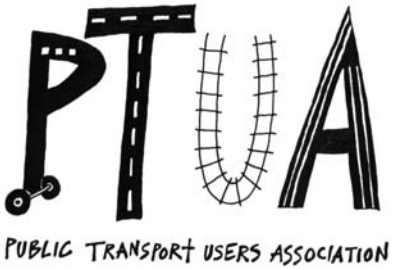
Submission to the
Inquiry into Australia's future oil supply and alternative transport fuels

February 2006



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Introduction

We welcome the opportunity to contribute to this inquiry and congratulate the Committee for inquiring into a matter that has serious implications for Australia's future economic, social and environmental sustainability.

The Public Transport Users Association (PTUA) is Victoria's recognised consumer organisation representing passengers of all forms of public transport. The PTUA is committed to:

- A sustainable economy;
- A healthy ecology;
- An equitable society.

Environment Victoria (EV) is Victoria's peak non-government environment organisation. EV works with all sectors of society to develop and encourage innovative and practical outcomes to environmental problems. EV collaborates with organisations in other sectors already advocating for better policies, in addition to environment organisations at the national, state, regional and local level.

Our analysis of the demand and supply positions for transport fuels points to an urgent need for all tiers of government in Australia – federal, state and local – to immediately shift towards less car-dependent transport and land-use practices. This must be undertaken by boosting investment in active[1] and public transport infrastructure and services and ensuring a Whole of Government(s) approach is taken to reinforce active and public transport in areas such as land-use planning and taxation policies. The upside potential from such a shift in transport thinking includes healthier, safer and more liveable cities, while inaction will undoubtedly result in major economic, social and environmental decline[2].

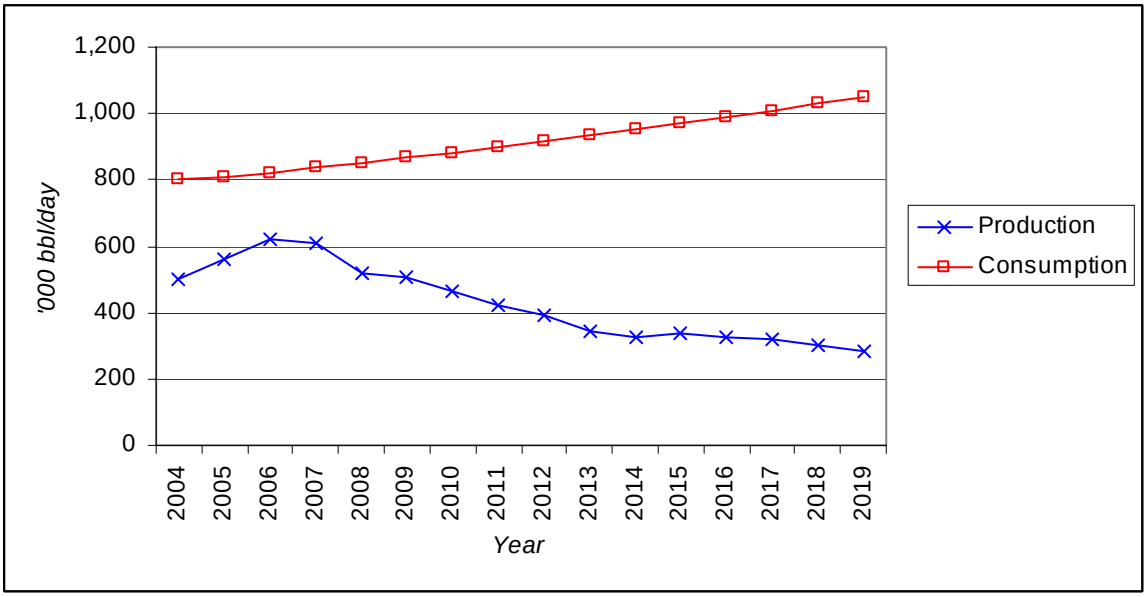
[1] The most commons forms of active transport are walking and cycling. In addition to superior energy efficiency, greater use of active transport would have widespread health benefits.
[2] Coalition for People's Transport, 2006, *Transport and Liveability: The Path to a Sustainable Victoria*, http://www.melbourneontrack.org.au/publications/liveability_statement.pdf

1. Projections of oil production and demand in Australia and globally and the implications for availability and pricing of transport fuels in Australia

The PTUA does not propose to address this item in great detail as we believe other submissions and readily available information (e.g. ASPO) provide adequate foundation from which we may draw conclusions.

Australia's oil supply data is among the most robust in the world. Figure 1.1 below shows official estimates of Australian production and consumption over the next 13 years.

