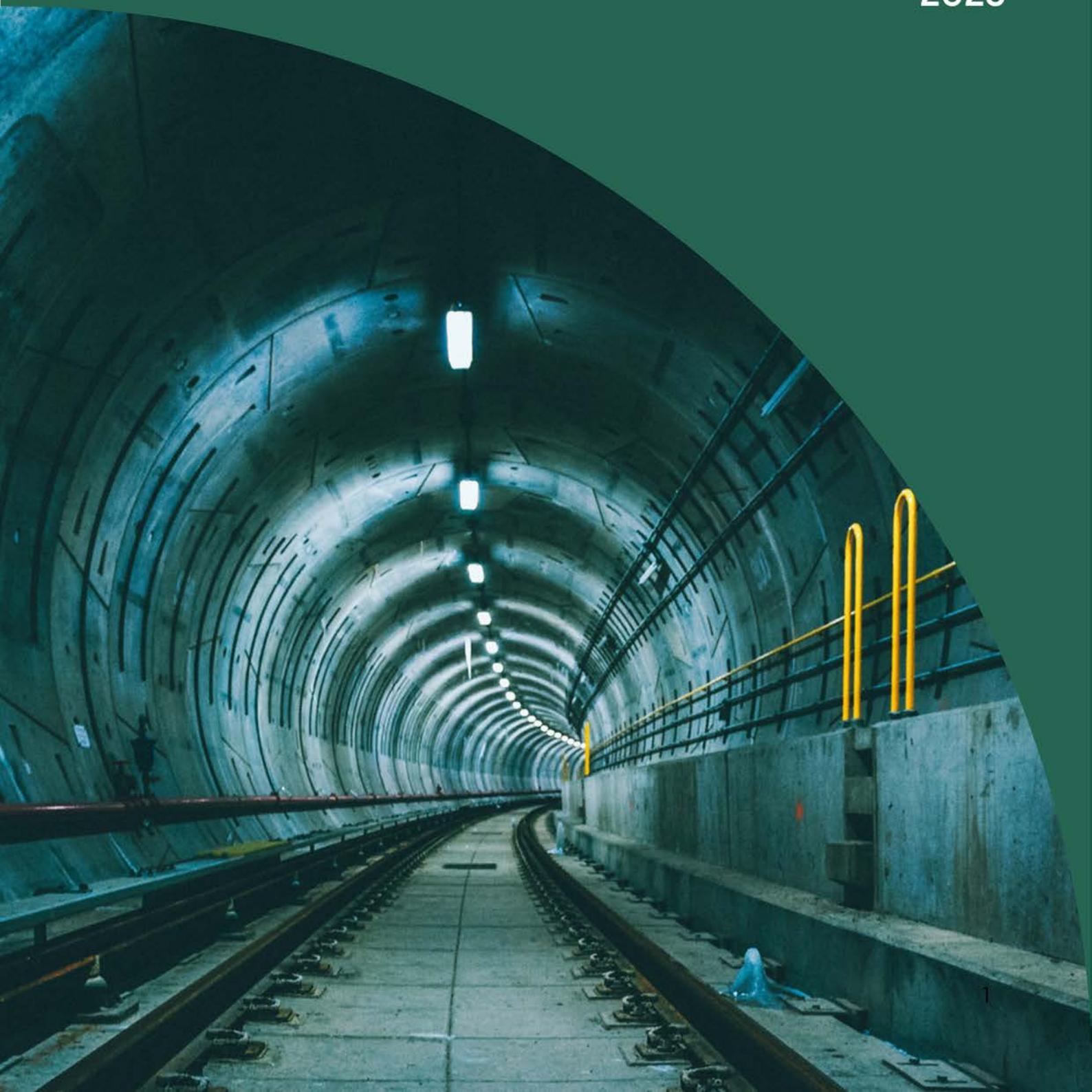
On the road to net-zero

Decarbonising transport infrastructure delivery

2025



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Acknowledgement of Country

Roads Australia acknowledges Aboriginal and Torres Strait Islanders as the Traditional Owners and Custodians of this land and waterways.

We acknowledge and pay respect to their ancestors and Elders both past and present.

