# AUSTRALIA'S FUEL SECURITY: RUNNING ON EMPTY

A REPORT PREPARED FOR THE MARITIME UNION OF AUSTRALIA

JOHN FRANCIS • NOVEMBER 2018

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# INTRODUCTION

Australia is facing a fuel security crisis. Government statistics show current reserves averaged across Australia are at three weeks or less, and that we have been non-compliant with the International Energy Agency's 90-day fuel stockholding obligation since March 2012.

Engineers Australia told the fuel security Senate inquiry in 2015 that Australia's total stockholding of oil and liquid fuel comprised two weeks of supply at sea, five to 12 days' supply at refineries, 10 days of refined stock at terminals and three days stock at service stations.

The Turnbull government announced in May that it would undertake a National Energy Security Assessment due to concerns over declining domestic production, diminishing refining capacity and concerns over potential flash points in the Middle East and South China Sea.

The last National Energy Security Assessment was in 2011, but a number of inquiries and reports since then have touched on the important issue of fuel security. For example, the Senate has held inquiries into both fuel security and flag-of-convenience shipping, while the Energy White Paper and Defence White Paper also investigated our increasing reliance on foreign fuel.

The security of Australia's petroleum supply chains has been adversely impacted by Commonwealth and corporate policies. Australia is the only developed oil importing country in the world with all three of the following policies:

- no government controlled stocks of crude oil or clean (refined) petroleum products ("CPP");
- no mandated commercial stock requirements for oil companies; and
- no government involvement in oil markets.

Furthermore, four petroleum refineries have recently been closed on economic grounds and the refining capacity has not been replaced. The impact of this development on the security of petroleum supply chains is significant.

There are now no Australian-crewed tankers supplying fuel to our nation, down from 12 tankers in the year 2000. This has led to a substantial loss of maritime jobs and training opportunities and has undermined the security of our petroleum supply chains, at a time when we rely on the equivalent of approximately 60 full-time ships to keep us supplied. This loss of ships means that if the government needed to requisition fuel tankers to keep Australia supplied at a time of geopolitical or economic crisis, there are simply no Australian tankers available to them.

# EXECUTIVE SUMMARY

This report investigates the significance and the cost of an Australian owned, managed and crewed fleet of petroleum tankers to improve the security of Australia's liquid fuel supply chains. In recent years, commentators have rightly focussed on geopolitical threats as the primary security concern, but this report argues that economic instability has the potential to disrupt petroleum supply and that this risk may be rapidly escalating in significance. The cost of addressing this risk is comparatively low: even carrying Australia's entire import volume on a fleet of Australian tankers would cost less than one extra cent per litre.

The wisdom of Australia's current 'leave it to the market' policies varies with the geopolitical and economic risks facing the country. In addition to growing tensions in the South China Sea through which a significant percentage of our petroleum products transit, economists are alarmed by the financial risks created by the debt-driven growth model of the world's major economies.

The International Monetary Fund warns that the world is at risk of another financial meltdown as a result of global debt levels being well above those at 2008 levels and the failure of governments and regulators to implement the reforms necessary to protect the financial system from reckless behaviour. Senior executives from the Bank for International Settlements warn that the 'unprecedented asset price bubble engineered by G7 central banks is a ticking time-bomb that is ready to burst after seven years of near zero interest rates and speculative excesses in bonds, stocks and real estate.'

Many commentators consider that a financial crisis will occur eventually and some anticipate that it will be far bigger than the 2008 crisis. Furthermore, a banking liquidity crisis in any of the G7 economies can be expected to generate a cascading effect with global consequences for the international shipping market.

Air Vice-Marshal John Blackburn RAAF (Ret'd) has expressed concern that Australia's international and coastal CPP supply chains have not been the subject of a comprehensive, independent security assessment. Instead, Blackburn notes: 'we need to apply the national security framework and analytical methods that we have applied to our nation's defence forces to areas of risk such as energy security, that are critical to our national security.'

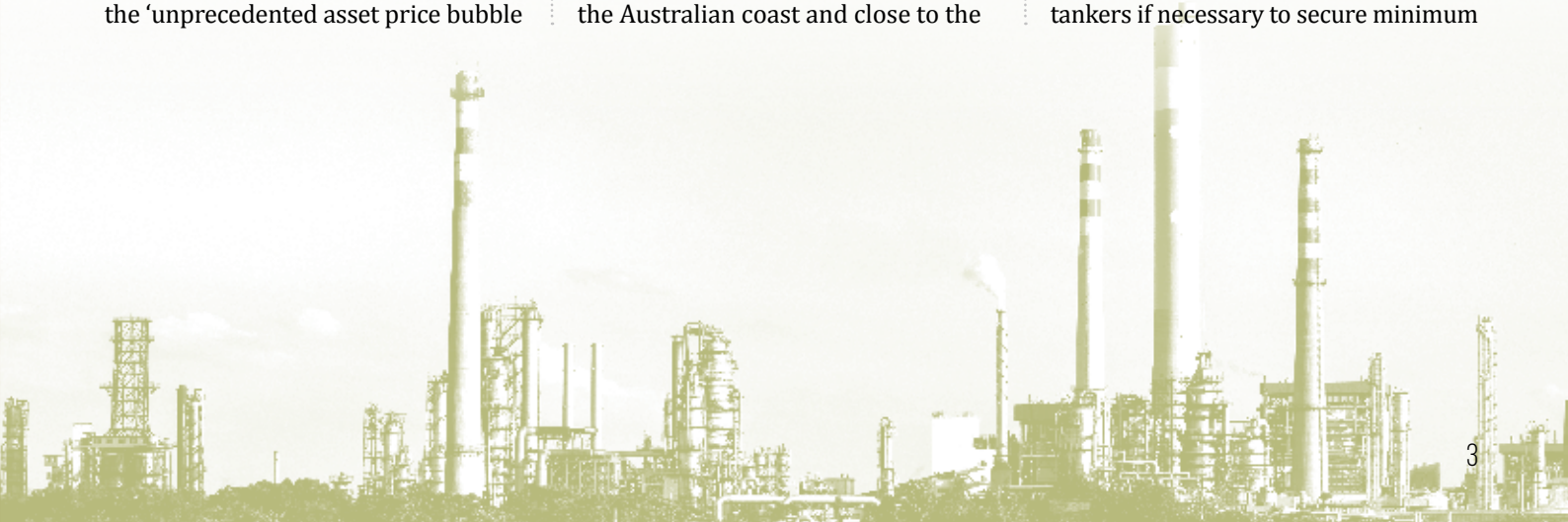
According to Blackburn, a thorough risk assessment should investigate the potential impact of geopolitical and economic disruption across all major elements of the national and regional petroleum supply chain, including ownership, management and crewing of tankers. The Maritime Union points out that unlike Australian seafarers, foreign crews have no background checks yet they are carrying petroleum products, ammonium nitrate and LNG around the Australian coast and close to the middle of major population centres.

Blackburn recommends, inter alia, that we should decide whether we want a proportion of our liquid fuel supply to be secure: if so, how much and for what purpose? We then need to determine the optimal way of achieving this level of security, considering both demand and supply related initiatives. A satisfactory investigation into these issues should, in Blackburn's view, encourage Australia to move petroleum supply chain arrangements from the current 'just in time' to a 'just in case' structure.

## KEY FINDINGS AND RECOMMENDATIONS:

1 Australia's oil import dependence (crude and clean products) stood at about 90% in 2017-18. This growing dependence on overseas sourced petroleum products can be contrasted with Australia's repeated failure to meet its 90 day IEA stockholding obligation, with stocks of key products standing at 18 to 21 days. The risk of any major disruption to Australia's import arrangements and the capacity of importers or government to secure alternative supplies in a timely manner needs to be investigated.

