Net Zero Commission

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Australasian Railway Association

SUBMISSION

NSW NET ZERO COMMISSION

DECARBONISATION PATHWAYS FOR NSW - CALL FOR EVIDENCE

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ABOUT THE ARA

The Australasian Railway Association (ARA) is the peak body for the rail sector in Australia and New Zealand and represents more than 230 member organisations across the industry.

Our membership covers every aspect of the rail industry, including:

- passenger and freight operators that keep essential rail services moving;
- track owners, managers and contractors that deliver a safe and efficient rail infrastructure network; and
- suppliers, manufacturers and consultants that drive innovation, productivity and efficiency in the rail industry.

Our members support vibrant, sustainable and connected communities through greater use of rail. The ARA brings together industry and government and undertakes research and policy development to advance practical, evidence-based reform.

OVERVIEW

The ARA welcomes the opportunity to contribute evidence to the NSW Net Zero Commission's (the Commission) development of the state's first decarbonisation pathways. The three pathways should not treat transport demand, modal choice, energy supply, infrastructure delivery and climate resilience as separate variables. These elements form one system and must be modelled together if the pathways are to support practical investment and policy decisions. [1]

Rail is already a comparatively low-emissions mode for moving people and freight. The quickest transport abatement available to NSW is therefore a combination of avoiding unnecessary travel; shifting suitable passenger journeys from private vehicles to public and active transport, and suitable freight tasks from road to rail. This is consistent with the avoid-shift-improve framework supported by the ARA and the outcomes of the National Decarbonising Transport Summit. [2][3]

The pathways must also recognise the long lead times and long asset lives involved in rail. Rollingstock procured in the next decade may remain in service beyond 2050. Infrastructure, energy, technology, procurement and workforce decisions taken before 2030 will therefore materially affect whether the 2035 and 2050 targets can be achieved at reasonable cost. [4]

The submission is structured around the Commission's guided questions and focuses on those areas where rail-sector evidence is most material. It is intended for publication and contains no confidential information. The ARA supports the Commission's arrangements for receiving commercially sensitive data separately and confidentially from individual organisations.

EXECUTIVE SUMMARY AND RECOMMENDATIONS

The ARA recommends that the Commission's modelling and advice reflect the following priorities:

1. **Model mode shift as a core abatement pathway.** Include explicit passenger and freight mode-shift assumptions in every scenario, supported by measurable indicators and sensitivity testing.
2. **Set clear NSW mode-shift objectives.** Establish targets for increased public and active transport use and a dedicated rail-freight mode-share target, with transparent milestones to 2030, 2035 and 2050.
3. **Implement practical measures to move more freight by rail.** Progress an emissions-based freight incentive scheme, invest in network capacity and reliability, protect strategic freight corridors and improve access to intermodal terminals.
4. **Create a coordinated rail decarbonisation plan.** Align NSW action with a national heavy-transport or network-specific decarbonisation strategy covering rollingstock, enabling energy infrastructure, standards, approvals, data, trials and procurement.

5. **Fund trials and de-risk early deployment.** Use co-investment, concessional finance and government procurement to support Australian trials of battery-electric, bi-mode, hydrogen and other low- and zero-emissions rollingstock technologies.
6. **Secure transitional fuel supply for hard-to-electrify operations.** Treat renewable diesel and other low-carbon liquid fuels as important short- to medium-term options while protecting affordability and supply for freight and regional passenger services.
7. **Embed whole-of-life carbon and circularity.** Apply consistent carbon valuation, embodied-carbon measurement and recycled-material requirements from business case through design, procurement, construction, operation and end-of-life.
8. **Integrate resilience into every pathway.** Assess whether the infrastructure and supply chains needed for each pathway remain reliable under increasing heat, flood, bushfire and severe-weather risks.
9. **Plan for an inclusive workforce and supply chain transition.** Invest early in skills, local manufacturing and maintenance capability, regional workforce pathways, culturally safe employment and genuine opportunities for First Nations businesses and communities.
10. **Build a decision-grade evidence base.** Develop consistent rail emissions, freight-task, fleet, energy-demand and technology-deployment datasets, with leading and lagging indicators that can be updated as evidence changes.

1. POLICIES AND MARKET MECHANISMS

Question 1.1: What opportunities or barriers could improve the effectiveness of NSW's transition to net zero?

