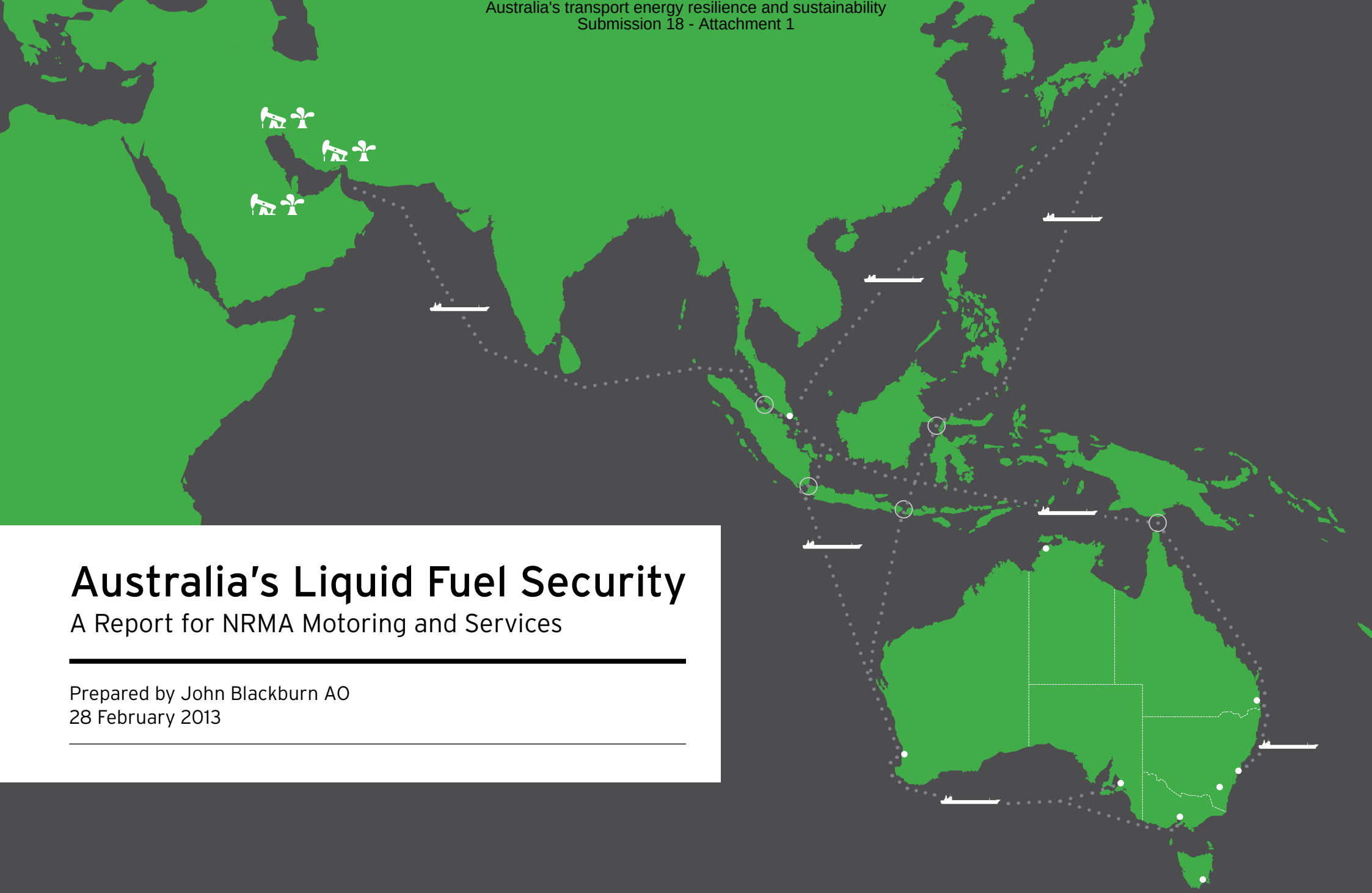

Australia's Liquid Fuel Security

A Report for NRMA Motoring and Services

Prepared by John Blackburn AO
28 February 2013

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In 2012 he was the Chairman of the Kokoda Foundation Board, the Deputy Chairman of the Williams Foundation Board and a director of the Australian Strategic Policy Institute Council. He holds a Masters of Arts and a Master of Defence Studies. In February 2011 the Kokoda Foundation published his report *Optimising Australia's Response to the Cyber Challenge* which he co-authored with Dr Gary Waters.


AP via AAP / Greg Gibson

AP via AAP / Peter Hermann

Left: Oil wells burn out of control outside Kuwait City, 1991. Oil supply interruptions in the Middle East can be felt rapidly in import dependent countries such as Australia. Above: Widespread power outages in 2012 in the USA, after Superstorm Sandy, caused long lines at service stations with power, as residents filled jugs with fuel for their portable generators.

Executive Summary

As the world's ninth-largest energy producer, Australia has abundant renewable and non-renewable energy resources. Despite these resources, we are heavily dependent on imports of refined petroleum products and crude oil to meet our liquid fuel demand. This import dependency has increased in recent years.

Our transport systems are wholly oil dependent. The reasons for this dependency may be economically sound due to the relative lower cost of oil but the lack of fuel diversity significantly impacts our resilience if we experience supply interruptions or a reducing availability of affordable oil supplies in the future.

The very small consumption stockholdings of oil and liquid fuels in Australia, combined with what appears to be a narrow assessment of our fuel supply chain vulnerabilities, does not provide much confidence that the strategic risks to our fuel supply chain are well understood and mitigated by our nation's leaders, the business community or the population at large.

In essence, we have adopted a "she'll be right" approach to fuel security, relying on the historical performance of global oil and fuel markets to provide in all cases. Unfortunately, as a result of our limited and decreasing refining capacity, small stockholdings and long supply chains, our society is at significant risk if any of the assumptions contained in the vulnerability assessments made to date prove false.

We would not be the first country to get our assumptions wrong. In that respect, history can be relied upon.

Australia's Liquid Fuel Security

As the world's ninth-largest energy producer, Australia has abundant renewable and non-renewable energy resources. Despite these resources, we are heavily dependent on imports of refined petroleum products and crude oil to meet our liquid fuel demand and our import dependency has increased over recent years. Any major interruption to the supply chain would significantly impact our way of life.

Supply shortfall – an increasing financial burden

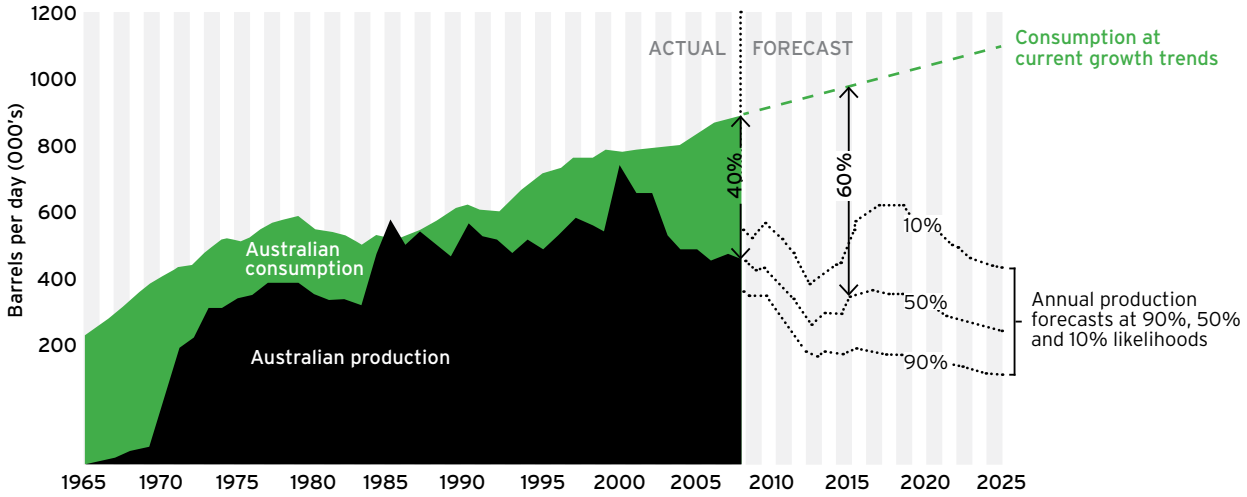


Figure 1: Australia's imported oil dependence[1]

"... Australia must have a mature debate about our energy sector and implications of different decisions. This means there must be a deeper community engagement in energy policy issues and outcomes."

