks!


MECLA
Email: info@mecla.org.au
Website: https://www.mecla.org.au
LinkedIn: https://www.linkedin.com/company/materials-embodied-carbon-leaders-alliance