2 The exclusive reliance on foreign flagged tankers for crude and CPP supply chains removes any opportunity for the Commonwealth to be able to requisition national flag tankers if necessary to secure minimum

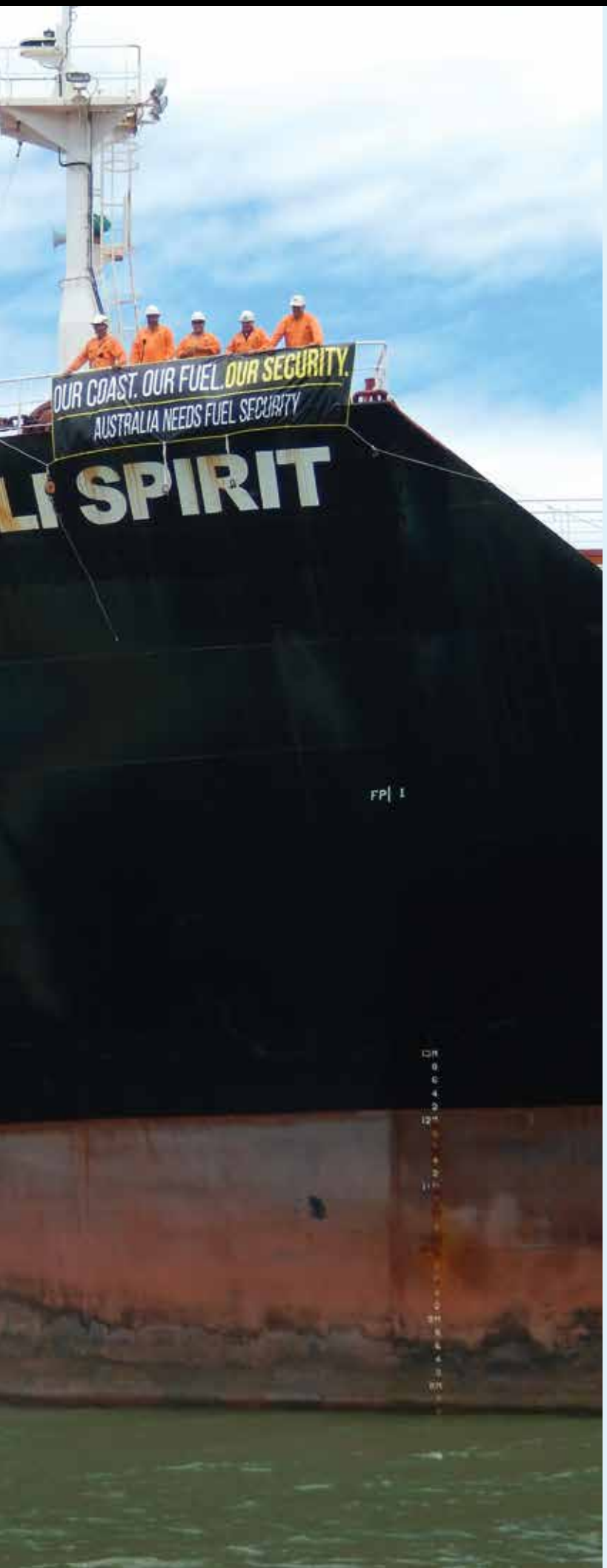


import or coastal distribution requirements following major economic or geopolitical disruptions to oil markets. It has also diminished skills training for those operating and managing critical petroleum import supply chains and infrastructure.

**3** Any risk assessment of bank liquidity and potential disruption to world credit markets needs to include consideration of the cascade effects on world freight markets. This includes the likelihood of ships being arrested by suppliers of bunkers and other creditors such as ship mortgagees; those holding liens against the vessel such as ship's crew seeking unpaid wages; unpaid ship repair facilities; and insurers etc. Potential arrests from claimants with a right to proceed *in rem* under Admiralty legislation are inevitably at heightened risk where ship owners are unable to secure sufficient lines of credit to pay their creditors as and when their debts fall due. Courts are often left with little choice but to order the sale of arrested vessels where their owners are subsequently unable to provide satisfactory security in relation to the proceedings.

**4** If a comprehensive risk assessment indicates that retention of a minimum number of tankers owned, managed and crewed by Australians is justified on national security grounds, the Commonwealth, in consultation with stakeholders, should investigate options to equitably apportion the differential costing.

**5** The additional cost per litre of cargo carried by an Australian tanker carrying clean petroleum import cargoes ranges from 0.49 cents to 1.25 cents per litre, and depends on the size of the ship and the distance from the supply country to the port of importation. This additional cost could be spread across the entire import volume to provide a very modest cost per litre. For example, the cost of 5 Australian ships spread across the projected import volume of 38,087 ML in 2018-19 results in a cost of less than one-tenth of a cent per litre (Table 8). Fifteen Australian ships would cost less than a quarter of a cent per litre. Even if the whole future import volume covered by 60 ships, the cost is less than 1 cent per litre.




# ABOUT THIS REPORT

This report responds to a request from Maritime Union of Australia to investigate:

1. The risks of relying on international flag ships on the spot market for the majority of Australia's liquid fuel supply.

2. An estimate of the number of tankers required to service Australia in the context of closing refineries and increasing imports.

3. A calculation of cost, per litre, created by employing Australian labour on import tankers across nominal voyages from Singapore, South Korea and Japan to central Queensland, Brisbane, Sydney, Melbourne, Adelaide, Fremantle and Darwin (diesel, petrol and kerosene/jet fuel)

This report was drafted after extensive consultation with Air Vice-Marshal John Blackburn RAAF (Retd). Blackburn has been at the forefront of expert commentators who have publicly expressed reservations about the security of Australia's petroleum product supply chains and the failure to comply with IEA stockholding requirements. He has long shared the view of the Maritime Union that the demise of Australian crewed vessels has contributed to a weakening of the overall security of these supply chains. Over the last three or four years Blackburn's views have hardened in the face of ever increasing complexity in geopolitical issues confronting the West, especially in the Asia-Pacific region. He regards a reliable supply of petroleum products as a national security issue that simply cannot be left to market forces alone and he advocates for a rigorous independent inquiry to fully investigate the vulnerabilities confronting current supply arrangements.

The objective of this report is to provide some industry background to inform the debate surrounding the merit of having a portion of Australia's imported petroleum products shipped in Australian owned, managed and crewed tankers.

## ABOUT THE AUTHOR

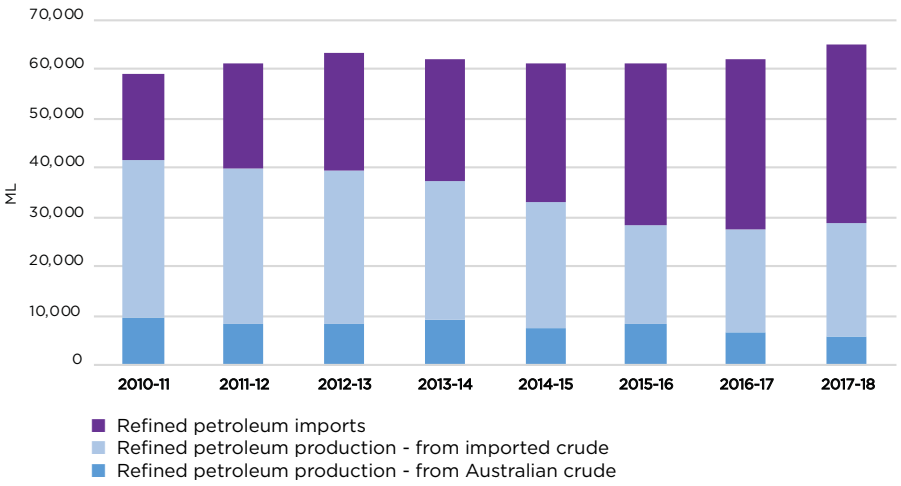
John Francis is a management consultant who commenced his career as a shipbroker and administration manager of international trading contracts. He subsequently became a barrister at the Victorian Bar specialising in maritime and Admiralty cases. He later joined a consultancy specialising in commercial, regulatory and operational aspects of Australian shipping. From 2008-2011, John was the Director of the Maritime Transport Policy Centre at the Australian Maritime College.

