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Supplementary submission to the Productivity Commission re National Competition Policy December 2004

1. This submission is to follow up the main submission of the Railway Technical Society of Australasia (RTSA) to this inquiry, and remarks made at the Public Hearing held in Sydney on 30 November 2004. It also includes a note re contestable land freight.

Delays in part due to vertical separation

2. Some examples follow:

A. The delay from 1995 to 1999 to install concrete sleepers into degraded track from a giant pile of sleepers at Maroona, Vic. This was to be done by National Rail to finish off the 1992-1995 $450m capital works program where the track in 1995 from Melbourne to Adelaide via Maroona had been converted from broad to standard gauge. However, with rail-rail competition and National Rail not to take up the track, it was left to the Victorian Government who in turn left it to the Australian Rail Track Corporation. Result- four years of speed -weight restrictions near Maroona.

B. The delay from 1995 to 1999 to build a simple triangle at Parkes, NSW to facilitate through-movement of Sydney – Cootamundra – Broken Hill – Perth superfreighters by National Rail. The job was finally done after years of negotiation between National Rail and the NSW Rail Access Corporation. Result - four years of delays for Sydney - Perth freight trains of up to an hour, with extra locos and staff needed at Parkes for shunting the longer trains between Parkes station and Goobang Junction (see Railway Digest, July 1998).

C. The extended and ongoing delay to replace antiquated safeworking (that uses a staff) between Casino (NSW) and near Acacia Ridge (Qld). This was the subject of an ABC TV *7:30 Report* program on 6 November 1998, six years later despite ARTC having a lease on the NSW track, it now has to negotiate with the Queensland Government (who took back the lease on the 100 km of standard gauge track from the NSW Government in 2004). The estimated cost of delay to each freight train for stopping it for four minutes to change a staff was estimated to cost $106 (Michell and Laird, *Smooth running - a route of cost reduction* Conference on Railway Engineering, Wollongong Proceedings page 227-237), with the numbers of trains involved and crossing loops, costing well over $1 million per annum. How

much longer this situation will persist is a good question. Any vertically integrated rail operator would have fixed these impediments within months, not years.

Other delays in essential infrastructure

3. Some more examples follow:

A. The ongoing delay to replace antiquated safeworking between Harden to Wallendbeen (NSW) that uses 'block telegraph' on a section of double track. This was good technology around 1920 when this duplication was completed.

B. The long overdue South Sydney Freight bypass that was the subject of a specific recommendation of the Commission in its 1999 Report on Rail.

C. Sydney's intermodal road and rail terminals. Pacific National and other parties are better placed to address this issue than the RTSA.

D. Upgrading the track linking Australia's two largest cities of Sydney and Melbourne for faster and heavier freight trains with some rail deviations to complement the proposed 121 km of rail deviations in 14 locations to be constructed between Maitland and Brisbane (as noted in the AusLink White Paper).

Delays to track straightening and funding of Queensland's North Coast Line

4. Delays in acquiring land and environmental approvals for track straightening in Queensland (and likely NSW) is shown by the long overdue upgrading of the Caboolture - Nambour track. Some Queensland Government funds were allocated for this purpose in the late 1990s.

This track was recognised as congested in the 1994 BTCE report of the National Transport Planning Taskforce. It is now in all likelihood the nation's most congested single rail track. An Option 2 route for a Caboolture – Landsborough duplication with deviations was on public exhibition to December 2003. The Brisbane – Townsville line may be regarded as a vital extension of the Defined Interstate Rail Network. As such, the upgrading of Caboolture - Landsborough to Option 2 standard will assist in efficient interstate rail operations between Central and North Queensland and other Australian states. This includes the premier NQ Direct Services bringing Queensland fruit and vegetables to the Sydney and Melbourne markets.

On 15 January 2004 the Queensland Government decided not to proceed with Option 2. This raises many questions as to reconciling the national interest against that of a relatively small number of pineapple farmers that were well represented by a Government backbencher before a State election. It is, however, our understanding that the Government will proceed to examine other options outside the existing rail corridor. In the mean time, rail congestion imposes an ongoing cost to efficient rail freight and passenger train operations.