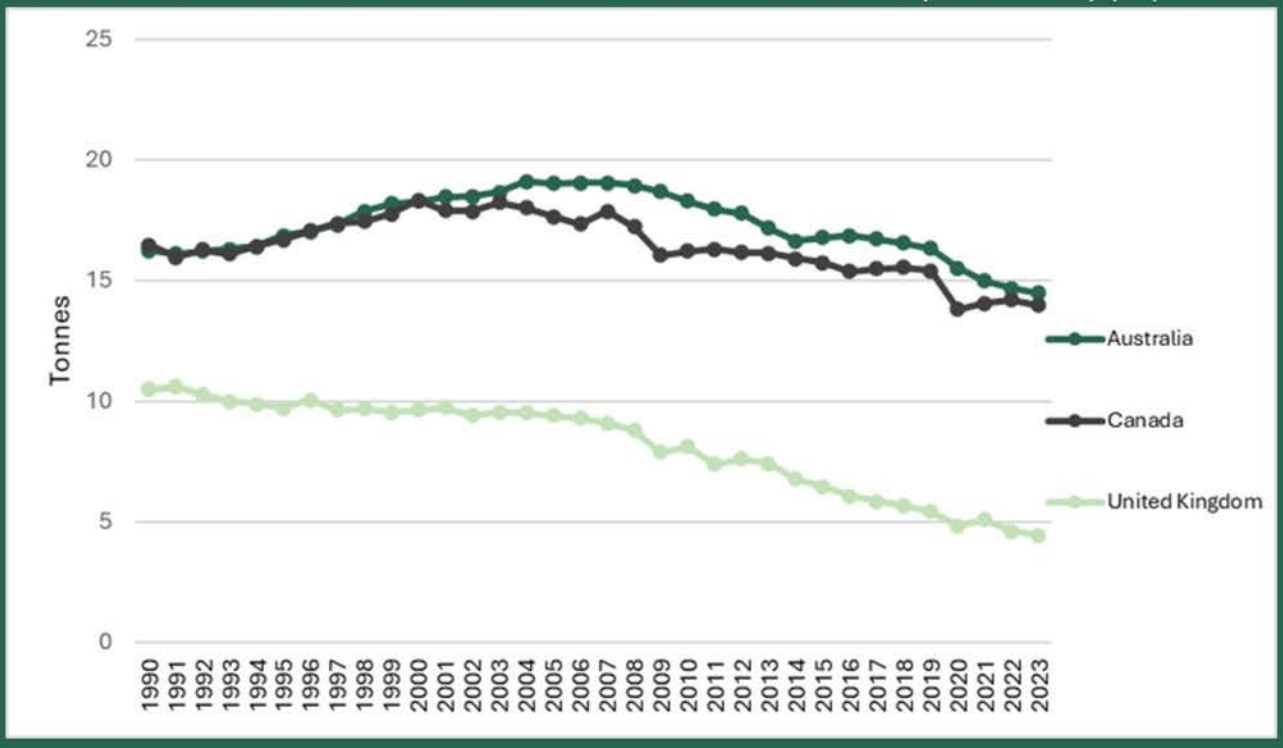
Roads Australia is committed to reconciliation amongst all Australians.

Contents

Introduction

Australia is on the road to net zero. With a Commonwealth legislated target of net zero by 2050, all levels of government and all industry sectors are now in the process of decarbonisation. Decarbonising transport sector infrastructure delivery is one of the many critical steps in the process.

Australia's CO2 emissions per capita is declining
Annual tonnes of CO2 emissions from fossil fuels and industry divided by population

