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**Abstract:**

The National Committee on Transport (NCTR) of Engineers Australia has identified five transport issues as being of highest national priority, and the condition of Australia's transport infrastructure is one of them. This paper is based on a draft position paper of NCTR. Concentrating on land transport (railways and roads), it reviews the transport task that rail and road infrastructure is expected to service now and in future. The implications of this in terms of using infrastructure that is 'fit for purpose' are assessed both for the rail and for the road sector. The paper suggests that there is a large backlog of necessary works to bring Australia's land transport infrastructure up to scratch. These capital works are broadly identified. The problems are very different in metropolitan and regional areas, and these are distinguished. The paper then argues for a better pricing framework than we currently have, and for interim government intervention in the modal choice for port-related freight before an improved pricing framework can be achieved. The paper concludes with a number of policy recommendations, which if implemented together would eventually allow Australia to claim that its land transport infrastructure was truly 'fit for purpose' for present and future freight and passenger tasks.

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### **Introduction**

The National Committee for Transport (NCTR) is a sub-committee of Engineers Australia, formerly known as the Institution of Engineers, Australia. NCTR exists to focus the energy of the nation's transport engineers towards:

- influencing government policy making;
- promoting excellence in transport systems, analysis techniques and education;
- providing expert guidance on transport issues to Engineers Australia members and others;
- encouraging informed debate on transport issues;
- promoting direction to research and investigation; and
- communicating with state panels/branches and other stakeholders on transport issues.

NCTR has identified five transport issues as being of highest national priority, and the condition of Australia's transport infrastructure is one of them. The other four areas are:

- road safety;
- changing travel behaviour;
- transport infrastructure funding (the federal Government has taken major steps forward with the concept generically known as "AusLink" in its Green Paper (Department of Transport and Regional Services, 2002) – see Kilsby (2003) for a summary; and
- the relationship between transport, the environment and health – see Kilsby and Laird (2004) for a summary.

This paper is based on a draft position paper of NCTR (2004). Concentrating on land transport (roads and railways), it reviews the transport task that rail and road infrastructure is expected to service now and in future, and whether the infrastructure is, and will be, fit for purpose. By "fitness for purpose" we mean that the infrastructure condition and capacity is commensurate with the transport demands which it is called upon to support, and in particular that freight should not be subject to restrictions on its transport because of avoidable deficiencies in the infrastructure. More generally, to quote Engineers Australia (2001) "Infrastructure is fit for purpose for its current and anticipated purpose in terms of infrastructure condition, committed investment, regulatory appropriateness and compliance, and planning processes"

The broad framework for determining whether Australia's Land Transport Infrastructure is 'Fit for Purpose' has been established at four levels comprising:

- National level: The Federal Government's Draft National Transport Strategy 'Auslink'
- State level: State and Territory Transport Plans;
- Regional level: Regional Transport Strategies within each state.
- Technical level; Engineers Australia (1999) Task Force report on Sustainable Transport; Engineers Australia (2000, 2001, 2003) Infrastructure Report Cards; and Railway Technical Society of Australasia (RTSA - 2002).

## **The land transport task**

Road vehicles were driven in Australia's capital cities a total of about 105 billion kilometres in 2001 (Australian Bureau of Statistics - ABS, 2003). This is an increase of over 20 per cent from 1991 levels. Further growth is projected.

The Auslink White Paper predicts an almost doubling of the national freight task in the next 20 years, with the highest growth in the domestic non-bulk freight sector to 255 billion tonne kilometers (btkm) by 2020 at an average annual growth rate of 3.4%. This overall growth assumes increases in exports and domestic production, along with improvements in transport efficiency. The recent (1999-2000) modal share of freight tonnages is estimated at 72% by road, 26% rail, 2% sea and 1% air, with road and rail assuming respectively 37 and 35 % of the tonne kilometers.

Such predictions have significant implications for Australia's transport network for all modes and will require a more integrated approach in planning to ensure improved linkages to rail inter-modal facilities, shipping berths and airports in order to gain a more balanced modal share. Factors which are crucial to determining where emphasis should be placed include:

- The best modes for handling 'Just in time' commodities;
- The condition and safety of the road network;
- Changes in heavy vehicle configurations and legal load limits;
- The condition, efficiency and capacity of the rail network;
- Deep sea Panamax vessel capability at national ports and servicing times;
- The potential role of the Port of Darwin and the Adelaide - Darwin railway in servicing the Asian and European markets;
- The most effective modes for handling east-west and north-south interstate freight tasks.

