Sustainable Infrastructure Program

David Kelly
Director Engineering Sustainable Infrastructure
Infrastructure & Place
Transport for NSW

NSW GOVERNMENT

transport.nsw.gov.au

Transport Net Zero and Climate Change Policy

The targets are:

100% renewable energy for all operational electricity for the rail, light rail and metro train network by 2025

50% of Transport's passenger vehicle fleet procurement transitioning to all-electric by 2026

100% of Transport passenger vehicle fleet procurement transitioning to all-electric by 2030

65% reduction in Transport operational emissions by 2030 (compared to 2018-19)

Net Zero in Transport operational and fleet emissions by 2035

Fossil fuel-free Transport construction and maintenance by 2040

Net Zero in Transport's annual embodied emissions by 2045

Net Zero in transport sector emissions by 2050

Net negative transport sector emissions by 2060

Sustainable Infrastructure Program (SIP)

Intent

Delivers sustainability reforms based on direct industry engagement

Clear long-term pathway for TfNSW to implement net zero and circular economy in infrastructure *driven by digital*

Cross cluster consistency in management of carbon and circular economy outcomes

Expanding capacity and capability in managing net zero and circular outcomes in infrastructure

Five workstreams of SIP

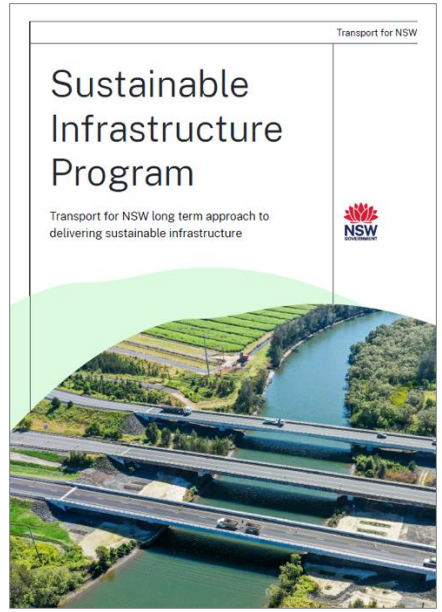
1 **Net Zero Procurement:** Place carbon alongside of cost, schedule and other functions through multi-modal procurement

2 **Net Zero Engineering & Innovation:** Reform the way we design infrastructure and use materials to drive cost and carbon reductions

3 **Decarbonising Development Phase:** Set carbon values in business cases that drive rapid decarbonisation, and tackle carbon early in the lifecycle

4 **Decarbonising Construction Phase:** Accelerate uptake of zero emission plant & equipment and embrace the Modern Methods of Construction

5 **Cross Cluster Systems Processes and Alignment:** Alignment across the cluster including Sydney Metro led by SER Environment & Sustainability



Decarbonising Infrastructure Roadmap

Focus areas in 2024 delivered with industry

Transport release Engineering Cost & Carbon Library

- First MOU deliverable as part of **'The future of carbon accounting in infrastructure contracts**'
- Set to become the single source of truth for baseline carbon in Australian infrastructure, including cost management and engineering design
- Utilised throughout the project lifecycle including Cost Benefit Analysis (CBA) to understand the marginal cost of abatement for decarbonised options
- Dataset to update standards and specifications

National carbon measurement guidance and national procurement guideline tabled endorsement

- INSW and Transport's work is being adapted and elevated to the national level and due for endorsement throughout 2024

M1 to Raymond Terrace – Black Hill to Tomago Package : 25% emission reduction target

Release the Protection of Environment Policy (PEP) for NSW Government Infrastructure

- Based on the INSW Policy and Transport pilot projects the PEP will be released for NSW Government infrastructure

Footbridge St Mary's
PEP trial with INSW and EPA

The years ahead 2025 and 2026

TfNSW's carbon and cost management approach is multimodal	Decarbonising Infrastructure Delivery Policy and Measurement Guidance becomes operational	TfNSW to implement a certified Carbon Management System
• Finalise transition to carbon and cost management at TfNSW including setting Project Carbon Budgets (PCBs) • Digital Engineering Framework includes 'carbon and cost dimension'	• Policy enabled including a consistent monitoring framework and reporting platform across NSW Government • INSW reviews the Decarbonising Infrastructure Delivery Policy on captured lessons learnt	• TfNSW certifies a Carbon Management System aligned to PAS2080 • Core members of TfNSW's value chain will implement a certified carbon management system

