

THE FUTURE OF CLYDE REFINERY

Shell's Clyde refinery: proposed closure and use as an
import-only terminal



*A report to CFMEU
Mining & Energy
and AMWU*

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Strategic Economics and SGS Economics and Planning

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Preface

This report has been prepared with support and inputs from CFMEU and AMWU delegates at Shell's Clyde Refinery and Gore Bay terminal. In particular, the report draws on the knowledge and experience of:

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Under the terms of the Enterprise Agreement between Shell Refining (Australia) Pty Ltd and the CFMEU, the company has agreed to consult with the unions and their workforce in relation to any major decision associated with the future of the plant. Much of the information requested from Shell to undertake a detailed investigation for this project was not made available to the consultant team. Company representatives met with the project team on a number of occasions but declined to provide systematic quantified analysis which would enable the "Case for Change" to be subject to a rigorous and independent appraisal. The company considers it commercial-in-confidence. Further, the fact that Shell is unlisted on the Australian Stock Exchange creates challenges in obtaining data regarding the performance and profitability of the company's refineries. Shell representatives, however, agreed to meet with the consulting team on a number of occasions, and have verbally elaborated on their "Case for Change" presentation, which makes to cease refining at Clyde and the convert the facility into an Import-Only Terminal. We would like to thank Steve Burger, Tony Paul, Michael Pope, Dennis Skinner and Heidi McSweeney.

The overall report was prepared by Strategic Economics. SGS Economics and Planning drafted Section 7.

Executive summary

Shell Refining (Australia) Pty Ltd. has put a case to cease refining at Clyde and to convert the facility into an Import-Only Terminal. Under the Enterprise Agreement between Shell and the Construction Forestry Mining and Energy Union, the parties agree to consult prior to any major decision about the future of the refinery. This report is a response to the Shell “Case for Change”.

Based on analysis from the Australian Competition and Consumers Commission (ACCC) and published information on profitability and costs from Caltex, it would appear that the integrated margins of the Australian downstream operations are highly profitable. While Shell has not reported publicly on the profitability of its refinery operations, the company has reported positive margins over the past decade, with the exception of a period when the refinery was shutdown in 2009. It is also noted that Shell has acknowledged the recent positive outcomes in the refinery margin at Clyde. But for Shell the good news stops there. The company has put forward a case that over the next 10 years, due to the growth of new refinery capacity in the Asia-Pacific, refinery margins at Clyde are expected to be unsatisfactory.

This report doesn't accept the proposition that the growth of excess supply capacity in Asia-Pacific region will devastate the refinery margins of Australian refiners. Excess supply is expected to slowly decline in the region due to the expected high growth rates of product demand over the medium-long term. No evidence has been provided that to support the proposition that the refinery needs to close urgently.

The proposition put by Shell that local refinery margins are too low is not universally shared. The Australian Competition and Consumer Commission, which has been closely monitoring industry profitability and performance in the Australian refining industry, finds the return on assets for the refining industry to be higher than that of the ASX200, and about the average of most manufacturing.

Shell's only competitor in Sydney, Caltex, the Australian market leader, believes that all of the existing Australian refineries can be made more efficient. Unlike Shell, Caltex is a publicly listed company and highlights the strength of its downstream operations and initiatives it is taking to improve the efficiency of its refineries.

There are risks for Sydney and Australia from a further reduction in refining capacity. The economic impacts including the loss of highly skilled jobs are likely to be significant. The report estimates the conversion of Clyde to an Import-Only Terminal will result in employment losses of 1,700 jobs and a net reduction in output of \$187 million. Further, a reduction of refining capacity in Sydney, Australia's largest market, could make it more difficult to obtain Australian grade fuels, resulting in an increase in premiums for Australian grade fuel. It is important to emphasise that the Clyde Refinery is not in the same position as the Port Stanvac refinery in Adelaide, which was mothballed in 2003. Clyde is centrally located in a large and growing market segment, growing at well above OECD average. The Clyde Refinery is located at the geographical core of Sydney and the Greater Metropolitan Region (GMR), Australia's largest urban region. The company owns and supports major infrastructure assets including a jet fuel pipeline, which is linked to Sydney Airport, and is strategically integrated into Sydney's other petroleum pipelines, road and rail infrastructure networks. The GMR, unlike many other OECD cities, continues to experience strong growth. Clyde is located in Parramatta, which services the rapidly growing Western Sydney region. Government population

projections indicate that the population of Western Sydney is forecast to increase from around the current 2 million people to 3 million by 2036. The growth in demand for jet fuel at Sydney Airport, which accommodates around 50% of all flights into and out of Australia, is growing rapidly and represents a significant opportunity for a competitive market. Finally, the resource boom in the Hunter region is one of the factors driving strong growth for diesel. The report makes the case for developing Clyde as a major energy and transport fuels hub for NSW linked to complementary petrochemical industries to capture new and changing market opportunities.

All parties agree “business as usual” is not an option. A number of recommendations, detailed in Section 10, are put forward on the basis of maintaining a profitable and efficient refining operation at Clyde. In summary it is recommended that:

- 1 The Unions approach the Board of Shell Australia Ltd. with a proposal to work together to establish a joint Efficiency and Innovation Improvement Working Group, with the objective of implementing initiatives to, inter alia, improve utilisation of the cat cracker and other processing units, achieve reductions in cost and improve technological innovation.
- 2 The Unions approach the Board of Shell Australia Ltd. with a proposal to establish a major Scenario-Base Planning Project, using Shell’s global best practice methodology to enable a substantive and more transparent process to evaluate future options. The project should consider four scenarios:
 - S1 Current Trends Scenario
 - S2 Strategic Efficiency and Productivity Initiative Scenario
 - S3 Import-Only Terminal Scenario
 - S4 Sydney Fuel and Energy Centre Scenario
- 3 The Unions approach the NSW Government with a request to obtain summary expert advice on the realistic prospects of an international mid-tier refining company acquiring the Clyde Refinery from Shell as a going concern.
- 4 In the event of the confirmation of Shell’s decision to close the Clyde refinery, it is recommended that the Unions take the following actions:
 - Approach the NSW Government with a request to prepare an expert summary proposal for a competitive open-access oil industry infrastructure policy framework.
 - Request the NSW Government to initiate a Public Inquiry into the future of Sydney’s refining and wholesale assets, and bring together major state agencies concerned with planning, infrastructure, industry and trade and competition policy, to adopt a “whole of government approach” to increase competition, research and innovation and investment in the downstream petroleum and advanced biofuels industry.
 - Seek the agreement from the NSW Government for a consultation with key industry stakeholders with respect to the adoption of oil industry infrastructure access policy framework.

- Seek the support of Parramatta Council and neighbouring councils, petroleum consumers and local industry for the adoption of an effective oil industry infrastructure access policy framework to enhance investment and employment in Western Sydney.
- 5 The Unions approach Parramatta City Council and the NSW Government to designate Clyde, with its central location and infrastructure networks, as a strategic transport fuel hub for Sydney and NSW, and to prepare planning instruments to reinforce this role.
 - 6 In the event that Shell confirms its intention to close refining operations at Clyde, it is recommended that the Unions approach the NSW Government, emphasising the potential economic, social and environmental costs for Sydney and NSW associated with the closure of the refinery and the importance of retaining and developing the site for transport fuels refining and distribution.
 - 7 In the event that Shell confirms its intention to close Clyde, it is recommended that the Unions, perhaps with the support of Parramatta City Council, CSIRO and organisations such as the Biofuels Association of Australia, work together and lobby to get support to increase competitive access for new investors to the site to enhance broader economic, social and environmental goals. In particular the group should seek to identify prospective credible businesses which could become the nucleus of a bio-fuel technology hub in the Clyde precinct. If a viable grouping of companies can be identified, an action plan should then be identified to facilitate the establishment of the bio-fuel technology hub in the Clyde precinct with business and Government support.

1 Setting the scene

1.1 Background

Shell Refining (Australia) Pty Ltd has put forward a proposition to cease refining at Clyde and to convert the facility into an Import-Only Terminal. The company has stated that it has not made a final decision and will only do so after consulting with the workforce and their representatives. Under the Enterprise Agreement between Shell and the Construction Forestry Mining and Energy Union (CFMEU), the company is committed to genuinely consult with the union prior to making substantial changes to refining operations.

The implications are potentially severe and hence all parties want to be sure that the decision to cease refining is the correct one. The current refinery employs around 570 operators and maintenance workers, whilst the Import-Only Terminal will require up to 80 workers.

To examine options, CFMEU Mining and Energy and the Australian Manufacturing Workers Union (AMWU) commissioned Strategic Economics to evaluate the proposal to cease refining and convert Clyde into an Import Only Terminal. The report looks at four issues:

- The viability of the Clyde facility
- Economic and social impacts of closure
- Broader public interest concerns
- Alternative options

The Clyde oil refinery, along with its counterpart in Geelong, is owned by Shell Australia Limited, an unlisted public company that is a subsidiary of the Royal Dutch Shell plc. The company has a strong position in a highly concentrated industry, with the two refineries producing around a quarter of Australia's petroleum products including petrol, liquefied petroleum gas (LPG), diesel, aviation fuel, propylene, solvents and bitumen. It is a major supplier of petroleum products to households and transportation, mining, agricultural and manufacturing sectors. Shell Australia also has major interests in Australian resource industries. The company employs around 2,500 people in Australia.

Shell is one of a handful of integrated oil companies (IOCs). Four of these IOCs: BP, Caltex (which is owned 50% by Chevron), ExxonMobil and Shell own Australia's 7 operational oil refineries. Shell has a long history of involvement in Australia's downstream petroleum industry, with refining linked to a national wholesale and distribution network and retail outlets. Since 2003, Shell has rationalised its 900 retail outlets, entering into an arrangement with Coles Express to operate 600 service stations, while another 300 hundred are owned and operated by independents.

Shell is a major player in Australia's minerals and energy industries, and, consistent with its global strategy, the company has shifted its priorities to upstream exploration and production activities, most notably with its major gas interests in North Western Australia.

1.2 Refinery economics

Before looking at the Clyde specific issues in more detail, it is important to look at what drives investment, employment, profitability and locational decision in the refining industry.

Oil refineries, by taking crude oil and processing into marketable petroleum products, are central to the petroleum industry supply chain. In the short term, the factors driving investment, prices and profitability in crude oil and petroleum product markets are different but interrelated. They both operate in global markets. The major participants in the petroleum industry, integrated oil companies such as Shell, are involved in all stages of the supply chain, and periodically they shift their priorities between different elements of the supply chain. Currently, Shell is shifting its investment priorities towards upstream exploration and production of hard-to-get oil reserves and other sources of energy such as Liquid Natural Gas. Refinery capacity, however, either owned or associated with the integrated oil companies, is critical to getting petroleum products into the market.

A key indicator used to assess viability of and investment in the Clyde Refinery is the Refiner Margin. For Shell in Australia, the Refiner Margin is the difference between the cost of importing a representative suite of petroleum products to eastern Australia, including additional freight costs and a premium for products to meet Australian requirements) and the cost of importing the crude oil required to refine these products locally. The calculation is based on average Singapore refiner margin + product quality premium + crude discount / (premium) + product freight – crude freight - yield loss. The proposition is that if the net cost of importing is lower than domestic refinery, then an Import-Only Terminal would be a better option than maintaining Clyde as a refinery operation.

Another key indicator is refinery utilisation, which is defined as the ratio of the total amount of crude oil, unfinished oils, and natural gas plant liquids run through crude oil distillation units to the operable capacity of these units. For a refiner, the higher the capacity utilisation means higher throughput associated with expensive fixed plant and hence the higher the potential gross margin. One of Shell's propositions is that Clyde's utilisation rates, either simple or complex utilisation, are too low. This has increased the marginal operating costs of the refinery. There are a number of reasons why utilisation rates have tended to be low.

Firstly, there is constraint on what the refinery can produce, particularly high demand diesel and jet fuel.

Secondly, Clyde has experienced downtime over the past decade, including shutdowns to make product modifications to meet Australian fuel standards and a major intervention in from December 2008 to July 2009 when the plant was not operating.

Thirdly, supply/demand imbalances in the Asia-Pacific region, associated with over-supply of new capacity, has intensified competition and depressed ex-refinery prices. In fact, surplus capacity—the difference between refining capacity and petroleum products demand—in the Asia Pacific nearly doubled from 1,908 kb/d in 2008 to 3,556 kb/d in 2009 and then dropped to 2,804 kb/d in 2010.

There is a direct link between the sunk investments, the capacity of the investments, demand in the market and utilisation. These linkages tend to drive refinery margins that are available in the region.

The refining industry is traditionally a low margin business. For many years, the integrated oil companies have not been major investors in new refining capacity in developed economies because margins are lower than other parts of their business. On the other hand, they need refinery capacity to maximize profits across the supply chain and hence the close relationship between domestic refining, distribution and retail outlets.

One major response to low profitability and gross margins has been to focus on continuous plant improvement, automation and cost cutting. The successful refineries put a lot of resources into cost cutting. For example, “refineries achieved reduced per barrel and distillation and operational costs by one third over the period 1991-2000¹”. The integrated oil companies have shifted value added management with greater attention to the profitability of specific units and cost centres. In addition to cost cutting and changes in management approaches, refineries have had to invest to meet tighter product specifications resulting from fuel quality legislation. This doesn’t always hurt profitability because it can create niche markets for refineries to exploit. They have also had to make new investments to meet changing demand patterns – gasoline stable, diesel, jet fuel growing rapidly. In general, refineries have not responded adequately to changing demand, including in Australia. Following periods of low margins this is somewhat understandable, and accessing finance is a challenge. On the other hand, new investments to meet changes in market demand have been a key to the success of refineries in OECD countries. Those that invested benefit from higher profits.

Although it is generally a low margin business, refining is also a cyclical business. Since the early 2000's, gross margins of Australian refineries have improved significantly, with the exception of a two year period partly associated with the intervention and the Global Financial Crisis. Caltex, in its submission to the Energy White paper and annual reports, emphasises that refining is a competitive low margin business and margins have been improving. Shell has produced time series for this project to show that gross margins at the Clyde Refinery have been positive for the past 10 years, with the exception of the period of the intervention, which coincided with the GFC. Shell also notes the significant improvement in gross margins since the intervention, and the cooperation of management and workers that produced this positive outcome.

Some of the relevant characteristics of investment and operation of viable refineries include:

- Large scale, long life and lumpy investments,
- New refinery capacity and plant modifications require lengthy and detailed planning and complicated financing,
- High fixed cost and low variable costs, giving economies of scale advantages to large refineries because the more they produce the lower the average costs per barrel,
- Capital and technologically intensive and high fixed costs of maintenance,
- Generation of environmental and health and safety impacts that need to be carefully managed,

¹ Peterson D.J. and Mahnovski S. (2003), **New forces at work in refining – industry views on critical business and operations trends**, Sanata Monica, USA: RAND science and technology.

- High remediation costs in the event of closure,
- A high skilled workforce with complex management, engineering, operating and maintenance skills,
- Adaptable and sufficiently complex to meet changing product demand and regulatory requirements, and
- Closure and decommissioning has become extremely difficult because of strict environmental regulations.

2 The Australian refining industry

2.1 Refining participants location and capacity

Australia's seven petroleum refineries are owned by four of the major international oil companies - Shell, ExxonMobil, BP and Caltex. The nameplate capacity, ownership and location of each are as follows:

Refinery	Company, location	Capacity ML pa
Bulwer Island	BP Brisbane	5,910
Lytton	Caltex Brisbane	6,300
Clyde	Shell Sydney	4,740
Kurnell	Caltex Sydney	7,810
Altona	Exxon Mobil Melbourne	4,640
Geelong	Shell Geelong	6,530
Kwinana	BP Kwinana	8,280
Total		44,210

Source: Australian Institute of Petroleum

The principal product out-turn on a state by state basis of the Australian oil refining industry is indicated below:

Location	Petrol	Diesel	Jet fuel	Lubes, solvents, other	Total
	ML	ML	ML	ML	ML
Sydney	4,633	2,491	1,281	n/a	8,405
Melbourne/ Geelong	4,978	3,582	1,298	672	10,530
Brisbane	3,955	4,436	1,428	527	10,345
Perth	3,139	2,409	657	1,095	7,300
Total	16,705	12,918	4,664	2,294	36,581

Source: ACIL Tasman 2009

According to the Australian Institute of Petroleum, total capacity at Australian refineries has increased slightly in recent years. Total capacity is now estimated to be 44,210 ML pa, an increase of 3.5 per cent since 2006–07. The most notable increase in capacity occurred at the BP refinery in Bulwer Island, Brisbane, where capacity has increased by 15.5 per cent to 5,910 ML pa. Capacities at the Shell refineries at Geelong and Clyde have been reduced marginally in order to improve reliability.

2.2 Evolution of the Australian refining system

The Clyde Refinery along with the other domestic refineries were established and expanded in Australia in an era of the international oil industry in which the major international oil companies had substantially vertically-integrated operations from the wellhead to the bowser, and crude and product shipping economics favored locating refineries close to growing consuming product markets. This resulted in a stable Australian refining system from the 1950s to the 1990s, in which the dominant market shares of each of the four principal refiner-marketers closely corresponded with their respective domestic refining capacity.

Until the 1980s, this Australian national refining system was underpinned by a structure of uniform regulated maximum wholesale prices - under various forms of price regulation and surveillance by the Australian Competition and Consumer Commission (ACCC) and its predecessors in the Commonwealth from 1975, and prior to that by the respective state-based authorities. The national ex-refinery supply system was also underpinned in the earlier years by the "compulsory absorption" of indigenous crude oil production also at regulated prices; ex-refinery like and unlike product exchanges between the refiner-marketers to supply their respective wholesale marketing networks in states in which they had no equity refining capacity; and, by a system of cooperative coastal shipping of indigenous crude and products by the refiner-marketers on a cooperative basis which was coordinated by the Commonwealth Government.

In the context of the emergence of OPEC from 1973, and reflecting the ensuing restructuring of the international oil market in the 1970s and 1980s, the stable regulated national refining system in Australia gradually broke down. Associated with this process there was the progressive withdrawal of the smaller refiners and wholesale marketers, including, Amoco, Golden Fleece, Esso and Ampol; the emergence of Trade Practices constraints on inter-company 'cooperative market behaviour' in both the US and Australian jurisdictions; and, the evolution of product price regulation from the approval of maximum wholesale petroleum prices to less interventionist forms of price surveillance and monitoring resting on the concept of Singapore-based product import-parity pricing. With the more rigorous adoption of product import parity wholesale pricing, ex-refinery product exchange arrangements between the refiner-marketers progressively evolved from un-monetized borrow and loan arrangements to negotiated location-based price differentials reflecting the opportunity supply costs of the respective exchange participants at individual ex-refinery and ex-coastal bulk terminal exchange locations.