## **Implications for the rail network**

With the completion of the Alice Springs to Darwin railway, Australia has about 37,000 route-kilometres of standard, broad and narrow track as against a 44,883 km peak in 1940 and 34,480 km in 1990 (Quinlan, 2001).

As observed by the House of Representatives Standing Committee on Communications, Transport and Microeconomic Reform (1998), the quality of Australia's rail infrastructure varies from deficient to the world's best. Engineers Australia (2000, 2001) has twice rated the Melbourne – Sydney – Brisbane mainline interstate track as F and the iron ore railways of the Pilbara Region in WA as A+ (on a scale from A to F). Other ratings (RTSA, 2002) include Central Queensland's narrow gauge electric coal railways as A-, Hunter Valley coal lines and the Adelaide - Perth track as B, with urban rail operations of A- for Perth, C- for Sydney and D for Adelaide, with Engineers Australia (2003) rating NSW rail as D.

Aside from sugar railways (which move up to 40 million tonnes per annum (mtpa) of cane on narrow 610 mm track, and track for tourist trains), rail infrastructure can be divided into categories as follows, which we examine in turn:

1. Iron ore, coal and other mining railways;
2. Other regional lines;

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3. The Defined Interstate Railway Network; and
4. Urban rail track.

#### Mining railways

Exports of coal and iron ore in 2002-03 were valued at over \$17 billion. The iron ore railways in the Pilbara Region of WA were constructed in the 1960s with the expectation that each line would carry less than 10 million tonnes per annum (mtpa). Each of the two main lines (to Port Hedland, and to Dampier) now haul in excess of 60 mtpa. Accommodating a surge of tonnage during the 1970s led to Australia becoming a world leader in rail heavy haulage with major advances in axle loads, performance, productivity and energy efficiency.

Queensland Rail electrification of Central Queensland coal lines during the 1980s and their ongoing development is another success story. NSW Hunter Valley track supporting coal exports has scope for improvement, including better separation of coal and other freight trains, with a new Fassifern – Hexham link. Heavy haul in both Queensland and NSW could use some easing of ruling 1 in 80 grades facing loaded trains. Hauling coal via Sydney to Port Kembla is a text book example of difficult operations including rail congestion and steep 1 in 40 ruling grades.

#### Other regional lines

In New South Wales and other states, rural lines supporting grain transport are degraded with severe speed-weight restrictions. Failure to upgrade such track will lead to many more heavy trucks using rural roads which will incur appreciable costs to road authorities. Such “cost shifting” is not new, as per an account of the Industry Commission (1991) on the costs of closing the Wilmington – Gladstone line in SA, and has been accentuated with recent rail privatisations. As outlined by the NSW Farmer’s Association (2002) Green Paper, potential grain line closures are now of particular concern. A NSW Department of Transport (2003) report examined 15 grain lines and recommended the closure of three lines, with further consideration of other lines.

The issue is further complicated by ongoing relaxation of mass and dimension limits for heavy trucks whilst current road user charges for the heavier trucks hauling large distances each year result in under-recovery of road system costs by the National Transport Commission (NTC 2004). As recognised by several enquiries in the 1980s, this is a long-standing issue in Australia (Laird, 1990, with further elaboration in Laird et al, 2001). Under-recovery of road system costs from the heavier long distance trucks is recognised by the Bureau of Transport and Regional Economics (BTRE – 1999a). Pending a third determination by the NTC of road user charges, the RTSA has argued (2004) that there is a good case for putting on hold both approvals for the areas of operation of longer and heavier trucks, and maintaining Community Service Obligation payments for rural grain lines.

Residual gauge standardisation of non metro broad gauge lines is long overdue in Victoria and South Australia. It is hard to see how Victoria can achieve its goal of being Australia's centre for freight and logistics without gauge standardisation.

#### The Defined Interstate Rail Network

The Defined Interstate Rail Network (DIRN) includes over 8000 km of standard gauge track joining the mainland capital cities and their ports with connecting lines to Whyalla, Port Kembla and Newcastle. Current priorities include adequate crossing loops along with good formation, ballast, bridges and tunnels. Increased track capacity in Sydney for separation of freight and passenger trains, and modern safeworking systems, are also needed.