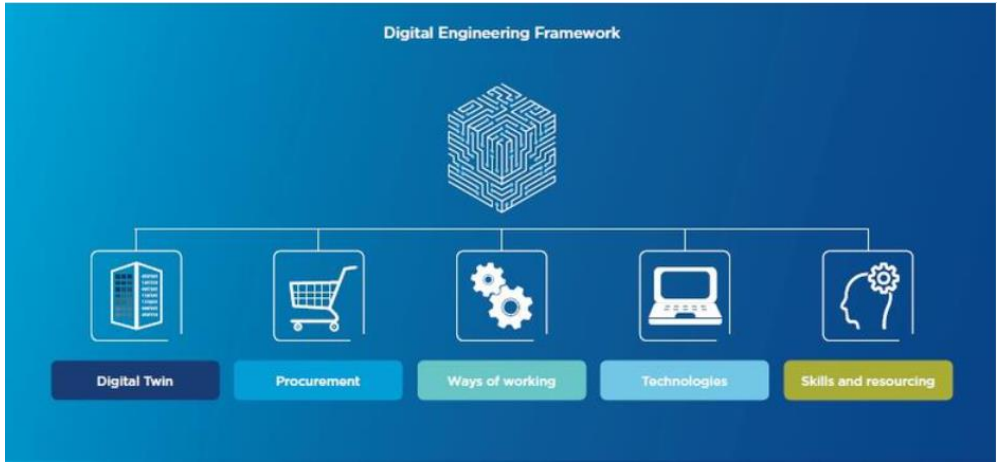
TfNSW case study: WSI Airport Precincts Roads Network:

- Integrated carbon and cost management from strategic business case onwards
- Multi-billion dollar program where cost is 'mirrored' by baseline carbon with delivery dates out to 2040.
- Decarbonised options produced as a back analysis understanding the potential marginal cost of abatement for Cost Benefit Analysis

Near term deliverables

Common Data Model for Infrastructure with ESG Dimensions

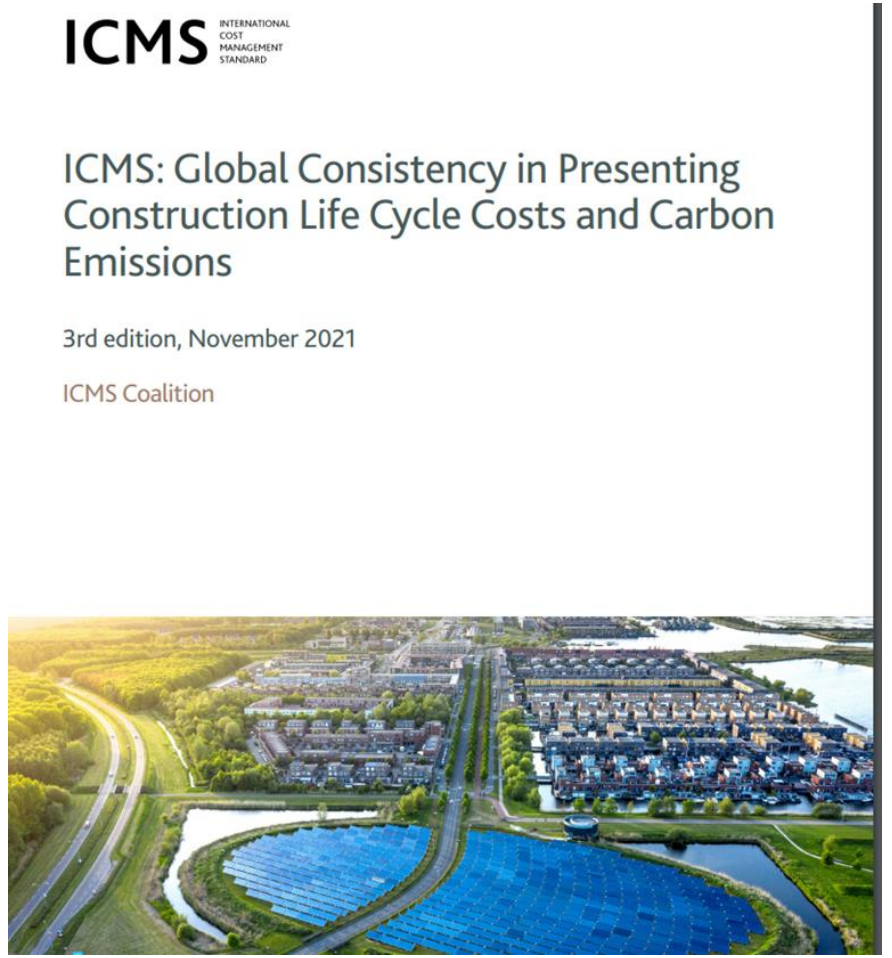
- Common data model for infrastructure which utilises a series of international standards, including International Cost Management Standard 3 (whole of life) and other guidelines like Project Institute Project Management Body of Knowledge (PMBOK)
- Governance through TfNSW Digital Engineering Framework
- Enables benchmarking with all key asset types, at all applicable levels of that asset, including construction resources (plant, labour, materials).
- Brings together Asset Breakdown Structure (ABS) and Work Breakdown Structure (WBS) into a unified Common Data Model for Infrastructure
- Has Environmental Social & Governance Dimensions



