23 May 2002

Professor Peter Newman
Director, Sustainability Policy Unit
Department of Premier and Cabinet
197 St George's Terrace
PERTH WA 6000

Dear Professor Newman

Focus on the Future: Opportunities for Sustainability in Western Australia

The Australian Petroleum Production & Exploration Association (APPEA) appreciates the opportunity to comment on the consultation paper for the State Sustainability Strategy for Western Australia.

APPEA supports sustainable development. Our Mission Statement is

> "to achieve a legislative, administrative, economic and social framework which efficiently and effectively facilitates safe, environmentally responsible, socially responsible and profitable oil and gas exploration, development and production."

APPEA makes the following points in regard to sustainable development:

- APPEA does not support the use of subsidies or other non-market mechanisms to achieve sustainable development. APPEA supports market forces as the preferred basis for policy.

- The mix of fuels to be used in the future is one aspect of sustainable development. In the sustainable development debate the impression is usually created that "renewables" are infinite, while fossil fuels are not. Rather renewables are part of the fuel mix. Over time the primary energy fuel mix and the end use mix vary. They are not constant nor are they dependent on a single source. Some renewables are only suitable for electricity and there are sustainable development implications of renewables e.g. the environmental impacts of tidal and biomass and the aesthetic impacts of wind generation. Please see my attached article from the April 2002 edition of APPEA's quarterly magazine, *Flowline*.

- How fuel is produced is another aspect of sustainable development. The role of gas in primary energy supply must be recognised. Australia can expect to be reliant on fossil fuel supplies for its energy needs for the foreseeable future. The attached editorial from a recent edition of *Flowline* sets out APPEA's thinking on the process by which energy policy is being developed in Australia and key points to be addressed.

- Sustainable development must clearly recognise the economic and social benefits of an industry. The petroleum industry's role in the community and its economic and fiscal contribution must be considered. I have attached for your information a copy of a study, commissioned by APPEA, on the impact of the petroleum industry in Western Australia: *Energy for growth*. As

a case study, you might also find useful the work done by the University of Western Australia for Woodside on the economic impact of the North West Shelf project.

Further to discussions at APPEA's meeting with you on 8 April, I have also enclosed a copy of our gas development strategy and crude oil development strategy. These present the upstream petroleum industry's perspective on sustainable development of Australia's oil and gas.

Yours sincerely

Barry Jones
Executive Director

EDITORIAL

SUSTAINABILITY — THE THIRD DIMENSION of energy policy. Having a national energy policy that is both strategic and balanced is a key objective of APPEA. For many months APPEA has been delivering two messages whenever we speak about energy policy. Firstly, energy policy is not just about electricity and gas market reform. Secondly, energy policy must address the issues of Australia's emerging liquid fuels self-sufficiency problem and the need to develop a strategic policy approach to facilitate using more gas.

However, there is a third aspect that is just as critical to developing a strategic and balanced national energy policy, namely ensuring that sustainable development approaches are a key driver of energy supply and use.

As all ministers have said, Australia must have an energy policy that delivers:

1. a reliable energy supply; and
2. a competitively priced energy supply; and
3. one that is produced within a sustainable development framework.

What will the sustainable development debate really be about?

Firstly, let's make it clear what it is not about. Sustainable development in the energy policy context is a much wider issue than a debate about greenhouse emissions. In fact it is not even primarily about greenhouse emissions and this is particularly so at the production of primary energy stage.

Secondly, sustainable development and sustainability are not the same things, but some will seek to see them as the same and in effect only address the latter concept.

Therefore, as the petroleum industry considers this aspect of energy policy, we have to make a complex judgement that has to address three issues:

1. depletion; and
2. the environment; and
3. contribution to the community.

The usual way depletion comes up in the debate is in the context of fossil fuels versus renewable energy. The impression created is that fossil fuels (particularly oil) are running out (and therefore are not sustainable). On the other hand, renewables are infinite (and therefore sustainable). Both aspects of this 'message' are wrong in some respects.

The commodity that the policy has to deal with is energy in all its forms. The various forms of primary energy can be seen as a spectrum – they should not be seen as a set of unconnected silos. Society has been moving backwards and forwards across this spectrum for generations. A thousand years ago we lived in a world where energy mainly came from wind, water and biomass. Today these fuels still exist as part of the fuel mix and are dominant in some parts of the globe. However, for most of the developed world, the dominant

sources of energy are coal, oil, gas and uranium.