# AUSTRALIA RELIES ON FUEL IMPORTS

Australia largely produced and refined enough fuel to meets its own needs until 2004, when imports began to increase significantly. Australian refined petroleum imports have more than doubled since 2010-11 (Table 1). In 2017-18, 91% of Australian refined petroleum was imported or produced from imported crude (Figures 1 and 2). 56% of our petroleum needs are met by just-in-time shipments on international ships carrying finished petrol, diesel, jet fuel and other petroleum products.

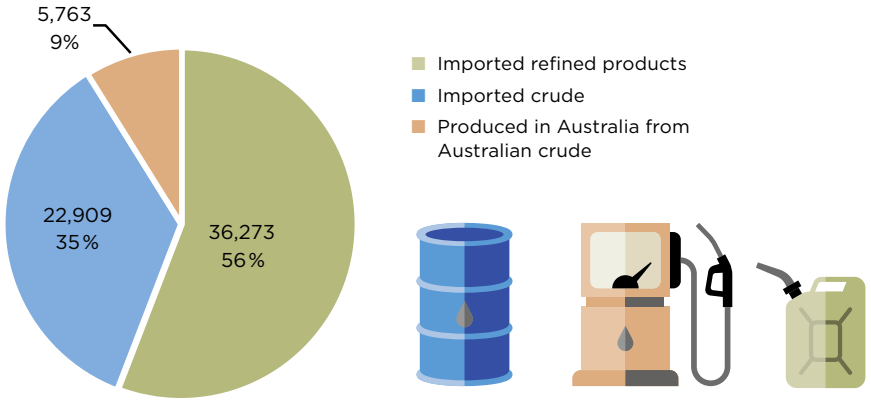
It is widely known that Australia is the only IEA member country that fails to meet its 90 days IEA net oil import stockholding level.[1] This failure has existed since 2012. Government statistics show current stocks for critical fuels would last between 18-21 days, if averaged across Australia (Figure 3), but of course in reality supply across Australia is much patchier..[2] This is particularly concerning given that Australia is the only developed oil importing country in the world where none of the following three areas are addressed: a) there are no Government controlled stocks of crude or CPP; b) no mandated commercial stock requirements for oil companies; and c) no government involvement in oil markets. This state of affairs does not augur well economically or socially in the event of major supply disruption – hence the IEA's recommendation that the national stockholding position be rectified.[3] The passage of the *Petroleum and Other Fuels Reporting Act* 2017 has improved reporting, but significant flaws remain, especially with regard to fuel being shipped to Australia (addressed later). Australia's policy needs to be contrasted with the policies of the countries that supply Australia with CPP that have implemented substantial fuel stockholding measures.[4]

**Figure 1: Refined petroleum imports and domestic production, 2010-2018**




**Source:** Department of Environment and Energy, *Australian Petroleum Statistics*, Issue 265 August 2018. Table 2 (p.8) and Table 4 (p.26).

**Figure 2: Sources of refined petroleum in Australia, 2017-18**



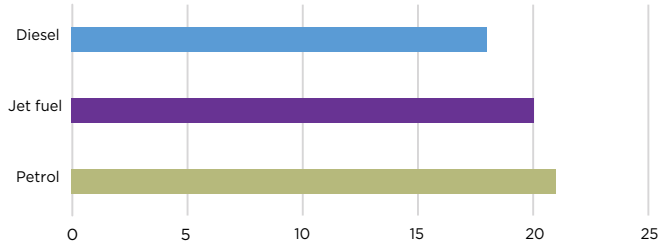

**Source:** Department of Environment an Energy, *Australian Petroleum Statistics*, Issue 265 August 2018. Table 2 (p.8) and Table 4 (p.26).

**Table 1: Australian refined petroleum imports and production**

| | Refined petroleum imports | | Refined petroleum production in Australia | | | |
|---|---|---|---|---|---|---|
| | Volume (ML) | % increase year on year | From Australian crude (ML) | From imported crude (ML) | Total (ML) | Percentage of Australian crude used in production |
| 2010-11 | 17,419 | | 9,596 | 31,945 | 41,541 | 0.231 |
| 2011-12 | 21,426 | 23 | 8,580 | 31,327 | 39,907 | 0.215 |
| 2012-13 | 23,765 | 11 | 8,350 | 31,222 | 39,572 | 0.211 |
| 2013-14 | 24,843 | 5 | 9,022 | 28,107 | 37,129 | 0.243 |
| 2014-15 | 28,041 | 13 | 7,698 | 25,483 | 33,181 | 0.232 |
| 2015-16 | 32,791 | 17 | 8,183 | 20,231 | 28,414 | 0.288 |
| 2016-17 | 34,492 | 5 | 6,811 | 20,542 | 27,353 | 0.249 |
| 2017-18 | 36,273 | 5 | 5,763 | 22,909 | 28,672 | 0.201 |

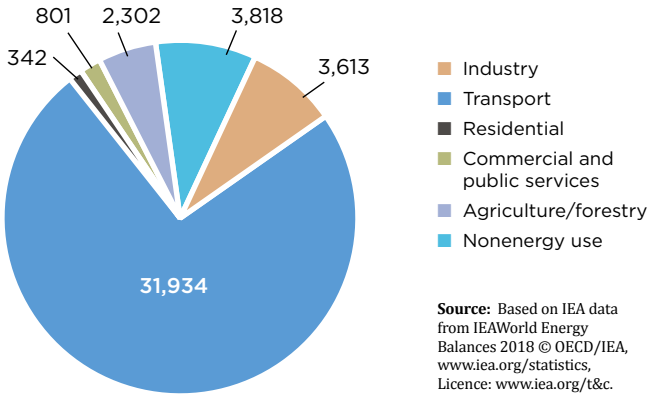
**Source:** Department of Environment and Energy, Australian Petroleum Statistics, Issue 265 August 2018. Table 2 (p.8) and Table 4 (p.26).

**Figure 3: Days of consumption cover available for of key petroleum fuels, averaged across Australia**




**Source:** Department of Environment and Energy, Australian Petroleum Statistics, Issue 265 August 2018. Table 7 (p.36). The Department explains that "Days of Consumption Cover" is the number of days that Australia's end-of-month petroleum stockholdings would last if recent consumption rates continued. It assumes: no change in consumption levels; no domestic production of crude oil; no refinery production; and no imports or exports of crude or refined products. The calculation takes the national month-end stockholding of each product converted into megalitres and divides it by the average daily consumption of that product. Average daily consumption of refined products is calculated as the sum of the previous 12 months of sales divided by 365.