The Adelaide - Perth rail corridor can support 1800 metre trains with double stacked containers. Rail is now able to win about just over 80 per cent of interstate land freight moving in and out of Perth which is estimated to be about 3.5 million tonnes (BTRE, 2003). Between Melbourne and Sydney, over 10 million tonnes of non-bulk freight is now moved each year, with rail winning only about 1 million tonnes a year (ie 10 per cent) of intermodal intercity freight on this corridor.

The Broken Hill - Adelaide and Melbourne - Adelaide lines currently carry over 5 million tonnes of freight per annum . These tasks are predicted to increase as more freight is attracted to the Adelaide-Darwin Railway line from the eastern states and mining industries.

The operating average speed on these east-west lines is approaching optimum (90km/hr) and the track condition is generally good. However, capacity exists for additional trains and double stacking (subject to investment in raising clearances on the Adelaide - Melbourne line). There is strong potential for increasing mode share on the east-west railway network to cater for the projected freight tasks and to support the Asian market via the Adelaide-Darwin railway. Infrastructure to support this could include inter-modal facilities at Parkes, Port Augusta and Crystal Brook, and a possible diversion of the Melbourne - Adelaide line through the Adelaide Hills north of Ballhanah to Gawler or the raising of existing tunnels and road bridges in the Adelaide Hills and metropolitan area.

As recognised by the 2001 Australian Rail Track Corporation (ARTC) Track Audit, the House of Representatives Committee cited above, a Prime Minister's Task Force (1999) and the Productivity Commission (1999)), most attention now needs to be paid to New South Wales.

Most Melbourne - Brisbane freight is moved by heavy trucks along the Newell Highway west of the Great Divide. As recognised by many reports, benefits would accrue from upgrading the existing NSW lines via Parkes and constructing new lines in South East Queensland to give a more direct rail route between Melbourne and Brisbane. This could be combined with a new Grandchester - Gowrie route. The Track Audit noted an investment of \$1.5 billion for an inland route.

On 5 September 2004, an intergovernmental agreement for the Australian Rail Track Corporation (ARTC) to take a 60-year lease on the NSW mainline interstate tracks comes into effect. This provides \$872 million investment over five years for track upgrades to reduce terminal to terminal times including Melbourne - Sydney from 13 hr 30 min to 10 hrs 30 min.

Even if all the work under the ARTC - NSW agreement were to be completed, and the entire Albury - Sydney - Brisbane track had concrete sleepers, this track would still not be 'fit for purpose'. To support efficient and competitive intermodal freight operations, the ability is needed to move heavy freight trains at an average speed of at least 80 km per hour. This is the case with the Class I Railroads in Canada and the United States. The capacity to move double stacked containers is a further advantage. About 23 per cent of the track between Junee and

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Campbelltown is on curves with a radius of less than 800 metres and so speed has to be reduced. Most of this 'steam age' alignment could be eliminated by construction of three major deviations as identified in the ARTC Track Audit. On the North Coast line between Maitland and Brisbane, over 40 per cent of track is on curves of radius less than 800 metres.

To bring the DIRN up to infrastructure performance targets proposed by a National Transport Planning Taskforce (2004) and agreed by Australia's Transport Ministers in 1997, including intermodal trains averaging 80 km/h, would cost approximately \$3 billion. Investment at this level would allow Main South track straightening and, along with notable improvements in rail's share of interstate freight, would support passenger tilt trains at moderately high speeds. Upgrading mainline track for faster and heavier freight trains, and the use of tilt trains, has proved to be effective in Queensland.

Queensland's North Coast Main Line, although upgraded during the 1980s and 1990s with more recent concrete resleepering requires further track straightening along with Caboolture - Nambour duplication.

The ARTC - NSW agreement and the AusLink White Paper provide a good, albeit delayed, start. In addition to the \$872m noted above, which includes \$432m for the Sydney - Melbourne rail link, a further 2004 Federal Budget allocation of \$450m will provide Sydney - Brisbane track upgrades, including rail deviations to straighten the track. The AusLink White paper also notes proposals such as an Inland Melbourne - Brisbane railway and notes (DOTARS, 2004, p 63) that "The Australian Government expects State Governments and the private sector to contribute to the nation's rail system."

