

Chapter Five

Supply side responses – overview and exploration

Overview

5.1 Regardless of whether peak oil is or is not a pressing problem for Australia, commentators advance a number of what appear to be sound reasons for exploring options for increasing or diversifying Australia's indigenous transport fuel supply, and doing so in the near future. These include:

- Balance of trade – Australia is expected to run an increasingly large deficit in petroleum products in the future. By developing more locally available energy supplies, the country may offset some of the trade imbalance that may result from increasing requirements to import oil, as well as adding value to products currently exported at lower values, for example, natural gas.
- Security of supply – much of the world's oil supply comes from countries that are potentially unstable. Some commentators also consider there is a risk that security of supply may be threatened if larger countries lock in supply contracts from countries that are developing oil resources. There is some evidence that the latter may already be occurring.¹
- Time lags in developing new supply sources are long. Diversification of supply, whether by finding new supplies of conventional oil or developing alternative sources of liquid fuel supplies, will be a protracted process, requiring lead times of up to a decade and possibly longer. If it is to be successful and sufficiently timely, action may be required sooner rather than later.
- Global warming – some fuel supply diversification options offer possibilities for reducing or limiting transport sector greenhouse gas emissions, while maintaining the necessary functionality of transport systems.

5.2 Demand side measures, that is, seeking to control or reduce the demand for liquid transport fuel supplies through options such as energy efficiency measures, or shifting the transport task to other forms of transport that are less dependent on liquid transport fuels, may make a significant contribution to easing the economic disruption of restricted fuel supplies and high prices, if these come to pass. However, the

1 CSIRO, *Submission 128* for example discusses this. Smaller countries like Australia, who are at the end of long supply lines, may be more vulnerable to supply disruptions. It is important to note that the energy white paper disagrees that this is necessary, considering security of supply to be adequate. The Australian Institute of Petroleum (AIP) agrees with this assessment – see submission.

economy currently depends significantly on primary industries, in particular mining and agriculture, which are energy intensive and liquid fuel dependent. The transport industries, which also predominantly use liquid fuels, are also vital to economic well-being. Accordingly, it is prudent to also consider options for increasing or diversifying transport fuel supplies – that is, a supply side response.

5.3 The committee has received evidence about a number of supply side options for meeting domestic liquid transport fuel requirements. These options include:

- finding more conventional oil supplies within Australia or in Australian territorial waters;
- sourcing a proportion of fuel requirements from biomass - fuels such as ethanol, biodiesel, DME, methanol and synthetic diesel can be produced from biomass;
- producing fuels by liquefying coal or natural gas, or distilling it from oil shales; and
- using other fuels that can be substituted for petrol and diesel, such as LPG, natural gas (methane) or hydrogen as a transport fuel.

5.4 All of these possibilities come at a cost, economic or environmental, or have limitations. There is no one perfect solution. This chapter gives a broad overview of the evidence received in relation to exploring for more petroleum resources. The following two chapters examine options for deriving some or all of Australia's liquid fuel requirements from sources other than oil, including natural gas, coal and biomass.

Exploring for more oil in Australian territory

5.5 Australia has been nominally² self-sufficient in oil for several decades, thanks largely to the discovery of the large oil, gas and condensate fields in the Gippsland and Carnarvon basins. As described in Chapter 2, self sufficiency is declining, partially because the Bass Strait fields are depleting, but also because of rising demand.

5.6 A number of organisations highlighted the effect that this decline in self sufficiency will have on the trade deficit. The Australian Petroleum Production and Exploration Association, for example, told the committee that the trade deficit in crude oil and condensate will be about \$20 billion by 2015 – that is, within a decade.³ This deficit may be off-set wholly or partially by energy exports (coal and gas) and other exported products, but has the potential to have an adverse economic impact if prices or markets for these other exports fail to meet expectations.

2 Australian oil production is classified as light sweet crude and is of high value on the world market. Most production is exported. Further, Australian refineries require heavier crudes to produce the full range of petroleum products required in the Australian market.

3 *Committee Hansard*, 11 August 2006, p. 2.

5.7 The importance of petroleum products or substitutes for them in Australia's energy mix is likely to continue for the foreseeable future. It therefore appears to be prudent to actively encourage local exploration. This does not necessarily mean that resources, if discovered, will be developed. This will depend ultimately on the economics of bringing any discoveries into production, and on the price at which competing substitutes or imported product can be made available.