Figure 1.1: Australia's production and demand for crude oil and condensate

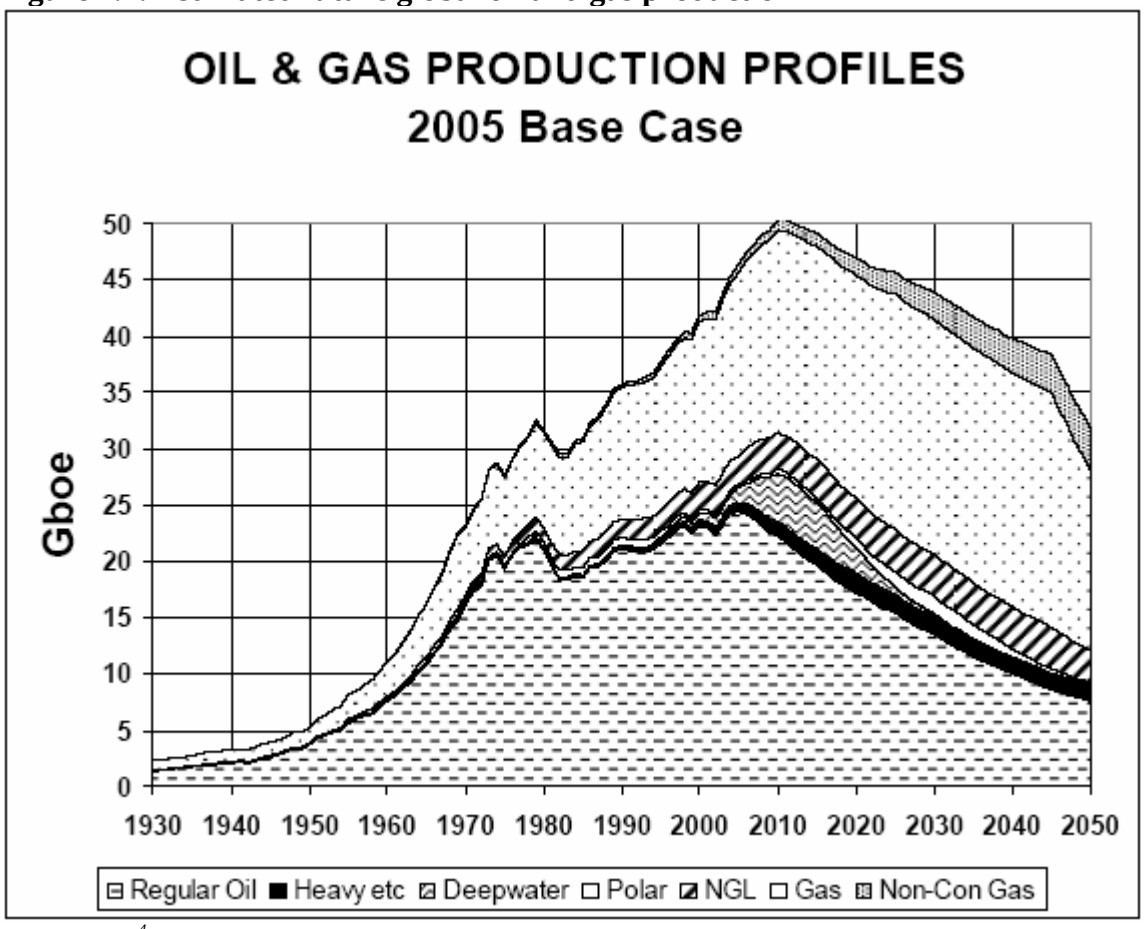


Source: Geoscience Australia[3]

The clear trend in the above graph demonstrates that Australia will become increasingly dependent upon imported oil over the coming decade, effectively reversing our current position of about 70 per cent self-sufficiency to around 70 per cent imports. This growing import dependence raises questions over the adequacy of global oil production to meet this growing demand. Figure 1.2 below provides what we believe to be the best estimate of future global oil production.

[3] http://www.ga.gov.au/image_cache/GA6111.pdf

Figure 1.2: Estimated future global oil and gas production



Source: ASPO[4]

As is evident from the above diagram, global oil production is forecast to peak within the next 10 years and then begin an inevitable and irreversible decline. This peak and subsequent decline is the origin of the concept of "peak oil" that is gaining increasing international credence.

The precise timing of the peak is a matter of considerable uncertainty for two key reasons:

i. demand
ii. supply

i. Demand

To some extent, the recent spike in the price of oil is the result of demand growth, particularly in India and China, that caught many by surprise and absorbed the bulk of excess production capacity. While it is likely that underlying global demand will continue to show strong growth, all else being equal, it is also conceivable that demand could be reigned in by a modest economic slowdown or a major external shock such as a major terrorist attack or pandemic sapping consumer and investor confidence.

If demand growth continues its strong upwards trend, we are likely to see oil prices remain closer to their historical highs than to the lows seen in the late 1990s, and an earlier - rather than a later - peak in global oil production. Comments from some OPEC members indicate that we are unlikely to see prices below US$40 per barrel in the foreseeable future[5].

