Peak Oil Policy Options for Australia

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BIOGRAPHY - Bruce Robinson is a physical scientist with 30 years experience in mineral research instrumentation with CSIRO, Australia's research organisation. He has studied forecasts of world oil depletion since 1996 and attended the first six International Workshops on Oil Depletion held by ASPO-International, . He is a member of the board of ASPO-International. Bruce was asked to establish ASPO-Australia in 2005. It now has working groups in most capital cities and regional centres and on specific topics, such as the Finance, Health, and Social Services sectors, as well as transport and urban planning. He has presented invited papers on Peak Oil at conferences in Lisbon, Beijing, Kyoto, Seoul, and Vienna. Since 2004, he has been English editor of "Petroleum Science", the international journal published by the China University of Petroleum in Beijing.

ABSTRACT - There are a great many Peak Oil mitigation and adaptation policy options available for Australia, although most are likely to be completely overlooked as a result of the focus on "business-as-usual" economic perspectives. Most of these are "people" options, involving the social sciences and community behaviour rather than technology. The "technological-fix" options, like electric cars and alternative fuels although perhaps important in the long term, are not likely to have any significant effect if global oil shortages arrive as forecast within the current decade.

Keywords: *Peak Oil, mitigation, adaptation, policy options, Australia, demand management*

1. INTRODUCTION

Australia is a highly-urbanised developed country, very dependent on oil imports, and similar in various ways to both Europe and the United States. It is interesting that some policy options which are now unthinkable in Australia and the US have already implemented in Europe, and others in force in the US and Australia are not considered in parts of Europe.

If Australia and Australians were able to consider and implement many of the available options, our oil vulnerability would be substantially reduced and we would be far better equipped when global oil shortages start to hit Australia. The long menu of policy options for Australia may well be generally applicable in varying degrees to most other countries, both developed and less-developed.

A major point being made here is that traditional economics, and economic yardsticks such as GDP to energy ratios are so aggregated and so divorced from individual human behaviour that they are very largely irrelevant and misleading. For instance, Australia's GDP rises when a heavy articulated truck crashes into a school bus laden with students. There is all the extra work for ambulances, nurses, hospitals, to replace the vehicles and so on. However, such a crash is not a positive, but a tragedy. The GDP is not a good measure of our well-being and it is not a useful parameter when we are facing global oil shortages. We must start assessing oil vulnerability and the risks and opportunities it is likely to bring using social sciences as well as business tools, and we will be far better to consider oil vulnerability assessments at the micro and meso-levels as well, or perhaps instead of, pondering just at the global economic scale. Even if there are serious economic problems worldwide, those individuals, companies and governments which have prepared in advance for Peak Oil will fare better than those which did not.

Some of the options available for consideration in Australia include:-

1: Awareness: The first policy option, "Talk about it, talk about it", is taken from USGS geologist Les Magoon's 2000 "Big Rollover" (i.e. Peak Oil) poster[1] and his presentations in Australia in 2001.

"Q! Should we do something to prepare for THE BIG ROLLOVER?
A! Just like preparing for the Y2K bug. talk about it, talk about it, and talk about it!
Q! What good is talk?
A! As somebody once said, "You can't solve a problem until you know you have one."

Australian Governments (both State and Federal) are unwilling to discuss "Peak Oil", as they are very reluctant to mention a problem until they have "the solution". As there is no "solution" to Peak Oil, the topic is either not mentioned at all, or only in indirect and misleading terms such as "Energy Security" "rising fuel prices" or "Alternative Fuels. Australia imports almost 80% of its transport fuel, either as refined product, or crude to be refined in Australia, so like most nations we are very vulnerable to global oil shortages. As well, crude oil and NGLs are also exported, leaving us about 60% net self-sufficient. The term "Energy Security" can be sensibly applied to our electricity and natural gas supply, as Australia is entirely self-sufficient in both. We have very large coal reserves and are a big exporter of natural gas, with around 1.6% of the world's proven gas reserves. However, for Governments to use the term "Energy Security" to encompass liquid transport fuels is clearly inappropriate and actually very misleading, probably intentionally so. Community awareness of the coming problems is an essential first step to enable Governments to avoid overlooking very useful options, some of which they would not even consider as the community currently would not support them.

It does seem in Australia that it is far easier for local governments (at the suburban, regional and city level) to discuss "Peak Oil", and to propose strategies and countermeasures So far, the local government level has not been organised enough to exert any effective upward pressure to persuade the State and national governments to consider seriously the nation's oil vulnerability, either long-term from declining global oil production or sudden oil shortage emergencies, for instance from political instability in the Middle East.

