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Railway Challenges, Realities and Business Opportunities

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Overview
This paper describes key aspects of Australia's transport system, the challenges which face it in future and its performance. It proposes why and how rail must play a more significant role in Australian transport in order to achieve business, community and environmental outcomes. The paper follow the following elements:

1. Transport Challenges, summarising the issues which Australian transport systems face against objectives and external pressures.
2. Transport Future, which illustrates aspects of the performance of Australia's transport system, both at the present time and into the future.
3. Transport and Climate Change, discussing the interaction between climate change and the transport system.
4. Rail in Transport, describing the advantages of railways in contributing to a more efficient and effective transport system.
5. Rail Opportunities, by which railways can be promoted and encouraged to take a greater role in improving the transport system.

Transport is a derived demand. It must respond to external demands in recognition of the wider business, social and environmental context.

Transport Challenges
Discussion amongst governments, industry and commentators suggest there are four key challenges facing transport, which are large in scale and not limited by time:

1. Congestion
2. Fuel price
3. Emissions (predominantly greenhouse gases, NOx & SOx and particulates)
4. Increasing transport demand

Transport demand is primarily driven by population for passenger transport use and by both population and the economy for freight transport.

Other challenges also need to be managed, but appear to be a lower order due to smaller scale or limited timeframe.

- the current Global Financial Crisis
- Climate change (infrastructure impacts and demand changes)
- accessibility (equity of personal transport services for access)

1 At the time of presentation. At completion of the paper, Brett Hughes was Director Curtin-Monash Accident Research Centre at Curtin University of Technology.
2 Diagrams relevant to in this discussion are included in the presentation slides attached and are not duplicated here.
• workforce attraction & retention
• community and business expectations (which particularly generate political pressure)

Some are sure to argue that climate change should be included amongst the key challenges. However, while climate change certainly exhibits the right scale and temporal features, the effects on transport appear to be likely to be both smaller in scale and manageable through design, maintenance and operational changes.

The question which arises is defining the role of governments and industry in response to these challenges.

**Land Transport Performance**

The Bureau of Transport and Regional Economics (BTRE) has recorded key transport indicators for Australian capital cities and forecast future values for these indicators, covering the 30 year period from 1990 to 2020 (BTRE, 2007). These estimates show the following increases over the period, aggregated over all Australian Capital cities:

- City Population – 40 percent
- Network Delay – 90 percent (measure of time wasted due to traffic)
- Total Vehicle Travel – 90 percent
- Road Freight – 190 percent
- Total Delay – 260 percent (a measure of all time wasted in transport)
- Congestion – 290 percent (costs due to delay and other transport effects)

There are two important points which must be recognised here, regarding the occurrence of these substantial increases:

- provided that policies which have occurred in the past to improve transport, can be continued by new policies to achieve further improvements; and
- the benefits of transport investment can continue to be achieved.

Both of these propositions appear unlikely, primarily due to diminishing returns. Policies are becoming both harder to devise and implement, and lower in effect than previous policies. Transport investments (such as road construction) are both constantly more costly to build and also less beneficial in terms of results.

**Passenger Transport Forecasts**

Based on Australian and OECD information, the year 2004 would appear to be a watershed year for urban passenger transport. Up to this time, public transport travel continued to decline, or remain at a base level, often low. However, public transport dramatically increased over the following four year period and passenger road transport growth collapsed, as shown in the Table One.
Table 1: Road and Rail Passenger Travel – 2000 to 2008

<table>
<thead>
<tr>
<th>Period</th>
<th>Rail Passenger Travel Increase</th>
<th>Road Passenger (private vehicle) Travel Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 - 2004</td>
<td>per annum 1.6%</td>
<td>2.3%</td>
</tr>
<tr>
<td></td>
<td>4 year total 6.7%</td>
<td>21.9%</td>
</tr>
<tr>
<td>2004 - 2008</td>
<td>per annum 5.1%</td>
<td>0.3%</td>
</tr>
<tr>
<td></td>
<td>4 year total 9.4%</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

The reasons for this substantial shift in user behaviour are not clear. Anecdotal evidence suggests that fuel price, traffic congestion, population increase, more inner city living and more environmentally sensitive transport choices all made some contribution. All of these factors appear likely to continue into the future. However it is not clear what the future public transport and private passenger car growth rates will be.

