Policies to Develop a Low Emissions Transport Sector in Australia

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Mark Reynolds in NSW provided this excellent submission to the Australian Federal Government's Garnaut Climate Change Review on Issue Paper Number 5: Transport Planning and the Built Environment.

Mark's complete submission is available as a PDF.

Professor Garnaut,

Thank you for the opportunity to provide this submission. In the following pages I set out to show that you have not included in your thinking to date the most disruptive factor affecting transport emissions. Given that oil is the lifeblood of our transport system I provide evidence that escalating oil costs and supply constraints are real and critical within short planning horizons. I then describe four linked and supportive policy thrusts to develop a low emissions transport sector in Australia, with economic, social and environmental benefits.

I write based on many years experience as a business advisor recommending ways for large companies to deliver goods to their customers more efficiently. I have worked on all types of freight networks from the transport of bulk goods to the "fresh daily" operations which deliver bread and milk to every food outlet in Australia. This submission focuses on the efficiency and sustainability of Australia's transport operations, including brief mention of the built environment which our transport networks serve and are shaped by.

The Issues paper from Forum 5 – Transport, Planning and Built Environment – highlights robust recent growth in emissions from the Australian transport sector and seeks input on policies to encourage cost-effective emissions reductions in passenger and freight transport by land, sea and air. Some technical options and barriers to change are discussed in the issues paper and the Forum presentations. The stated context for the issues paper is continued growth in demand for transport services as a key enabler of economic growth and social activity in Australia.

However the issues canvassed do not include a critical interfering factor from beyond our borders

– the looming global supply-side constraints on the oil needed to fuel ongoing growth in transport activities and emissions. There is overwhelming evidence from numerous sources (for example IEA 2007, Rubin and Buchanan 2008, Simmons 2008, van der Veer 2008) predicting imminent and worsening supply shortages of oil fuels for transport during coming years and decades. Such shortages will seriously and rapidly disrupt past patterns of transport use, especially personal use of cars, and may be expected to significantly reduce emissions from some parts of the transport sector, perhaps in an abrupt and unplanned manner.

It is essential to extend the questions posed in the issues paper and ask: What should be a broader set of policy responses to address transport emissions reduction considering both demand and supply-side factors?

This submission contends that emissions from Australia's transport sector are best addressed as one part of an innovative and integrated policy package that tackles the inevitability of major reductions in oil use. Australia faces particular difficulties transitioning away from oil dependence because of the geographical realities that require us to deal with the "tyranny of distance" at all transport scales – globally, nationally, in our regional areas and across the sprawling suburbs of our large cities.

A comprehensive policy response to these challenges goes well beyond the remit of your current Climate Change Review so let us focus on policy matters most closely related to reducing emissions from transport. Four policy thrusts are required to shift economic resources away from business-as-usual into future-proofing Australia's transport sector, thus reducing the risk of disruptions from oil shortages and eventually reducing emissions by large amounts. I am confident that your review will deliver recommendations supporting all of these policy thrusts, not least through targeted application of the revenue from the rent value of emissions permits.

The four policy thrusts are;

1. Redirect future infrastructure investments towards low emissions transport modes such as rail freight and public passenger transport. Urgent support for such investments is vital because transport construction projects take many years and lock in a legacy of favoured travel options, fixed emissions profiles and sunk costs that will be with us for decades
2. Ensure the full cost impacts of emissions trading and global oil price rises flow directly through to end users to reshape consumer markets by encouraging transport usage efficiencies, modal changes and positive technology choices without interference from perverse subsidies or other mechanisms that may delay end-user moves to a future lower-emissions transport model
3. Develop and fund social equity policies to compensate and help reorient the most disadvantaged, such as low-income residents of outer suburbs and country regions, towards less dependence on oil fuels
4. Focus strong emissions reduction incentives and efforts on the electricity generation sector in anticipation of transport becoming a growing user of electricity in place of oil (indicative scale could be a currently unforeseen 20 – 50% addition to national electricity demand by 2030)

Australia is doubly fortunate in being a wealthy country and in having a comfortable though diminishing degree of self-sufficiency in oil supplies along with ample LPG and natural gas supplies (ABARE 2008). These factors can ease our transition to a low-emissions economy and make it a lot more painless than the journey faced by most other countries in the world.

The remainder of this submission enlarges on the global oil supply context and on each of the four policy thrusts outlined above. It also provides a set of references for more detailed support of the arguments presented here. A key reference is the recently published book Transport Revolutions

– Moving People and Freight Without Oil (Gilbert and Perl 2008) which contains extensive data on the current realities of the global transport industry and puts forward policy options and plans for revolutionary changes to maintain transport services in an oil-depleted world.

The overriding message is one of urgency. Every week that passes now without vigorous action to prepare for the coming world of scarce and expensive oil has an opportunity cost that we will pay many times over if we are forced into crisis actions such as abandoning urban motorways half-built and scrambling to compete with other countries at high prices for railway and electric vehicle manufacturing capacity.