If Australians were aware of the high probability of global oil shortages in the near and medium terms, and of the probable serious impacts on their lives, there would be much more support for government and community action to assess and minimise our oil vulnerability. In the absence of widespread understanding of "peak oil", Australian governments are very likely to continue with their off-hand "No-worries" and business-as-usual view of our transport and its fuels.

2. ENGAGEMENT:
The second option is community engagement. That is to involve the community at all levels in both discussing the probable oil shortages and especially in outlining possible mitigation and adaptation strategies. Unlike Climate Change, where many mitigation and adaptation policies are quite separate, most Peak Oil options can be both mitigation and adaptation simultaneously and many are also "No-regrets" options; things we should already be doing. For instance, over the last two or three decades, the number of children walking or cycling to school in Australia has dropped quite sharply (as has happened in other countries, for instance the UK). Reversing the trend of children being taken to school by car will save fuel (mitigation) and prepare us for future fuel shortages (adaptation). Australians are very largely unaware of the coming oil shortages, and unaware of the many steps they can take personally to reduce their automobile dependence and oil vulnerability and those of their family.

Techniques used in public health, such as in anti-smoking campaigns, and in water conservation have been very effective in changing community attitudes and behaviour. These should be adapted and used to engage the community towards recognising and tackling our oil vulnerability.

TravelSmart individualised marketing:
Programmes in Australian cities have shown a reduction of some 12% in car-kms travelled, from individualised marketing ("IndiMark™")projects which engage and empower individual households to recognise and review travel options. Providing simple transport information is enough to make a significant change in travel patterns. This is with no change in pricing or public transport availability, and will be far more powerful when communities are aware of their serious need to reduce transport fuel use after Peak Oil . Australia cities are quite like US cities, in that public transport provision is relatively poor. Even so, the "IndiMark™"dialogue marketing TravelSmart technique, developed in Munich by Socialdata, and proven in many countries, has been very successful in Australian cities[2,3,3a,3b]. It is far more cost effective to undertake TravelSmart dialogue marketing than to build more freeways, and of course demand management is an effective Peak Oil countermeasure, while building or expanding more freeways just exacerbates our already high oil vulnerability. However, there is no nationwide campaign to extend TravelSmart across all Australian cities, nor to extend it to regional areas or to freight.

As a hypothetical example, if the US implemented a nationwide "Travelsmart" individualised marketing program, it could reduce its oil consumption by perhaps 1 m b/day, roughly half the rate of production of Iraq. This would be a much cheaper and quicker option than producing 1 m bbl/day of alternative fuels, or exploring to find new fields with an extra 1 m bbl/day[4].

Deliberative Democracy:
There are now proven strategies to involve communities in important decision making, separate from the counter-productive adversarial two-party political systems in Australia, the US and other countries.

These have been shown to be successful in small and medium-scale decision-making. Deliberative processes have been used in Western Australia to address almost 40 specific urban and transport planning problems. Using deliberative techniques, community participants contributed to joint decision making and policy development. Outcomes from deliberative processes were seriously considered by the Minister and used to influence policy decisions. In many cases, the recommendations generated through deliberative processes were fully adopted by the Minister. The experiences in WA demonstrate that deliberative engagement processes can be successfully implemented by government and can be used to guide policy[5].

It is very important that such processes, like a "Dialogue with Peak Oil", be developed and trialled, to enable communities to engage seriously with the problems of Peak Oil, and to consider and evaluate all the many options for mitigation and adaptation.

Water conservation analogy:
Australia has (on average) very low rainfall over much of the continent, and there is a history of long droughts followed by floods. In the eastern states, unusually low rainfall patterns occurred in 2006-2008, leading to serious urban water storage shortages in major cities (Brisbane, Sydney and Melbourne). Perth has seen ever-decreasing levels of rainfall and stream inflow into reservoirs since 1975. Australian cities handled severe water shortages by a series of quite draconian urban water restrictions. Watering gardens even by hand-held hoses was prohibited, washing cars was prohibited or restricted, and people were encouraged to take short showers, and to save shower and bath water to put on gardens. These various coordinated measures were very successful in reducing urban water demand during the years of drought and this continued even with the return of rain. People in the Brisbane region (South-East Queensland) halved the water consumption per person from circa 300 kl pa to circa 150 kl/person, and this saving has continued after the relaxation of water restrictions and even after the floods.

