

## Submission from Wind Quarry Zealandia to Transpower's Net Zero Grid Pathways 1 – Major Capex Project

Our submission follows the format of the questions suggested in the consultation document.

### 1. Do you agree with our staged approach to this major capital investment programme?

Wind Quarry Zealandia Limited (WQZ) was established in 2019 to explore the development of offshore wind generation in New Zealand, with a particular focus on the waters of the South Taranaki Bight. It was the first company to complete a feasibility study on the offshore wind opportunity in this area. That study has shown that offshore wind is feasible and can produce large volumes of electricity at competitive prices.

WQZ acknowledges that it has specific interests in seeing the transmission network improved to allow electricity to be sent to and from the Taranaki region – both northwards and southwards. Our submission is focused on the grid developments that will enable that to occur.

WQZ appreciates Transpower carrying out the Net Zero Grid Pathways exercise and has contributed previously to the consultation process. The process of electrifying and decarbonizing the New Zealand economy by 2050 is a massive exercise requiring appropriate planning and large-scale investment in generation, transmission, and distribution assets as well as a wide range of infrastructure to use electricity.

WQZ respects that Transpower has a regulated environment in which it operates. That environment includes the requirement from the Commerce Commission to use the 2019 Electricity Demand and Generations Scenarios (EDGS) or reasonable variations of the EDGS as the basis for planning.

Transpower, with the help of an external panel, reviewed the EDGS in late 2020 and prepared variations to the EDGS.

Unfortunately, this process is flawed. When the EDGS were being developed in 2019 there were no developers publicly identified as exploring the offshore wind opportunity in New Zealand. There was interest by developers in addition to WQZ in place by late 2020. By mid-2022 there are at least five credible groups focusing on the offshore wind opportunity in Taranaki waters. The offshore wind industry and opportunity for New Zealand is quickly coming into focus and Transpower and the Commerce Commission must adapt accordingly, or the New Zealand grid, rather than the lack of new clean power generation, will be the reason that decarbonization goals and mandates are not realized.

The NZGP1 process, based on the EDGS and its assumptions, has not kept up with the pace and scale of development of offshore wind in both New Zealand and in many other countries.

The scale of the opportunities being explored with offshore wind in New Zealand (typically 1 GW+) dwarfs other new generation options in New Zealand. WQZ suggests the development of offshore wind is the 21<sup>st</sup> century equivalent of the 20<sup>th</sup> century development of hydro in the South Island and on the Waikato River. Offshore wind will be nation-building infrastructure of critical strategic importance. It will require new transmission infrastructure comparable to what was developed to transfer electricity from the South Island to the demand centres in the North Island.

This scale of generation is allied with rapidly dropping costs of generation. The UK's latest Contracts for Difference Allocation was completed in July 2022. There were five successful offshore wind projects to be delivered in 2026/27 all at strike prices of GBP37.35/MWh (under NZ\$75/MWh). These strike prices were lower than the onshore wind and solar projects allocated at the same time. Four of the five offshore wind projects were larger

than 1 GW with the largest being 2.85GW.

The UK has over 12 GW of offshore wind installed and has a target of 50GW of offshore wind generation by 2030. Similar growth is expected in many other countries including Australia.

New Zealand does not yet have any offshore wind deployed but has amongst the best, if not the best, offshore wind resources in the world. This world-class wind resource can deliver net zero by 2050 for New Zealand and help New Zealand export energy that will help decarbonize other countries. This opportunity has been recognised by several companies that are exploring the development of both offshore wind and Power to X production opportunities that utilise renewable electricity to produce green hydrogen and related products such as green ammonia and urea.

The New Zealand transmission network needs to be ready for multiple large-scale offshore wind projects – not just one project.

WQZ accepts that the staged approach to the major capital investment programme makes sense based on the modified EDGS. However as described above the EDGS is not appropriate and not reflective of the actual speed and scale of clean offshore power generation in New Zealand. As a result the NZGP lacks the ambition and does not show the urgency that is required to enable new large-scale offshore wind generation to be developed in the Taranaki region.