### Urban railways

Australia's mainland State Capital cities of Sydney, Melbourne, Brisbane, Perth and Adelaide are now home to about 12 million people. The cost of road congestion in these five cities was estimated by the Bureau of Transport and Regional Economics (BTRE 1999b) to be about \$12.7 billion in 1996.

By 2015, on recent trends with "business as usual" projections, the BTRE (1999b) estimates that road congestion costs will blow out to about \$30 billion in Australia's five major cities. The BTRE recently estimated the health costs of air pollution from motor vehicle use in capital cities at about \$3.3 billion per year. Increasing congestion, air pollution and urban road crash costs will adversely affect Australia's international competitiveness and quality of life.

Australia's urban rail generally gives a good service with low fares. However, Sydney's heavy rail network has failed to grow to meet the demands of a growing population. The population of Greater Sydney, which includes the Lower Hunter (Newcastle) and Illawarra (Wollongong) regions, now stands at about 4.9 million people. As recognised by official reports including the 1998 Action for Transport 2010 and the Co-ordinator General's 2001 Long Term Strategic Needs for Rail, the NSW system is now in need of a major upgrade and extension with one estimate of cost at about \$20 billion over 10 to 20 years. There is also scope to extend the present light rail network. The Adelaide urban rail system was rated D in an Infrastructure Report Card (RTSA 2002) is also considered to be in need of extension and upgrades if it is to remain viable.

The value of selective urban rail investment is clearly demonstrated by Perth. In 1991, this system was carrying about 10 million passengers per year. Following electrification and extension to Perth's northern suburbs, trains are now carrying over 31 million passengers per year. The system, which was rated A- (RTSA, 2002) is being further extended, and by 2006 will include the growing city of Mandurah to the south west. Perth's trains are expected to carry 61 million passengers per year by 2011.

### **Implications for the road network**

Australia has approximately 800,000 kilometres of roads. As noted by Austroads (2000), 18,619 km were part of the National Highway System, 94,793 km were rural arterial roads and 12,441 km were urban arterial roads. Roads are mainly the responsibility of State and Local Government, with some Federal funding commencing in 1922, and full federal funding of the National Highway System commencing in 1974.

Engineers Australia (2000, 2001) Infrastructure Report Card has twice rated National Roads as C, State Roads as C- and Local Roads as D – again, on a scale from A to F.

Along with a sustained increase in passenger vehicle kilometres (from about 78 billion passenger vehicle kilometres (bvkm) in 1975 to nearly 140 bvkm in 2000) the road network currently carries 72 per cent of the annual national freight tonnage. Much of this tonnage is carried in urban areas via the urban arterial network transferring freight from rail inter-modal facilities and ship berths to consumers and warehouses within the major capital cities and to regional areas. The balance is interstate and intrastate freight which is transferred between major capital cities via the national highway and state rural arterial road networks.

Over the last twenty-five years, road pavements have had to withstand appreciably increased loads. During the mid 1970s, a six axle articulated truck had a legal Gross Vehicle Mass (GVM) of 36 tonnes - today the standard limit is 42.5 tonnes. Some roads also cater for the use of road trains, and many roads have seen the increasing use of B-Doubles that were introduced in Australia during the 1980s.

Many State Road Authorities, Regional Local Government Associations and individual Councils have or are in the process of developing transport strategies, which provide standardised 'Fit for Purpose' hierarchical road classifications and a focus on the strategic road network, with mechanisms for maintaining and upgrading the road network under their control.

Engineers Australia (2003, 2004) is also currently in the process of developing state infrastructure report cards to rank our state transport infrastructure.

Notwithstanding population increases and efficiency changes in heavy vehicle configurations, the continuation of the current road modal split for managing the projected increases in land freight is considered unsustainable. This growth will result in accelerated deterioration of the existing road network, increased pressure to provide new road links, and an increased mix of heavy vehicles on the road network. This scenario will require considerable capital expenditure and an increase in road safety and trauma funding to offset the negative impacts arising from increased exposure to road traffic accidents involving heavy vehicles.

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In brief, this would place a heavier burden on established road maintenance and road safety programs and budgets and would be contrary to Federal and State Road Safety Strategies to reduce the incidence and cost of road trauma. Furthermore whole of life costs may potentially outweigh benefits even when considering freight cost savings arising from reduced travel times.