The reason for mentioning this is that many Australian people have historically been aware of the need to conserve water (as a result of past farming backgrounds in many families). People could understand that levels in reservoirs supplying our cities were dangerously low, and it was essential to conserve water. The need for the government imposed restrictions was clearly understood, and the community broadly supported the restrictions and complied with them without hesitation. The various governments were not blamed for the lack of rain and governments did not suffer any serious backlash.

Water is a renewable resource. There will always be rain in future, as the record-breaking eastern Australian floods in the last year have shown, even if overall the climate in much of Australia is becoming seriously drier as the result of climate change (whether natural or anthropogenic or both). On the other hand, oil and transport fuels are essentially a non-renewable resource. However, unlike the widespread recognition of the limits of water supplies, so far there is no general understanding in Australia of the probabilities of future oil shortages.

The power of the analogy is that if Australians were to become as aware of probable future fuel shortages as they already are of water shortages, then a whole range of policy options, including fuel rationing and restrictions, would open for governments. Unfortunately, there is little transfer of information and strategies between government water and transport authorities.

3. PRICING AND FUEL TAXES: THE FUEL TAX ESCALATOR

Australian fuel taxes are higher than the US, but substantially lower than those in Europe. Australia would be very well advised to raise fuel taxes to European levels and beyond. One practical and politically sensible strategy would be for us to follow the examples set by British PM Margaret Thatcher in 1988. She put Britain on a "fuel tax escalator", with regular small increases scheduled every year, lasting till 2000 when, under pressure from rising fuel costs and tanker drivers' strikes, PM Tony Blair turned off the fuel tax escalator. It is clear that high fuel taxes shielded Europe significantly from the oil price rises in 2008. The petrol price rise in Europe was proportionately much smaller than it was in the US where much more of the gasoline price is from oil and much less from taxes. As well, because of longstanding high fuel taxes, the European car fleet is much more fuel efficient than the US fleet. Increasing the fuel taxes steadily would give Australians advance warning of on-going oil price increases, while providing funds for overdue improvements in hospitals, public transport and other services to help people adjust in advance to future fuel shortages. If Australians wait until international oil prices raise the price of fuel, we will not have as much time to adapt and much of the price increases will be exported, rather than being retained in the country for the Government to fund the necessary "safety nets" to shield people as much as possible from the hardships which are likely to arrive as global oil shortages start to bite. We should follow Margaret Thatcher's example and raise fuel taxes incrementally, predictably and continually. Mrs Thatcher is remembered as a conservative economic rationalist, not as a left-wing environmental radical, so her example is a useful one to put to nervous governments.

4. PETROL RATIONING AND ALLOCATON SYSTEMS

In Australia, petrol was rationed quite severely during the Second World War, and up till 1950. The US also rationed gasoline severely (to three gallons, 11 litres, per week,) during WWII.

It would be very sensible for the Australian Government to have in place, developed and tested, an electronic-card-based equitable scaleable tradeable fuel allocation system. This would be along broadly similar lines to our wartime rationing, but far more flexible, more equitable, and far more easily and transparently controlled.

Water for domestic use is priced on a sliding scale in many Australian cities. That is, the modest amount needed for cooking, washing etc is provided at a relatively low rate. Increasing household consumption, for lavish gardens and swimming pools for instance, is charged at an increasing rate, up to perhaps a factor of four greater than the base rate. This sensible equitable charging system has arisen gradually (from previous inefficient and inequitable systems for charging for access to water supplies) as a result of the need to increase revenue to maintain and expand water supplies, while avoiding penalising those who are frugal with their water use. This is another useful analogy from accepted water policies which could well be applied to fuel pricing and allocation.

Suggestions for the design of an equitable scaleable tradeable fuel allocation system.

Existing simplistic Australian fuel emergency plans normally include "odds and evens" number plate schemes, where fuel would be available only to vehicles with even number-plates on even-numbered days. This is simple, but grossly inequitable as well as being ineffective. A family of five people, who have five cars will receive five times as much fuel as a similar family living nearby who manage on one car. Allocation should be to people, not cars, and it also should be as equitable as possible.

Dr Ali Samsam Bakhtiari told me that when there was petrol rationing in Iran, during the Iran-Iraq war, that the rationed fuel was very cheap, but one could buy extra on the black market at four times the price. Rather than decrying this likelihood, it should be the basis of a fuel allocation system. Fuel allocations should indeed be tradeable.