Clearly the momentum of these changes in industry-based supply and marketing arrangements in the national Australian ex-refinery supply system increased with the partial withdrawal and consolidation of the wholesale market presence of BP and Mobil from states market areas in which their retail-supplied networks were not strong. Further impetus came from the rapid growth in demand particularly of diesel in the resource-rich states of Western Australia and Queensland, which enhanced the economics of direct product importation from Singapore by the major wholesalers into proprietary or shared coastal bulk product terminals in the consuming states in preference to the back-haul of product sourced from domestic refineries by coastal product carriers.

2.3 Current market structure

While contemporary economic and oil industry discourse is framed in terms of international efficiency and competitive and contestable market concepts, the location and ownership of the principal assets in the Australian national refining system and its enduring market structure was determined by the historical evolution of the industry in a previous era, before these concepts had much currency in either official policy circles or strategic planning in the oil industry.

The most distinctive enduring features of the Australian refining system are the degree of market concentration and, the enduring dominance by the major-refiners of both the refinery system, control of oil industry terminal infrastructure, and consequently of the wholesale product market which they supply.

The four refiner-marketers which together own and operate all seven domestic refineries account for the overwhelming majority of petrol wholesaling operations in Australia.

Company	2005-06	2006-07	2007-08	2008-09	2009-10
BP	17	17	17	17	17
Caltex	36	36	36	36	36
Mobil	14	15	15	13	13
Shell	29	27	27	28	29
Independent wholesalers	4	4	5	6	6

Source: ACCC 2010²

Among the other minor wholesalers, the most prominent are United, Neumann, Gull and Liberty. While the relative shares of volumes in the wholesale sector held by the independent wholesalers did not change significantly in 2009-10, they have shown a modest upward trend since 2005-06.

The major refiner-marketers also account for a major share of the total national capacity in petroleum importing terminals. The recent ACIL Tasman Report on the adequacy of Petroleum Import Infrastructure in Australia³ omitted to publish statistics on this significant issue though it noted in passing that of a total of 64 import facilities, 44 are operated by the majors.

2.4 Supply and demand trends

Over the 30 years to 2000, Australia enjoyed relatively high levels of liquid fuels self-sufficiency based on production from fields such as those in the Gippsland and Cooper Basin plus other smaller fields mainly onshore. Since that time however, total production from Australian fields suitable for Australian refineries has been declining. New production from more recently discovered fields has either not been able to arrest the decline or is not always suitable for Australian refineries and is exported.

More than 70% of the petroleum products consumed in Australia are currently refined

² ACCC (2010), **Monitoring of the Australian petroleum industry—Report of the ACCC into the prices, costs and profits of unleaded petrol in Australia**, 15 December, Chapter 3 p38

³ ACIL Tasman (2009), **Petroleum Import Infrastructure in Australia**, prepared for the Department of Resources, Energy and Tourism, August, p22.

locally. In 2009–10, there was a slight increase in both production and sales of total petroleum products. The share of sales of petroleum products refined domestically in 2009–10 remained unchanged at 72 per cent. However, since 2002–03 the percentage of sales of petroleum products refined in Australia has fallen significantly, from 100 per cent to 72 per cent in 2009–10 (Table 2.4). This reflects growth in demand which exceeds the available ex-refinery production.

Year	Petroleum products sales (ML)	Petroleum products production (ML)	Production as a proportion of sales
2002–03	41 980	41 951	100%
2003–04	43 899	39 654	90%
2004–05	45 496	38 786	85%
2005–06	45 610	37 160	81%
2006–07	46 541	39 108	84%
2007–08	48 434	37 744	78%
2008–09	48 052	34 590	72%
2009–10	48 665	34 839	72%

Source: ACCC

The mix of imports as a proportion of total sales varies in relation to the principal Australian product streams. In the case of the various petrol product grades, imports account for 20.9% of sales whereas imports now account for 45% of total diesel sales (up from 12% in 2002-3).

In the two decades to 2006-07, consumption of jet fuel in Australia has risen by an average of 4.3 per cent a year, although the average growth rate between 2000-01 and 2006-07 has been only 1.6 per cent per annum caused in part by the slump in international aviation and tourism following the terrorist attacks in New York and Bali and by the SARS epidemic in Asia.

The major companies directly import the overwhelming proportion of Australian petroleum product imports from their Singapore-based affiliated refiners. In the case of Shell these imports are sourced and shipped by Shell International Eastern Trading Company, the Shell Group regional trading arm in Asia.

	2006-07		2007-08		2008-09		2009-10	
	ML	%	ML	%	ML	%	ML	%
Singapore	2 668	90	3 301	93	3 426	84	3 330	86
Taiwan	182	6	110	3	297	7	91	2
Oman	0	0	0	0	108	3	46	1
South Korea	1	0	18	0	81	2	278	7
Other	99	3	125	4	182	4	144	4
Total	2 950	100	3 536	100	4 093	100	3 889	100

Source: Australian Petroleum Statistics

2.5 The modest role of independent wholesalers

Given the inescapable market reality that the major refiner-marketers have such a dominant grip on the national wholesale market as both refiners and importers, the

recent public policy focus on the “contestability of independent imports at the margin of the market” by the ACCC and the Commonwealth Government would seem somewhat misconceived.

ACIL Tasman was commissioned by the Department of Resources, Energy and Tourism to produce a report entitled “Petroleum Import Infrastructure in Australia” which was published in August 2009. This report was commissioned in response to findings by the ACCC in its report of December 2007⁴, in relation to the following factors which the ACCC concluded had enabled the four domestic refiner-marketers to dominate the Australian National Wholesale Market. These factors were:

- the highly concentrated ownership structure of domestic refineries;
- the dependencies between domestic refiners arising from their buy-sell arrangements;
- the very small proportion (around 2 per cent) of the wholesale market being supplied by independent importers;
- the limited prospect of large-scale (independent) importing of refined petrol; and
- the extremely low likelihood of substantial new market entry into domestic refining.

The ACCC Report considered that the most significant competitive threat to domestic refiners would be large scale importing of petrol by a reseller or independent retailer. However the ACCC report concluded that this was unlikely for a number of reasons. One of these reasons was lack of access to import terminal facilities of sufficient scale in the major markets.

The ACCC recommended a comprehensive audit of terminals suitable for importing refined petrol in current and future use of terminal capacity, and details of terminal leases and terminal sharing arrangements⁵. In commissioning this Audit report the Government appears to have had little appreciation of the market realities which underpin the noted market dominance of the refiner-marketers. The barriers to fully competitive imports by possible new market entrants or the small independent wholesalers, which are indeed formidable, are based on the economies of scale (and the severe diseconomies of small scale) in the high-volume and petroleum shipping, and the continuous flow economics of terminal and distribution operations. These barriers include the following:

- Fully efficient cargo parcels for petroleum product imports are in Medium Range (30,000+ DWT) tankers with no more than 2 cargo discharge points per voyage.
- To import with cost-competitive freight, an importer requires the financial capacity to purchase such a large cargo parcel (in the order of 1000 tank wagon loads) and finance the working capital tied up in it as inventory until it is sold;
- Efficient importation distribution costs require that the importer has access to a secure high volume channel to market close to the coastal bulk terminal at which it is discharged.

⁴ ACCC (2007), **Petrol prices and Australian consumers Report of the ACCC inquiry into the price of unleaded petrol**, Commonwealth of Australia

⁵ ACCC (2007), *ibid.*, ACIL Tasman (2009), p7

- The more remote is the ultimate supply points, the higher the unit distribution costs will be.
 - High volume sales rates are also required to minimise the inventory holding period and the cost of financing working capital.
- Petroleum terminal operations have high capital costs and fixed operating costs. A new market entrant wishing to construct or acquire terminal assets will find that direct costs per unit of storage, capacity so acquired are likely to substantially exceed those of the refiner marketers who for the most part operate substantially amortized terminal assets in Australia.
- Independent terminal operators lease storage capacity to importers only on a long term basis. Even if access to coastal bulk tanks is available to a new entrant or independent where and when it is sought, it is not economic to own or lease coastal bulk tanks which have a low through-put or capacity utilization. Opportunistic occasional imports by independents will incur substantially higher unit terminalling costs than those of the refiner-marketers who are able to maximise thru-puts through owned terminals on a continuous flow basis.
- Independent importers are exposed to both foreign exchange risks product price risks in the interval between loading the cargo and completing ultimate wholesale distribution of the product. Although the major refiners are skilled at managing these risks they have none-the-less also experienced very substantial foreign exchange and product price losses as a consequence of volatility in currency exchange rates and the product pricing market.
- Independent refiners are also exposed to greater risks and costs should an imported cargo be off-specification than are the majors who are both better able to manage this risk and to economically dispose of off-spec stocks by blending or re-processing.

2.6 Recent processes of change in the structure of the retail market sector

Public discussion of the long-run processes of change in the wholesale product markets and in the retail service station sector has been somewhat confused by misapprehensions regarding the linkages between the two market sectors in Australia. As noted above the wholesale dominance of the refiner-marketers is a very long-run feature of the Australian industry. The changes in the nature of the participation of the major refiner-marketers in the retail sector have not diminished this dominance and may in fact have served to further consolidate it.

In 2003, Shell entered into an alliance with Coles Myer (now part of Wesfarmers Ltd), in the terms of which Shell supplies fuel products and Coles, under the banner of Coles Express, operates the fuel and convenience retail business independently of Shell⁶. The deal saw Australia's largest retailer take over the operation of the 584 petrol stations (including all convenience stores located in Shell's retail network across Australia) allowing Coles Myer to offer the then innovative loyalty petrol price discount scheme to its supermarket customers.

⁶ ColesExpress (2007), **Submission to ACCC Inquiry into the price of unleaded petrol**, July.

Shell contributed access to its property network, use of its intellectual property and exclusive supply of fuel. Coles Myer contributed its site operating rights, acquired for A\$94 million, plus stock, plant and equipment for about A\$80 million, as well as its retailing experience. The sites are co-branded with both Coles Express and Shell. Coles Myer sets pump prices as well as offering CML customers fuel discounts at its supermarkets. In 2007, Coles Express operated 602 fuel and convenience stores Australia-wide, equating to approximately 10% of the 6,500 service stations in Australia with a fifth of Australia's retail fuel sales⁷.

Shortly after the announcement of the Shell-Coles agreement in 2003, Caltex Australia also entered into a joint venture agreement with Woolworths. Woolworths' existing "Plus Petrol" service stations received Caltex branding and, similarly, Caltex service stations received Woolworths branding—the joint venture outlets became Caltex Woolworths. However this was the case only with certain Caltex service stations close to Woolworths supermarkets and many Caltex sites remain unassociated with the fuel discount branding offer. In Victoria, Woolworths Supermarkets are known as *Safeway* and Caltex Woolworths trades under the *Caltex Safeway* brand.

Caltex subsequently negotiated with Mobil, when the company had taken a decision to quit the retail market in Australia, to purchase 302 Mobil Service Stations. In December 2009, the ACCC announced its decision to oppose this proposed acquisition because it considered it would lead to a substantial lessening of competition in the retail market⁸. In May 2010 Mobil subsequently sold 295 of its service stations to 7-Eleven stores⁹.

In consequence of these changes it will be noted that while Mobil has exited from direct participation in the retail market in Australia the ACCC understands that the Mobil agreement with 7-Eleven provided for Mobil to continue wholesale fuel supply to its former network beyond the sale¹⁰.

Shell has also exited from *direct participation* in the retail market while it remains an alliance partner in the retail sector with a compelling retail strategy which has consolidated its dominance in the national wholesale market place.

In 2009-10 the ACCC reported the share of sales volume by retail sites by brand and operator (Table 2.6).

It will be noted that whereas Shell had reportedly supplied 20% of the total volume of retail sales prior to the commencement of its Alliance with Coles in 2003, by 2009-10 its total share of the retail market had increased to 24% of which Coles/Express sales accounted for 22%.

⁷ Coles Express, **Op.cit**

⁸ ACCC (2010), **Monitoring of the Australian petroleum industry—Report of the ACCC into the prices, costs and profits of unleaded petrol in Australia 2010**, p41.

⁹ **Ibid.**, p42

¹⁰ **Ibid.**, p42.

Table 2.6 Share of sales volume by retail sites by brand and operator								
Brand	2002-3	2003-4	2004-5	2005-6	2006-7	2007-8	2008-9	2009-10
BP	20	20	18	19	19	20	19	17
Caltex	24	22	18	16	16	17	16	16
Coles Express/ Shell	0	16	25	25	22	20	22	22
Mobil	19	17	12	11	11	11	11	10
Shell	20	3	3	3	3	2	2	2
Woolworths/ Caltex	10	14	18	20	22	22	23	23
Other retailer chains	6	7	6	6	7	8	9	10

Source ACCC¹¹

Over the same period Caltex has also increased its share of total retail sales from 24% in 2002-3 to 36% in 2009-10, of which the Woolworths Caltex retail channel comprises 23%. The increased dominance by Caltex and Shell of the wholesale markets and of their co-branded representation in the retail market over this period has been at the expense of BP and Mobil. BP's share of retail sales volumes over the same period declined from 20% to 17%. Prior to its sale of its retail assets Mobil's similar share of the retail market had reportedly declined from 19% to 10%. Other small retail chains have reportedly also increased their modest collective share of the total market from 6% to 10%.

2.7 Profitability of the petroleum refining industry

The ACCC 2010 report reviewed measures of, and trends in, the profitability of the refining sector in Australia in comparison with reported profit trends in the industry internationally and with profit trends in other manufacturing sectors in Australia. Given the capital-intensive nature of the refining industry, the most appropriate measures of its profitability are return on assets and, return on total capital employed.

The ACCC's reported findings, based on its monitoring and reporting role, included the following:

- The return on assets for the domestic refining sector from 2002-3 to 2009-10 averaged 12.5% which, while higher than that of the ASX200, is about the average of most manufacturing in Australia¹².
- The ACCC reported the refining sector revenues, costs and net profit or loss (reflecting crude oil and other material inputs and gross product sale revenues). On this basis the total industry profitability was negative by \$100 million in 2009-10, an improvement on the reported result for 2008-9 of a total industry loss of \$280 million.
- These results were in contrast with industry profits in excess of \$1.4 billion in each of the years from 2005-6 to 2007-8¹³.

¹¹ *Ibid.*, p 39.

¹² *Ibid.*, p228

¹³ *Ibid.*, p225

- On average the ACCC considers that the refining of petrol has realised an average net profit since 2002-03 of 2.9 cents per litre (cpl) while diesel has realised an average net profit over the same period of 4.6 cpl.
- The ACCC compared the return on assets of the Australian 'total downstream industry' (by which it evidently refers to both refining and product importation and other product supply and terminalling functions) with "a sample of about 30 companies which operate across a dozen countries with greatest representation from the US". It concluded that the average return on assets between the two industry groups over the period from 2002-3 to 2009-10 is broadly similar at just over 9%¹⁴.

A similar comparison by the ACCC of the return on capital employed in the total refining industry in Australia and overseas between 2006-7 and 2009-10, indicated a return in the case of the Australian industry of just under 12% and one for the international group of companies of just over 12%¹⁵. (Report 2010, p219).

The above reported information needs to be regarded with the following caveats:

1. The ACCC notes that some \$680 million of the announced loss in 2008-09 were attributable to foreign exchange losses. Reported profits /losses have also been substantially impacted in some years by adverse price movements which have resulted in substantial inventory gains and/or losses.
2. The reliable estimation of individual ex-refinery product margins (as employed by the ACCC) encounters the familiar difficulty of the inherently arbitrary allocation of joint refining product costs across product streams of differing relative values.
3. Given the capital-intensiveness of the industry and the advanced age of many of its assets in Australia which have been substantially depreciated, profitability assessments are substantially influenced by the assumptions employed in valuing these aged assets. It is noted for example that Caltex Oil Australia adopts the concept of Replacement Cost Operating Profit (RCOP) EBIT, in reporting its earnings.
4. It is inherently difficult for the ACCC or other industry analysts to obtain systematic profitability data for the business units of international companies in Australia or elsewhere whose costs are influenced by transfer pricing between corporate affiliates, which business units are not obliged to produce audited public accounts.

Caltex is the only Australian-based refiner-marketer to be publicly listed in the Australian market. As such, and in its capacity as Australian market leader, its reporting to shareholders provides a useful window on the performance and prospects of the Australian refining industry.

¹⁴ *Ibid.*, p219.

¹⁵ *Ibid.*, p219

2.8 Profitability trends in the Australian wholesale and retail petroleum markets

The ACCC has reviewed measures of profitability and trends in the profitability of the petroleum wholesale and retail marketing sectors in Australia in comparison with reported profit trends in the industry internationally and with profit trends in other marketing sectors in Australia. Its findings include the following:

- The average return on assets of the wholesale marketing sector from 2002-3 to 2009-10 averaged in excess of 12.5%, which exceeded this measure of reported profitability for all but one of the other principal national commodity marketing sectors which were reviewed over the same period. By contrast the reported return on assets of grocery wholesaling was 4.25% over this period. (ACCC Report p 250).
- The average return on assets of the wholesale marketing sector from 2002-3 to 2009-10, in excess of 12.7%, compares with an average of 5% for a sample of firms in the international petroleum wholesale sector.
- The average return on capital employed in the petroleum wholesale sector between 2006-7 and 2009-10, was 25.1%. This exceeded the return on capital employed in all other major wholesale marketing areas in Australia over the same period.
- The 3 KPIs reviewed (return on sales, assets, and capital employed) for the domestic wholesale industry were all higher than their long-term average in 2009-10 which was also the highest realised over the period since 2002-3.
- The long-term measures of the profitability of the Australian wholesale and retail petroleum sector in comparison with overseas wholesale and retail petroleum sectors, were found to be broadly similar.

The Australian refineries have needed to invest to meet both more demanding product specifications, growing market opportunities and to continue to drive down costs through improvements in technological performance. Those refineries that have responded to growth markets such as diesel and jet fuel have been able to increase their refinery margins and profits because of their capacity to meet growing demand and to supply products with increasing prices. In Sydney, for example, Caltex embarked on an Efficiency Improvement program to improve the performance and cost efficiency of the Kurnell refinery. It has reported positive profit outcomes as a consequence (see Appendix 2A).

The integrated oil companies have been restructuring their refineries in mature markets for a number of years. Refining margins in mature markets tend to be under pressure due to the operation of older, smaller and less complex refineries. This does not mean that they are not profitable or cannot be made more profitable. Average returns on assets have remained positive since the early 2000's, with the exception of the period associated with the GFC (2008-09). Some refineries are just not positioned in rapidly growing markets and making the investments that would increase their rates of return. It is a challenge because the refining industry has gone through long periods with low gross margins.

International refinery capacity is expected to increase in the medium term as is international demand. If capacity expansion leads regional demand growth, as some inquiry participants predict domestic refiners may face stronger competition from imports of refined petrol.

The Australian refineries are under cost pressure and this is exacerbated by the relative strength of the Australian dollar. The Australian situation is in stark contrast with the emerging markets of Asia where there has been substantial investment in new refinery capacity. These refineries are seeking to reap economies of scale from large scale operations in new complex refineries. In the mature markets, of which Australia is considered one, refiners are restructuring refineries.