[4] http://www.peakoil.ie/downloads/newsletters/newsletter61_200601.pdf
[5] Bahree, B. 'Moves afoot to keep oil above $40', *The Australian Financial Review*, 7 December 2004, p. 10

If demand growth tapers off, whether for macroeconomic or efficiency reasons, we could expect the peak to be delayed and possibly extended over a longer period of time as a plateau rather than a clearly defined point. Given the renewed enthusiasm for petroleum exploration and development sparked by recent high prices[6], it is not inconceivable that an economic slowdown combining with expanded production capacity could depress prices to levels not seen since the 1990s. In many ways, this could represent a bigger risk than continued demand growth as it would remove the sense of urgency from addressing oil dependency without altering the fundamental reality of peak oil.

ii. Supply

Perhaps the biggest uncertainty revolves around the level of recoverable oil supplies at a global level. We reiterate, however, that Figure 1.2 above represents what we believe to be the best available estimate of potential future production.

A number of official estimates provide relatively reassuring assessments of global oil reserves, such as the International Energy Agency (IEA) and BP's *Statistical Review of World Energy*[7]. It cannot be emphasised too strongly, however, that these assessments rely on producer data whose veracity has been called into serious question. For example, during the 1980s the major OPEC members revised their estimated reserves upwards by about 300 billion barrels without any significant new discoveries[8]. This statistical sleight of hand becomes understandable when one recognises that around that time OPEC began to base production quotas on reserve size, meaning the larger a member state's official reserves, the more oil they were allowed to pump.

One of the most comprehensive external assessments of Middle East oil reserves has been undertaken by US energy investment banker Matthew Simmons[9]. Simmons' assessment indicates that oil production in Saudi Arabia may peak very soon and that there is strong evidence that Saudi Arabia is already overproducing its key oil fields. Given the important role Saudi Arabia plays in global oil production, a peak in Saudi production effectively heralds a peak in global oil production. Similar concerns have also been raised over Kuwaiti reserves, suggesting that actual reserves are only around half the official figures[10]. Meanwhile Iran, the fourth biggest oil producer in the world, has announced plans to dramatically increase public transport usage in an attempt to "slash its expensive and environmentally ruinous petrol consumption"[11].

Given seemingly intractable geopolitical tensions in the Middle East, the peak of non-OPEC oil production may be more relevant to energy security in the West than the global peak. Based on official data, non-OPEC production is forecast to peak much earlier than OPEC production, leaving the world dependent upon supplies from an unstable part of the world where reserves data currently lacks independent verification.

Any well-run business that faced such uncertainty over its inputs would be expected to prioritise the sourcing of alternatives or development of alternative processes that removed this key operational risk. Relating this analogy to national energy security implies that Australia must prioritise the lowering of the oil intensity of the Australian economy, especially that of the transport sector. This process is already being initiated in Sweden where plans are afoot to completely wean the nation off

[6] http://www.theage.com.au/news/national/fuel-price-panic-sparks-oil-quest/2005/06/28/1119724633882.html
[7] http://www.bp.com/genericsection.do?categoryId=92&contentId=7005893
[8] Campbell, C. & Laherrère, J, 'The End of Cheap Oil', *Scientific American*, March 1998, pp 78-83
[9] Simmons, M., 2005, *Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy*, John Wiley & Sons, Hoboken NJ
[10] http://today.reuters.com/business/newsarticle.aspx?type=tnBusinessNews&storyID=nL20548125&imageid=&cap
[11] http://today.reuters.co.uk/news/NewsArticle.aspx?type=scienceNews&storyID=2006-01-15T152944Z_01_OLI538691_RTRIDST_0_SCIENCE-ENERGY-IRAN-GASOLINE-DC.XML

fossil fuel by 2020[12].

The simple message that should be taken from the above discussion is that there can be no guarantee of reliable and affordable access to conventional sources of liquid fuels beyond the short-term and that responsible risk management dictates the aggressive pursuit of less car-dependent transport practices.

[12] http://www.sweden.gov.se/sb/d/3212/a/51058

2. Potential of new sources of oil and alternative transport fuels to meet a significant share of Australia's fuel demands, taking into account technological developments and environmental and economic costs

The world has supposedly been on the cusp of a major transport fuel breakthrough for the last 50 years. Nuclear-powered cars envisaged in the 1950s[13] failed to materialise, as did solar cars in the 1970s and widespread use of cooking oil as a fuel in the 1990s. Despite promises of releasing us from oil dependency, each potential contender for the transport fuel crown has failed to offer the energy density and mobility of petroleum at a competitive price. Given the current range of alternatives discussed below, there is little reason to expect significant change in this state of affairs in the near future.

Non-conventional oil

Non-conventional oil includes oil obtained from a range of sources such as tar sands, shale or coal-to-liquid. Many of the more optimistic forecasts of ultimately recoverable oil reserves include a substantial component of non-conventional oil[14].

Non-conventional oil production has tended to be low because of high establishment costs and/or poor energy return on energy invested (EROEI). Many researchers question the ability of non-conventional oil to make a major contribution to energy security within the time period that many people are now expecting the arrival of peak oil. Even if significant amounts of oil can be obtained from non-conventional sources, the resulting greenhouse emissions would be catastrophic for the global climate.