5.8 The evidence received by the committee indicates that there is a view, particularly amongst organisations such as Geoscience Australia, that there are good prospects for discovering new oil resources within Australia and in Australian territorial waters. Geoscience Australia told the committee that by world standards, Australian sedimentary basins, particularly those in offshore areas, have only been lightly explored. Fewer than 9,000 exploration and development wells have been drilled in Australia, compared to about 3,000,000 wells in the United States, which has a comparable land area.⁴

5.9 The Australian Bureau of Agricultural and Resource Economics (ABARE) gave similar evidence, stating that more than half of the offshore basins that show signs of petroleum potential remain unexplored.⁵

5.10 The CSIRO also provided an optimistic assessment of Australia's prospectivity, telling the committee that:

Australia has probably used only a relatively small proportion of its overall petroleum endowment. This is a big advantage that sets us apart from the traditional major OECD petroleum players, including the UK and USA, both of which have sharply declining production.⁶

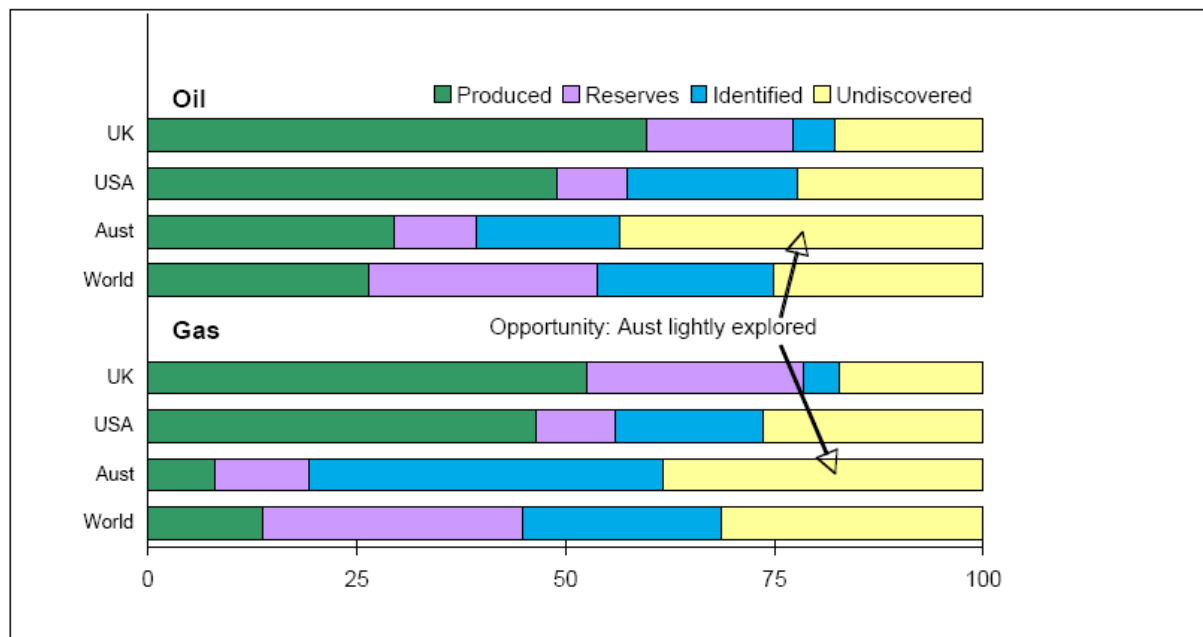
5.11 The following graph, drawn from the CSIRO submission, compares estimated recoverable oil and gas resources, including gas and condensates for Australia and the rest of the world, in percentage terms.

4 *Committee Hansard*, 18 August 2006, p. 51.

5 ABARE, *Submission 166*, p. 4.

6 CSIRO, *Submission 128*, p. 11.

Figure 5.1 – Comparison of the recoverable oil and gas resources (%) for Australia and the rest of the world (including gas and condensates)



Sourced from USGG Estimates, reprinted from CSIRO, *Submission 128*.

