

An aerial photograph of a winding asphalt road cutting through a vast, dense forest of tall, green trees. A truck carrying a large load of logs is visible on the road. The scene is captured from a high angle, showing the texture of the forest canopy and the curve of the road.

Z Energy: Our future fuel supply



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01

How will New Zealand get fuel in the future?



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There has been considerable analysis from industry experts and market commentators as to whether New Zealand will be more vulnerable to fuel supply disruption as the country stops importing and processing crude oil at Marsden Point and moves to an import-only, finished product model. The analysis has centred on a reduction in supply security for New Zealand. At Z we reckon that there is good reason to believe that the import-only model will provide greater flexibility and reliability.

After the successful transition from domestic refining, all New Zealand fuel companies will shift to 100 percent import supply from international markets for hydrocarbon fuels. Refining New Zealand, renaming itself Channel Infrastructure New Zealand, will become an import terminal, supplying fuel to Northland, Auckland and the Waikato.

Marsden Point is serviced by a deep-water port able to discharge medium-range tankers (those carrying 50,000 tonnes or more). As well as Marsden Point, fully laden medium-range tankers will be able to access other ports around New Zealand like Mt Maunganui and Lyttelton; medium-range tankers, having partially discharged at the larger ports and carrying smaller cargoes, can then access other ports around New Zealand, ensuring a flexible and more efficient coastal supply of fuel.



Instead of importing crude oil from the Middle East, a region which has faced frequent political instability, New Zealand will instead predominately acquire its refined fuel from Asia, including Singapore, Japan and Korea. A refined fuel import supply chain, sourced from multiple refineries in multiple countries, will provide more options for sourcing product and is therefore more resilient to most credible fuel disruption scenarios.

There will also be more frequent deliveries of finished product to New Zealand, with Z estimating around 175 tankers arriving annually. Put that another way, a tanker will be discharging into our domestic supply chain every two days. That is considerably more tankers than the industry currently imports and each carrying fuel that is ready to be delivered to customers.

New Zealand's current fuel structure: Marsden Point

For nearly 60 years New Zealand has operated its own oil refinery at Marsden Point, near Whangārei. The refinery supplies around 70 percent of New Zealand's refined product, imported as crude oil and processed at the refinery, with the remaining 30 percent coming from Singapore, Australia, South Korea and the Americas. The majority of crude processed at Marsden Point Refinery is imported from overseas with only a tiny portion coming from domestic New Zealand sources, and then primarily in the form of condensate.

The Marsden Point refinery is operated by Refining NZ, a company listed on the NZX and owned by many shareholders including its three main customers, bp, Mobil and Z.

The refinery is well run and holds an enviable safety record, however it is far from the major oil markets and faces increasing operating costs. Profitability at the refinery has been declining for years and, in relative terms, larger, more efficient refineries have emerged across South East Asia to provide product at increasingly lower refining margins. Add to this the uncertainty around long-term domestic fuel demand from the adoption of new technology like EVs, the future of refining in New Zealand became increasingly difficult to justify. The Covid-19 pandemic, with the inherent drop in demand, especially for jet fuel, accelerated the evaluation of the long-term viability of domestic refining in New Zealand.



Refining NZ took a vote on its future earlier this year. Ninety-nine percent of shareholders voted in favour of transitioning Marsden Point out of refining. Having negotiated the contract with its main customers, the final investment decision was made to cease domestic refining at Marsden Point and move to an import terminal by April 2022.



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The import-only model is not new. Smaller operators already work this way; for over 20 years Gull has received refined products via Mount Maunganui without any need to hold crude stocks. In the past 20 years, Australia has dropped from eight refineries supplying nearly all of its domestic demand to two, with recent announcements that ExxonMobil will close its Altona refinery in Victoria and bp will shut Kwinana in Western Australia.

Like Marsden Point, the Australian refineries have struggled to compete with the larger and more efficient refineries in Asia. The Australian government has agreed to subsidise the remaining two refineries by more than \$2 billion to keep them open until at least 2027.

New Zealand’s National Inventory Agreement

The New Zealand industry currently operates under a National Inventory Agreement (NIA), which allows all fuel infrastructure to be shared between the fuel companies Z, bp and Mobil operating in the country. This system, designed decades ago to reduce the fixed asset cost of supply in New Zealand, worked well when there was equal market share and supply from the major fuel companies. However, this is no longer the case.

