



Sustainable Growth and the Victorian Government's Melbourne 2030 Strategy

1. The Future of Oil Production

There is a growing recognition that the world is close to the 'Big Rollover' when the current buyer's market becomes a seller's market as oil production begins to fall.

Australia

Woodside Petroleum's Managing Director said recently that *Australia has been consuming oil three times faster than it has been discovered. Projections by Australian Government forecasting agencies indicate that Australia is facing a rapid decline in liquid petroleum production over the next decade. Liquid petroleum self-sufficiency is expected to decline from an average of 80-90% over the past decade to less than 40% by 2010. The economic implications for Australia are significant including a rapid deterioration in Australia's trade deficit on liquid hydrocarbons (from a surplus of \$1.2 billion in 2000/01 to a projected annual deficit of A\$7.6 billion by 2009/10'.* (Akehurst, 2002)

The general view within the oil industry is that Australia has low oil prospectivity and fields yet to be discovered are of small to medium size and becoming more technically demanding, e.g. heavy oil or deep water reserves.

World Oil Production

The May 2002 Uppsala University International Conference on Oil Depletion and the May 2003 Association for the Study of Peak Oil Conference held in Paris evidenced a growing consensus on the reality of oil depletion.

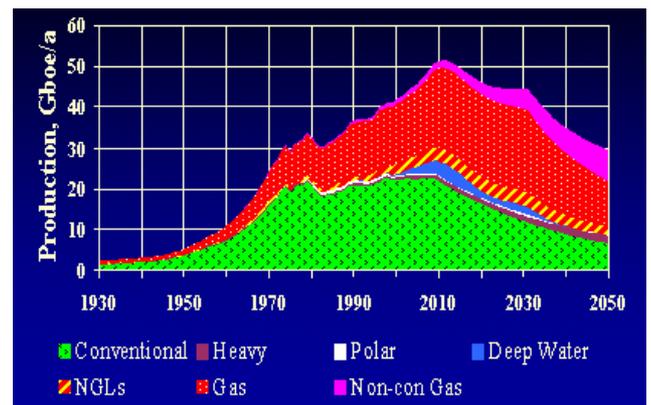
Overall there emerged a scenario of world oil depletion of 5-10% per year, a recognition that oil reserves had been deliberately overestimated by the oil industry and there are unlikely to be more major significant reserves to be found. Middle East and American oil representatives issued warnings on the absence of any more major frontier regions except the polar regions, and the increasing incidence of "dry holes". For several years, for every new barrel of oil discovered, four barrels of oil have been consumed. Once peak oil production is passed, cost rises and quality tends to decline.

Australia will be exposed to a national decline in oil production at the same time as the overall world

production declines, leaving it vulnerable to serious oil shortages and price spikes in the short to the long term. The world oil market is expected to become a seller's market as early as 2003 but by 2020 at the latest. Temporarily the balance of power will shift towards OPEC, but even Middle East production is expected to start falling around 2010 (Robinson, 2002).

In the short term we can expect short but unexpected oil crises, and over the next decade significant changes in oil pricing. A crisis in supply-demand balance will emerge within 20 years as the impact of growing demand of the developing economies compete with the high demand from developed countries (the USA is predicted to import 70% of its oil by 2020) for a dwindling supply. Currently five-sixths of the world's population uses comparatively very little energy per capita.

The chart below illustrates the current settings of oil and natural gas reserves in terms of production rates and world demand forecast to mid-century, expressed in GBOE, or 1,000 million barrels of "oil-equivalent".



Source: C.J.Campbell., December 2000.

Alternative non-conventional petroleum fuels (Venezuelan heavy oils, Canadian tar-sands, oil shales eg) or deep ocean fields (estimated at 5% of the world's supply by 2020) will become economic as conventional oil prices rise. They will not fill the gap because of the increased energy inputs needed to extract, convert and refine, as well as increased greenhouse gas emissions and their lack of suitability for refining into petrol or aviation fuel.

Forecasts released at the May 2002 conference show declines in production of gas liquids, polar oil, deep and heavy oils, all providing a fraction of the conventional oil output, by about 2010 (Robinson, 2002).

2. Alternative Energies

One conclusion from the 2003 conference is that there is no evidence of any credible alternative to oil in particular and hydrocarbon energy in general in the near or foreseeable future. Robinson also concludes that at this stage there is no 'single "Magic Bullet" panacea for our oil vulnerability.' (Robinson, 2002).