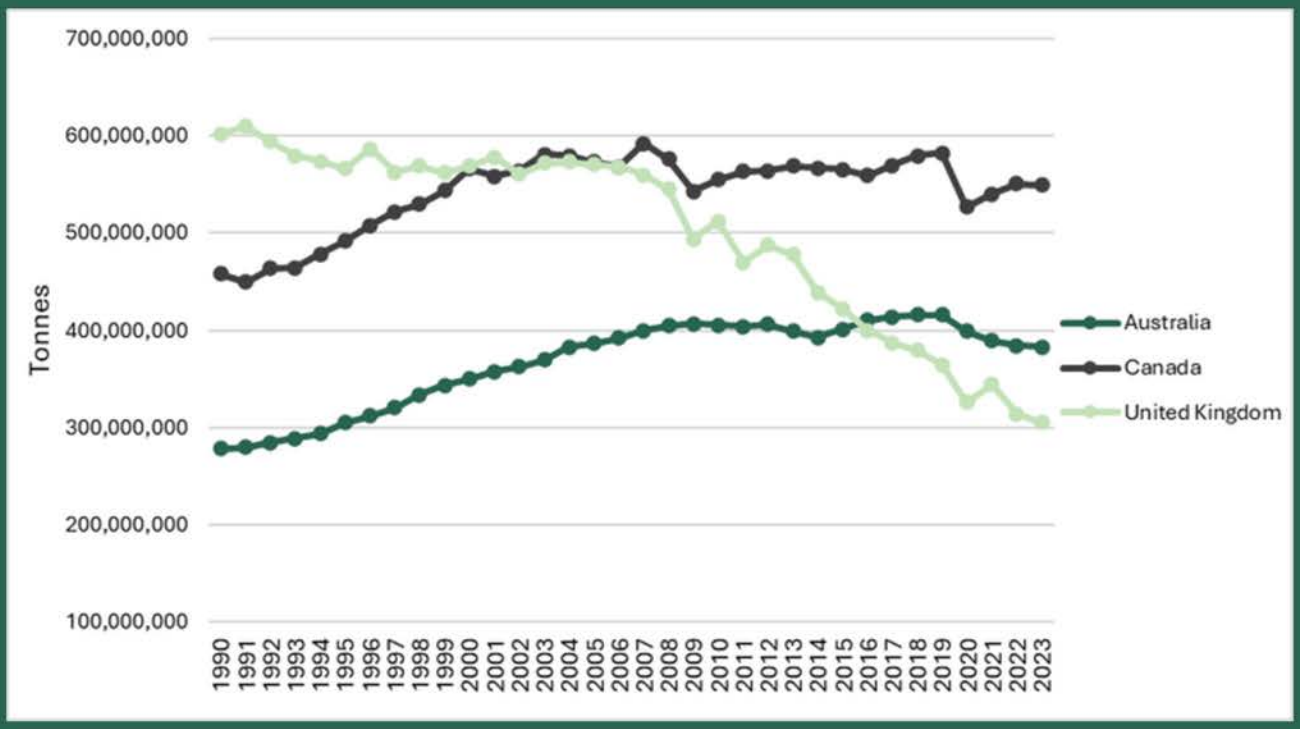


Source: Our World in Data

It is estimated that embodied carbon from transport infrastructure accounts for 3% of Australia's total emissions[1] and this infrastructure enables an additional 21% of Australia's total emissions[2] from transport vehicle emissions. Decisions about what we build, how we build, and what materials we build with are now more important than ever.

[1] Australian Government Department of Infrastructure, Transport, Regional Development, Communications and the Arts
[2] Australian Government Department of Infrastructure, Transport, Regional Development, Communications and the Arts

Australia's total CO2 emissions have only just started to decline
Annual tonnes of CO2 emissions from fossil fuels and industry



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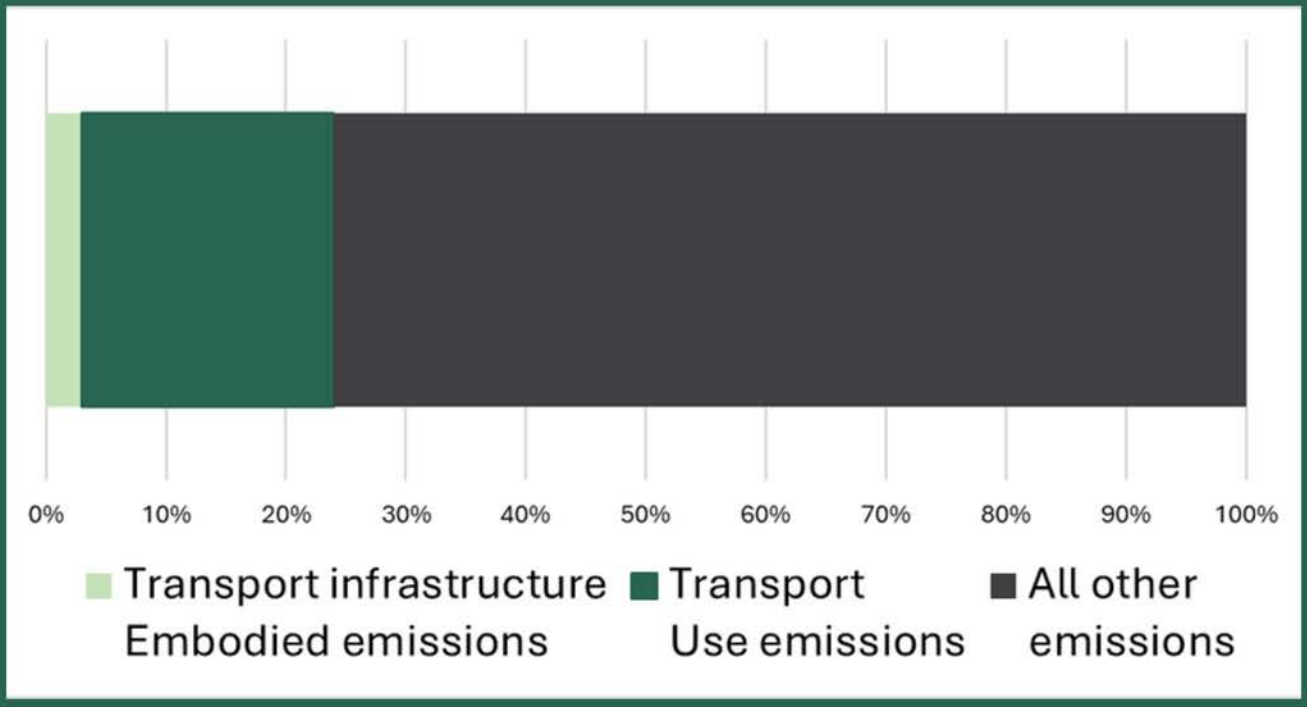

Source: Australian Government DITRDCA

Analysis by Infrastructure Australia finds in a Maximum Decarbonisation Scenario – with the use of decarbonisation strategies and policies –, embodied carbon from transport infrastructure could reduce 25% by FY26-27, from a FY23-24 baseline[3].

