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8 April 2022

## Transpower's Renewable Energy Zone National & Northland Pilot Concept Consultations

Mercury welcomes the opportunity to provide feedback on Transpower's consultation papers *Renewable Energy Zones National Consultation* (REZ Consultation Paper) and *Renewable Energy Zones Northland Pilot Concept* (Northland Pilot Paper).

The REZ Consultation Paper seeks stakeholders' views on the *potential for developing Renewable Energy Zones (REZs) in New Zealand to enable the high volume of generation development interest in areas of the electricity network – both transmission and distribution – that do not currently have adequate spare capacity.*<sup>1</sup> Furthermore, Transpower, Northpower and Top Energy, in the Northland Pilot Paper, seek stakeholders views on a potential REZ pilot in Northland.<sup>2</sup>

Mercury supports the development of new measures that would promote the efficient connection of generation and load to the grid. Furthermore, we consider that the REZ concept is a potential measure that is worth exploring in order to identify an appropriate specification and its impact on generation deployment.

Transpower's consultation proposes the REZ concept as it may address a potential gap in the capability of normal market mechanisms to connect generation and load that is at the fringe of the network. Mercury's feedback aims to move this analysis forward by proposing that this potential gap is more clearly defined; proposing high-level principles that aim to minimize the risk of unintended outcomes; and highlighting specific concerns with the Northland Pilot. In summary, we:

- Request Transpower make available its analysis that informed its split between connections that are difficult-to-connect and those that might be enabled by normal market mechanisms;
- Propose Transpower consider a wider set of potential options for addressing connections where there is a first mover disadvantage and connection costs are high
- Suggest Transpower consider mechanisms for providing information that may enable new investors in generation and load to make decisions about sharing the common cost of a connection
- Submit that the REZ coordinator and Transpower should be independent of each other
- Submit that any underwriting of spare connection capacity should treat REZ and non-REZ connections the same
- Submit Transpower's interconnected grid upgrades should treat REZ and non-REZ connections the same

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<sup>1</sup> REZ Consultation Paper, Page 4.

<sup>2</sup> Mercury has combined its response to both consultation papers in this submission because our feedback on the more general REZ Consultation Paper applies equally to the Northland Pilot Paper, and our feedback on the Northland Pilot Paper, as well as raising issues that we consider should be addressed in the planning and implementation of the pilot, gives concrete examples of the particular issues with the REZ concept may raise.

- Submit that the REZ site selection should consider impact on generation site diversity and supply security
- Submit that Regional Spatial Strategies should similarly guide REZ and non-REZ developments
- Request that Transpower address the potential impact of the Northland Pilot on Mercury's Kaiwaikawe Wind Farm that is under development

Mercury's submission develops each of these points in response to two strategic questions that aim to better define the REZ concept. This is followed by our feedback on the proposed Northland Pilot and our response to Transpower's consultation questions.

### **Strategic questions that should be addressed in order to better define the REZ concept**

Transpower highlights in the REZ Consultation Paper that responses to its Net Zero Grid Pathway's consultation indicated that investors are considering building about 11GW of wind and solar generation over the next 30 years. It also states that:<sup>3</sup>

- 6GW of this potential generation can be enabled by *normal market mechanisms* and Transpower's streamlined connections processes; and
- the remaining 5GW is in regions that are *difficult to connect* to grid due to the first mover disadvantage and high connection costs.

We cannot comment on these conclusions as the analysis supporting these conclusions has not been included in the REZ Consultation Paper. Therefore, in our present submission we simply reference the 11GW, 6GW and 5GW values and Transpower's conclusions as a means to help explain and illustrate the risks and issues that we consider the REZ concept may raise and should be addressed.

Mercury, however, requests that Transpower provide stakeholders with its analysis so that we might better understand the issues that motivates the REZ concept and provide more specific comments in the future.

Transpower introduces the REZ concept as a potential mechanism to enable the connection of the 5GW of generation capacity under consideration, which would be difficult to connect due to the first mover disadvantage and high connection costs. This suggests that there is presently a potential 5GW gap that normal market mechanisms cannot enable, particularly where there is a first mover disadvantage and connection costs are high.