'All alternative fuels to replace petrol and diesel have severe constraints on their introduction. Enormous volumes are required to replace sizeable proportions of our current liquid fuel usage, and the time scale for their provision in these volumes is short. It will very risky indeed to rely on unproven technologies becoming available on such enormous scales within a decade of so, which is the time frame likely to be required if the Rollover forecasts are accurate.' (Robinson, 2002).

Natural gas, as demand will exceed supplies in the near future, will need to be used frugally and efficiently to make the best of the long-term buffer against future oil shocks.

None of the other non-petroleum based fuels (eg oil from coal, bio-diesel, ethanol from crops, hydrogen from solar power, coal-fired electricity for battery powered vehicles) appear able to provide a significant short-term alternative to petrol and diesel from petroleum (Robinson, 2002). Conversion of natural gas or coal to petroleum substitutes is perhaps US\$15-25 more expensive per barrel than from crude oil and discards some 40% of the resource energy.

Hydrogen is not the easy solution still hoped for, and recently adopted by the Bush administration. Intensive costs of production, inherent energy inefficiencies, lack of infrastructure and impracticality were generally accepted at the 2003 conference as reasons why hydrogen was not a solution in the near or long term (Ruppert, 2003)

Most of today's hydrogen is produced from natural gas, which is only an interim solution since it discards 30% of the energy in one valuable but depletable fuel (natural gas) to obtain 70% of another (hydrogen). The challenge is to develop more appropriate methods based on sustainable energy sources, methods that do not employ electricity as an intermediate step.

As a means of converting energy from nature, then transferring, storing and using this energy, hydrogen is less than half as efficient as is electricity. Hydrogen from water electrolysis is more than twice as expensive as from gas.

Research by Ulf Bussel and Baldur Eliasson (*Energy and the Hydrogen Economy*) into the energy needed to run a hydrogen economy was included in the TCPA's submission to Melbourne 2030. The paper concludes that 'Production, packaging, distributing, storage, transfer and delivery of hydrogen in essence all key components of an

economy, are so energy consuming that alternatives should and will be considered' (Bossel & Eliasson, 2003).

The European Commission is investing US\$2 billion in research programs for the generation of hydrogen from renewable resources principally biomass, to help power road transport. Europe's push for hydrogen is motivated largely to achieve the Kyoto Treaty targets on global warming, and reduce its dependence on Middle East oil. To date the policy of the EU wants 22% of the EU's electricity to come from renewables by 2010. However the role of hydrogen as perceived by the EU is sensibly limited.

3. Energy for Transport

The main political driver for the so-called hydrogen economy is the need to replace petroleum for road transport, most of whose consumption is in cars.

Bossel and Eliasson estimate that 22 tube-trailer hydrogen trucks or four liquid hydrogen trucks would be required to deliver the same amount of energy currently delivered by a single 40-ton gasoline truck. The consequences would be a dramatic increased number of hydrogen carrying trucks with one out of seven truck accidents involving an hydrogen carrier (Bossel & Eliasson, 2003).

Dr. Jorg Wind, representing Daimler Chrysler, said that his company did not see hydrogen as a viable alternative to the petroleum-based combustion engine. *'We predict that by 2020 only 5% of fuel use will be hydrogen and that infrastructure and the political framework is the most important factor.'* Dr Wind stated that *'we would see improved conventional vehicles, starter hybrid vehicles, electric hybrid vehicles and, finally, fuel cell vehicles as solutions, but he had little optimism that fuel cells would ever amount to a significant market share'* (Ruppert, 2003).

Robinson estimates that the changeover to hybrid and fuel cell cars is likely to be slower than the changeover to unleaded petrol, which will have taken about 20 years. Normal fleet changeover is slow with the BTRE estimating that 50% of today's new cars will be on the road in 20 years time in Australia (BTRE, 2002).

4. Economic Implications

Oil depletion has major implications for the global economy, as well as national economies, and involves major equity issues for the world's poor who will need access to affordable energy, especially for agriculture. The world faces a major challenge to find clean and enduring sources of energy

A more comprehensive industrial transformation towards sustainability is hence needed in developed countries like Australia, including an all-of-government approach to decouple economic growth from carbon fuel consumption.

The necessary change processes will have to emphasise conservation, as there appear to be no technical panaceas to allow the current high-energy consumption patterns to persist. These changes will involve lifestyle changes, oil

and transport demand management measures, new “energy-lean” technologies, land use and transport planning to reduce car dependence particularly for personal travel.