According to Ernst and Young, refiners in mature markets are¹⁶:

- Divesting non-core refining assets.
- Engaging in partial shutdowns of key refineries.
- Doing full shutdowns of less complex sites and conversion to storage terminals to defer expensive remediation and cleanup cost.
- Postponing new refining capacity and upgrading projects.

¹⁶ Ernst and Young (2010), **Global Oil and Gas Transactions Review 2010**.

Appendix 2A

The Caltex Window on the refining industry outlook In Australia

Caltex is the only Australian-based refiner-marketer to be publicly listed in the Australian market. As such, and in its capacity as Australian market leader and the operator of NSW's only refinery other than Clyde, its reporting to shareholders and the ASX provides a useful window on the performance and prospects of the Australian refining industry.

Caltex is consolidating its position as the market leader in NSW. It operates two refineries in Australia: Lytton in Brisbane and Kurnell in Sydney. The Kurnell refinery is larger than Clyde, and there are caveats in comparing refinery performance. Despite recognizing the difficulties in the refining industry, Caltex is implementing long term initiatives to improve performance and to capture new market opportunities.

Caltex is positive about the Australian market due to its market position in mining, agriculture and transport industries in Australia. Caltex concentrates on high yield gasoline products and less emphasis on low margin fuel oils compared to Shell.

The company reports significant improvements in refinery margins at its Sydney Kurnell refinery, as a consequence of improvements in efficiency at the plant and growing market opportunities. The key point is that the competitiveness of refineries requires continuous investment to improve performance through cost reductions and expanding opportunities in growing product markets. Caltex is implementing the Refining Improvement Initiative, targeting a \$100 million EBIT in refinery performance.

As the only other refiner in Sydney, Caltex is likely to be a beneficiary of any rationalisation of Shell's Clyde Refinery particularly if it can be demonstrated that petroleum products refined locally can be supplied more efficiently and reliably than an import-only model. In recent statements regarding local refining performance, Caltex has highlighted:

- Record sales volumes for transport fuels, particularly premium fuels and finished lubricants.
- Improvements in refinery reliability continued with best on record mechanical availability, enabling Caltex to leverage strong margins when they occur.
- Production improved to near record levels of 5.5 billion litres in the second half of 2010 with refinery utilisation in excess of 78%.

Caltex doesn't seem to be overly concerned about long term supply increases in the Asia Pacific region. The company argues that excess supply currently being experienced in the Asia Pacific region should slowly decline as the growth in demand for product in non-OECD countries is likely to offset the decline in demand expected in OECD countries.

The company believes all of the existing Australian refineries can be made more efficient. In its submission to the Australian Government's White paper, Caltex has expressed concern about further reductions in Australian refining capacity as follows:

If there was a substantial reduction in Australian refining capacity, Australian-

grade fuel could become harder to obtain and premiums for Australian grade fuel could increase, depending on the rate at which Asian countries moved to fuel standards similar to Australia. Freight costs could increase if importers had to place orders with refineries outside Asia, for example from the Middle East. ... Longer term, Asia may also struggle to keep up with demand, leaving countries like Australia that are short on refining capacity vulnerable to disruption of supply from overseas.

Caltex is a participant in the alternative fuels industry in Australia. Caltex is a leading marketer of biofuels blends, and the company aims to significantly increase sales of biofuels. The company is a supporter of recent investigations into the development of an aviation bio-fuels industry in Sydney. Preparing for the future in Sydney, Caltex sees opportunities for expansion of diesel, liquefied petroleum gas (LPG) and compressed natural gas (particularly in freight) will expand, particularly if there is an abrupt decline in the availability of international oil supplies.

If there was a substantial reduction in Australian refining capacity, Australian-grade fuel could become harder to obtain and premiums for Australian grade fuel could increase, depending on the rate at which Asian countries moved to fuel standards similar to Australia. Freight costs could increase if importers had to place orders with refineries outside Asia, for example from the Middle East. Longer term, Asia may also struggle to keep up with demand, leaving countries like Australia that are short on refining capacity vulnerable to disruption of supply from overseas.

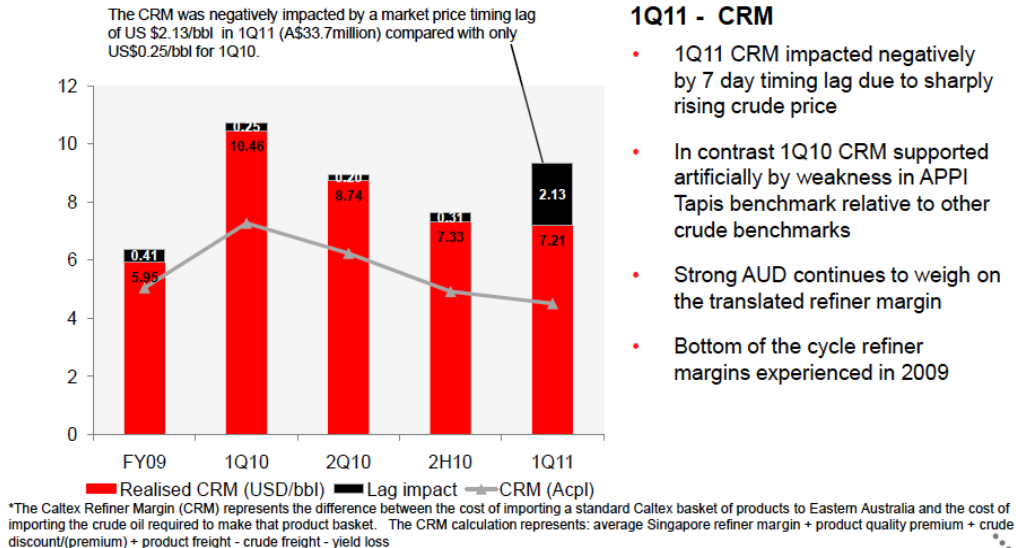
Caltex publishes what it refers to as the Caltex Refiner Margin (CRM) which represents the difference between the cost of importing a standard Caltex basket of products to eastern Australia and the cost of importing the crude oil required to make that product basket. Recent CRM values have been strongly positive. Table 2.7 indicates movements in the realised CRM from January to May 2011, in comparison with the CRM in the same months in 2010. The realised figure reflects the impact of the 7 day lag reflecting the notional supply interval to Australia.

It will be noted that while the Caltex Realised Refiner Margin in 2011 is much reduced from the elevated margins realised in 2010, the average margin at \$US7.82/bbl is strongly positive. Caltex reports the following movements in refining margins reflected in the CRM between 2009 and 2011.

Table 2.7 Caltex Refiner Margin (CRM) 2011		
Realised CRM	US\$/bbl	US\$/bbl
Reference month	2011	2010
January	\$8.86	\$12.39
February	\$6.44	\$9.14
March	\$6.32	\$10.22
April	\$6.16	\$6.79
May	\$11.30	\$13.59
Average Jan-May	\$7.82	\$10.43

Source: Caltex Australia Press Releases

Caltex Refiner Margin



1Q11 - CRM

- 1Q11 CRM impacted negatively by 7 day timing lag due to sharply rising crude price
- In contrast 1Q10 CRM supported artificially by weakness in APPI Tapis benchmark relative to other crude benchmarks
- Strong AUD continues to weigh on the translated refiner margin
- Bottom of the cycle refiner margins experienced in 2009

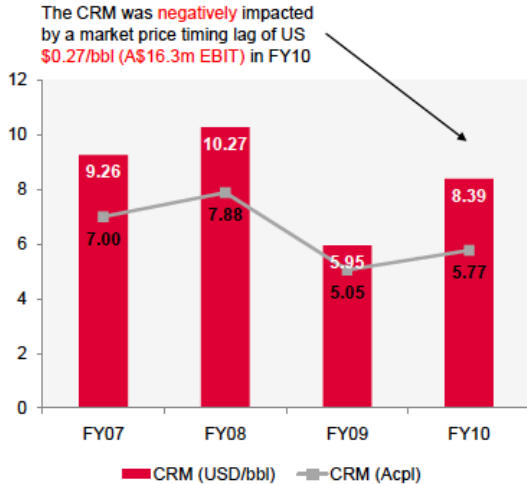


Caltex does not share the outlook of declining refining margins in Australia, which is apparently Shell's view as reported in the Consultation process, which in part underpins the case for closure. Caltex considers that the bottom of a cycle in refining margins was reached in 2009, and while it has noted and reports considerable impacts of exchange rate volatility and price volatility on realised margins, the CRM has been above US\$7.00/bbl since FY2009 and up to \$10.46/bbl in Q1 2010.

On a fiscal year basis the movements in the CRM since 2007 were reported by Caltex see below. It should be noted that the CRM is not a profit result. Rather it benchmarks the refining margin available in the Australian market over time from efficiently procuring, shipping and processing crude oil into the high value transport fuels which predominate in the Australian market mix. The CRM does not directly translate to the contribution to profit which Caltex realises from its refining activities in Sydney and Brisbane.

SUPPLY CHAIN HIGHLIGHTS

CALTEX REFINER MARGIN – SIGNS OF RECOVERY



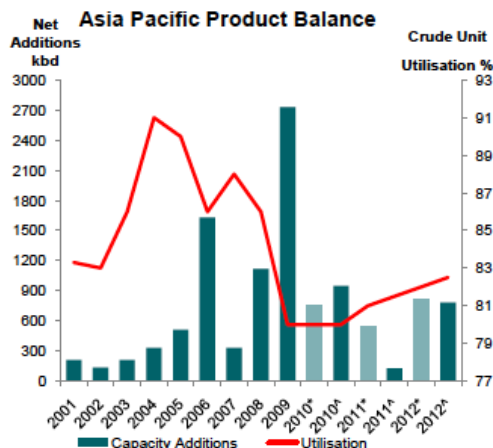
Caltex Refiner Margin Build-up (US\$/bbl)		
	Tapis Basis	Dated Brent Basis
Singapore WAM	13.65	9.86
<i>Add:</i>		
Product freight	3.90	3.90
Crude discount	0.00	0.00
Quality premium	1.90	1.90
<i>Less:</i>		
Crude freight	2.18	2.18
Crude premium	4.44	0.65
Yield loss	4.17	4.17

*The Caltex Refiner Margin (CRM) represents the difference between the cost of importing a standard Caltex basket of products to Eastern Australia and the cost of importing the crude oil required to make that product basket. The CRM calculation represents: average Singapore refiner margin + product quality premium + crude discount/(premium) + product freight - crude freight - yield loss

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Caltex projects the imbalance between Asian product demand and supply to be reducing with a gradual margin recovery as demand growth outstrips supply:

SLOW RECOVERY IN SUPPLY DEMAND BALANCE EXPECTED



- Japan's CDU capacity is forecast to drop by 300kbpd in 2011, in addition to the 250kbpd shuttered in 2009/10, offsetting capacity additions in China and India
- FACTS forecast Asian product demand growth to be 2.3%, down from 4.2% in 2010. IEA forecast 2.6%.
- Gasoline surplus in the region forecast to grow. However, Australian grade quality premium to remain.

Gradual margin recovery underway as demand growth outstrips net capacity additions

Source: FACTS Global Energy, International Energy Agency, Caltex estimates

* April 2010 Forecast. Capacity additions are net of forecast closures

**October 2010 Forecast. Capacity additions are net of forecast closures

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Nor does Caltex share the rather simplistic view that the Australian wholesale market is fully exposed to the pressures of excess refining capacity in Asia. Caltex has reported to its shareholders the structural advantages that it enjoys given its dominant position in the Australian market, which is *not* fully exposed to broader Asian product market. Of particular significance in this context is the “relative geographical isolation” of the Australian inland market, and the structural advantage to the dominant refiner markets including Caltex and Shell given these “market dynamics”, of owning and controlling well-located infrastructure.

Caltex also acknowledges another factor that has enhanced the profitability of the refiner marketers in recent years. As it notes below, Australia fuel specifications are amongst the tightest in the region and command a quality premium. Because the domestic wholesale price in Australia was based on a notional import parity quotation for product qualities which were in very illiquid supply in the region, the resulting product premiums substantially boosted Australian refining margins. The full impact of this reflected very substantial quality premiums for the lower-emission grades (most notably diesel was max 50ppm sulphur to the E4 Standard) was reflected in the Caltex profit performance and elevated share price over 2006-7.

Australian market dynamics offer structural advantages

- Australia is relatively geographically isolated, with key and growing markets dispersed around the long coastline
- The Australian transport fuel market is structurally significantly short, with about 30% of all products imported (45% diesel, 30% jet)
- Demand growth linked to strong regional GDP growth (particularly resources sector)
- Deregulated market, with pricing based on import parity
- Australian fuel specifications are amongst the tightest in the region, attracting a quality premium
- This allows CTX to maximise refinery production when margins permit
- Given market dynamics, having well located infrastructure is a critical success factor
- These factors have shaped the Australian downstream industry and differentiate us from our global peers



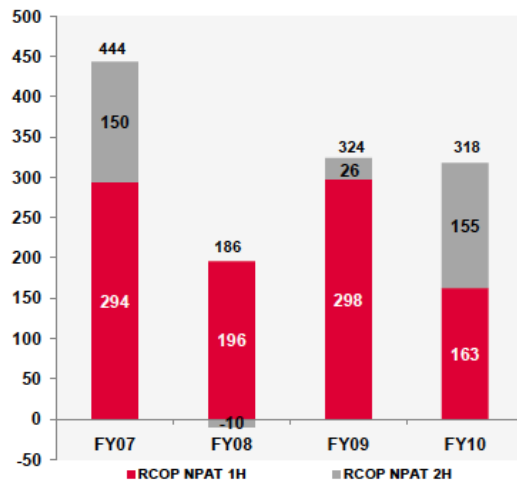
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Caltex reported earnings for 2009-10 an EBIT of \$500 million, were up by 2% on the 2008-09 result (Caltex February 2011). The positive trend in the profitability of Caltex over 2007-2010 was highlighted as follows:

FINANCIAL HIGHLIGHTS STRONG SECOND HALF RESULT



Caltex NPAT* (\$M)



- Strong Marketing performance underpins result
- Refining result close to breakeven due to higher USD CRM being offset by high AUD/USD exchange rate impact on CRM and lower production
- Best 2H result since 2006

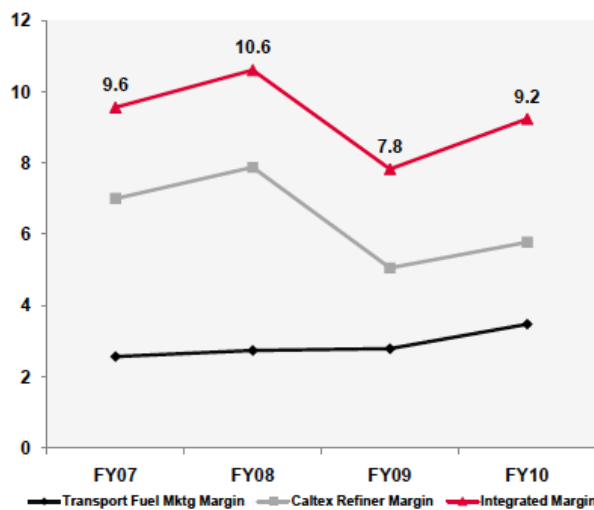
*Net RCOP profit after tax, excluding significant items

It is notable however that Caltex' profitability has been dependent on its vertically integrated model with supply and wholesale marketing operations driving the less-than-breakeven realised contribution of refining in 2010.

FINANCIAL HIGHLIGHTS INTEGRATED MARGIN RECOVERING



Caltex Integrated Gross Transport Fuels Margin* (Acpl)



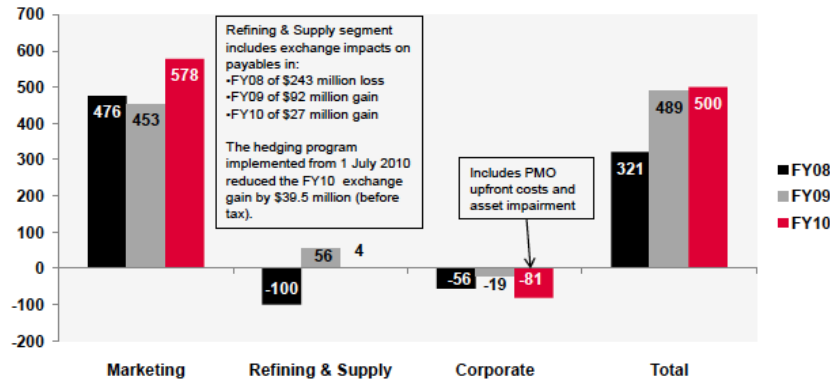
- Stronger than expected USD refiner margins due to weaker Tapis APPI benchmark relative to other crude markers in 1H10
- Benefit of higher USD margin partially offset by higher AUD throughout 2010
- Transport margin enhanced through improved product mix and changes to the franchise agreement

*Gross transport fuels margin, before expenses. Note that Transport fuels marketing margin applies to total transport fuel sales (15.1BL for 2010) whereas the Caltex Refiner Margin applies to sales from production (9.9BL for 2010).

FINANCIAL HIGHLIGHTS SEGMENTED[#] REPORTING



RCOP EBIT* (\$M)



*RCOP EBIT, excluding significant items

#Segment results are based on a transfer price between Refining & Supply and Marketing determined by reference to relevant import parity prices for petrol, diesel and jet, and other products including specialties and lubricants. Such a basis does not necessarily reflect the true economic profitability of either segment on a stand alone basis. Domestic refinery production is essential to support the Marketing Business.

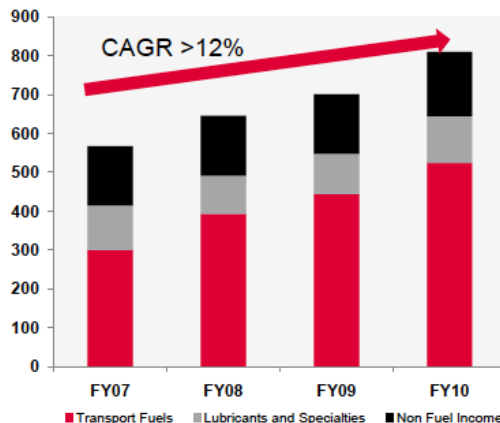
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Caltex considers the growth outlook for the Australian market to be very favourable to continuing strong profits in the wholesale market reflecting the cumulative annual growth rate it has enjoyed in the gross contribution of marketing of better than 12%.

MARKETING HIGHLIGHTS STRONG MARKETING RESULTS REFLECT STRATEGIC FOCUS



Marketing gross contribution (\$M)



Strong growth

- Transport fuel volumes up 4.5%
- Increased petrol and diesel margins due to increased share of premium fuels
- Contribution from Lubricants and Specialties up 16.5% in 2010
- Non fuel income contribution up 7.8% despite high level of store upgrades in 2010.