5.12 Others are more cautious about the prospects of finding significant quantities of oil in particular. For example, John Akehurst, former Managing Director of Woodside Australian Energy wrote:

...the general view within the 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...⁷

5.13 Similarly, Professor David Harries, Director of the Research Institute for Sustainable Energy (RISE) at the Murdoch University submitted that many petrogeologists considered that the prospects of finding significant oil reserves in Australian Territory is not high:

Many petrogeologists ... argue that Australia's prospectivity in oil is inherently low and that while there are likely to be undiscovered oil reserves in Australian territory, these are unlikely to be significant. Some petrogeologists have attempted to explain Australia's low hydrocarbon prospectivity in terms of plate tectonics and a possible north-south planetary asymmetry during the carboniferous period.⁸

5.14 The Australian Academy of Technological Sciences and Engineering (AATSE) agreed that many Australian sedimentary basins remain substantially

7 Akehurst, J. 2002, *World Oil Markets and the Challenges for Australia*, Woodside Australia Energy, ABARE Outlook conference, 2002.

8 RISE, *Submission 104*, p. 5.

unexplored, but also cautioned that many of these are in deep water and difficult environmental conditions. The AATSE noted the Government's programs through Geoscience Australia aimed at opening some of these areas up for exploration, commenting that only by encouraging exploration in these frontier areas can the opportunity of finding a new oil province be realised.

5.15 However, as noted by AATSE and others, the process of bringing the resources of a new province on line, assuming that one is found, involves long delays, as long as a decade. The AATSE said that the release and preliminary exploration of new acreage took around four years, and if a discovery was made, it would take a further six years before it could be brought into production.⁹

Exploration activity

5.16 Intuitively, it might be expected that the high oil prices of 2005 and 2006 would be enough to stimulate exploration activity. As Dr Brian Fisher told the committee when commenting on whether the recent higher oil prices would stimulate exploration activity: 'On the supply side, clearly high oil prices encourage lots of activity in the exploration sector and drive new technology'.¹⁰

5.17 However, evidence from the Australian Petroleum Production and Exploration Association (APPEA) indicated that while increased prices stimulate exploration in areas known to have produced hydrocarbons in the past (ie: brownfield sites), this was not necessarily the case for exploring new areas:

While higher crude oil prices result in increased brownfield exploration and appraisal drilling, it does not necessarily deliver increased exploration in those areas where it is needed most, and that is the frontier areas. It does not provide Australia with any relative competitive exploration advantage. Frontier basins, of which Australia has many, are high risk and very high cost, as rightly pointed out by the Prime Minister in his speech to CEDA in July.¹¹

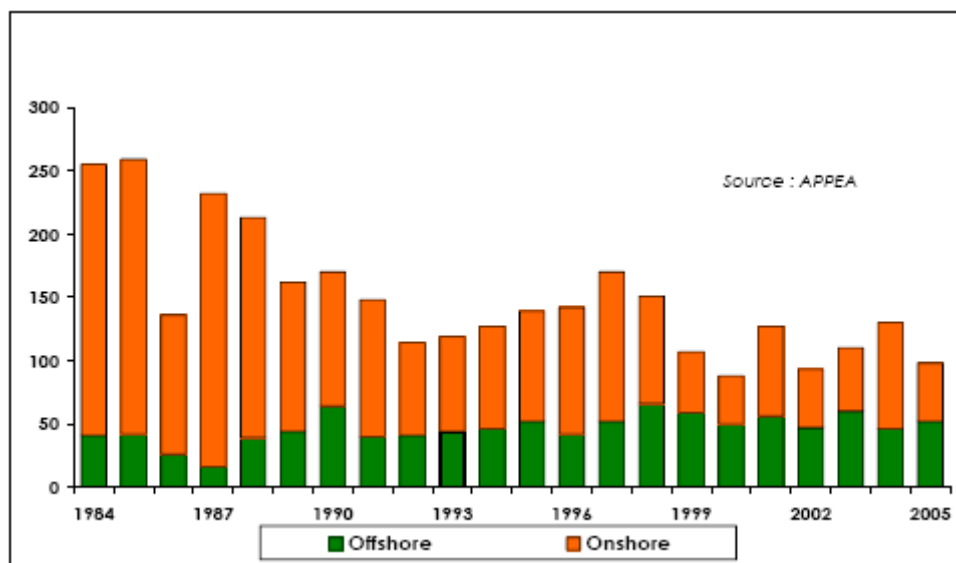
5.18 Information provided by APPEA shows that around 100 exploration wells have been drilled in the last year, about half of them in offshore areas.¹² This does not represent a high level of activity in historical terms.