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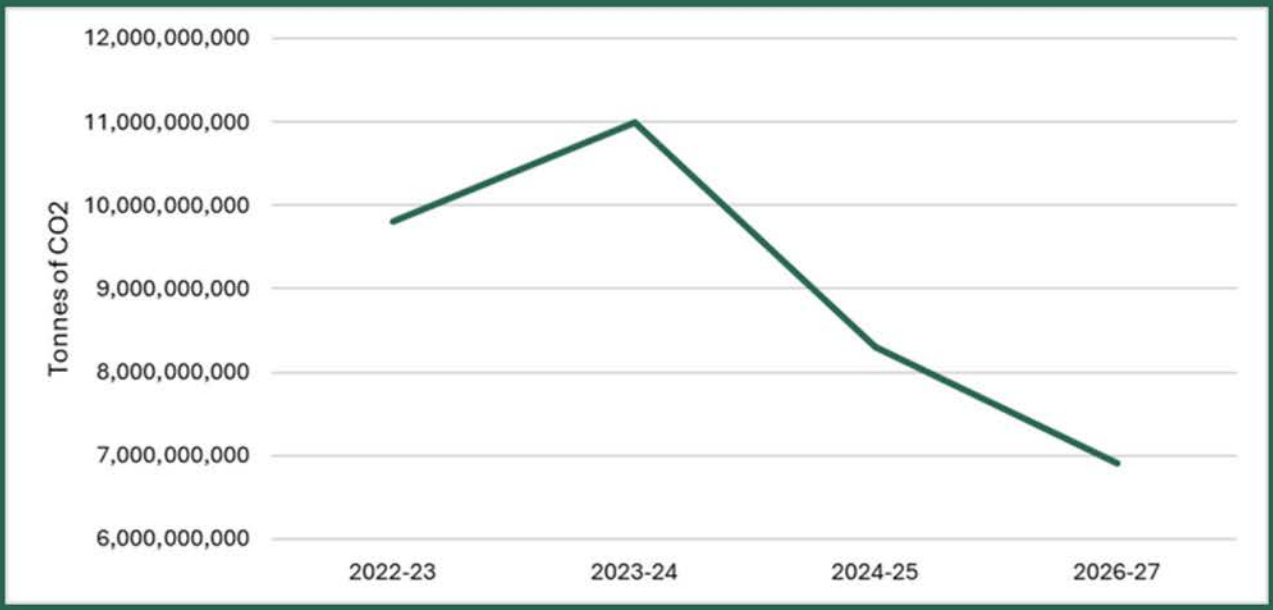


Source: Infrastructure Australia

The Infrastructure and Transport Ministers' Meeting (ITMM) has agreed to a suite of policies and guidance documents focussed on decarbonising transport sector infrastructure delivery, in 2024. Their efforts to date can be used as guidance for the Commonwealth and states and territories to apply these mechanisms within their jurisdictions.

While each state and territory will set their own decarbonisation strategies and policies, there is also the need for a nationally harmonised approach to ensure industry is able to viably transition and deliver. A harmonised approach will lead to efficiencies across the states and territories, shared knowledge, consistency and Australia wide progress. There is a strong commitment to do this, with collaboration through the Infrastructure and Transport Ministers Meeting.