Ethanol

With Australia being a major agricultural nation and one of the world's major sugar exporters, ethanol has attracted both positive and negative attention as a potential transport fuel. Despite this interest, there is little agreement as to whether ethanol production is of net benefit as a fuel source. Many studies indicate that the energy required to produce ethanol (e.g. inputs into growing, harvesting and processing the feedstock) is close to or often greater than the energy derived from burning the ethanol that is produced (Ferguson 2004; Pimental & Patzek 2005; Brown 2005). Where this is the case, the negative EROEI resulting from ethanol production is reducing rather than contributing to energy security. Even proponents of ethanol as a fuel in Australia only claim an EROEI of about 1.5 compared to the current EROEI for petroleum of about 30 (Dodson & Sipe 2005). The slim (or negative) energy profit is reflected in the poor economic return available from unsubsidised ethanol production. Even the most "successful" example of large-scale ethanol production – Brazil – requires significant government support to ensure its viability.

With low or negative EROEI from ethanol production, it is possible that life-cycle greenhouse emissions may be higher than conventional fuels. Regardless of EROEI, ethanol usage has been shown to result in increased emissions of NOx (a powerful contributor to greenhouse emissions and linked to heart disease and damage to the nervous system[15]), acetaldehyde and formaldehyde (a

[13] http://en.wikipedia.org/wiki/Ford_Nucleon
[14] http://www.southaustralia.biz/Events_Calendar/Event_PDFs/GODTO/CritiqueBTRE_WP61.pdf
[15] http://www.npi.gov.au/database/substance-info/profiles/67.html

highly toxic organic solvent)[16]. Increased use of ethanol, especially in urban areas where vehicle emissions are more concentrated, is clearly not without risk.

Even assuming a positive net energy profit (i.e. more energy obtained than consumed in production), the area required to produce enough ethanol to make a serious contribution to national energy security would displace enormous quantities of crops that are currently producing food and/or export earnings [ref]. The livestock industry has also expressed great concern at the impact on feed prices and competitiveness that would result from a significantly expanded ethanol industry[17].

In a world where 800 million people go hungry each and every day[18], it would be obscene to consider turning over large tracts of agricultural land to feed motor cars.

Bio-diesel

Similar to ethanol, bio-diesel faces scale limitations that limit its ability to contribute significantly to energy security. The entire Australian oilseed crop would be required to produce a mere 6 per cent of Australia's current diesel consumption[19]. It must also be noted that the vast majority of the Australian passenger car fleet runs on petrol and would be unable to benefit from bio-diesel production.

Hydrogen

In the early stages of the latest oil price spike, the "hydrogen economy" and fuel cells attracted a significant amount of attention, however the early excitement has given way to more sober forecasts. Despite the hype, hydrogen is not an energy source, but is better characterised as a form of energy storage. Almost all of the world's current production of hydrogen is sourced from finite fossil fuel, such as coal gasification and reforming of natural gas. Other likely sources of hydrogen include costly and inefficient techniques such as the electrolysis of water which will itself require significant inputs of electricity, frequently generated from fossil fuel[20]. Many options involve substantial conversion inefficiencies and transmission losses. Given the questions that are currently being raised about Australia's greenhouse emissions and the capacity of Australia's generation and distribution infrastructure to meet peak demand, a major new use for electricity is unlikely to be universally welcomed.

Even if issues surrounding the production of hydrogen are solved, the logistical and infrastructure requirements of a hydrogen economy lead experts to believe that hydrogen vehicles will not become widespread before the middle of the century[21]. The current state of development of hydrogen fuel cells was eloquently summarised by Professor Donald Sadoway of the Massachusetts Institute of

[16] Apace Research, 1998, Intensive Field Trial of Ethanol/Petrol Blends in Vehicles; http://www.deh.gov.au/atmosphere/fuelquality/publications/ethanol-limit/issues.html
[17] http://www.thecie.com.au/publications/CIE-Ethanol_report.pdf
[18] http://www.oxfam.org.au/campaigns/mtf/povertyhistory/goals.html
[19] http://dpmc.gov.au/publications/energy_future/chapter7/7_alternative.htm
[20] ACIL Tasman & Parsons Brinckerhoff, 2003, *National Hydrogen Study*, Department of Industry, Tourism and Resources, Canberra;
Romm, J., 2004, *Testimony for the Hearing Reviewing the Hydrogen Fuel and FreedomCAR Initiatives*, US House of Representatives Science Committee, Washington;
Harrison, L., 2004, *Hydrogen Hijacked*, [online] Retrieved 18 November from http://www.renewableenergyaccess.com/rea/news/story?id=18714
[21] Hook, W., 2001, *Implementing the Kyoto Protocol in the Transport Sector*, Institute for Transportation and Development Policy, New York;
http://web.mit.edu/newsoffice/2003/hydrogen-0212.html

Technology:

> "In the context of portable power, fuel cells are not a technology, they're a laboratory curiosity."[22]

While hydrogen may prove viable several decades from now, in the context of an imminent peak in global oil production, hydrogen-powered cars are a diversion that we cannot afford.

