# Inquiry into Australia's Oil Refinery Industry

A Submission from Eriks Velins

*Question 1. Identify the current international and domestic trends and pressures impacting on the competitiveness of Australia's domestic oil refineries.*

Response 1

Global overview. Australia's locally refined product shortfall in 2011 was some 0.3 million b/d, which will become some 0.5 million b/d when 2 more refineries cease operations in the coming years. Its 4 major oil companies optimise their local supply requirements in the context of their regional supply and demand. There is adequate global crude oil supply availability plus some 2 to 3 million b/d spare production capacity, mostly in Saudi Arabia and Kuwait. There is an additional 2 million b/d crude production capacity held up by various short term local causes such as strikes or civil wars. The largest, and hence the lowest cost refineries in the region, are in the range of 0.5 to 1.5 million b/d capacity. There is some 2.0 million b/d product capacity in regional refineries in excess of local demand. Much of that could be available for exports. The greatest surplus is in China with 1.1 million b/d, followed by South Korea with 0.4 million b/d and India with 0.3 million b/d. Most refineries can meet Australian product specifications, EURO 4 for gasoline and EURO 5 for diesel.

Summary: There would appear to be ample competitive surplus refining capacity for the medium term in the region to meet Australia's expected requirements for imported fuel.

Changing global demand. Demand growth is being driven by non-OECD countries, 2.8% 2011/2010, dominated by China with 5.5%, India 3.9% and Saudi Arabia 3.7%. In contrast, demand in the OECD countries declined by 1.2%. Demand growth is linked to economic growth. This pattern is expected to continue, albeit at a slower rate.

At the same time, some 25% of global consumption of petroleum fuels is being subsidised, mostly in producer countries by their governments, thus ensuring greater demand than would otherwise be the case. Some countries, such as China, India and Indonesia, have tried to reduce these subsidies due to other economic priorities but have not found that to be a simple process.

Several countries have introduced mandatory biofuels' content as well as encouraged alternative fuels which, in a global context have had, and will have, little impact. Mandatory fleet fuel efficiency targets could have a greater impact.

Summary: Global demand for petroleum fuels is expected to continue, though demand growth will vary from time to time as a function of economic growth. There is potential for the demand to fall significantly in highly subsidised countries when those subsidies are removed and if demand for electric vehicles and alternative fuels - biofuels, LPG or CNG, takes off.

Changing global supply. Conventional crude oil production peaked around 2006. Demand growth since then has been met from condensate (associated with production of natural gas), Venezuelan heavy oil from the Orinoco Belt, Canadian tar sands and deepwater oil. BP's Statistical Review of World Energy 2012 indicated that oil reserves have grown from 1267 billion bbls at the end of 2001 to 1653 billion bbls at the end of 2011. This would result in a reserves/production ratio of 54 years.

One must question the accuracy of these figures. Firstly, it is no longer certain that all reserves are reported at the P90 level, the quality standard for statutory accounts and hence may be overstated. Secondly, 'crude oil' now includes tar sands, heavy oil, condensates and LPG, thereby inflating the 'conventional' reserves. (Australia overstates its 'reserves' by a factor of four, for example, by including condensates and LPG).

These incremental crude supplies cost more to produce and to process than conventional crude oil. Hence a period of structural cost increases has begun. In the longer term, petroleum fuels will also be made from natural gas (as by the Pearl project in Qatar) or from coal (as by Sasol in South Africa), further exacerbating cost increases but assuring supply of fuels.

Summary: The era of cheap fuel is over, as incremental supply will include heavy oils and tar sands, later to be followed by synthetic crude oils from natural gas and coal. The commercial challenge for oil companies is to continue to gain access to OPEC's resources and for governments to manage the politically unpopular cost increases.

Local overview. Domestic petroleum product prices are set relative to import parity for particular product specifications, which then determine refinery economics. This practice has ensured that Australia receives globally competitive fuel supply. Due to low excise, Australia has the fourth cheapest gasoline and diesel price in the OECD. That has provided little incentive for consumers to change to more fuel efficient vehicles, as a result of which Australia has a relatively inefficient vehicle fleet and an unsustainable heavily subsidised motor vehicle manufacturing industry. The refineries, albeit debottlenecked and upgraded to meet new product specifications, have grown old, with no longer an ability to reach globally competitive economies of scale due to the low growth in local demand and an inability to compete in the major product export markets.