[[3] Infrastructure Australia

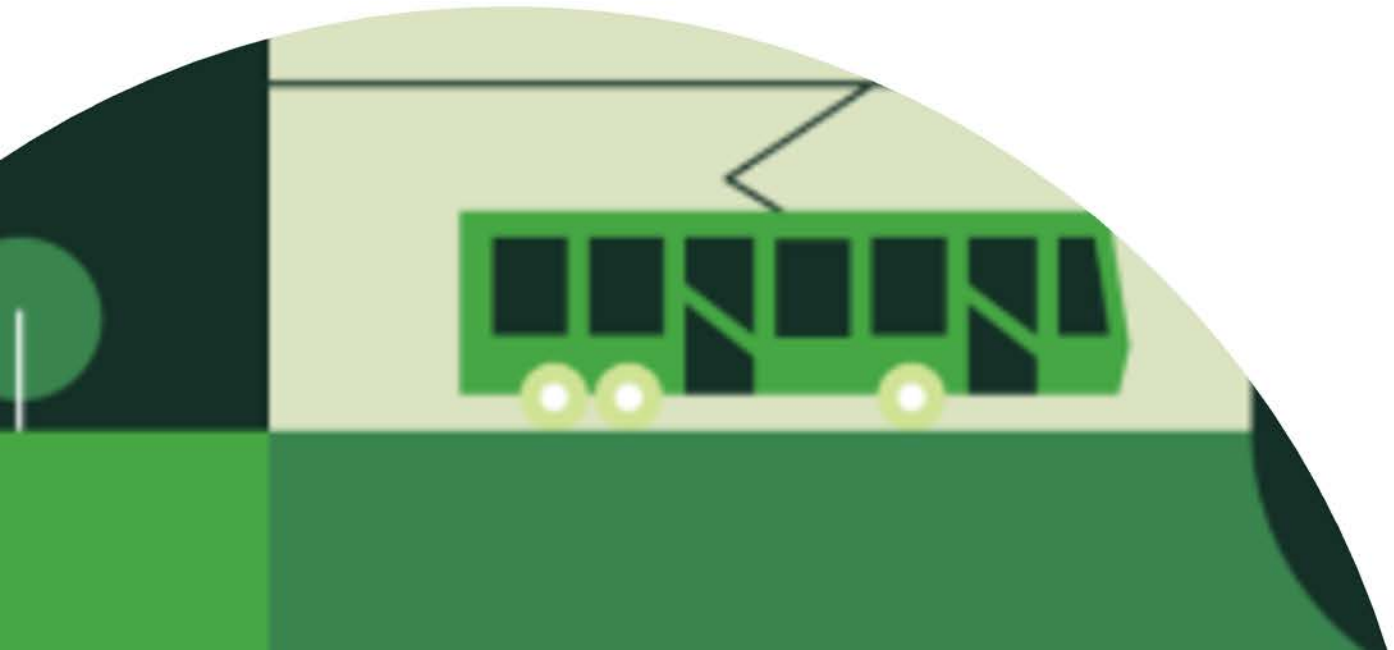
In 2024, Roads Australia convened Infrastructure NSW and industry for an interactive consultation on the NSW Decarbonising Infrastructure Delivery Policy, that became operational in April 2025. The consultation was hosted by Aurecon and participants represented Roads Australia members across the supply chain, from the business case end through to material supply and construction.

The development of this NSW policy, and its associated technical guidance, was used as the basis to develop the national Embodied Carbon Measurement for Infrastructure: Technical Guidance (Guide). This national guidance was agreed upon by the Infrastructure and Transport Minister's Meeting and published in 2024 by the Department of Infrastructure, Transport, Regional Development, Communications and the Arts.

The development of a national approach to embodied carbon measurement was one of the recommended actions in Roads Australia's National Decarbonising Transport Summit Report, developed in partnership with PTANZ and ARA.

This report situates the NSW Decarbonising Infrastructure Delivery Policy within the various government initiatives to decarbonise transport infrastructure and draws on industry's input to that consultation process.

We make 10 key recommendations to bolster this policy and further harmonise the implementation of decarbonisation policies, carbon measurement and monetised carbon values nationally.



Our 10 key recommendations are:

1. Undertake market soundings to understand low- or no-carbon innovations
2. Require consideration of carbon in Multi Criteria Analysis
3. Keep carbon intensity benchmarks up-to-date for target setting
4. Create a mechanism for bidders to challenge standards
5. Develop nationally consistent Emissions Factors and calculation assumptions
6. Develop technical guidance for whole-of-life carbon measurement
7. Update supporting policies and procedures for the use of national carbon values
8. Create a national decarbonising infrastructure library
9. Develop foundational learning materials for carbon management in infrastructure
10. Investigate the possibility of setting a carbon budget for the transport sector

Please go to page 17 for the detailed recommendations.

Decarbonising infrastructure delivery timeline

This timeline sets out the various Commonwealth, state and territory government initiatives and commitments to the decarbonisation of transport sector infrastructure delivery and net zero.

December 2015

Australia adopted the Paris Agreement, along with another 195 Parties at the UN Climate Change Conference of the Parties (COP21) in Paris, France. The Paris Agreement, entered into force for Australia on 10 December 2016, is a legally binding international treaty on climate change that commits to:

- hoolding the increase in the global average temperature to well below 2°C above pre-industrial levels
- pursuing efforts to limit the global average temperature increase to 1.5°C above pre-industrial levels.

March 2020

The NSW Government's Net Zero Plan Stage 1: 2020–2030 details how government plans to achieve the objective of halving greenhouse gas emissions from 2005-levels by 2030.

March 2020

The Victorian Government implemented a Recycled First Policy, as part of their ecologiQ initiative designed to increase the use of recycled and reused materials in infrastructure projects. The Policy requires all tenderers on Victorian major transport projects to demonstrate within their bid how they will optimise the use of recycled and reused materials at the levels allowed under current standards and specifications.

December 2021

The WA Metronet Sustainability Strategy set out requirements for a Life Cycle Assessment (LAC), to consider whole-of-life carbon emissions for the project. LACs are now being used across various government portfolios in WA and are undertaken for major infrastructure projects.

February 2022

Transport for NSW launched a four-year Sustainable Infrastructure Program, working with industry to develop solutions that accelerate decarbonisation in construction.