Draft Energy White Paper, 2011[3]

The reason we are dependent on imported energy, despite having an abundant energy resource base, is that the types and quantity of energy we currently consume in the form of liquid fuels cannot be readily supplied from within our own country. We are therefore dependent on global supply chains. As our energy needs increase in the future, so will our dependence on imported oil and in turn our financial burden. Figure 1 illustrates the supply challenge posed by a possible 50% increase in imported oil by 2015 in the face of decreasing Australian production.

The Australian Government does not view this situation as an energy security threat; the 2011 National Energy Security Assessment found that a significant reduction in refining capacity is not expected to cause fuel security problems, given our access to well-functioning global markets that can provide adequate and reliable supplies.[2]

This report seeks to contribute to the public debate by raising the question of whether we should be concerned about this increasing dependency and whether or not our nation is resilient enough to withstand interruptions to the supply chain.

In order to explore the issue this report will:

» Sketch an overview of our oil dependence and the fuel supply chain;

» Outline how we are critically dependent on an uninterrupted supply of liquid fuels in the transport sector and;

» Examine whether or not we are resilient enough to deal with future supply interruptions.

While the probability of supply interruptions may be low in the majority of cases, the consequences of such interruptions may be so severe as to warrant the same contingency preparations we apply in other areas. One example is Defence. We spend in excess of $25,000,000,000 per annum to build a Defence Force which is capable of addressing what are, in many cases, low probability but high consequence risks.

As this report will discuss, in the case of liquid fuels security we do not appear to be prepared to invest in our national resilience, preferring to leave market forces and global supply chains to provide for us in the case of an emergency arising or in circumstances where risk levels become elevated above the historical norm.

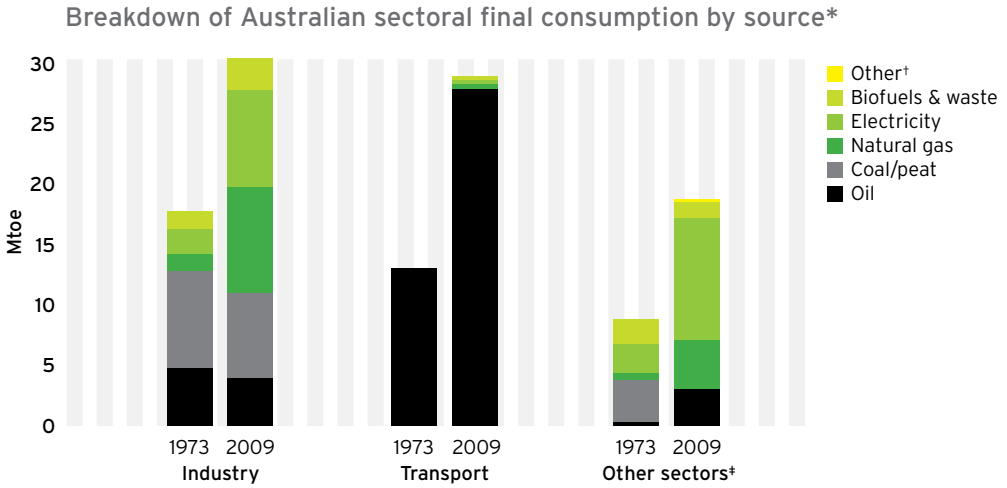
Unfortunately, our unwillingness to assure our liquid fuel supplies puts at risk many of the societal functions that we take for granted. For example, without an adequate supply of liquid fuels we could not access health services; food production and distribution would be severely curtailed; most businesses could not operate; our personal and much of the public transportation system could not function; and our Defence Forces could not operate.

Essentially, our society as we know it would cease to function.

1 Peak oil & the advent of demand destruction, Zeibots & Bell, Australian Planner, December 2010.

2 http://www.ret.gov.au/energy/Documents/ewp/2012/Energy_%20White_Paper_2012.pdf, p 126.

3 http://www.ret.gov.au/energy/facts/white_paper/draft-ewp-2011/Pages/draft-ewp.aspx, page xii.



* Includes non-energy use.
† Includes direct use of geothermal/solar thermal and heat produced in CHP/heat plants.
‡ Includes residential, commercial and public services, agriculture/forestry, fishing and non-specified.

Figure 2: Australia's oil dependence[4]

Oil Dependence

Our transport systems are wholly oil dependent. While the reasons for this may be economically sound due to the relative lower cost of oil, the lack of diversity significantly impacts our resilience in the face of a supply interruption or a future resource limitation.

Figure 2 is the International Energy Agency (IEA) breakdown of Australian oil consumption by sector, comparing the 1973 and 2009 statistics. Energy diversification has taken place in the "industry" and "other" sectors over time; however, in the case of the transport sector, it is evident that diversification has not occurred.

The dependence of our society on oil, and in particular transport fuels, cannot be over emphasised as the delivery of essential goods and services cannot occur without reliable fuel supplies.

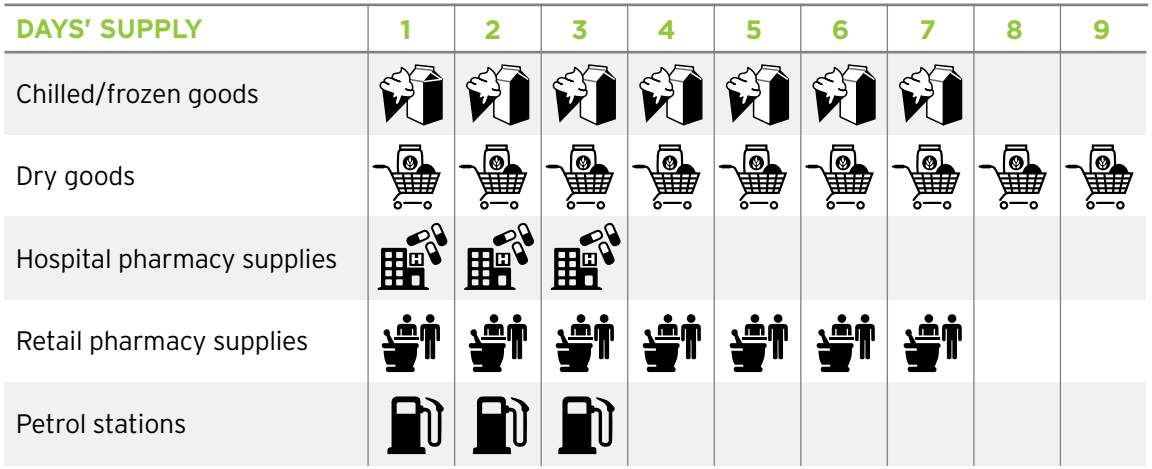
Food supply dependencies

Australia is a net exporter of food but we are not self-sufficient in the domestic food supply chain. Global supply networks are increasingly important in the Australian food sector, and many types of foods, or inputs to food, are imported. While domestic manufacturing could, over time, be re-tooled to replace such imports, in a sudden crisis we need mechanisms to deal with immediate shortages.[5] There are two ways disruption of oil supplies might impact food supplies: the supply of imported foods and the distribution of those and nationally produced food.

The question for Australians to consider is: how resilient is our food chain in the face of disruption? It is reasonably resilient when a natural disaster strikes but highly vulnerable to the combined effects of more than one disaster. In the event of a major disruptive event, the risk that Australians in affected regions would go hungry is growing, especially if separate events in eastern states were to coincide.[6]

Our food supply chain is potentially vulnerable to large-scale events such as a national fuel

4 http://www.iea.org/stats/pdf_graphs/AUBSFC.pdf
5 Resilience in the Australian food supply chain, February 2012, Department of Agriculture, Fisheries and Forestry.
6 ibid, page vi.



Limited retail stockholdings would impact all Australians: at an individual level, in our businesses and in Government services such as our Defence Forces. No one would be immune from the impact of fuel shortages.

