SUBMISSION TO THE PRODUCTIVITY COMMISSION RE ENERGY EFFICIENCY IN RESPONSE TO DRAFT REPORT

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General

This submission will draw on research conducted at the University of Wollongong and supported, in part, by the Rail CRC. However, it does not necessarily reflect the views of either organisation.

We are now at a time, as argued cogently by Professor Allan Fels and Fred Brenchly (*'No time to be over a barrel'* Aust Fin Review 5 May 2005), that the Government's White Paper on Energy, released less than 12 months ago, is now out of date. There is also a perception that the White Paper relies too much on 'Business As Usual'. It is now suggested that the Commission's approach to Energy Efficiency as indicated in the Draft Report is in need of updating.

The draft finding 8.4 re support of energy efficiency research (page no 183 section 8.6) is not supported and is considered to be in strong need of review. This finding stated :*"The need for special energy efficiency research and development funds has not been substantiated, given that funds can be sourced from existing more general research and development programs."*

The comments made in the primary submission (no 1) about the value of the work done by the former Energy Research and Development Corporation (ERDC) stand. It is submitted that any objective review of the work done by this Corporation in its operation from about 1990 to 1997 would show that Federal money supporting ERDC was well spent, and, that there is much unfinished business in this area. It is also submitted that energy security is too important to be left to market forces alone.

Transport

As noted in the Draft Report, (p200) transport is a significant user of energy. It is also a major user of imported oil. The combustion of oil generates air pollution with associated health costs in urban areas. It also contributes to greenhouse gas emissions.

Surprisingly, however, there is no reference in Chapter 9 in the draft report (Energy efficiency in transport) of any need to set targets to reduce (or even constrain) dependence on imported oil. One would have thought that a brief reference would

have been appropriate to the concept of **'peak oil'** (which could well be a reality in a few year's time rather than decades). Or at least some recognition that since the Commission received its terms of reference from the Parliamentary Secretary to the Treasurer dated 31 August 2004, oil prices have increased and remained above $US40 per barrel since the start of 2005.

Also missing in the Draft Report, despite being raised in an earlier submission (No 1. to the issues paper, see Appendix A), is the 2003 estimate due to the Bureau of Transport and Regional Economics (BTRE) of the health costs of air pollution in capital cities from motor vehicle pollution of $3.3 billion. To quote (eg page 199) the concept of "cost effective" depends whether or not external costs are taken into account. This could usefully be clarified by the Commission in its final report.

Passenger Transport

The fuel consumption labelling scheme is noted on page 202 as being introduced to Australia in 2001. The draft report notes (p209) the average fuel efficiency (actually litres per 100km is **fuel use** not fuel efficiency) of **new vehicles** (emphasis added with a question as to are these cars and other passenger vehicles, or all vehicles?). However, conspicuous by its absence in the Draft Report is a discussion of the fuel consumption rate of the passenger vehicle **fleet** (comprising old and new cars etc). Such information is readily available (eg ABS SMVU data and to 1995 is given by Mees, P "A very public solution; transport in the dispersed city, MUP, 2000 or the book Back on Track, 'Rethinking transport policy in ANZ', UNSW Press 2001 p86 which notes "*This dismal performance is due to the aging vehicle fleet which continues to wash out any improvements due to new vehicles, and the growth in the Four Wheel Drive market which has shown that consumers can always choose to move away from technological efficiency."*

The notes on congestion pricing in the draft report are helpful; however, they could usefully be supplemented by specific attention to other road pricing (as per the discussion on heavy vehicle charges on p222). The topic of road pricing was found to warrant a separate chapter in the NSW (Parry) Report into Sustainable Transport 2003 and, for example, the BTRE's *Greenhouse policy options for transport 2020.*

Some recognition of the value of electric urban rail services in reducing road congestion, air pollution in capital cities and conserving imported oil could also be given. Take for example, the Sydney City Rail task, reported to be moving over 270

million passengers each year. Assume that the metropolitan part of this task (over 250 million passengers) is about 5 billion passenger-km (average length of journey being almost 19 km), and that on a hypothetical closure of the service, an extra 4 billion passenger-km of car travel is generated with a higher than usual occupancy rate of 1.25 passengers per car (cf the BTRE's estimate of the average vehicle occupancy rate in Australia of around 1.1 persons cited on page 11 of *Greenhouse policy options for transport 2020* Report 105, 2002). This would result in an extra 3.2 billion car km per year. On an ABS average petrol use of 11.0 litres/100km (ABS SMVU data for 2003, Table 5) this results in an extra 291 million litres of fuel used per year. The increase in external health costs due to the extra air pollution (see Appendix A with the unit cost of 2.4 cents per passenger vehicle km) would be $768 million per year. There would undoubtedly be an increase in road trauma as well.