Why should talk of such crisis actions be taken seriously? Recent oil market movements point to the answers. Even without regard for the sound geological basis of "peak oil" arguments (see for example Hirsch et al 2005, Senate 2006), the sustained rise in the price of oil over the past 15 months exceeds any mainstream projections and suggests that larger forces are at work. Indications are that geopolitical factors may be converging to encourage some oil exporters to leave more of their petroleum assets in the ground while others are experiencing rapidly growing domestic demand which reduces their net export volumes (Brown & Foucher 2008).

Net oil exports are the critical survival issue for oil importing countries – the majority of nations – who rely on a few countries that are rich in oil to export enough to supply everybody else's needs for liquid fuels; needs which by and large can only be supplanted by other energy sources slowly and with difficulty.

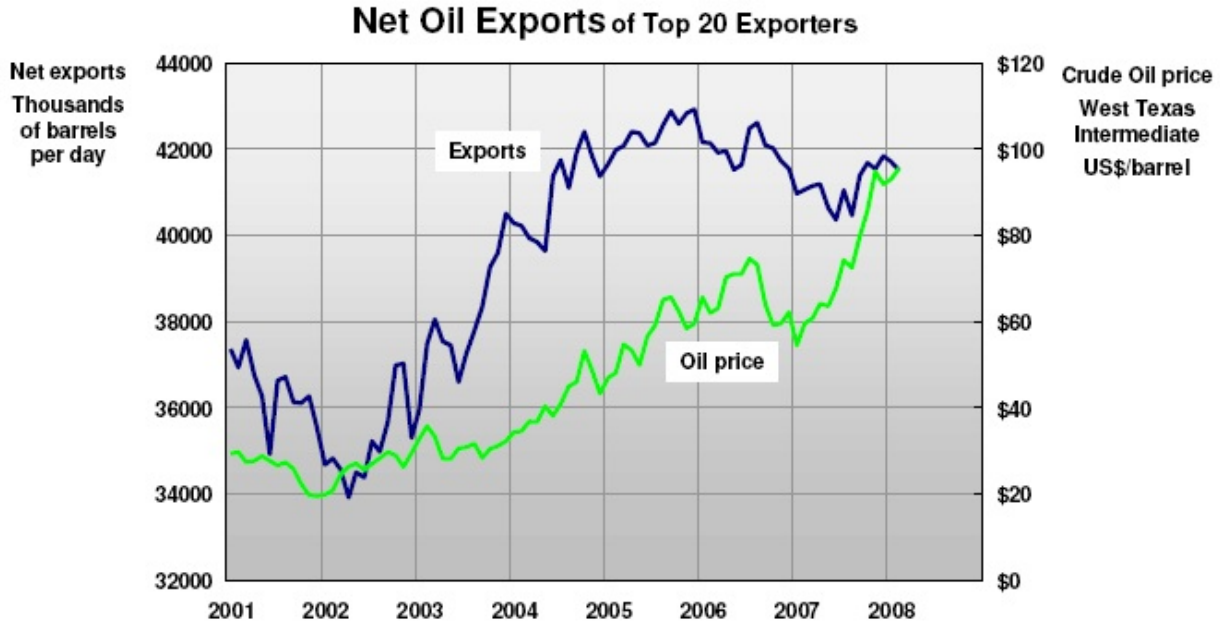

Fig 1. Global net oil exports showing indications of decline over the last two years
Source: Net Oil Exports 2008

As shown in Fig 1 global net exports of crude oil are displaying a worrying downward trend in the face of global demand which has grown at 1.4% to 1.5% per year since 2004 (IEA 2008). Furthermore, known oil supply augmentation projects out as far as 2012 show little hope of adding new supply capacity fast enough to keep up with projected demand (Oil Megaprojects Task Force 2008). Some analysts predict that oil availability to OECD countries including Australia could be as much as 8% below today's volumes by 2012 (Rubin and Buchanan 2008, Table 2 on p6), and will likely decline further in future years.

Australia is in the happy position of being somewhat insulated from world oil supply shocks by our domestic production which provided 53% of consumption in 2007 (ABARE 2008). We imported the remaining 47%, partly as crude oil for local refining and partly as refined products. A concern is that the available historical data up to 2005-06 shows that diesel fuel imports grew in just 3 years from 30% to 40% of Australia's refined petroleum imports by volume while remaining about 30% of consumption by volume (ABARE 2007). This suggests that the diesel fuel vital for agriculture, mining and freight transport is increasingly import-exposed.

A temporary 4% dip in fuel supply was enough to cause hoarding, petrol queues, supply stoppages and empty supermarket shelves during the two-week-long tanker drivers' strike in the UK in September 2000 (PSEPC 2005). Transport fuel supply is close to being a Just In Time business with little buffer in the pipeline. Even with the cushion of our capable local oil industry the implications of a reduction of 8% in imports to Australia could be a 3 to 4% shortfall in total petroleum fuel volumes available to users. Further declines in imports would raise the shortfall steadily through 5% and beyond.

It is worth taking a look at the usage profile of petroleum fuels and biofuels in Australia. The transport sector is by far the biggest user at 69% as shown in Table 1.