Figure 3: Australia's estimated stockholdings at point of sale

shortage; for example, a shortage of diesel fuel for food distribution in the case of a national fuel emergency.[7] The huge scale of our food distribution system is surprising to most people. In NSW alone, food distribution comprises 14 million cases a week through 25,000 truck trips from retail distribution centres and direct suppliers to retail outlets.[8]

The average stockholdings of food in supermarkets is estimated to be seven days in the case of refrigerated/frozen foods and about nine to 10 days in the case of packaged foods, as illustrated in Figure 3. Households have between two and four days in stocks. Supply chain efficiencies are likely to reduce the level of stockholdings even further in the future.

Pharmaceutical supply dependencies

Pharmaceuticals are primarily an imported product and are distributed through a small number of centralised warehouses. Chemists hold approximately seven days of pharmaceutical supplies in stock at normal usage rates. Hospitals hold about two to three days' worth of stock to minimise inventory costs and waste. Any interruption to the pharmaceutical logistics chain could prove disastrous for many people. As with food supplies, the pharmaceutical distribution system is wholly dependent on the transport infrastructure and the continuity of fuel supplies.

Utilities dependencies

The analysis of supply chain vulnerabilities in the case of natural disasters has highlighted the dependence of utilities on the transport infrastructure and in turn the fuel supply chain. For example, the supply of drinking water is critically dependent on transport to provide chemicals for purification and to maintain water distribution systems.

Business and personal transportation dependencies

NSW Government travel statistics for Sydney show the apportionment between public and private transportation in 2012.[9] In Sydney, 67.9 per cent of all resident travel was by car, with only 11.1 per cent by bus or train. However, train usage during peak hours is very high, with passenger loads in the order of 120 per cent to 150 per cent of seating capacity. Any interruption to fuel supplies, or even any significant increase in the cost of fuel, would have a dramatic effect on the functioning of Sydney. The public transportation system would not be able to cope with the large increase in demand. The impact on workers, businesses and services would be significant.

7 ibid, pages viii–ix.
8 ibid, page 6.
9 NSW Bureau of Transport Statistics – NSW and Sydney Transport Facts April 2012.

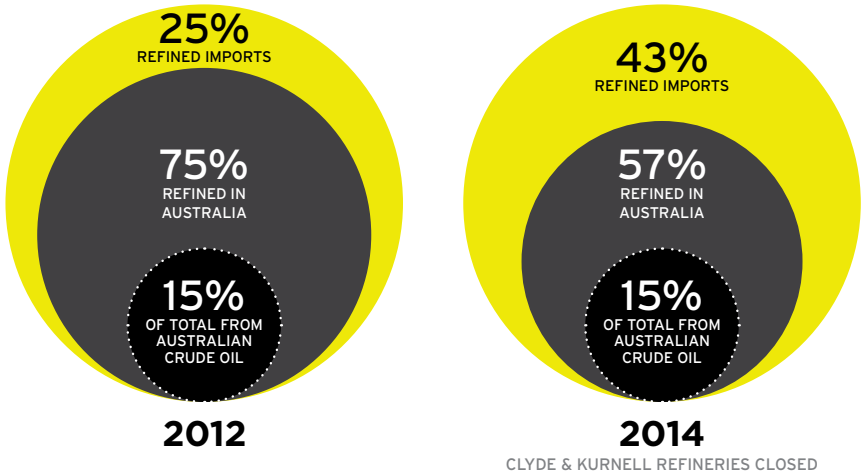


Figure 4: Impending changes in Australia's balance of imported and locally refined fuels

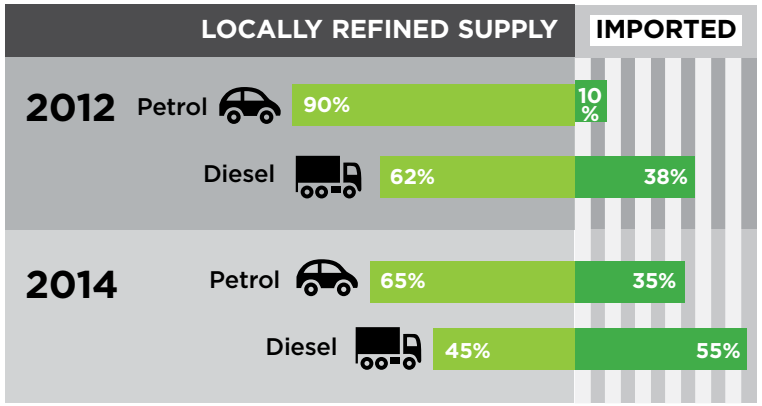


Figure 5: Impending changes in the sources of Australia's petrol and diesel fuel supplies

The Liquid Fuel Supply Chain

The majority of Australia's crude oil production is exported because the qualities and characteristics of the oil are more suited to export markets than the Australian refinery market. Australian refineries currently source around 80 per cent of their crude oil needs from overseas.

Liquid fuels are a significant component of Australia's energy system, representing 48 per cent of final energy consumed. Transport alone consumes approximately 35 per cent of Australia's energy use and some 70 per cent of all liquid fuel supplies.

Australian refineries currently produce around 75 per cent of Australia's petroleum needs. However, domestic refining capacity will reduce by around 10 per cent in 2013 with the closure of the Clyde refinery in Sydney and a further 18 per cent when the Kurnell refinery in Sydney closes. These closures will result in greater reliance on imports for refined product. Recent comments made by a Shell spokesman suggest their Geelong refinery may also not be financially viable.[10] The loss of this refinery would leave only four in Australia.

Beyond 2014 it is likely that increasing domestic production costs and the cost of upgrading ageing refinery infrastructure will further reduce Australian refining capacity, especially given the option of lower cost refined product imports.

Figure 4 illustrates the impending changes in Australia's balance of imported and locally refined fuels as a result of the closure of 28 per cent of Australia's oil refinery capacity by 2014.

The loss of refining capacity will probably change the sources of Australia's petrol and diesel fuel supplies, as illustrated in Figure 5.

10 http://www.heraldsun.com.au/business/companies/future-of-shell-geelong-refinery-borderline/story-fndgp8b1-1226476443125, 18 December 2012.