**Figure 4: Share of oil products final consumption by sector in Australia in 2016 (ktoe)**

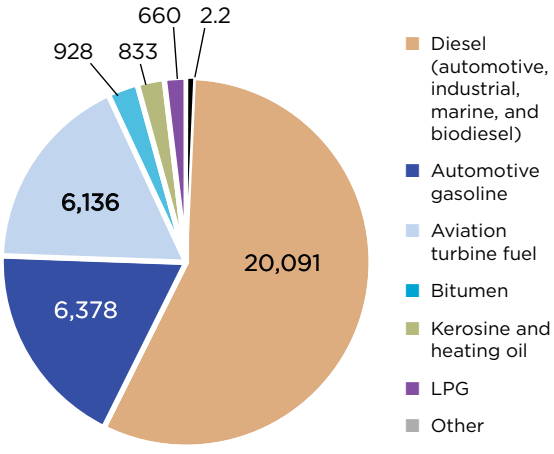



**Source:** Based on IEA data from IEAWorld Energy Balances 2018 © OECD/IEA, www.iea.org/statistics, Licence: www.iea.org/t&c.

Little information is available on the distribution of demand for refined petroleum across the Australian economy. However, Figure 4 demonstrates the importance of petroleum for transport and industrial use across all sectors of the economy.. Over half of all imports are diesel, with about 17% being aviation fuel and a similar amount of petrol (Figure 5). Any disruption to petroleum supply would have a far-reaching impact. The decline in domestic crude production has occurred in tandem with the construction of massive export-oriented refineries in Asia that are able to operate at substantially improved efficiency levels compared to the ageing Australian refineries. This has placed a lot of economic pressure on domestic refinery operators and has left Australian supplies largely subject to the security of supply lines bringing petroleum products from international markets.[5] The security risks attached to this development need thorough investigation because Des King, formerly managing director of Caltex Australia Ltd, has said that retaining a substantial oil refining capability is essential to Australia's energy security.[6]

To optimise returns from Australian refining, management policies increasingly favour retailing refinery output as close to the refinery as possible to avoid incurring shipping costs involved in inter-state sales.[7] This strategy, in turn, reduces the demand for coastal tankers and major domestic markets such as the mining industry in Queensland are increasingly supplied with direct shipments from Singapore. 82% of our petroleum imports (29, 788 ML) come from Korea, Singapore, Japan, Malaysia and China (Figure 3).

**Figure 5: Australian refined petroleum imports in 2017-18 (ML).**




**Source:** Department of Environment and Energy, Australian Petroleum Statistics, Issue 265 August 2018. Table 4 (p.26).

**Table 2: Australian refinery closures**

| Year | Refinery | Capcity (bpd) | Location |
|---|---|---|---|
| 2009 | Closed: ExxonMobile Stanvac refinery | 100,000 | Adelaide |
| 2011 | Closed: Shell Clyde refinery, converted to import terminal | 100,000 | Sydney |
| 2012 | Closed: Caltex Kurnell refinery, converted to import terminal | 124,500 | South of Sydney |
| 2014 | Closed: BP Bulwer Island refinery, converted to import terminal | 90,000 | Brisbane |
| 2018 | **Operational refineries:** | | |
| | BP Kwinana | 138,000 | South of Perth |
| | Caltex Lytton | 104,000 | Brisbane |
| | ExxonMobil Altona | 75,000 | West of Melbourne |
| | Viva Geelong | 130,000 | Geelong |

**Table 3: Origin of Australian refined petroleum products imports in 2017-18.** Only countries with more than 0.5% of annual imports are listed in the table and with those more than 1% of imports are plotted on the map.


| Country | 2017-18 refined petroleum imports to Australia (ML) | % of total annual imports (36,273 ML) |
|---|---|---|
| Korea | 10,243 | 28% |
| Singapore | 9,614 | 27% |
| Japan | 5,044 | 14% |
| Malaysia | 2,782 | 8% |
| India | 2,680 | 7% |
| China | 2,105 | 6% |
| United States of America | 1,154 | 3% |
| Indonesia | 578 | 1.6% |
| Netherlands | 353 | 1% |
| United Kingdom | 294 | 0.8% |
| United Arab Emirates | 280 | 0.8% |
| Thailand | 200 | 0.6% |

**Source:** Department of Environment and Energy, *Australian Petroleum Statistics*, Issue 265 August 2018. Table 4B (p.28).

## NO MORE AUSTRALIAN TANKERS

Using data from the Port State Control reports of the Australian Maritime Safety Authority ("AMSA")[8] we estimate that approximately 677 international tankers visited Australia in 2017. Some vessels only visited once in that year while others recorded multiple visits. None of these vessels (crude or product tankers) are owned, managed and crewed by Australians (see Appendix).

Indeed, the entire supply chain for imported and domestic crude and CPP is currently exclusively carried by foreign flagged ships. In 2011, six Australian-crewed tankers distributed CPP around the coast from refineries in Kwinana, Brisbane, Geelong and Sydney. The last domestic tanker was *British Fidelity*, which BP removed from service in May 2016 (Table 4). However, there were still 4 million MT of domestic shipments of refined petroleum products in 2017-18, but these took place on international ships chartered using a Temporary Licence (see Domestic refined petroleum shipments in Table 9 for details).[9]

## WHY DOES AN AUSTRALIAN FLAGGED FLEET CONTRIBUTE TO OUR FUEL SECURITY?

For readers without a shipping background, it may be helpful to briefly review the contractual arrangements that underpin CPP imports so that the difference between **commercial control** of a cargo and **ultimate control** of a ship and its voyage are clearly differentiated. This will hopefully demonstrate the desirability of having part of the nation's CPP imports and coastal distribution carried in Australian flagged tankers.

In the ordinary course of business, an hypothetical Australian independent importer of CPP can source product from say Singapore, South Korea or Japan. If the importer does not operate an appropriate vessel that is available on the dates required for loading the cargo, it will charter a suitable tanker from the freight market to load the cargo, steam to one or more Australian ports and discharge the cargo - all in accordance with terms set out in the contract of carriage.

**Table 4: Reduction of Australian-crewed coastal clean petroleum tankers on long term charter to Australian oil majors**

| Year | Australian-crewed coastal clean petroleum tankers |
|---|---|
| April 2011 | Araluen Spirit (Shell), Tandara Spirit (Shell, then Viva), Hugli Spirit (Caltex), Alexander Spirit (Caltex), British Loyalty (BP), British Fidelity (BP). |
| April 2014 | Alexander Spirit (Caltex), British Fidelity (BP), British Loyalty (BP). |
| May 2016 | No Australian-crewed refined petroleum tankers (except small bunker barges used for refuelling ships in port). |


The contract for the carriage of bulk products (wet or dry) is known as a charter party and, in the case of tanker trades, pro-forma charter parties are produced by oil majors such as BP or Shell; independent bodies such as the Association of Ship Brokers and Agents (ASBA); or representative bodies such as BIMCO (previously referred to as the Baltic and International Maritime Council). These forms are drafted for specific trades and activities and are adapted through negotiation by the parties to create a binding agreement.

In the above scenario, the charter party between the importer and tanker operator will usually be on 'voyage terms'. This means the cargo is loaded, shipped and discharged for an agreed US dollar freight rate per tonne of product carried. The transaction leaves the charterer in commercial control of the cargo, but the ship always remains under the ultimate physical control of the master (appointed by the ship owner).