Summary: The benefits obtained from a market driven industry will be retained when the market continues to determine the future of Australia's remaining refineries.

Changing local demand. Due to the long mining boom, now nearing its end, fuel demand grew by 5.7% during 2011/2010 but longer term expectations will now be more heavily influenced by general economic growth and are likely to remain modest. Australia has a distorted market barrel due to the rapid growth in demand for diesel. Such demand can only be met with imports, unless Australian refineries build hydrocrackers, for which there is no economic case.

Summary: The regional market is dominated by diesel, the Australian market by gasoline, albeit with diesel demand growing rapidly. Australia is in an excellent position to take advantage of 'cheap' regional gasoline whilst still being able to cover its diesel shortfall. Independents are able to exploit short term market weaknesses and this regional market imbalance will continue to place enormous pressures on local refineries.

Changing local supply. Local crude oil supply peaked around 2000 and is now in rapid decline. Hence the growing reliance on imported crude oils and feedstocks. At its peak, Australia had 10 major refineries, including 4 luboil plants, plus several tiny ones, but today only 7, and within several years, no more than 5. Individual refinery capacity is somewhat over 100,000 b/d, a small fraction of the size of regional exporters. Furthermore, Australian refineries have shallow berths and hence are

unable to use large crude oil tankers, thereby paying more for crude oil freight than regional suppliers.

When these refineries were built in the 50's and 60's, subject to a small tariff in the early years, they were of global scale protected by geography, by the crude oil/product freight differential (later by even lower crude pipeline charges) and by local product specifications. They have lost that competitiveness today. We are witnessing the end of an era, particularly as regards availability of indigenous crude oil.

As the existing industry declines, is there a case for a new industry? A refinery with a capacity of some 500,000 b/d would be able to retain viability in the medium term. That is roughly half the current total demand. Will that demand grow or decline? There are two options for a revitalised industry:

1. Replace the remaining 5 refineries with one or two new 500,000 b/d industry based refineries located at deepwater sites with facilities to meet the distorted local demand and designed to process imported crude oils and feedstocks. Long term supply agreements would be required with one or two state owned producers. Such an arrangement would create additional product distribution costs and become a factor in the investment decision, as would the management of all other risks associated with an investment at this stage of the oil industry cycle. It is not at all certain that the industry would agree to such a concept.
2. Build two natural gas fed GTL refineries in NW Australia (the Pearl model) to ensure Australia has at least some 250,000 b/d supply of indigenous diesel. That could be supplemented by one simpler 500,000 b/d crude oil refinery and some imports. Given the unproven economics of GTL, a risk sharing arrangement would need to be made with the government. This concept would provide a stable long term structure.

Summary: The current refining industry is in terminal decline. A new refining industry could emerge from the remains of the present one based on risk sharing with the government.

*Question 2. Investigate the impact of declining refinery capacity in Australia on the economy. This should include analysis of :*

*a) current supply chains and their effectiveness in meeting Australia's liquid fuel requirements;*

Response 2

Australia has enjoyed a long period of stable supply of petroleum fuels with adequate investment to meet growing demand, which has only being interrupted locally by the occasional local strike. One recent major incident, the closure of Clyde refinery for a number of months, did not cause any supply disruptions or price spikes.

Summary: The present supply chains, a mixture of own refining and crude and product imports/crude and product exports, are safe, secure and reliable and supply fuels at the lowest cost.

*b) import price outcomes for consumers from current price arrangements;*

The current government fuel pricing policy has ensured that consumers can obtain some of the OECD's cheapest petroleum fuels and marketing margins have been adequate to justify investment

of capital to provide for growth. Furthermore, EURO 4 gasoline and EURO 5 diesel product quality standards have enabled consumers to purchase state-of-the-art gasoline and diesel engine vehicles. However, this competitive market has resulted in half the refineries either being closed or being in the process of closing down. Some 5 local vehicle manufacturers have closed down too.

Summary: The befits of a free market have been disproportionally gained by the consumers at the expense of the producers.

*c) direct and indirect employment impacts;*

Reduction in employment started once protective tariffs were removed in the early 1960s. The next waves of change came in the late 1960s when mandatory processing of Gippsland crude oil commenced, as most refiners then lost the upstream margin from their own fields overseas which had propped up their downstream (refining, distribution and marketing) operations. Changed maintenance processes and the move to centralised control rooms, automated analytical instruments and the use of process control computers in early 1990s resulted in further reductions in staff.