[22]http://web.mit.edu/newsoffice/2003/hydrogen-0212.html

3. Flow-on economic and social impacts in Australia from continuing rises in the price of transport fuel and potential reductions in oil supply

Recent high prices for oil have been a two-edged sword for Australia. While petroleum imports have harmed Australia's balance of trade and eaten into household expenditure, Australia has benefited from high prices for its other energy exports such as coal and gas. There are many indications that this is generating a dual economy – one prospering from high prices for commodity exports and another struggling with high petrol costs and reduced competitiveness[23]. As long as the commodity boom continues, Australia may be spared the worst impacts of high energy prices, however a decline in Australia's currently very favourable terms of trade could see recent record trade deficits[24] blow out even further.

One of the more informative assessments of the likely impact of continued high oil prices on Australians was conducted at Griffith University[25]. This study paints a grim picture for low income households on the urban fringes where public transport is under-developed. Of great concern to us as organisations based in Victoria is Dodson & Sipe's finding that a larger proportion of households in Melbourne are vulnerable to peak oil than in either Sydney or Melbourne.

The high degree of oil vulnerability in Australian cities points towards high financial distress as transport fuels increase in price and displace other retail expenditure with higher local employment content. Table 3.1 below shows estimated job creation from various forms of consumer expenditure. The subsequent dampening effect of high petrol consumption on local employment will further exacerbate financial distress and reverberate through the rest of the economy. Households on the urban fringe confronting escalating travel costs and potential fuel shortages may also become increasingly isolated from education opportunities and from health and other community services. Declining mobility and limited educational, employment and recreational opportunities could also encourage crime and other anti-social behaviour.

Table 3.1: Estimated jobs creation from $1 million expenditure

Expenditure category	Jobs
Petroleum	4.5
General automotive	7.5
General consumer goods	10-15
Public transit	21.4

Source: British Columbia Treasury Board

Similarly, a report commissioned by the US Department of Energy found that oil depletion "deserves immediate, serious attention" and will result in "dramatically higher oil prices" causing "protracted economic hardship"[26]. The report also points to potentially "chaotic" social consequences unless nations immediately institute programs to reduce oil dependency.

[23] http://www.theage.com.au/news/national/business-booms-as-petrol-puts-brakes-on-economy/2005/12/07/1133829661016.html ; http://www.theage.com.au/news/national/brake-on-jobs-boom-as-economy-cools-off/2006/02/09/1139465796973.html ; http://www.theage.com.au/news/business/imports-menace-industry/2006/02/16/1140064203799.html

[24] Colebatch, T., 'Oil, cars drive nation's surging import bill into record territory', *The Age*, 19 January 2006, http://www.theage.com.au/news/business/oil-cars-drive-nations-surging-import-bill-into-record-territory/2006/01/18/1137553653214.html

[25] Dodson, J. & Sipe, N., 2005, *Oil Vulnerability in the Australian City*, Griffith University, Brisbane, http://www.griffith.edu.au/centre/urp/URP_RP6_OilVulnerability_Final.pdf

[26] *Peaking of world oil production: Impacts, mitigation, & risk management*, by Robert L. Hirsch, Roger Bezdek & Robert Wendling, February 2005

4. Options for reducing Australia's transport fuel demands

As discussed above, alternative transport fuels will only be able to play a minor role in meeting projected total transport energy demands, hence the nation's response must be based on two inter-related planks:

i. Prioritising rural and remote users in access to liquid fuels;
ii. Encouraging more efficient transport practices, especially in urban areas.

i. Prioritising rural and remote users in access to liquid fuels;

As active and public transport are often not viable for many journeys in rural and remote areas, Australia's domestic and imported fuel supplies should be prioritised for non-urban users.

Access to liquid fuels is crucial for Australia's agricultural production which itself is fundamental to the nation's own food security and for earning foreign exchange to import liquid fuels.

To some extent this is aided by the fact that much bio-fuel production – if it is able to produce a positive EROEI - could take place in regional areas (thus minimising distribution requirements) and problems of localised air pollution from the combustion of bio-fuels are less acute. Conversely, transporting bio-fuels to urban areas could eliminate the slim energy profit – or increase the energy loss - that exists in much bio-fuel production.

As alluded to above, this priority measure is one of two planks that must be facilitated by the encouragement of more energy-efficient modes of transport, especially in urban areas where active and public transport – when well-planned – are viable for a much larger proportion of journeys.

ii. encouraging more efficient transport practices, especially in urban areas.

The level of demand for liquid transport fuels, especially in urban areas, could be reduced by:

- reducing the amount of travel;
- shifting travel to more energy-efficient modes such as active and public transport;
- improving the efficiency of the existing motor vehicle fleet.

a) reducing the amount of travel

Containing urban sprawl would assist in reducing both the number of motor vehicle journeys and reducing the total passenger kilometres of travel. Where land-use and transport policy complement each other, higher levels of effective mobility can be achieved with smaller quantities of travel. International research has confirmed the importance of integrating land-use planning and transport policy to ensure mobility whilst minimising traffic volumes.