On completion of loading, the Master of the ship or his agent signs bills of lading which, inter alia, provide a documentary receipt for the goods; they usually incorporate, by reference, the terms of the charter party; and represent a document of title to the goods. Lawful possession of the original bill of lading entitles the holder to possession of the goods described in the bill.[10]

Much like contracts for the sale of goods, charter parties address circumstances where performance of the contract is prevented, hindered or delayed by unforseeable event(s) that are beyond the control of the parties. The allocation of that risk as between the parties is set out in a 'force majeure' clause which operates to excuse the impacted party either fully or partially from performing their obligations.[11] Force majeure events generally cover two basic groups: natural events such as floods, fire, drought, plague (Acts of God); and political events such as terrorism, riots, war whether declared or not, acts of foreign enemies, mobilization, requisition, or embargo etc.[12] Any of these political events could potentially impact the performance of vessels in Australian CPP import supply chains. Fortunately, in the ordinary course of business, a very modest percentage of the world fleet is impacted by force majeure events (or frustration of contract - the common law equivalent) in any one year. In a major credit squeeze, a much more significant percentage of vessels may be impacted for reasons explained below.

Registration under certain flags renders the ship liable to requisition by the flag state in the case of emergency. The requisitioning of more than 50 UK flagged ships by the UK's Ministry of Defence to support the Falklands War is one example. In Australia, if geopolitical or other circumstances were to impact the availability of clean petroleum tankers to the point where it was either difficult to secure ships to carry imported or coastal cargo on the dates required or to charter them in at an acceptable freight rate, the option for the Commonwealth to requisition Australian flagged ships and thereby secure at least part of those operations would be highly desirable. Unfortunately, at present there is not a single Australian flagged crude or clean tanker of a suitable size available to the government in case of emergency.[13] So, the question arises as to how many clean tankers would it be prudent to have under the ultimate control of Australian interests and how should the premium cost of such vessels be apportioned equitably? If this is to be recognised and treated as a national security issue, how should the Commonwealth be developing and supporting such an arrangement?

# THE RISKS OF RELYING EXCLUSIVELY ON FOREIGN FLAGGED SHIPPING

In the ordinary course of business, the chartering of any overseas owned tanker for an inbound CPP cargo is a purely commercial matter, even if the contract of carriage might involve loading the vessel at a terminal with heightened security concerns. Availability of tankers on the spot market is unlikely to represent a major issue because a foreign flagged tanker operator could be expected to evaluate the carriage of a cargo out of, say, an armed conflict zone in a commercial way. If the freight rate offered is satisfactory, relative to earnings the vessel could secure by loading a cargo outside the conflict zone, and any additional war risks insurances required by underwriters were paid for by the charterer, an agreement would likely be concluded. Consultants Hale & Twomey, also consider the tanker market to be robust:

> *In reality it is difficult to envisage a scenario in which shipping is not available and historically we cannot point to an event which saw the collapse of the petroleum tanker market. Supply disruption affecting tankers is far more likely to arise as a result of other components in the supply chain (e.g. disruption to liquidity in the banking system, geopolitical events.*[14]*)*

## RISK: DISRUPTION TO LIQUIDITY IN THE BANKING SYSTEM

The disruption to liquidity in the banking system - a risk noted by Hale & Twomey - is an increasing source of concern for economists and financial market commentators. The International Monetary Fund warns that the world is at risk of another financial meltdown as a result of global debt levels being well above those at 2008 levels and governments and regulators failure to implement the reforms necessary to protect the financial system from reckless behaviour.[15]

Martin Khor recently reported on the views of two eminent economists: Peter Dittus, former Secretary General of the Bank for International Settlements ("BIS") and Herve Hamoun, the former Deputy General Manager of the BIS, expressed at the launch of their book "*Revolution Required: The Ticking Bombs of the G7 Model*".[16]

In warning of an impending financial crisis, Dittus and Hamoun identified the major problem as 'the G7 debt-driven growth model' which has driven irresponsible fiscal policies to create high government liabilities as a percentage of GDP. In the case of the US, they estimate this is likely to lead to a fiscal deficit of approximately US$1 trillion in 2019. They also named the G7 banks as having become 'facilitators of unfettered debt accumulation.' The near zero interest rates 'have been a huge incentive to borrow and extreme monetary policies have destroyed any incentive to fiscal rectitude.'

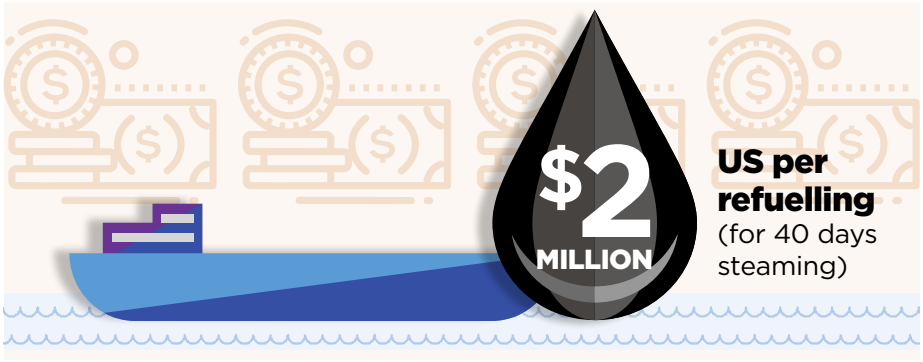
Dittus and Hamoun warn that the 'unprecedented asset price bubble engineered by G7 central banks is a ticking time-bomb that is ready to burst after seven years of near zero interest rates and speculative excesses in bonds, stocks and real estate.'[17]

Many commentators consider that a financial crisis will occur eventually and some anticipate that it will be far bigger than the last one.[18] Unfortunately, in the case of the US economy, Congress has taken away some of the most powerful tools used by Federal Deposit Insurance Corporation, the Federal Reserve Board and the US Treasury to deal with a financial crisis. For example, the FDIC can no longer issue guarantees of bank debt as it did during the 2008 panic and the Treasury would not be able to repeat its guarantee of the money market funds.[19] These powers were 'critical in stopping the 2008 panic.'[20]

A credit squeeze would have a cascading effect on global freight markets,[21] and would affect the shipping industry if liquidity issues prevented some ship owners and operators from securing sufficient credit for day to day trading. This would represent a potential risk to petroleum supply chains because major bunker suppliers (entities that provide fuel oil and diesel oil to ships) may feel compelled to arrest vessels where owners are unable to pay for fuel oil within the terms originally agreed at sale or even extended credit terms. Issuing Admiralty proceedings against ships, known as actions *in rem*, are enabled by Admiralty legislation that permits defined claimants to sue a ship owned by the debtor as opposed to suing the person or corporation itself - an action *in personam*. In Australia, the rights to sue *in rem* are set out in the *Admiralty Act* 1988 (Cth). Many jurisdictions overseas have broadly equivalent legislation. The essence of *in rem* proceedings is always that where a ship owner is unable to provide satisfactory security in relation to the proceeding, a court can sell an arrested vessel and distribute the proceeds to claimants in accordance with the priorities set out in the enabling legislation.

The propensity of oil interests to arrest ships for unpaid bunkers was well demonstrated in the recent collapse of the OW Bunker group of companies – at the time the biggest bunker supplier in the world. This is understandable given the substantial sums of money involved. OW generally supplied bunkers on 60 day terms and doubtless many of today's suppliers provide similar credit. How many failures to settle current invoices will bunker suppliers tolerate in the event of a serious credit squeeze? Tankers in the petroleum supply chain generally consume between 25-30 tonnes of fuel oil per day at sea for a MR clean tanker of about 42,000 dwt[22] to 110-120 tonnes per day for a 300,000 dwt very large crude carrier ("VLCC") steaming to refineries in Singapore, Japan or Korea from the Middle East Gulf. These very large ships have

**Figure 6: Cost of refuelling a VLCC tanker**




~9,000 cubic metre fuel oil tanks and the current price for intermediate fuel oil (380 Cst) in Singapore is quoted at US$ 508.50 per tonne.[23] Thus, VLCC owners can be expected to incur debts of at least US$2 million each time they refuel (for 40 days steaming).