Wherever possible, taxation regimes should be employed to discourage demand for 4WDs (SUVs) and switch demand to hybrid petrol/electric fuel-efficient smaller cars and buses, light commercial vehicles, bikes and 20 kg Electric-Power Assisted Bicycles (E-PABs).

E-PABs could be used instead of cars for trips of less than 10 km (Parker, 2002). Biofuels such as ethanol could be used in PABs with very small clean internal combustion engines. In Japan photovoltaic cells have been used to charge E-PAB batteries. E-PABs have more potential than cars to efficiently use renewable energy resources.

We need to encourage walking and cycling directly to destinations or as access to public transport by treating as a priority the funding of better infrastructure including the completion of a close-knit urban bikeways network (Parker, 2001). This would also reduce the trend to obesity!

5. Sustainable Growth: Perth and Melbourne Compared

The WA government draft consultation paper "Focus on the Future: The Western Australian State Sustainability Strategy" (WA, 2002) addresses the problem of oil depletion of Australian and world oil reserves with strategies to reduce oil dependence and to use gas as a transitional fuel for essential transport in WA. It drew upon Robinson's analysis (Robinson, 2002). TCPA's submission to Melbourne 2030 appended Robinson's paper, which is now on the TCPA website.

Robinson recommended the formation of an Oil Vulnerability Task Force to examine WA's oil vulnerability as a risk management strategy and urgent measures to address Perth's automobile dependence. These recommendations addressed directly or explicitly recognised the future sustainable transport risks facing WA, namely:

- Urgent completion of the bicycle network
- City-wide TravelSmart Programs
- A bicycle planning and engineering group within the responsible department to coordinate provision of bicycle facilities and ensure that all new roads and developments or modifications made provision for safe and convenient bicycle transport.
- Review of funding of additional urban roads in light of probable decrease in future automotive travel demand as a result of oil vulnerability and success of alternative transport programs
- State motor-vehicle charges to be progressively modified to encourage purchase of small fuel-efficient motor vehicles.

Robinson concludes that:

'If WA sits complacent knowing that Australian has decades of gas, and some dwindling oil, we may miss the bandwagon completely as has happened before. Oil-conservation is likely to be far more productive and cost-effective in the short term than any attempts to bring on stream the substitutes upon which people are pinning their hopes. In the long run, we will need both the alternative energy sources and a much more frugal approach to non-renewable resources.'

In contrast, the Victorian transport and land use strategy, Melbourne 2030, is remarkable for its almost total silence on the issue of oil depletion and the future of alternative sources of energy for transport. Risk management is absent. It is only under the Direction 7, a greener city, that we find any reference to reducing energy use. However, the focus is on greenhouse gas emissions and climate change. There is literally only a brief fine print note that 'Reducing fossil fuel consumption has other benefits for finite natural resources, such a more secure and diverse supply and a reduced rate of consumption'. (DOI, 2002).

The most radical recommendation in Melbourne 2030 is that 20% of all motorised trips will be made by public transport by the year 2020. However, this recommendation is not hypothecated to goals of energy-use or greenhouse gas reduction that might be associated with reducing trip tonne-kilometres to a commensurate level. It comes without a package of supporting strategies for actual implementation. This is, after all, only a minor reduction in car dependence compared to what has been achieved already in some cities in Japan and Northern Europe and even then it is most unlikely to happen under the present strategy plan.

It is less than convincing to recommend that walking, bicycling and public transport can replace the automobile and reduce petrol use in any developed western city without a planned and regulated reduction in car use and car parking over a decade or more.

The likely scenario for Melbourne till 2030 is one of uncertainty in the short, medium and longer terms in the availability of gasoline and diesel, the costs to the consumer and the economy at large, and the costs and accessibility of replacement energies. The viability of Australia's metropolitan suburbs and the economic security of homeowners are potentially under threat.

The TCPA's submission to Melbourne 2030 drew attention to the need for risk management in the planning for Melbourne and to the lack of attention in the draft of Melbourne 2030 to the identifiable 'broad event elements' which could radically affect the plan. Three of these - oil supply or pricing crises, failure to invent alternative automotive traction and energy formats to make timely and full substitution for oil, and the costs of increased oil importation - will have to be faced over the next 30 years and sooner.