September 2022

The Australian Government's Climate Change Bill was passed, legislating targets for reducing greenhouse gas emissions by:

- 43% from the net greenhouse gas emission in 2005 by 2030
- Net zero by 2050.

October 2023

Transport for NSW's Net Zero and Climate Change Policy came intro effect, setting principles and requirements aimed at achieving net zero in transport sector emissions by 2050.

November 2023

South Australia launched its Climate Ready Government Net Zero Emissions for Government Operations Program, which sets out cross-agency actions to reduce emissions – including the development of sustainable building requirements.

December 2023

The NSW Government's Climate Change (Net Zero Future) Act came into effect, legislating targets for reducing greenhouse gas emissions by:

- 50% from the net greenhouse gas emissions in 2005 by 30 June 2030
- 70% from the net greenhouse gas emissions in 2005 by 30 June 2035
- Net zero by 30 June 2050.

December 2023

The Infrastructure and Transport Ministers' Meeting approved a nationally consistent set of carbon values for use in transport infrastructure project decision making.

February 2024

In accordance with ITMM agreement in December 2023, Infrastructure Australia released a guidance note for Valuing emissions for economic analysis. This sets monetised values per tonne of carbon emissions to be used in Infrastructure Australia's evaluation of infrastructure proposals requesting more than $250 million of Commonwealth funding.

March 2024

Infrastructure Victoria published Opportunities to reduce greenhouse gas emissions of infrastructure, which provides advice to the Victorian Government on how consideration of whole-of-life transport infrastructure emissions can be included in decision-making processes, in line with the work being led by the Infrastructure and Transport Ministers Meeting. Victoria's Business Case Guidelines are now being updated to require carbon values.

March 2024

Infrastructure Australia published a Guide to assessing greenhouse gas emissions, which outlines the information required to consider greenhouse gas emissions targets in infrastructure proposals. It also sets requirements for measuring and valuing emissions in economic analysis..

April 2024

Infrastructure NSW released the NSW Decarbonising Infrastructure Delivery Policy that will apply to all NSW Government building projects valued over $50 million and linear infrastructure projects valued over $100 million. The policy becomes operational in April 2025. Technical Guidance: Embodied Carbon Measurement for Infrastructure (Measurement Guidance) was published alongside the policy. Both documents were co-designed with NSW Government agencies and industry to ensure upfront carbon emissions is a key consideration across all project stages, and embodied carbon is measured consistently for government projects.

May 2024

The Transport and Infrastructure Net Zero Roadmap was released for consultation by the Federal Department of Infrastructure, Transport, Regional Development, Communications and the Arts.

June 2024

The Infrastructure and Transport Ministers' Meeting – convened by the Federal Government to facilitate and coordinate work between all levels of government – published Embodied Carbon Measurement for Infrastructure: Technical Guidance (Guide) to support consistent measurement of embodied carbon in infrastructure projects. This guidance is aligned with PAS2080:2023 – a global standard for managing infrastructure carbon – for measurement and reporting guidance.

June 2024

The Infrastructure and Transport Ministers' Meeting published a Policy on the application of National Carbon Values by jurisdictions in the assessment of business cases for transport infrastructure. The policy states that enabled and upfront embodied greenhouse gas emissions should be considered in option selection and cost benefit analyses using National Carbon Values (or higher) for all transport infrastructure projects – and where appropriate programs – over $100 million of funding from state, territory and/or Commonwealth funding.

June 2024

The Queensland Department of Transport and Main Roads published a Guidance Note – Infrastructure Sustainability Base Case Framework. This guidance supports the Queensland Government's requirement for all government infrastructure projects over $100 million to have a sustainability assessment. The guidance uses the Infrastructure Sustainability Council's IS Rating Scheme.

August 2024

Infrastructure Australia published Embodied Carbon Projections for Australian Infrastructure and Buildings, which finds in a Maximum Decarbonisation Scenario – with the use of decarbonisation strategies and policies –, embodied carbon from transport infrastructure could reduce 25% by FY26-27, from a FY23-24 baseline.

September 2024

Tasmania's Climate Change Office released a Transport Emissions Reduction and Resilience Plan 2024-2029. Tasmania achieved net negative carbon for the 9th year in a row in August 2024, thanks to their investment in renewable energy and large forested areas. Despite this, the plan still commits to further carbon emissions by reducing whole-of-life carbon for the transport sector through mode-shift and low-emissions infrastructure.

November 2024

The South Australian Department of Infrastructure and Transport published updates to their Master Specification and Sustainability Manual, to operationalise ITMM's policy on the application of National Carbon Values and align with Embodied Carbon Measurement for Infrastructure Technical Guidance.