The greatest immediate opportunity is to accelerate this mode shift as an emissions-reduction measure. The Commission's pathways should make the emissions consequences of modal choice visible. The ARA's July 2025 submission to the Commission identified that, using the then available 2022 data, road transport accounted for 87 per cent of NSW transport emissions while rail accounted for two per cent. [5] The Value of Rail 2025 subsequently found that passenger rail produces 40 per cent less carbon pollution than road travel per kilometre and freight rail is 16 times less carbon intensive than road freight per tonne-kilometre. [6]

This emissions advantage means mode shift can deliver abatement before every vehicle or locomotive is replaced. National modelling in The Value of Rail 2025 found that shifting one per cent of freight from road to rail would reduce crash, health and emissions costs by about $80 million each year. It also found that an additional 10 per cent of commuters using trains and trams to travel to work could generate $669 million a year in social and environmental benefits. Although this is national-level data, it demonstrates why mode shift should be tested explicitly in the NSW pathways. [6]

The principal barriers are the absence of explicit mode-shift objectives, constrained network and terminal capacity, service reliability, fragmented land-use and transport planning, and appraisal frameworks that do not consistently value avoided congestion, road trauma, air pollution and infrastructure costs. The pathways should therefore include passenger-kilometres and freight tonne-kilometres by mode, not only the emissions intensity of individual vehicles.

> **Recommendation:** Include quantified passenger and freight mode-shift assumptions in the Balanced, Delayed and Fast-tracked pathways, and publish the emissions and wider economic effects of those assumptions.

Question 1.2: What policies or market mechanisms could accelerate emissions reductions in specific sectors or communities? What barriers or opportunities exist for their adoption, including any evidence from businesses, industry and/or comparable jurisdictions?

The ARA's 2025 submission called for a dedicated NSW rail-freight mode-share target and urgent implementation of an emissions-based incentive scheme. It noted that rail's share of interstate freight was only about two per cent between Melbourne and Sydney and three per cent between Sydney and Brisbane. [5] Transport for NSW's Delivering Freight Policy Reform in NSW recognised that previous efforts to increase rail's modal share had not been effective and identified an incentive scheme for investigation. [7]

However, an incentive scheme alone will not be sufficient; mode shift depends on reliable paths, suitable terminal capacity, efficient access pricing, interoperability, protection of freight corridors, clear investment pipelines and service performance that meets customer needs. Complementary mechanisms should include public and active transport mode-share objectives, consistent carbon values in business cases, digital freight-emissions information, lower-emissions requirements in government purchasing and major-project logistics plans, and proportionate whole-of-life carbon requirements.

> **Recommendation:** Adopt a measurable NSW rail-freight mode-share target and implement a coordinated package covering incentives, network performance, intermodal terminals, corridor protection, digital carbon information and planning reform.

Question 1.3: How could the NSW Government better stimulate private finance at the scale and pace needed for the net zero transition?

Rail assets have long lives, high upfront costs and benefits that accrue across users and the wider community. Private finance will not reach the required scale if policy is fragmented, government investment pipelines are uncertain, or project appraisal does not recognise avoided emissions, congestion, health and safety costs. A stable policy framework should combine consistent carbon values in business cases, transparent infrastructure and fleet pipelines, risk-sharing for first-of-a-kind trials and clear long-term service or access arrangements.

Existing public finance mechanisms can be used more deliberately to crowd in private investment. Concessional finance, grants and co-investment through relevant state and Commonwealth programs can reduce technology and infrastructure risk, while coordinated procurement across jurisdictions can create the market scale needed for suppliers to invest in Australian capability. Government should also publish the assumptions used to value carbon and co-benefits so proponents and financiers can apply them consistently.

> **Recommendation:** Develop an investable NSW transport-decarbonisation pipeline, supported by consistent carbon valuation, coordinated procurement and targeted risk-sharing for enabling infrastructure and technology trials.

Question 1.4: What are the drivers and risks to reaching NSW's interim targets in 2030 and 2035, and net zero by 2050?

Key drivers are early passenger and freight mode shift, timely renewable electricity and fuel supply, coordinated fleet and infrastructure planning, policy stability, investable procurement pipelines and workforce readiness. The 2030 and 2035 targets require measures that can reduce emissions before wholesale fleet replacement, while decisions made during the next fleet-renewal cycle will shape the feasibility and cost of reaching net zero by 2050.