It must also be remembered that owners of large fleets likely have many dozens of outstanding bunker invoices at any one time.

Any major disruption to world credit markets would not solely lead to arrests from bunker suppliers. Providores (suppliers of victuals for ships); ship mortgagees; those holding liens against vessels (eg. ship's crew seeking unpaid wages); unpaid ship repair facilities; insurers and others all have rights under Admiralty legislation. While ship arrests are not an uncommon event to secure payment from debtors, arrests from all eligible claimants will be at heightened risk where ship owners and operators are unable to secure sufficient credit to pay creditors as and when their debts fall due.[24] The level of disruption to CPP supply chains consequent upon ship arrests is likely to be broadly commensurate with the severity of any credit squeeze.

## RISK: GEOPOLITICAL DISPUTES

In discussions, Blackburn fully acknowledges the risks extant in the financial markets and he also warns of the need to properly consider the geopolitical risks confronting Australia. He argues that the evolving political warfare strategies described in "*Countering Comprehensive Coercion – Competitive Strategies Against Authoritarian Political Warfare*"[25] form just a part of a rapidly evolving defence landscape that has not received sufficient analysis.

In "*Defence Challenges 2035: Securing Australia's Lifelines*" the Lowy Institute analyses the Australian security environment and notes that: "The probability of war in Asia is small but real, and greater than a few years ago. Disruptive technologies are altering calculations of military advantage. Deep dependence on energy, information, trade and human links with the outside world makes Australia vulnerable…

"The world is changing across such crucial areas as economics, demographics, military spending, technology, resource and environmental stresses, and the behaviour of powerful states, as outlined in comprehensive future-scanning surveys by Western intelligence and defence agencies. These changes are rapid, simultaneous, and intersecting, and therefore unusually complex and hard to predict." The authors go on to note that the accumulation of risk to Australia's interests is greater than at any time since the Cold War.[26]

While it is beyond the scope of this paper to investigate the features of these risks, it is instructive to note that from a shipping risks and supply chain perspective, the increasing assertiveness of the Chinese government has enabled them to secure the effective seizure of most of the South China Sea.[27] Given that a significant amount of our fuel imports transit the South China Sea, it is an area of concern that was unfortunately overlooked in the last National Energy and Security Assessment.[28]

## RISK: LOSS OF MARITIME SKILLS

In a recent review of Australian Coastal Shipping by Noetic Infrastructure Solutions,[29] it was noted that two critical impacts from the continued decline of the Australian coastal shipping industry was the loss of a sustainable maritime skills base to support a broad range of Australian industries and national economic development more broadly; and loss of supply chain security and service reliability.

Noetic found that a major practical concern for tanker operators was the loss of operational and management skills that are so important for effective shore management of tanker operations at terminals and refineries, as well as on board ship operations. Handling homogeneous cargoes is relatively straightforward but handling multiple grade shipments, which form a major part of Australian coastal operations, requires significant operational skills and experience so that cargoes like jet fuel are not left off specification by dint of contamination from other cargo.

Opportunities to train Australian tanker crews have disappeared in parallel with the rapid decline in Australian-crewed coastal trading tankers. Training, skills, and the operational challenges of Australian supply chains must be incorporated in any analysis of the cost and benefit of carrying part of the cargo in coastal and international CPP supply chains

on tankers owned, managed and crewed by Australians. Teresa Lloyd, CEO, Maritime Industry Australia Ltd, estimates that 20 Australian owned and crewed vessels would provide 850 permanent jobs (~100 ashore and 750 at sea) and provide training for 100 seafarers each year.[30]

## RISK: TRANSPARENT REPORTING

The Commonwealth passed the *Petroleum and Other Fuels Reporting Act* (2017) in August 2017 to assist in monitoring fuel security and to support production of Australian Petroleum Statistics. It is also an object of the act to assist the Commonwealth give effect to Australia's obligations under the IEA Agreement.[31] The mandatory requirements of the legislation are a significant step forward. However, the Maritime Union has understandable concerns that the legislation is overly optimistic in the way that it includes stocks of petroleum on ships bound for Australia as part of Australia's 'Holding stock'. The Act defines 'holding stock' of a petroleum product to include 'holding, in circumstances prescribed by the rules for the purposes of this paragraph, a contractual right to take possession of a covered product' (s5(1)). The rules say this applies if 'the covered product is on water' (s7 b)), without specifying further conditions, defining 'on water' as 'intended to be unloaded from the ship at an Australian port (s4). The explanatory memorandum says:

*"A contractual right to acquire stock is intended to capture arrangements such as:*

- *Stock held in a storage facility outside Australia which is destined for import to Australia under a contract.*
- *Stock held in an oil tanker in transit to Australia where the stock is under contract to be delivered to an Australian business.*
- *International oil tickets, under which a company in one country holds a contractual right (but not obligation) to purchase oil owned by a different company in another country within a particular period (such as three months).*

*The Department is consulting with industry to determine the exact conditions when it is appropriate that such contractual rights should be reported. As a result, the Bill provides that the Rules will set out the specific circumstances in which such contractual rights will constitute holding stock."*[32]

A risk assessment should include the full extent of circumstances allowed by the final form of legislation and rules, and the reliability of these arrangements in various economic and geopolitical scenarios.

# REDUCING OUR FUEL SUPPLY RISKS

The lack of analysis of the vulnerabilities in the international and coastal CPP supply chains is regrettable. Blackburn argues that this risk analysis should be rapidly organised and not be undertaken solely by economists, because 'we need to apply the national security framework and analytical methods that we have applied to our nation's defence forces to areas of risk such as energy security, that are critical to our national security.'.[33]

In Part 2 of his Fuel Security Report to the NRMA[34] Blackburn suggests that we should:

1 Reduce our national liquid fuel demand by adopting measures around fuel efficiency, public transport and alternative fuels.

2 Decide whether we want a proportion of our liquid fuel supply to be secure: if so, how much and for what purpose?

3 Determine the least costly way of achieving this level of security, considering both demand and supply related initiatives.

4 Institute measures to assure the appropriate secure sources of supply and ensure that sufficient refining, processing and storage capacity is retained in Australia to provide a secure source-to-consumer supply chain for a portion of our liquid fuel demands.

Many of the security issues he raises are not directly transport related. However, he notes that a thorough, independent analysis should cover all major elements of the petroleum supply chain. This should include ownership, management and crewing of tankers, noting that the origin/nationality of ship owners and crew are elements to be considered in any thorough security assessment, while standards of ship management (including the provision of quality marine training for crews) is the element of most concern in assessing marine safety risks, including marine environmental safety standards. Such an assessment must include current geopolitical risks and the potential for liquidity and credit disruptions in the event of another financial crash.

Blackburn considers an appropriate way to address fuel supply chain security is to include a benchmarking exercise of Australian security arrangements with that of comparable nations. A critical question to address in such a review will be how many ships in this supply chain should be Australian owned, flagged and crewed? Part of this exercise requires a detailed cost analysis of Australian and international crewing arrangements to determine how the more expensive Australian crewing option directly impacts the retail price of the major petroleum products.

The need for benchmarking is not confined to import supply chains. Blackburn rightly stresses that benchmarking must include coastal supply chains. Given the very modest fuel stocks in Australia, the efficient coastal movement of these stocks, particularly in a national emergency, is heavily dependent on secure access to clean tankers given that there is no road and rail capacity to provide viable alternative transport arrangements.