If the pre-2004 rates of increase occurred over the following 20 years it would result in a rail passenger travel increase of 37 percent and a road passenger travel increase of 57 percent. However if the post 2004 rates of increase occurred over the following 20 years it would result in a rail passenger travel increase of 170 percent and a road passenger travel increase of six percent!

Now the crucial point is that transport policy and planning for Australian cities is based on historical growth rates similar to those experienced up to 2004. If the post 2004 growth rates continue, Australian cities are completely unprepared for the consequences. The transport system will not be able to cope with the increasing demand and mode change, and cannot provide adequate capacity. This is evidenced by the recent experiences with urban rail passenger transport failing to meet peak demands resulting in passengers being stranded and considerable customer dissatisfaction. The clear policy implication is that the current road dominated transport investment and policy would need to be dramatically rebalanced and additional funding, incentives and complementary initiatives be provided in favour of public transport based policy and investment.

For rail transport, it is extremely difficult to meet substantially increased transport demand, especially in short time frames. In practice it takes a minimum of about five years to purchase new rail rolling stock once a decision is made by a government operator in order to progress through approvals, tendering, design, procurement and delivery phases. It also takes a minimum of about ten years to build a new passenger railway line. So at these growth rates railways should be making decisions now to purchase rolling stock and increase railway lines and capacity by 64 percent.

Greenhouse Gas Emissions from Transport

Greenhouse gas emissions (predominantly carbon dioxide) remain a critical environmental, community issue, and are therefore foremost politically. This is not the place to argue the science of climate change, so while it is an issue, government and private transport interests will respond to it.
The BTRE has estimated Australian transport CO$_2$-e emissions (BTRE, 2005). Land transport CO$_2$-e emissions comprise 14 percent of national CO$_2$-e emissions. To meet greenhouse gas emissions targets, all sectors will need to reduce emissions, but most are increasing, and transport is reported as the second fastest growth sector.

This BTRE work reports transport emissions and future estimates which reveal that transport emissions are forecast to increase by 78 percent over the period 1990 to 2020. At the same time the national emission target is a 60 percent reduction in the period 2000 to 2050. Increases in greenhouse gas emission for transport sectors are summarised in the following table.

The major component of the increase in emissions is due to increases in transport demand. However, the point remains that transport emissions are increasing over a period when the national agenda requires national emissions to decrease. At the same time there is more freight carried by rail for the 2,523 million tonnes of emissions than carried by road freight for the 39,298 million tonnes of emissions. Plus the rail emission includes considerable public transport travel. This is shown in Table Two.

Table 2: Transport Sector Emissions

<table>
<thead>
<tr>
<th>Transport Sector</th>
<th>Increase in CO2-e emissions (1990-2020)</th>
<th>2020 Emissions Forecast (million tonnes CO$_2$-e)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All Modes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor Vehicles</td>
<td>74.7%</td>
<td>92892</td>
</tr>
<tr>
<td>Rail</td>
<td>44.9%</td>
<td>2523</td>
</tr>
<tr>
<td>Maritime</td>
<td>-7.6%</td>
<td>2119</td>
</tr>
<tr>
<td>Aviation</td>
<td>239.9%</td>
<td>8716</td>
</tr>
<tr>
<td><strong>Road Transport Sectors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passenger Vehicles</td>
<td>50.2%</td>
<td>53518</td>
</tr>
<tr>
<td>Cars</td>
<td>50.6%</td>
<td>51510</td>
</tr>
<tr>
<td>Buses</td>
<td>42.6%</td>
<td>1684</td>
</tr>
<tr>
<td>Motor cycles</td>
<td>35.1%</td>
<td>323</td>
</tr>
<tr>
<td>Road Freight</td>
<td>124.6%</td>
<td>39298</td>
</tr>
<tr>
<td>Light commercial vehicles</td>
<td>139.3%</td>
<td>16787</td>
</tr>
<tr>
<td>Articulated trucks</td>
<td>165.0%</td>
<td>14760</td>
</tr>
<tr>
<td>Rigid and other trucks</td>
<td>57.9%</td>
<td>7751</td>
</tr>
</tbody>
</table>