Moreover "electric train" does not appear at all in Chapter 9. Given the advantages of electric trains in people moving and reducing road congestion, liquid fuel use and air pollution, some consideration may be warranted in the final report.

In regard to Draft Finding 9.4, the Travel Smart program is a good one. But to work properly, it needs (as implied by the NSW Parry Report and other findings) improved road pricing. It also needs improved public transport infrastructure.

Freight Transport

Freight Transport is an increasingly important topic, as shown by the warnings of the Reserve Bank of Australia early in 2005, and the OECD 2004 report on Australia. The Commission's recommendation for a national reform program **encompassing all freight transport modes** (NCP Inquiry report, p224, emphasis added) and not just the *"rail sector"* (Energy efficiency draft report, page 222, para 4) is supported.

Dealing with energy efficiency first, some discussion of the energy efficiency of all freight transport modes and not just road freight (drafts p224-5) would be in order. So also would relative energy efficiencies for various tasks and transport modes. Such discussion was provided for road and rail by the Industry Commission's 1991 report on Rail Transport.

In regard to Intermodal Transport, a series of Federal Government and Parliamentary Inquiries have established rail track infrastructure deficiencies including "…*substandard national track*". The Commission, in its 2005 NCP Inquiry

Report, Box 8.7 page 208 notes *"disparities in the standard of road and rail infrastructure"* whilst in its 1999 Report on Progress in Rail Reform, Box 10.2, p237 notes *"Participant's comments on deficiencies in rail infrastructure"* and concludes *(p239) "There has been inadequate investment in some parts of the rail network"* (including Sydney).

The cost of poorly aligned "steam age" track between Sydney and Melbourne was conservatively estimated (see Appendix B) in a joint ARC/RIC/UOW project as 28 million litres of diesel per annum.

It is a good question as to how diesel fuel could be saved if the Australian land freight task was redistributed to a system with "fit for purpose" rail infrastructure and competitively neutral access pricing for road and rail. To answer such a question will require improved transport data and would naturally depend on the assumptions made. The Commission was quite prepared to take on board such questions in its 1991 report 'Costs and benefits of reducing greenhouse gas emissions' Vol II: Appendices page F54 where this writer had noted, in regards to freight moving between Sydney and Melbourne; *"**If** the ruling gradients and limiting curvature were improved to Fast Freight Train standards and if rail was to increase its modal share of land freight on the between Sydney Melbourne corridor to 70 %, there could be savings of **roughly** 70 million litres of diesel each year."*

The 1991 Industry Commission report also noted that such a fuel saving would correspond to a reduction of 202 kt of carbon dioxide. If such questions were relevant to the Commission in 1991 in considering Greenhouse Gas emissions, they would appear to warrant at least some attention by the Commission in 2005 in dealing with energy efficiency and the implied concept of energy conservation.

The need for improved rail transport data was recognised by the Commission in its 1999 report on Progress in Rail Reform, the ATC 2004 National Transport guidelines, and in a May 2005 report by the Senate Committee examining AusLink.

Concluding remarks

Recent data as given in Table 1 demonstrates the superior energy efficiency of rail, and also rail's ability to substitute electricity use for imported oil. From this data, rail performed a larger freight task than road along with a small but significant passenger task for the use some electricity and about 2.5 per cent (one fortieth) of the fuel used by all road vehicles.

TABLE 1 TRANSPORT TASKS AND FUEL USE - RAIL AND ROAD:2002-03

Transport tasks in Australia

Freight (billion tonne kms -btkm) Rail 158 btkm Road 153 btkm

Passenger rail 10.6 billion passenger km

road 188 billion passenger km (bpkm) being 153.1 billion km moved by cars, other passenger vehicles and motor cycles along with an occupancy rate of 1.1 (BTRE as cited above) plus about 19.7 bpkm for buses.