The question then arises: how to improve the process for other desirable Queensland North Coast line deviations, including Landsborough - Nambour, the track near kilometre 218 (a tight radius curve requiring trains to slow down to 40 km per hour), and a bypass to go with a new bridge over the Burnett River at Bundaberg which is currently subject to a speed restriction of 15 kilometres per hour with no braking or acceleration. The speed restriction used to be 25 km/h. Can the Commission imagine this situation on the Bruce Highway? In North Bundaberg, and north of the Rockhampton Station the trains have to go down the middle of a road at a slow speed. Obviously, new bridges, on new alignment are needed.

5. The decision of the Federal and Queensland Governments to allocate over $400 million to the Bruce Highway and not one dollar to the Brisbane – Cairns railway may warrant comment by the Commission. This allocation appears to totally contrary to the intention of AusLink, as stated by the Deputy Prime Minister Mr Anderson on 7 June that Government *"will fund projects on the transport corridors that have the greatest importance for Australia's long term future, whether the projects involve road, rail …"*

In addition, the Brisbane-Cairns line carries more freight than the Sydney-Brisbane railway line which has deserving projects noted in the AusLink Fact Sheets amounting to $450 million. This again makes a lack of Federal funding for Brisbane –Cairns track very hard to understand.

6. RTSA strongly supports the Draft Proposals of the Commission in its Draft Discussion report on Nat Comp Policy that CoAG should drive reform in both freight and passenger transport. RTSA also supports moves to improve road pricing.

Urban Passenger Transport

7. As argued by the Industry Commission (IC) in its 1994 report on Urban Transport, the way people then moved themselves around Australia's larger cities was in need of reform. Ten years later, the need for reform is even greater in order to reduce high economic, environmental and social costs imposed by excessive automotive dependence.

8. The difficulty in introducing reform in this area was outlined by this and other writers in the book *Back on Track: Rethinking transport policy in Australia and New Zealand* (Laird, Newman, Bachels and Kenworthy, UNSW Press 2001) referred hereinafter as Back on Track. In brief, the IC in 1994 gave a good appreciation of "major problems in major cities" (pp96-98). The IC in its 1994 Urban Transport report also gave a carefully considered way of moving forward. The Commission recognised the complexity of the problem and that the important thing was to start the reform process.

9. Ten years after this definitive IC report was released in 1994, we know that passenger vehicle kilometres in our major cities have significantly increased (for example, in the order of 25 per cent in Sydney from 1991 to 2001). However, major Australian cities, (with the notable exception of Perth) have seen very modest growth in urban public transport passenger numbers.

10. There are many factors resulting from much increased car use and little growth in public transport usage. One factor is the introduction of the New Tax System in 2000-01 to not only place a GST on public transport, but also lead to cheaper cars and through a removal of indexation of fuel excise, cheaper petrol. A further factor is a vigorous roll out over the last 10 years of freeways and tollways in major cities, with modest and variable investment in urban rail and bus systems.

11. With the exception of fuel excise, which is offset by Federal funds for roads and the Queensland Fuel Subsidy Scheme, there is a very limited effort to recover external costs from motor vehicle use.

12. The Bureau of Transport and Regional Economics (BTRE) in a 2003 paper *The economic consequences of the health effects of transport emissions in Australian capital cities*, by J Amoaka et al to the Australasian Transport Research Forum, Wellington gave mid-range estimates of the annual health related costs of air pollution from motor vehicles in Australia's capital cities. The mid-range estimate, for the year 2000, was $3.3 billion. This comprises $1228 million from the estimated cost of mortality (premature death as a result of air pollution), and $2460 million for morbidity (quality of life and/or productive capacity of victims impaired or reduced as a result of air pollution). Following a European approach (Kunzli N, Kaiser R and Medina S, Public health impact of outdoor and traffic related air pollution: a European assessment, *Lancet* Vol 356, Sept 2 2000) the BTRE effectively attributes air pollution costs to PM10 (particulate matter of size less than 10 microns) levels.