As needs change, prices change and technology evolves, both the primary energy fuel mix and the end use mix vary. They are not constant nor are they dependent on a single source. Phrases like ‘the age of coal’ or the ‘age of oil’ or ‘the age of hydrogen’ are grossly misleading.

The environmental aspect of sustainable development has two prongs. On one hand it is about continuous improvement in best commercially practicable environmental management. On the other hand it is about continuous improvement in best practice in relation to energy, production transmission, transformation and end use.

Best practice is not just a single dimension issue. It must address:

- the terrestrial impact of energy supply AND use (issues like the area of land occupied by a wind farm, a mine, an oil field or a hydro dam; site decommissioning and rehabilitation; access to land by vehicles using rehabilitated seismic lines; land clearance for power transmission lines; waste and pollutants from power stations and mines; land loss for roads; radioactive waste disposal; loss of biodiversity due to dams); and
- the marine impact of energy supply AND use (issues like the impact of seismic on whales, drilling near reefs; loss of habitat due to tidal power; oil spills from its transport by and usage in shipping; oil from motor vehicles and industry and tourism in sewerage and waste water discharges; waste water and pollutants from mines and power stations; fertiliser run offs from biomass production); and
- the atmospheric impact of energy supply and use (including issues like the health impacts of smog and particulates; the agricultural and biodiversity impacts of acid rain; greenhouse – differentiating between emissions from energy extraction, transformation and end use; the impact of wind farms on biodiversity).

The concept of continuous improvement is also a vital part of the equation. Environmental management is not a static state science. We are continually seeking to be smarter and better. We are continually seeking to use technology to reduce impacts. This, for example, is why the industry is researching geological sequestration of carbon and studying the impacts of seismic on marine mammals

The difficulty is that, at the end of the day, determining the environmental balance of the fuel mix must be the result of value judgements, some of which are exceedingly politically difficult – after all, most environmental impacts occur at the stage of use of energy by consumers or at the stage where it is being transformed into a form able to be used by consumers. Addressing these impacts is costly. Consumers don't like rising energy prices.

The third aspect of sustainability is community impact. Here a number of issues come into play. Is the energy being produced under a continuous improvement process aimed at best commercially practicable safety management? How are indigenous communities treated? Does the community get a fair return for the use of its resources (eg via royalties, PRRT and company tax)? Are jobs being created? Are new skills and technologies being developed? Does the industry participate in the community via things like sponsorship of sport, the arts and culture? Is community heritage and amenity being maintained?

When one takes such a holistic approach, the oil and gas industry has an enviable track record that goes way beyond statements of principle and motherhood. Look at the role of oil companies in developing new and renewable energy forms. Consider the terrestrial footprint of an oil field versus uranium mine, a wind farm or a dam. Examine our marine record versus the impact on the marine environment of run-off from agriculture and coastal towns and of excessive tourism development. Gas is the least greenhouse intensive of the fossil fuels and the industry has a demonstrated track record of greenhouse gas abatement. Look at the industry's safety record. Consider the industry's role in the community and it's economic and fiscal contribution.

But the track record is not all that has to be considered. The industry will continue to make a major contribution to sustainability into the future.

Barry Jones

Executive Director

Running on empty

Barry Jones, Executive Director of APPEA, believes the current national energy policy is too narrowly focused to cope with Australia's looming indigenous liquid fuels crisis. Failure to broaden the approach will lead to an increasing reliance on imported supplies and missed opportunities to develop an alternative fuels industry based on gas.

Australia is rapidly moving into a liquid fuels self-sufficiency crisis — a problem that will become acute about 2005 and critical by 2010 and be particularly felt in the transport sectors of the economy. *(Figure 1)* Unfortunately, the current national energy debate is too narrowly focused on an attempt to ensure lower electricity prices for eastern States consumers by promoting competition on the EastCoast energy market. Such an approach is doomed to failure and the cost of this failure will be much greater than under investment in electricity generation, transmission infrastructure and the associated risk of supply disruption. Unless governments broaden their approach to energy policy, inevitably Australia will be importing more oil in the future.

However, if that is the intention — in other words, if Australia does plan to adopt an import-dependent supply strategy to meet future transport (and other) fuel requirements — governments have to actively consider a number of issues and assess the likely outcomes.

WHAT OIL SUPPLIES ARE AVAILABLE NOW AND WHERE?

Three facts are clear.

- The majority of available supplies of crude oil and condensate are located in the Middle East and our dependence on this region will increase over time.
- Somewhere between 2020 and 2050 the global crude oil production curve from known sources will have tipped downward to such an extent that a scarcity situation might start to arise that will only partially be offset by higher production of condensates, gas-to-liquids, tar sands, oil from shale and heavy oil.
- The downturn in Australia's domestic production is likely to happen well before the global downturn — *(Figures 2 and 3)*.