A thorough investigation should, in his view, encourage Australia to then move from the current 'just in time' supply arrangement to a 'just in case' supply chain.[35] Clearly, the option for the Commonwealth to requisition ships to ship petroleum products plays a role in a 'just in case' strategy and the current unavailability of any Australian flagged product tankers for requisition should be a matter of concern.

## A FLEET OF DEDICATED AUSTRALIAN PETROLEUM IMPORT TANKERS

One potential method of mitigating the supply chain risks articulated by Blackburn and others would be to allocate a portion of the supply chain shipping task to tankers owned, managed and crewed by Australians.

As we have seen, the consequence of refinery closures on shipping movements has been to drive an increase in the number of clean petroleum tankers required in Australian import supply chains. Thus, any review of Australia's future fuel security must increasingly focus on the role of Australian flagged tankers in CPP import and coastal supply chains.

It was estimated by consultants Hale & Twomey that by 2016/17 Australia would require the equivalent carrying capacity of between 53 and 64 dedicated tankers depending on the size (deadweight) of vessels within the fleet.[36] Deadweight ('dwt') refers to the carrying capacity of a ship. Most of the CPP shipped to Australia over the last 20 years has been moved in Medium Range tankers of approximately 40/42,500 tonnes dwt ("MR") but the trend is rapidly moving to the use of much larger vessels.

This number of dedicated tankers (see Table 5 and assumptions below) represents a hypothetical number. The reason for that is that most imported CPP and crude oil cargoes are shipped to Australia through the charter of a suitable vessel on the spot market. This is why approximately 677 ships are currently involved in this trade. A vessel is suitable in an operational sense when it is available to load the cargo on the dates required by the shipper and can carry the amount of cargo required to the nominated discharge port(s) after any draft or physical restrictions at the terminals are considered. One individual ship may carry one cargo per annum to Australia, while other ships may carry numerous cargoes to Australia over the same period.

Tankers are 'tramp' ships and if they are not employed on long-term time charter to an oil company or trader, their operators generally take the most profitable employment available from the freight market at any given time.

In the Hale & Twomey report referred to above, the authors considered the opportunities for the use of larger vessels than the traditional ~40,000 dwt size and assessed the trend across four ship sizes to determine the number of tankers needed to service Australia's import requirements.

The first estimate is founded on the current MR tanker; the second contemplated the use of larger MR's of 45,000 dwt; the third assumes the use of 45,000 dwt tankers and some 50/80,000 dwt Large Range 1 tankers ("LR1"). The fourth estimate goes one step further to assume maximum use of LR1's. The fourth estimate appears to be the most likely because the closed refineries in NSW and Queensland are being operated as import storage terminals.[37] This means that much of Sydney and Brisbane CPP imports are being accomplished in LR1 tankers and this optimization of economies of scale reduces transport costs per litre of cargo delivered to Australia.

While MR's continue to have a role in servicing smaller ports, the move to chartering larger vessels for import trades is now firmly established.[38] Consultation with oil companies will enable the total ship data in Table 5 to be updated and possibly lower the total number of tankers in column 4 if, as expected, the maximum use of LR1 vessels is larger than previously anticipated. The increasing size of petroleum tankers has likely already resulted in significant cost savings for importers.

## COST OF AUSTRALIAN TANKERS

The additional cost per litre of imported fuel derived from introducing Australian crewed and flagged tankers into Australia's international CPP supply chain forms the major element in determining the cost of shipping at that level of security.

The cost differential between operating a MR tanker or an LR1 with an Australian crew compared to a typical international crew is broadly estimated to be approximately A$6.0 million per annum.[39] All the other costs incurred in operating a ship are generally comparable, regardless of crew origins. The consequential Australian Tanker Premium ("ATP") for the top three import countries of Japan, South Korea and Singapore is given in Table 6. The total premium ranges from 0.49 cents per litre to 1.25 cents per litre, and depends on the quantity of cargo carried and the duration of the voyage.

According to modelling carried out by Hale and Twomey, the areas of greatest increase in fuel imports will be NSW and Queensland due to refinery closures

**Table 5: Projected number of full-time equivalent tankers required for imports of clean petroleum products to Australia, made in 2013**

| | 1. No Change to tanker size | 2. Larger MR tankers | 3. Larger MR's and some LR1 tankers | 4. Larger MR's and max LR1 tankers |
|---|---|---|---|---|
| Average cargo size in tonnes | 40,000 | 45,000 | 50,200 | 53,750 |
| Projection for tankers required in 2016/17 with four Australian refineries operating | 72 | 64 | 57 | 53 |

**Source:** Hale & Twomey "Australia's Maritime Petroleum Supply Chain" June 2013. Hale & Twomey's projection for 2016-17 was based on the assumption that Clyde, Kurnell and Geelong refineries would be closed by 2016-17, but instead Geelong remained open and the Bulwer Island refinery was closed. The report assumes imports of 37,420 ML, which is 3% higher than the actual 2017-18 imports of 36,273 ML, and slightly lower than our projection of 2018-19 imports of 38,087 ML.

**Table 6: Cost of the Australian Tanker Premium on a fuel import tanker in cents per litre of petrol carried from primary source countries to primary Australian import ports**

| Loading petrol at | Discharge port | Australian Tanker Premium in cents per litre | |
|---|---|---|---|
| | | Petrol is imported in 45,000 dwt MR cargoes | Petrol is imported in 80,000 dwt LR1 cargoes |
| Kawasaki | **Brisbane** | 0.87 | 0.49 |
| | **Sydney** | 0.96 | 0.54 |
| | **Melbourne** | 1.07 | |
| | **Adelaide** | 1.15 | |
| Ulsan | **Brisbane** | 0.97 | 0.55 |
| | **Sydney** | 1.06 | 0.59 |
| | **Melbourne** | 1.17 | |
| | **Adelaide** | 1.25 | |
| Singapore | **Brisbane** | 0.89 | 0.50 |
| | **Sydney** | 0.97 | 0.55 |
| | **Melbourne** | 0.89 | |
| | **Adelaide** | 0.84 | |
| | **Darwin** | 0.53 | |
| | **Fremantle** | 0.59 | |

**Notes:** Conversion factors for tonnes to kilolitres are taken from www.bp.com. Marine distances are from ports.com/sea-route. A steaming speed of 12.5 knots in assumed, based on discussions with ASP Ship Management, and total voyage time includes 2 days in port to load and discharge. Details are available from the author on request.

in those states.[40] They projected that 69% of total clean petroleum product imports would be to those two states in 2016-17 (Table 7). Given the required volumes to NSW and Queensland and increased size of terminal facilities there, it would be logical for importers to increase the size of cargoes. With cargo sizes of 80,000 tonnes to Sydney and Brisbane, employing Australian crew costs only 0.49 to 0.59 cents per litre on those voyages.

## MODELLING AN AUSTRALIAN TANKER PREMIUM ACROSS THE FLEET

If security analysis supports a portion of the import task being allocated to tankers owned, managed and crewed by Australians, the ATP in Table 6 could be spread across the entire import volume to produce a reduced cost impact on the total import supply chain (the equivalent of approximately 53-57 ships in 2016-7). For example, the cost of 5 Australian ships spread across the projected import volume of 38,087 ML in 2018-19 results in a cost of less than one-tenth of a cent per litre (Table 8). Fifteen Australian ships would cost less than a quarter of a cent per litre. Even if the whole future import volume was covered by 60 ships, the cost is less than 1 cent per litre.