In a further 2003 BTRE paper (*Urban pollutant emissions from motor vehicles: Australian trends to 2020)* estimates are given of both PM10 emissions in Australia's capital cities and the kilometres driven for various types of motor vehicles. Analysis of this data shows, in part, that the average health cost of air pollution from operations of cars (and other small passenger vehicles) in Australia's capital cities is 1.8 cents per vehicle kilometre. The average health unit cost for within Australia's mainland State capital cities range from one cent per vehicle kilometre (Perth) to 2.4 cents per vehicle kilometre (Sydney). To recover a cost of 1.8 cents per car kilometre in capital cities through fuel taxes would require, assuming an average fuel use of 11.4 litres per 100 km (ABS SMVU 2001 estimate), a **fuel levy of about 16 cents per litre.**

13. An outline of external costs of motor vehicle use and 'road deficits' follow in Appendix A that suggests an annual 'road deficit' now exceeding $13 billion. In regards to the costs of accidents involving motor vehicles it can be argued that some, but not all of these costs fall on other road users. The percentage of road crash costs that should be regarded as an external cost is open to question. Hence, the estimate of 'road deficit' exceeding $13 billion per year is also open to question. However, treating external costs as zero is not a satisfactory policy option.

14. It is submitted that Government should support a move to a "polluter pays" principle to see internalisation of all current external costs, and to place some cost for greenhouse gas emissions.

15. As well, transport policy and taxation measures should be reformulated to be *"consistent with our obligation to current and future generations to sustain the environment"* (as per the AusLink Green Paper). This paper recognises that (p19) [transport] *"greenhouse gas emissions in 2010 are projected to be almost 47 per cent above 1990 levels."*

16. In a similar way, government could well give more support to the National Strategy for Lowering Emissions from Urban Traffic with a National Action Plan, as approved by the Australian Transport Council in August 2002.

To quote from the communique for this meeting: *The Strategy and Action Plan developed by the National Transport Secretariat in collaboration with all states, territories and the Commonwealth government provides a groundbreaking national approach to reducing greenhouse emissions from the transport sector.*

Ministers noted that the National Strategy is the first agreed national approach driven by the transport sector to reducing greenhouse emissions, creating greater momentum than can be achieved via a fragmented approach.

The National Action Plan builds on the large range of activities already underway in each state and territory. The positions are, within the next 5-10 years:

a fully integrated transport system that allows for timely, reliable, accessible and safe travel will be operational.

programs that encourage people to take fewer trips by car will be operational in each jurisdiction and a nationally cooperative approach between jurisdictions will have been developed.

transport costs will have moved from predominantly fixed to predominantly variable costs. This outcome will address cost variations in transport modes and ensure that transport users experience more of the true cost of their travel choices.

a significant improvement in the emissions efficiency of urban vehicles will have been achieved.

nationally developed policy and benchmarking tools for the integration of transport and land use planning will have been implemented. Well-planned urban development reduces the need for car trips and improves the 'liveability' of towns and cities.

a nationally developed transport investment framework for investment decisions across all transport modes of travel will have been trialled and implemented.

17. The issues of urban transport and road pricing are considered sufficiently important as to warrant separate inquiries by the Commission. Indeed, following release in 1994 of the Industry Commission's report on urban transport, the Government of the day agreed for a further inquiry to take place in 1997. This did not proceed. The Commission in its 1999 report on progress in rail reform recommended an inquiry into road provision, funding and pricing. This inquiry was not agreed to by the Howard Government and did not proceed.

18. As argued in the book *Back on Track* whilst some gains were made towards more efficient transport arrangements during the 1990s and the early part of the present decade, road pricing has for the most part gone backwards at a national level (cheaper diesel in 2000 and freezing of fuel excise indexation in 2001) and in at least two states (NSW with toll rebates, and Queensland with its Fuel Subsidy Scheme). Moreover, the Fuel Taxation Inquiry recommendations were set aside in the 2002 Federal Budget.