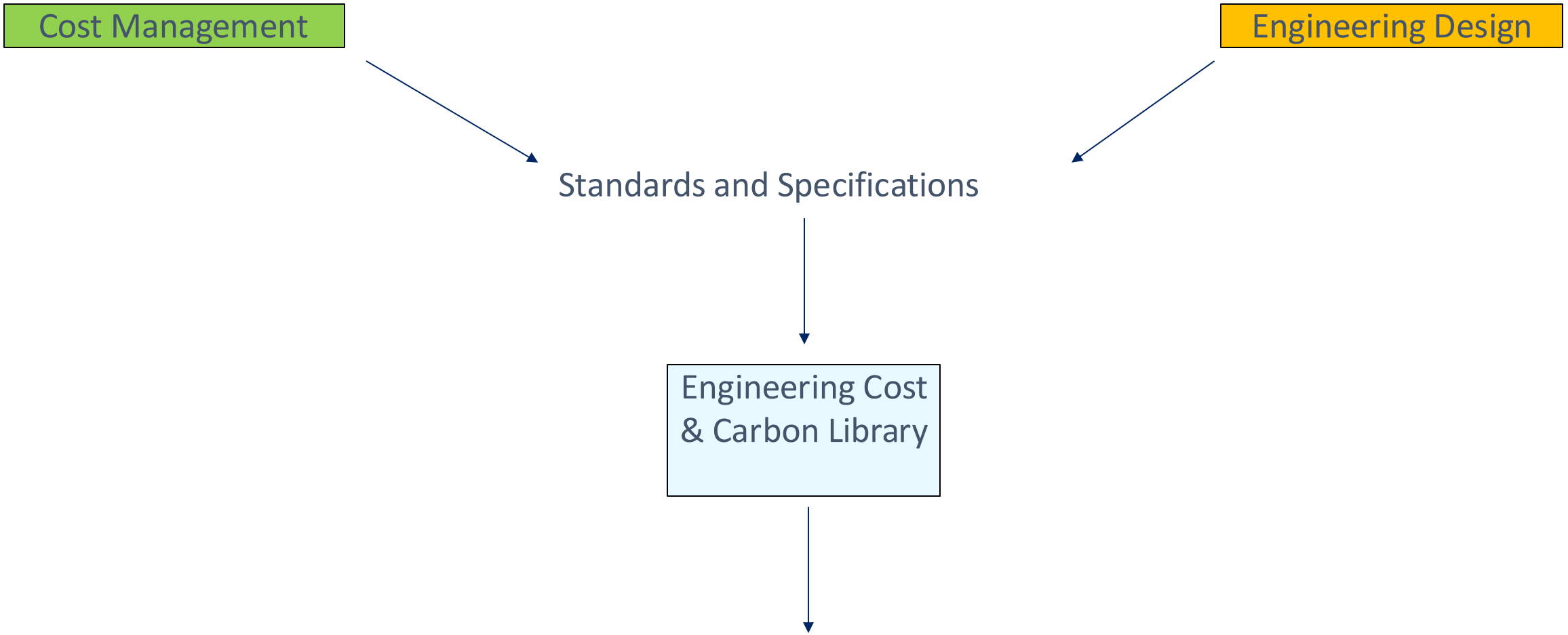
Near term deliverables

Engineering, Cost & Carbon Library

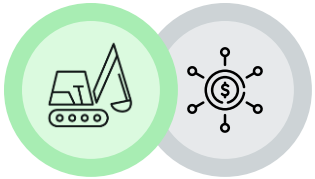
- Part of this common data model is ***TfNSW Engineering Cost & Carbon Library*** which classifies and defines construction resources (Plant, Labour, Materials, Fuels), also has an assured carbon rate aligned to the modules of EN15978
- Leverages ICMS3, PAS2080 Carbon Management in Buildings in Infrastructure, EN15978, Uniclass, Royal Institute of Chartered Surveyors (RICS) Whole Life Carbon Assessment 2nd Edition, Civil Engineering Standard Method of Measurement (CESMM), Australian and New Zealand Standard Method of Measurement of Building Works (ANZSMM), and other standard methods of measurement.
- Maps key Transport for NSW Engineering Standards and Specifications, including key maintenance specifications.



TfNSW Engineering Cost & Carbon Library



Outputs using the single source of truth, enabling Digital Engineering carbon and cost dimensions



Near term deliverable

TfNSW Engineering Cost and Carbon Library V1.0

