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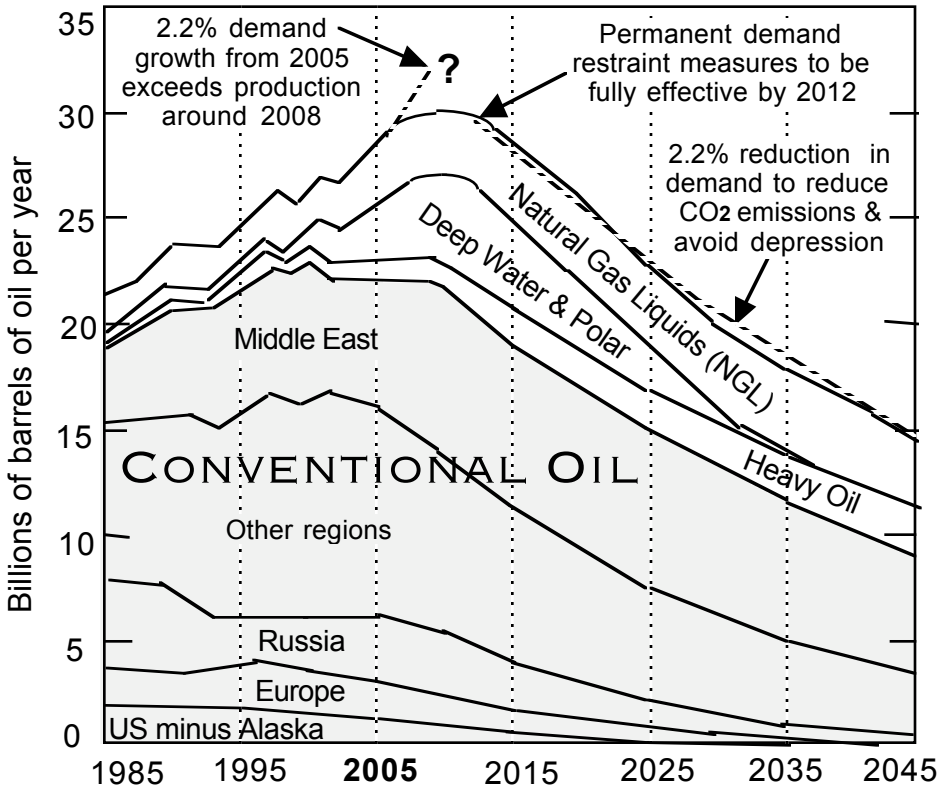
Submission to the Rail Freight Network Review

by Alan Parker Design 15-8-07



Source: Oil production data from the April 2005 newsletter of the Association for the Study of Peak Oil www.asponews.org

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Introduction

Since the 1960s the transport policy focus has been on roads at the expense of investing in the more energy efficient forms of transport. Consequently Australia now has one of the highest levels of per capita car travel, air travel and road freighting in the world. Mainstream transport planning has ignored the need to maintain the rail network so it is not surprising that rail and road freight transport planning conducted over the last seven years in Victoria has reflected this longer term bias towards roads. This has happened despite the State Labor government's motherhood statements about reducing green house gas emissions.

Hopefully this policy contradiction can now be resolved because of the dramatic paradigm shift in the commitment of the Commonwealth Government, the Federal Opposition, some state governments, the Greens, the Democrats and many major companies to combat climate change. Indeed, at the highest level of decision making at the APEC conference there has been a recognition by Australia, its allies and its trading partners of the need to act together to prevent dangerous climatic trends becoming a threat, to their national economic well being and national security. The Stern Report (2006) made it very clear that climate change was the result of the greatest market failure in human history.