In other words, if there is no 5GW gap under these circumstances, then there may be no need to consider the REZ concept. Mercury, therefore, proposes that Transpower's analysis and the REZ concept raise the following strategic questions:

1. What are the features of the connection gap for the 5GW generation capacity, and how might the REZ address these features?
2. How might the REZ impact generation developers' decisions regarding the 6 GW under consideration that engage the normal market mechanisms?

Addressing these questions would help define the REZ concept better so that it is more likely to achieve the desired outcomes and mitigate risks. Our submission addresses these questions in order to identify key requirements that should be included in the specification of the REZ concept.

### **Scope of the connection gap where there is first mover disadvantage and high connection costs**

Mercury considers that there may be a number of factors that influence a potential investor in generation. These factors include the question of the first mover disadvantage where connection costs are high. There also may be informational challenges particularly for new investors, who may not know with whom nor how they might be able to

<sup>3</sup> REZ Consultation Paper, page 7.



share the cost of a connection. New investors may also lack knowledge of the consenting process and Transpower's usual processes for developing new grid connections.

To start with, a key factor that Transpower seeks to address is the first mover disadvantage. Transpower indicates that this is an issue that is hindering the deployment of generation:<sup>4</sup>

*The first mover disadvantage arises in a situation where the first customer incurs the full costs of a larger asset and bears the risk of subsequent customers not eventuating or not being able to recover costs from subsequent customers.*

Transpower's first mover disadvantage problem is an example of a *hold-up problem* which is discussed in the economics literature.<sup>5</sup> One description of the hold-up problem provided in a standard economic text is:<sup>6</sup>

*The general business problem in which each party to a contract worries about being **forced to accept disadvantageous terms later**, after it has sunk an investment, or worries that its investment may be **devalued by the actions of others**, is called the **hold-up problem**. The party that is forced to accept a worsening of the effective terms of the relationship once it is sunk an investment has been **held up**. [emphasis added]*

Furthermore, a firm's concern that they might be held up "... may lead to inefficiencies as firms, fearing that their investments will leave them vulnerable, refuse to make efficient investment.<sup>7</sup> That is, in the case of a firm considering to make an efficient investment in generation and connection, if they have a concern that they may be held up after they make the investment, then they might choose not to make it.

In the case of Transpower's first mover disadvantage problem, the first customer chooses not to invest in a larger connection asset because of the risk that they may be *held up* and *forced to accept disadvantageous terms later* for connection, because of the subsequent *actions of others*, particularly subsequent customers that do not eventuate.

The hold-up problem covers another situation addressed in the REZ Consultation Paper, that is where the first and subsequent customers do not invest because they are concerned about being *held up* by future capacity constraints on the transmission grid. In this case, it would be the actions of Transpower that may raise the risk of the hold up.

The hold-up problem is not new in practice, specifically in the case connecting generation capacity, and there are the standard familiar solutions applied today, which include:

- Vertical Integration – e.g. transmission connections are integrated with the ownership of the generation installation site
- Contract – e.g. distribution networks supply connectivity from generation installations to the interconnection grid on a contractual basis

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<sup>4</sup> REZ Consultation Paper, page 11

<sup>5</sup> The terms "first mover advantage", "second mover advantage" or "first mover disadvantage" are usually applied in marketing and management literature to questions addressing rivalry between firms and analysing competitive strategies. Whereas, we note that Transpower does not introduce its description of the first mover disadvantage problem as part of an analysis of competitive dynamics, but to address the question of a firm's motives for not investing. In our present submission we use the term "first mover disadvantage" based on Transpower's definition (i.e. not as it is applied in the more general marketing and management literature).

<sup>6</sup> Milgrom & Roberts, *Economic, Organization & Management*, published 1992, page 136

<sup>7</sup> Ibid. page 137



These solutions are in fact part of the set of normal market mechanisms that Transpower considers would enable the connection of 6GW of generation capacity. In other words, these normal market mechanisms resolve the first-mover-disadvantage/hold-up problem, particularly where connection costs are not high.

#### Current solutions to high connection costs coupled with the first mover disadvantage problem

High connection costs coupled with the first mover disadvantage problem may introduce challenges for enabling connections.