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Caltex also considers its dominant market position and financial strength to have positioned it to take advantage of the process of industry rationalisation which is underway. (Press Release to ASX 9-5-11

3 Clyde Refinery

3.1 Overview

Shell's Clyde refinery, Australia's oldest operational refinery, is located on the Parramatta River in the geographical centre of Sydney. Originally commissioned in 1928, the refinery has a capacity of around 4,740 ML per year. The refinery produces gasoline, diesel, jet fuel, bitumen and LPG. The refinery is one of Sydney's most significant industrial assets, meeting the daily fuel needs of car owners and commercial vehicles and key industries including transportation, manufacturing, agricultural and mining. The refinery has been an important part of Sydney's industrial structure for many decades. Shell has continuously invested significant amounts of capital in the plant, which has resulted in significant improvements in plant efficiency and environmental performance, including investments to meet Australian product specifications.

Clyde Refinery processes crude oil, condensate and other intermediate feedstocks to produce liquid fuels that are distributed through distributors. Table 3.1 shows product throughput.

Product	Percentage (%)	ML/day
Petrol	45	6.30
Diesel	25	3.50
Jet fuel	23	3.22
Fuel oil	4	0.56
LPG	3	0.42
Total	100	14ML/day

Source: CH2MHill

The refinery is strategically placed, being virtually the geographical centre of metropolitan Sydney and the Greater Metropolitan Region, the latter accounting for around 25% of GDP.

The refinery imports crude oil and intermediaries to its 10 hectare Gore Bay terminal, 13 kilometres to the east, in Sydney Harbour and transports via a 19km 300mm diameter underground pipeline to Clyde for processing. Crude oil, fuel oil and other feedstock and products are stored in tanks at the Gore Bay Terminal and then transported by pipeline to Clyde. More than four million tonnes of crude oil, feedstock and products are imported through the terminal for transfer to Shell's Clyde Refinery by pipeline every year. Around 90 ships carrying between 55,000 to 100,000 tonnes offload crude oil per year at Gore Bay destined for the refinery. If the Import-Only Terminal proposal proceeds, there will be a significant increase in small-medium specialised vessels each year offloading petroleum products at Gore Bay.

The refinery is also linked to the Sydney-Newcastle pipeline, owned by Caltex, and Port Botany, including Vopac's liquid storage facilities, and owns a jet pipeline, which

supplies Sydney Airport with jet fuel. Petroleum products are distributed through distribution's terminals on site.

The refinery is also connected to a metropolitan spur line that connects with Sydney's and NSW's major rail networks. Up until 2008, petroleum products were delivered to western centres of New South Wales by rail. Although the rail line is currently not in operation (due to the removal of a state government subsidy) the refinery's rail network is an important infrastructure asset, not only for distributing petroleum products in Eastern Australia, but also potentially for receiving inputs such as bio-fuel feedstocks.

Shell at Clyde and Caltex at the Kurnell refinery dominate the Sydney and New South Wales market. Clyde supplies Sydney, Australia's largest market, with around 40% of total demand for petroleum products, and NSW with around 50% of total demand. Approximately 40% of output is distributed to BP and Mobil.

Clyde Refinery is comprised of the following units¹⁷:

- one crude distiller;
- hydrotreater;
- HDS Unit;
- a platformer and benzene reduction unit;
- high vacuum distillation unit;
- fluidised catalytic cracking unit;
- Alkylation plant;
- recovery plant;
- treating units; and
- extensive utilities complex.

The refinery has demonstrated its capacity to meet demand in Australia's largest market over a long period of time. In response to the argument that the refinery is too small, it is suggested that the refinery is the right size to meet the requirements of a large and dynamic market in Sydney and NSW. Major strengths include:

- Locational advantages of a transport fuel hub
- Access to growing markets
- Flexibility
- High skilled workforce
- Complementary industries

¹⁷ CH2MHill (2007), **Proposed Upgrade of Hydrodesulphurization (HDS) Unit at Clyde Refinery, Preliminary Environmental Assessment**, prepared for Shell Refining (Australia) Pty. Ltd.

3.2 NSW transport fuels and infrastructure hub

Clyde is at the geographical centre of the Greater Metropolitan Region (GMR), Australia's most significant urban region with Sydney at its core, and its distribution networks. The current population of Sydney is 4.5 million people and 5.6 million people live in the GMR, which includes the Hunter region north of Sydney and the Illawarra to the south. The refinery, which is located in Western Sydney, borders the M4 Motorway. This integrates it into Sydney's Motorway Network and Sydney's most rapidly growing areas of Western Sydney.

Refinery locational economics is driven by water access (due to global trading) and either proximity to a crude source or, as in Clyde's case, a significant urban market. Oil refiners with refineries and logistics systems based in areas of high petroleum consumption enjoy a competitive advantage over other suppliers because of their proximity to local demand. Clyde's pipeline infrastructure links to Sydney Airport, as well as access to the rapidly growing resource-based Hunter region through the Sydney-Newcastle pipeline and connections to storage facilities at Port Botany, give the refinery major logistical advantages. The refinery also has a rail spur (not currently operational) that links the refinery to the state's rural regions.

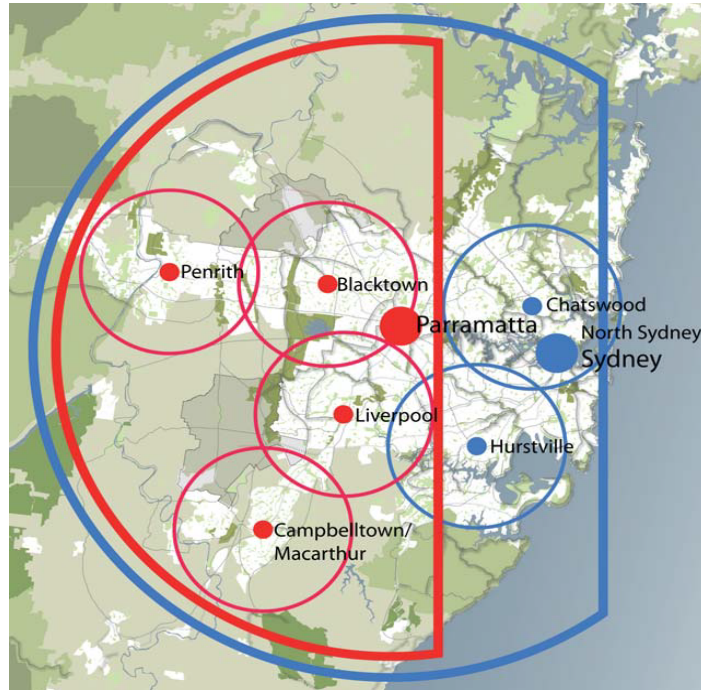
3.3 Access to growing markets

Arguments have been put forward that contrast slower growth in mature economies with the rapidly growing developing economies of the Asian-Pacific region. It is very fashionable to focus attention on massive new refinery capacity required to support fuel projections, particularly in China and India. The consequence of this line of argument is that oil refinery capacity in developed, predominantly OECD countries, should be rationalised to support the growth of capacity in new Asia markets. This is much too simplistic. Australia is in fact one of the largest, fastest growing and most prosperous economies in the Asia-Pacific region¹⁸. The population is growing at a much faster rate than the major OECD countries such as Germany, Japan, UK and the US. It is wrong to compare Australia with slower growth OECD economies with stagnant populations.

Australia and Sydney in particular, have distinctive features in different market segments. Despite significant improvements in fuel efficiency, there are a number of factors that are likely to drive demand in Sydney. Firstly, Australia remains arguably the fastest growing country in the OECD, and a high proportion of population growth, largely driven by skilled migration, is forecast to be accommodated in Sydney. It is important to emphasise, for example, that the population of Western Sydney, where the refinery is located, is forecast to increase from 2 million residents in 2011 to 3 million residents in 2036. Figure 3.1 highlights Sydney's changing geography and shift towards the west, with the Clyde Refinery, based in Parramatta, emerging as the economic and population centre of Sydney.

¹⁸ OECD (2010), **OECD Factbook**, Paris

Figure 3.1 Sydney's centres



Source: Cox Ricardson

Secondly, the globalisation of the Sydney economy over the past 30 years has resulted in a major expansion in air travel, resulting in sustained demand increases for jet fuel. This is particularly the case in Sydney, where around 50% of all of Australia's international flights have their origin and destination. The Sydney Airport Master Plan indicates that the number of aviation passengers will increase from 31.9 million passengers in 2007 to 78.9 million passengers in 2029, an annual average growth rate of 4.2 per cent. Total freight is forecast to grow from 471,000 tonnes in 2007 to 1,077,000 tonnes in 2029, an average annual growth of 3.8%¹⁹.

Thirdly, there has been a significant increase in demand for diesel, spurred by the resources boom in NSW, particularly in the Hunter Valley, with a substantial increase in coal and energy intensive exports, and strong growth of four wheel drive vehicles.

3.4 Flexibility

One of the most important advantages of Clyde as a refinery is that it can be adapted quickly to meet changing local demand. One of the most important characteristics of an efficient refinery is its ability to quickly change feedstocks and at the same time continue to produce quality fuels at a good rate. Clyde Refinery is a complex refinery and it has a demonstrated capacity to change feedstocks three times a day to meet market demand.

¹⁹ Sydney Airport Corporation Limited, **Sydney Airport Master Plan 2009**.

Although, like other Australian refineries, Clyde was designed to accommodate sweet and light Australian crudes, it can now accommodate broader crude types and qualities. To meet Australia product specifications, including for gasoline and diesel, the plant is recognised as a trim controller in that it is able to produce the right fuels at the right rate to meet demand.

In 2008, Shell substantially revamped the catalytic cracker but this has never been fully utilised. A major effort is required to get a long term return on this investment. The company also invested in a de-sulphurisation plant. As with other Australian refineries, the de-sulphurisation plant was subsidised by taxpayers.

3.5 Skilled workforce

Refining is a capital intensive and skill intensive industry. Managers, operators and maintenance workers are engaged in complex daily activities involving high level problem solving, technology literacy and other tasks including an awareness of health and safety and environmental management legislation and practices. Refining processes have become more automated, and operators and technicians have a high degree of computer literacy and are increasingly multi-skilled. This enables them to manage continuous changes in legislation, technology, equipment and work organisation. The skills base of Clyde refinery, with ongoing interaction with global best practices, is an important conduit for the transfer of skills into the NSW economy.

It takes a long time to assemble the skills base to run a refinery. Labour with the appropriate knowledge and skill base is not simply a commodity that can be quickly bought and sold. Around 40% of the operators have more than 20 years of service to the refinery. This enhances team-work, communications, plant specific knowledge and learning by doing and passes on know-how to younger workers.

3.6 Complementary industries

Clyde is at the centre of the metropolitan economy. It can draw on a dense network of competitive firms in finance and business service, engineering, logistics and IT. It is of course true that these strengths support both the refinery and the import-only terminal, although demand is far greater to support an operating refinery.

The refinery directly supports the local polypropylene plant and the closure of the refinery would create challenges for the plant. LyondellBassell Industries is the owner of a polypropylene plant co-located with the Clyde refinery. The polypropylene plant, which was once owned by Shell, obtains feedstock from the refinery. Shell provides around 40% of the feedstock required by the polypropylene plant. They also obtain some feedstock from the Caltex refinery at Kurnell, which is trucked to Clyde. The plant employs 57 workers directly, and also relies on local logistics companies, and provides products plastic products for the automobile and household sectors. This is a mature market, with LyondellBasell, meeting around 85% of Australian demand through its Clyde and Geelong plants. The Australian company's revenue is around A\$400 million

p.a. and approximately 60% of that value (A\$240 million) can be attributed to the Clyde plant.

3.7 Challenges

The refinery faces a number of challenges. In a meeting of delegates on 27th May 2011, a number of criticisms were raised about the refinery's performance and suggestions made for improving its viability. The delegates believe that management culture needs to change. It is suggested that the refinery needs long term commitment and authority from Sydney based managers. The Clyde Refinery operates in a competitive market in Australia's largest urban conurbation. In seeking to meet global targets (eg refinery rationalisation) the company is missing opportunities to understand specific challenges and opportunities in Sydney and NSW markets. Sydney does not face exactly the same challenges as Montreal and Gothenburg. The Sydney economy doesn't have a dense local network of local alternative refiners and suppliers. Unlike North America and Europe, it is a long distance from proposed product sources.

One of the key tenets of running a competitive capital intensive business is the need to keep investing in new technologies and skills to retain market share and competitive supply. One of the criticisms of the Clyde Refinery is that it has under-invested in capital equipment and maintenance in times when margins are high and this makes it more difficult to compete when refinery margins are lower.

It is recognized that size of the plant is an issue. The Clyde Refinery is small and reasonably complex but, as industry sources state, new refineries in North West India are larger than the total capacity of the Australian refining industry. Does this matter? The dominant view in the company is that economies of scale should drive investment and this is what is driving Shell global decisions in relation to refineries such as Bukom, Singapore and Port Arthur, Texas. On the other hand, by focusing on mega-refineries in consolidated locations, the company should give consideration to a number of risks. Firstly, the procurement requirements of mega-refineries can lead to upward pressure on raw materials and suppliers, resulting in higher prices that flow through the supply chain. Secondly, the mega-refinery option results in growing management complexity and less interaction with customers and feedback. This can result in local customers looking at alternative suppliers who can accommodate and adapt quickly to their product requirements. Thirdly, concentrating activities in a mega-refinery also concentrates risks, including logistics and supply disruptions associated with disasters and technical shutdowns, as well as sovereignty risk.

Shell workplace delegates expressed concern about the reliability of indicators and benchmarks that assess the performance of Clyde. The Shell philosophy is that each asset should aspire to "best in class." Delegates make the point, however, that it is important to compare apples with apples rather than apply universal criteria that may or may not account for specific local differences. The issue is not how Clyde compares with larger refineries in other markets, but whether there are distinctive features of Clyde; and are they optimal to meet the needs of the local market including price

competitiveness, adequacy, reliability and adaptability? In assessing the performance of Clyde, for example, Shell delegates state that the Solomon benchmarks include operators at the terminal at Gore Bay in employee numbers for the refinery operation.

4 The perspective of Shell

4.1 The “Case for Change” at Clyde

Shell has put forward a “Case for Change” which involves the cessation of refining at Clyde and to convert Clyde Refinery, Gore Bay Terminal and its pipeline into Import-Only facilities, or what can be termed an Import-Only Terminal (IOT). Shell has stated that the final decision to close has not been made. The company has said they are open to proposals put by the workforce through their unions.

If the “Case for Change” proceeds, the refinery would be dismantled and Shell would import all of its petroleum product requirements, making use of existing terminals, adding more and using existing pipeline infrastructure and distribution networks. The closure of the refinery would occur at the next shutdown prior to mid-2013. The company argues that its estimates of net cash flows for an Import-Only terminal compared to refining are closer to break even.

The Shell case for ceasing manufacturing is based on the following:

- Smaller and older refineries such as Clyde are unable to compete with larger Asia-Pacific refineries that can generate economies of scale. Shell is developing its Bukom refinery in Singapore as a major regional refinery and petrochemical complex and company suggests that around 50% of imported petroleum products to the proposed Clyde terminal will be sourced from this refinery.
- The Australian market is small compared to the rapidly growing Asian region.
- Surplus capacity in the Asian region is intensifying competition and putting pressure on Clyde’s refinery margins. Supply will continue to outstrip demand until around 2016, although it is conceded that demand is less predictable than supply. China will continue to soak up demand for new refineries in the Asia-Pacific region.
- Clyde, like other Australian refineries must meet stringent product quality and environmental requirements and invest in new technologies and plant to meet these requirements.
- Clyde like other Australian refineries was designed to take Australian light sweet crudes – but Australian sources are declining. Dominant Middle East crudes are not technically capable of being processed at Clyde. The cat cracker at Clyde, despite being a relatively recent investment, is under-utilised. Nameplate capacity is around 5,000 tonnes per day (tpd) but it currently produces around 3,000 tpd.
- Clyde does not have the features of the most competitive refineries, which combine sufficient:
 - processing complexity to ensure maximum production of high value products and volume yield;
 - processing capacity to achieve economies of scale;
 - heavy crude capability to reduce feed cost and to feed cracking units; and
 - sour crude capability to ensure a broader range of crudes can be processed, especially from the Middle East.

- Engineering costs in Australia are higher than Asian and North American competitor markets, and this puts cost pressure on modernisation programs, such as high costs to install a new platform splitter and benzene saturation unit. Shell predicts there will be no significant reductions in capital expenditure if it maintains Clyde as a refinery operation.
- Despite substantial efforts by management and workforce to improve productivity, and acknowledged improvements in performance, Clyde Refinery still doesn't meet "best in class" refinery performance, as measured by the Solomon benchmarking process, although the company acknowledges significant improvements in productivity over the decade.
- Shell is a large trading enterprise, and hence has a capacity to efficiently access regional and global petroleum products. Imports already supply around 30% of the Australian market. With an IOT Shell believes that it will be able to increase volumes through Clyde.
- Currency volatility will impact the decision to continue an Australian refining operation or to import petroleum products. Shell (along with most market observers) has assumed that the \$A will depreciate against the USD.
- The company also assumes changing price relativities for Asian crudes in the global crude oil market.

4.2 Risks of conversion at Clyde

Shell acknowledges that there are a number of challenges and risks associated with the transition to an IOT. A major challenge will be assuring customers such as Coles Express and Qantas that there will not be major disruptions in supply and price hikes due to unavailability of products at points of high demand. To manage these relationships, the company suggests that it has the experience to sharpen contracts, will build inventories and seek the right balance between spot purchases and contracts.

The company argues that the transition will be manageable. The transition would take around 12 to 18 months, involving cleaning and modifying out pipes, altering pumps, replacing "dirty" barrels with "clean" barrels (i.e instead of transporting crude oil from Gore Bay to Clyde, the pipeline will transport petroleum products. In the interim, the company will rely on products sourced from elsewhere. The dismantling of old plant and equipment and remediation of surplus land will take longer.

Refinery closure and decommissioning has become extremely difficult and costly because of strict environmental regulations²⁰. Even in times of low margins and low levels of utilization, refineries generally remain operational because of the high costs of shutting down.

20 Stevens P., Oil Markets, **Oxford Review of Economic Policy**, Oxford: UK, 2005

4.3 Shell's Global Strategy

Shell is shifting resources into more complex exploration and production areas. With the depletion of many established reserves, the priority is to develop complex oil and gas reserves, including deep sea oil extraction, gas to liquids and LNG. According to Shell CEO, Peter Voser "Upstream, we have built up strong foundations in activities like gas-to-liquids, oil sands and liquefied natural gas," Mr Voser said. "Looking out to 2020, I expect Shell's exploration to underpin new upstream growth, especially in North America and Australia, with additional barrels from development-led projects.²¹"

With intense global competition from state oil companies, other major and independent refiners, the company is restructuring its downstream operations. Shell has a "global management structure in place...refining, chemicals, retail and other themes are all managed on an efficient, world-wide basis, rather than in regions, which is a more complicated and expensive way to run it²²".