During the past 12 months there has also been a growing awareness of the risk of crude oil prices increasing to well over US$100 a barrel in a few years; with oil production peaking around 2010 and world crude oil production declining from around 2012 this would become a threat to the well being of all Australians (See front cover graph) The awareness of risk was very evident in the Senate Report on Future Oil Supplies (2007) their main recommendation was to treat peak oil as a risk management problem. Within the time frame of the "Rail Freight Network Review" the convergence of the threats of climate change and oil shortage is perhaps inevitable. These two threats certainly needs to regarded as risk management problems in this "Review". Appendix A sets out the risks of not reducing Australia's oil dependence.

There is also a need to create a paradigm shift in how transport plans are made and implemented at local government and state agency level because stake holders are mostly pursuing a 'business as usual' agenda. New national priorities need to penetrate the bureaucracy from top to bottom so that the need to reduce oil dependence as the first major step to reducing both greenhouse gas emissions and oil consumption is seen as a basic objective.

This submission argues that rail freight will have to triple in the next 20 years and take over much more of the freight task, particularly the non-bulk freight. It is argued that the enhancement of the rail based freight network in Victoria and Australia is crucial to reducing carbon dioxide emission and reducing economic vulnerability to oil shortages of households in rural areas and outer suburbia, who depend on two or three vehicles and constant car trips to work, school and supermarkets.

Diesel electric locomotives are far more efficient in their use of diesel fuel than trucks. In the longer term there will be serious oil shortages so the use of diesel oil for non essential urban car and light commercial vehicle travel and the 'carrying of coals to Newcastle' by heavy road vehicles will have to be severely constrained. A large strategic reserve of diesel oil must be kept for the mass movement of freight and essential goods by rail, exporting raw materials overseas, producing food and maintaining essential services. The use of natural gas to power locomotives must also be

considered as a transition measure until clean sources of electric power become available.

to adjust to peak oil in Victorian transport planning

Previous plans and strategies for Victoria have mostly ignored the risk management issues and focused on the narrower concerns of the Department of Infrastructure (DOI) and VicRoads. Planning was based on the cosy assumption that current patterns of consumption and growth would continue will nilly to 2030. There was no understanding that energy security is vital for national security and that oil conservation is just as essential as protection from an invading force for the preservation of a democratic way of life. Neither was reducing greenhouse gas emissions taken seriously; only token measures were ever implemented which resulted in a large increase in per capita greenhouse emissions in the last seven years . See Appendix A which describes effective measures to reduce oil use and carbon dioxide emissions in passenger transport.

In 2001 a DOI management committee responsible for deciding what should be studied in the conduct of "Melbourne 2030" decided to exclude any consideration of oil resource depletion. The issue of peak oil was raised with the management committee in a letter written by the Convener of the Association for the Study of Peak Oil (ASPO Australia) and tabled by Dr John Grant. That letter was discussed and a decision was made to ignore the oil issue. As a consequence there are no risk management measures to cope with the high oil prices and shortages that are certain to take place before 2030 and perhaps before 2012.

The Committee had many reasons for ignoring oil production peaking and then steadily declining. One reason was the limited human resources available to take on board this time consuming issue. Another reason was that they knew so little of what was going to happen with oil prices and no one had any understanding of the geo-political issues. Another reason was that it was seen as a Commonwealth responsibility anyway. This suggests that DOI did not have an institutional framework or enough human resources to tackle any plan with a 10 year timeframe let alone a 30 year time frame.

That decision was unfortunate but understandable because in November 2002 when " Melbourne 2030" was released the price of crude oil was only US$25 a barrel, and Australian government agencies, particularly the Bureau of Transport and Regional Economics, and several national oil agencies were predicting that oil would only be around US$30 a barrel in April 2006 and that it would stay that way for a decade or so later; this was so out of touch with reality that it undermines their credibility, Whatever the reason the DOI management committee made the wrong decision and oil reached US$ 75 a barrel in August 2007, a 340% increase.