In 2000 all Australian transport emissions totalled 75Mt per annum, which is forecast to rise to 106Mt in 2020. If the forecast is extrapolated by the rates of later years, the transport emissions reach a total 145Mt in 2050. However the total Australian national GHG emissions target is only 222Mt. Therefore, if the Australian transport system continues as it has in the past, including continuing to achieve improvements through policy and investment and operations, by 2050 transport will contribute more than two-thirds of the total Australian emissions target.
Clearly, substantial changes to the transport system will be required if transport is to make its contribution to reducing national GHG emissions. While the government intends to introduce an emissions trading scheme to manage and limit emissions we shall see later that market failures question whether sufficient reductions in emissions will occur to meet the target and objectives.

**Our Transport**

Particularly since transport is not an end in itself its performance should be considered to ensure that it is efficient and effective. The following indicators reflect a variety of aspects of the current performance of the Australian transport system:

- Australian transport fuel use, emissions and transport infrastructure are amongst the highest per capita in the world,
- more than 1,600 people die on our roads and another 30,000 are injured and road crashes cost over $20 billion annually,
- traffic congestion in cities costs more than $10 billion annually
- transport emissions are responsible annually for (BITRE 2005):
  - the deaths of over 1,500 people,
  - over 4,500 cases of asthma and other sickness,
  - cost of death and sickness by transport emissions exceeds $2.3 billion annually,
- personal transport times and costs are increasing as a proportion of available time and disposable income, contributing to family pressure and other social degradation
- there has been no significant move towards more sustainable modes of transport, until recent years,
- fuel usage of passenger cars has not decreased.

This assessment of transport shows that the costs and effects of transport are already high. Many of these impacts are understated. For instance, the impacts of transport emissions on health are midrange figures and could be 40 percent higher. The costs of road crashes follow a conservative methodology and do not take full account of personal pain trauma and disruption. In addition, these figures do not include many other effects such as noise and carbon emissions. Some indicators, such as transport emissions and family impacts of travel times are not well accounted or in transport policy and planning since they are not assessed.

Some of these effects are graphically illustrated in the charts from the assessments of vulnerability to fuel, inflation and mortgage cost increases (Dodson & Sipe, 2008). These assessments, completed for small zones in each of the capital cities, demonstrate that outer areas of cities are more at risk when costs increase, including transport. An assessment of travel time would show similar patterns. Yet these are the growth areas for our cities. The estimates for later years show that these areas will deteriorate in future as costs and the system increase, and the deterioration again more marked in outer areas. In other words, *we are consigning more and more people buying their homes to areas which...*

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3 These statistics are extracted mainly from government reports, particularly the Bureau of Industry and Regional Economics (BITRE, formerly BTRE), Department of Industry Transport Regional Development and Local Government (DITRDLG), Australian Transport Safety Bureau (ATSB).
are more and more vulnerable to future transport pressures of congestion and fuel price, and these areas will degrade faster in future.

**Our Transport Future**

Transport agencies and business are investing considerably in transport systems (particularly infrastructure). Policy and operational improvements continue to be implemented, so it is worthwhile considering whether the performance of the transport system will improve. The indicators for the future, similar to those identified above, include:

- by 2050 transport emissions will comprise more than 66 percent of Australia’s entire greenhouse gas emissions target,
- transport congestion costs are increasing at a faster rate than traffic is increasing:
  - heavy vehicle transport congestion costs will increase by an additional 100 percent,
  - traffic congestion in cities will cost $20-30 billion annually by 2020,
- road trauma will deteriorate:
  - road deaths are not decreasing,
  - serious injuries caused by road crashes is rising,
  - deaths caused by articulated vehicles is increasing,
  - serious injuries caused by articulated vehicles is not decreasing,
- other factors such as health effects, transport costs and travel time are certain to increase.

In other words, transport in Australia is getting worse, not better. Additionally, the rate of deterioration for some of these indicators, such as congestion, is deteriorating at an ever increasing rate, as demand approaches capacity. Over the 15 years from 1990 to 2005, heavy vehicle congestion costs increased by 53 percent, but over the following 15 years to 2020, the costs are estimated to increase by a further 118 percent (BTRE 2007).