Z currently operates the largest network of the most strategically important fuel storage assets in

New Zealand. We own and operate more than 50 percent of New Zealand’s bulk fuel storage terminals, representing 191 million litres of storage. We also have a fuel market share of approximately 40 percent. Z is committed to ensuring these terminal assets generate a fair, appropriate commercial return for the capital committed and believe the best way to achieve this is to exit the NIA. Z is currently discussing the future state of the NIA with the other NIA participants.



02

Why does flexibility and reliability of fuel supply matter?



Fuel is an essential product for New Zealand. As a highly mobile island nation it is critical to support our economy and the everyday lives of New Zealanders. Although the demand for liquid ground fuels will steadily reduce with the advancement of alternative technologies, it is forecast to be part of the energy industry for decades to come and remains vital for a just transition to a low-carbon future.

Refining crude oil at Marsden Point has provided a level of comfort to governments and consumers alike; that New Zealand has control over its fuel supply and therefore energy independence. While people assume having crude on hand at the refinery provides a level of protection, that oil still needs to be refined and distributed. In the case of a refinery or pipeline outage there can be a significant delay to supply finished product.

Import shipments of refined fuels provide more flexibility as ships can be redirected to other ports if needed and arrive with the finished product ready to use. In cases such as the Refinery to Auckland Pipeline (RAP) failure in 2017, it would have been far more helpful to have more product on the water enroute to New Zealand, such as under an import model, than having unrefined crude in the country. While fuel in transit is not currently considered part of the national supply, we think it should be, as there is a low likelihood that this product could not be delivered in whole or in part which considerably ramps up our capacity. Under an import-only model there will always be three ships carrying 144 million litres of product within seven days of unloading at a New Zealand port.

On the basis that storage tanks are half full, there are roughly 400 million litres (approximately 17 days of cover) currently held in tanks across New Zealand. As the country moves to an import-only model, it will have an estimated 440 million litres of additional fuel on the water making its way to a New Zealand port within three weeks.



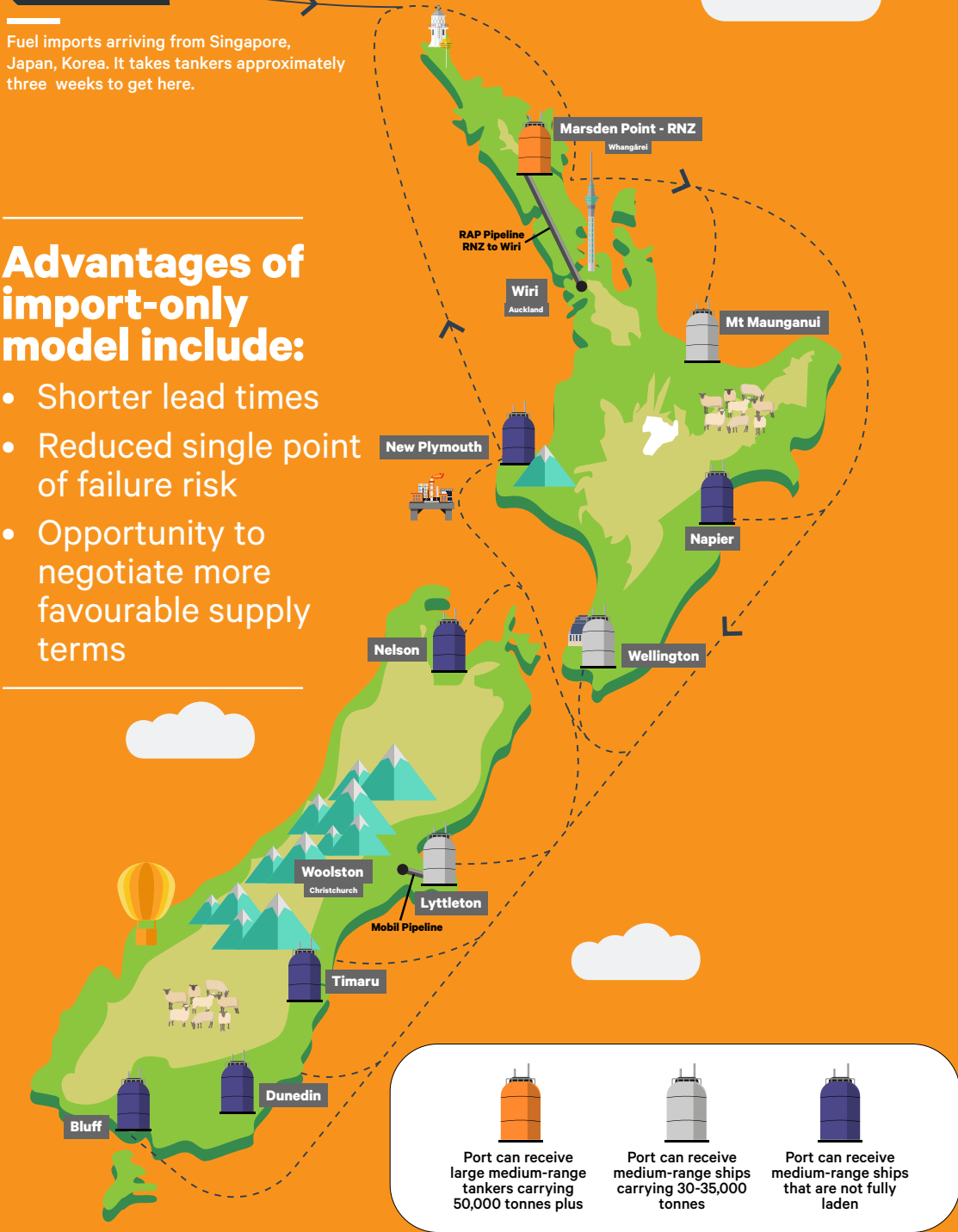
Fuel moving around NZ coast.