To avoid this, priority needs to be given to reducing both heavy vehicle use on the road network and heavy vehicle conflict with other road users. Strategies to achieve this include:

- Provision of integrated rail and heavy vehicle transport corridors to transport hubs, inter-modal facilities, ship berths and airports (ie dedicated heavy vehicle express roads located in rail corridors);
- Freight movements to and from ship berths and container terminals by rail only;
- Provision of fringe urban warehouse hubs or inter-modal facilities for distribution and transfer;
- Moving the majority of interstate and intrastate freight by rail;
- Provision of strategically located regional inter-modal facilities that assist road - rail and rail - rail transfers to the ARTC network for long distance intra and interstate freight movements; and
- Revised pricing and/or charging arrangements of road transport for fuller cost recovery.

### **Developing the road network**

Strategic roads in each state that facilitate efficient linkages to ports, rail intermodal facilities, airports and warehouse hubs should be given priority over roads that encourage or cater primarily for commuter vehicles and cars.

Like rail, most of Australia's road challenges are in New South Wales. As seen by the NSW Roads and Traffic Authority (2003), a growing economy and increased population growth will necessitate development of the motorway and arterial road network in the Greater Metropolitan Region as well as improvements to the State Highway network in regional New South Wales. Over the next twenty years there will be a need to address completion of the Sydney motorway network, including: the Westlink M7, the Lane Cove Tunnel, the Cross City Tunnel, the F3-M2 Link and the M4 East - all in the context of an overall metropolitan transport strategy for Sydney, which at the time of writing is conspicuous by its absence.

The bulk of works in regional New South Wales will comprise improvements to the major urban/rural connections and freight links. These include the Pacific, New England, Hume, Princes and Newell Highways.

For Victoria and Queensland, the Allen Consulting Group (2003) highlights strategic road investments with high benefit cost ratios as follows: Victoria - Completion of a 40 km arterial Scoresby Corridor road via Melbourne's eastern suburbs, linking Ringwood to Frankston, and a Deer Park Bypass on via Melbourne's western outskirts; and, Queensland Ipswich Motorway (Riverview to Granard Road) and the Barkly Highway (Mr Isa - Camooweal). This report also suggests that "*...there are good grounds for concluding that a substantial public investment program funded in substantial part by borrowing is feasible at present.*" We suggest this would apply for rail as well as road.



The AusLink White Paper (DOTARS, 2004) notes an allocation over five years for National Highways including \$714m for upgrading the Hume Highway and \$480m for the Pacific Highway.

### **Infrastructure costs**

The electricity supply industry has projected its estimate of the need for \$30 billion of new investment over the next 10 years - some \$10 billion for generation, and \$20 billion for distribution. It is suggested that over the next 10 or more years, about \$30 billion will also be required for the upgrade of existing rail tracks and their extension, with a larger amount for roads.

With regard to rail, for desirable upgrading of the existing Melbourne - Sydney - Brisbane route, with development of an inland route, it is suggested that an amount of \$4 billion over 10 years is realistic. Queensland's North Coast Main Line, combined with a new Grandchester - Gowrie route will probably require at least \$1 billion. Sydney's Greater Metropolitan Region was estimated to require about \$20 billion over 10 years, whilst if Adelaide, Melbourne and Brisbane are to match Perth's current urban rail investment, with more investment in Melbourne's trams, a further \$5 billion is required.

This sums to a total of \$30 billion. It is basically 'catch up' rather than 'patch up' work and is necessary to ensure that rail can carry more freight and many more passengers. It should also be seen in the context of Queensland Rail's \$6 billion investment in rail infrastructure over the past decade.

For road, in NSW alone, the Roads and Traffic Authority in the above cited submission estimated some \$28 to \$30 billion needed over the next twenty years as follows. The cost of completion of the Sydney motorway network is in the order of \$9 to \$10 billion, with a possible State contribution of about \$1 billion. The bulk of funding is expected from the private sector. State funding of the non motorway works for the Greater Metropolitan Region is expected to be in the order of \$10 billion. Improvements to the major urban/rural connections and freight links are expected to cost in the order of \$9 to \$10 billion over the next twenty years.

The Allen Consulting Group (2003) notes an estimated total currently required road works (including upgrades and new construction) in New South Wales of around \$4.4 billion, in Victoria about \$3.8 billion, and in Western Australia about \$2.2 billion.