19. The Issues Paper on page 33 for the Commission's inquiry into energy efficiency mentions that transport accounts for 41 per cent of Australia's final energy usage, mostly in road transport. As this Issues Paper on page 34 notes (as do other references - see Appendix B) rail freight is more energy efficient than road freight whilst road freight gives flexibility. However, intermodal freight allows energy efficient rail or sea transport for the line haul, with flexible road transport for the pick up and delivery. Impediments to intermodal transport are currently being addressed by the National Transport Commission.

20. Rail infrastructure and road pricing do affect rails ability to win freight. One study was for an ARC/Rail Infrastructure Project "Greenhouse gas reductions from mainline rail track upgrading and competitive neutrality" where Sydney-Melbourne intercity land freight was studied. Here, four different rail freight transit times were used (ranging from the current 14 hours which is too slow for the market down to about 10 hours (after appreciable track straightening) along with four different regimes for road pricing of heavy trucks (ranging from recent NRTC charges ('highway subsidisation') up to recent New Zealand mass-distance pricing (about three times NRTC charges for the heavier long distance semitrailers)).

21. A good approach to energy use in transport was given 25 years ago in a government Australian Transport Advisory Council 1979 publication *Transport and Energy Overview*. This report was prepared, following the second major world oil price shock during the late 1970s. Although the data used in this report is now dated, the approach is commended, as are the conclusions. In part:

"... rail is relatively energy efficient compared to road for long distance freight ... (and) ... does have fuel substitute options, such as coal-oil slurries or electrification ..... As far as possible pricing and cost recovery policies should be consistent across the modes so as to encourage use of modes appropriate to particular tasks. Appropriateness may be defined broadly as minimising the total social cost of transport services, including externalities.

22. Another commendable approach was taken during the early 1990s by a Working Group on Ecologically Sustainable Development examining transport. The report made about 30 useful recommendations (which regrettably had only limited application to Government policy and budgets). The 1995 report of the Intergovernmental Committee on Ecologically Sustainable Development (ESD), Part V Section 2 notes the 1992 National Strategy for ESD and the National Greenhouse Response Strategy recommendation of reducing *"...total energy consumption in transport through:*

* *improved technical and economic efficiency of urban and non-urban transportation*
* *switching to alternative transport technologies or modes where this reduces greenhouse emissions per passenger or unit of freight".*

23. The difficulty by government during the 1990s, and early part of this decade, in making progress on transport in a way to reduce both energy use and significant external costs (economic, social and environmental) is explored in the book *Back on Track*. One the one hand (Chapter 5), there is an 'Institutional Problem' leading to 'Policy Paralysis' and on the other hand (Chapter 6), Australia has no fewer than 60 road lobby groups leading to a formidable 'Political Problem'.

24. There has been progress in some areas in improving energy efficiency in moving people as shown by the production of cars using as little as 5 litres (or less) of petrol per 100 km. However, as per *Back on Track*, due to various factors (including low tariffs for large four wheel drive vehicles with high fuel usage per km) there has been little or no reduction in the average energy efficiency of the overall car fleet. In regards to freight movement, the situation is again mixed, with good overall advances in energy efficiency for articulated trucks and rail (as per the literature survey).

25. However, the bottom line is that Australia is using more energy in transport. In fact, as suggested by the AGO, our energy usage is now some 24 per cent above 1990 levels, and by 2010 could be 44 per cent above 1990 levels.

26. The Commission is invited to support a simple challenge: for Australia to actually reduce, year by year, its total energy use in transport (and electricity). With the relevant 'policy levers', this would give a real incentive to both cut waste and improve energy efficiency.

27. There has been at least one period during the 1990s, as noted by the Apelbaum Consulting Group (Australian Transport Task, Vol B, 1997, p120) where the private rail freight task increased (by 8 per cent - p 44) and the energy use actually declined by 4 per cent from 1990-91 to 1994-95.

