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**Net Zero Grid Pathways 1 Major Capex Project (Staged) Investigation: Long-list consultation**

1. This is Vector's submission to Transpower's Net Zero Grid Pathways (NZGP) Longlist Consultation.

2. As noted in the consultation document, there remains uncertainty around future demand, future generation technologies and the location of future generation. It is therefore critical Transpower preserves investment optionality as much as possible by taking a "just in time" investment approach. That is, given future uncertainty, it will be best to wait where possible to avoid investments being locked in should evidence arise that they are not needed.

3. Accordingly, we are more supportive of options in the long-list that are modular and have short lead times in order to avoid lock-in.

4. We also strongly encourage Transpower to pursue non-transmission solutions (NTS) wherever appropriate.

5. Vector is transforming its electricity network from traditional poles and wires to an intelligent energy system with choice and control for customers through our Symphony Strategy. This includes actively supporting flexibility services and distributed energy resources and trialling ways to increase their use. Our response to Transpower's RFI provides details of current projects that could in future contribute to Transpower's NTS.

6. Related to uncertainty around future demand, we note ongoing demand-side electrification appears as a load increase but can offset during peak times through demand management. For example, Vector is currently working with Auckland Transport to ensure their electric bus fleet is integrated into the network, including identifying opportunities where innovative technologies can be deployed to avoid network upgrades.

**Response to specific questions**

7. The table below provides Vector's response to Transpower's consultation questions. We have not responded to all questions.

| Question number | Vector response |
|---|---|
| 1 & 2 | *Is our need description for this investigation reasonable?*<br>*Should Transpower be looking to enable investment in new generation and demand ahead of when that generation or demand is confirmed?* |

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| | More information on timing is needed. We note Transpower has "consulted with generation investors on where new generation might be built now and 2050 and approximately 2/3 is likely to be built south of Whakamaru or be connected to our Wairakei Ring 220kV network." However, we consider uncertainty remains. For example, if large-scale solar on agricultural land in the North Island takes off.<br><br>We recognise Transpower needs to start planning for major infrastructure in due time, however, the process should ensure flexibility and optionality is maintained so a project can be amended or cancelled if evidence appears that it is no longer required.<br><br>The long list contains solutions that can be rolled out in 1-3 years which suggests waiting to get more certainty is possible.<br><br>We also suggest the HVDC project needs to provide clear evidence that HVDC constraints are linked to demand shortages and high prices. |
| 3 | *Are our long-list options (B1 and B2 in Table 3.1) to meet the overall need for this investigation reasonable?*<br><br>We note installing new undersea cables from Nelson region to Taranaki region (option B2) involves a large distance which we expect would be expensive. |
| 5 | *Are our long-list options for enhancing capacity of the CNI 220kV corridor reasonable?*<br><br>Contracting demand side services from distributors (e.g. hot water load control) should also be considered. |
| 7 | *Are there other criteria we should consider when evaluating our long-list of options and reducing it to a short-list?*<br><br>The risk of lock-in/sunk investments should also be considered (i.e. projects that maintain optionality should be preferred). |
| 8 | *Is our process for developing relevant scenarios reasonable?*<br><br>The interaction with the TPM and its beneficiaries pay approach should be further considered.<br><br>The needs statements in the consultation document are focussed on supporting generators and that reinforcement far away from demand centres will attract generators to these locations.<br><br>The process does not take into account the cost to beneficiaries nor that beneficiaries are not provided a choice to incur these costs. |

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| | Ultimately Transpower's decision will dictate the future generation mix i.e. whether the future is wind power from the central and west North Island or solar and wind from the North. |
| 9 | *Are our proposed NZGP1 demand forecasts reasonable?*<br><br>Not much detail is provided on how the consumption assumptions (TWh) are converted to demand and load shapes which will impact the generation dispatch and mix as well as grid loading. When comparing the peak demands provided in the Appendix, then it appears the scenarios vary less in demand than in consumption.<br><br>This is also reflected in the scenario narratives which focus on differential adoption of technologies (e.g. high or low EV uptake). However, customer behaviour (e.g. customer charging behaviour such as time of charging) will have an equally important impact.<br><br>We note the future of Auckland (e.g. the spatial distribution of demand) is uncertain but also appears the same in all scenarios. Uncertainties include for example urban intensification rules, digitalisation of the economy (e.g. recent announcement of AWS investment in New Zealand) and the future of remote working arrangements as result of the Covid-19 pandemic<br><br>The Global scenario also includes an assumption about generation cost whereas the scenarios are intended to be demand scenarios. |
| 10 | *Is our proposal to identify base scenarios and sensitivity scenarios reasonable?*<br><br>We consider - as described in Transpower's summary of feedback received in the December 2020 consultation - that there is too much uncertainty around future generation to reflect in just five nationally determined scenarios. |
| 13 | *Is our choice of scenarios to include in our analysis reasonable?*<br><br>We consider important uncertainties are not captured in the select scenarios chosen for final evaluation. We note the evaluation process drops a number of the initial scenarios to focus on conventional and linear thinking. This will not value the benefits of modular solutions with short lead times that will avoid costly lock-ins/dunk investments |

Yours sincerely

**Richard Sharp**
GM Economic Regulation & Pricing