Fuel imports arriving from Singapore, Japan, Korea. It takes tankers approximately three weeks to get here.

Advantages of import-only model include:

- Shorter lead times
- Reduced single point of failure risk
- Opportunity to negotiate more favourable supply terms



Port can receive large medium-range tankers carrying 50,000 tonnes plus



Port can receive medium-range ships carrying 30-35,000 tonnes



Port can receive medium-range ships that are not fully laden



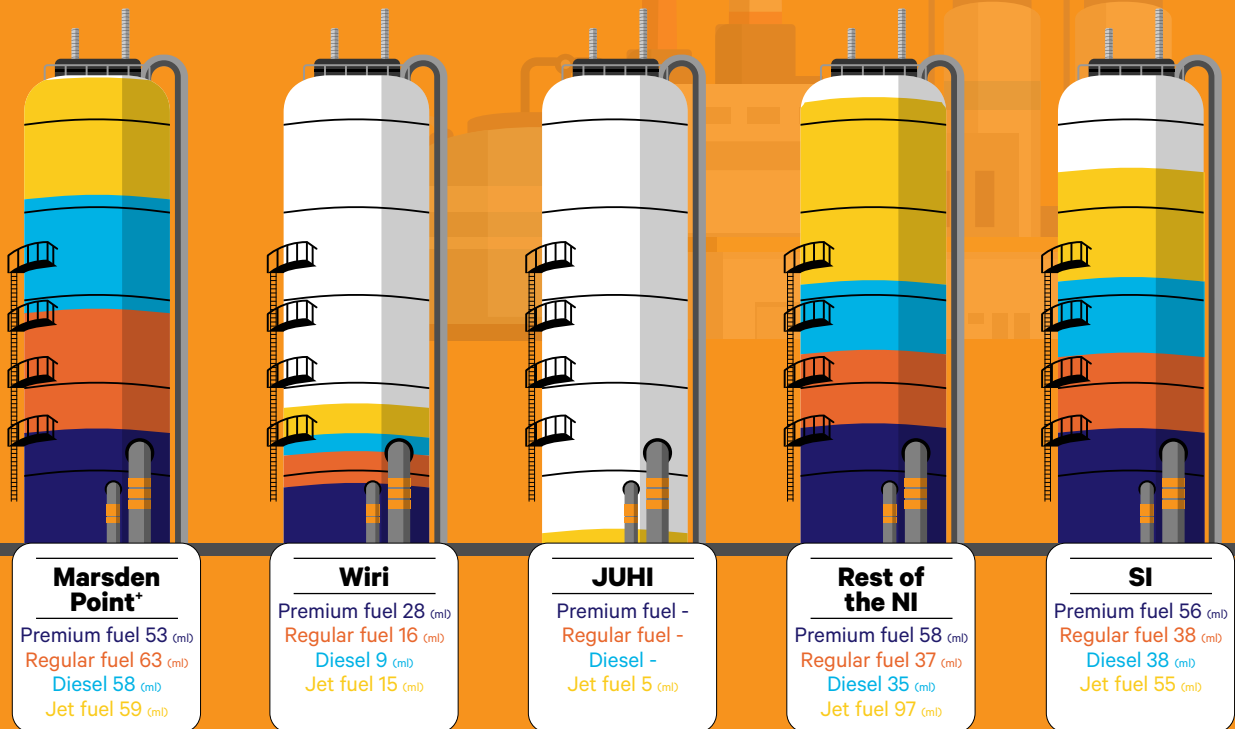
If we were to include fuel in transit as part of our national supply, this would more than double our capacity.