These figures assume that policy, infrastructure and operational improvements will continue to occur, with the same benefits and costs as in the past. However this is exceedingly unlikely:

- infrastructure construction costs are increasing
  - the unit rates over recent years (as demonstrated by tender prices and the Road Construction and Maintenance Price Index) has been increasing at a greater rate than inflation
  - projects are becoming more complex to implement (for instance as road widening becomes more expensive, as houses need to be demolished to make for wider roads),
- benefits of transport projects are diminishing as projects realise successively lower relative benefits (including accounting for inflation).

Therefore the value for money proposition for transport infrastructure projects continues to dwindle. The ultimate consequence is that the future performance of Australian transport is likely to be even worse and more expensive than forecast for governments, industry and the community.

While the data is available, it appears to be largely ignored in government transport policy and planning. It is apparent that Keynes words are being fulfilled:
"There is nothing a Government hates more than to be well-informed; for it makes the process of arriving at decisions much more complicated and difficult."\(^4\)

**Rail’s Energy and Environmental Advantage**

All transport modes which are used have a role depending on their characteristics and the environment in which they operate. Rail transport suits situations which have higher density of demand, longer distances and homogeneity (i.e. much the same product, be it bulks, containers or passengers). Obviously rail is preferred for transport such as Pilbara iron ore, and inappropriate for small packages around cities. Rail is preferred due to lower costs and higher performance (such as safety). Clearly, is important that the best mode of transport be used for the task.

Rail has a particularly important advantage in the future where fuel costs will continue to rise, and environmental issues become more sensitive, particularly carbon emissions. Rail’s energy and environmental advantages are illustrated in the following table for passenger and freight transport (Australasian Railway Association, 2009).

Rail’s advantages for passenger transport are more marked during peak travel. At such times, public transport is heavily utilised, reducing the energy use and emissions per unit of travel. At the same time, high road demand results in the opposite, where congestion increases the energy use and emissions per unit of travel. This is shown in Table Three.

**Table 3: Fuel Intensity by Transport Mode**

<table>
<thead>
<tr>
<th>Transport Mode</th>
<th>Fuel Intensity (Passenger-km/GJ-FFC)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Passenger Transport</strong></td>
<td></td>
</tr>
<tr>
<td>Ferries</td>
<td>220</td>
</tr>
<tr>
<td>Passenger vehicles</td>
<td>340</td>
</tr>
<tr>
<td>Domestic airlines</td>
<td>410</td>
</tr>
<tr>
<td>Motorcycles</td>
<td>420</td>
</tr>
<tr>
<td>Light Rail</td>
<td>460</td>
</tr>
<tr>
<td>Buses</td>
<td>590</td>
</tr>
<tr>
<td>Heavy Rail</td>
<td>650</td>
</tr>
<tr>
<td>General aviation</td>
<td>880</td>
</tr>
<tr>
<td><strong>Freight Transport</strong></td>
<td></td>
</tr>
<tr>
<td>Light commercial vehicles</td>
<td>45</td>
</tr>
<tr>
<td>Rigid trucks</td>
<td>310</td>
</tr>
<tr>
<td>Coastal shipping</td>
<td>410</td>
</tr>
<tr>
<td>Articulated trucks</td>
<td>990</td>
</tr>
<tr>
<td>Pipelines</td>
<td>1020</td>
</tr>
<tr>
<td>Hire and reward heavy rail</td>
<td>3130</td>
</tr>
<tr>
<td>(including intermodal container transport)</td>
<td></td>
</tr>
<tr>
<td>Ancillary Rail</td>
<td>11100</td>
</tr>
<tr>
<td>(including bulk ores)</td>
<td></td>
</tr>
</tbody>
</table>

Note: FFC - Average Full Fuel Cycle which means the whole fuel use for the transport mode including idling, maintenance running, dead running to depots, etc.

**Climate Change Management**

Climate change has the potential to impact transport in a variety of ways, which are mostly not well understood. There are innumerable activities undertaken by governments, business and the community which may be altered by climate change. Examples of these include:

1. Transport demand  
   - e.g. changed agricultural production, more environmentally sensitive transport choices by travellers
2. Transport infrastructure and networks  
   - damage due to track buckling, flooding or bushfires
3. Operations  
   - locomotive emissions which change with ambient temperature, air-conditioned failures caused by overheating.