### **User pays**

As noted by the Allen Consulting Group (2003, page 2) *"A proper pricing framework is also fundamental to the success of any overall transport plan. Without it, an appropriate balance of usage among transport modes - one that maximises community benefit - will not come about."*

Privatisation of most rail freight in Australia has occurred with moving towards user pays and profits for rail freight. Large urban rail subsidies are likely to come under increasing scrutiny.

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The AusLink Green Paper notes two new road pricing mechanisms - that of congestion charging in major cities, and mass distance pricing for heavy trucks. Both of these measures are finding increasing international application, and have scope for acceptance in Australia's more populated regions.

There is also a need to internalise significant hidden environmental and social costs with land transport. Pending recovery of all external land freight transport costs, there is scope for State Transport Authorities, in consultation with the Federal government the road transport industry, bulk handlers and stevedores, to use available policy levers (eg regulation, legislation, pricing etc) to encourage most interstate freight to be transported by rail; and for freight movements to and from ship berths and container terminals away from ports to be by rail only. The cost of any necessary multi-modal infrastructure at ports would have much fewer externality costs to be internalized than the alternative of the expansion of road infrastructure.

### **Recommendations and policy directions**

Based on the reports cited and the above analysis, the National Committee on Transport (NCTR) of Engineers Australia has made the following recommendations (some of which build on the findings of the Sustainable Energy Transport Taskforce (Engineers Australia, 1999).

- 1 Taxation and fiscal policy instruments should encourage sustainable transport. At present, these measures encourage car and truck use.
- 2 There is a strong case for increased investment in transport infrastructure that is more sustainable and less greenhouse gas intensive. Where market forces fail, government should intervene.
- 3 More holistic approaches that integrate considerations of impacts on health, sustainability and greenhouse gas emissions into transport decisions are needed.
- 4 There is a need for research to support cleaner transport fuels and technologies along with transport pricing, economics and demand management technologies (including Intelligent Transport Systems).
- 5 State Governments should ensure that rail authorities undertake advanced planning for the construction of new track and upgrading of existing track, with a view to early identification and protection of land corridors, which allow for the provision of integrated rail and express heavy vehicle transport corridors.
- 6 The Federal Government should implement its proposed AusLink programme without further delays and extend it to urban transport (or implement a special program for urban public transit).
- 7 Federal and state governments legislate to provide integrated rail and heavy vehicle transport corridors to transport hubs, inter-modal facilities, ship berths and airports (ie dedicated heavy vehicle express roads located in rail corridors);
- 8 Development plans should be amended to ensure that urban warehouse hubs and inter-modal facilities are established in fringe urban areas of the major capital cities and ports

with direct rail access to airports and ports and road access to major freeways to enable safe subsequent distribution and transfer of major freight goods within and from major cities;

9 All levels of Government in conjunction with transport handlers should plan and provide strategically located regional inter-modal facilities that facilitate road-rail and rail-rail transfers to the Australian Rail Track Corporation (ARTC) network for long distance intra and interstate freight movements;

10 Advanced planning should be undertaken by the ARTC at an early stage to upgrade the Adelaide-Melbourne-Sydney-Brisbane railway network to facilitate double stacked trains between Adelaide and Melbourne, and track straightening between Melbourne and Sydney to facilitate faster and heavier freight trains.

## Conclusion

With a few world-class exceptions, neither the rail nor the road infrastructure on which this nation's transport depends can be said to be "fit for purpose", as we have defined it at the outset of this paper, without major expenditure on upgrading. If we continue with present trends, upgrading will be unaffordable and things will deteriorate further. The recommendations put forward by the NCTR, if followed, would change the direction of those current trends and lead us to a more sustainable future.

Although Australia has some world-class rail infrastructure supporting bulk exports, there are problems with some grain lines, the East Coast Interstate Rail Network, and urban rail in Sydney and Adelaide. Most rail challenges are within New South Wales. Their resolution is in the national interest.

The Australian road network is highly variable. Within Australia's major cities, there are now major traffic problems, and building more urban motorways does not result in long term traffic improvement. Moreover, many regional roads that were upgraded during the 1950s and 1960s are now in need of further upgrading.

As with rail, the biggest challenges for the development of the road network are in New South Wales. In the metropolitan area of Sydney, the motorway network still has major gaps, and the main highways connecting regional areas to Sydney should be prioritised for improvement.

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