Society for Underwater Technology

submission to the Senate Inquiry into

Australia's future oil supply and alternative transport fuels

Terms of Reference of the Senate Inquiry

Australia's future oil supply and alternative transport fuels, with particular reference to:

i. projections of oil production and demand in Australia and globally and the implications for availability and pricing of transport fuels in Australia;
ii. 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;
iii. flow-on economic and social impacts in Australia from continuing rises in the price of transport fuel and potential reductions in oil supply; and
iv. options for reducing Australia's transport fuel demands.

The Society for Underwater Technology

The Society for Underwater Technology (SUT) is a multi-disciplinary learned Society bringing together individuals and organizations from more than forty countries having a common interest in underwater technology, ocean science and offshore engineering.

The SUT was founded to promote the further understanding of the underwater environment and to encourage:

- Cross-fertilisation and dissemination of ideas, experience and information between workers in academic research, applied research and technology, industry and government;
- Development of techniques and tools to explore, study and exploit the oceans;
- Proper economic and sociological usage of resources in and beneath the oceans; and
- Further education of scientists and technologists to maintain high standards in marine science and technology.

The Australian Branch of the Society for Underwater Technology (SUT) welcomes the opportunity to respond to this invitation, and wishes to make the following submission to the Senate Inquiry on this issue. SUT believes that within the next two decades, the future of hydrocarbon supplies has the potential to fundamentally affect the life-style and standard of living of all Australians.

The debate on Peak Oil is well expounded in the *btre Working Paper 61*[(1)]. Issues related to transportation fuels in the Western Australian context have been analysed in the Interim Report June 2003[(2)] of the WA Transport Energy Strategy Committee. This latter document outlines a strategy for minimising the "carbon shock" for the WA economy.

This submission will not replicate these analyses, but will focus on initiatives that government can implement to increase the production life of existing and yet-to-be-discovered hydrocarbon assets, with the aim of cushioning the coming "carbon shock" and extending Australia's future hydrocarbon and transport fuel supply.

Clearly, Australia needs to maintain its self-sufficiency in hydrocarbons for as long as possible, while developing a portfolio of alternative energy supplies.

The Australasian Branch of the Society for Underwater Technology notes that -

1. OIL RESOURCE

In Australia, as in most developed countries, our life-style is powered by energy derived from fossil fuels. Oil and coal have been the primary source of energy in Australia. [(3)]

Oil is a finite resource. The global rate of discovery of new oil resources has been on a downward trend since 1965 and consistently falling since 1980.[(4)]

Global oil consumption is increasing, and is likely to increase markedly with the forthcoming development and industrialization in China and India.

There is considerable debate about the timing of Peak Oil production, the rate of decline, and the consequences. However, there is little debate that demand will eventually out-strip oil supply.[(5)]

The Earth's total reserve of oil produced from geological processes is fixed, but the ultimate recoverable resource (URR) of oil is a function both of:-

1. the price of oil

2. the availability of enabling technology to recover the resource economically.[6]

The price of oil is a function of supply, demand, URR, and speculation; with speculation factoring in the effects of international relations.

The two viable options to extend the supply of oil are to:
(i) curb demand, or
(ii) increase the URR by enhancing technology to recover more of the oil resource.

Attempting to curb demand, especially that of developing States, is unlikely to be an effective option.

According to the US Department of Energy (DOE) [7] only about 10% of a reservoir's original oil in place is typically produced during primary recovery; secondary recovery techniques boost that to between 15% and 40%. Enhanced oil recovery (EOR) techniques can boost recovery to 30% to 60% of the oil in place [8].

Global rates of oil recovery are low, and without secondary or EOR recovery, over ⅔ of the global oil reserve will not be recovered. Technology plays an increasingly important role in ensuring affordable oil supplies, both through better definition of the hydrocarbon asset, and through enhanced recovery of the asset.

A significant trend is for new offshore oil and gas discoveries to be located in deeper water where subsea production technology is the most economic option for exploitation.

Innovation and technology enhancement in the hydrocarbon industry is critical for the future supply.[7]

Recommendations

1. That Australia actively encourages technology development in the oil industry. The government has a primary role in this regard, and Australia would benefit from long-term government support for technology development, particularly focused on -
   i. oil production technology
   ii. subsea fluid multiphase transportation
   iii. subsea processing and fluid segregation

2. That Australia fosters its knowledge base in the exploration, production and processing of hydrocarbons, through its Universities, research organisations, TAFE's and professional associations.