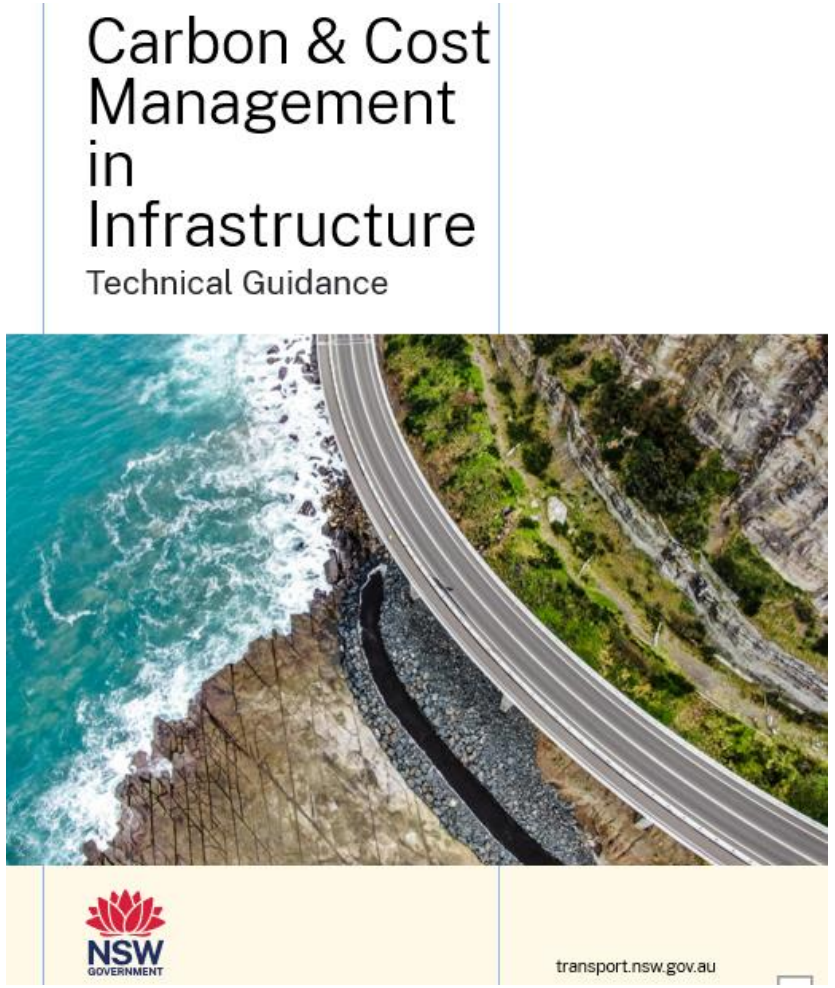
- The first deliverable as part of **'The future of carbon accounting in infrastructure contracts'**
- Version 1 industry consultation on October 28th
- Library defines baseline carbon to the modules EN15978, also global cost rates
- Currently has 4,000 resources (Plant, Labour, Materials, Fuels) and hundreds of items (specifications), expected to grow to around 15,000 resources by 2026
- Enables systems to be configured to automate baseline carbon estimates as part of the cost estimation process
- The dataset to update engineering standards and specifications for baseline carbon (kgCO2e/unit)
- Utilised to quantify the marginal cost of abatement in Cost Benefit Analysis (CBA), see TPG23-08.
- A basis for cost and carbon for the Digital Engineering Framework
- Enables Contractors (all phases) to produce quantified decarbonisation plans with cost plans/schedules (long term plan)
- Roads, Motorways, Bridges, Tunnels. Maritime, Rail, Buildings & Integrated Precincts (Phase 1)
- Metro and Fleet (Phase 2)