Material risks include continued growth in private and road-freight vehicle kilometres, rollingstock replacement decisions that commit operators to diesel for decades, slow grid and refuelling infrastructure, constrained low-carbon fuel supply, inconsistent standards and approvals, fragmented procurement, skills shortages and disruption from worsening heat, flood, bushfire and severe weather. Rollingstock asset lives and climate exposure make delay particularly costly for rail. [4][8]

> **Recommendation:** Use milestones and decision points for 2030, 2035 and 2050 that address mode share, fleet renewal, energy infrastructure, technology readiness, workforce capability and resilience, with sensitivity testing for delayed action.

Question 1.5: What are the opportunities or barriers for collaboration across sectors to support the transition?

Transport for NSW, Infrastructure NSW, NSW Treasury, the energy and environment portfolios, planning agencies, local government, operators, infrastructure managers, ports, freight customers, energy providers, unions, the research sector and the rail supply chain all hold parts of the solution. Collaboration is needed to align transport demand, network investment, land use, electricity and fuel supply, technology approvals, workforce planning and climate resilience.

NSW Government action should align with national heavy-transport decarbonisation, infrastructure carbon measurement, product approvals, rollingstock standards and energy planning. National alignment is also important for interstate freight operators whose locomotives cross multiple networks. Different fuel, charging, approval or reporting requirements in each jurisdiction would increase costs and slow deployment.

> **Recommendation:** Establish a cross-sector pathway implementation forum with clear ownership, national coordination and structured engagement with operators, infrastructure managers, suppliers, workers, communities and research organisations.

2. TECHNOLOGY AND BEHAVIOUR CHANGE

Question 2.1: What are the opportunities and barriers to technology development and deployment for each sector?

Rail traction accounts for about 90 per cent of the industry's scope 1 and 2 operational emissions. [4] Metropolitan passenger networks are largely electrified, but regional passenger, freight and heavy-haul services remain predominantly diesel-powered. The ARA's rollingstock critical-path research identified approximately 2,600 diesel-powered locomotives nationally and estimated in 2024 that around half of the fleet may require replacement within eight to 13 years. Because rollingstock typically remains in service for 25 to 30 years, poorly timed decisions could lock in higher emissions beyond 2050. [4]

Technologies and readiness. No single technology will suit every rail task. The practical pathway is likely to combine energy-efficiency measures, renewable diesel and other transitional fuels, bi-mode operation, further electrification, battery-electric and hybrid systems, and potentially hydrogen or other future fuels. Technology suitability and readiness depend on route length, gradients, payload, duty cycle, access to electricity or fuel, depot constraints, safety requirements, interoperability and whole-of-life cost.

Constraints on uptake and deployment. Key barriers identified by the ARA's research include:

- limited Australian trials and incomplete evidence on performance under local operating conditions;
- uncertain availability and price of renewable fuels, hydrogen and grid capacity;
- inconsistent standards and approval processes across networks and jurisdictions;
- the uneven allocation of costs and benefits between operators, infrastructure managers, energy providers and government;
- short-term budget and procurement settings that do not align with long asset lives;
- depot, bridge, power and corridor constraints that can add cost to enabling infrastructure; and
- workforce, manufacturing, maintenance and supply-chain capability gaps.

Cost evidence. Current and future costs are highly use-case-specific. The pathways should compare total cost of ownership, including vehicles, electricity or fuel, network and depot upgrades, maintenance, residual value, carbon and service impacts. Cost curves should use ranges and sensitivities for energy prices, technology learning, utilisation and asset life rather than assuming a single cost or deployment rate.

Role of the NSW Government. NSW can reduce barriers by co-designing trials with industry, enabling trials to operate across networks, using the National Product Type Approval framework and nationally harmonised standards, coordinating charging, power and refuelling infrastructure, and sharing trial evidence wherever commercial and safety considerations permit.

> **Recommendation:** Establish a NSW rail-technology deployment program that is coordinated with Commonwealth and other state and territory initiatives, co-funds trials, streamlines approvals, shares evidence and coordinates enabling energy infrastructure before the major fleet-renewal window.