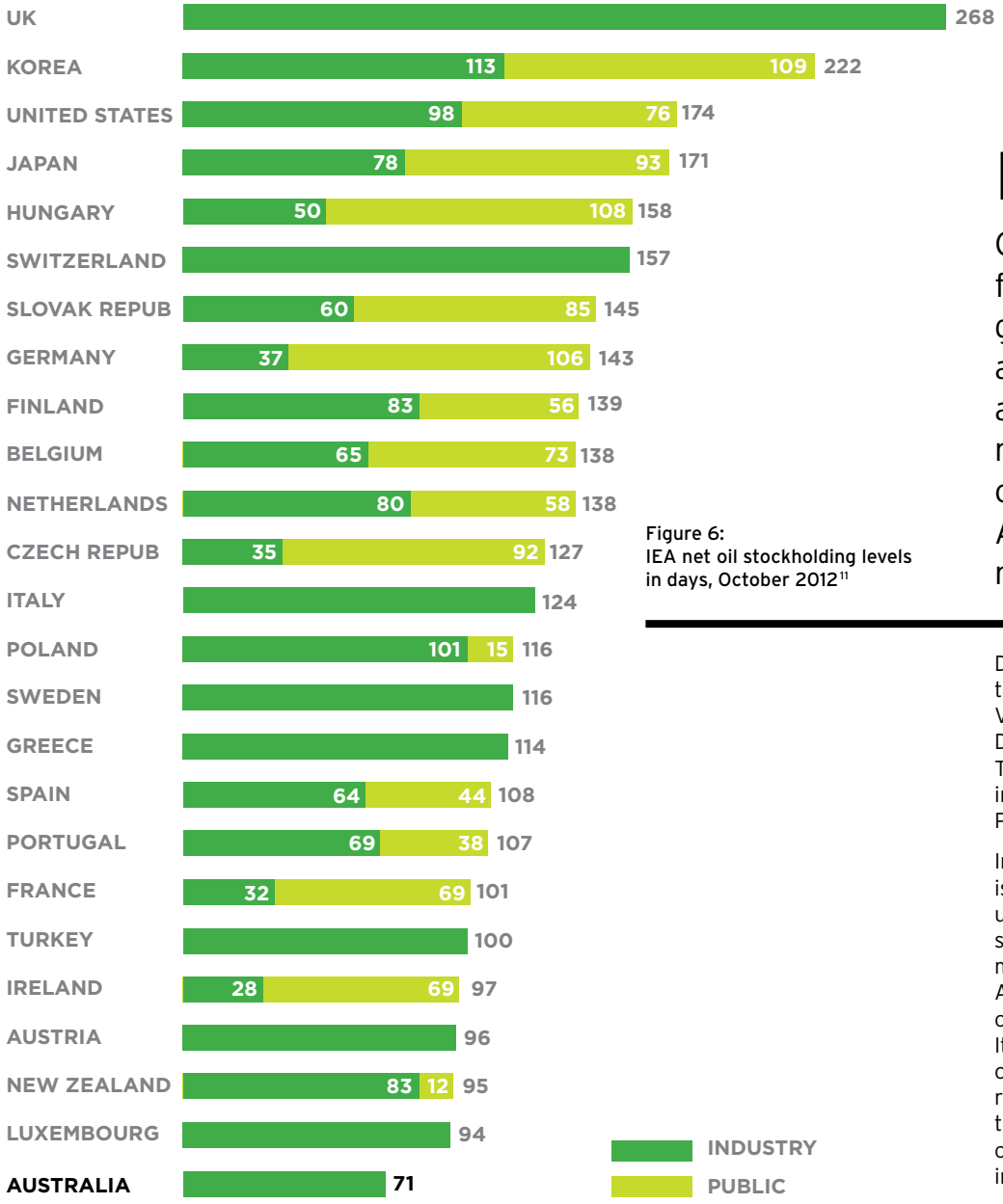


Figure 6:
IEA net oil stockholding levels in days, October 2012[11]

Liquid Fuel Stockholdings

Given our critical dependence on oil for the effective functioning of our society, it would seem reasonable to have a good understanding of how much oil and petroleum products are in the supply chain and where they are located. It would also be reasonable to assume we would have some stocks in reserve in case of an interruption to the supply or shipping of oil and/or petroleum products, to the production of products in Australian refineries or in the fuels distribution system. This is not necessarily the case.

Do we know what stocks exist and where they are? Perhaps not. The 2011 Liquid Fuels Vulnerability Assessment produced for the Department of Resources Energy and Tourism highlighted gaps and discrepancies in the reporting of stocks in Australian Petroleum Statistics.[12]

In addition to stocks for our own use, Australia is obliged to hold oil reserves that can be used to respond to some form of global oil supply emergency. In 1979 Australia became a member country of the International Energy Agency (IEA). Before becoming a member a candidate country must be part of the OECD. It must also demonstrate (amongst other conditions) that it has, as a net oil importer, reserves of crude oil and/or product equivalent to 90 days of the prior year's average net oil imports that the government could immediately access in a national emergency.

Figure 6 summarises the stockholding levels of IEA member countries as of October 2012.[13] Australia, with only 71 days' holdings was the only country out of 28 member countries that failed to meet its 90-day net oil import stockholding levels. So the world's ninth-largest energy producer is the lowest and only non-compliant stockholder in the IEA.

Australia's level of IEA reportable stockholdings has been decreasing over time; according to an Australian National Audit Office report, our net import stockholding in 2002 was 310 days. By 2008 it had dropped to 101 days. Projections in the 2011 Liquid Fuels Vulnerability Assessment conclude that, with growing net imports, the ratio of stocks to net imports is likely to decline. In other words, our ability to meet our IEA obligations will likely decline even further.

The question is whether or not this is significant. While the failure to meet IEA obligations is

11 Net exporting members of IEA not included in Figure 6.

12 ACIL Tasman Liquid Fuels Vulnerability Assessment Report dated October 2011, page xiii.

13 http://www.iea.org/netimports.asp

It is difficult then to understand how Australia could ever meet its obligations to the IEA from crude oil and petroleum stockholdings that appear to average 23 days of actual consumption and which are held by private companies who utilise those stocks for "just in time" delivery.

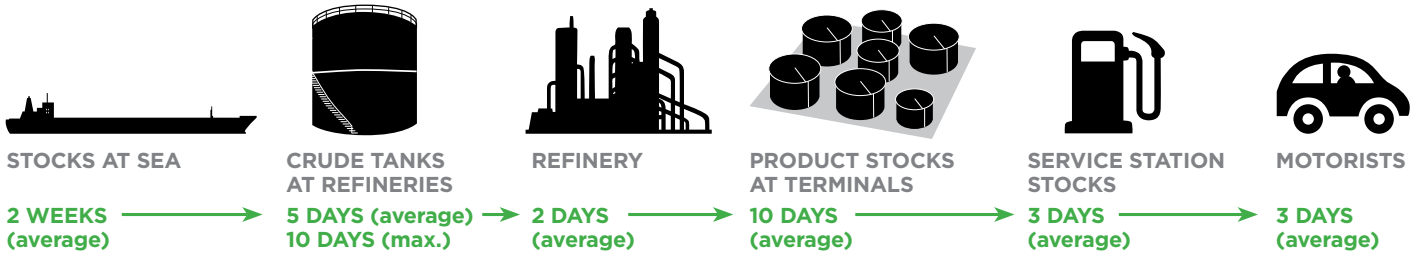


Figure 7: Estimated oil and liquid fuel stockholdings in Australia (Australian Institute of Petroleum, 2008)[14]

certainly serious, the underlying lack of stockholdings is perhaps of greater concern. Simply meeting the IEA obligations will not address our supply chain vulnerabilities.

The 71 days of industry stockholdings shown in Figure 6 is not 71 days of actual consumption in Australia. It is based on a "net imports" calculation.[15] The 71 days that we report as Australia's stockholdings to the IEA is roughly equivalent to 23 days of actual consumption of liquid fuels.

The Australian Institute of Petroleum 2008 Report "Maintaining Supply Reliability in Australia"[16] supports this rough estimate. It estimates there are about 10 days of crude oil stocks at refineries, 10 days of petroleum products in the distribution chain and perhaps three days in the hands of consumers, as illustrated in Figure 7. The 14 days of estimated stocks at sea are not included in IEA estimates as they are not yet delivered to Australian territory.

The Australian Institute of Petroleum report also notes there is little or no surplus tankage for crude oil at refineries and that the crude tanks operate between full and relatively low inventory in line with the shipping pattern. It is difficult to understand how Australia could ever meet its obligations to the IEA from crude oil and petroleum stockholdings that appear to average 23 days of actual consumption and which are held by private companies who utilise those stocks for "just in time" delivery.

If the supply chain is broken down further into specific fuel types then the supply risks become more apparent. For example, Australia currently imports 38 per cent of diesel as a refined product. The remaining 62 per cent is produced domestically and depends largely on imported oil; only 12 per cent of diesel is sourced from Australian oil processed in Australian refineries. By 2014, domestic production of diesel could reduce to only 45 per cent of domestic demand.

If the Government decided that increased stockholdings were in our national interest, then such stockholdings would need to be in crude oil in order to avoid issues related to the cost and shelf life of refined fuels. However, a domestic refining capability would be essential to turn those stocks into the required fuels when needed.

It is clear that Australia does not have a policy or plan related to the level of refining capacity that should be maintained in Australia.

14 http://www.aip.com.au/pdf/AIP%20Paper%20-%20Maintaining%20Supply%20Reliability.pdf **15** The 71 days is calculated by dividing the amount of commercial fuel and oil stocks in the country by the average daily amount of imports minus the average daily rate of oil exports (even if they cannot be used by our refineries as they are currently configured.) **16** http://www.aip.com.au/pdf/AIP%20Paper%20-%20Maintaining%20Supply%20Reliability.pdf

As at 2011, Singapore provided 51% of Australia's imports of petroleum products.

ACIL Tasman Fuel Vulnerability Assessment

Liquid Fuel Supply Risks

The convenience of our modern lifestyles, particularly in large cities, leads us to expect the supermarkets and chemists will be stocked and there will be fuel at service stations when we need it. While city living has significant benefits, our modern lifestyles have, unfortunately, made us complacent.