WHAT OIL SUPPLIES MIGHT BE AVAILABLE IN THE FUTURE?

In reality the question being asked is when will global scarcity compound the existing decline in Australia's domestic production? In particular:

- When will such a downturn become critical (how far beyond 2015 can it be pushed); and
- How rapid will the downturn be?

It is impossible to make deterministic prognostications about long-term supply of oil, but there are a number of variables that need to be considered.

Firstly, there are the geological issues.

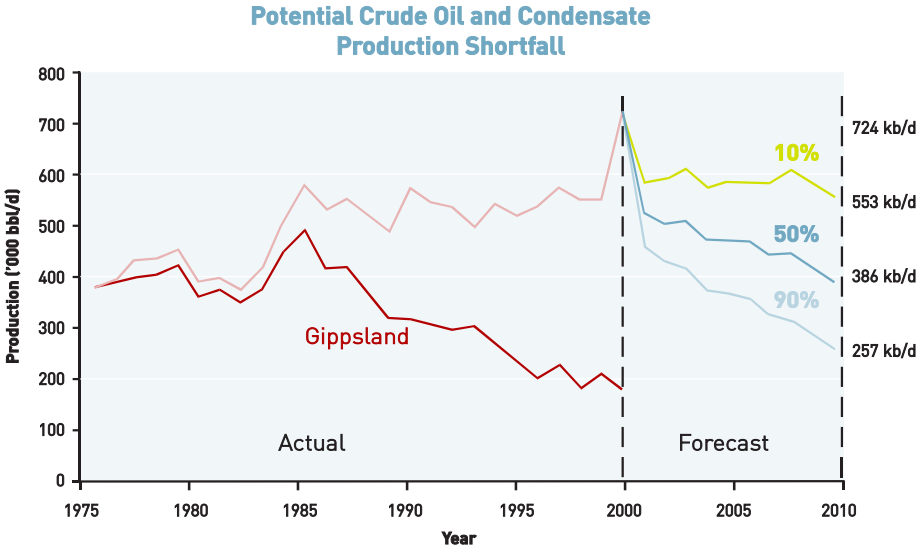
- How much can oil production in the former Soviet Union be revived? When? What are the political and technology preconditions for this to occur?
- How much oil is there in deep water? Where? What are the price technology conditions that will allow its exploitation?
- Are there other sources onshore in the vast tracks of the world (and Australia) that are still relatively unexplored?
- What is the remaining potential in Iraq?

Secondly, there are the technological issues.

- What combination of price, technology and perception factors will see shale oil, heavy oil and tar sands become acceptable and commercial sources of liquids?
- Will a price technology combination arise that will enable tight oil reservoirs to be developed?
- Under what combination of price and technology circumstances will alternative forms of liquid fuels be developed? What impact will gas to liquids technology have by supplying a substitute for diesel? Will a hydrogen economy develop based on natural gas (with CO_2 re-injection) and, if so, what price and technology and infrastructure circumstances are needed?

Thirdly, there are the social issues that will arise, such as:

- Will society always subscribe to the current popular mantra that 'fossil fuels are dirty and bad'?
- Is there a combination of price and technology circumstances that will lead society to change some of



its current production constraints particularly on the environmental side?

Alternatively, will society's environmental values constrain production further (say in the deep water, in rainforest areas or in permafrost)?

WHAT ARE THE RISKS?

Assessment of the risk of relying on imports begins with a look at production/supply and the prevailing perception in this regard is dominated by one factor. The Middle East is regarded as politically unstable hence it is a high risk strategy to import from that region.

While there is certainly some risk of supply disruption from the Middle East, the sweeping nature of this perception is questionable.

In spite of three so called Middle East oil crises, the International Energy Agency has never reached the trigger point for activating its emergency supply measure arrangements.

In recent times one could speculate that OPEC has in fact been a stabilising factor in relation to oil prices and has acted to actually provide global economic stimulus.

Many of the governments in the Middle East have been in power longer than their so-called 'stable' counterparts in the developed world.

Questions of political instability can be equally leveled at the Central Asian and Caspian regions, along with parts of north and west Africa. In Australia we might need to consider the so called 'arc of instability' to our north and what that might mean for supply reliability risk assessment in a world of imports of crude oil from PNG, Indonesia, Vietnam and products from Singapore.