As these effects occur, governments, companies and individuals will respond in ways which they consider appropriate. The Australian Commonwealth Government's principal response is an emissions trading scheme (the Carbon Pollution Reduction Scheme - CPRS), which additional elements such as Mandatory Renewal Energy Targets (MRET). However, as described later, it is questionable whether these arrangements are either sufficient or efficient. These responses either mitigate against increasing climate change further by reducing greenhouse gas emissions, or are adaptations to a changed environment. Almost none of these consequences have been examined and quantified for the transport system as a whole or for railways. In other words, transport in Australia is simply unprepared for climate change and does not know how it should respond appropriately

**Transport and the Carbon Economy**

In the simplest terms, transport can contribute to a low carbon economy by reducing travel or transport demand, or by burning less carbon while travelling. Transport demand management has been around for several decades, although in practice, some techniques actually properly fall into the category of supply management. Others are cross modal, where one mode substitutes for another. Less carbon is emitted when more efficient transport or modes of transport are used, more efficient vehicles are used, or more efficient energy sources are used (such as hydro power instead of brown coal to power electric railways).

**Market Issues of an Emissions Trading Scheme**

Economists describe that markets work when certain conditions exist. Conversely, markets fail when the following conditions occur:

- there is inadequate information between buyers and sellers,
- there is a natural monopoly of buys or sellers,
- externalities to the transaction result (i.e. impacts experienced by those external to the transaction), and/or
• other social objectives are required to be met (e.g. income distribution or service quality).

As described above the Australian Commonwealth Government's principal response to Climate Change is the CPRS, which is a market based scheme to limit the total amount of greenhouse gas emissions. In its presently proposed form, the CPRS has numerous flaws, compared with the requirements for a market to operate properly, including:
• car driver's costs will not change since the emissions permit cost will be rebated from the fuel price,
• rail public transport costs will increase since operators will pay higher electricity or diesel fuel costs,
• road freight charges will not change, but rail freight costs will increase (for the same reasons as above),
• CPRS charges are not market linked to public transport,
  - pricing (fares) which may be constrained by political choices and economic regulation,
  - infrastructure charges and provision (i.e. users pay for infrastructure but don't have choices about where improvements are made).
• car owner's costs are discounted by tax rebates or payments by others (business).
• governments, as purchasers (and business to a lesser extent), are not responding to the market by purchasing small cars, while the general community has responded by predominantly purchasing four cylinder cars,
• businesses will transfer their increased costs to consumers who have no influence over business costs ("Take it or leave it"), so business does not always have much incentive to reduce emissions costs. Governments have even less management incentive,
• commercial drivers are often distant from the usage costs. So a truck or light commercial vehicle driver can drive in a very fuel inefficient manner and receive no penalty so there is no incentive to change,
• car and truck emission trading charges are proposed to be rebated, but freight and passenger railways pay full costs,
• road freight pricing is flawed so trucks do not pay efficient prices for the use of the road infrastructure,
• road user charges are not market linked to infrastructure supply.

Professor Ross Garnaut, has described that governments must take a variety of actions in response to climate change, including (Garnaut, 2008, p. 44)5:

"Governments have a major role to play in lowering the economic costs of adjustment to higher oil prices, an emissions price and population growth, through planning for more compact urban forms and rail and public transport. Mode shift may account for a quarter of emissions reductions in urban passenger transport, lowering the cost of transition and delivering multiple benefits to the community".

5My emphasis added.
These statements describe that governments must do more, and the transport system must develop, in order to meet the needs of Australia in future.

**Transport Policy Development**

Typically the transport system is assessed according to certain performance criteria, such as capacity, utilisation, speed or safety. The question arises as to whether these are the appropriate criteria for assessment.

Infrastructure Australia summarised key objectives for funding of infrastructure by government, including (Infrastructure Australia, 2009, p6):

“A national rail freight network development of our rail networks so that more freight can be moved by rail.

Transforming our cities increasing public transport capacity in our cities and making better use of existing transport infrastructure.”

It is possible to meet such measurable criteria and improve micro efficiency, but fail to achieve macro effectiveness. For instance a passenger transport system would be completely safe, if it carried no passengers, and therefore there would be no injuries. However it would obviously be completely ineffective.