There are examples where Mercury has adapted the normal market mechanisms to address these challenges and that have enabled shared connections, which include:

- NZ Windfarms' Te Rere Hau site sharing transmission capacity with Mercury's Tararua Wind Farm; and
- Mercury oversizing its transmission asset for its Turitea windfarm in anticipation of additional future generation from the region, including Mercury's Puketoi project as well as other third party projects.

These examples illustrate how a group of investors considering investing across different sites in a region can pool their resources in order to overcome the first mover disadvantage problem. Furthermore, parties can use combinations of the following elements to address the first mover disadvantage:

- setting up common ownership across generation sites and the transmission connection;
- forming a consortium, or;
- engaging contractually as an access provider and access seeker of transmission capacity.

How parties might combine these different elements in order to find solutions to the first mover disadvantage will depend on their experience and the available information.

#### Information that may enable decisions for new investors in generation

The potential solutions to the first mover disadvantage problem, which investors might consider would depend on their assessment of the risks and expected return. In order to make an assessment they would need a level of experience and information about investing in generation in the region and New Zealand more generally. If they lack this experience or information, then this may act as barrier to investing. This may be the case particularly if the investor is new to the market.

Information, therefore, that may facilitate investment by those who are new to the market may include information about who else in the region they might partner with; when and how they might organise themselves in order to share the cost of a connection; consents processes; and seeking access to land. Even though Transpower may have visibility of aspects of this information, a process for gathering this information from the market may help facilitate new investors organize themselves within a region.

### **Reducing the risk of unintended adverse consequences of a REZ**

Mercury considers that it is important to reduce the risk of adverse unintended consequences of a REZ, such as adversely slowing or displacing the deployment of generation sites that would be enabled by the normal market mechanisms.

Transpower has indicated that the development of the 6GW generation capacity can be enabled by normal market mechanisms and Transpower's streamlined connections processes. Mercury's concern is that a poorly designed REZ development might displace or reduce the effectiveness of the normal market mechanisms for enabling the deployment of the 6GW of generation capacity.

Mercury sets out below proposed requirements of a REZ that aim to reduce the risk of these unintended consequences.



REZ site selection should consider impact of site diversity on supply security

The development of REZs have the potential to concentrate generation sites in a particular geographic areas. This would potentially reduce the diversity across generation sites, thereby increasing the risk of wind and solar generation experiencing simultaneous high or low outputs.

Mercury, therefore, submits that the criteria for selecting regions for REZ listed on subsection 4.3 of the REZ Concept Consultation should explicitly take into consideration the intermittent nature of renewable energy generation and the need to maintain security of supply. Transpower mentions under the potential criterion “*Potential added benefits to the grid*” that the benefit of additional generation that would improve network resilience could be consider. We consider that security of supply and geographic diversity should be a factor when considering a REZ development.

Underwriting of spare network capacity built ahead of demand should treat REZ and non-REZ developments the same

Transpower indicates that the funding of a transmission connection for a REZ would be prorated against generation capacity of the parties to the REZ. Transpower also notes a risk may arise where a party delays connecting its generation to the REZ transmission connection because of, say, consenting or development delays. This in turn could delay the party’s contribution to the cost of the transmission connection, resulting in a funding shortfall until the party connects. In this situation, Transpower suggests that:<sup>8</sup>

*Mitigating measures could be designed into the contract during the tender process. Alternatively, a third party, such as the Government, could underwrite the unused capacity until generators are able to connect. The third party could then recover the costs once connectees come online.*

Transpower also identifies a similar challenge in relation to the cost of oversizing the transmission or distribution network capacity in advance of anticipated growth in generator and large energy users demand. The concern raised by Transpower is that it is *likely to be unattractive for New Zealand households* to cover some or all of the cost of oversizing network ahead of demand. Transpower, therefore, suggests:<sup>9</sup>

*To mitigate the risk of additional costs falling onto existing connected customers, a third party, such as the Government, could provide some level of underwriting for the network investment. As discussed earlier, this third party would cover the cost of the additional unused network capacity and could recover the cost as new generators or energy users connect to the network. This party would hold the risk of the capacity not becoming fully subscribed.*

Mercury recognizes the importance of investing in network capacity ahead of consumer, large energy user and generator demand in order to enable the growth in the electrification of the New Zealand economy. The investment in interconnection, connection and distribution network capacity needs to anticipate this growth in electrification, otherwise there is a risk that it may slow the growth in electrification due to the hold-up problem, as discussed above. That is, for instance, investors in generation may not invest in generation if there is a risk that there will be insufficient network capacity to transmit the increase in generated electricity to consumers and large energy users. Investing in network capacity ahead of demand would help mitigate this risk.