What's more, production/supply risk is not only a judgement about political stability at the production point. The notion of an 'arc of instability' to the north of Australia means we need to take a realistic look at the vulnerability of both our crude and our product supply routes.

In addition, an assessment of risk needs to consider some domestic political factors. For instance, the economy does not take kindly to energy supply disruptions. At the end of the day our foreign and defence policies depend on having access to reliable supplies of transport fuels. What is the trade-off between national security and the risk of supply disruption?

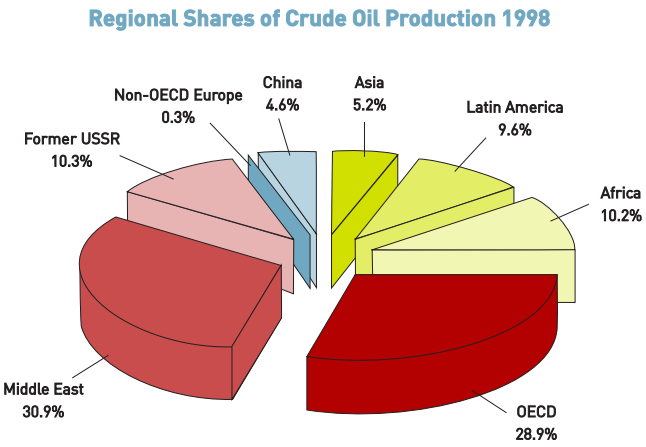
Finally, risk assessment is not just a matter of how much primary energy (crude oil) a country is importing. The state of the national refining industry is also a critical factor. The risk factor increases the more a country has to rely on imported petroleum products as well as imported crude oil.

However the deliberations cannot end there. Australian policy makers must realize there is more to consideration of the future of liquid fuels than just looking at the availability of imports, the potential sources and the associated risks.

There are three further issues to be addressed.

CAN AUSTRALIA FIND MORE INDIGENOUS OIL?

For a relatively small group of countries the capacity to produce liquids at home can reduce reliance on imports



and it is a realistic policy option. Australia is one, but the option needs to be considered as a matter of urgency because domestic production downturn is likely to occur in the next three to five years. It is vital that we make new greenfield oil discoveries.

To do that there must be adequate funding for pre-competitive research in Australia in bodies like the Australian Geological Survey Organisation/Geoscience Australia, State geological surveys, CSIRO and universities. Instead we are facing a funding and a student interest crisis in the petroleum-related earth sciences.

We need to have a sensible regulatory system governing access to resources for petroleum exploration and production. Instead, because of native title legislation, environmental perceptions and processes, cultural heritage perceptions and processes and the nature of our federal system, we have created an approvals regime which is costly, time consuming, duplicative and uncoordinated.

And, because of our fixation with the economic theory, we have created a taxation system that discriminates against investment in Australia in oil and gas production and supply infrastructure.

In short, Australian governments have set in place policies that have partly created the self-sufficiency crisis we are facing.

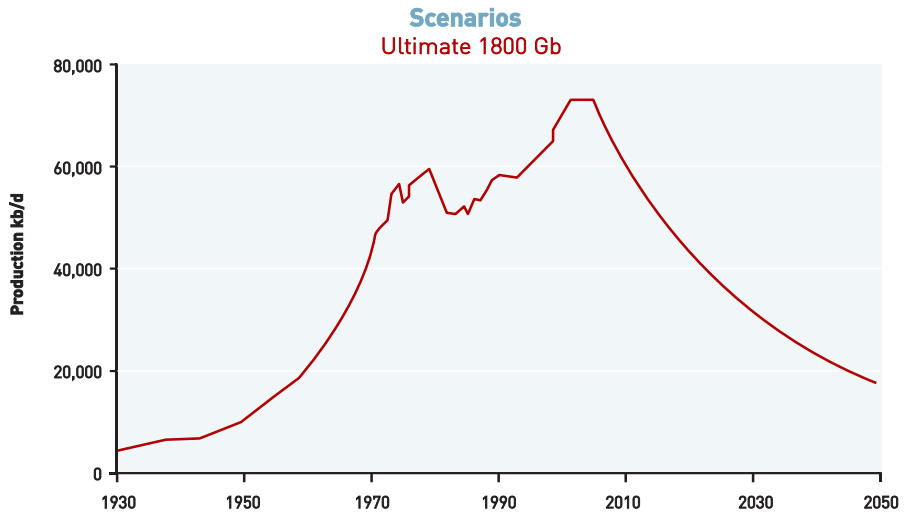
CAN ALTERNATIVE FUELS/SOURCES OF ENERGY BE DEVELOPED?