The high fixed costs of the refinery model compare poorly to the variable costs of importing fuel for the foreseeable future, which allow companies to respond to supply and demand variations with greater flexibility. Industry can plan and optimise supply by product, and not be limited by so-called barrel constraints.

What does this mean? When you buy a barrel of crude oil, it contains layers of products. At the bottom of the barrel is heavy, sticky bitumen and at the top is processed product that can be used to make petrochemicals and industrial petrochemicals. In between is layers of jet fuel, diesel and mogas (91/95 petrol). You may not need fuel oil, for example, but this is produced by refining the crude oil, whether you want it or not. When importing refined oil, you get exactly what you want, without having excess stock or products that are subsequently exported at a loss.

Days cover of fuel.

At any one time in New Zealand, there is considerable fuel supply available across industry. This is an approximate breakdown of how many days of cover we have, and will continue to have as we move to an import only model, for ground and jet fuel. Based on current consumption, a day of cover equates to 23 million litres.



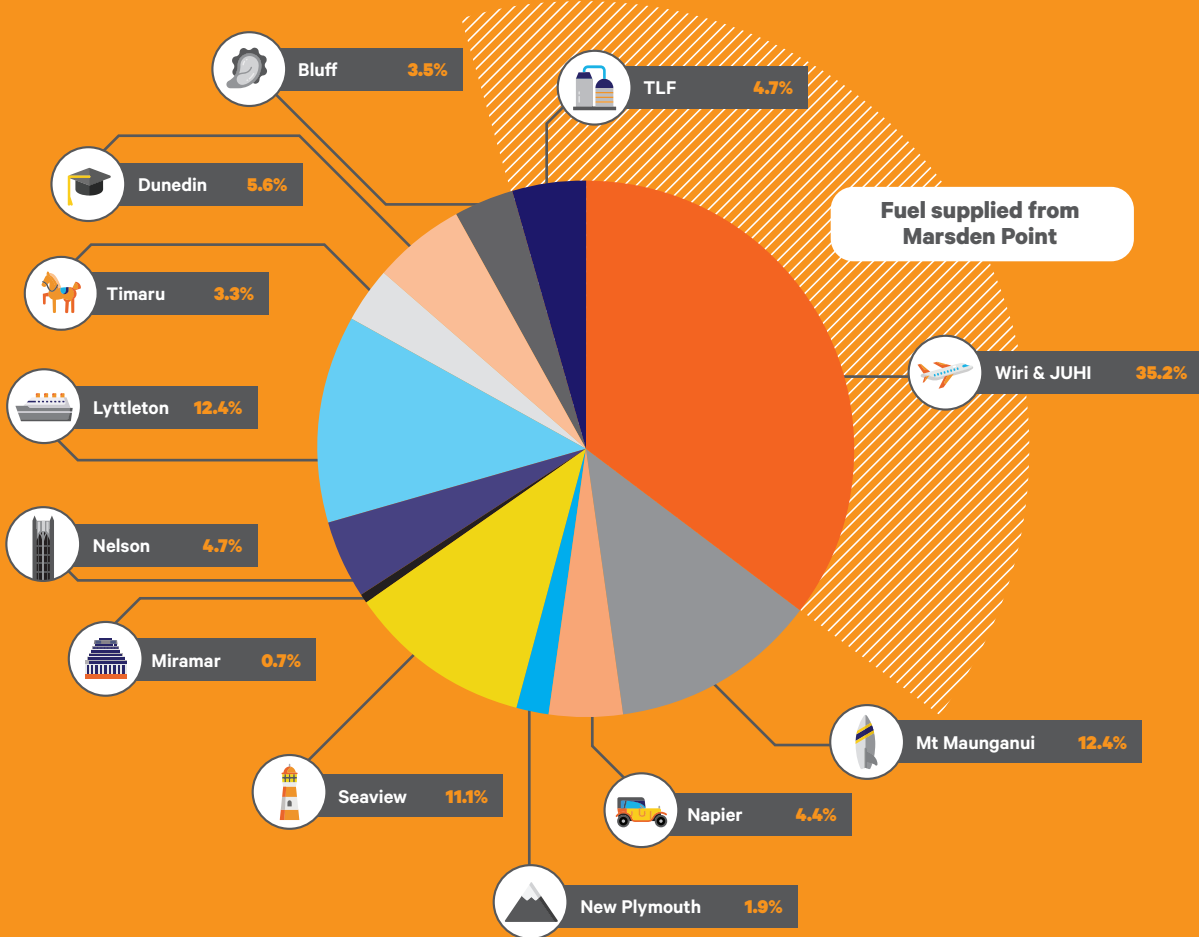
* Millions of litres (ml)
 + includes the Truck Loading Gantry (TLF) at Marsden Point