We view fuel largely as a commodity supplied by the market in response to consumer demand and not as a fundamental enabler of capabilities that are essential to the effective functioning of our society. This way of thinking leads to a majority of consumers, including many in Government, assuming that fuel supplies will be provided by the market in all situations. We should be asking what measures are being taken to assure a minimum essential level of supply in the event of an interruption to the fuel supply chain.

The fuel supply chain is comprised of multiple elements, each with the potential to impact the delivery of fuel to the end customer. These elements include: oil sources, trading systems, shipping, ports, refineries, transport, distribution/storage, point of supply and consumers, as illustrated in Figure 7.

The 2012 Energy White Paper[17] and its supporting analysis primarily addresses two stages of the fuel supply chain's near term risks.

The first is the potential for interruption to the oil supply, as has historically occurred during past Middle East conflicts. The 2012 Energy White Paper and the associated 2011 Liquid Fuels Vulnerability Assessment rightly point out that in each case, oil markets have adjusted to address these challenges. While the cost of oil may rise during such events, the nature of the global markets is such that supply can be maintained. In this case, historical precedent determines that the risk of supply interruption would be low.

A second scenario, explored at some depth in the 2011 Liquid Fuels Vulnerability Assessment, is that of a 30-day interruption to supply from Singapore, a scenario type also specified by the Department of Resources, Energy and

17 The 2012 Energy White Paper sets the Australian Government's strategic policy framework to address energy sector challenges and future directions in the way energy is produced and used.

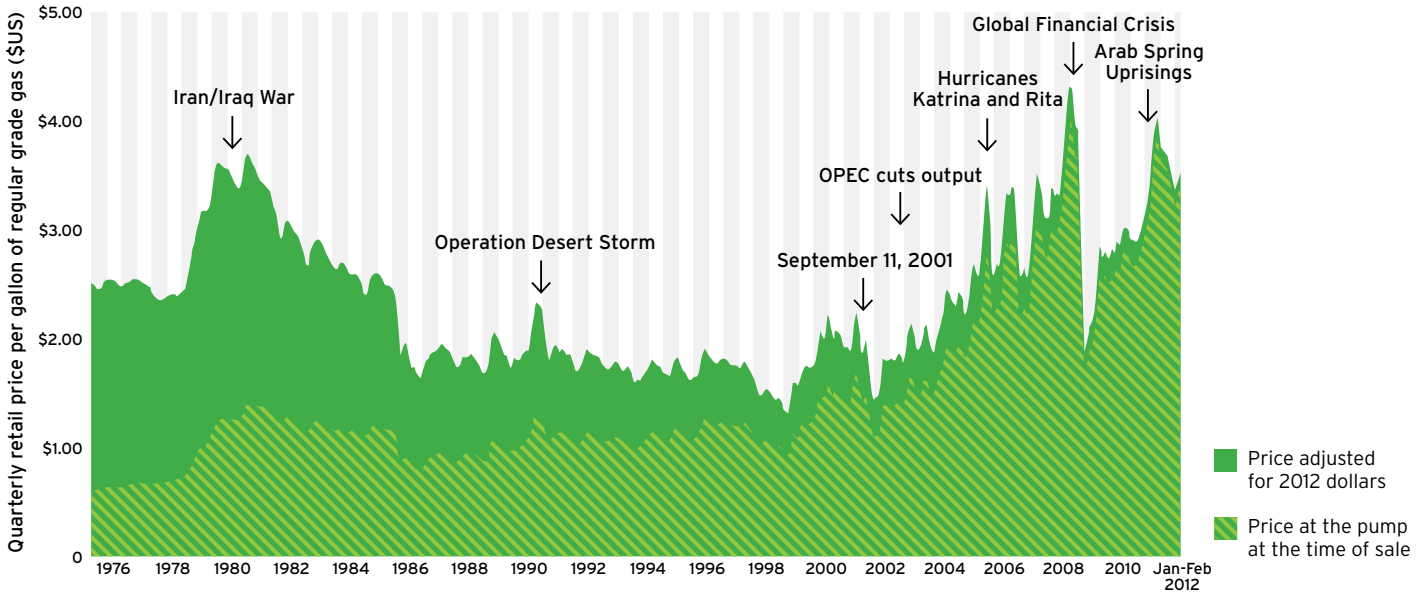


Figure 8: Global instability causes unpredictable price spikes (United States Energy Information Administration)[18]

Tourism in their assessment. The broad conclusion by the Department of Resources, Energy and Tourism was that oil markets would respond adequately to such an event and the impact on Australian consumers would be contained. The assessment concludes that oil and fuel supplies would continue but that the price of the oil or petroleum products would rise during the supply disruption. The impact of price rises on our economy and the affordability of transport for the average consumer would be highly dependent on the level of price rise and the exchange rate at the time.

Fuel price impacts

As Figure 8 illustrates, there is a clear relationship between major global events and pump prices. These global events as displayed on the graph relate to spikes in crude oil prices which manifest themselves into pump price movements.

The history of petrol price movements in Australia since the 1970s shows that crude oil price spikes are translated into higher prices at the pump within 7 to 10 working days. The price rises are passed on through the entire transport logistics chain, resulting in higher prices for all goods and services. These fuel price spikes have tended to reverse themselves once the upward pressures associated with the oil price spike have abated.

However, the 1978 to 1982 oil crisis, which was associated with the Iranian Revolution and the subsequent Iran-Iraq War, showed huge price spikes that have not been reversed. The average price of petrol in Australia rose from 19.7 cents per litre in 1978 to 39 cents per litre in 1982. This doubling was not reversed. Average prices have trended upwards ever since, apart from during the 2008 Global Financial Crisis.

The initial price surge of the 1978-1982 oil crisis was driven by disruptions to oil supply associated with the Iran Revolution. However, the second and third spikes in this period were attributed to a resurgence of global economic activity (in Europe and the United States) combined with speculative demand driven by fears of military conflict in the Persian Gulf and consequential oil supply interruptions. This was in the context of high oil production capacity utilisation rates in OPEC countries and worldwide.

A period of continued supply interruptions and production cuts throughout 1980 and 1981 resulted in increasingly higher fuel prices for Australian motorists.

This period demonstrates that ongoing tensions associated with initial supply disruptions can lead to significant price increases that have not been reversed. The liquid fuel vulnerability issue becomes a chain of events that can result in a doubling of average fuel prices for motorists. Fuel vulnerability in the current global environment could be easily heightened by a similar chain of events.

It is worthwhile considering what other risks should be included in an analysis of the fuel supply chain that are outside the terms of reference of the 2011 Liquid Fuels Vulnerability Assessment. The Vulnerability Assessment addresses the global market and wider supply chain perspectives but not the vulnerability of Australia's specific supply chain in any detail.

Some potential near to mid term risks are not addressed in depth in the 2012 Energy White Paper. These include the consideration of liquid fuels needs during times of conflict. There is little comfort in an energy security assessment that is only valid during times of peace and regional stability. Figure 9 provides an overview of some of the supply chain vulnerabilities.