December 2024

NSW Treasury released the Carbon emissions in the Investment Framework, which sets the monetised value of carbon per tonne that NSW Government agencies must use when valuing carbon emission impacts in cost-benefit analyses. As of January 2025, cost-benefit-analysis of all capital projects with a total cost of $100 million or more must include the cost of the project's embodied carbon, operational carbon and enabled emissions. The Carbon Values set by NSW are higher than those set by Infrastructure Australia up until FY2048.

December 2024

The SA Climate Ready Government initiative became effective, including the Net Zero Emissions for Government Operations Program. The program includes actions to undertake early action to reduce scope 1, 2 and 3 emissions, prioritise direct emissions reduction to minimise the need for carbon offsets and leverage government procurement activity to maximise emissions reduction and low emissions economic opportunities.

December 2024

WA Department of Transport implemented the Transport Portfolio Sustainable Infrastructure Policy, which strengthens requirements of sustainable resource use and decarbonisation of life cycle impacts from energy, water and materials across transport infrastructure and assets. The Policy supports priorities under the Infrastructure and Transport Ministers Meeting.

December 2024

WA Government published Industry Sustainability Guidelines for non-residential major projects over $500 million. The Guidelines incentivise lead contractors by providing weighted criteria in relevant procurement processes for delivering Industry Sustainability initiatives.

February 2025

South Australia published their Net Zero Strategy 2024-2030, which sets out the government's objectives, policy priorities and actions to reduce greenhouse gas emissions for South Australia. Transport and the built environment are two of the seven priority sectors of the strategy.

February 2025

Infrastructure WA published Major Infrastructure Proposal Assessment Subject Guide: Decarbonisation of infrastructure. Designed for state agencies and government trading enterprises, the guide shares well-accepted approaches to carbon emission mitigation and provides guidance on how to align decarbonisation of infrastructure with expectations of capital investment set out in business case guidelines.

March 2025

WA Department of Transport and Main Roads launched CircleZero, a knowledge hub for government and industry partners to share case studies, materials guides, research and training, to progress actions towards circular economy and net zero emissions.

March 2025

Infrastructure Victoria released its draft 30-year infrastructure strategy 2025-2055 which makes recommendations for the Victorian Government to adopt the national approach to measuring and valuing embodied carbon in infrastructure projects, and to update its business case, procurement and contracting guidance in line with this.

Recommendations

Our recommendations aim to bolster the outcomes of the work being done by state, territory and Federal Governments to decarbonise infrastructure delivery. The recommendations also aim to further this work, by starting to consider how we reduce whole-of-life emissions for transport infrastructure. We also present recommendations aimed at helping to achieve a nationally harmonised approach to decarbonisation in the sector.

1. Undertake market soundings to understand low- or no-carbon innovations

Government procurement teams should always engage in market sounding to understand what innovations are available, and at what cost, prior to going out to tender or issuing a Request for Proposal.

Innovations in the decarbonisation of infrastructure are occurring rapidly, so it is critical that procurement teams are across new materials and methods of construction when developing tenders for upcoming projects. This approach is particularly important to help garner innovative solutions in rigid tenders.

This should be led by state and territory Transport and Infrastructure Departments, but organisations such as Infrastructure Australia and the Net Zero Commission could play a supporting role by undertaking broad market soundings that can be shared with states and territories.

2. Require consideration of carbon in Multi Criteria Analysis

Governments should require carbon emissions to be considered in Multi Criteria Analysis and agencies should develop guidance to ensure it is weighted sufficiently. Guidance should be provided on how to weight all types of carbon – upfront embodied, operational and enabled. Australian Transport Assessment and Planning (ATAP) should develop this Guidance.

Multi Criteria Analysis is used in business cases to consider multiple options available to address a defined problem. Weighting is given for different criteria of each option to help decide on the best option available. Guidance is needed around what weighting all upfront embodied, operational and use carbon should have to ensure emissions are sufficiently and consistently weighted to ensure low-carbon or low-build options are favoured.

3. Keep carbon intensity benchmarks up-to-date for target setting

Carbon intensity benchmarks for use in target setting and baselines have been developed in the national Embodied Carbon Measurement for Infrastructure Technical Guidance – in Appendix 7.

The Commonwealth should commit to reviewing and updating these benchmarks on a regular basis, now that a nationally consistent approach for measuring embodied carbon has been set.

State and territory Governments, and their departments and agencies, can then set carbon baselines and reduction targets, and incentivise further reductions through the tender process.

Collecting data on projects following a consistent methodology – as is now possible through the National Embodied Carbon Measurement Guidance – can form the basis for benchmarking but targets and baselines may need to be nuanced at the project level – as the conditions of the location may determine what is possible or cost feasible.

Often low carbon solutions are cost efficient, but in locations where low carbon solutions become cost prohibitive, government may need to support market transformation such as through incentives for low carbon steel and concrete.

4. Create a mechanism for bidders to challenge standards

Procurement teams should develop a mechanism in the tender process to make it easy for industry to challenge standards that may be preventing innovation in decarbonising infrastructure delivery.