A further example from the 1990s is with National Rail's then new fleet of 4000 HP Dash 8 locomotives. This investment coupled with upgraded wagons and incentives for drivers to save fuel allowed National Rail to obtain significant fuel savings. A September 2001 brochure issued by National Rail (pre-sale and to note the advent of a profit in 2001-01) **stated an average fuel use of 4.0 litres per 000 gtkm for 1999-00-01 as against 7.4 litres per 000 gtkm for 1992-93-94.**

28. The condition of Australia's infrastructure has been addressed, in part, by a series of Infrastructure Report Cards released by Engineers Australia (the nation as a whole, 2000 and 2001, NSW 2003 with Queensland released on 8 November 2004). Land transport infrastructure has also been addressed, for example, by the National Committee of Transport of Engineers Australia.

29. The BTRE has more than once examined reducing energy use and greenhouse gas emission from transport, including in 2002 with *Greenhouse policy options for transport - Australian trends to 2020*. Here, optimal road pricing was held to offer the best way forward.

30. This view was shared by the Parry Inquiry (NSW Ministry for Transport, 2003) that noted, inter alia (p72) *"The thinking underlying the support for road use pricing is that road access is currently 'too cheap' (as distinct from the general cost of motor vehicle use), as motorists are not directly bearing all of the costs associated with their decision to make a journey. For example, driving a vehicle is associated with costs such as congestion, road wear and tear, pollution and accidents."*

The Parry Inquiry (loc.cit, p 74) also noted *"Currently, public transport is disadvantaged compared with private transport by a range of taxation (for example, the fringe*

benefits tax), expenditure and other policies that encourage private transport use. As a separate issue, and irrespective of the decision made regarding road use pricing, those policies that distort decision making in favour of private transport should be reviewed to ensure that public transport is not disadvantaged."

31. Various Non-Governmental organisations in Australia have expressed some concern about transport policy. By way of example, the Chartered Institute of Transport in Australia is a conservative body that found it necessary to issue a sternly worded statement at its 1998 National Symposium. This was regarding the oil situation and in order to warn the government, industry and the general public: *"The Symposium heard that a clear consensus is emerging that cheap oil production outside the Middle East will begin permanent decline around the year 2000, to be followed by permanent world decline within 15 years. 'More of the same' in our current transport plans and ways of thinking is no longer tenable. ..."*

32. With recent international events and oil prices, this warning is now more relevant. Also, as found by the Institution of Engineers, Australia (1999) we have major problems in major cities, and, there is a need to respond to the challenges. In brief:

A Taxation and fiscal policy instruments should encourage sustainable transport. At present, these measures encourage car and truck use.

B 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.

A ten point transport pricing plan

33. As above, there is increased interest in road pricing. One approach is given by the Railway Technical Society of Australasia (2004 see www.rtsa.com.au and go to publications etc to find a Submission to the House of Representatives Environment and Heritage Committee's inquiry into Sustainable Cities 2025) which proposed a ten point transport pricing plan along the following lines.

1. Re tolls

A. remove toll rebates in Western Sydney, which is a costly scheme to administer.

B. reinstate tolls at Berowra and Waterfall, with the proceeds being used to expedite long-overdue improvements of both the Pacific and Princes Highways.

C. ensure that the Mitcham - Frankston motorway is built as a toll way.

2. Remove the Queensland Fuel Subsidy Scheme, at least from South East Queensland.

3. Impose a congestion charge for access to the Sydney and Melbourne CBDs. It works well in London. And/or impose an environmental fuel levy for motor vehicle use in the Greater Metropolitan Areas of state capital cities and Canberra.

4. Restore fuel excise indexation, with the additional revenue going into improved transport infrastructure. To ensure best use of funds, replace road funds (as enjoyed by the NSW Roads and Traffic Authority) by transport funds (as per Western Australia, New Zealand and as proposed under AusLink).

5. Ensure that the third determination of heavy vehicle road user charges by the National Transport Commission recovers - at least the populous zone - the full road System costs from heavy articulated trucks, B-Doubles and road trains. At present, these vehicles are cross-subsidised by other road users. Ensure that additional revenue is directed towards not only National Highway System maintenance (to compensate for changes under AusLink), but improved intermodal facilities.

6. Increase annual registration fees for the heavier four wheel drive vehicles.

7. Support the recommendation of the Productivity Commission from its 1999 Inquiry into Progress in Rail Reform into an inquiry into road provision, funding and pricing. Also have the Productivity Commission examine urban transport.