The current Statutory Formula method under the *Fringe Benefits Tax Assessment Act 1986* provides increasingly concessional treatment for longer distances travelled in any one year without any requirement to substantiate a commercial basis for the travel. On top of excessive vehicle use during the year, it is also common for employees to undertake additional journeys near the end of the FBT year (31 March) simply to increase the kilometres travelled and attract a lower statutory fraction for FBT purposes. This widely-recognised "March Corporate Rally" adds to national oil consumption, greenhouse emissions and road congestion and increases motor vehicle costs for business. Evidence from the accounting profession indicates that this concession is being applied well beyond the spirit of the legislation, and that a large proportion of the kilometres being counted under the formula are of a private or domestic nature.

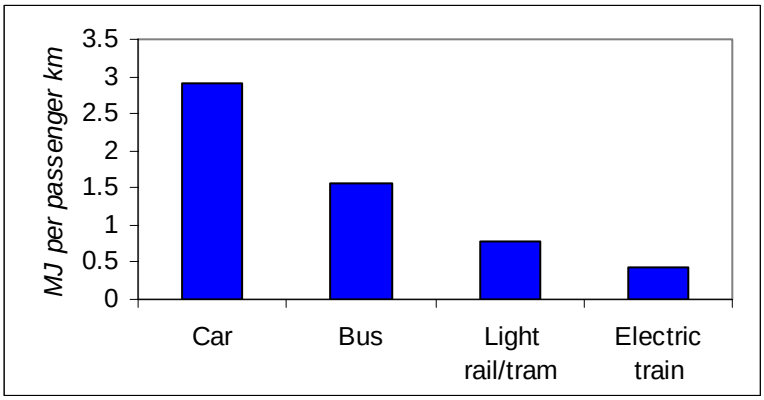
According to the *Tax Expenditures Statement 2004*, the application of the statutory formula to car benefits amounts to a tax payer funded subsidy to corporate car users in excess of $1 billion per annum, or twice the cost of building heavy rail lines to Doncaster East and Rowville in Melbourne each year. Furthermore, this perverse subsidy is growing at about 3.3% per annum, or greater than the rate of inflation. The statutory method is ripe for reform and its removal would enhance national energy security.

The addition of new road capacity is widely recognised as generating additional vehicle traffic and shifting journeys from more energy-efficient modes[27]. In light of this, Australia's energy security would be severely harmed by continued construction of freeways and major roads. Energy security, road safety, air quality and mobility would all be enhanced by shifting the focus of transport expenditure to active and public transport. While the availability of petroleum as a liquid fuel is clearly the major risk to the transport sector from oil depletion, it may also be worth noting that the vast majority of road construction and maintenance uses oil-derived bitumen as a key ingredient.

b) shifting travel to more energy-efficient modes such as active and public transport.

By their nature, urban centres are much more conducive to active and public transport. While the advantages of active transport in reducing oil consumption are obvious, public transport is also much more energy-efficient that private motor vehicle use as shown in Figure 4.1 below.

Figure 4.1: Land transport energy consumption per passenger km



Source: Newman 2000[28]

Furthermore, grid-connected public transport, such as electric trains and trams, have greater flexibility in primary energy source and are theoretically able to access renewable energy from wind, solar and hydro-electric plants as well as traditional coal-fired electricity. This superior energy-efficiency and flexibility could aid in both reducing national energy demand and enabling the prioritisation of liquid transport fuels for rural and remote users and emergency services.

[27] PTUA, 2005, *Submission to Inquiry into Managing Transport Congestion in Victoria*, Public Transport Users Assocation, Melbourne

[28] http://wwwistp.murdoch.edu.au/publications/e_public/Case%20Studies_Asia/sustrans/sustrans.htm

Table 4.1: Journeys to work and study – National

	1996	2000
Car, truck, van	75%	81%
Cycle	2%	1%
Walk	6%	4%
Train	8%	7%
Bus	6%	4%
Other	3%	2%

Source: ABS 2004[29]

Table 4.1 shows that active and public transport have declined sharply. While the levels of the 1990s are not high when compared to the mid-20th century, mode shift of that magnitude is remarkable considering the relatively short timeframe in which the shift took place and the comparatively little change that could have taken place in infrastructure and land-use patterns. This suggests that this mode shift may be reversed given favourable policy settings.

Surveys that gauge the reasons behind mode choice invariably point to a small number of key factors:

- Coverage;
- Reliability;
- Frequency;
- Integration[30].

Australian governments should seek to improve the performance of active and public transport on each of these performance indicators. Taking Melbourne as an example, public transport is currently infrequent, poorly integrated, unreliable and suffers from delays caused by private motor vehicle traffic[31]. Encouraging a mode shift to public transport will require improved connectivity between services, better coverage, faster and more frequent services and improved reliability. The PTUA has produced a five year plan for public transport in Melbourne titled *Five Years Closer to 2020*[32]. This plan, if adopted, would go a long way towards addressing the many deficiencies that are deterring Melburnians from making greater use of public transport.