President Regan's chief economic advisor, Harvard's Prof. Martin Feldstein wrote in the Wall Street Journal[6]

> *"In short, a system of tradeable gasoline rights (TGRs) would be better than either higher taxes or tougher new car regulations. That a majority of households could benefit from the TGR system while all households would have an increased incentive to economize on gasoline is both an economic and a political advantage. It would be an efficient way to reduce gasoline that Congress could actually pass."*

1. Fuel purchases from an individual's allocation would be authorised by use of a personal electronic smart-card. This could either be using existing credit-card technology as a specific add-on to one existing card per person, or using a special card as is used for public transport ticketing in parts of Australia. Indeed the modern public transport cards could be adapted to include the fuel allocation system

2. Allocation to individuals should be as equitable as possible, but not equal. Some people need and deserve more fuel than others, so a flat per-capita allocation would not be fair.

Location: Allocations to people should allow for differing access to facilities, services and public transport infrastructure. For instance, someone who lives, as I do, close to shops, schools, hospitals, train and bus services, does not need as much fuel as someone who lives in the poorly serviced distant outer areas

Health Status: People (the majority) who are fit enough to walk to the bus-stop, or to ride a bicycle 10 kms or so should receive a lower allocation than those who can not walk or ride freely. An expectant mother with a couple of small children should receive preference over fit and unencumbered football players, for instance.

Trip and job importance. People who work weekends to keep our hospitals running are often not well paid, but their role is very important. Carers helping elderly people in their homes and "Meals on Wheels" drivers taking food to housebound people should receive allocations for their work. People selling bottled water where there is good clean piped water on tap are by no means essential, and should not get any extra allocation.

3. Sliding scale pricing. The personal allocations can be on a sliding scale, like urban water allocation in Australia so people will have a basic allowance at a relatively low current tax rate, while extra allowances are available at an increasingly higher tax rate.

4. Tradeable allocations People would be encouraged to sell unused allocations if they are able to conserve fuel, or to buy them if they need more than their allowance. Petrol stations would charge for the petrol and its government tax as normal, and as well deduct the volume sold from the person's allowance balance or enable the purchase of the required extra allocations on the electronic open market if the person has used up their current allowance.

System transparency. The smart-card basis means that data on the average and indeed individual allocations can be easily provided as a function of location, health status etc, so there should be confidence in the equity and efficiency of the system, and improvements can be suggested and implemented easily.

Short-term fuel shortage emergencies: A tested and working smart-card fuel allocation system would be invaluable in the quite probable event of another sudden fuel emergency, as we saw in the 1973 and 1979 oil shocks. The system could be rapidly modified to discourage panic-buying, and to become more severe, or to be eased as the fuel availability changed. For instance, Adelaide came within 3 days of running out of petrol

in 2005 in the confusion after cyclone Katrina. A tested working fuel allocation system would have been a very valuable insurance in case the tanker did not arrive in time.

In many Australian cities, public transport is already used to capacity at peak hours, and could not handle the extra demand from car travellers if fuel rationing is introduced. Hence, petrol rationing should be accompanied by rationing access to public transport on a similar equitable needs basis. No Australian government has given any thought to this aspect of fuel emergency planning. Cities with high existing public transport usage are less likely to be swamped by extra demand than many Australia cities where public transport trips currently are only a very small fraction of those taken by car.

The Black Swan Theory: Australia's first Peak Oil speaker, Les Magoon of the US Geological Survey, said "The prudent strategy is to plan for the worst and hope for the best". There is the business management analogy, the Black Swan theory, about unforeseen disruptive events[7]. Australia's swans are different from those in Europe, in that they are black, and white swans are the imported exceptions, so perhaps we can imagine we can anticipate a few things differently. The analogy of preparing as far as possible for unexpected events is of course brought to prominence by the 2011 Japanese earthquake. Building nuclear power plants close to sea-level in an earthquake-prone environment without far more precautions was, in retrospect, very unwise. However, all of Australia is very vulnerable to oil shocks and our governments are doing essentially nothing except saying "No worries, it won't happen. Business will be as usual". There is a very good chance they will be proven wrong in the relatively near future, and they will be as culpable as the people who built the Fukushima nuclear reactors without adequate safety precautions.