**Table 7: Projected states with the largest volume of clean petroleum imports, and total Australian clean petroleum imports**

| | 2010-11 (seven refineries) | 2016-17 (four refineries) | % of total imports in 2016-17 | % increase in imports |
|---|---|---|---|---|
| Products imported to Qld (ML) | 4,293 | 9,312 | 25% | 117% |
| Products imported to NSW (ML) | 3,827 | 16,537 | 44% | 332% |
| Products imported to Qld and NSW | **8,120** | **25,849** | **69%** | **218%** |

**Source**: Hale and Twomey, "National Energy Security Assessment (NESA) Identified Issues: Competitive Pressures on Domestic Refining, June 2012.

**Table 8: Australian Tanker Premium spread across the import fleet**

| Number of Australian tankers | Australian Tanker Premium | | |
|---|---|---|---|
| | Total cost based on annual premium/ship of A$6 million | Per ML based on estimate for 2018-19 national imports of 38,087 ML | In cents per litre |
| 5 ships | 30,000,000 | $788 | **0.08** |
| 10 ships | 60,000,000 | $1,575 | **0.16** |
| 15 ships | 90,000,000 | $2,363 | **0.24** |
| 30 ships | 180,000,000 | $4,726 | **0.47** |
| 60 ships | 360,000,000 | $9,452 | **0.94** |

**Note:** 2018-19 import volumes are projected based on 2017-18 volumes of 36,273 ML plus 5%, which is the amount that imports have increased each year for the past two years. See Table 1.

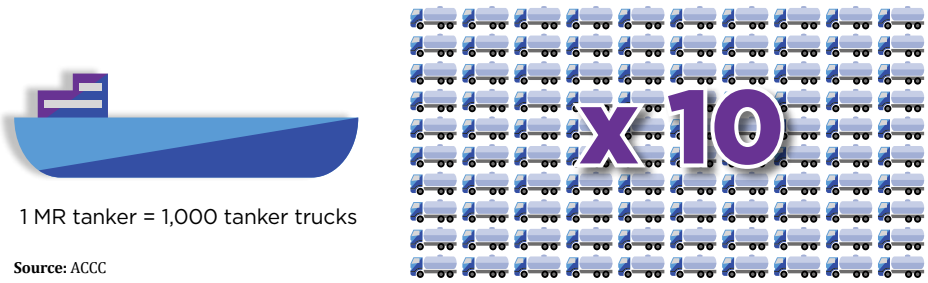
If an Australian segment of the petroleum import fleet was introduced, it would be most cost effective for them to be LR1 or smaller LR2 tankers operating mainly to NSW and Queensland (see Table 7 above). However, an assessment should be made of the size of all Australian fuel import terminals to ensure that at least two Australian import fleet vessels would be able to access import terminals in other states and provide optimal transport solutions for defence purposes. The costs in Table 8 compare favourably with the estimated $25 billion in public funding for roads and $8.3 billion in funding for rail in 2013-14.[41]

# DOMESTIC REFINED PETROLEUM SHIPMENTS

Despite the loss of coastal refined petroleum tankers, there remains almost 4 million MT of refined petroleum being shipped in domestic trades, on international ships using a Temporary Licence. Previous domestic tankers carried approximately 600-700,000 MT per year (loading in Western Australia) or 1 million MT per year (loading in the eastern states, with shorter voyages).

Australian coastal tankers have played an important role in redistributing domestic refined petroleum far more efficiently than trucks or rail. The Australian Competition and Consumer Commission (ACCC) estimates that the standard cargo of an MR tanker (which they estimated at 30,000 tonnes) is equivalent to the volume carried by 1,000 tanker trucks.[42] At times of disruption or emergency, Australian coastal tankers could be directed to load and discharge petroleum as needed, in Australia and internationally, and could form part of the Australian security fleet.

**Figure 5: Equivalent trucks needed to carry the cargo of an MR tanker**




1 MR tanker = 1,000 tanker trucks

**Source:** ACCC

**Table 9: Domestic trade in refined petroleum in 2017-18.**
These cargos were carried on international ships carrying out domestic voyages on a Temporary Licence

| Discharge ports (MT) | Load ports (MT) | | | | | TOTAL |
|---|---|---|---|---|---|---|
| | Kwinana | Geelong | Port Botany | Brisbane | Melbourne | |
| **Adelaide** | 759,117 | 95,642 | 475,406 | | 37,956 | **1,368,121** |
| **Port Botany** | 530,673 | 53,109 | | 129,988 | 98,771 | **812,541** |
| **Sydney** | 9,800 | 250,768 | | 23,818 | | **284,386** |
| **Hobart** | 135,414 | 93,537 | | | | **228,951** |
| **Newcastle** | 124,454 | 65,673 | 20,667 | | 12,919 | **223,713** |
| **Devonport** | 56,644 | 107,211 | | | | **163,855** |
| **Townsville** | 7,012 | 21,047 | | 121,693 | | **149,752** |
| **Burnie** | 119,599 | | | | | **119,599** |
| **Brisbane** | 28,083 | 21,428 | 52,407 | | | **101,918** |
| **Melbourne** | 38,475 | 28,358 | 6,512 | 21,793 | | **95,138** |
| **Cairns** | 6,812 | | | 76,100 | | **82,912** |
| **Esperance** | 71,442 | | | | | **71,442** |
| **Mackay** | 7,283 | | | 36,323 | | **43,606** |
| **Broome** | 36,405 | | | | | **36,405** |
| **Port Hedland** | 34,040 | | | | | **34,040** |
| **Darwin** | | 22,995 | | | | **22,995** |
| **Port Lincoln** | | 15,877 | | | | **15,877** |
| **Geraldton** | 15,581 | | | | | **15,581** |
| **Geelong** | 11,909 | | | | | **11,909** |
| **Gladstone** | 4,502 | | | | | **4,502** |
| **Kwinana** | | | 781 | | | **781** |
| **TOTAL** | **1,997,245** | **775,645** | **555,773** | **409,715** | **149,646** | **3,951,002** |

**Source:** Temporary Licence Voyage Reports published by the Department of Infrastructure, Regional Development and Cities, available at https://infrastructure.gov.au/maritime/business/coastal_trading/licencing/voyage_reports.aspx .


# APPENDIX

## CALCULATING THE NUMBER OF OVERSEAS VESSELS SHIPPING PETROLEUM TO AUSTRALIA

Through its Port State Control function, AMSA collects information on ships trading to Australia and carries out inspections of these ships. It keeps statistics on the number of ships arrivals and the total number of ships this represents (accounting for multiple visits by a single ship). However, for specific ship types (in this case tankers carrying oil, chemicals and noxious liquid substances, it only keeps statistics on the number of inspections and detentions. We have used the available information to make our best estimate of the number of refined petroleum tankers trading to Australia.

### ESTIMATE A

Average number of arrivals to Australia per individual ship in 2017: 4.85 arrivals per ship.
Arrivals by oil and chemical tankers in 2017: 2,652 arrivals
2,652/4.85 = Estimate of 546 individual tankers visiting Australia in 2017 if each tanker makes 4.85 arrivals

### ESTIMATE B

Proportion of ships visiting Australia which AMSA inspected in 2017: 49.7%
Number of oil, chemical and NLS tankers inspected in 2017: 402
402/0.497 = Estimate of 808 individual tankers visiting Australia in 2017 if 49.7% are inspected by AMSA

Using two different methods based on Port State Control data, we estimate that between 546 and 808 individual international tankers visited Australia in 2017. It should be noted that chemical tankers could also be carrying clean petroleum products, and frequently do. It is safe to say that at least 600 individual tankers visited Australia in 2017, yet it is likely that only 49.7% of these ships are inspected by AMSA.

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