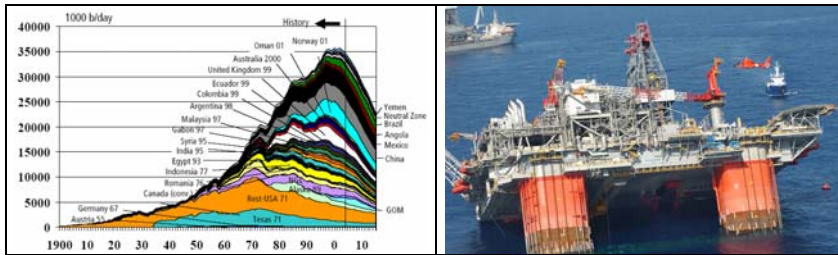


Fuel Availability Analysis

for oil dependent infrastructure projects

In the NSW Premier Department’s latest report by the Infrastructure Implementation Group



Double whammy peak oil (annual oil production in 18 countries, left) and global warming (hurricanes disable oil platform in GOM, right)

“Review of future provision of Motorways in NSW”, no reference can be found to the most pressing problems our transport system is facing right now: peak oil and global warming resulting from GHG emissions.

TYPICAL PROJECT STAGES	MAJOR GOVERNMENT TASKS	
<p>Project identification early consideration</p> <p>Project approval</p> <p>Planning Assessment</p> <p>Project Delivery</p> <p>Project Implementation including construction commissioning opening and ongoing operations</p>	<p style="text-align: center;">←</p> <p style="text-align: center;">Strategic Assessment</p> <p>Project identification and early consideration taking into account broad policy and strategy issues</p> <p>Project assessment and funding approval Including gateway review process</p> <p style="text-align: center;">Planning System</p> <p>Environmental assessment under EP&A Act</p> <p>Ministerial determination</p> <p style="text-align: center;">←</p> <p style="text-align: center;">Procurement</p> <p>Including Tender Evaluation and Contract Award</p> <p style="text-align: center;">Monitoring</p> <p>Monitoring of project delivery and ongoing operations</p>	<p style="text-align: center;">Resource analysis needed here as first step:</p> <p>(1) Peak oil timing and future oil production profile</p> <p>(2) Quantitative and timely availability of alternative fuels</p> <p>(3) Limitations of the atmosphere’s CO₂ absorption capacity</p> <p>(4) Realistic feasibility of new technologies</p>
<p>www.nsw.ipaa.org.au/00_pdfs/Motorways2005.pdf</p>		<p>Resource analysis as part of the EIS would come too late as project has already gained momentum at this stage</p>

Resource analysis

Such an analysis would have **to prove quantitatively** and with a **very high probability** that future traffic growth – still assumed as given and taken for granted by traffic planners - can actually and realistically be underpinned, **timely and over a period of 25 years**, by:

- 1) **growing oil production**
This would require the calculation of oil production profiles over time using EURs of 95% or higher and a guarantee from all oil exporting countries that they can maintain their current ratio of exports and domestic consumption – against trends of their own population growing fast and needing more oil. The high probability of oil supplies actually materializing is needed for banks investing in oil dependent infrastructure
- 2) **replacing oil based fuels with alternative fuels**
Stagnating or decreasing oil production as calculated under (1) would necessitate filling the gap between demand growth and oil supplies with alternative fuels. A demand growth of 2% pa against an oil production decline of 2-3% pa means a continuous replacement level of 4-5% **every year**
- 3) **improving or adapting existing engine technology**
Fuel supply gaps as calculated under (2) would require legislation for a mandatory introduction of hybrid cars or other fuel saving vehicles, sufficient local manufacturing capacities for these vehicles and adequate purchasing power for a sustained fleet

rejuvenation in an environment of continuing economic growth over at least 15 years, the minimum transition period required for a compulsory programme

4) introducing new vehicle technologies and/or energies

In a recent study on fuel cells the US Department of Energy found that in order to compete with petroleum based internal combustions engines, fuel cells would have to improve 10-20 times in cost, by the factor of 5 in lifetime and a factor of 2 in efficiency.

An analysis covering all of the above points would have to be done by observing

- oil depletion laws
- environmental equilibria, in particular the earth's carbon balance
- nature's thermodynamic laws
- energy profit ratios being greater than 1

Many of the alternatives would have to be implemented at a global scale, not just in Australia, in order to become economic.

Biofuels in competition with food production

Possible biofuels contributions are quite limited for various reasons (soils, rainfalls, energy inputs). A study by CSIRO, ABARE and BTRE on a possible contribution of 350 Megalitres of biofuels pa by 2010 has now been reviewed by a biofuels taskforce. Renewable Fuels Australia proposes 750 Megalitres pa. as achievable. However, even this increased target would represent a mere 2.2 % of our current oil based fuel consumption. It would be cancelled out by just 1 year's oil decline after peak oil. Theoretical calculations show that in the case of ethanol, all Australian sugarcane converted to this fuel would yield approximately 5 litres per week per car. Climate change might reduce this amount further. The energy white paper itself quotes estimates that all Australian oilseed crops used for bio-diesel production would cover 6% of present diesel consumption. An unending supply of natural gas for fertilizer production would be needed in order to support the current high per hectare yields.

Critical path analysis for natural gas transition

Natural gas requires a completely new gas production and supply infrastructure for the transport sector and an adapted vehicle fleet. A critical path analysis would have to show that building up such a system is timely, economically and financially feasible. As gas production from the Cooper basin is expected to decline over the next 5-8 years, large-scale gas pipeline projects to the North/West would have to be included in this analysis. Both the bio fuel and natural gas alternatives would require that no more gas export deals are being done.

Safe geo-sequestration for coal to liquid technology

Similar analysis would have to be done for coal to liquid technology including safe geo-sequestration of carbon dioxide. After a series of hurricanes along the US South coast linked to global warming the need to actually reduce the burning of coal has become very urgent. Peak oil is an energy problem and consequently a green house gas problem.

Population growth will not translate to traffic growth after peak oil

Resource constraints for high scenarios of immigration were first identified by the CSIRO in its report "Future Dilemmas" in Oct 2002. The concepts developed there should be used to draft a detailed terms of reference for a fuel availability analysis.

Nuclear power

Nuclear power (uranium mining dependent on diesel supplies!) should first enable us to turn off coal-fired power plants and secondly it should be used to fully electrify our land transport system. The hydrogen economy is not around the corner. It may even turn out to be an illusion that hinders us using existing, proven technologies like electric trains

Government and industry commitment

It would also have to be demonstrated that all players and stakeholders pro-actively participate in any transition plan in a coordinated manner and stick to agreed targets.