TLF - truck loading gantry at Marsden Point JUHI - jet tanks at Auckland Airport
 NI - North Island SI - South Island



Fuel supply across New Zealand.

Where our ground fuel and jet fuel is currently located, across the country.



Covid-19 highlighted the challenge of barrel constraints when New Zealand’s demand for jet fuel dropped significantly. Jet was still being produced from crude oil being refined to make petrol and diesel even though demand for jet had dropped by over 75 percent. An import-only model would have given industry the flexibility to reduce our order of jet fuel while continuing to meet demand for other fuel types.

Scheduling of ships is more complicated under the import-only model, however, the options for delivering fuel to where it is needed are also greater. If something goes wrong in one part of the country, you have significantly more options to discharge ships to other parts of the country and ensure supply.

The single point of failure risk is greatly reduced with an import-only model. It is highly unlikely all companies will be sourcing from the same refinery, and increasing the amount of product imported can offer commercial advantages.





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There is a highly active global market for refined products; spot markets exist in the case of disrupted supply from term supplier contracts. The market runs 24/7 every day of the year and is highly liquid (excuse the pun!) with multiple industry participants across diverse geographies. It's yet another reason Z thinks the move to import-only does not diminish supply security and possibly enhances it for New Zealand.

The lead times on refined products are half the lead times on crude oil. It takes four to five weeks to transport crude oil from the Middle East to New Zealand, and it's unusable when it arrives – it needs to be processed into various types of fuel. It takes approximately three weeks to get processed fuel from Northern Asia to New Zealand, and it's ready to use as soon as it arrives.

It will be of key importance to schedule these ships well and be certain about the specifications and quality of the product arriving into New Zealand (meaning that you get exactly what you have ordered), because it can no longer be sent to the refinery for processing. Z is confident that this can be done and the industry is building systems and capability to achieve that.

None of this takes away from the significant contribution the refinery has had in New Zealand. Rather it is an indication that times have changed and that an alternative model will continue to provide the security New Zealanders need to support a highly mobile nation.

03

What additional actions could enhance security of fuel supply?





To allay concerns as New Zealand transitions out of refining, there are a number of steps industry and Government can take. Although it could be argued that there is no need to do anything more, as fuel supply will be ample under the proposed model, Z believes additional resilience is worth considering. Z supports solutions to enhance security of supply.

Support local biofuels production

Supporting the domestic supply of biofuels and sustainable aviation fuel (SAF) is one obvious solution. The development of domestic biofuel manufacturing capability has long been a strategic goal for Z, which believes it is in the best interests of New Zealand and its carbon reduction goals.

