Submission on the *Interim Hydrogen Roadmap*

Name	
Organisation (if applicable)	
Contact details	

Release of information

Please let us know if you would like any part of your submission to be kept confidential.

☒ I would like to be contacted before the release or use of my submission in the summary of submissions that will be published by MBIE after the consultation.

☐ I would like my submission (or identified parts of my submission) to be kept confidential, and **have stated below** my reasons and grounds under the Official Information Act that I believe apply, for consideration by MBIE.

Responses to questions

Section 1: Hydrogen is emerging as an important part of the future global energy system	
	Are there other issues we should be considering in our assessment of the strategic landscape for hydrogen in New Zealand?
1	A fundamental question the Government of New Zealand (GoNZ) needs to answer is how much energy it wants the population to STORE, as opposed to GENERATE. Initiatives to encourage consumer uptake of battery solutions are all well and good, so long as sufficient power is persistently available to recharge electrical wares. However, when STORED energy is depleted, the commodity which it powers becomes nigh on useless. This seems a high risk strategy in a country where, in the last 12 months, 30% of its land mass (accounting for 50% of NZ GDP) has experienced two extensive floods and a cyclone, all of which impacted the mains power infrastructure. Rather, it would seem more logical for the New Zealand population to be enabled to GENERATE power and maintain a higher degree of self-sufficiency, on the understanding climate volatility will increase and the risk of earthquakes will be forever constant. Hydrogen powered systems would appear a sensible means for powering larger goods and services (such as vehicles, or providing backup power), which would then provide the populous greater freedom of manoeuvre and an autonomous means to cascade power down to recharge personal smaller wares. Secondly, it would be useful for GoNZ to actively consider the Life Cycle Analysis (LCA) of energy solutions, rather than focus solely on the period when the product is in use by the consumer. Batteries and solar panels are cases in point: the mining for rare earths (and child labour that often undertake said task) is typically ignored or forgotten, and the concepts for disposing of, or recycling the products are considered 'tomorrow's problem' (and which the world currently has no industrial-scaled solutions for). Given the vulnerabilities inherent with being at the physical end of the global supply chain, New Zealand should afford more effort to understanding the LCA of its fuels, power systems and supporting infrastructure. Were it to do so, NZ's ability to generate green hydrogen from its renewable energy sources to drive fuel cells (which are predominately aluminium and carbon stacks and, in extremis, could be built in NZ) would propel H2 solutions ahead of some power systems that have assumed precedence.
Section 2: The role for hydrogen in New Zealand's energy transition	
2	**Do you agree with our assessment of the most viable use cases of hydrogen in New Zealand's energy transition?**
	Yes.
	Do you support some of these uses more than others?
3	P33 of the Interim Roadmap states that 'the opportunity for hydrogen in rail is relatively limited.' This is perhaps true were NZ to consider like-for-like replacements across the entire rail ecosystem. A more pragmatic option however could be to target the pollutant-heavy

	parts of the rail network, and perhaps start by introducing hydrogen shunting engines at the primary freight terminals. In NZ, the freight terminals are currently serviced by diesel engines, which is problematic because these are in the cities, and the continuous start-stop characteristics of the shunting engines release large amounts of GHG into the atmosphere. To mitigate this, the Polish Rail Network have taken delivery of their first hydrogen shunting engine, and will use their findings to inform a locomotive design that will extend the use of hydrogen fuel cells into passenger services.
4	**What other factors should we be considering when assessing the right roles for hydrogen in New Zealand's energy transition?**
	Section 2 touches on potential uses for hydrogen as part of a Humanitarian Aid or Disaster Relief scenario (i.e. deployable electrolysers and fuel cells). It may be worth considering fuel requirements for a large-scale emergency scenario in NZ, and to ensure that the appropriate infrastructure is introduced as part of the national hydrogen rollout. One example can be drawn from Cyclone Gabrielle. Contrary to popular belief, Hawkes Bay had plenty of diesel or petrol stored across the region. Unfortunately, there was no power at the pumps: only one supermarket petrol station had a backup power system, resulting in it being seconded by the first responders to refuel their vehicles and disseminate fuel to where it was needed most. In this instance, (and on the understanding that hydrogen will replace diesel and petrol) there could be a requirement for forecourts to have pumping mechanisms to refill cylinders in an emergency and have backup power. It could also behove us to consider stocking hydrogen in various form factors for such a scenario. The positive is that H2 does not degrade over time, but it may require reserve stocks to be rotated, to avoid the storage vessels falling prone to embrittlement.