9 AATSE, *Submission 154*, p. 4.

10 *Committee Hansard*, 12 May 2006, p. 8.

11 *Committee Hansard*, 11 August 2006, p. 2.

12 APPEA, *Submission 176*, p. 4.

Figure 5.2 – Exploration wells drilled, 1984 to 2005 (number of wells)

Source: APPEA, *Submission 176*, p. 4.

5.19 There are a number of reasons for this relatively low level of activity. These include:

- exploration costs and risks;
- the longer term price of oil; and
- policy settings including taxation regimes and incentives.

Exploration costs and risks

5.20 The costs of exploring for oil, particularly in offshore areas are high and rising. APPEA provided the committee with information about the costs of drilling, and in particular, how these have risen:

...where we are seeing really big rises are in rig rates. For the rigs that we use for exploration our industry was paying about \$65,000 a day about 18 months ago, and now they are upwards of \$250,000 to \$300,000, or even \$400,000 a day...in general we are seeing cost increases over the past 12 months of between about 30 to 50 per cent depending on the project.¹³

5.21 The costs associated with exploration work are compounded by risk, that is, the chances of commercial success. Commercial success has to be distinguished from the rate of discovery, which is apparently quite high. In 2004, the technical success rate (ie: a well is clearly shown to contain petroleum on the basis of electrical logging) was 53.3 per cent for onshore wells, and 40 per cent for off shore wells. The following table shows the technical success rate for oil exploration wells over the last decade.

13 *Committee Hansard*, 11 August 2006, p. 4.

Table 5.1: Discovery rate per well drilled

| Year | Success Rates (per wells drilled) | | | |
|------|-------------------------------------|----------|--------------|----------|
| | Number of exploration wells drilled | | Success rate | |
| | Onshore | Offshore | Onshore | Offshore |
| 2004 | 59 | 27 | 53.3% | 40.0% |
| 2003 | 28 | 45 | 39.3% | 25.5% |
| 2002 | 24 | 31 | 61.9% | 38.2% |
| 2001 | 49 | 49 | 61.7% | 26.0% |
| 2000 | 27 | 55 | 39.1% | 40.0% |
| 1999 | 29 | 44 | 41.4% | 28.6% |
| 1998 | 74 | 56 | 46.6% | 22.6% |
| 1997 | 85 | 33 | 54.0% | 28.1% |
| 1996 | 73 | 30 | 40.3% | 39.5% |
| 1995 | 63 | 34 | 40.7% | 25.0% |
| 1994 | 60 | 26 | 57.6% | 28.1% |

Source: Department of Industry, Tourism and Resources, Response to Questions taken on notice, 12 September 2006, p. 4.

5.22 However, as noted by the Department of Industry, Tourism and Resources, technical success does not imply commercial success. Discoveries may be small and the ability to commercialise them depends on a range of technical and economic factors which change over time.¹⁴

5.23 In Australia, commercial success rates have been considerably lower than in other countries, creating the perception that explorers may be more likely to achieve a return on investment elsewhere. As APPEA pointed out in its submission:

The offshore Australia region success rate for commercial oil discoveries was 6.5 percent (that is on average one in fifteen exploration wells drilled in the study period resulted in a commercial petroleum discovery in offshore Australia). This compares to a global average success rate of 17 percent.¹⁵

5.24 Ms Robinson of APPEA elaborated:

...frontier areas are very high risk and high cost. We are talking about perhaps a risk ratio of 1:15. In other words, if you drill an exploration hole you have about a 1:15 chance of finding something, and it has been very costly because it is deep water and so on, whereas a lot of the companies would prefer to go to, say, North Africa, the Middle East, Russia or other places where the risk ratio is much lower—in the Gulf of Mexico it is 1:4 and in West Africa it is 1:3. I think that is the issue.¹⁶

14 Department of Industry, Tourism and Resources, Response to Questions taken on notice, 12 September 2006, p. 4.

15 APPEA, *Submission 176*, p. 6.

16 *Committee Hansard*, 11 August 2006, p. 3.