Worse still, in 2007 many private sector researchers are predicting near future oil prices of well over US$100 a barrel. 'Melbourne 2030' was a prescription for business as usual by VicRoads and the transport planning branch of DOI whose unsound projections for the growth in rail patronage were revealed when increased petrol prices resulted in severe congestion of the Melbourne Passenger Rail system in 2007. Is that mistake going to be repeated.? When imports of diesel fuel becomes scarce will there thousands of stranded heavy road vehicles and not enough rail freight capacity to cope ? The is a serious issue because if and when the oil crunch comes the energy efficient rail locomotives will have to be given priority to keep the economy rolling.

Other plans and strategies for rural Victoria and its freight transport system will predictably fail to achieve their stated objectives because they also ignore what needs to be done in the next 10 years to cope with both climate change and the peaking of both Australian and world conventional oil supplies. The review brief states that Victoria's freight task is expected to double over the next

30 years and Victoria's rail network will need to take up a much higher share of the freight task. In fact the freight task will perhaps need to triple or even quadruple in the worse case scenario of oil depletion.

Carbon emissions are driving global warming

The new international scientific consensus about the need to reduce per capita carbon dioxide emissions has been well publicised in both Sir Nicholas Stern's Report (Stern 2006) and the InterGovernmental Panel on Climate Change's Fourth report by 2,500 of the world's leading climate scientists. It concluded that global warming was "unequivocal" and predicted catastrophe if emissions caused by human activity were not curbed through swift political responses. Representatives of 113 nations endorsed the report's conclusions.(IPCC 2007) The strategy Melbourne 2030 failed to anticipate the conclusions of the fourth IPCC report because it ignored the third report of the IPCC. It has been very clear that reducing carbon emissions requires fundamental changes in how people live and financial risks for powerful industries including airlines, car manufacturers, industrial farms and construction companies. The fourth IPCC report reinforces its previous report and concludes that there is a need to reduce carbon emissions in the next ten years.

Long before clean energy from coal, nuclear energy or hydrogen is available the use of non-conventional oil from tar sands, shale or very heavy oil or coal, which are very carbon intensive to produce, must be avoided (see Appendix A for details of how Carbon intensive substitutes for convention oil will greatly increase carbon dioxide emissions.)

Both oil conservation and carbon trading will have an important role in reducing the competitive advantage of fossil fuels and encouraging the growth of renewable energy infrastructure.

Railways and the risk management of oil dependence

Researchers state that several future outcomes are possible; what is important is managing the risks by taking action well before world oil production peaks. Action to mitigate the consequences can reduce the pain of inevitable change. (Hirsch 2005) Possible scenarios are:

• Oil production peaks in 2010 then declines from around 2012 inducing a world wide depression,wrecking the Australian economy and producing mass unemployment.

• Oil peaks between 2015 and 2025 making a less painful adaptation possible; provided that most developed nations agree to reduce oil dependence with strong government, market intervention, the introduction of fuel rationing, fuel efficiency standards etc.

• Oil peaks after 2025 allowing a timely adaptation with mutually agreed supply and demand side oil conservation measures recommended by the International Energy Agency

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There is need for planners to include the worse case of climate change and oil depletion scenarios in their long term plans. Even with world crude oil production peaking later around 2018 it is a unique challenge and a very serious risk to the Australian and the world economies. Such intervention would also be a timely and positive response to climate change. All national state and local governments must redefine their long term planning strategies and restructure their transport bureaucracies so that they can reduce the demand for oil. (Hirsch 2005)(Stern 2006)

One Australian study prepared in 2006 recognises that the shortfalls in oil supplies could be very damaging for those dependent on cars in outer suburbia and cite the work of Dodson and Sipe (2006) showing a map of the level of vulnerability in Metropolitan Melbourne. Whatever the timing of

peak oil people living in outer urban and rural areas will be the most disadvantaged and within a few years the well being of most other people will also be under threat.

Oil dependence has to be reduced because in a few years when it becomes very costly and scarce it will pose a very serious threat to the well being of Australians, particularly those with outer suburban lifestyles, which are hinged on two or three car families and constant car trips to work, school and supermarkets.(see appendix A for measures to reduce oil consumption in passenger transport so as to conserve oil for the energy efficient forms of freight transport.)