Oil Vulnerability Mapping: Highly detailed descriptions of small-scale local variations of oil vulnerability have been mapped by Australian researchers for major Australian cities[8]. Tools like these are very useful to look at geographic and socio-economic distribution of oil vulnerability. This avoids the over-simplified and misleading aggregate assumptions of parameters like oil-price vs. GDP indices, which are very divorced from the lives of many individuals. Mapping along these lines can be used to model those areas likely to be most affected by fuel shortages and higher prices enabling the consideration of location-specific "safety-net" policies, for instance enhancing outer suburb public transport, and extending services such as schools and hospitals to better serve these disadvantaged areas

Examination of subsidies, charges and tax concessions:
There are many "perverse policies" in Australia which actually subsidise high fuel consumption[9]. A detailed examination of the range of charges and direct and indirect subsidies and their impact on our oil vulnerability is essential. The fixed "vehicle ownership" charges, like licence and third party injury compensation insurance, should be abolished and replaced with equivalent "vehicle use" charges, at least initially based on a fuel tax. A flat once-a-year charge for injury insurance is inequitable, as those who drive small cars only infrequently, slowly and calmly are forced to subsidise those who drive big cars often, fast and aggressively. The risk of being involved in a crash causing injury to others is proportional to exposure, speed and vehicle mass, so a flat charge per vehicle is grossly inequitable. Fuel consumption is a good proxy for crash injury risks.

Australia has a "fringe benefits tax", which provides an increasing tax concession subsidy for vehicle use as part of a salary package as the annual distance driven increases. This encourages people to drive more to each the next more favourable tax level. This is simply crazy in times of resource constraints.

Subsidies to Australia's struggling car industry is another practice which is very questionable. There are many of these perverse policies, many of which are so accepted as normal practice that they are completely overlooked. It is important to look for and evaluate their effects on our oil vulnerability

Benefits of Peak Oil
Although there are many problems which will arise as global oil shortages impact on Australia, there are also a number of advantages and opportunities which should also be considered and evaluated along with the risks. These include:

Reduction of road trauma. It is likely that serious oil shortages could perhaps half the road toll.
In Australia, some 1500 people a year are killed in road crashes, and some 30,000 admitted to hospital. A study of the 1990 recession showed that a 10% reduction in petrol use in Australia was correlated with a 25% reduction in road fatalities[10]. This may have in part arisen from high-risk discretionary car trips being preferentially suppressed during a recession. Of course, when there are oil shortages, reduction of speed limits is an obvious way of reducing fuel use, with the likely result of also reducing crash injury rates substantially. The US reduced highway speed limits to 55 mph (circa 90 kmh) after the first oil crisis from 1974 until 1987 reducing both fuel consumption and crash rates. However, unlimited speeds on many Autobahns is deeply ingrained in Germany, for instance, so decreasing speed limits may be more acceptable in the US and Australia, for instance, than in parts of Europe.

Health benefits: A large and growing proportion of Australians, including children, are overweight or obese, leading to a range of health problems currently and especially in the future. Physical activity from active transport, such as walking to the bus, running to catch the train, or riding a bike to school is very important in improving and maintaining both physical and mental health. Of course reduced vehicle use, and lower speeds will also reduce urban air pollution and noise and their associated public health problems. In Australia, many over-anxious parents take unfit children to school in overweight SUVs. Our community will be significantly healthier if this trend is reversed to past practices where most children walked or rode bikes to school. Increasing the level of active transport will substantially improve community health as well as helping reduce our oil vulnerability.

CO_2 emission reduction. A reduction in liquid fuel availability will reduce CO_2 production, unless alternatives like coal-to-liquids or palm oil are substituted in high volume.

5. CONCLUSION - There are a great many things that Australians at all levels could do to prepare for the probability that Peak Oil will hit Australia soon and hard. Federal, State and local governments should do far more than they are now doing (which is virtually zero). Universities, research organisations, business groups and companies and ordinary citizens could all make major contributions by developing, testing and implementing methods to assess oil vulnerability and prepare risk management plans. There will be no single solution to the coming oil shortages, and in considerable part we will have to adapt to the changes forced upon us. Dr Ali Samsam Bakhtiari's Noah analogy is particularly relevant[11]. We need to follow Noah's example and build arks to prepare for Peak Oil. Noah completed the ark before it started raining. Likewise, we need to prepare for Peak Oil in advance. It is very hard to build an ark under water, and many Peak Oil mitigation and adaptation options need to be started 20 years before Peak Oil[12].

It is crucial that Australia and Australians start to consider Peak Oil seriously and to abandon the "state of denial" which is very common in our decision-makers.

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