Transitional fuels. Renewable diesel and other low-carbon liquid fuels can reduce emissions from existing locomotives without waiting for wholesale fleet replacement or extensive new infrastructure. They are particularly relevant to long-distance freight and regional passenger services that may be difficult to electrify. However, ARA members have consistently identified price premiums, uncertain domestic supply and competition with other hard-to-abate sectors as barriers to uptake. [9]

The pathways should not assume unlimited fuel availability at a uniform price. They should test supply constraints, competing sectoral demand, lifecycle emissions and regional access. Transitional fuel assumptions should also avoid delaying investment in genuinely zero-emission technologies where these are operationally and economically feasible.

> **Recommendation:** Model realistic low-carbon fuel supply, price and lifecycle emissions, and develop targeted measures that give freight and regional passenger operators access to affordable transitional fuels while zero-emission technologies mature.

Infrastructure technology and materials. The transport pathway should include emissions embodied in new and renewed infrastructure, not only vehicle and traction emissions. The ARA supports the direction of the NSW Decarbonising Infrastructure Delivery Policy and the Sustainable Construction Protection of the Environment Policy, including consistent measurement of upfront carbon and recycled-material use. [10]

The greatest opportunity to avoid embodied emissions occurs before delivery. Business cases should test no-build and optimise-existing-asset options; project teams should engage the supply chain early; specifications should focus on outcomes; and approvals should allow proven low-carbon and recycled products to move efficiently between networks. Reporting should align with established frameworks and prioritise material emissions sources so that the burden, particularly on smaller suppliers and contractors, remains proportionate.

> **Recommendation:** Apply whole-of-life carbon, circular-economy and climate-resilience criteria consistently from strategic planning and business case through procurement, construction, operation, renewal and end-of-life.

Question 2.2: What are the opportunities to foster demand reduction and behaviour change?

Demand-reduction measures should reduce avoidable private-vehicle travel by making lower-emissions choices practical, while preserving equitable access to jobs, education, health care and community life. Integrated land-use and transport planning supports both objectives by shortening trips and placing more homes, services and employment within convenient reach of public and active transport. Flexible work and digital service delivery may reduce some journeys, but they do not replace the need for accessible, frequent and reliable transport.

Mode choice is driven by practical conditions, including reliability, safety, convenience, frequency, accessibility, comfort and value for money. The pathways should distinguish between stated willingness to change and the service conditions needed to make change practical. Behavioural assumptions should be linked to measurable service and access improvements rather than relying mainly on information campaigns.

Practical measures include:

- integrated land-use, housing and transport planning around rail and public transport corridors;
- frequent, reliable and safe services with simple, integrated fares and journey information;

- first- and last-mile walking, cycling and feeder-service connections;
- affordable access for communities currently underserved by public transport, including regional and outer-metropolitan areas;
- road-pricing, parking and low-emission-zone measures introduced only alongside credible and equitable alternatives; and
- freight information and procurement requirements that help customers compare the full emissions and social costs of modal choices.

> **Recommendation:** Tie passenger mode-shift assumptions to service quality, affordability, accessibility and land-use measures, and test the distributional impacts of pricing or demand-management policies.

3. ECONOMIC IMPACTS AND JUST TRANSITION

Question 3.1: What are the likely economic effects on NSW of different emissions pathways, relative to NSW's current level of ambition?

Decarbonisation should be modelled as an economic and productivity transition, not only as an emissions constraint. The Value of Rail 2025 estimated that rail directly added $6.8 billion to the NSW economy in 2024, comprising passenger rail, freight rail, manufacturing and supply, and rail construction. NSW benefited from the largest direct rail contribution of any jurisdiction. Nationally, the wider rail industry contributes $38.8 billion and supported about 196,600 jobs directly and indirectly. [6]

A well-managed pathway can support skilled employment, local manufacturing and maintenance, cleaner supply chains, lower congestion and safer roads. A poorly sequenced pathway risks stranded assets, higher fuel and energy costs, fragmented technology choices, supply shortages, duplicated approvals and another boom-bust procurement cycle. Those risks would be felt most strongly by smaller suppliers, regional operators and workers who have less capacity to absorb rapid changes in demand.

A Fast-tracked pathway would require greater near-term capital and workforce mobilisation but could bring forward productivity, safety, health and emissions benefits and reduce the risk of long-lived diesel lock-in. A Balanced pathway would stage investment and capability growth but still requires early enabling decisions. A Delayed pathway may reduce near-term expenditure but is likely to increase later adjustment costs, compressed delivery risks and the abatement burden placed on other sectors.

Question 3.2: What are the most significant economic or workforce pressures the pathways should account for in your sector or community?