18 United States Energy Information Administration, sourced from http://www.whitehouse.gov/energy/gasprices

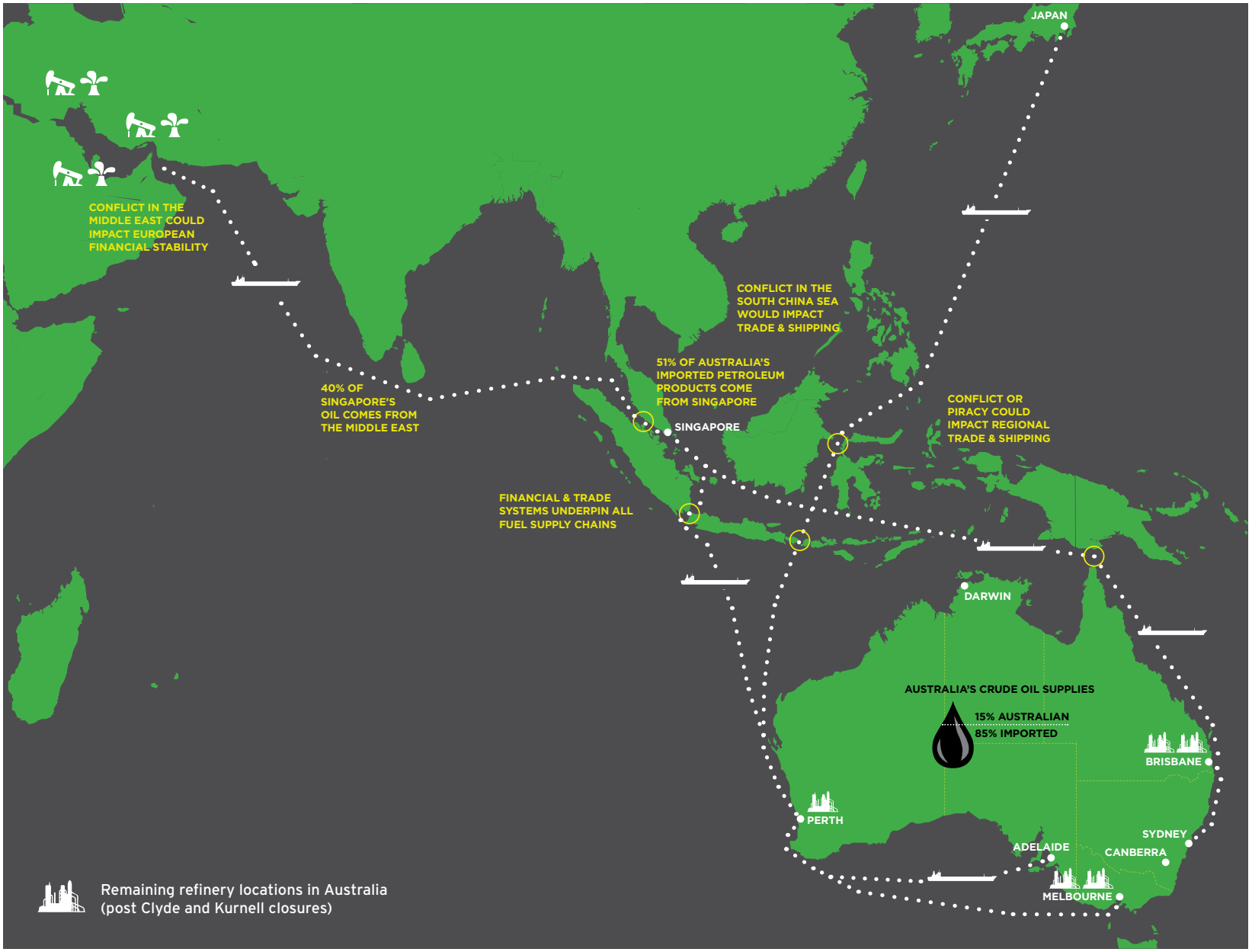


Figure 9: Fuel supply chain elements and vulnerabilities

Trading systems

While the oil trading market is well established and apparently robust, the purchase and shipment of oil requires trusted trading and credit systems. The viability of some shipping companies in times of significant economic turbulence should be considered. Ongoing debate regarding the risk to the global economic system is resulting in agencies, such as the United States Department of Homeland Security, conducting studies into the impacts of supply chain failures. Global supply chains are dependent on monetary confidence and bank intermediation. Growing and unsustainable debt levels, as evidenced in Europe and many other developed nations, put at risk the solvency of significant parts of the banking system. Their failure could lead to a corresponding collapse in segments of world trade.

Shipping

In times of significant economic turbulence, the security of shipping lanes is also an issue for consideration. Piracy, accidents, natural disasters, threats from state or non-state actors and closure of shipping lanes in times of tension or conflict – they all have the potential to impact the free flow of shipping and the timely delivery of oil supplies to Australia.[19] Defence planning has for decades included scenarios of defending the sea-air gap to the north of Australia. In such contingency operations, imported oil and petroleum supplies could be adversely impacted. In particular, Defence operations in the north of Australia would rely on the shipment of processed fuels into ports across the north of the country as there is not sufficient transport capacity in-country to transport the required amounts of fuels by land. The shipping lanes to these ports would run through the potential area of operations and would therefore be at risk. It is concerning to note the Defence Minister's recent speech to the Lowy Foundation: "Fuel supply is a critical factor in sustainability ... While the fuel supply chain can meet current requirements, its resilience under the stress of major operations is much less certain."[20]

Ports

In States with no refineries (South Australia, Northern Territory, Tasmania and NSW [by 2014]) all liquid fuels must be imported. Ports can be subject to disruption from a range of incidents including accidents, equipment failures, industrial action, natural disasters and terrorist attacks. For example, the primary fuel port in South Australia is at Port Adelaide; a single, narrow, shipping channel services the port. A blockage of that channel as the result of a shipping accident/incident, could result in significant and prolonged disruption to fuel supplies for Adelaide and a large part of the state. Such a disruption would be beyond the ability of market forces to respond, given the inability to transport sufficient fuel stocks overland to South Australia. Similarly, the Darwin Port Facilities could be a limiting factor as they would be the single point of entry for fuels to support domestic demands and potentially a significantly higher demand for Defence operations in times of contingency operations. The Australian Institute of Petroleum has also raised concerns about the adequacy of ports infrastructure to meet increased demand in the future.[21]

Refineries

There is little to no surplus tankage for crude oil at refineries so a delay in arrival of oil shipments could interrupt fuel production. As with ports, refineries can be subject to

19 For a discussion of such threats see TTCP Report, Energy Security Threats, June 2011 (http://drdc-rddc-gc.academia.edu/PeterJohnston/Papers/840169/Energy_Security_Threats)

20 Defence Minister's speech to the Lowy Institute, 9 August 2012.

21 http://www.aip.com.au/pdf/AIP%20Paper%20-%20Maintaining%20Supply%20Reliability.pdf page 16.

disruption by a range of incidents including accidents, catastrophic equipment failures, industrial action, natural disasters and terrorist attacks. According to the Australian Competition and Consumer Commission, in 2008–2009 almost every Australian refinery had major production outages, both planned and unplanned.[22]

Transport

The distribution of oil and fuel within Australia is dependent on road transport (with the exception of limited rail transport capacity in North Western Australia for the mining sector). The number of road tankers available would limit interstate transportation of fuels. Fuel shortages would be compounded by a shortage of fuel to transport the fuel itself to the end-consumers.

Depots and points of supply

An issue of some concern is the decreasing storage capacity across the supply chain as a result of improved roads and delivery trucks. Approximately 80 per cent of petroleum product is delivered directly from the refinery or import terminal to service stations or other end-consumers.[23] As a result, there is less storage capacity along the supply chain and a resulting decline in the amount of product in the supply chain ex-refinery. Whilst this may make economic sense, the reduction in product levels in the supply chain makes the supply chain less resilient. "Large and unanticipated surges in demand … will always present a supply challenge because of the commercial imperative not to hold excess stocks in any part of the supply chain, and physical limitations in the supply chain."[24]

22 ACCC Report – Monitoring of the Australian Petroleum Industry, Dec 2009, page 34.

23 http://www.aip.com.au/pdf/AIP%20Paper%20-%20Maintaining%20Supply%20Reliability.pdf, page 8.

24 Ibid, 10.

The National Oil Supplies Emergency Committee, which provides the channel through which Commonwealth and State Governments create their overall management response to a national liquid fuel emergency, is comprised of representatives of the Commonwealth (the chair), the states and territories and the oil industry. There does not appear to be any representation of the end users. It would seem logical to include some consumer representation, perhaps through the Australian Automobile Association, which represents the interests of 7 million members across Australia.

Liquid Fuel Supply Emergency Responses

The IEA publishes the Emergency Response reports for Oil and Gas Security of 20 of the 28 IEA member countries. It is worthwhile comparing the approach of different governments to the stockholding issue.

The IEA report for the United Kingdom (UK) notes that the current reliance on imports is only marginal and that the country has well beyond the 90-day IEA stockholding levels (268 days as of October 2012). The UK places stockholding obligations on industry. The UK's projected import dependency will increase to 44 per cent of the consumption of oil by 2020. That level of imports has been assessed as having a significant impact on the UK's oil security.[25] The UK's concern at having a 44 per cent import dependency contrasts with Australia's complacency at having an 85 per cent import dependency.