Capital investment and use of more productive and skilled staff has been an ongoing aspect of this industry since its beginnings. Labour costs represent a relatively small proportion of total costs, inventory (working capital) costs, capital charges and energy costs being the largest. Much of the maintenance work has now been outsourced.

Summary: Optimisation of labour resources and capital investment has enabled the refining industry to compete with prices for its products set at 'import parity'.

*d) any relevant information on the impact of the closure of Australian refineries, including on downstream activities.*

Oil refineries once provided chemical (and mechanical and electrical) engineers with challenging career opportunities, not only in Australia but overseas, as well as creating national wealth. Those opportunities have largely gone, thereby reducing the incentive to study chemical engineering. Many of the petrochemical plants associated with oil refineries and the luboil plants have gone too. New opportunities have arisen in the upstream oil industry, natural gas production and LNG manufacturing and, in a few cases, in minerals processing. It is not yet evident that the changes have produced a net gain.

Summary: The changing manufacturing sector has reduced opportunities for chemical engineers, in particular, thereby reducing incentives for engineers, in general.

*Question 3. Identify any potential issues for Australia's energy security from possible further closures of oil refinery capacity, noting the findings of the National Energy Security Assessment (December 2011)*

Response 3

It is not evident that closure of one more or one less refinery can have a material effect upon Australia's energy security, for market forces will determine that outcome. The question is whether a local refinery industry, or a local oil industry, can give Australia added 'energy security'.

There is no incentive for any oil company to invest in expansion of its refinery, as that can never be large enough to gain economies of scale. Nor is there any incentive for a company to build a new refinery. The only two options for an industry in the future were noted in Response 1.

The best government support for the next version of the industry would be to remove all imposts arising from its policies e.g. improve labour flexibility and productivity, review taxation, reduce local shipping costs, reduce sovereign risk, revert to the use of commercial energy etc. In the meantime, more closures are inevitable, the only issue being their timing. That would also clarify the structure of the industry from which it then could evolve. In the meantime, Australia will rely on growing imports for its fuel needs.

As far as short term security is concerned, Australia continues to fail to meet its obligations as a member of the IEA, i.e. there is no strategic storage of crude oil. Nor does the ADF have any strategic stocks for defence purposes. Australian governments have decided that this was an acceptable risk. It would not be reasonable to expect any IEA member to come to Australia's assistance if Australia itself has decided that it does not need to comply with the requirements of membership.

The present system seems to be able to handle domestic disruptions to supply, see Response 2.

There are two possible other issues. The first issue would occur with the Australian exchange rate returning to its long term trend, say 0.7. In such a case, the present crude oil price would rapidly increase by some 30 c/l, thereby triggering panic in political circles and growth in demand for public transport in Sydney and Melbourne with which their run down systems could not cope.

The second issue would be an 'incident' in the Middle East which would disrupt supplies of crude oil and feedstocks to this region. As Australia has neither crude oil nor product carriers, some time may elapse before the appropriate additional vessels could be secured. In such an event, product carriers would also be in very short supply. Clearly, the fewer the refineries, the greater the loss of flexibility in sourcing their crude oils and feedstocks and the higher the risk of a disruption.

Summary: Australia remains vulnerable to major supply interruptions due to lack of strategic storage and stocks and to an inability to access sudden additional requirements for crude oil and products due to lack of Australian flag crude and product carriers. Australia's exchange rate could depreciate rapidly causing economic disruption due to an inability to cope with large spikes in fuel prices.

*Question 4. Consider the implications of refinery closures on associated workforce, including age profile, alternative employment opportunities and labour force mobility.*

Response 4

Currently at least 5 new LNG plants could become operational in the next few years and over 1300 staff will be needed to operate them. Some of them may come from the construction workforce, some will be expatriates and others will be FIFO. Oil refining skills are readily transferrable to these plants. The issue is whether staff would like to work in these plants and in those locations. That really is up to the individual. In the context of Australia's workforce, the above numbers are insignificant and so is the issue.

Summary: Refinery closures will be able to provide a large proportion of the staff for the new LNG plants now under construction, thereby removing another potential bottleneck and cost over-run.

*9th November, 2012*