The document does nevertheless hint at the transmission network developments that are required.

It notes (p56) that Transpower has identified “several large uncertainties which are too significant to spread across the EDGS” and note that one of these uncertainties is “the possibility of Taranaki development, including offshore wind being built.”

It also mentions relevant infrastructure such as:

- New lines from Bunnythorpe to Huntly (possibly via Taranaki)
- Reconductoring one of the Brunswick-Stratford lines (but not commissioned until close to 2030).
- A new HVDC cable from the South Island passing through Taranaki (but this is not included in the preferred option)

We note that on p21, in regard to the reconductoring of the Brunswick-Stratford lines, the document notes the delay until 2030 “would align with greater certainty on renewable generation investments in the Taranaki region, including offshore wind.”

WQZ suggests there needs to be a rethink of the NZGP process that takes the offshore wind opportunity fully into account. In particular, there needs to be immediate investigation into the grid improvements necessary to enable offshore wind development in Taranaki.

## 2. Is our approach to NTS reasonable?

WQZ has no comments to make on non-transmission solutions.

## 3. Is our reduced list of options for enhancing capacity of the HVDC reasonable?

As noted in our response to question 1 WQZ appreciates the constraints that Transpower is under in this exercise. Bearing in mind those constraints, it is understandable that Transpower has focused on the reduced list of options that it has. These options to improve the existing grid including the Cook Strait cable make sense.

However, we note that there is not a specific consultation question on the NZGP long list options in section 3.1.

It is WQZ's view that Transpower should also be prioritizing in NZGP1 the investigation of the new inter-island HVDC option B2 that includes new undersea cables from Nelson to Taranaki and on to Huntly. The document notes that this "option might be required if a large Lake Onslow scheme is developed."

WQZ suggests the option of a new inter-island HVDC cable between Taranaki and Nelson also has potential to enable offshore wind in Taranaki waters provided there is an opportunity for connection to this proposed HVDC link in Taranaki.

Such a connection will facilitate the transmission of electricity from Taranaki to demand centres in the upper North Island as well as the southward transmission of electricity to alleviate pressure on hydro lakes in dry years and the potential for storing electricity generated in Taranaki in the proposed Lake Onslow battery project. It would also enable the transmission of electricity to Taranaki from other regions for green hydrogen production which in turn underpins storage of green hydrogen in depleted oil and gas fields as proposed by Firstgas in 2022. Green hydrogen can then be used to produce electricity on demand fueling green peakers.

This investigation should be carried out at the same time as the planning for the replacement of the current Cook Strait cable as outlined in Section 3.2.

WQZ notes that Transpower has not included the new inter-island HVDC cable in its preferred option as it has focused on improving the existing grid, rather than the options (such as the interisland HVDC cable) which bypass the existing grid.

WQZ suggests Transpower needs to be pursuing both options. The existing grid needs improvement, but to enable the large generation of electricity required and its transmission between generation, storage and demand centres, in both islands, an expanded and more resilient grid structure will be required. A new inter-island HVDC cable will be the essential component required and it needs further investigation.

4. Is our reduced list of options for enhancing capacity of the CNI 220 kV corridor reasonable?

The options appear reasonable. WQZ notes that improvements in this section of the transmission grid will enable the transmission of larger volumes of electricity from Taranaki northwards either via Bunnythorpe or the lines to Huntly. Of particular interest is option D2 involving a new 220 kV Bunnythorpe-Stratford-Huntly line. We note that this is suggested for further analysis in NZGP Phase 2. WQZ views an improvement in capacity through Taranaki as a priority before 2030 and encourages this analysis to occur in NZGP1.

5. Is our reduced list of options for enhancing capacity of the Wairakei Ring reasonable?

WQZ has no comments to make on options for enhancing capacity on the Wairakei Ring.