One might think of travelling from Melbourne at good speed, without incident, and using reasonable amounts of fuel. The performance according to these criteria might well be very good. However if the objective is to arrive in Sydney, no amount of performance improvement in these criteria will achieve the required result.

Once the transport system can be adequately assessed for both efficiency and effectiveness, good decisions can be made about how best to achieve the objectives. Typically, policy makers promote policies from their fields of experience and expertise; their comfort zone. So, regulators propose legislation, engineers propose construction, and economists propose charges and markets. But transport is complex with a diversity of alternatives, opportunities and effects.

**A New Planning Paradigm**

The current transport policy development, transport system planning and project assessment is based on the following perspectives:

- microanalysis,
- short term,
- narrow focused,
- detailed / fragmented,
- historical,
- quantitative,
- separate mode view,
- infrastructure solutions,
- commodity view,
- incremental & evolutionary,
- environmental and social benefits are largely ignored.
This type of analysis has been helpful in answering the question "How do we improve what we have?", which is incremental.

The existing transport system performance, future demands and likely performance in future described above illustrate that Australia needs to fundamentally and structurally transform its transport system. It needs to respond to the question "How do we provide what we need?", which requires the following, quite different perspectives:

- strategic,
- holistic,
- long term,
- broad,
- integrated,
- multifaceted,
- future oriented,
- qualitative and quantitative,
- customer view,
- logistics chain analysis,
- quantum change & revolutionary,
- environmental and social benefits described and included.

While recognising that rail transport is not for its own sake and must be justified against alternatives, under a new planning paradigm rail would take a greater share in contributing to a sustainable and productive transport system. Passenger and freight rail provides a numerous benefits to the Australian community, business and the environment including:

- supporting regional communities,
- reducing community health effects,
- minimising environmental consequences,
- reducing the road toll by reducing crashes,
- limiting local government road maintenance,
- limiting road investment demands on Treasuries,
- improving international competitiveness for agriculture,
- reducing road infrastructure costs for state government road authorities, and
- maintaining robust transport systems to suit a variety of futures, including reduced oil availability.

An efficient, effective, safe transport system is required to meet Australia's short and long term needs. Therefore, compared with historical practice, passenger and freight rail must take a much larger proportion of land transport in Australia. To do so requires many and diverse industry and government activities at substantially higher levels than have occurred previously.

**Rail System Structure**

The rail system is primarily comprised of:

- Infrastructure (track, signals, land use, information & ticketing systems, etc),
- Rolling Stock (passenger cars, locomotives, wagons), and
• Users (passengers and staff).

In this form railways are large and still quite complex. However, the system exists within a much larger and even more complex milieu which includes:

• the environmental context,
• education and training issues,
• technology development and deployment,
• divergent and sometimes incoherent or conflicting business and community requirements and expectations,
• inadequate data, information, and research, together with uncertain innovation,
• funding restrictions and competition,
• industry culture and practice,
• integration and interaction with other systems,
• a multitude of business, safety, environment, economic and workplace safety regulation,
• and three levels of government with different policies, aspirations and effects.

At different times these may sometimes be collaborative, while at other times they may be very competitive.

In addition (or perhaps as a consequence), there appears to be a lack of leadership resulting in a lack of vision and direction resulting in a transport policy vacuum. The last major policy reforms in Australia were to heavy vehicle charges in the early 1990's and commercialisation of government freight railways in the late 1990's. So there has been no significant transport reform in Australia for a decade (perhaps that's why it was called the 'noughties').

**Rail Needs and Opportunities**

For rail to make a greater contribution to Australia changes to investment, incentives, taxation, regulation and other legislation are required. In particular:

• continue government investment in infrastructure and rolling stock,
• reform of transport system policy to ensure incentives to achieve public outcomes
• reform taxation by
  - removing the fringe benefits tax (FBT) financial incentives encourage more road travel, and
  - provide incentives for promoting public transport use,
• introduce a more efficient mass-distance-location charging system for road use, particularly for freight transport,
• introduce taxation incentives for environmentally friendly rolling stock and infrastructure,
• neutralise the negative effects of the Carbon Pollution Reduction Scheme on transport, as described above.