The IEA report for Norway notes that as a net exporter of oil, Norway does not have an obligation to hold IEA stockholdings. However, Norway requires its industries to hold 20 days of stocks for sales/imports in the domestic market. Release of company-held stocks is the preferred course of action in the event of collective IEA action.[26]

So what would happen in Australia in the case of a disruption of supply? Currently there are no public oil stockholdings and the Australian Government does not mandate stock levels in industry. The stock levels held in industry are poorly reported and, based on earlier conclusions in this report, impractical or difficult to access given the "just in time" nature of oil deliveries and refining. The Australian Government does not consider the 85 per cent level of oil and petroleum imports as a risk to our liquid fuels security.

In the event of a supply interruption, the Liquid Fuels Emergency Act of 1984 and associated amendments passed in 2007, provide the Commonwealth Government with the authority to prepare for and manage a national liquid fuel emergency. However, the detail of how fuel rationing or control measures would be implemented is not publicly visible and little is known of how the contingency measures would be put in place. There are also differences in how states and territories would respond to such a crisis, with a lack of a common framework to address, for example, the fuel needs for critical infrastructure.

The very small consumption stockholdings in this country, combined with what appears to be a narrow assessment of our liquid fuels supply chain vulnerabilities, does not provide much confidence that the strategic risks to our liquid fuels supply chain are well understood.

Recent calls to legislate mandatory compliance with the IEA 90 day stockholding levels will not address the wider range of supply chain vulnerabilities.

Our liquid fuels supply resilience in the face of a potential range of supply shocks is fragile.

25 http://www.iea.org/publications/freepublications/publication/uk_2010-1.pdf page 7

26 http://www.iea.org/publications/freepublications/publication/norway_2011.pdf

The recent findings of a Japanese Government panel reviewing the Fukishima nuclear disaster, which followed the devastating tsunami that struck Japan in 2011, are worth reflecting on: "... The utility and regulatory bodies were overly confident that events beyond the scope of their assumptions would not occur ... and were not aware that measures to avoid the worst situation were actually full of holes."

Resilience

The issues already outlined suggest that it is worth considering the issue of resilience. The predominant mindset is that fuel is a commodity that will be supplied by the market rather than an essential capability enabler. This mindset significantly impacts the resilience of our society.

A comprehensive resilience model to cope with natural disasters in Australia has been built up over the past decade as a result of our experience with cyclones, floods and fires. With natural disasters, assistance can be sought from outside the disaster area. With a fuel supply crisis, assistance may not be available from outside the Australian "disaster area" as the crisis may be global. Australia needs a national resilience model that enables the country to cope with such a crisis using the resources at hand.

The Attorney-General's Department's Trusted Information Sharing Network for Critical Infrastructure Protection discusses resilience at length.[27] It states that "resilience is about being better able to adapt to change, having reduced exposure to risk, and being better able to bounce back from any type of hazard including natural disasters, pandemics, accidents, negligence, criminal activity and terrorist attack ... An important part of creating a more resilient Australia is creating more resilient critical infrastructure."

So what would a national resiliency model look like? The Trusted Information Sharing Network resilience guide describes a resilient organisation as having the right combination of culture and attitude, process and framework. It also anticipates emerging threats and understands the systems dependencies that support and underpin the organisation's (or in this case Australia's) strategic direction. The question is whether we should accept the 2012 Energy White Paper assessment regarding the low risk to our liquid fuel supplies given that it appears to be based on only a limited range of scenarios in the supporting analysis, as discussed on page 11 of this report.

27 http://www.tisn.gov.au/Pages/default.aspx

An important part of creating a more resilient Australia is creating more resilient critical infrastructure.

The 2012 Energy White Paper states that:

"Our lack of oil self-sufficiency and the prospect of further refinery rationalisation does not in itself compromise or reduce our energy security … Our liquid fuel security is expected to remain high because of our access to reliable, mature and highly diversified international liquid fuel supply chains."[28]

It also says: "Pursuing self-sufficiency in energy resources such as liquid fuels would impose higher costs on Australian consumers without necessarily providing a material economic benefit. Maintaining diversity of supply (with alternative source countries, import points, and commercially viable fuels and technologies) is prudent, but does not justify the pursuit of self-sufficiency as a goal in itself. For a major energy trading nation like Australia, pursuing a goal of national energy self-sufficiency would make little sense."[29]

While complete self-sufficiency may not make sense, neither does the possibility of complete dependence on foreign owned suppliers in the future.

The 2012 Energy White Paper also notes that "the NESA [National Energy Security Assessment] also modelled a limited set of hypothetical physical infrastructure supply chain 'shocks' in the liquid fuel, natural gas and electricity sectors to test the resilience of the energy system (RET 2011a). The modelling highlighted the continuing importance of resilient infrastructure and the diversification of supply arrangements and transmission infrastructure to avoid or respond to economically damaging supply disruptions."[30]

This is at odds with the paper's contention that "The decline in Australia's domestic refining capacity … is not considered to impair Australia's liquid fuel security … Substituting imports of crude oil for imports of refined fuel at this scale does not pose any additional risk to market security."[31]

Given the lack of any policy regarding minimum levels of refining capacity in Australia, the 2012 Energy White Paper statement is not reassuring. Neither is it in accord with the National Energy Security Assessment modelling, which highlighted the continuing importance of resilient infrastructure.

The 2012 Energy White Paper states that the Government will continue to assess Australia's liquid fuel vulnerabilities regularly as part of the biennial National Energy Security Assessment process covering the liquid fuel supply chain, including import and refining infrastructure.[32]

The scope of the next assessment must include a larger set of scenarios if Australia is to prove resilient to a range of future supply threats.

28 2012 Energy White Paper, page 53.
289 ibid, page 54.
30 ibid, page 51.
31 ibid, page 50.
32 ibid, page 129.

Liquid Fuel Security in a Resilient Society

There are solutions on offer to address the risks identified in this report. The issue is not the lack of ideas and options, but the willingness to address and invest in the issue and to take the necessary steps to build resilience ahead of a potential crisis.

If fuel security resilience is to be achieved, strategic level visibility of the supply chain will be essential, along with a commitment to invest in and assure diversity of supply and of demand. Such investment will not be the responsibility of industry alone; Governments will need appropriate policies and to be prepared to invest in resilience, even when it does not make near term commercial sense to do so.

On the supply side, our dependence on the importation of oil and petroleum products is a reality. The emerging trend to reduce our national refining capacity may make business sense to the companies that own the refineries but it does not make common sense in terms of our national security and resiliency. The recent Government response to the announcement of the planned closure of the Kurnell refinery appeared somewhat glib: "... The closure will not jeopardise Australia's energy security as Australia already imports large amounts of crude oil and finished petroleum products ..."[33]

In something of a contradiction, the 2011 Liquid Fuels Vulnerability Assessment noted: "... the continued operation of some Australian refineries will still provide a diversity of supply which is important to reducing the risks associated with a disruption in the global supply chain."[34]

The challenge is to define what level of refining capacity is necessary to provide resilience in the face of possible supply disruptions and what actions the Government can and should take to achieve that capacity. Unfortunately, the Government does not appear to have defined a minimum level of refining capacity that should be maintained in Australia. Relying on market mechanisms to meet Australia's fuel security needs could prove foolhardy.