While much of the daily travel that could be most easily shifted to active and public transport is centred within urban areas, a good deal of travel to, from and within regional areas could also shift to public transport given appropriate investment and planning. Decades of under-investment in regional rail lines should be reversed and greater integration sought between school buses, community transport and regional public transport systems in order to cushion regional Australians from higher energy prices and potential liquid fuel shortages.

All three tiers of government in Australia provide funding to the construction and maintenance of roads. Conversely, the vast majority of public transport funding comes solely from state and territory governments. With some notable exceptions, most state and territory governments seem reluctant to invest in public transport infrastructure and often cite fiscal constraints as a reason for not improving public transport. By contrast the Commonwealth, with its larger and broader revenue base, has shown little enthusiasm to spread federal transport funding more evenly between roads and public transport.

[29] ABS, 2004, *Year Book Australia: Energy Use*, Australian Bureau of Statistics, Canberra
[30] Booz, Allen & Hamilton, 2001, *Bus Improvement Strategy: Final Report*, Report prepared for the Victorian Department of Infrastructure, Melbourne;
ABS, 2000, *Australian Social Trends 1998: Transport choices and the environment*, Canberra;
Gardiner, A., 'Travellers shun public transport', *Herald Sun*, 6 February 2006, citing AAMI
[31] http://www.mtf.org.au/n/resources/presentations_from_mtf_report_launch_8th_november_.html
[32] http://www.ptua.org.au/news/2005/PTUA_Five_year_plan_20051115.pdf

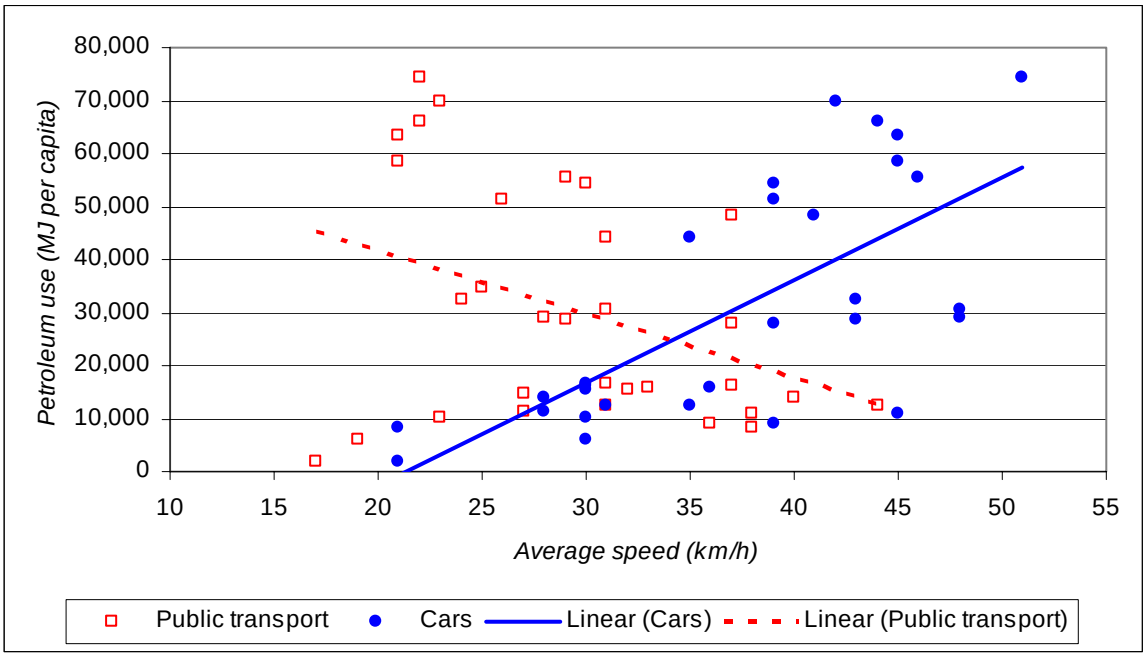
c) improving the efficiency of the existing motor vehicle fleet.

Hybrid petrol-electric vehicles are often touted as a means of lowering fuel consumption. While this technology can reduce fuel consumption for a typical urban motorist, the savings are less pronounced when used in non-urban areas or when driven aggressively in urban areas. On the other hand, it is possible that fuel savings could encourage additional driving through a "rebound effect" and cancel some or all of the technical efficiency gains[33].

Hybrid vehicles are also a very small minority of the national car fleet and are likely to remain so for quite some time, especially given their current niche status. The conversion of the national car fleet to unleaded fuel took around 20 years despite this being mandated for all new cars sold after 1986. In the absence of strong, mandated efficiency standards and given the high upfront cost for hybrid vehicles, the rollout of hybrid cars would be substantially slower. Even if hybrids composed 20 per cent of new car sales, APEC has estimated that oil consumption in Australia would still grow by 16 per cent from 2006 to 2015[34]. Even California, with stringent emissions standards and numerous incentives for hybrid vehicles, expects hybrid technology to do no more than reduce *growth* in gasoline consumption rather than reduce total consumption[35].