The pathways should assess workforce demand by occupation, location and timing. Relevant capability includes electrical and energy systems, battery and hydrogen safety, systems integration, data and digital maintenance, carbon measurement, climate-risk assessment, sustainable design, manufacturing and maintenance. Training providers need sufficient lead time and a credible pipeline before these skills are required at scale.

Economic pressures include high upfront capital costs, uncertain energy and fuel prices, uneven allocation of costs and benefits across operators and infrastructure managers, limited supplier scale, approval duplication and volatile procurement pipelines. A coordinated pipeline can help businesses invest in people, facilities and technology, while a fragmented or stop-start pathway will raise costs and weaken local capability.

> **Recommendation:** Publish a staged workforce and supply-chain plan alongside the preferred pathway, including demand forecasts, capability gaps, training responses and opportunities for Australian manufacturing, maintenance and technology providers.

Question 3.3: What are the opportunities and barriers to addressing socio-economic priorities for a just transition, including equitable outcomes for First Nations peoples and rural, regional and remote communities?

A just transition requires equitable access to the benefits of cleaner transport and meaningful participation in the work and investment it creates. Public transport must remain affordable and accessible, including for people with disability, people on lower incomes and communities in outer-metropolitan and regional areas. Freight and regional rail investment can also strengthen the reliability of supply chains and the economic resilience of communities across NSW.

Rail operates across Country and connects urban, regional, rural and remote communities. The ARA's 2026 research on the participation and engagement of First Nations people in rail identified opportunities to strengthen culturally safe workplaces, reconciliation leadership, sustainable employment and partnerships with First Nations businesses. [11] These outcomes should be designed into procurement, skills and regional investment rather than added after projects and programs are established.

The Commission should assess:

- who bears changes in fares, road charges, energy prices and transition costs;
- whether communities have a practical low-emissions alternative before demand-management measures commence;
- the location, quality and durability of new jobs, including transition pathways for existing workers;
- opportunities for First Nations participation, shared decision-making, employment and procurement;
- impacts on regional supply chains and small and medium-sized enterprises; and
- whether benefits such as cleaner air, safer roads and improved access are distributed fairly.

> **Recommendation:** Include distributional measures in pathway evaluation and require major transport-decarbonisation programs to set transparent employment, capability, accessibility and First Nations participation outcomes.

4. EVIDENCE AND OTHER CONSIDERATIONS

Question 4.1: What evidence can you provide to inform pathway inputs and assumptions? For example, cost curves, deployment rates or sector-specific data, including commercially sensitive data where relevant.

The ARA supports transparent assumptions that can be updated as technologies, costs and behaviour change. Evidence from previous ARA research provides useful starting points, while recognising that national estimates must be calibrated to NSW conditions.

Suggested rail inputs include:

Modal emissions intensity: Passenger rail produces 40 per cent less carbon pollution than road travel per kilometre; freight rail is 16 times less carbon intensive than road freight per tonne-kilometre. [6]

Mode-shift co-benefits: A one per cent national freight shift from road to rail saves $80 million annually in crash, health and emissions costs; an additional 10 per cent of commuters using train and tram was estimated to create $669 million annually in social and environmental benefits. [6]

NSW economic baseline: Rail directly contributed an estimated $6.8 billion to the NSW economy in 2024 across passenger, freight, manufacturing and supply, and construction. [6]

Operational emissions: Traction energy represents about 90 per cent of rail scope 1 and 2 operational emissions, while freight accounted for about 95 per cent of direct national rail emissions in the ARA's 2024 analysis. [4]

Fleet and timing: Approximately 2,600 diesel locomotives operate nationally; around half of the rollingstock fleet may require replacement within eight to 13 years (as of 2024) and rollingstock commonly remains in service for 25 to 30 years. [4]

Technology pathway: Use-case-specific combinations of energy efficiency, transitional fuels, bi-mode systems, electrification, batteries, hydrogen and other future fuels should be modelled rather than a single technology assumption. [4]

Resilience: Rail assets and operations face growing exposure to heat, floods, bushfires and severe weather, requiring assessment of resistance, redundancy, reliability and response across people, processes, assets, interdependencies, metrics and data. [8]

How the three scenarios could be differentiated:

Balanced pathway. Assume a credible, staged increase in passenger and rail-freight mode share; timely fleet trials and planning; progressive access to transitional fuels and electricity; consistent carbon valuation; and steady improvement in embodied-carbon and resilience practice.