33 http://www.news.com.au/business/companies/caltex-to-cut-330-jobs-shut-kurnell-refinery/story-fnda1bsz-1226435364736#ixzz2250PaV00
34 ACIL Tasman, op cit, para 7.7.3

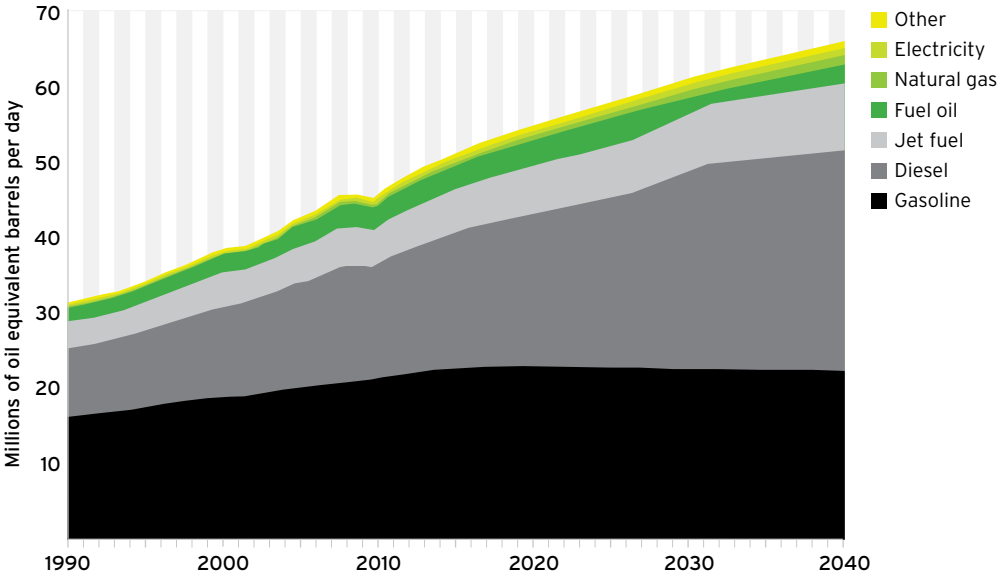


Figure 10: World transportation fuel demand (Exxon Mobil's 2012 The Outlook for Energy: A View to 2040)[35]

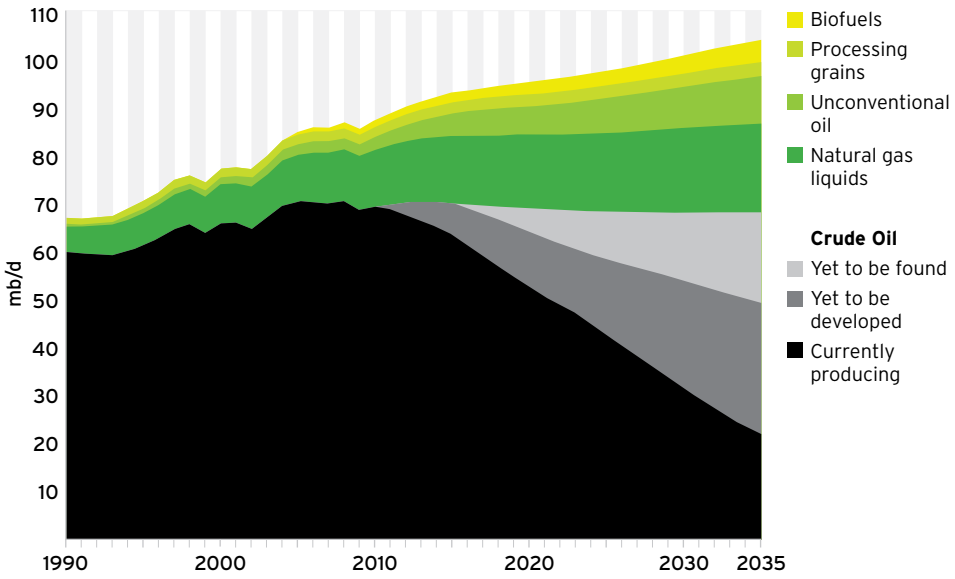


Figure 11: Projected oil production by type (IEA World Energy Outlook 2011)[36]

Supply side vulnerabilities – shipping, ports, refineries and domestic distribution – warrant serious consideration and an appropriate level of contingency planning. The issue of appropriate stockholding is an important aspect of supply side resiliency; however, defining required stockholding levels is a complex task. It is vital that the level of stockholdings be determined by a broad analysis of supply chain vulnerabilities and that the specific storage requirements for Australia and each of the states and territories are analytically derived. The IEA stockholding levels are not the result of an analysis of Australia's specific needs and should not be seen as the panacea to our potential supply risks.

On the demand side, the effective lack of energy diversity in the transport sector in particular makes our society highly vulnerable to supply shocks and to future growth in oil costs when growth of supply does not keep pace with growth in demand, as illustrated in Figure 10.

The supply side of the equation is illustrated in Figure 11. The significant proportion of crude oil yet to be found and/or developed gives rise to concern for longer term resource availability and security.

Alternate fuels, particularly those in plentiful supply in Australia, are the obvious option to improving our fuel resilience from both the supply and demand side. The potential of increased gas to liquid fuel processing bears serious investigation. The NRMA's Jamison Group Report (February 2010) proposes alternative fuels and technologies for passenger vehicles[37] and provides sound recommendations regarding the use of alternative fuels to reduce the dependence on oil in the transport sector. However, the absence of adequate policy or incentives in this area does not bode well for fuel demand diversity.

35 http://www.exxonmobil.com/Corporate/files/news_pub_eo.pdf, page 19

36 World Energy Outlook 2011 © OECD/IEA 2011, figure 3.16, page 123.

37 Fuelling Future Passenger Vehicle Use in Australia, Jamison Group, February 2010, http://www.mynrma.com.au/images/About-PDF/Jamison-Group-Fuelling-Future-Passenger-Vehicle-Use-in-Australia-February2010.pdf

While the probability of supply interruptions may be low, the consequences of such interruptions are severe enough to warrant contingency preparations.

Conclusions

This report provides a broad overview of our oil dependence and the associated fuel supply chain. We are critically dependent on an uninterrupted supply of liquid fuels in order for our society to function; however, our ability to deal with a broad range of potential supply chain interruptions does not appear to have been analysed in sufficient depth.

Our Government seems to have made a decision to leave market forces and global supply chains to provide for us in supply emergency. Whether this has been a well informed and holistic decision is the subject of debate. Our oil and fuel stockholdings are below the levels we are obliged to maintain as a member country of the IEA. We do not have stockholding policies or requirements that specify minimum levels of private stockholdings, as is the case in other countries, and we do not have any public stockholdings.

The Government has responded to recently announced reductions in Australia's oil refining capability in a blasé fashion and has not defined any minimum level of refining capacity for Australia. While the probability of supply interruptions may be low, the consequences of such interruptions are severe enough to warrant contingency preparations.

However, such contingency measures do not appear to have been developed and fuel emergency management processes under the National Oil Supplies Emergency Committee system are somewhat opaque.

Our Government appears unlikely to act on the loss of Australian oil refining capacity and is content to rely on market forces to assure our fuel security. This situation will only change if we, the Australian public, say that this approach is not acceptable. If we are to improve the fuel security and national resilience for ourselves and future generations of Australians, we need to invest in building a greater level of energy resilience in this country.

In essence, we have adopted a "she'll be right" approach to fuel security, relying on the historical performance of global oil and fuel markets to provide in all cases. Unfortunately, as a result of our limited and decreasing refining capacity, our small stockholdings and long supply chains, our society is at significant risk if any of the assumptions contained in the vulnerability assessments made to date prove false.

We would not be the first country to get our assumptions wrong. In that respect, history can be relied upon.

Recommendations

In order to improve our fuel security and our national resilience we should insist on the following actions.

1. Australia's liquid fuel security should be addressed as a component of a national resilience model.

2. Our Federal and State Governments should develop appropriate policies and be prepared to invest in and assure diversity of supply and of demand even when it does not make near term commercial sense to do so.

3. As our dependence on the importation of oil and petroleum products is a reality, Government should define what level of refining capacity is necessary to provide resilience in the face of possible supply disruptions and what actions the Government can take to achieve that capacity.

4. Government should analyse supply side vulnerabilities with respect to shipping, ports, refineries and domestic distribution and, where warranted, conduct an appropriate level of contingency planning.

5. Government should ensure the level of oil and petroleum stockholdings for Australia and each of the states and territories are analytically derived and that they are determined by Australia's specific needs as well as the IEA obligations, which we currently fail to meet.

6. Government should determine policies and incentives to improve demand side resilience through the increased use of alternate transport fuels.

7. Government should improve preparations for and management of a national liquid fuel emergency by developing a common framework to include, for example, the fuel needs for elements of the critical infrastructure in the operations of the National Oil Supplies Emergency Committee and should also review our membership of the National Oil Supplies Emergency Committee to include representation of end users.

8. Government should advance the planned 2014 assessment of Australia's liquid fuel vulnerabilities. It should ensure the assessment addresses the complete liquid fuel supply chain and a broader range of scenarios to include threats such as regional conflict, economic systems failures, accidents, catastrophic equipment failures, industrial action, natural disasters and terrorist attacks.

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Australia's transport energy resilience and sustainability
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