**Benefits from Rail Investment**

The CRC for Rail Innovation has researched aspects of the Carbon Pollution Reduction Scheme which relate to railways and transport generally. This work (CRC for Rail
Innovation, 2009) concludes that substantial benefits can be realised from investing in railways, including:

- annual reductions of CO$_2$-e emissions of 3.8 to 6.2 Mt,
- 11% lower transport emissions by 2030,
- Total benefits of $27.4 to 41.7b (NPV 2010 -2020).

These benefits could be realised by an investment of $2 billion per annum for 10 years, with the benefits continuing to accrue indefinitely.

**Conclusions**

This paper describes weaknesses in the current Australian transport system which will continue to deteriorate over time to the disadvantage of Australian business, the community and the environment. Rail must take a greater role in transport in order to meet the future needs. A different decision making model is needed and substantial changes to policy is required to improve the transport system.

**Bibliography**


Appendix: Presentation Slides

**Australia’s Transport System:**
*Railway challenges, realities and business opportunities*

Australian Railway Business Economics Conference
PATREC, Perth, July 2009

Brett Hughes
Director Policy

Overview

- Transport Challenges
- Transport Future
- Transport and Climate Change
- Rail in Transport
- Rail Opportunities
Transport Challenges

- Congestion
- Fuel price
- Emissions
  - greenhouse gases
  - NOx, SOx, etc
  - particulates
- Transport Demand
  - Passenger (population)
  - Freight (economy)
- GFC
- Climate Change
  - Infrastructure impacts
  - Demand changes
- Accessibility
  - equity
- Workforce Attraction & Retention
- Community & Business Expectations

The government's view of the economy could be summed up in a few short phrases:

If it moves, tax it.
If it keeps moving, regulate it.
And if it stops moving, subsidize it.

- Ronald Reagan
**Land Transport Performance**

[Graph showing Australian Metropolitan Transport Indicators (increases):
- Congestion
- Total Delay
- Road Freight
- Total Vehicle Travel
- Network Delay
- City Population]

**Australian City Heavy Vehicle Congestion Cost Increases**
- 1990 - 2005: 53%
- 2005 to 2020: 118%
- 1990 to 2020: 234%

Source: from BITRE WP71 data

Our best transport planning and policy gets us HERE!

**Passenger Transport Forecasts**

**Average Growth 2000-2004**
- Passenger Rail: 1.6%
- Private road vehicles: 2.3%

**Average Growth 2004-2008**
- Passenger Rail: 5.1%
- Private road vehicles: 0.3%

[Graph showing Changes in Urban Passenger Transport (increase from 2000, 2003-2004 trend shown dotted):
- Passenger Rail
- Private road vehicles]

Transport planning and policy is based on these forecasts.

Source: from BITRE IS31 data
The Future of Transport Emissions

Australian Transport Emissions Forecast

- Aviation
- Maritime
- Rail (non electric)
- Motor Vehicles
- 2050 Total Australian Emissions Target

Source: BTRE 2005 forecast, extrapolated

If we continue what we’ve done in the past, by 2050 transport will contribute more than 2/3 of the total Australian emissions target

Our Transport

- Australian transport fuel use, emissions and transport infrastructure are amongst the highest per capita in the world
- More than 1600 people die on our roads and another 30,000 are injured and road crashes cost over $20 billion annually
- Traffic congestion in cities costs more than $10 billion annually
- Transport emissions are responsible annually for:
  - the deaths of over 1500 people
  - over 4,500 cases of asthma and other sickness (but could be 40% higher)
  - cost of death and sickness by transport emissions exceeds $2.3 billion annually
- Personal transport times and costs are increasing as a proportion of available time and disposable income, contributing to family pressure and other social degradation
- There has been no significant move towards more sustainable modes of transport, until the last two or three years
- Fuel usage of passenger cars have not decreased

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Our Transport Future

- by 2050 transport emissions will comprise more than 66% of Australia’s entire greenhouse gas emissions target
- transport congestion costs are increasing at a faster rate than traffic is increasing
  - heavy vehicle transport congestion costs will increase by an additional 100%
  - traffic congestion in cities will cost $20-30 billion annually by 2020
- Road trauma will deteriorate
  - road deaths are not decreasing
  - serious injuries caused by road crashes is rising
  - deaths caused by articulated vehicles is increasing,
  - serious injuries caused by articulated vehicles is not decreasing
- Other factors such as health effects, transport costs and travel time are certain to increase

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Rail’s Energy and Environmental Advantage

There is nothing a Government hates more than to be well-informed; for it makes the process of arriving at decisions much more complicated and difficult.