3. That Australia reviews its petroleum production legislation, encouraging the unitization of fields that straddle lease boundaries, thereby encouraging more efficient production strategies in these fields.

4. That production licence applications are assessed on the basis of the proportion of the total hydrocarbon resource that will be recovered.

5. That Australia implements a petroleum royalty structure providing incentive for exploiting stranded assets and maximizing the recovery from known oil assets.

6. That Australia fosters development of Advanced EoR technology through research, development and application and provides incentives through modified or flexible royalty / taxation structures.

2. GAS RESOURCE

Australia's Bass Basin reserve is in significant decline, and the North West Shelf province is gas prone[9]. Gas will therefore play an increasingly important part in supplying Australia's energy needs, either directly or through export/import parity.

Condensate production, which has the potential to considerably offset the decline in oil production over the next 20 years, is dependent on gas production, which in turn is dependent on gas production facilities (and gas sales).

Gas to Liquids Technology (GTL) is well proven and becomes increasingly attractive economically as oil prices rise and processing technology improves. Australian gas prices are low relative to the price of fuels delivered in larger consumer countries, and this provides a significant opportunity for investment. SASOL's experience and ability to supply the majority of South Africa's liquid fuels over many decades, and Shell's 6BnUSD investment in GTL production in Qatar are examples of the success of this technology. Such developments require long term feed stock supply (similar to LNG investments) and the benefit from the ability to deal in a ready 'spot' market for fuels. Australia's larger gas reserves are offshore in deeper water, requiring subsea production, long distance transport to shore based facilities.

Hydrated methane in deepwater but shallow sub-seafloor pockets promises to be a large source of gas in the future for countries with deep continental shelves. While this resource is currently excluded by some from future reserve predictions, Japan is actively studying the economics of exploitation and has already assessed the subsea technologies that will be required as the basis for extraction. The technology to exploit this gas

resource may require significant advances in subsea production and subsea energy systems.

CO_2 from produced gas and from burning of hydrocarbon contributes to the green-house effects in the global environment. Carbon capture and sequestration is currently being investigated as an option to offset the CO_2 effects on the environment. This technology could be employed in a manner that enhances oil reservoir recovery rates, as well as achieving CO_2 disposal, delivering a double win where geological conditions are suitable. In this regard, subsea technologies enable longer distance transport and injection, widening the economic radius between points of capture and disposal.

Recommendations

1. That Australia actively encourages technology development in the gas industry. The government has a primary role in this regard, and Australia would benefit from long-term government support for technology development, particularly focused on -
   i. gas production technology
   ii. subsea fluid transportation, flow assurance, & hydrate mitigation
   iii. subsea processing and fluid segregation
   iv. marine transportation of natural gas

2. That Australia implements a petroleum royalty structure providing incentive for exploiting stranded gas fields and maximizing the recovery from known gas assets.

3. That Australia actively pursues GTL technology development (in consort with LNG) to provide high added value for large, deepwater assets and realises the taxation income from finished fuel products.

4. That Australia fosters the research and development of hydrate mining technologies and techniques in consort with countries where trading partnerships are already strongly established.

5. That Australia commissions a study to investigate the application of subsea technology in the economic disposal of CO_2 through re-injection into reservoirs for improved recovery.

3. RENEWABLE ENERGY FROM THE OCEAN

Renewable energy resources such as harnessing ocean tides and currents are a viable source of energy that could replace some component of the energy currently sourced from fossil fuels. These energy conversion systems are particularly suited to smaller remote communities around the Australian coastline and across the islands of Asia Pacific.

The benefit to remote and less well developed economies has a significantly greater impact as fossil fuel cost rise.

Recommendations

1. That Australia actively encourages technology development in the marine renewable energy industry. The government has a primary role in this regard, and Australia would benefit from long-term government support for technology development, particularly focused on -
   i. Energy production from waves, tides and ocean currents;
   ii. Maximising marine (and rail) freight transport where appropriate.

2. That Australia exploits its predominant coastal distribution of population and its extensive coastline by harnessing ocean generated power derived from wave, tide and ocean currents energy.

3. That Australia engages in the development of renewable energy facilities and products to create and capture a new technology area of business with significant export potential.

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