8. Increase rail fares, with all proceeds going into a better rail system.

9. Improved land transport data, with publication of accurate and up-to-date information on all modes of transport, with details of energy use and greenhouse gas emissions.

10. Ensure that major airports and seaports are not in receipt of hidden subsidies.

APPENDIX A ROAD TRANSPORT EXTERNAL COSTS

Increasing road vehicle based transport for moving people, and a strong growth in road freight as outlined above comes at a cost. This cost is not only what is directly paid, but external costs that fall on other road users and the community as a whole. For Australia, these hidden costs include:

1. Road crash costs were estimated by the BTRE (2000) at $15 billion in 1996. Only about half of this is covered by insurance with about $7 bn being a cost to other road users and the wider community (*Back on Track*);
2. Road congestion costs in major cities of about $12.8 billion in 1995 (BTRE, 1999);
3. Health related costs from the effects of air pollution from motor vehicles in Australia's capital cities with mid-range estimates for the year 2000 of the BTRE (see item 18) as $3.3 billion;
4. The cost of noise from all motor vehicles in urban areas as $0.7 billion, as per a low range estimate of the Bus Industry Confederation (2001);
5. Net taxation refunds for motor vehicle use of $2.8 billion in 1997-98 (*Back on Track*);
6. A $1.7 bn greenhouse gas cost in 2000-01 (at $25 per tonne);
7. An annual $0.8 bn non-tariff automobile industry assistance programme;
8. An estimated increased health cost of lack of physical activity due to excessive car use of about $0.8 b per annum in Australia
9. A Queensland Fuel Subsidy Scheme payment now costing the Qld Government $0.5 bn per year, and the NSW Government about $40m per year; and,
10. Toll rebates in Western Sydney costing about $60m per year.

These approximate costs add up to $31.3 billion per year. Road system costs are now about $8 billion a year. The total is $39.5 billion per year. Road vehicle specific revenues to Government in 1997-98 were about $12.6 bn in 1997-98 (and only $12.7 bn in 2001-02 - BTRE, 2004). Hence, excluding congestion costs, a case can be made that there is a 'road deficit' that now exceeds $13 billion per year.

There are also subsidy schemes for bus operations in most States. The most expensive subsidy is in New South Wales where funding in 2002-03 (NSW Department for Transport, 2002) for the State Transit Authority which operates bus and ferry services in Sydney and Newcastle was $214.4m (mostly for buses). In addition, funding for school student travel subsidies is $427m; whilst subsidised concessions for pensioners and other travel subsidies was $305m.

A 'road freight deficit' of approximately $2 billion in 1997-98 due to the operation of articulated trucks was identified in *Back on Track* (Appendix D). These trucks include the Australia 'workhorse' of six axle articulated trucks, plus B-Doubles of length up to 25 metres, and road trains which are even longer, and used mostly on remote roads. This 'road freight deficit' is mostly made up of unrecovered road system costs of about $1.3 billion that average out at 1.25 cents per net tonne km. Other costs include about $500m per year for the cost of road crashes involving articulated trucks, and environmental costs of at least $280m per year. The high unrecovered road system costs result from road user charges for heavy trucks being restricted to fuel taxes and simple annual charges for each type of truck. These charges were determined by the National Road Transport Commission that twice passed over the option of mass distance charges that have been successfully used in New Zealand since 1978.

APPENDIX B Rail CRC Project 24:Rail Transport Energy Efficiency and Sustainability

Sources of data re energy use in transport operations in Australia include the Australian Bureau of Statistics (ABS), the Bureau of Transport and Regional Economics (BTRE), the Apelbaum Consulting Group (ACG), the Australasian Railway Association (ARA-Australian Rail Industry Report 2003) the Australian Trucking Association (2004) and this writer. A common theme is that rail transport is more energy efficient than road transport.