national highways

Near term deliverables

TfNSW Carbon and Cost Management in Infrastructure Technical Guidance

- Introduces and gives guidance on the TfNSW Engineering, Cost & Carbon Library
- Technical guidance on carbon and cost management.
- Including setting Project Carbon Budgets (PCBs), carbon contingency (P50 carbon and P90 carbon).
- Methodology for assured automation with BIM models and cost estimation software
- Connects and gives guidance on engineering design standards and specifications



Near term deliverables

TfNSW Project Climate Risk Portal

- Climate Risk a component of the Common Data Model
- Climate Risk Portal being developed based on historical analysis of project Climate Risk Assessments
- Adaptation database a component of the Portal
- Aggregates project level climate risk to the portfolio level
- Aligned to global relevant global standards

Project objectives

Transform and digitise TfNSW's project climate risk assessments

1	2	3	4
Historical CRAs reviewed and added to database	Common data model	Geospatial visualisation and reporting	User friendly, easily maintained system

Near term deliverables

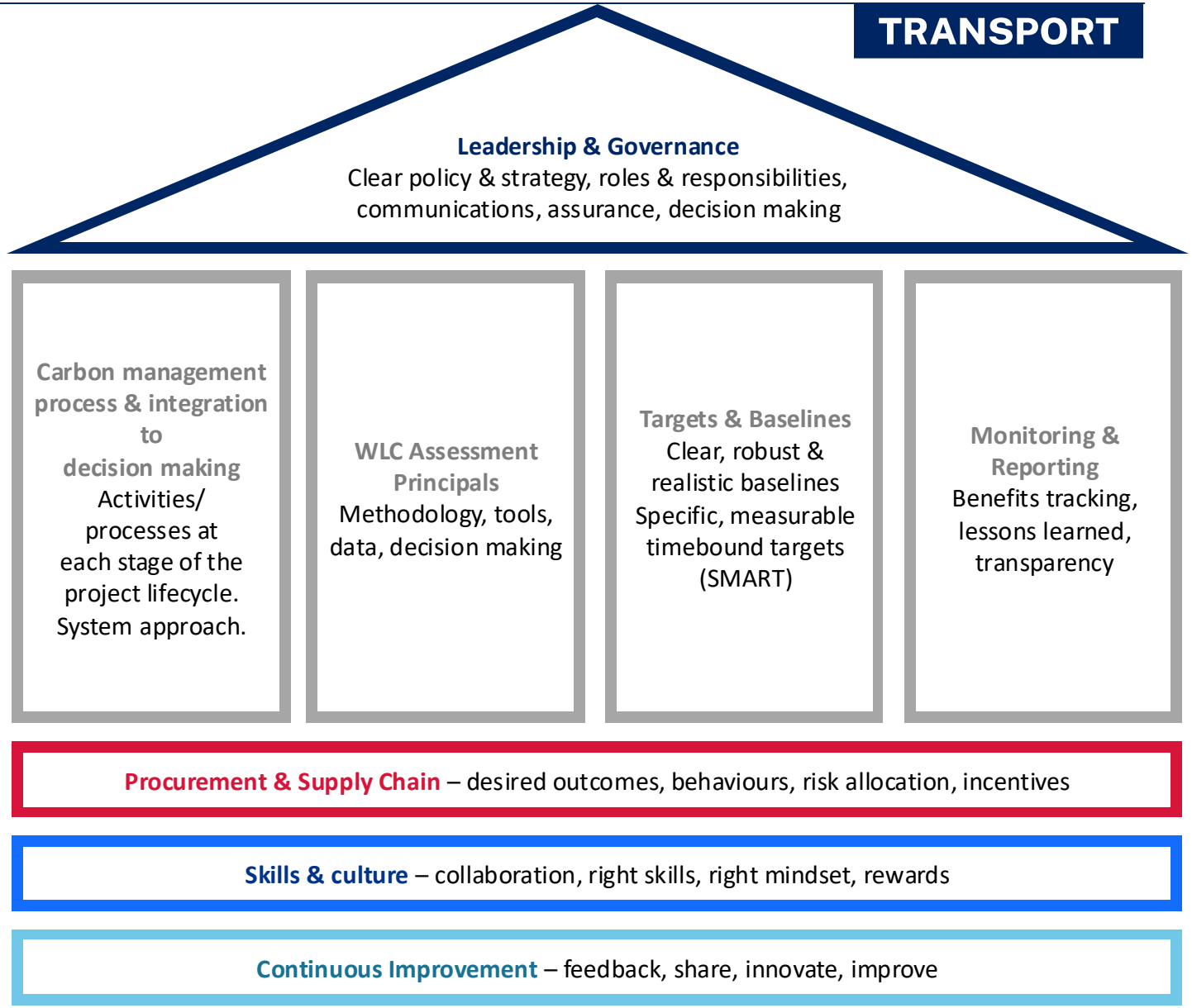
TfNSW Valuing Sustainable Outcomes Technical Guidance

- This aims to develop a clear value definition and outcomes framework.
- Also creating a more extensive monetisation framework for investment decision making, and other value-based decision-making points like multi criteria analysis in design.