5.25 Australian commercial discoveries are generally smaller compared to other countries, further increasing the perception that Australia is not an attractive place to explore for petroleum. APPEA advised the committee that the average commercial discovery size in offshore Australia was small compared to other regions (28 million barrels for oil and 197 billion cubic feet for gas). APPEA submitted that this combination of factors 'presents significant challenges from a policy context'.¹⁷

Lack of confidence in longer term oil price

5.26 A lack of confidence in the longer term cost of oil also appears to act as a disincentive to undertake exploration in frontier areas, which are acknowledged as being more difficult areas in which to achieve an acceptable return on investment. When asked about what would happen if the price of oil returned to \$US20 per barrel, Ms Robinson of APPEA responded that:

If it went back to \$20 a barrel I think we would see what we have seen in the past around the world, and which is perhaps part of the reason why we are in the predicament that we are globally, and that is a failure to invest in exploration.¹⁸

5.27 One factor which holds down the longer term expectation of higher oil prices is substitution – that is, when the price gets to a certain level, substitutes for conventional oil may become economically viable. Dr Fisher of ABARE alluded to this factor in evidence:

If your long-term expectation is that oil prices will be sustained at very high levels then you bring in all this extra supply. The reason you do not see that extra supply rushing in today is that effectively people are not convinced that oil prices are going to stay at these levels... anyone who calls a price above \$40 is not taking into account the liquefaction of coal.¹⁹

Policy settings

5.28 APPEA was of the view that Australian policy settings need to be adjusted to improve Australia's relative attractiveness as an investment destination on a risk adjusted basis. APPEA also sought an extension of Geoscience Australia's pre-competitive geoscientific information program, commenting that 'probably the most useful service or program that the government provides for the industry as a whole is the collection and provision of... pre-competitive geoscientific information.'

5.29 APPEA also addressed the introduction by the Government of a 150 per cent uplift factor in relation to Petroleum Resource Rent Tax in relation to a limited number of designated frontier exploration areas. APPEA did not appear to regard this measure as particularly useful, pointing out that it is of 'limited interest' in that it is

17 APPEA, *Submission 176*, p. 6.

18 *Committee Hansard*, 11 August 2006, p. 12.

19 *Committee Hansard*, 12 May 2006, p. 9.

only relevant to those companies paying petroleum resource rent tax who are actually in profit.²⁰

5.30 The committee notes that on 14 August 2006, the Prime Minister announced a number of initiatives to stimulate local exploration activity, including the requested extension of the Geoscience information program. The initiatives include the following:

- the allocation of an additional \$76.4 million over the next five years to expand Geoscience Australia's pre-competitive data acquisition program;
- a review of the exploration policy framework, to reduce the red-tape burden on the petroleum exploration industry; and
- \$58.9 million to allow Geoscience Australia to 'to pioneer innovative, integrated geoscientific research to better understand the geological potential of onshore Australia for both minerals and petroleum.'²¹

5.31 The committee also notes that in February 2006, the Minister for Industry, Tourism and Resources announced the awarding of a total of 13 new petroleum exploration permits. Nine of these new permits are in Commonwealth waters off WA, two are off Tasmania and two are in the Territory of Ashmore and Cartier Islands offshore area.²²

Committee comments

5.32 Ultimately, decisions about whether to conduct exploration will be commercial decisions made by companies on the basis of the assessment of commercial risk and likely returns. In making these decisions, companies will undoubtedly make an assessment of whether any resources discovered can be produced at a price that is competitive with alternative fuel sources.

5.33 It remains to be seen whether the Government's initiatives will result in the discovery of significant new oil reserves. The committee accepts that there are reasonable grounds to believe that there are good prospects for discovering further reserves. However, a multifaceted approach to reducing dependence on imported oil is prudent, requiring the parallel consideration of other alternative sources of liquid or substitute fuels, as considered in the following chapter.

20 *Committee Hansard*, 11 August 2006, p. 9.

21 Transcript of the Prime Minister's statement to Parliament on energy initiatives, Parliament House, Canberra, 14 August 2006 and Department of Prime Minister and Cabinet website, at <http://www.dPMC.gov.au/initiatives/docs/exploration.rtf>.

22 Transcript of the Prime Minister's statement to Parliament on energy initiatives, Parliament House, Canberra, 14 August 2006 and Department of Prime Minister and Cabinet website, at <http://www.dPMC.gov.au/initiatives/docs/exploration.rtf>.