6. Are our scenario weighting sets reasonable?

As noted in the consultation document (p58) the global and reference scenarios anticipate low growth compared to other industry forecasts and are given lower or no weighting. While reducing the importance of these scenarios is helpful the process is still based on the remaining three scenarios which WQZ argues do not enable New Zealand to reach the New Zealand Government's target of 100% renewable electricity by 2030 and net zero by 2050, and certainly do not enable overproduction of electricity and energy export opportunities.

We contrast the scenarios in the NZGP process with those prepared by the Australian Energy Market Operator (AEMO) in its June 2022 Integrated System Plan: [2022-integrated-system-plan-isp.pdf \(aemo.com.au\)](https://www.aemo.com.au/energy-system/integrated-system-plan/2022-integrated-system-plan-isp).

One of AEMO's four scenarios "Progressive change" which is designed to meet an economy-wide net zero emissions 2050 target. Another scenario is "Hydrogen superpower" where Australia overproduces electricity and exports green hydrogen at large scale.

We encourage similar scenarios to be developed and included in the NZGP process. There is genuine commercial interest in New Zealand becoming an energy exporter. This interest should be enabled by the provision of a suitable transmission network. While not consistent with past practice, WQZ will go so far as to recommend that in the near future, the New Zealand Government should consider funding backbone grid expansion since the enabling and encouragement of material large scale growth in generation, transmission, storage and export of clean energy is clearly in the national interest. This is true from the standpoint of jobs creation, expanded tax revenues, affordable energy for industrial and domestic consumers, and environmental benefit.

7. Is our shortlist of HVDC and CNI options reasonable?

WQZ notes the process used for determining the shortlist is complex and difficult to follow. There are so many variables and such complexity in the method that it is impossible to really know whether the best options have been chosen.

It is also difficult to follow the mix of specific individual options that are then combined into the grouped development plan options on p51. When you see a reference to Option C2 in later pages is it difficult to know what is being referred to – an individual component of development, or a group of components? We suggest it would have been helpful to have used a different system for referring to the two types of options.

With regard to the HVDC options it is sensible to have Option H1 and H2 on the shortlist – improvements to the current Cook Strait Cable are essential. However, WQZ believes Option B2, a new Inter-Island HVDC with a connection from Nelson to Taranaki should also be on the shortlist for further investigation in NZGP1.

WQZ supports the CNI development plan option C9 which we understand includes:

- Building a new line north from Bunnythorpe – particularly if it passes through Taranaki (option D2 from p40)
- Upgrading protection on the Huntly-Stratford line - a facilitating project noted on p86
- Enhancements to the Brunswick-Stratford lines – a facilitating project noted on p87

Options C6 and C8 do not include all these options.

8. Is our shortlist of Wairakei Ring options reasonable?

WQZ has no comments to make on the Wairakei Ring options.

9. Is our choice of the preferred option reasonable?

It should be no surprise based on our previous comments that we do not fully agree with the preferred option. The actions in the preferred option appear sensible and WQZ supports them being implemented. While these options are necessary, they are insufficient to support the transition of the electricity sector that is required to achieve net zero by 2050 and address a growing crisis as a result of climate change.

In addition to the actions included in the preferred option on p75 we note that replacing protection on the Huntly-Stratford line is included as one of the smaller facilitating projects that support the preferred option (as noted on p86). It is part of the Stage 1 MCP and on p8 the approximate year of commissioning is noted as 2024. WQZ supports this project forming part of the preferred option.

WQZ notes that on p89 the preferred option also includes as a facilitating project: “Investigate routes and detailed design for new BPE north 220 kV line” at a cost of \$3m. WQZ also notes that on p8 the approximate commissioning date for this investigation is listed as 2024. WQZ supports the inclusion of this funding and suggests that the development of offshore wind in Taranaki should be a factor in choosing the route for this line. The sooner this project can occur the better.