The Marsden Point site could be converted into a biofuels hub. It sits next to a deep sea port, there are long term consents in place for the site, and some of the manufacturing kit needed to create biofuels is already there.

There are advantages from converting the Marsden Point site into a biofuels hub for local employment and for the Northland economy, as well as developing engineering skills and biofuels intellectual property for the country.

Expand the IEA tickets system

Another option would be to expand on a system that already exists – agreeing to supply contracts with other countries that are part of the International Energy Agency (IEA). Member countries exchange IEA tickets, which are traded for fuel products when needed. The preference would be to hold IEA tickets for fuel that is as close to

New Zealand as possible – in Australia. In case of emergency, it would be possible to get fuel to New Zealand within days. Z believes there are better ways to ensure the flexibility and security of fuel supply.

National fuel inventory

Although New Zealand has never experienced an event that prevented fuel imports, establishing a national fuel stockpile could provide additional fuel security. New Zealand consumes around 8.5 billion litres of fuel per year, or 23 million litres a day, and it would offer peace of mind if a certain number of days worth of fuel cover were sitting in tanks in New Zealand, ready to be used.

How would this work? The Government could hold additional product in tanks (most likely but not exclusively at Marsden Point where a number of crude tanks could be refurbished for finished product) that in a crisis the country could quickly access. The industry could manage the additional supply to ensure the product reserves are well maintained.

This system has been used successfully in the United States for decades, to protect against emergencies such as the 1973-1974 Arab oil embargo, when the price of imported crude oil tripled. In Z's view, a national fuel stockpile like this is preferable to mandating each fuel company to hold fuel in storage.

Require fuel suppliers to hold stock

The Government might look at requiring fuel suppliers to stockpile and manage emergency fuel reserves on behalf of the nation. This is done in Sweden, where the emergency oil stocks mandated by the IEA are stored and financed by industry rather than central government. As of April 2018, the emergency stocks amounted to 42.3 million barrels, or 187 days worth of net imports. Any company that fails to maintain the compulsory stocks must pay the Swedish government a storage penalty charge.

In Z's view, this is an expensive and unnecessary exercise, with the costs of additional storage and increases in working capital and risk likely to be passed on to the consumer. We would not endorse this for New Zealand given the availability of lower cost alternatives.

Practise for the worst-case scenario

Lastly, we think it is useful that the Ministry of Business, Innovation and Employment (or another government agency) mandate annual exercises to simulate a large fuel supply chain disruption, to see how importers and other critical customers like Air New Zealand, Auckland Airport and large domestic commercial firms would respond.

The large fuel companies already hold regular crisis simulation exercises, and real-life scenarios had to be worked through in 2017 (jet fuel supply problems arising from the RAP failure) and 2020 (sudden drop in demand due to Covid-19). But there is still a case for doing more. We see value in expanding these exercises.

04

Conclusion



Rather than seeing the closure of the Marsden Point Refinery as a problem for security of supply, Z views it as an opportunity for greater efficiencies, and there are very real options being put in place that will maintain supply security. It is in keeping with the national goal of reducing our carbon footprint and will cost less to manage than the current refinery system.

Supply will certainly not diminish and could quite plausibly be enhanced with more fuel held in tanks onshore and on the water. That fuel can be sent exactly where it is needed and will be ready for immediate use on arrival, rather than having to be refined and moved around the country.

We will be working with more suppliers, which will help New Zealand diversify and mitigate the risks of being over reliant on one region or refinery. Any changes we make we realise we sit at the end of a very long supply chain and cannot mitigate all risk, such as a region-wide geopolitical event in the Middle East. However, outside such a severe upstream event, what we move to will be a more flexible and reliable model.

There are additional steps the Government could take which would provide even higher levels of confidence in the security of fuel supply. These include:

- supporting a green energy hub at Marsden Point;
- establishing a national stockpile of fuel;
- and mandating crisis management exercises.

Z is confident that fuel security can be maintained post-refinery. Fuel is critical to our economy and the everyday lives of New Zealanders, and we are committed to continuing to deliver this to our customers, to meet their needs and support a highly mobile nation.





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