Keynes

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Transport and the Carbon Economy

- Travel / Transport less
- Burn less carbon
  - more efficient transport & modes
  - more efficient vehicles
  - more efficient energy sources

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Market Issues of an Emissions Trading Scheme

- Market principles
- Market failures
  - Poor information
  - Natural monopoly
  - Externalities
  - Social objectives (eg income distribution or service quality)

So, other strong policies are needed to complement the Emissions Trading Scheme
CRC for Rail Innovation, 2009

Emissions trading on its own does not work; it needs other actions
Allan Jones - CEO, London Climate Change Agency
Transport Emissions
Market Distortions

- Car driver's costs will not change, but rail public transport costs will increase
- Road freight charges will not change, but rail freight costs will increase
- ETS charges are not market linked to public transport
  - Pricing (fares) which may be constrained by political choices and economic regulation
  - Infrastructure charges and provision (i.e., users pay for infrastructure but don't have choices about where improvements are made)
- Car owners costs are discounted by tax rebates or payments by others (business)
- The general community has responded to the market by purchasing small cars, while government (and business to a lesser extent) has not. In other words, governments are not responding to the market.
- Businesses will transfer their increased costs to consumers who have no influence over business costs ("Take it or leave it"). So business does not always have much incentive to reduce emissions costs. Governments have even less management incentive.
- Commercial drivers are often distant from the usage costs. So a truck or LCV driver can drive in a very fuel-inefficient manner and receive no penalty so there is no incentive to change.
- Car and truck ET charges are rebated, but freight and passenger railways pay full costs.
- Road freight pricing is flawed.
- Road pricing not market linked to infrastructure supply.

Emissions Adaptation and Transport

Governments have a major role to play in lowering the economic costs of adjustment to higher oil prices, an emissions price and population growth, through planning for more compact urban forms and rail and public transport.

Mode shift may account for a quarter of emissions reductions in urban passenger transport, lowering the cost of transition and delivering multiple benefits to the community.

Professor Ross Garnaut, Final Report, Sept 2008
Government Objectives

➢ **A national rail freight network**
  development of our rail networks so that more freight can be moved by rail

➢ **Transforming our cities**
  increasing public transport capacity in our cities and making better use of existing transport infrastructure

  *(Infrastructure Australia, May 2009)*

Where is Australian Transport Going?

➢ **Performance Criteria**
  – Capacity / utilisation
  – Speed
  – Safety

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Policy Tool Selection

Regulators

Legislation

Desirable? Necessary?
Valuable? Sufficient?
Integrated, complementary or conflicting?
Are there better alternatives?

A New Planning Paradigm

Current Perspective
- microanalysis
- short term
- narrow focused
- detailed / fragmented
- historical
- quantitative
- separate mode view
- infrastructure solutions
- commodity view
- incremental & evolutionary
- environmental and social benefits largely ignored

New Planning Paradigm
- strategic
- holistic
- long term
- broad
- integrated
- multifaceted
- future oriented
- qualitative and quantitative
- customer view
- logistics chain analysis
- quantum change & revolutionary
- environmental and social benefits described

How do we improve what we've got?
How do we provide what we need?
Rail Needs and Opportunities

- Continuing government investment
- Transport system reform with incentives to achieve public outcomes
- Reform FBT
  - Remove FBT incentives for non-sustainable fuel use and
  - provide incentives for promoting public transport use
- Mass-distance-location charging for road use
- Accelerated taxation depreciation for rolling stock and infrastructure.
- Neutralise the negative effects of the Carbon Pollution Reduction Scheme on transport
**Economic Opportunities**

- Investment
- Incentives & taxation
- Reducing regulatory burden
- Legislation

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**Benefits from Rail Investment**

- Annual 3.8 to 6.2 Mt CO$_2$-e emissions reductions
- 11% lower transport emissions by 2030
- Total benefits
  - $27.4 to 41.7b
  - (NPV 2010-2020)

Source: CRC for Rail Innovation 2009, www.railcrc.net.au
Transforming Rail: A Key Element in Australia's Low Pollution Future