Diesel use by rail

Freight 609 Million litres

Passengers 67 Million litres

Electricity use by rail

Freight 581 GigaWatt hours

Passengers 1128 GigaWatt hours

Road vehicles fuel use (total 27.5 6 billion litres)

17.76 billion litres of petrol

7.96 billion litres of diesel

1.85 billion litres of LPG etc

Reference ARA (2004) Australia Rail Industry Report 2003 (overlooking 250 tonnes of coal) ABS SMVU data and Bus Industry Confederation (2003) Transport Facts

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Some discussion on the **energy efficiency** of various modes of passenger transport would also be in order (particularly given that the inquiry is about energy efficiency). Energy efficiency is usually expressed in terms of **net passenger kilometres per Megajoule,** and was used by the Industry Commission in its 1991 report on rail which notes, inter alia, in a discussion (p61) on non-urban freight *"aggregate energy efficiency comparisons between road and rail transport show that rail is the more energy efficient mode."* This Industry Commission report noted this was subject to some debate and this was also the case (p65) re passenger transport.

The fact is that aggregate energy efficiencies are published, including by the Apelbaum Consulting Group (done over the years in various assignments for the Federal Government and others) as reported in submission No 1 to the present inquiry. A 2004 publication -The Australian Rail Industry 2003 by the Australian Railway Association - also gives aggregate energy efficiencies for various transport

modes. Thus, some technical discussion would be welcome in the Final Report of the issues relating to transport aggregate energy efficiencies for various transport modes.

As noted over 25 years ago (and in this writers primary submission to the present inquiry) the Australian Transport Advisory Council 1979 publication *Transport and Energy Overview* found, inter alia, that *"... 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.*

This report was prepared following the second major world oil price shock during the late 1970s. Although the data used in this ATAC report is now dated, the approach it proposed is commended. So also is that of the BTRE's report 105 *Greenhouse policy options for transport 2020* that is cited in the draft report.

The challenge to the Productivity Commission is to ensure that the final report will respond to the need for increased efforts to reduce dependence on imported oil in a new global environment.

Appendix A Excerpt from submission no 1 to the current inquiry

18. The Bureau of Transport and Regional Economics 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 1 cents 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.**

Appendix B External costs and potential energy savings

Excerpts from Sydney–Canberra–Melbourne High Speed Train Options, Australasian Transport Research Forum, Canberra, Papers, Volume 25

As part of the ARTC National Interstate Track Audit Booz Allen and Hamilton (BA&H - Appendix A page 24) considered *'...six external cost items of noise pollution, air pollution, greenhouse gas emissions, congestion costs, accident costs, and incremental road damage costs.'* Their estimates reflect the fact that noise, air pollution costs and congestion costs are higher in urban areas than in rural areas and are mainly based on estimates given by the BTE (1999). The BA&H estimates of externalities were used in the ARTC national interstate track audit to calculate the external benefits associated with diverting tonnage from road to rail.

Using the BA &H values, as modified …, we obtain unit external costs, in cents per net tonne km, as follows.

	Road	Rail
Rural	2.073	0.140
Metro	2.276	0.174

The net reduction of external costs was found to be $15.70 per tonne of freight moved from road line haul to rail line haul [between Sydney and Melbourne]. This estimate also used a road distance of 840 km, an upgraded rail distance of 893 km, urban hauls of 50 km for each line haul mode, plus an average 25 km urban road pick up and delivery for each rail line haul

The ARC-RIC project found that assuming Melbourne - Sydney intermodal tonnages at 8.4 million tonnes in the year 2000, with a 4 per cent per annum growth rate, major track upgrading and rail gaining a 50 per cent modal share would lead to annual diesel savings of about 28 million litres by 2020. This is compared with no track upgrading and rail retaining a 14 per cent modal share, and translates to about 75,000 tonnes of carbon dioxide per annum. Other assumptions include rail having an energy efficiency of 2.7 Megajoules (MJ) per ntkm on existing track and 3 MJ per ntkm on upgraded track, along with 77 MJ for road pick up and delivery when rail line haul is used, and line haul road having an energy efficiency of 1 MJ per ntkm (with 38.6 MJ per litre of diesel).