Providing a sound basis for future planning in Australia and Victoria

A major shift is required from road to rail freight. However, the composition of rail freight traffic and future demand cannot be predicted with any degree of accuracy because of the lack of government planning in the areas of oil depletion and climate change. . The risk management planning vacuum prevents a realistic estimate of future demand for rail freight. .

Because peak oil is certain to occur it would be prudent for the Commonwealth and state governments to do the following if they intend to maintain essential public services, food production and prevent a melt down of the economic system .

1. Develop a risk management strategy to free Australia from oil dependence by decoupling the growth in oil consumption from the growth of GDP.
2. Unilateral implement the Oil Depletion Protocol by reducing oil consumption by 2.5 % per year and launch an all out diplomatic effort to persuade nations in this region to do likewise.
3. Produce an integrated national Energy Security Policy to mitigate oil dependency with both demand and supply side measures, institutional changes, transport innovations, tax incentives and constraints that collectively focus on the synergistic reduction of oil use and carbon dioxide emissions from the transport sector below 2000 level by 2012
4. Establish a strategic reserve of a mix of crude oil and refined oil products.
5. Make a commitment to freeing Australia from oil dependence by 2020, similar to Sweden and Norway, and to opposing the use of military force to gain control of foreign oil reserves.

Trying to make meaningful recommendations on the future of rail freight transport in Australia would be so much easier if planning along the lines set out above was proceeding; unfortunately it is not.

The freight rail network's present physical condition is deficient because it has been neglected for so long despite the appalling condition of much of the existing tracks and some bridges. This has be been documented and acknowledged in every transport inquiry into rail freight over the last 20 years. .

The energy efficiency of rail freight compared to road freight.

The following tables set out the energy efficiency of road and rail freight for most of the vehicles in use today. The data reflect the mechanical advantage of a steel wheel running on steel rail over a pneumatic tyre running on a relatively uneven and less smooth road surface.

Every 1 tonne of freight that goes by rail instead of road on the Sydney to Melbourne route saves Australia nearly 17 litres of diesel oil. It is clear that demand for transport services, efficiencies within the transport/logistics task and efficiencies in converting energy into work need to be tackled

if further reduction in Australia's oil dependency is to occur. (RTSA 2005)

The most positive development so far at national level has been the bipartisan political commitment to the completion of the inland rail freight link from Melbourne to Brisbane and this review should provide the means for building the southern end of that desirable rail link and ensure that all the necessary rail and road links to it and the modal interchanges are provided for.

TABLE 1 TRANSPORT ENERGY USE - RAIL AND ROAD: 2002-03

Rail Freight	Diesel ML	Electricity GWatt hrs	Energy (FFC) PetaJoules
Bulk	459.2	566.6	26.0
Non Bulk	149.9	4.7	6.4
Total	609	581	32.4

Road Freight	Petrol ML	Diesel ML	LPG ML	Energy (FFC) PetaJoules
Light Com Veh	2277	1395	603	159.3
Rigid Trucks	43	2128	14	90.9
Articulated Trucks	-	3161	-	132.0

Note: ML = million litres. FFC = Full fuel cycle. Source

TABLE 2 LAND TRANSPORT TASKS AND ENERGY EFFICIENCY: 2002-03

Freight	billion	Net tonne
Rail	tonne kms	km per MJ
Bulk	136.2	5.24
Non bulk	21.9	3.40
Total	158	4.88
Road		
Articulated trucks	115.66	0.88
Rigid Trucks	30.41	0.33
Subtotal	146	0.66
Light Com Vehicle	6.71	0.04

Source Tables 1 and 2 : The Railway Technical Society of Australasia (RTSA) is a Technical Society of Engineers Australia.

Improved rail freight networks and Australia's clean energy resources

More energy efficient locomotives are now becoming available and in the longer term cleaner renewable energy supplies will be useful for reviving non-bulk rail freight high speed rail freight, urban rail services and high speed intercity trains. Australia will continue to have liquid fuel shortages but the prospects for clean electricity from geothermal, wind and solar resources are very good if the reliance on liquid fuels can be phased out.