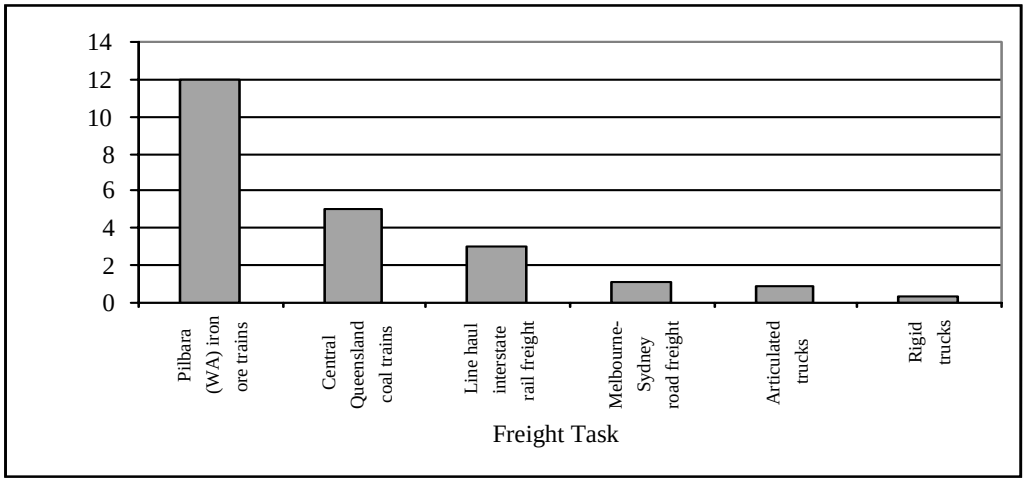
Rail freight In Australia, fuel use per tonne for BHP Iron Ore operations has decreased by 43 per cent between 1980 and 2000 to about 0.75 litres per tonne of iron ore (Darby, 2001 *Technology for profit*, Proceedings 7th International Heavy Haul Conference). This gives a world record energy efficiency of at least 12 net tonne per Megajoule (net tkm/MJ) on a Full Fuel Cycle (FFC) basis where 1 litre of diesel is equivalent to 41.77 MJ.

Queensland Rail (QR) and former government rail systems had an average FFC energy efficiency in rail freight of 2.98 net tkm/MJ in 1997-98 (ACG). This includes the use of electric power for QR where 1 KWh is equivalent to 12 MJ on a FFC basis giving Central Queensland coal trains an energy efficiency of at least 5 net tkm/MJ. CRC project 24 data for 2001-02 suggests an average for non iron ore freight trains of 3.3 net tkm/MJ.

By 2002, US Class I railroads had gained an average energy efficiency of 3.7 net tkm/MJ (primary energy). The Canadian Pacific Railway 2003 Annual Report publishes data

implying an impressive energy efficiency of 4.2 net tkm/MJ. There are problems in gaining accurate and up to date land transport data within Australia.

Driving techniques, equipment, train mass, terrain and track alignment all influence rail fuel consumption. With 4000 HP locomotives, upgraded wagons, and incentives for drivers to save fuel, Melbourne - Sydney - Brisbane standard superfreighter average energy efficiency now appears about 2.7 net tkm/MJ on the existing track. Computer simulation from an earlier project for the Rail Infrastructure Corporation has shown that for the entire Sydney - Melbourne track, a major track upgrade (with three major deviations outlined in the ARTC Track Audit and the 2002 ATRF paper cited below) would increase rail freight energy efficiency by 12 per cent. Further Rail CRC work in this area is now underway by the Project for these and other rail deviation sites within NSW and Queensland.



Rail passengers Rail CRC project 24 aggregate data from individual Australian rail passenger operators is given in Table C. Based on 2001-02 ARA/ ACG FFC estimates, passenger rail had an average energy efficiency of 0.65 passenger (pax) km per Megajoule (MJ) as compared with 0.36 pax km per MJ for passenger road vehicles, 0.71 pax km per MJ for buses and 0.40 pax km per MJ for domestic airlines.

TABLE C **RAIL PASSENGER ENERGY EFFICIENCIES**

Passenger km per MJ (Full fuel cycle)

	Light Rail	Urban Rail	Non-Urban Rail
2000-01	0.60	0.69	1.09
2001-02	0.60	0.68	1.13
2002-03	0.61	0.64	0.99