Delayed pathway. Test lower service investment and mode shift, slower energy infrastructure, constrained renewable-fuel supply, fragmented approvals and late technology trials. The model should show the additional cost and abatement burden created by diesel lock-in and deferred resilience investment.

Fast-tracked pathway. Test earlier passenger-service and freight-productivity improvements, stronger mode-shift incentives, coordinated procurement, co-funded demonstrations, accelerated enabling infrastructure, widespread renewable electricity and mature whole-of-life carbon requirements.

For all scenarios, the Commission should publish key assumptions, ranges and sensitivities. Commercially sensitive fleet, fuel and investment data could be received confidentially and aggregated before publication, consistent with the Commission's consultation approach. [1]

> **Recommendation:** Create a rail data workstream with government, operators, infrastructure managers and industry bodies to improve the NSW baseline for freight task, fleet composition, energy demand, emissions, technology readiness and deployment cost.

Question 4.2: Beyond emissions reduction, what outcomes should be considered? For example, impacts on business, jobs, land use, water and biodiversity.

The preferred pathway should maximise total public value. Emissions reductions are central, but the modelling and appraisal framework should also capture:

- productivity and supply-chain reliability, including the efficient movement of growing passenger and freight tasks;
- congestion, road maintenance and network-capacity effects;
- road and rail safety outcomes and avoided crash costs;
- air-quality and health benefits, including reduced particulate emissions and increased active travel;
- access to employment, education and services, including accessibility and social inclusion;
- jobs, skills, local manufacturing, maintenance and innovation capability;
- First Nations employment, procurement, cultural safety and community partnership outcomes;
- land use, biodiversity, water, waste and circular use of construction materials; and
- climate resilience, service continuity and recovery costs under more frequent and severe events.

These co-benefits are not incidental. They materially affect the relative value of pathways and the willingness of households, freight customers and investors to support the transition. A pathway that reduces exhaust emissions but increases congestion, inequitable access or exposure to climate disruption would not represent an optimal outcome for NSW.

Question 4.3: Do you have any other comments or information to provide?

Climate resilience should be treated as a pathway input rather than a separate adaptation issue. The infrastructure, energy systems and supply chains needed to decarbonise transport must continue to operate under increasing heat, flood, bushfire and severe-weather risks. The ARA's Climate resilience framework for rail provides a practical basis for considering resistance, redundancy, reliability and response across people, processes, assets, interdependencies, metrics and data. [8]

The Commission should track a concise combination of leading and lagging indicators, including:

- transport emissions by mode and passenger/freight task;
- passenger and freight mode share, service coverage, frequency and reliability;
- fleet composition, age, energy source and efficiency;
- renewable electricity and low-carbon fuel availability, price and use;
- trial completion, technology approvals and rate of deployment;
- charging, power and refuelling infrastructure readiness;
- whole-of-life and upfront carbon in major transport infrastructure;
- recycled and reused materials, with proportionate reporting;
- workforce capacity, local capability and First Nations participation; and
- climate-risk exposure, resilience investment, disruption and recovery performance.

Metrics should align with existing reporting wherever possible, avoid unnecessary duplication and be capable of supporting course correction. The pathway assumptions and indicators should be reviewed on a regular cycle as technology, costs, energy markets and travel patterns change.

> **Recommendation:** Publish a regular transport pathway scorecard covering emissions, mode shift, technology, infrastructure, workforce, equity and resilience indicators, and update pathway assumptions as evidence changes.

CONCLUSION

NSW has an opportunity to build a transport pathway that delivers near-term abatement while preparing the assets, energy systems, workforce and supply chains required for 2050. Rail can make an immediate contribution through greater use of existing passenger and freight capacity and a longer-term contribution through coordinated decarbonisation of rollingstock and infrastructure.

A mode-shift-first approach can reduce emissions and wider social costs now, while early planning, trials and investment can prevent long-lived rail assets from locking in avoidable emissions. Whole-of-life carbon, resilience and a just transition should be embedded across that pathway from the outset.

The ARA would welcome the opportunity to work with the Commission, the NSW Government and industry to refine rail-related assumptions, identify data sources and test practical implementation options as the pathways are developed.

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[11] Australasian Railway Association (2026), *The participation and engagement of First Nations people in the rail industry*. Available online.