In early 2010, Shell announced its intentions to exit more than one third of its retail markets and slash refining capacity. Shell announced the company's intention for a further 1,000 job cuts, in addition to previously announced 6,000, in order to boost output. The company believes that exposure to refining and natural gas placed it at a competitive disadvantage. Shell proposed to exit 35% of its petrol station markets and reduce refining capacity by 15% to help it make cost saving of \$1bn (£658m) this year. It also said it would sell non-core assets worth \$1bn-\$3bn a year, including its refineries in Gothenburg, Los Angeles and New Zealand²³.

Shell owns or has equity in more than 35 refineries worldwide with the capacity to process some 4 million barrels of crude oil per day.

Region/country	Barrels per day
Canada	
Shell Sarnia Refinery	71,400
Scotford Refinery	110,000
USA	
Convent Refinery	235,000
Deer Park Refining Ltd	329,800
Port Arthur Motiva Refiner,	285,000
Norco Refinery	220,000
Europe	
Fredericia Refinery, Denmark	68,000
Elbe Mineralölwerke Hamburg-Harburg Refinery, Germany	110,000
Miro Karlsruhe Refinery, Germany	285,000
Rheinland Werk Godorf Cologne Refinery, Germany	162,000
Schwedt Refinery, Germany	210,000
Shell Pernis Refinery, The Netherlands	416,000
Asia	

²¹ Garry White (2010), "Shell Plans to sell refineries to boost output", UK Telegraph, 6 March

²² **Ibid.**

²³ **Ibid.**

Keihin Refinery , Japan	185,000
Showa Yokkaichi Refinery, Japan	210,000
Yamaguchi Refinery , Japan	120,000
Shell Port Dickson Refinery, Malaysia	155,000
Tabangao Refinery , The Phillipines	110,000
Shell Pulau Bukom Refinery, Singapore	458,000
Other	
Buenos Aires Refinery, Argentina	110,000
Sogara Refinery, Gabon	21,000
Sapref Durban Refinery, South Africa	172,000
Aramco/Shell Jubail Refinery, Saudi Arabia	305,000
Australia	
Geelong	110,000
Clyde	87,000

Source: A Barrel Full; Australian Institute of Petroleum

Shell predicts oil will trade between \$50 and \$90 a barrel over the next few years and is targeting output of 3.5m barrels of oil equivalent per day in 2012. This compares to 3.15m in 2009, the equivalent to an annual growth rate of 3.5%, or 11% in total over three years.

Mr Voser said the company should be in a surplus cash flow position in 2012, after capital investment and dividend payments – assuming \$60 oil prices and a more normal environment for natural gas prices and downstream. In order to achieve this it will have to invest between \$25bn and \$27bn a year in its operations²⁴. The Anglo Dutch group also said that it replaced 288% of its oil and gas output with new discoveries in 2009, or 3.42bn barrels of oil equivalent. Shell has embarked on a major global restructuring focused on expanding exploration and new production activities, improving short term performance through assets sales and identifying options for future growth.

Shell is rationalising and reducing refining capacity, particularly in smaller mature markets. According to CEO Peter Voser, in 2010 the company exited from seven of what the company terms eight non-core refineries. Shell reduced refining capacity by 450,000 barrels per day in 2010, which is approximately 12% of the total²⁵. Since 2002 the company has reduced refining capacity by almost 30%, or 1.2 million barrels per day.

For example, Shell agreed to sell its 90,000 bpd Heide refinery in Germany to a family investment firm Klesch and Company²⁶. In October 2010 Shell announced its intention to sell a majority of its marketing and refining business in Sweden and Finland to a Finnish company Keele and Co. for \$US640 million²⁷. The deal includes sale of Shell's 87,000 bpd Gothenburg refinery. In March 2011, Shell announced it has signed a sales and purchase agreement for its 270,000 barrel-per-day Stanlow refinery in the United Kingdom and certain associated local marketing businesses with Essar Oil (UK) Limited (Essar) around \$US1.3 billion. In June 2010, Shell sold its downstream businesses in Greece to Motor Oil (Hellas) Corinth Refineries S.A. In 2010 Shell Canada closed its Montreal East refinery, its largest refinery in Canada (161,000 bpd), with the loss of around 800 jobs.

²⁴ Shell (2011), **March 2011 strategy update**.

²⁵ Peter Voser and Simon Henry (2011), **Royal Dutch Shell PLC Quarter and Full Year 2010 Results**, 3 February.

²⁶ Reuters (2011), "Factbox-European oil refineries for sale or closure", 1 June

²⁷ The Sydney Morning Herald (2010), "Shell reveals Nordic asset sales", 28 October

Shell is concentrating its refining expansion plans in larger integrated plants in growth markets. The company is shifting new investment opportunities in larger refining capacity. Shell is increasing capacity at its joint venture Motiva's Refinery in Port Arthur, Texas by 325,000 bpd, which will increase the refinery's crude oil throughput capacity to 600,000 b/d, making it the largest refinery in the U.S. and one of the largest in the world²⁸. Shell continues to expand its mega refinery on Pulau Bukom Singapore, which currently has a capacity of 600,000 bpd, and is the core of a major petrochemicals cluster. The Singapore cracker complex has the ability to turn naphtha, liquefied petroleum gas and heavy hydrocarbons into chemicals. It has an annual capacity to produce 800,000 metric tonnes of ethylene, 450,000 tons of propylene and 230,000 tonnes of benzene.

²⁸ Reuters (2007), "Shell to begin Port Arthur refinery expansion", 21 September, 21 September

5 Global and regional trends and dynamics

We are witnessing a major transformation of the global oil industry. This transformation has been characterised by:

- Continuing increases in world energy output, with the U.S. Department of Energy (DoE projecting increases of 29% (base 2007) to 640 quadrillion British thermal units by 2025 to meet anticipated demand. If supply can't keep up with demand, we can expect significant increases in fuel prices²⁹.
- a geographical shift in both demand and supply towards Asia,
- the decoupling of oil demand from GDP growth, (since 1980, each 1% increase in GDP has been accompanied by a 0.3% rise in primary oil demand)
- real energy prices increases and increasing oil price volatility,
- the share of oil demand in total energy demand is falling, from around 33% in 2009 to between 26-28% by 2035.
- the factoring of climate change policy into oil market investment decisions and the growth of alternative fuels.
- A decline in the number of refineries globally and an expansion of average capacity of remaining refineries, with a reduction of the number of refineries by 53 between 1995 and 2008, and an increase of crude processing capacity over the same period by 17%³⁰.

A defining feature of both the upstream and downstream petroleum industries is continuous fluctuations. In brief, high real oil prices associated with two oil crises in the 1970's were followed by a long period of low oil prices in the 1980s and 1990s and, emerging from the Asian economic crisis, a sustained increase in prices up until the GFC. During the GFC, oil companies slashed upstream investment by 15% as a consequence of low oil prices and financing difficulties. High debts to support new exploration and production projects forced companies, including Shell, to accelerate the sale and offloading on many downstream assets. In part, there is some relationship between increase oil demand and prices and investments in refineries in that higher demand spurs opportunities for new investment. But refinery investment is also driven by other factors including existing and proposed supply capacity, utilization rates in refineries and government policies to encourage industrial investment in refineries of to increase energy self-sufficiency.

One important long term trend is the decline in oil intensity, the ratio of oil demand to GDP growth, in OECD economies. For every 1% increase in GDP in developed economies there is a 0.3% increase in oil demand. Declining oil intensity is driven by higher real energy prices, technological improvements in vehicles and equipment, fuel

29 Klare, Michael T. (2011), "The Global Energy Crisis Deepens", **Middle East Online**, 6 June.
30 Purvin and Gertz (2008), **Study and Oil Refining and Oil Markets**, for the EU, pp 101-102.

switching and energy conservation. In 2009, global oil intensity (expressed in purchasing power parities, or PPP) was only about half the level of the early 1970s³¹.

The recent turmoil and uncertainty associated with energy markets and oil markets in particular are set to continue. Price volatility remains high. The uncertainty and risks are associated predominantly with the sustainability of global economic recovery from the GFC, political upheavals, policy responses to climate change and the economics of extraction and production of new energy sources. Forecasting has become more unpredictable. In its World Energy Outlook 2010 report³², the International Energy Agency outlines three scenarios to 2035:

- New Policies Scenario, which takes account policy commitments and plans that have been announced by countries around the world, including pledges to reduce greenhouse gas emissions and plans to phase out fossil-energy subsidies
- Current Policies Scenario, in which no change in policies as of mid-2010 is assumed, i.e. recent commitments are not acted upon.
- 450 Scenario, which sets out an energy pathway consistent with the 2°C goal through limitation of the concentration of greenhouse gases in the atmosphere to around 450 parts per million of CO2 equivalent (ppm CO2-eq).

These three scenarios highlight significant difference in terms of future oil demand. This makes it difficult to plan for major developments and the need for governments and industry to consider a broad range of options. Oil demand (excluding biofuels) experiences steady growth, increasing from 84 million b/d in 2009 to 99 million b/d in 2035. According to the IEA, all of the net growth comes from non-OECD countries, almost half from China alone, mainly driven by rising use of transport fuels. Under the current policies scenario, global oil demand increases to 107 million b/d by 2035. Under the 450 Scenario, oil demand peaks in the next few years and declines to 81 million b/d by 2035. Table 5.1 sets out a recent estimate of the number of refineries in different regions³³. Asia is consolidating as the region with the largest concentration of refineries.

Region	No. of refineries
Africa	45
Asia	161
North America	154
Middle East	44
Eastern Europe	89
Western Europe	102
South America	66
Total	661

Source: Oil and Gas Journal

³¹ International Energy Agency, **World Energy Outlook 2010**, Paris: OECD/IEA, p103-4.

³² **Ibid.**, p59.

³³ True, Warren R; Koottungal, Leena (2009), "Global refining capacity advances; US industry faces uncertain future", **Oil & Gas Journal** 107. 47, 46-48, 50-53, 21 December

Table 5.2 shows changes in global refinery capacity over the period 1999-2009. The table highlights the shift in refining capacity to the Asia-Pacific region over the past decade, with its share of total refining capacity increasing from around 26% to 30% of the global total. Around 65% of new global refining capacity is coming from Asia-Pacific. Refining capacity increased in China by 60% and India increased by 63% over the 10 year period. At the same time, refinery capacity in Europe/Eurasia, and Japan is also declining.

Table 5.2 Global Refinery Capacities ('000 bpd)											
Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
North America	19822	19937	20183	20143	20316	20503	20698	20821	20964	21086	21127
South/Central America	6210	6298	6373	6318	6369	6393	6419	6429	6509	6672	6687
Europe and Eurasia	25467	25399	25276	25159	25005	25066	24999	25042	24981	24947	24920
Middle East	6530	6491	6746	6915	7039	7256	7284	7362	7537	7633	7859
Africa	2950	2888	3155	3219	3168	3107	3225	3046	3024	3178	3263
Australia	828	828	815	829	756	763	711	694	733	734	734
China	5401	5407	5643	5479	5487	6289	6587	7029	7511	7812	8635
India	2190	2219	2261	2303	2293	2558	2558	2872	2983	2992	3574
Indonesia	1119	1127	1127	1092	1057	1057	1057	1127	1157	1068	1106
Japan	5087	5010	4705	4721	4683	4683	4529	4542	4598	4650	4621
Singapore	1246	1255	1255	1255	1255	1255	1255	1255	1255	1385	1385
South Korea	2598	2598	2598	2598	2598	2598	2598	2633	2671	2712	2712
Taiwan	732	732	874	1159	1159	1159	1159	1140	1197	1197	1197
Thailand	899	899	1064	1068	1068	1068	1078	1125	1125	1175	1240
Other Asia/Pac.	1344	1403	1512	1487	1416	1410	1428	1435	1443	1459	1602
Asia Pacific	21444	21478	21853	21990	21771	22724	22959	23851	24673	25184	26806
Total World	82452	82491	83487	83742	83668	85049	85584	86515	87687	88699	90662

Source: BP Statistical Review 2010

Other Asian countries such as Thailand and Taiwan are significantly increasing refining capacity. The Republic of Korea is now experiencing slower growth in capacity, but generous tax concessions in the 1990's lifted the country into a major global player in refining and petrochemicals. Australian refining capacity's share of Asia-Pacific refining capacity is declining, from 828,000 to 734,000 bpd, or by 11%.

Higher prices and growing demand are encouraging refiners in these Asia-Pacific growth markets to build new capacity. New refineries are benefiting from economies of scale based on the strengthening of a global market in petroleum products. Many invest in surplus capacity that will enable them to export back to mature markets in advanced economies.

Another important trend is the growth of biofuels. The IEA has released a biofuels road map³⁴. The report suggests that biofuels will generate \$11-\$13 trillion in production between 2010 and 2050, and the global share of biofuel in total transport fuel will grow from the current 2% today to 27% in 2050.

³⁴

International Energy Agency (2011), **Biofuels Roadmap**, Advanced Biofuels Conference.

Under all scenarios, the demand for biofuels is expected to grow strongly, driven by rising oil prices, concerns about energy security and global policies to reduce greenhouse gas emissions. New opportunities are also being driven by research and innovation, which is leading to the commercialisation of what are termed advanced biofuels. In its New Policies Scenario, the IEA projects global biofuels consumption to increase from the current 1.1 mb/d to 4.4 mb/d in 2035. In this case, biofuels meet 8% of world road-transport fuel consumption by 2035, compared to 3% in 2009. The IEA estimates, with this scenario, that biofuels will meet around 20% of global incremental demand for total road transport fuels between 2009 and 2035. If more ambitious global greenhouse reduction targets are adopted, the share of biofuels will be higher.

Shell is a global leader in the emerging biofuels industry. Shell is involved in a major global R&D program into biofuels, participates in setting new product standards for biofuels and has invested in a number of biofuel companies, including Iogen, Codexis, Virent Energy Systems and HR BioPetroleum³⁵. Shell also has made research agreements with several universities, including the Massachusetts Institute of Technology. Shell's "Long-term Energy Scenarios to 2050" suggest that biofuels has the potential to meet a quarter of the global energy needs by the middle of the century. In the medium term, Shell considers a proportion of 7-10% in the fuel mixture to be possible³⁶.

A new global aviation biofuels industry is emerging, driven by high jet fuel prices and greenhouse gas initiatives, particularly the European Emissions Trading Scheme, which is imposing costs and environmental obligations on the major airlines. Boeing has been a leader in developing new biofuel standards. In the US, ASTM International (formerly known as the American Society for Testing and Materials) has amended jet fuel specifications to include fuels from bio-derived sources. This includes algal, jatropha, waste and other cellulosic feedstocks. The finalisation of the new BIO SPK fuel standard is imminent, which is expected to limit such fuels to 50% by weight. According to the US based Air Transport Association, fuel processed from organic waste or non-food materials (eg algae, wood chips), has the potential to provide as much as 50% of the total fuel required by passenger airlines. With final approval of the new standard, Lufthansa and Airbus are expected to begin a six-month commercial trial of a 50 per cent biofuel blend, on four flights per day operating between Frankfurt and London.

³⁵ Bloomberg Businessweek (2009), "Graeme Sweeney Reveals Shell's Biofuels Strategy," **The Outlook for Energy**, 16 April.

³⁶ Dr. Jörg Adolf and Siegmund Witt (2008), "Second Generation Biofuels' Strategy", **Communications Manager IV**, December.

6 Domestic demand and prospects

6.1 Local trends

Oil and petroleum products are relatively mature markets in most OECD countries. This is a consequence of slower population growth in most OECD countries (although Australia has the fastest population growth rate), improvements in energy efficiency and growing concern and regulatory measures to reduce carbon intensity and other environmental impacts.

Australian consumption of refined petroleum products has increased at an average rate of 2 per cent a year over the past 10 years, driven by growth in the transport sector, which accounts for the vast majority of refined liquid consumption³⁷.

Time series data from the (then) Australian Bureau of Agriculture and Resource Economics indicated that Australian consumption of petroleum fuels was growing at around 3% per annum, with:

- High annual growth rates for automotive diesel (5.2% p.a.)
- High annual growth rates for jet fuel (8.3% p.a.)
- Moderate growth for automotive gasoline (0.5% p.a.)
- Slower growth in liquefied petroleum gas (1.7% p.a.) and fuel oil (1.5% p.a.)

ABARE³⁸ has provided longer term demand projections for petroleum products with total demand (excluding LPG) projected to increase by 24% 2005-06 and 2019-20. The contribution to growth in demand is dominated by diesel and jet fuel with growth in demand for petrol expected to be more modest. NSW is the largest market for oil in Australia. Oil is primarily used in transport, as well as industrial and residential sectors. Petroleum demand has been on a continuous growth path over a 30 year period, with primary consumption of petroleum increasing from 400 PJ in 1981 to 600 PJ in 2011. In NSW, around 20% of petroleum products are imported, which will increase to around 50% if the Import-Only Terminal option is implemented³⁹. Factors driving metropolitan petroleum demand include:

- High rates of population growth and car sales,
- stronger than OECD average economic growth,
- globalisation and resulting demand for jet fuel and
- increasing demand for diesel in transport and rapidly growing resources sector in NSW.

The number of vehicles in Sydney increased to almost 2.4 million in 2007, with the number of vehicles increasing at almost twice the rate of population and household growth over the past decade. More people in outlying areas of the Greater Metropolitan Region are dependent on cars for commuting, shopping and education because public

³⁷ ABARE (2009), **Energy in Australia**, Australian Government: Canberra

³⁸ ABARE (2006), **Australian Energy National and State Projections to 2029-30**, Canberra: Commonwealth of Australia

³⁹ Preliminary estimate from Shell

transport services are poor. Between 2002 and 2020, Sydney's (unconstrained) traffic volumes are forecast to increase by 33%⁴⁰.

6.2 Jet fuel

In 2010, the Minister for Resources Energy and Tourism the Hon. Martin Ferguson established the Sydney Jet Fuel Infrastructure Working Group⁴¹ to examine current and projected fuel supply situation at Sydney Airport and to make recommendations on actions that could be undertaken to provide for the effective provision of jet fuel at Sydney Airport in the short, medium and long term. The Working Group's report projected that annual jet fuel demand at Sydney Airport would increase from 2450 million litres (ML) in 2009 to 5644 ML in 2029, with an annual growth rate of 7.22% from 2009 to 2014 and an average annual growth rate over the 2009-2029 period of 4.2% p.a.

6.3 Australian Refining Futures

Continuing solid demand growth for petroleum growth, and high growth rates for jet fuel and diesel in particular, will increase opportunities to expand domestic refinery capacity and imports. In 2006 ABARE released long term energy projections for Australia to 2029-30, including projections for refinery capacity⁴². The report estimated that gross refinery output in Australia, including that of petrochemicals, would increase from 1482 petajoules in 2004-05 to 1670 petajoules in 2010-11 i.e. an average rate of 2% a year. According to ABARE⁴³:

"... new investment in refining capacity will need to occur in the medium term, reflecting a consistent increase in the domestic consumption of petroleum products and an improvement in the economics of petroleum refining in Australia. In the projections, this new investment is assumed to occur around the period 2010-11 to 2012-13, when a 5 per cent increase in capacity is assumed.

