Biofuels key to food security and shipping resilience for NZ

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By Shannon Williams

Photo: Marsden Point oil refinery

Aotearoa New Zealand's reliance on imported fossil fuels poses significant risks for food security and shipping resilience in the face of global catastrophes, according to experts speaking at a recent webinar on biofuel self-sufficiency.

Speaking on the *Biofuel requirements for New Zealand self-sufficiency* webinar, Matt Boyd, owner of Adapt Research and executive director of the charity Islands for the Future of Humanity, emphasised the role of bioenergy in maintaining essential services and food production during trade disruptions.

"In an energy supply crisis, we must ask: what are the most durable and resilient forms of energy that can get us back on our feet quickly and robustly? Bioenergy is probably the best of the lot", he said.

The webinar, hosted by the Bioenergy Association with funding from EECA, is part of a series aimed at exploring bioenergy's role in New Zealand's economy. Islands for the Future of Humanity focuses on global catastrophe research, particularly how islands like New Zealand and Australia can prepare for fuel and energy supply disruptions.

"New Zealand and Australia are highly dependent on trade and vulnerable to supply chain collapse. In a severe global catastrophe, trade could halt entirely, leaving us without access to essential fuels".

He said that global catastrophic risks, while individually unlikely in any given year, are inevitable over time.

“We're an island in the middle of nowhere on a volcanic rim. We have massive potential catastrophes for a whole range of things. It's not about if they occur, it's when they occur.

“Global catastrophic risks are a category of problem defined by the occurrence of some event that spreads to impact the entire world with potentially catastrophic consequences. Examples of such risks would include global nuclear war, extreme pandemics that are worse than Covid-19, solar storms that have continent-spanning impacts on electrical grids, great power conflicts, global industrial disabling due to cyber events, multiple breadbasket failures due to climate change and the ensuing cascading impacts of that, or super volcano or asteroid impacts that create a change in global climate.

"If one of these events disrupts global supply chains, New Zealand must be prepared to sustain itself”.

Boyd said it wasn’t just about the protection of New Zealand’s own citizens.

“Both [New Zealand and Australia] are large food exporters, and so the wellbeing of tens of millions of people around the world actually depends on the internal functioning of these countries”, he said.

A recent study by the New Zealand government highlighted the country's vulnerability in this area. It found that in a scenario where all imports and exports are halted for 90 days, only 27% of usual diesel consumption could be met with onshore fuel reserves.

"Even during Covid-19 lockdowns, New Zealand used 30–40% of its usual diesel supply. The reserves we have now wouldn’t be enough to sustain critical services for long", Boyd said.

His research has also shown that about a quarter of New Zealand’s energy supply could come from biomass and organic matter.

“However, recent trends have moved away from fuel resilience, including the closure of the Marsden Point refinery, closure of Z Energy's Tallow plant, a preponderance of road freight rather than electric rail or shipping, and the biofuel blend mandate was eventually dropped.

“And so the question really becomes, in such a catastrophe context, how do you supply basic needs like food and water when no one may be coming to help?”

Biodiesel in shipping and trade resilience

Independent researcher Mike Hodgkinson expanded on Boyd's concerns, focusing on the critical role of shipping in a post-disaster scenario.

"There are many ways shipping could be halted for months or longer. And if that happens, it's ironic that a fuel shortage could cause a food shortage", he said.

Hodgkinson said agriculture in New Zealand and Australia is almost entirely diesel-dependent, and without fuel, we wouldn't just lose transportation—we'd lose food production, emergency services and defence capabilities.

He said New Zealand holds just 21 days' worth of diesel reserves, while Australia has about 55 days' worth.

"How bad could it get? There's quite a strong bit of evidence that food shortages lead to social breakdown. It's pretty obvious if people can't eat then things are going to get pretty bad".

Hodgkinson pointed out that shipping is not just vital for trade but also for internal logistics. "Ninety per cent of world trade is delivered by shipping. Even just the essentials of food delivery around New Zealand, or medical supplies from Australia or nearby, and being able to collect fuel – if there's hardly any fuel available, then ships using only 50% of the fuel per ton kilometre of trucks is one reason that they may be essential. And of course, foreign vessels may not be available, so a locally controlled fleet could be essential as well."

He cited real-world examples demonstrating that biodiesel is a viable fuel for shipping.

"The Canadian Steamship Lines fleet has logged 75,000 operating hours using 100% biodiesel. The same results have been seen with diesel-powered vehicles and farm equipment. Locally produced biodiesel could keep our ships and tractors running when conventional fuels run out".

Hodgkinson said Australia has missed an opportunity in this area. "Australia exports 80% of its canola seeds—many of which are turned into biodiesel in the EU. Instead of sending that resource overseas, we could be using it to build our own fuel resilience".

The global shipping industry is already transitioning toward biofuels.

"Amazon and Nike are demanding biofuel blends in their shipping. The International Maritime Organisation (IMO) and the EU are setting regulations to encourage or mandate biofuels. Singapore tripled its biofuel sales to 500 million litres in 2023. Even in New Zealand, Bluebridge Ferries has started using a 24% biodiesel blend supplied by BP", Hodgkinson said.

Hodgkinson argued that investing in local biofuel production is not just a business opportunity – it's a survival strategy.

"If fuel disruptions threaten social stability, biodiesel from food oil could provide an immediate stopgap, while scaling up sustainable biodiesel production would build long-term resilience for New Zealand and Australia, and other countries".

He called for further research and quantification of fuel needs for essential services.

"We need to know exactly how much energy is required to maintain basic needs in a crisis and how to optimise those requirements. New Zealand and Australia's fuel security is crucial – not just for us but for the world, given our role as major food exporters.

"If New Zealand can develop a self-sufficiency model for biofuels, it could serve as a template for other vulnerable island nations. Cooperation across the Tasman is critical for sustaining trade and fuel security."

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