



Ministry of Business, Innovation and Employment

By email: hydrogen@mbie.govt.nz

7 November 2023

Interim Hydrogen Roadmap

Transpower appreciates the opportunity to respond to the Ministry of Business, Innovation and Employment's (MBIE) paper, *Interim Hydrogen Roadmap*. Importantly, the paper recognises the potential implications for the electricity system of green hydrogen produced from renewable electricity. We welcome the thinking that MBIE has begun with this paper.

Our submission raises three key points in relation to the role of hydrogen as part of Aotearoa New Zealand's wider energy transition:

- Hydrogen could represent a substantial future increase in electricity demand. We support MBIE's position of first focussing on our domestic transition needs and energy decarbonisation goals while maintaining affordability and security;
- Coordinated action is required to support green hydrogen uptake, including anticipatory investment. Changes to environmental and property legislation is required to enable renewable generation and associated transmission to be developed at pace – these changes would also benefit hydrogen production;
- The Electricity Demand and Generation Scenarios (EDGS) need to be better aligned with the Government's view on the electrification need.

For the purpose of our submission, we have assumed that hydrogen production will connect to the transmission grid.

Hydrogen could represent a substantial future increase in electricity demand

In our *Whakamana i Te Mauri Hiko* work,¹ Transpower analysed the potential demand increases that may arise as New Zealand increasingly electrifies its process heat and transportation. Our work has not yet considered the impact of green hydrogen production on the electricity system. This production could assist with decarbonisation of hard-to-electrify areas of our energy system and industry. However, there would be impacts on the electricity system from this increased demand.

The demand scenarios presented in the *Interim Hydrogen Roadmap* are substantially higher than has previously been modelled in the sector, including the Climate Change Commission's scenarios,² the recent modelling by BCG,³ and Transpower's own *Whakamana i Te Mauri Hiko* analysis.

Importantly, even the MBIE *Base Case* identified an additional 33.9 TWh of energy would be required by 2050, beyond the additional ~30TWh already expected. In capacity terms, this amounts to needing to build and connect roughly twice as much generation by 2035 as the industry had previously modelled - an addition of ~9GW compared to an extra ~4.5GW in previous scenario work.

¹ <https://www.transpower.co.nz/about-us/our-strategy/whakamana-i-te-mauri-hiko-empowering-our-energy-future>

² <https://www.climatecommission.govt.nz/our-work/advice-to-government-topic/inaia-tonu-nei-a-low-emissions-future-for-aotearoa/modelling/>

³ <https://www.bcg.com/publications/2022/climate-change-in-new-zealand>

The extent to which the Government supports the uptake of green hydrogen under, or in addition to, the *Base Case* will require a corresponding response from the electricity industry, and supportive legislative and regulatory frameworks, to enable this uptake. As a result, we support the approach in the paper of first meeting our own domestic transition needs and energy decarbonisation goals, while maintaining affordability and security.

Coordinated action is required to support green hydrogen uptake

We note that the price-point advised in the paper of \$55/MWh required to competitively produce hydrogen implies a grid connection to access wholesale electricity prices and renewable spill. The need for this connection is also reiterated through the emphasis given in the paper to the role of hydrogen in providing demand response. Connecting hydrogen production to the grid will likely require new infrastructure build.

Building the increased amount of infrastructure required for hydrogen production (in addition to that otherwise required to decarbonise the economy), and at the pace required means that coordinated planning needs to begin now.

We need to ensure the vision for the role of hydrogen in the future energy mix is consistent across the wider consultation package⁴ and across the related actions currently underway, such as the Commerce Commission's Input Methodologies (IMs) review and any legislative reform.⁵

Green hydrogen production has the potential to require substantial amounts of renewable electricity generation and transmission to be consented and built to meet hydrogen production. It is therefore vitally important the Government enables a faster, more certain and permissive build of renewable generation and transmission infrastructure. Transpower considers the transmission investment test in the Capex IM needs to enable anticipatory investment. Our submission to MBIE's paper *Measures for Transition to an Expanded and Highly Renewable Electricity System* discusses the changes required to the investment test in more detail.

The reform of the resource management system, including the review of the National Policy Statements on Electricity Transmission and Renewable Electricity Generation, has highlighted the need for an environmental regime that will enable the build of new infrastructure (and works on existing assets) at the pace required for electrification. However, the timeframes for these reforms are currently many years away from taking effect, whilst the pace implied by the Energy Market Measures paper other modelling makes clear that support is needed immediately.

Additionally, it is important that MBIE extends a coordinated view of the role of hydrogen through to its updated EDGS, which Transpower must use for planning and Major Capex proposals. Currently, there is a very large discrepancy between the size of demand envisaged in the *Interim Hydrogen Roadmap* and the most recent set of EDGS.

Other roles hydrogen could play in the power system

The *Interim Hydrogen Roadmap* also outlines the possibility of hydrogen playing important roles in the electricity system, such as providing large demand response, peaking generation, and serving as a winter energy supply.

There is potential for hydrogen to fulfil these purposes. However, we consider that other technologies look likely to provide more efficient and economic solutions. In particular, the cost of

⁴ Notably the Electricity Market Measures paper – refer to our submission on this paper.

⁵ Our submission on the offshore wind paper discusses changes to environmental and property legislation and regulation that would be needed for electrification. These measures would equally benefit generation and transmission connections to hydrogen production.

batteries is rapidly falling, and opens up the possibility of many innovative solutions to peak demand. When comparing the round-trip efficiency of hydrogen to battery solutions, the latter present a potentially more efficient solution. For this reason, it will be important for all technology options to be on a level playing field in the provision of innovative solutions to our transition challenges.

Transpower can support future work with MBIE on hydrogen

Transpower considers that the electricity system impacts from new technologies and fuels, including hydrogen, need to be considered from a whole of system perspective in our role as Grid Owner and System Operator.