Combined with an assumed 1.0 per cent a year growth in overall refinery output through efficiency improvements, this would result in a projected average rate of growth in refinery output of 2.0 per cent a year over the whole projection period, together with a temporary fall in imports of refined petroleum products as the new capacity comes on stream.

Refining capacity and refinery output are assumed to continue to increase by about 1.0 per cent a year beyond 2012-13. Refinery output is projected to increase to 2066 petajoules by 2029-30, representing a 39 per cent increase over the projection period. However, this increase in output is outstripped by the increase in petroleum consumption, which is projected to be 42 per cent over the same period. Consequently, the share of domestic production of refined petroleum products in

40 David Gargett and John Gafney (2006), **Traffic Growth in Australian Cities: Causes, Prevention and Cure**, Towards Sustainable Land Transport, 2006.

41 Sydney Jet Fuel Infrastructure Working Group – Final Report (2010), **Infrastructure for the provision of Jet Fuel at Sydney Airport for the period to 2029**, 30 April.

42 ABARE (2006), **Australian Energy National and State Projections to 2029-30**, Canberra: Commonwealth of Australia

43 **Ibid.** P46

liquid fuels consumption is projected to decrease from 78 per cent to 76 per cent over the outlook period."

6.4 Australian biofuels

Australia is on the cusp on developing an aviation biofuels industry. In assessing transport fuel futures for Clyde, an important strategic opportunity exists to develop biofuels refinery capabilities. This is due to the site's competitive advantages including the jet fuel pipeline to Australia's largest airport, location on the rail network (to transport non-food feedstocks), and existing refining capabilities.

The opportunity to establish an industry is being driven by research and certified technological improvements in non-fuel biofuel refining, real increases in petroleum prices and global carbon policies and obligations by the airlines to reduce greenhouse gas emissions. In Australia opportunities to establish a biofuels refining industry is being driven by the aviation companies Qantas, Virgin, Air New Zealand and Boeing, researchers (through the CSIRO), specialist biofuels companies and Caltex. CSIRO, with support of these industry partners, has recently released a report - Flight Path to Sustainable Aviation - which looks at the establishment of an industry in Australia⁴⁴. The project is looking at sustainable jet fuels derived from biomass (plants, trees, algae, waste and other organic matter bio-oils), because they offer the largest single opportunity to reduce emissions while ensuring long term fuel security for the sector. The report estimates that a new bio-derived jet fuel industry that over the next 20 years could generate more than 12,000 jobs, reduce Australia's reliance on fuel imports by A\$2 billion per annum, and decrease greenhouse gas emissions by 17 per cent in the aviation sector.

Qantas is emerging as a major participant in supporting the growth of a local industry. Qantas and Solena Group have announced that they are looking at the feasibility of a Fischer-Tropsch based biofuels plant in Australia that will produce aviation biofuels from waste. Solena is involved in a \$309 million partnership with British Airways to construct a 16 million gallon aviation biofuels demonstration plant in East London. The London project would utilize up to 500,000 tonnes of waste as feedstock for the project.

⁴⁴ CSIRO (2011), **Flight Path to Sustainable Aviation, Towards establishing a sustainable aviation fuels industry in Australia and New Zealand**, May, Newcastle.

7 Economic impacts of closure

7.1 Introduction

This section has been prepared by SGS Economics and Planning. In responding to the set objective, SGS has estimated the direct and net induced impacts on output/ income, value-added and employment of substituting refining operations with an Import-Only Terminal. This analysis has been carried out for the following four geographical regions:

- Local Area (Parramatta LGA);
- Regional Economy (comprising the LGAs of Parramatta, Auburn, Holroyd, Bankstown and Fairfield);
- NSW state economy; and
- The Australian economy.

SGS has used the following inputs for this exercise:

- Information provided by Shell via CFMEU on current levels of output/ income and employment generated by refining operations and the estimated income and employment at the proposed Import-Only Terminal at capacity operational date;
- Multipliers simulated by SGS input-output tables to map the induced economic stimuli for the chosen regions. These multipliers help estimate the induced impacts for the respective regions.

A detailed overview of input output tables and the process followed by SGS to generate regional multipliers is provided in the appendix. This chapter is organised as follows. Section 7.2 summarises the direct economic contribution made by the current refining operations and the estimated proposed import-only terminal within the chosen geographical regions. As such, this section highlights the difference in baseline and anticipated economic contributions made by current operations and an Import-Only Terminal.

Section 7.3 shows the direct and indirect impacts of closure of operations and substituting these with an import-only terminal on jobs and value-added within the chosen geographical regions.

The appendix provides details on the input-output model approach used by the study and the multipliers generated by these tables to estimate the impacts.

7.2 Economic Contribution of the Clyde Refinery

As outlined in previous sections, the Clyde Refinery is one of the more complex refineries in Australia, which enables it to deliver high octane fuels to Sydney and the wider New South Wales economy. The facility provides Sydney with 40% and New South Wales with 50% of its total petroleum needs, indicating the importance of the refinery to the region. Hydrocarbon based fuels generated from the site are of vital importance for multi-modal transport to function properly, whilst also providing key inputs for a myriad of other industries.

Strategically, the site helps maintain a globally connected city. The site produces not only high octane fuels, such as petrol, but also diesel, aviation fuel, bitumen and liquid petroleum gas (LPG). Aviation fuel produced at the site is pumped via pipeline straight to Sydney International Airport. Other fuels are distributed by rail and road through the Parramatta distribution terminals to areas across the region.

In 2010, the refining operations contributed \$218 million towards Australian GDP and provided employment to 570 full-time equivalent (FTE) staff, employed either directly by Shell or contracted.

This contribution within the local and regional economies stood relatively lower at \$124 million (Tableoverleaf). Contribution to value-added (i.e. the wealth created within the respective economies via wages & salaries and operating profits OR in other words, the difference between the output sale price and the inputs purchased) was relatively small at \$6 million for the local economy, but climbed to \$38 million, if the geographic scope was extended to include the national economy. This puts the value-added contribution of the Clyde Refinery at just under 0.2% of the national output⁴⁵

Anticipated Economic Contribution

In contrast, employment and economic activity at the site will decrease substantially at the import-only terminal from their current levels. Following the cessation of refining activities the direct economic contribution to Australia will shrink to \$20 million from \$218 million, i.e. a reduction of 90%. Employment will also reduce to 80 from 570 - an 86% reduction (overleaf).

The contribution to value-added for all chosen geographical regions is estimated to fall to nil with the import-only terminal because the facility is likely to import the finished product from overseas without creating value anywhere within Australia (Table 7.1).

⁴⁵ KPMG Econtech (2009), **Economic Contribution of the Australian Refining Industry**, prepared for the Australian institute of Petroleum, December

Table 7.1 Economic Contribution of the Shell Refinery to Local and Regional Economies (2010\$)

	Refining facility	Import Only
LOCAL AREA		
Output (\$M)	\$124 mn	\$20 mn
Value Added (\$M)	\$6 mn	\$0 mn
Employment	570	80
REGIONAL ECONOMY		
Output (\$M)	\$124 mn	\$20 mn
Value Added (\$M)	\$11 mn	\$0 mn
Employment	570	80
NEW SOUTH WALES		
Output (\$M)	\$158 mn	\$20 mn
Value Added (\$M)	\$27 mn	\$0 mn
Employment	570	80
AUSTRALIA		
Output (\$M)	\$218 mn	\$20 mn
Value Added (\$M)	\$38 mn	\$0 mn
Employment	570	80

Source: Shell via CFMEU and SGS Economics & Planning calculations

Notes: It has been assumed that all staff is employed locally and that all other operational expenses have been spent entirely within the local economy. Value-added is estimated by deducting total purchases of raw materials from total sale of petroleum products. By its very scope, the economic activity generated within the state and national economies will be greater than the local and regional economies. This reflects the depth and scope of economic linkages that the more diverse NSW and Australian economies encompass, i.e. when compared to the local region(s).

Estimated Economic Impacts

Changing the role of the facility from refining to being import only consequently changes the level of economic activity generated within the chosen regional economies. The following figures and tables detail the estimated initial and total changes to the local, regional, state and national economies, estimated using input-output table analysis in terms of output, value added and employment.

The total changes encapsulate both the direct and induced economic activity reductions resulting from the substitution of the current facility to an Import-Only Terminal.

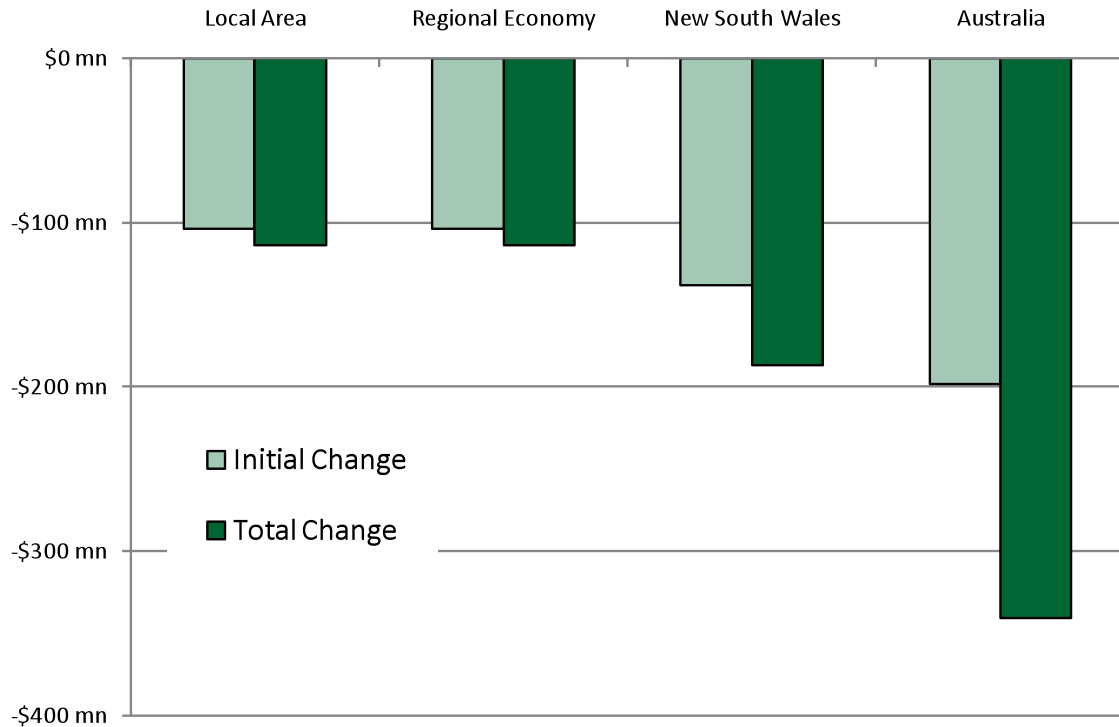
Impacts on Output

Importing refined products directly to the Clyde facility, rather than producing them in house reduces output substantially as wages, operational expenses and raw material purchases from within Australia reduce in line with the reduction in refining activities.

It is anticipated that the NSW economy will lose approximately \$138 million in output directly from the closure of the facility. Should the total economic impacts be considered, the net reduction in output is estimated at \$187 million. Direct effects on the Australian

economy would in turn be of the order of \$198 million and \$341 million, if total economic impacts on the national economy were considered.

Figure 7.1 Estimated Changes in Economic Contributions from Refinement Ceasing

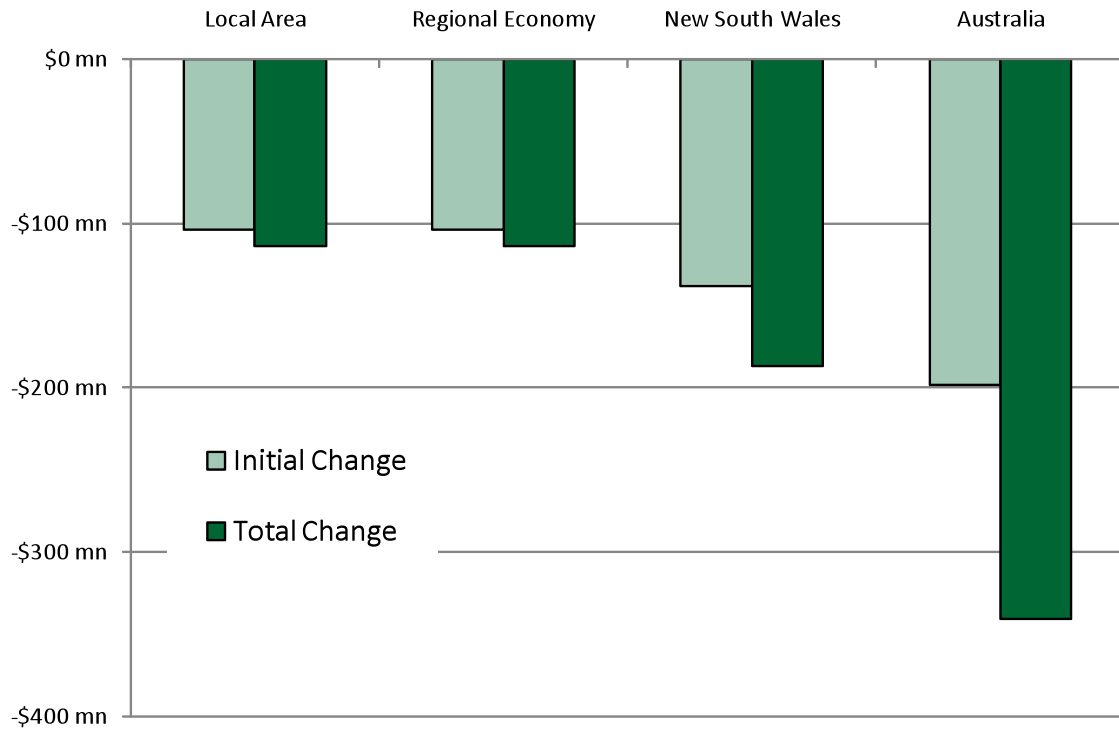


Source: SGS Economics & Planning

Impacts on Value-Added

Similarly, wealth creation within the state and national economies are also expected to decline considerably. The NSW economy is expected to lose \$27 million in value-added directly from the closure of the facility and \$54 million if total value-added were considered. Direct and total impacts on the Australian economy are estimated to be even higher at \$38 million and \$128 million respectively.

Figure 7.2 Estimated Changes in Value-Added Contributions from Refinement Ceasing

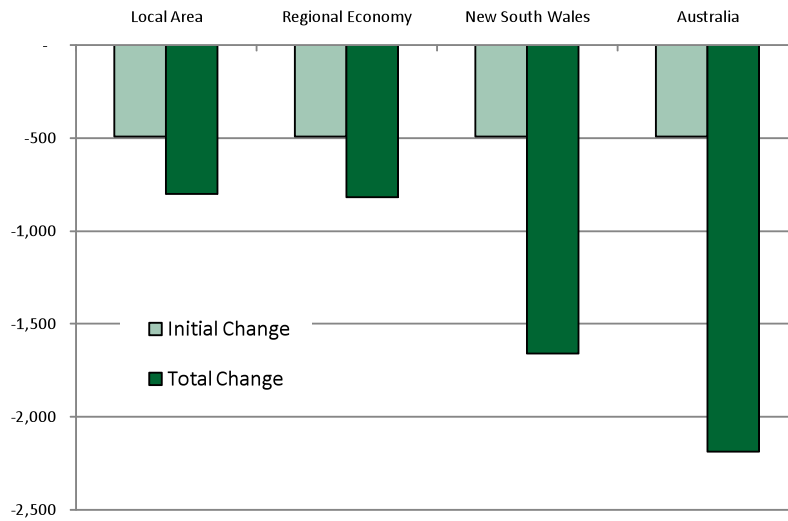


Source: SGS Economics & Planning

Impacts on Employment

A total of 490 jobs in New South Wales are likely to be directly lost by the closure of the refinery. Should total economic activity be taken into consideration, this reduction increases to approximately 1,700 jobs. It is likely that some of the staff directly affected by the closure could find employment elsewhere. However, this transition period is likely to create short-term hardships for these workers and their families whilst they invest time and resources to re-skill and/ or up-skill to remain in the workforce.

Figure 7.3 Estimated Changes in Employment from Refinement Ceasing

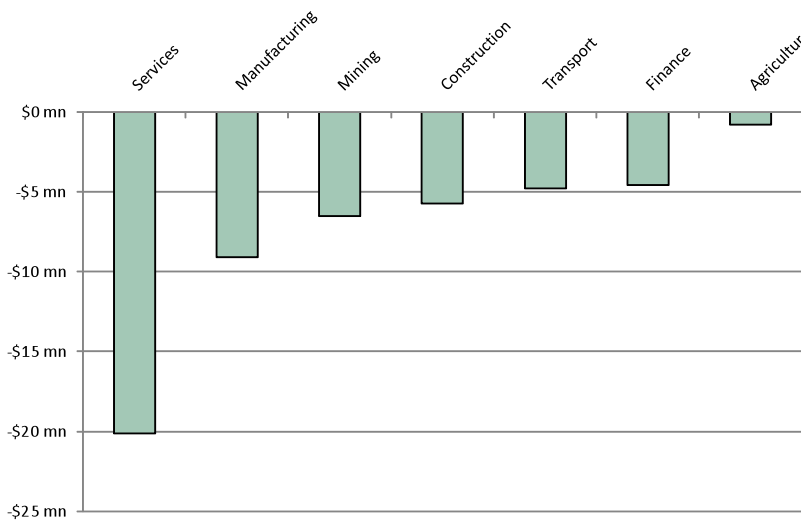


Source: SGS Economics & Planning

Distribution of Impacts

The induced economic impacts of the refinery closure are not likely to be limited only to the mining sector. Because of inter-industry linkages within the NSW economy and the international economy, the services sector followed by manufacturing and mining are estimated to be most adversely affected. Other sectors likely to be adversely affected include construction, transport, finance and agriculture (**Error! Reference source not found.** 7.4). Similar breakdowns occur for value-added and employment.

Figure 7.4 Induced Economic Contraction within NSW Industries



Source: SGS Economics & Planning

Appendix 7A: Study Method and Multipliers Study Method

In order to measure the reduction in contribution of the petroleum refining industry to the chosen regional economies, this study has used input-output (IO) tables published by the ABS (Cat 5209.0). These tables provide detailed information about the supply and use of products in the Australian economy and about the structure of and inter-relationships between Australian industries.

SGS have developed a methodology to scale these tables at the local/ regional level using published guidelines. In doing so, SGS has utilised the latest available localised data (including industry value-added components as reported in the Australian Bureau of Statistics State Accounts publication, population, and also industry structure) to customise the input-output model in order to model industry inter-linkages for state, statistical district (SD) and local government area (LGA) study area geography.