Table 1 Australian Energy Disposal for 2005-06, in PJ
Petroleum fuels (crude, LPG and refined) plus biofuels

Disposal sector	PJ	Percent
Transport subtotal	1,302	69%
Road transport	1,019	
Rail transport	27	
Water transport	54	
Air transport	202	
Industry	244	13%
Mining	147	8%
Agriculture	86	5%
Lubes, bitumen, solvents	63	3%
Commerce & services	25	1.3%
Residential (mainly LPG)	12	0.6%
Total	**1,879**	100%

Note: Biofuels comprised 0.3% and LPG 7.9%. Energy units are Petajoules (PJ).
Source: ABARE 2008

Demand elasticity for transport fuels is conventionally regarded as low (Morgan & Emoto 2007) but some experts (Ashton-Graham 2008) suggest that 13% - 30% reductions in motor vehicle usage can be achieved through community awareness, involvement and incentive programs. Every bit of saving that can be achieved this way may be needed because simple modelling shows that private motorists will need to make the biggest cuts in fuel use.

Table 2 provides an illustrative example of how a 5% overall reduction in petroleum fuel usage

might have to be achieved by voluntary and/or mandatory conservation actions in the case of sudden unplanned reductions in oil imports.

Table 2 Illustrative Scenario for a 5% Cut in Use of Petroleum and Biofuels

Sector	2005-06 PJ	5% cut PJ	Percent change
Transport subtotal	1,302	1,214	-7%
Road transport subtotal	1,019	936	-8%
Passenger vehicles subtotal	639	564	-12%
Personal	339	284	-16%
Commuting	163	147	-10%
Business	137	133	-2%
Motor cycles	3	3	10%
Light commercials subtotal	158	152	-4%
Personal	31	28	-9%
Commuting	25	24	-4%
Business	102	100	-2%
Rigid trucks	81	79	-2%
Articulated trucks	117	116	-1%
Non-freight trucks	2	2	
Buses	19	21	7%
Railway transport	27	27	
Water transport	54	54	
Air transport	202	197	-2%
Industry	244	239	-2%
Mining	147	147	
Agriculture	86	86	
Lubes, bitumen, solvents	63	62	-1%
Commerce & services	25	24	-2%
Residential, mainly LPG	12	12	
Totals	**1,879**	**1,785**	

Sources: Sectoral energy disposal data for 2005-06 from ABARE 2008 Road transport vehicle type allocations of fuel usage from DEWHA 2006 Passenger and Light commercial fuel usage allocations from ABS 2007
Modelling by Anawhata Associates

The scenario in Table 2 has been constructed on the principle that reductions in freight transport, air transport, industrial and commercial demands should be minimised to keep the economy moving. Therefore the largest share of fuel savings can only come from the biggest usage sector – private cars. The modelling which generated Table 2 suggests a rule of thumb as follows;

> 5% oil supply cut = 12% less for cars = 10% cut in commuting + 15% cut in personal use
>
> 10% oil supply cut = 25% less for cars = 20% cut in commuting + 30% cut in personal use

The implications of supply cuts exceeding 5% quickly become confronting and probably economically damaging unless we can put in place more efficient and less oil dependent transport alternatives such as natural gas powered buses, electric railways, and electric or hybrid cars, which also produce lower emissions.

The precautionary principle argues for strong early action to mitigate the impact of such

pervasive economic threats as oil supply cuts, even though the onset date is uncertain within a band of a few years, but could come soon. The peculiar threat to Australia of oil supply cuts is that our economy is highly dependent on oil fuels for transport and there are currently very few non-oil options offering any scale beyond the limited reach of our rail systems. Biofuels and LPG can be ramped up to play larger roles, especially in maintaining the viability of the current vehicle fleet with somewhat reduced emissions, but they have their own scale limits so we must set out to engineer a substantial increase in electrically powered transport by rail and road (Gilbert and Perl 2007). Natural gas can also play a greater role in Australian transport for a few decades.

The first critical step for freight rail in Australia does not even depend on electrification – it is simply the extensive and costly new trackworks needed to unblock the Sydney bottleneck and transform rail capacity and performance between Brisbane, Sydney and Melbourne. Diesel hauled rail on these heavily trafficked corridors can make a big contribution to reducing road freight haulage and transport emissions. Electrification is the logical next step.

Actions to reduce the oil dependency of transport also reduce emissions. Increased reliance on electricity should be welcomed because electricity generation from renewable sources is available and proven and will expand rapidly with the Federal Government's commitment to a 20% Mandatory Renewable Energy Target (MRET). Competitive new electricity generation technologies are developing to industrial scale at a faster rate than likely demand growth from the transport sector (see for example Mills and Morgan 2008). Some attention will be needed to align the time of day of transport electricity use with supply from renewable sources such as large-scale solar. It is likely that people will find it convenient to charge electric cars overnight creating some unexpected additional demand for base load coal generation plant that is otherwise losing its night-time load as we shift from electric off peak hot water to gas and solar water heating.

The full submission expands on the four essential policy thrusts summarised above.