As discussed above, alternative fuels and new vehicle technologies are not guaranteed to solve transport energy supply issues and will undoubtedly require long lead times. In the meantime, steps should be taken to improve the efficiency of the existing fleet where this does not undermine efforts to encourage a shift to active and public transport through a rebound effect. The IEA has identified lowered speed limits as a key response to liquid fuel emergencies[36]. As shown in Figure 4.2, per capita energy consumption increases significantly with higher traffic speeds.

Figure 4.2: Average transport speeds and fuel use



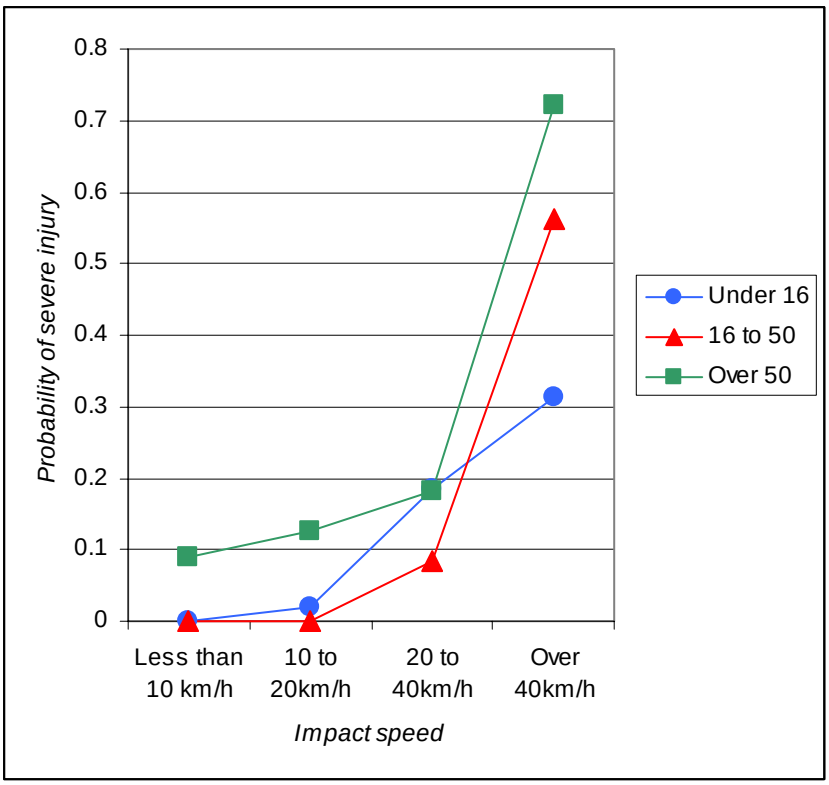
Source: Newman & Kenworthy 1989[37]

As well as reducing trunk road and motorway speed limits to below 100km/h as recommended by

[33] http://www.vtpi.org/fuelprice.pdf
[34] APEC, 2005, *Impact of Oil Prices on Trade in the APEC Region*, http://abareonlineshop.com/product.asp?prodid=13276
[35] California Energy Commission, 2005, *Forecasts of California Transportation Energy Demand 2005-2025*, http://www.energy.ca.gov/2005publications/CEC-600-2005-008/CEC-600-2005-008.PDF
[36] IEA, 2005, *Saving Oil in a Hurry*, International Energy Agency, Paris
[37] Newman, P. and Kenworthy, J., 1989, *Cities and automobile dependence: An international sourcebook*, Gower Publishing, Aldershot, England

the IEA, there are also efficiency benefits from reducing local speeds to below 50km/h. Research in Europe has demonstrated that reducing speeds to 30km/h can significantly reduce both emissions and energy consumption[38]. Australian governments should seek to rollout lower speed limits immediately to reduce national oil consumption and ensure that a speed reduction program can be completed before a liquid fuel emergency hits. It should also be noted that lowered speed limits will increase safety for pedestrians and cyclists (see Figure 4.3) which will greatly encourage these more energy-efficient modes of transport.

Figure 4.3: Probability of severe injury by age group



Source: Tharp 1976 cited in McLean et al 1994[39]

Australian governments should also rollout mandatory annual vehicle safety and emission testing (where this does not already take place) to ensure vehicles are operating as efficiently as possible. This is consistent with the findings of the Sustainable Cities inquiry[40] and would also improve road safety and urban air quality[41].

[38] Newman, P. & Kenworthy, J., 1992, *Winning Back the Cities*, Pluto Press, Leichhardt
[39] Mc Clean, A. J. et al., 1994, *Vehicle Travel Speeds and The Incidence of Fatal Pedestrian Collisions*, http://casr.adelaide.edu.au/pedspeed/PEDSPEED.PDF
[40] http://www.aph.gov.au/house/committee/environ/cities/index.htm
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