Essential outputs of the customised regional IO model include:

- Industry turnover generated within a local economy;
- Industry value-added within a local economy; and
- Multipliers for various industry sectors at the local/ regional economy level. These multipliers capture the amount of additional economic activity that is generated from an initial economic stimulus such as a new infrastructure project, policy changes, a new or existing business or even an entire industry sector. It is the multiple of this economic stimulus that will result in the overall effects.

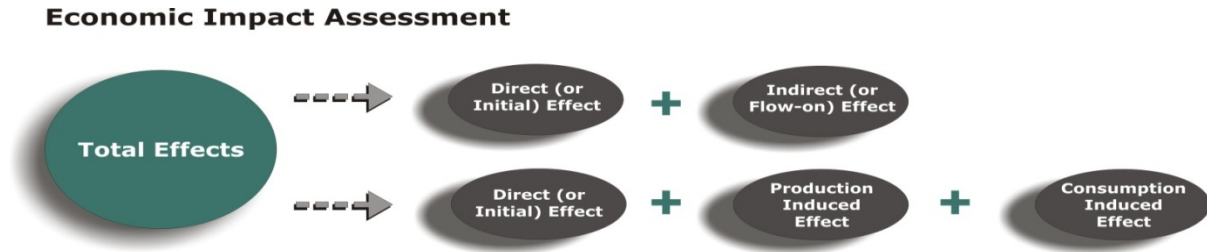
The IO model produces multipliers so that impacts on the following three indicators can be measured:

- Output: (or total turnover) which refers to the total value of the economic stimulus.
- Value added: is a measure of 'net output', i.e. total turnover less total purchases of raw materials. It represents only the value that is created within a region by employees and rent-seeking activities. The greater the value added, the greater the returns delivered to regional employers and employees.
- Employment: essentially the number of full time equivalent (FTE) jobs generated.

The multiplier is used to calculate the 'direct impact' and 'indirect impacts' (also known as the "flow-on effects") of an economic stimulus. The 'indirect contribution' to the economy of the study area exists because the initial economic stimulus will require purchases of inputs from suppliers who would in turn spend those dollars on their inputs from other supplying sectors in the economy, and so on.

This relation is illustrated in the image below. As shown in the diagram, the indirect impacts/ effects can be disaggregated into 'production induced effects' and 'consumption induced effects'. In order to understand this, consider Company A that spends money on its suppliers and its employees. The indirect effect of Company A relates to the benefits to the economy (or additional economic activity) as the company's

suppliers utilise their earnings from Company A to spend on their suppliers and employees etc (known as production induced effects) and secondly as the company's employees spend their wages on businesses who in turn spend on their suppliers and employees (known as consumption induced effects).



The direct and indirect impacts (also known as flow on effects), can be aggregated together to approximate an overall economic impact of an industry.

Generated Multipliers

The estimated direct and indirect multipliers from the I-O tables for the relevant industry (i.e. petroleum and coal refining) within the relevant geographic locations are reported in **Error! Reference source not found.A7.3**. These multipliers are applicable to estimate the induced economic activity of the current refining operations as well as the import-only terminal.

These need to be interpreted as follows:

- Taking the example of the New South Wales economy, these multipliers suggest that for each dollar of income generated by the petroleum refining industry, 17% of that income is comprised of value-add within that industry in the economy.
- Subsequently, each dollar of income generates approximately 1.35 times more income in all other industries within the state to produce that initial dollar's worth.
- Similarly, each dollar's worth of value-add generated initially within the industry creates approximately 1.95 times that value in all other industries within the state.
- Finally, each employee directly employed by the sector supports total employment of approximately 3.39 times within all other industries of the state.

Table A7.3 Estimated Economic Multipliers of the Refining Industry

	Direct Impacts		Total Impacts		
	Income	Value-Added	Income	Value-Added	Employment
LOCAL AREA					
Petroleum & coal product manufacturing	1.00	0.05	1.09	1.69	1.63
REGIONAL ECONOMY					
Petroleum & coal product manufacturing	1.00	0.09	1.10	1.50	1.67
NEW SOUTH WALES					
Petroleum & coal product manufacturing	1.00	0.17	1.35	1.95	3.39
AUSTRALIA					
Petroleum & coal product manufacturing	1.00	0.17	1.72	3.37	4.47

Source: SGS Economics & Planning

8 Economic competitiveness and liquid fuel vulnerability

This section examines whether there are any broader public interest concerns associated with the closure of the Clyde. The loss of refining capacity in Australia's largest market will result in increasing reliance on imported petroleum products. Sydney has been designated as Australia's global city and its catchment, the Greater Metropolitan Region (GMR), contributes around a quarter of Australia's GDP.

All OECD countries are concerned about oil and petroleum product security, particularly as a consequence of declining local production, growing price volatility and dependence on oil imports from regions experiencing geo-political upheavals. In a globalised economy, economic competitiveness is highly dependent on reliable and affordable supplies of fuels for industries and households.

The Australian Government, in its National Energy Security Assessment⁴⁶ (NESA), defines energy security as the adequate, reliable and affordable supply of energy to support the functioning of the economy and social development. The assessment provides an input into the Energy White paper, which is in preparation and due to be released in 2012. NESA approaches these three dimensions of energy security as follows:

- adequacy is the provision of sufficient energy to support economic and social activity;
- reliability is the provision of energy with minimal disruptions to supply; and
- affordability is the provision of energy at a price which does not adversely impact on the competitiveness of the economy and which supports continued investment in the energy sector.

NESA concluded that the level of security for liquid fuel supplies in Australia will remain relatively constant out to 2023 with a risk of decline in reliability with any further rationalisation of Australian refineries. A key argument in maintaining a diverse range of crude oil supplies and sufficient domestic refinery capacity in Sydney and Australia is the logistical difficulties of sourcing petroleum products that meet Australian fuel specifications quickly on the spot market. It is recognised that there is a shortfall of refineries in the Asian region that can meet Australian specifications. Associated with this is the increasing possibility of natural and geopolitical shocks that may impact supply. For example, the Japanese earthquake, tsunami and nuclear crisis at the Fukushima power plant have crippled much of Japan's energy infrastructure. Recent industry estimates indicate that Japanese fuel oil and natural gas consumption could increase by up to 238,000bbl/d and 1.2Bcf/d, respectively, depending on the combination of fuel substitution.

In the context of geo-political upheavals, volatile and increasing petroleum prices, diminishing supplies of "easy to get" crude oil supplies, and perceptions of insatiable demand in Asia, most developed North American, European and Asian countries are concerned and in some cases obsessed with long term petroleum security. Over the next decade, tightening supply/demand balances will put pressure on supply chains for both crude oil and petroleum products.

⁴⁶ Department of Resources Energy and Tourism (2009), **National Energy Security Assessment**, Australian Government: Canberra

On a much larger scale than Australia, the US Administration is confronting the challenge of increasing crude oil and petroleum products imports as a share of domestic consumption, reflecting the widening gap between growing domestic demand and stagnant supply. US foreign policy gives the highest priority to responding to the possibility of price spikes and oil embargoes. The US fuel policy is concerned with increasing exploration and production of harder to get petroleum reserves (sometimes with disastrous environmental consequences), coordinating the supply of boutique fuels (special fuels required by states for purposes of meeting air quality goals), energy conservation and the substitution of renewable fuels for gasoline. The US Administration established the Renewable Fuel Program (2005) and the 2007 Energy Independence and Security Act enhanced this initiative to cover transportation fuels in general, with a target of 36 billion gallons renewable fuel annually by 2022⁴⁷. This has significant implications for refinery operations, investment and their product mix.

The European Union has developed its Second Strategic Energy Review: an EU energy security and solidarity action plan⁴⁸. Given the rundown of European and “easy to get” global reserves, the EU is emphasising the values of security and solidarity. Of relevance to this project, it proposes an obligation of the Member States to build up and maintain a minimum petroleum reserve which will provide security of supply of petroleum resources to the European Union (EU). Due to the importance of oil in the EU’s energy mix, the EU’s strong external dependence for supply of petroleum products and the geopolitical uncertainty in many producer regions, it is vital to guarantee consumers continuous access to petroleum products.

According to a report commissioned by the Australian Government on liquid fuel vulnerability⁴⁹:

“Domestic refineries hold stocks of crude oil, intermediate products and finished products. Depending on the nature of any supply disruption in liquid fuels, refinery stockholdings create a buffer which enables alternative supply arrangements to be made, generally without any significant impact on consumers of refined petroleum products.”

Australia will face greater exposure to global crude oil and refined petroleum product markets as the margin between domestic production and domestic demand for both crude oil (from declining domestic production) and refined petroleum products (from increasing domestic demand that outpaces any domestic production expansion) widens over the next 12 years.

Interruptions to supply from domestic refineries or from problems at receiving terminals and pipelines will have a greater impact than in the past due to:

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- 47 Andrews, Anthony; Robert Pirog and Molly F. Sherlock (2010), **The U.S. Oil Refining Industry: Background in Changing Markets and Fuel Policies**, Congressional Research Services, 22 November 22.
- 48 Commission of the European Communities (2008), Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, **Second Strategic Energy Review, an EU Energy Security And Solidarity Action Plan**, Brussels, November.
- 49 ACIL Tasman (2008), **An Assessment of Australia’s Liquid Fuel Vulnerability**, prepared for DRET, November 2008.

- less spare capacity resulting in supply interruptions having a greater impact on the market
- replacements of refined petroleum products coming increasingly from imported cargoes rather than diverting cargoes from Australian production, therefore increasing supply chain delays for products by between three to six weeks.

The report expresses concern about increases in production disruptions and delays (and hence costs) as Australia becomes more dependent on imported products:

“Following the closure of Port Stanvac and reduced capacity of other domestic refineries due to tighter product specifications, there is little spare capacity in Australian refineries. Production disruptions are likely to become more pronounced due to the greater interdependencies due to Australian product specifications”.

“With less spare capacity, responses will depend more and more on replacing lost production with imported product – resulting in longer delays in rectifying production shortfalls.”

The report argues that major sources of interruption to supplies are more likely to be from four sources:

- Breakdowns at Australian refineries
- Breakdowns at terminals and associated infrastructure
- Interruptions to imported crude oil supplies and a possible supply side constraint in the period up to 2015 from a lack of spare capacity rather than a lack of petroleum resources
- Global problems in crude oil and refined petroleum product markets resulting from natural and/or geopolitical factors.

In relation to Clyde, a critical question is whether the closure of the Shell oil refinery in Sydney and its conversion to an import-only terminal will have an impact on petroleum security? Global supply chains for both oil and petroleum products are becoming more complex. The decline in Australia’s crude oil production has forced Australian refineries further afield to secure supplies of crude types that are suitable for processing in Australia’s refineries. For Shell’s operation at Clyde, the key issue is whether it will be possible to access petroleum products on the global market compared to accessing global supplies of crude oil. There is no agreement on this.

This report argues that the closure of Clyde Refinery is an important public policy issue because of the potential deleterious energy security impacts on Australia’s largest city and associated impact on GDP and GRP. The pattern of Australian cities, which are large urban conurbations separated by long distances from other conurbations are distinct. If you shut down refinery capacity in the US or Europe, petroleum users can draw on supplies from nearby cities. If Clyde shuts, Sydney will have one refinery at Kurnell, with the next closest domestic refinery located 850 kilometres away.

In an era of increasing supply vulnerability a mix of local refining, crude, intermediate and product storage capabilities and infrastructure to support imported product and inter-refinery product movements provides options to underpin efficiency and security of supply.

A related concern is the impact of dependence on petroleum imports on the balance of payments. The Australia economy periodically experiences boom-bust cycles. Because of Australia's high dependence on a relatively narrow resource base and imports of high value added as well as labour intensive goods the country experiences wide fluctuations in its currency and global indebtedness. Over the past few years, Australia has experienced a resources boom. Strong growth of minerals and energy exports and terms of trade, as well as weaknesses in major currencies following the GFC, has resulted in a strong currency. This has ignited debate, not for the first time, about the Dutch disease, with strong dependence on resource exports putting pressure on other tradeable industries including manufacturing, tourism, advanced business services and education. The balance of payments deficit associated with petroleum is deteriorating. This is of course not a problem when there is a resources boom pushing up the currency, but it can be a major problem during periods when global resource demand and prices are weak, which is a recurring feature of the Australian economy. Australia now depletes around 70% of its crude oil and 30% of petroleum product requirements. In 2010, the Minister for Resources Energy and Tourism noted that Australia now has a national trade deficit in crude oil, refined products and LPG of \$16 billion a year, heading for \$30 billion by 2015⁵⁰.

⁵⁰ Hon. Martin Ferguson (2010), **Address to the Annual Australian Petroleum Production & Exploration Association Conference**, Brisbane, May

9 The case for change at Clyde – an assessment

9.1 Scope of this report on the consultation with Shell

Shell has put forward a Case for Change to convert the Clyde Refinery into an Import-Only Terminal. The company states that it has not made a final decision and it is willing to consult with the unions to discuss alternative options. The alternatives under consideration at this stage appear to be a “business as usual” case versus the Refinery Closure Import-Only Terminal Case.

In the Consultation with Shell on behalf of the Unions which is reflected in this Report, as noted above, Shell has provided only the broad outline of its Case for the Closure of the Refinery. The company states that it has undertaken comprehensive analysis of the performance of the Clyde Refinery benchmarked against other Shell-operated refineries and using also other proprietary oil industry data sources on refining economics, and it has projected the refineries performance and prospects as so analysed forward in the changing dynamics of the Asia-Pacific downstream oil market. During the meetings with the project team on 30 May and 16 June 2011, Shell confirmed that while Clyde has realised satisfactory refining margins in 2010, this outcome is not projected to continue reflecting the following constraints:

- Poor utilization of total capacity constrained by the under-utilization of the cat cracker and the vulnerability of the refinery’s increasingly integrated process units to breakdown;
- Shell’s reported persistent inability to source the low-sulphur crude feedstocks without paying a price premium comparable to other feedstocks is presumably resulting in them reducing utilisation rates of the cat cracker;
- Projected reduced refining margins as recently favourable anomalies in crude oil pricing cease to apply;
- Projected on-going pressure on realised refining margins in Asia as product prices in the downstream Asian market increasingly come to reflect the marginal costs of the very large, efficient and flexible new refineries which have recently come on stream and are in process of construction;
- The on-going requirement for substantial recurrent capital expenditure to keep the refinery operating, together with relatively high fixed operating costs.

The company has declined to provide any systematic quantified analysis which would enable the business case for closure referred to by the company, to be subjected to an independent appraisal. For this reason no such independent appraisal has been attempted.

In the above circumstances this Report confines its review of the Company’s Closure Option to the consideration of the following:

- I. The implications of Shell’s proposed exit from refining at Clyde in the context of its global strategic repositioning, to its future wholesale marketing operations in Australia;

- II. The application of Shell's scenario-based planning methodology in relation to the future options for the Clyde refinery;
 - III. The broader public policy implications of the phasing-out of domestic refining within the national petroleum supply system in Australia and the wholesale product market. The role and value of the Clyde Refinery and its associated oil industry infrastructure in the specific context of Australia's national refining system and the wholesale supply chain in NSW and Australia
 - IV. The time horizon for the closure decision in the context of the decision and planning cycles in relation to Clyde.
- I. The implications to its future operations in Australia of Shell's proposed exit from refining at Clyde in the context of its global strategic repositioning**

The case for the closure of the Clyde Refinery and its alternatives and the timing of the decision (see below) needs to be understood in terms of the realities of the distinctive Australian industry and downstream market environment which has been summarised in Section 2 of this report. The principal conclusions to be drawn from this analysis in the context of the proposed closure are set out below.

1. The structure of Shell's operations in the downstream oil industry in Australia of which the Clyde Refinery is a key component, remain strongly vertically-integrated. Shell's crude oil and other feedstocks and product imports are all sourced from its trading, supply and refining affiliates in Asia. The output of its ex-refinery production is distributed by Shell into the wholesale market, in which it has a dominant position with 24% of the national market. Shell has made it clear that its proposed withdrawal from refining in NSW does not imply a withdrawal from the NSW wholesale market. With the proposed cessation of refining in NSW, Shell intends principally to meet its share of the national wholesale market by ramping up the importation of refined products sourced from the Shell refinery in Singapore and other affiliated supply sources in Asia supplied by the Shell International Eastern Trading Company (SIETCO).
2. As a vertically integrated refiner-marketer, the profitability and viability of Shell's downstream operations in Australia is derived from the revenues and margins realised from its operations in each phase of the petroleum supply chain: in the supply function of crude and imported products; as a refiner in NSW; as a distributor and wholesale marketer, and in terms of Shell's participation in the retail market. While as reviewed in Section 2, realised margin in the respective phases of the industry have been volatile in recent years, published information on refining profitability, and detailed reporting on the industry provided by Caltex, indicates that vertically integrated downstream operations in Australia through 2010 remain strongly profitable. While Shell has not reported on the profitability of its downstream operations, it would appear clear that it has shared in the benefits of a highly profitable downstream sector.
3. In the Consultation Shell confirmed that the refining margin realised at Clyde in 2010 substantially exceeded its assessed break-even margin but attributes this result to favourable, but anomalous, crude oil pricing. In the ACCC's assessment, the aggregate average return on assets of the domestic refining industry over the

period from 2002-3 to 2009-10 was 12.5%. This was higher than that of the ASX 200 group of companies but, in the ACCC's view, about the average for most manufacturing industry in Australia⁵¹.