There are several new innovations in the design of new hybrid gas/electric, and diesel /electric locomotives being trialled in different countries that are even more efficient than the existing locomotives. No doubt these new locomotives will be competitive with the new engines coming into use on B-double and B-triple trucks and these new locomotives could be used to carry non-bulk freight. Dual fuel locomotives, dual fuel B-double and B-triple trucks using 85% natural gas and 15% diesel are also feasible.

New gas fields are being opened up in Bass Strait below the existing oil fields and new gas pipelines will be bringing gas from other new gas fields into Victoria. The most promising development in the short term is the use of natural gas as a transitional fuel to buy some time for the development of other sources of clean energy. In the long term there are opportunities to move away from both diesel fuel and from the electricity generated from Brown coal in Victoria.

There are huge geothermal energy resources 1,600 km north of Melbourne and 1,600 km west of Brisbane that could replace all the electricity from all of Australia's coal fired power stations for a 1,000 years with hardly any carbon dioxide emissions. 27 companies are currently trying to establish the commercial viability of drilling into these hot dry rocks a few kilometres below the earth's surface to release the heat and drive turbines to produce electricity. The largest company Geodynamics is completing a large scale demonstration drilling to be complete by 2008 and a geothermal power stations is planned for 2012 (Toohey 2007) (Cawood 1996)

Around 100 km west of Melbourne there is also a geothermal hot spot that has the long term potential to create clean base load electricity to power the rail network in about 20 years from now with minimum transmission losses.(Cawood 1996)

Current wind farm developments are focused on generating electricity and in a few years the costs will be down to 6c per kilowatt hour. As yet there is no integrated wind farm development in which some wind turbines create electricity and others, by electrolysis of water, produce hydrogen to be used as energy storage for when wind speeds are not usable. However that technology is on its way in some other countries.

The potential for closing down all the brown coal fired power stations is very good in the long term. For the immediate future the name of the game is to conserve existing oil reserves, develop the renewable energy resources and to prudently use gas as a transitional fuel. Rail freight locomotives can make the best use of natural gas and of clean electricity when it becomes available.

All of these developments are needed for Australia to make its contribution to stabilising carbon dioxide levels in the atmosphere.

CONCLUSION

1. Australia does not have an energy problem because it is abundantly endowed with sources of renewable energy and relatively clean natural gas. Australia has a liquid fuel problem and is failing to conserve oil for essential purposes.

2. Australia is a gross carbon dioxide emitter because it chooses to use brown coal, an extremely dirty fuel which needs to be replaced by renewable energy resources particularly the geothermal resource.

3. Railways have an important role in reducing oil dependence and reducing Australia's contribution to global warming and can efficiently use renewable energy resources to mitigate shortages of liquid fuels.

4. Australia freight and passenger rail infrastructure has taken 100 years to build and is more or less complete but needs renewal and some extensions to the network. It can be used to build a more sustainable transport system for our children and grandchildren.

5. The Victorian rail freight network is needed to at least triple the use of rail freight in Victoria

and in the longer term greatly increase the use of the Melbourne to Brisbane inland rail link.

6. The terms of reference of this review grossly understate the importance of this review and the need for improving appalling condition of the existing rail network which has been documented by others at several inquiries into rail freight.

7. A state strategic reserve of diesel oil for freight transport should be created irrespective of whether a national strategic reserve is created.

8. Many of the measures to reduce oil use in the passenger transport sector contained in Appendix A would complement the development of the rail freight system and help conserve oil to cope with the worst case scenario of oil peaking in 2010 and then declining from 2012.

9. More energy efficient locomotives are now becoming available and in the longer term cleaner renewable energy supplies will be useful for reviving non-bulk rail freight, high speed rail freight services, urban rail services and providing energy efficient high speed intercity trains to replace air travel which is totally dependent on liquid fuels.

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