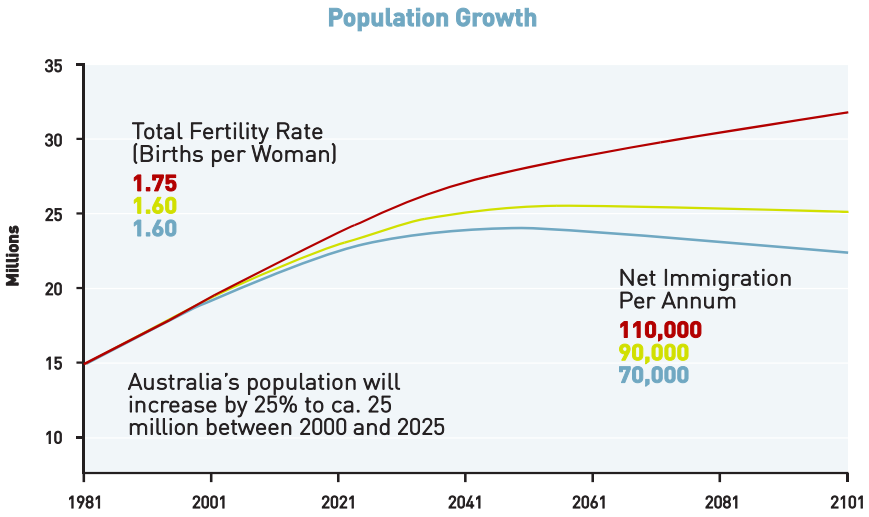
Energy is a service. No one really cares where it comes from so long as it is supplied reliably at a reasonable price. Society's love affair is not with oil but with a transportation system that gives it mobility and leisure time.

There are a number of hydrocarbon and non-hydrocarbon options for the future, including gas-to-liquids, gas-to-hydrogen, increased use of LPG and CNG, solar and electric powered vehicles and development of fuel cells. All revolve around price/technology equations.

The other critical issue in relation to alternative fuels and their likely impact on the future for liquid hydrocarbons is the matter of timing. The likelihood is that if we want a significant supply side impact, we are looking at a time frame for these fuel sources in the period 2010 to 2020. For the world, this is probably an acceptable schedule. For Australia, given the fact that its fuel supply crisis is well in advance of the rest of the world, the benefits are more problematic.

That does not mean we should ignore these industries. The real question is whether we in Australia see these





technologies as new driver industries for the country's future or whether we will sit complacently by and be followers. If we want to be market leaders, we need to move now. We have abundant supplies of energy and we should use the comparative advantage.

WILL DEMAND CHANGE?

Consideration has to be given to a range of factors.

Firstly there is the issue of population growth. Will population growth rates in Asia slow as economic growth advances and living standards improve? Will slowing of population growth rates and the ageing of the population in the developed world see different consumption patterns?

Will technology change demand? Will new combustion technologies and new metals technologies change dramatically the fuel consumption of motor vehicles? Will new pulse technologies change demand for fuel in direct heating and pumps?

Will we see a resurgence of construction of public transport or changed urban settlement patterns that will significantly change demand?

Will tastes/values change? Does the advent of information technologies presage a change in transportation habits and recreation needs?

Will infrastructure development in Asia change the demand for kerosene as a fuel for cooking and lighting? How long can fuel subsidies continue in parts of Asia?

CONCLUSION

The world of 2020 will not be the world of 2001. Changes will occur that are just as dramatic as those that occurred between 1980 and 2000.

It is entirely possible that we are moving to a global liquid hydrocarbons scarcity. New forms of liquid hydrocarbons will become commercially viable. Alternative fuels, some based on gas and some on non-hydrocarbon energy sources, will be developed. Technology will change. Values will change. Population levels and distribution patterns will change. Settlement patterns will change. Price responses will occur.

To meet and incorporate these changes governments must have a strategic vision for energy supply and demand — particularly its hydrocarbon component. Policy must be tackled on a broad front. There must be:

- A drive to enhance the oil exploration and development effort in Australia;
- The development of appropriate gas infrastructure, including new production projects, the further development of the LNG industry and the construction of additional gas transmission infrastructure;
- The commencement of a major R&D effort focusing on energy efficiency and development of new transport fuels, including gas-to-liquids and gas-to-hydrogen; and
- Further development of public transport infrastructure.

The future calls for more than simply tinkering on the edge of energy market reform.