WQZ notes that “Reconductor Brunswick-Stratford 220kV line” is also listed as a facilitating project likely to be part of Stage 2 (as noted on p87) at a cost of \$75M. Elsewhere in the document (p8) the approximate commissioning for this project is noted as 2030. WQZ supports this reconductoring as a vital step to enabling initial development of new generation in Taranaki, such as offshore wind, and suggests it should be prioritised for earlier implementation in the 2026 – 2027 time-frame.

The preferred option, as outlined on p75, also includes a new Cook Strait cable at a cost of \$120M though implementation is deferred to a Stage 2 MCP with an approximate commissioning of late 2027 (as noted on p7). WQZ supports the deployment of a new cable to increase capacity across Cook Strait. With the existing cables reaching the end of their design life in 2032, replacement of the existing cables may occur at the same time as the deployment of a new cable.

WQZ suggests the investigation of a new inter-island HVDC option connecting Nelson and Taranaki (as outlined in option B2 on p33) should also be prioritised and form part of NZGP1.

10. Is our conclusion that upgrading existing assets is more economic than bypassing the existing grid reasonable?  
Earlier in our submission we have outlined reasons why Transpower needs to be planning to upgrade the existing grid and develop new assets, including a new inter-island HVDC cable, that will allow much of the existing grid to be bypassed.

The conclusion reached in the consultation document to upgrade existing assets ahead of building new assets to bypass the existing grid is based on a process underpinned by EDGS that are out of date and out of touch with the commercial developments already underway in New Zealand. Indeed, given the scope and scale of new clean generation that will be needed in NZ by 2050, it is likely advisable for Transpower to consider developing a new grid backbone (perhaps a 500kV system) to overlay and support the existing 220 kV system.

WQZ does not agree with the conclusion to upgrade existing assets alone.

11. Do you agree that our choice of preferred option is robust against sensitivity analysis?

Similarly, to our response to Q7 we note that the process of sensitivity analysis for the myriad options is complex and difficult to follow. It is likely a robust analysis. However, it does not matter how robust and detailed an analysis is if it is based on flawed assumptions.

As we have noted several times, the assumptions underpinning the whole process are based on EDGS which are flawed, outdated, and unlikely to materialize. The sensitivity analysis is of some help in determining what components of the existing grid should be part of the preferred option – and WQZ has noted its support for some of those improvements occurring. But the analysis (indeed the whole NZGP exercise) does not genuinely acknowledge the offshore wind industry and its core role in helping New Zealand reach its decarbonization targets and build new export industries. The single most important purpose of the NZGP process is being completely missed.

There is an opportunity to rectify this omission.

#### The Potential Futures

In Section 4.7, Sensitivity Scenarios (p85), that immediately follows the section on sensitivity analysis it is noted that “we have developed a set of potential futures which may affect the configuration of the grid if they emerged but are not yet certain enough to reflect in our EDGS variations.”

Included in the 10 potential futures are:

	Sensitivity scenario	Description
6	Hydrogen future	Hydrogen becomes a viable zero carbon fuel, with North Island gas primarily replaced by hydrogen
7	Taranaki offshore wind	Taranaki offshore wind is developed
8	Taranaki demand grows	Taranaki region recovers from gas closures with new industry developed

WQZ is pleased to see these futures acknowledged.

We also note (p86) the statements that:

*“It is neither plausible, nor necessary in most instances, to scope out what the transmission grid might look like if any of these futures emerged, but we can evaluate what flows over those parts of the transmission network covered by this MCP would look like if they did.*

*This will provide further information on whether our preferred option is robust to these alternative futures.*

*We have not been able to explore these futures at this time, but will by the time we submit a MCP to the Commission late in 2022.”*

WQZ looks forward to further engagement with Transpower as it evaluates the transmission network requirements that will be necessary to support the development of offshore wind power generation in Taranaki waters. We believe it is plausible and necessary to scope out what the transmission network will look like when offshore wind is developed in Taranaki. This will provide more certainty to developers and reduce the risk of the transmission grid not being ready in time.