- The Technical Guidance will offer direction on the Most Economically Advantageous Tenderer (MEAT), now generally referred to as the Most Advantageous Tenderer (MAT) through procurement processes and bid evaluation.

Natural	Climate	Net Zero by 2045, majority by 2030 (Carbon Code pledger status)
	Resource use	Ensure sustainable use of resources
	Biodiversity	Ensure net gain in biodiversity
Human	Employment	Maximise local employment opportunities
	Skills and Knowledge	Improve capability, capacity and competence of all parties
	Health	Zero harm and positive wellbeing across the sector
	Experience	Facilitate a positive cultural and behavioural change
Social	Influence and Involvement	Involve all possible stakeholders at the earliest opportunity
	Equality and Diversity	Be leading exponents in fair and inclusive ethical practice
	Networks and Connections	Be a national voice for local government
Produced	Lifecycle Cost	Adopt a whole life cycle approach
	Return	Create and sustain a commercially viable pipeline
	Production	Achieve demonstrable market leading time, cost, quality and performance
	Resilience and Security	Ensure evidence-led interventions to intelligently manage change and risk

TfNSW Carbon Management System

- Transport for NSW has started developing a Carbon Management System (CMS).
- Key milestone on the Decarbonising Infrastructure Roadmap
- The CMS will further articulate Transport for NSW processes for tracking, managing, and reducing carbon emissions associated with construction and maintenance, in all stages of the delivery process.



Source: National Highways CMS

Thank you