State and territory Transport and Infrastructure Departments and Agencies should also develop pathways for industry to challenge standards or test innovations outside of the tender process. Transport for NSWs new Gateway to Innovate is one example.

Once at the design and construction phase, contracted businesses are unlikely to challenge standards because there is too much risk in the delivery process, but they're also unable to challenge standards in the tender process – as they need to prove they're able to deliver according to government requirements.

The tender process should include a mechanism that offers bidders the chance to put forward innovative decarbonisation solutions that challenge government standards. These innovations should be reviewed by the procurement team, and associated standards should also be reviewed where innovations present the possibility of significant carbon reductions.

Governments may also look to implement a process where standards can be challenged at any time outside of the tender process.

5. Develop nationally consistent Emissions Factors and calculation assumptions

For a nationally harmonised approach to decarbonisation, we need consistent Emissions Factors and calculation assumptions for construction materials and transport fuels. An Emission Factor is generally expressed as the weight of CO2 divided by a reference unit and is used to convert a unit of activity or product into its emissions equivalent.

To increase the accuracy of these estimations, Governments at all levels should encourage, and for some products require, Environmental Product Disclosures. This would increase the accuracy of data and emissions estimations.

A similar initiative can be found in the UK with the Built Environment Carbon Database. This effort can enable the alignment of new and existing calculation tools, which often vary in underlying data and methodology.

To avoid duplication of effort and continue on the path of national harmonisation, the Infrastructure and Transport Ministers' Meeting (ITMM) should identify which state or territory government is best placed to develop Emissions Factors and calculation assumptions for transport infrastructure. These Factors and assumptions should then be endorsed by ITMM for national application and use.

6. Develop technical guidance for whole-of-life carbon measurement

Technical guidance, including digital information management guidance, for measuring whole-of-life carbon emissions of transport infrastructure projects should be developed. This will build on the new technical guidance on measuring embodied carbon emissions and will ensure a harmonised approach to valuing whole-of-life emissions.

This additional measurement guidance is critical to ensure a standardised approach to the costing of embodied, operational and enabled carbon in cost-benefit-analyses – as is now required in all states and territories by ITMM through the policy on the application of national carbon values.

To avoid duplication of effort and continue on the path of national harmonisation, the Infrastructure and Transport Ministers' Meeting (ITMM) should identify which state or territory government is best placed to develop this technical guidance. The guidance should then be endorsed by ITMM for national application and use.

7. Update supporting policies and procedures for the use of national carbon values

Each state and territory should now prioritise updating policies and procedures required to support the use of the national carbon values for projects or programs over $100m. For example, updating business case and Multi Criteria Analysis guidelines.

8. Create a national decarbonising infrastructure library

To avoid duplication of effort and advance national harmonisation of decarbonisation policies and procedures, we recommend the Department of Infrastructure, Transport, Regional Development, Communication and the Arts creates a national decarbonising infrastructure library online, that collates relevant policies, technical guidance and plans set out by the Federal, state and territory Governments.

Having a central repository will assist the Infrastructure and Transport Ministers' Meeting in their efforts to harmonise the national approach to decarbonising transport infrastructure while also assisting industry to stay across a rapidly evolving spectrum of policies, monetised carbon values and measurement tools.

This online library could also be used for publishing nationally consistent emissions factors and calculation assumptions, benchmarks, baselines and comparisons once these have been set. This should incorporate and expand upon existing databases, such as the NABERS emission factor database. To ensure the library remains up to date, valid and useful, Government should fund an annual review and associated updates for the library.

9. Develop foundational learning materials for carbon management in infrastructure

To increase capability across government and industry, foundational learning materials and lessons on carbon management in infrastructure should be made available. Knowledge sharing will be easier with a nationally harmonised approach and could be led by government in partnership with industry and industry bodies.

Learning materials, online tutorials, or in-person lessons could be made available through government to industry portals, such as the Transport for NSW Infrastructure Industry Portal. Ideally this is facilitated at a Federal level, with input from state and territory governments, to ensure consistency and aid harmonisation. Learning materials could easily be included in a national decarbonising infrastructure library, as recommended above.

10. Investigate the possibility of setting a carbon budget for the transport sector

Setting a carbon budget and trajectories will avoid inflated baselines, prevent gaming emissions, and set us on track to meet our net zero commitments. This should be considered by the Department of the Prime Minister and Cabinet.

Carbon budgets set a legally binding cap on the maximum level of emissions for a set timeframe. The UK was the first country in the world to set a carbon budget in 2008 – which they gradually reduce every five years up until their net zero goal of 2050.

Setting a carbon budget requires maturity across all sectors of government and industry in being able to measure whole-of-life carbon and deliver low- to no-carbon infrastructure and services.

While Australia might not be ready to do this now, we recommend government begins investigative work on what would be required before setting a carbon budget. Some state or territory Governments may decide to be first movers, if they choose to do so.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