4. Shell's closure proposition for Clyde rests on Shell's view that refining margins of this order are unlikely to be available in future years in consequence of anticipated increasing competitive pressure on the down-stream refining margin in the Asian-Pacific region. It is noted in Section 2 that Caltex, Shell's principal national and NSW-based refiner and wholesale market competitor, does not appear to share Shell's pessimism regarding future refining margins in NSW.
5. As also noted in Section 2, in the ACCC's assessment the wholesale petroleum market realised an aggregate average return on capital over the period from 2002-3 to 2009-10 of 25.1%, which the ACCC found to be the highest such rate of return of any major commodity wholesaling activity in Australia over the same period⁵². In contrast the reported return on assets of the wholesale grocery marketing over the same period was 4.25%. The ACCC noted that profitability of wholesale petroleum marketing appears to be on an upward trend. The 3 KPIs of profitability reviewed by the ACCC for the domestic wholesale petroleum marketing industry (return on sales, assets, and capital employed) were all higher than their long-term average in 2009-10, which was also the highest realised rate of return over the period since 2002-3.
6. The strength and robustness of Shell's vertically integrated operations in Australia has been strongly enhanced by its innovative embrace, in 2003, of its highly successful alliance with Coles Express. This alliance provided Shell with an effective strategy to re-position its retail brand linked to a dominant player in the also highly concentrated super-market and convenience store sector, with a compelling retail loyalty proposition for both sides of the alliance. The alliance has served to increase Shell's share of the retail market it supplies while minimising the cost of its retail participation.
7. Shell's dominant position in the wholesale petroleum products market in Australia and the strongly vertically-integrated business model in which its Australian operations reside, provide a substantial measure of protection to the company against risks and uncertainties in the broader environment of the Asian downstream product market, specifically:
 - a. There is no realistic prospect of Shell's dominance of the wholesale market being contested by the other established major refiner-marketers for both obvious commercial and trade reasons;
 - b. There is no realistic prospect of a new refinery being established by a new market entrant in Australia;
 - c. The small so-called "independent" retail chains and wholesalers face insurmountable barriers to be-coming fully competitive high volume product importers into the Australian wholesale market;
 - d. Given the ownership and control by Shell and the other major refiner-marketers of a major proportion of the oil industry infrastructure (coastal bulk terminals, pipelines and product distribution terminals) necessary to support high volume importation of petroleum products to

⁵¹ ACCC Report (2010), **op.cit.**, Chart 14.15 p252

⁵² ACCC Report (2010), **op. cit.**, Chart 12.22, p214

Australia, there is little prospect of other owners of major Asian-based refineries seeking to achieve a major presence in the Australian wholesale product market as new entrants; and

- e. Given that the growing proportion of product imports required by Shell to meet its 24% share of the Australian wholesale product market are sourced exclusively from its Singapore-based refining affiliate, the security of Shell's control of this dominant share of the growing Australian market, serves as committed base load for its Singapore refining operations in the context of future excess refining capacity in the Asian region.
8. Given the robustness and profitability of Shell's vertically-integrated supply, refining and wholesale marketing operations, it may well be that in current oil market circumstances, Shell is able to profitably recover in the Australian wholesale market higher unit refining capital and operating costs than may be recoverable to it or competitors, in other more contestable Asian regional market places. As noted above, Shell has declined to provide any systematic quantified analysis which would enable the business case for closure referred to by the company - which largely rests on the magnitude by which the performance of the refinery falls short of appropriate unit cost and performance benchmarks - to be subjected to independent appraisal.
9. Given the above conclusion that Shell has a dominant market share in the Australian national petroleum supply chain, and that the company's vertically-integrated operations as currently structured - in supply, refining and wholesale marketing (including the Clyde refining operations in NSW) are profitable, the proposal to close the refinery is understood to rest on the following business issues with respect to Clyde's performance and viability:
- The poor utilization of total capacity constrained by the under-utilization of the cat cracker;
 - the vulnerability of the refinery's output to breakdown in the increasingly integrated process units;
 - The on-going requirement for substantial recurrent capital expenditure to keep the refinery operating, together with relatively high fixed operating costs; and
 - Shell's reported persistent inability to source the low-sulphur crude feed-stocks required to achieve fully-efficient utilization of the cat cracker.
- The latter difficulty (point 4) requires some explication. On the face of it, given the depth of the global market for crude oil and related feed-stocks and the magnitude and depth of Shell's presence in the global and regional markets, it is not obvious why its regional trading arm has been unable to economically source the timely supply of feed-stocks in qualities and quantities to support the efficient operation of the cat cracker.
10. In the terms of the enterprise agreement with the Unions it would seem appropriate in the first instance for Shell's performance benchmarks to be appropriately documented together with the assessed quantified deficiencies in the performance of the refinery. The opportunity should be made available to the workforce before the closure decision is made final to identify any means of achieving significant improvements in the performance of the refinery.

11. If the Clyde Refinery is closed Shell will be obliged to write off the book value of its refining assets and will also be obliged to commit very substantial resources to the remediation of the Clyde site. Clearly Shell has signaled that its global strategy is to both redeploy its resources and future investment focus to the upstream phases of the industry and, to concentrate its downstream investments in large new facilities in high growth markets. It does not, however, follow from this that all assets which may no longer fit Shell's above investment criteria are no longer commercially viable in the industry. Shell and other major international refiner-marketers have divested refining assets in other markets which have been acquired and operated by smaller mid-tier companies with expertise in refining. The potential option of the sale of Clyde as a going concern is clearly dependent on an number of considerations. This option should however be systematically considered.

II. The application of Shell's scenario-based planning methodology in relation to the future options for the Clyde refinery

Given the critical nature of this decision and the breadth of the impacts flowing from it to the workforce and the NSW and metropolitan economies, more options should be explored in detail before a decision is taken to shut the refinery. The global best practice of project evaluation is Scenario-Based Planning, which was in fact designed and developed by Shell and has been widely used by governments and industries over the last 30 years. With scenario planning, the assumptions and trajectories of different scenarios are carefully compared, including with a range of stakeholders, before critical decisions are made to identify the preferred option.

At a global level, Shell has recently employed scenario planning to investigate energy futures. Shell's first scenario is called Scramble, which appears to be based on crisis management, little emphasis is given to energy efficiency and reducing carbon emissions until the world is hit by major shocks. The second scenario is termed Blueprints. Under this scenario new partnerships are developed at the local level to find local solutions and parties cooperate to address the challenges of economic development, energy security and environmental pollution, with a strong focus on the transition to a low carbon economy. In relation to planning global energy futures, Shell clearly favours the second scenario.

A similar approach to evaluating the future of Clyde Refinery would be sensible. The proposal (see Section 10 Recommendation 2) is that Shell, the unions and other public and private parties engage in a systematic dialogue and analysis with respect to the possible future options for the refinery before any decision to proceed to its closure is taken. Four scenarios are proposed:

- S1 Current Trends Scenario
- S2 Strategic Efficiency and Productivity Initiative Scenario
- S3 Import-Only Terminal Scenario
- S4 Sydney Fuel and Energy Centre Scenario

S1 is a business as usual scenario, based on maintaining current capital and operating expenditures, with little emphasis on plant restructuring and continuous improvements in efficiency and productivity.

S2 incorporates assumptions and data relating to a commitment by the parties to implement major efficiency and productivity improvements at the Clyde.

S3, the current Shell proposal, is based on the economic case to convert the refinery into an import-only terminal.

S4 is based on building on the unique locational and competitive advantages of the site and its associated infrastructure networks of pipelines, rail and energy to attract new energy and fuel related investment, either by Shell or other parties.

III The broader public policy implications of the closure of Clyde

The closure of the Clyde Refinery raises a series of public policy and planning issues in relation to the future structure and operations of the refining and marketing industry and its infrastructure in NSW. In summary these are:

1. The likely adverse impacts on the future structure and competitiveness of the refiner-wholesale marketing industry in NSW and Australia of this major development;
2. The opening of import-only oil industry infrastructure to competitive access;
3. The critical scarcity of land suitable for heavy industry, linked to critical components of oil industry, shipping, rail and road infrastructure to cater for the strong projected future growth in the city and specifically for emerging liquid fuel and energy investment.

As noted above, Shell has declined to provide any systematic quantified analysis which would enable the company's business case for closure to be subjected to an independent appraisal. Shell's reticence with respect to placing market-sensitive confidential business data in the public domain is well understood. Given the possible magnitude of the adverse impacts of the closure decision on direct and indirect employment and value adding, and possible future investment decisions, and the other public policy issues which arise in consequence, it would be appropriate for these matters to be the subject of a public enquiry process where the business justification for these decisions can be appropriately tested, while fully protecting Shell's confidential information.

If a decision is taken to close the refinery, it is recommended that the Unions call upon the NSW Government to seek for a Public Inquiry to be called by the ACCC to assess the possible impacts of the closure on competition, prices and security of supply and to identify possible actions which may be taken to minimize such adverse consequences.

As noted above the historical evolution of the domestic refining industry has left the four major companies each with dominant positions in the highly-concentrated national wholesale product which have broadly corresponded with their respective refining capacity. The companies each own and privately operate key components of the petroleum tanker discharge facilities; coastal bulk terminals and pipelines which are required to support efficient industry-wide operations in each state. This infrastructure will be critically important to the future operations in the industry if, as Shell contends, in future the major product stream to the market will be imported. The competitive advantage to Caltex of its ownership of "strategic infrastructure" in a market which is undergoing rapid restructuring has been drawn to the attention of Caltex shareholders.

Hitherto the ACCC and its predecessors have placed considerable weight on competition between the wholesale refiner-marketers in the national market environment, in which reciprocal supply has rested on ex-refinery exchanges in locations where a refiner-marketer lacks refining capacity. As noted above these historical exchange arrangements have progressively broken down as imports have increased.

The potential for private owners of unique infrastructure assets to collect economic rents is well recognized in both economic theory and public policy. Australian and international public policy is grappling with the issue of the equitable and efficient terms on which industry participants may have access to shared critical infrastructure in a number of industries, most notably in Australia in relation to telecommunications, electricity and gas transportation. To date the limited focus on access to petroleum industry infrastructure by the ACCC and the Commonwealth Government as noted above, has been on whether small independents wholesalers wishing to arrange direct imports (largely on an opportunistic basis) can acquire access to import facilities. These operators and their imports are at the margin of a highly-concentrated national market. The future of Sydney's petroleum pipeline network is a public policy issue and hasn't been subject to scrutiny, based on competition principals, since the State Pollution Control Commission report and findings of the environmental investigation into the proposed construction and operation of three pipelines for the transport of crude oil and petroleum products between Botany Bay and the Rosehill area, Sydney in 1975.

The refinery site, at the core of metropolitan geographical and infrastructure network, is expected to have a strategically significant role as an economic hub for energy and fuels over the coming decades. Sydney has a critical scarcity of land suitable for heavy industry and transport fuels refining and distribution. It is proposed that the CFMEU and AMWU approach Parramatta Council and the NSW Government to designate Clyde as a strategic transport fuel hub for Sydney and NSW.

Because of its metropolitan, state and national significance Clyde Refinery is subject to a number of planning instruments. The zoning for Clyde Refinery needs to be retained to support functions associated with petroleum refining, transport fuels research and wholesale distribution for the Greater Metropolitan Region and New South Wales. The refinery is currently zoned Regional Enterprise under the Sydney Regional Environmental Plan No 28. The refinery is located in the Camellia Precinct, where the refinery is located, and the Plan No 28 aims to protect and support the integrity of the Camellia Precinct as one of Sydney's significant industrial hubs. The area is also subject to State Environmental Planning Policy No. 33 – Hazardous and Offensive Development and is also subject to State Environmental Planning Policy No. 55 – Remediation of Land. Any change in land-use in the area covered by refinery activity is likely to result in risky and costly investigations and remediation. In the event of closure of refining, surplus lands at Clyde should be made available for alternative transport fuels refining, advanced biofuels and research and distribution. It is also proposed that the existing pipeline infrastructure, such as the Jet Fuel pipeline, be available to other companies seeking to supply fuel to Sydney Airport.

In the event that Shell confirms its intention to close Clyde, it is also recommended that the unions approach the NSW Government, to draw to the Government's attention the potential economic, social and environmental costs for Sydney and NSW associated with the closure of the refinery and the importance of retaining and developing the site for transport fuels refining and distribution. Central considerations are:

- the land use and environmental issues associated with increasing petroleum product vessel movements and berthing operations at Gore Bay in Sydney Harbour, and particularly;
- the environmental and remediation costs associated with cleaning up a contaminated site; and
- the importance of retaining the Clyde site for future land uses for the refining, blending and distribution of alternative liquid transport fuels.

IV. The time horizon for the closure decision in the context of the decision and planning cycles in relation to Clyde.

Shell has made significant recent investments in Clyde most notably in asset integrity projects and turnarounds and catalysts in the order of US\$138 mill in 2008 and reports that its recent refining margin has exceeded breakeven. Recent substantial investments at Clyde (and in other domestic refineries) were required to meet the stricter product emission standards adopted by the Australian Government and a substantial part of these investments was subsidised by means of excise incentives provided to assist the refining industry in this transition process. Clearly it would be preferable for Shell shareholders and Australian tax payers to realize a return on these significant investments. From profitability trends in the industry which have been reviewed above in Section 2, it would seem that the integrated downstream margin available to Shell, Caltex and the other integrated-refiner marketers in NSW, has been positive and recently increasing. In this market context there would seem to be a window beyond the 2013 statutory shutdown, in which to achieve sustainable improvements in the complex utilisation of Clyde which could sustain better than break-even refining margins in NSW.

10 An Action Plan

Shell has put forward a Case for Change to convert the Clyde Refinery into an Import-Only Terminal. The company states that it has not made a final decision and it is willing to consult with the unions and discuss options.

The alternatives at this stage appear to be a “business as usual” model versus the Import Only Terminal. Shell does not seem to be carefully considering other options to support a dynamic and viable refinery. This limits the debate regarding the future. The unions and delegates make it clear that standing still is not an option. They emphasise the importance of improving refinery complexity and new opportunities to meet transportation fuel demand growth.

This report recommends that a new approach be advocated for looking at the future of the refinery based on the following principles:

- Building a partnership between industry, government, unions and consumers to chart a future for the refinery.
- Investing in growth areas and alternative fuels including renewables
- Continuous restructuring based on upgrading technologies and skills to maintain the viability of the refinery
- Continuous improvements in energy-efficiency within the refinery and a shift to lower carbon outcomes for users.

Recommendation 1

It is recommended that the CFMEU Mining and Energy Division and AMWU approach the Board of Shell Australia Ltd. and Shell Refining Australia Pty Ltd. with a view to establishing a joint Efficiency and Innovation Improvement Working Group with a mandate to identify initiatives at Clyde to:

- Improve utilisation of the cat cracker and other processing units
- Improve the reliability of the refinery
- improve technological innovation and cost efficiency
- achieve targeted and measurable reductions in unit processing costs
- Improve product quality processes to optimise market supply availability
- Improve cost efficiency by concentrating on the core local business refining
- Achieve cost reductions by best in class contractor management systems

Recommendation 2

It is recommended that the CFMEU Mining and Energy Division and AMWU approach the Board of Shell Australia Ltd., seeking agreement to undertake a major Scenarios Planning Project with the participation of the unions to look at future development and restructuring options for the refinery.

Four options (defined in Section 9) should be investigated:

- S1 Current Trends Scenario
- S2 Strategic Efficiency and Productivity Initiative Scenario
- S3 Import-Only Terminal Scenario
- S4 Sydney Fuel and Energy Centre Scenario

With scenario planning, the assumptions and trajectories of different scenarios are carefully compared before critical decisions are made about the preferred option. The approach outlined here is based on the scenario planning methodology developed by Shell over the last 30 years.

Recommendation 3

It is recommended that the CFMEU Mining and Energy Division and AMWU approach the NSW Government with a request to obtain summary expert advice on the realistic prospects of an international mid-tier refining company acquiring the Clyde Refinery from Shell as a going concern subject to the following:

- The assets being available in the market as an alternative to closure at realistic valuations reflecting the age, size and benchmarked performance of Clyde;
- Shell's agreement to purchase product from the refinery for a fixed contracted term at competitive import parity prices;
- Assurance of competitive access for the purchaser to the associated major oil industry infrastructure linked to the refinery; and
- Confirmation in principle that a transaction involving a new competitive refining entrant would not be opposed by the ACCC.

Recommendation 4

In the event of the confirmation of Shell's decision to close the Clyde refinery, it is recommended that the CFMEU Mining and Energy Division and AMWU take the following actions:

- a) Approach the NSW Government with a request to prepare an expert summary proposal for a competitive oil industry infrastructure open-access policy framework in relation to each component of the oil-industry infrastructure in NSW (currently privately owned and operated) on which the future of an import-dependent competitive and contestable product supply chain to NSW will depend.
- b) Request the NSW Government to initiate a Public Inquiry into the future of Sydney's refining and wholesale assets and, bring together major state agencies concerned with planning, infrastructure, industry and trade and competition policy, to adopt a "whole of government approach" to increase competition, research and innovation and investment in the downstream petroleum and advanced biofuels industry.
- c) Seek the agreement from the NSW Government for a consultation with key industry stakeholders with respect to the adoption of oil industry infrastructure access policy framework.

- d) Seek the support of Parramatta Council and neighbouring councils, petroleum consumers and local industry for the adoption of an effective oil industry infrastructure access policy framework to enhance investment and employment in Western Sydney.

Recommendation 5

It is recommended that the CFMEU Mining and Energy Division and AMWU approach Parramatta Council and the NSW Government to designate Clyde, with its geographical and infrastructure networks, as a strategic transport fuel hub for Sydney and NSW.

Because of its metropolitan, state and national significance Clyde Refinery is subject to a number of planning instruments. The zoning for Clyde Refinery needs to be retained to support functions associated with petroleum refining, transport fuels research and wholesale distribution for the Greater Metropolitan Region and New South Wales. The refinery is currently zoned Regional Enterprise under the Sydney Regional Environmental Plan No 28. The refinery is located in the Camellia Precinct, where the refinery is located, and the Plan No 28 aims to protect and support the integrity of the Camellia Precinct as one of Sydney's significant industrial hubs. The area is also subject to State Environmental Planning Policy No. 33 – Hazardous and Offensive Development and is also subject to State Environmental Planning Policy No. 55 – Remediation of Land. Any change in land-use in the area covered by refinery activity is likely to result in risky and costly investigations and remediation. In the event of closure of refining, surplus lands at Clyde should be made available for alternative transport fuels refining, research and distribution, and existing pipeline infrastructure be available to other companies seeking to supply fuel to Sydney Airport.

Recommendation 6

In the event that Shell confirms its intention to close Clyde, it is recommended that the CFMEU Mining and Energy Division and AMWU approach the NSW Government, through the Department of Premier and Cabinet, emphasising the potential economic, social and environmental costs for Sydney and NSW associated with the closure of the refinery and the importance of retaining and developing the site for transport fuels refining and distribution. Central issues are:

- the land use and environmental issues associated with increasing petroleum product vessel movements and berthing operations at Gore Bay in Sydney Harbour, and particularly;
- the environmental and remediation costs associated with cleaning up a contaminated site; and
- the importance of retaining the Clyde site for future land uses for the refining, blending and distribution of alternative liquid transport fuels.

Recommendation 7

In the event that Shell confirms its intention to close Clyde, it is recommended that the CFMEU Mining and Energy Division and AMWU, perhaps with the support of Parramatta Council, CSIRO and organisations such as the Biofuels Association of Australia, work together and lobby to get support to increase competitive access for new investors to the site to enhance broader economic, social and environmental goals. In particular the group should seek to identify prospective credible businesses which could become the nucleus of a bio-fuel technology hub in the Clyde precinct. If a viable

grouping of companies can be identified, an action plan should then be identified to facilitate the establishment of the bio-fuel technology hub in the Clyde precinct with business and Government support.

In Australia and New Zealand - the airlines, CSIRO, Caltex and various biofuels companies are working towards establishing a biofuels refinery in Sydney that can meet ambitious airline targets at Sydney Airport to utilise non-food crop biofuels to supply a share of the total airline fuel requirements by 2020. This is a significant opportunity for a country with an advanced science base to nurture the growth of a biofuels industry. Shell, with its global expertise, is potentially a major player in the development of this nascent and exciting industry in Australia. The Clyde refinery, with its existing skill base, processing units and, in particular, its pipeline connections to Sydney Airport, is ideally placed as a possible location for a refinery. What needs to happen is industry, scientific and government collaboration to consider the Clyde Refinery as an option for an Australian Biofuels Refinery.