A sustainable plan for Melbourne will need to adopt road-use charges, compact urban design, alternative sustainable mass transit and individual modes of transport, and substitution by alternative energies, as well as the

conservation of Australian sources of oil and gas.

The TCPA's submission on the implementation of Melbourne 2030 has reiterated its position strongly:

'Melbourne 2030 has ignored the issue of fossil fuel consumption of cleaner energy generation needed to support growth over the next 30 years. Multiple strategies aimed at reducing the actual trip-kilometres of personal travel are necessary to alleviate Australia's burgeoning oil importation and in responding to and achieving greenhouse gas reduction targets, such as those prescribed in the current Kyoto Treaty.'

There are no substitutes for present gasoline and diesel-engine road transport vehicles (cars and trucks) predicted to be widely available in the time frame to contend with emerging threats from declining Australian and world oil production or further restrictions on carbon gas emissions. Road transport accounts for 60% of Australia's oil use. Only the battery-electric car has a

reasonable chance of replacing part or most of the current car fleet. The much-vaunted hydrogen economy, featuring hydrogen-powered cars, faces major and fundamental barriers in the laws of physics, as well as huge costs in roll-out.

Realistically, strategies to reduce energy consumption and carbon emissions per passenger-kilometre will have to focus on the use of public transport, walking and cycling. Also, on government encouragement to switch away from existing cars to highly economical vehicles such as petrol-electric hybrid cars and diesel cars such as the Volkswagen Lupo'

The TCPA can only surmise that the issues are seen as politically too hard to openly face or that the planning bureaucracy remains divided among three camps: those who take oil and gas depletions seriously, those who do but feel that alternative energy sources will enable life to go on as usual, and those who believe the marketplace will find the solutions.

REFERENCES

- Akehurst, J. 2002, World Oil Markets and the Challenges for Australia, ABARE Outlook Conference March 2002, Canberra.
- Australian Energy News 2001, Oil Production Curve Cause for Concern, Federal Department of Industry Tourism and Resources, December 2001.
- Bossel, U. & Eliasson, B. 2003, Energy and the Hydrogen Economy, at URL = http://www.idatech.com/solutions/multi_fuel_solutions/Hydrogen%20Economy%20Report%202003.pdf
- C.J.Campbell. Peak Oil. Presentation at the Technical University of Clausthal, December 2000. <http://www.geologie.tu-clausthal.de/Campbell/lecture.html>
- Laherrere, J., 2003, Forecast of Oil and Gas Supply to 2050, Petrotech 2003, New Delhi. See www.hubbertpeak.com
- Hubbert petroleum production peak modelling can be referenced at <http://www.hubbertpeak.com/>
- Powell, T.G. 2001, Understanding Australia's Petroleum Resources, Future Production Trends and the Role of the Frontiers, Geoscience Australia, APPEA Journal 2001, pp. 273-287.
- Parker, A. A. 2001, Making Walking and Cycling Safer: Lessons for Australia from the Netherlands Experience, 24th Australasian Transport Research Forum, Hobart Tasmania, 17-20 April 2001.
- Parker, A.A. 2002, The Power-Assisted Bicycle: a Green Vehicle to Reduce Greenhouse Gas Emissions and Air Pollution, 25th Australasian Transport Research Forum, Canberra, 2002.
- Robinson, B. 2002, Global Oil Vulnerability and the Australian Situation: a Background Paper for WA State Sustainability Strategy, June 2002 (Dept of the Premier and Cabinet, <http://www.sustainability.dpc.wa.gov.au/docs/backgroundpapers.htm>)
- Ruppert, M.C. 2003, Paris Peak Oil Conference Reveals Deepening Crisis, the Wilderness Publications 2003.
- Simmons, M.R. 2002, Depletion and US Energy Policy, Proc. First International Workshop on Oil Depletion, Uppsala, Sweden, Eds. Aalklett K. & Campbell, C. (website www.isv.uu.se/iwood2002proceeding.html).
- State of Victorian, 2002, Melbourne 2030: Planning for Sustainable Growth, Dept of Infrastructure, 2002.
- State of Western Australia, 2002, Focus on the Future: The Western Australian State Sustainability Strategy, Department of Premier & Cabinet, 2002.

Bulletin Contributions

Members are invited to use the Bulletin to report or comment on any planning issues, including local ones, and initiatives relevant to the objectives of the association. Comment and analysis related to the implementation of Melbourne 2030 would be particularly welcomed. News of new publications would also be of interest to the Bulletin.

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