Mercury also recognizes the challenge in funding network investment ahead of demand, as Mercury has invested ahead of demand when oversizing its transmission asset for its Turitea windfarm, as already mentioned. This is an example of a practical, commercial approach for investing ahead of demand.

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<sup>8</sup> REZ Consultation Paper, page 38

<sup>9</sup> Ibid. page 39



Mercury considers that the question of whether the Government should underwrite investment in network capacity ahead of demand is beyond the scope of the present consultation on the REZ. Addressing this question would entail significant analysis to determine an appropriate model, from scoping the issue to assessing options, and developing an approach for cost recovery. We also anticipate that implementing such an model is likely to require changes to regulations as well as significant time and resources to implement.

However, should consideration be given to the proposition that the Government underwrite spare network capacity that is built ahead of demand, Mercury submits that as a general rule, any Government underwriting should treat REZ and non-REZ developments the same. Mercury's particular concern is that if the Government were to underwrite REZ and not non-REZ developments, then it raises the risk that it would displace non-REZ developments because the Government underwriting may have the effect of subsidizing the REZ network deployment. Favouring REZ over non-REZ developments in this way may displace some of the 6GW of potential generation that Transpower has indicated can be enabled by normal market mechanisms. Therefore, an unintended consequence of introducing Government underwriting may be slow the deployment of market-led renewable generation because the number of non-REZ developments decreases.

Mercury notes that an appropriately designed regime for the Government underwriting network deployment may be able to address these issues, but to reiterate we consider that it would be important that such a regime treats REZ and non-REZ developments the same.

*Transpower grid upgrades should treat REZ and non-REZ connections the same*

The Northland Pilot consultation paper identifies 9 potential network upgrades of which 4 projects would be REZ funded and the remaining 5 projects relate to investments in the interconnection grid.<sup>10</sup> These projects form Transpower's preliminary view of upgrades that that *may be required and could be considered basic building blocks for a Northland pilot REZ*.<sup>11</sup>

As already noted, Mercury considers that it is important that Transpower invests in network capacity in anticipation of the growth in electrification in order to promote investment in renewable generation and decarbonization by consumers and large energy users. Furthermore, Mercury acknowledges that Transpower in general takes a total growth view in demand for electrification when planning grid upgrades – for instance, the growth of 11GW of generation over the next 30 years, which Transpower has identified in the NZGP consultation.

However, a general question that the Northland Pilot example raises is how Transpower will coordinate and prioritise upgrades across interconnection and connection grids between REZ and non-REZ projects.

Mercury submits that Transpower should as a matter of principle treat REZ and non-REZ generation projects the same as they will both be expected to contribute to the growth in renewable generation. If Transpower were to favour REZ over non-REZ generation projects, then this would place non-REZ projects at a disadvantage. For instance, favouring REZ over non-REZ projects may result in grid upgrades for non-REZ projects being delayed compared with the REZ projects or incurring higher costs. Such an outcome could detrimentally affect the rate of renewable generation deployment.

*Regional Spatial Strategies should similarly guide REZ and non-REZ developments*

The REZ Concept Paper states that "*Transpower expects the Regional Spatial Strategies (RSSs) developed under the proposed Strategic Planning Act could identify areas that are appropriate for REZ development.*"<sup>12</sup>

RSSs will integrate land use planning, environmental management, infrastructure and climate change responses in and across regions. The focus for RSSs will be on the strategic issues and opportunities facing a region. As such,

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<sup>10</sup> Northland Pilot Paper, Table 1

<sup>11</sup> Ibid. page 13

<sup>12</sup> REZ Consultation Paper, page 40



it is expected to guide rather than identify areas that would be similarly appropriate for both REZ and non-REZ developments.

Mercury anticipates there will be factors aside from the RSS that will influence generation site selection including technical feasibility of build, landowner negotiation, progress through pre-planning stages, technological advances, and the level of offtake in that region.

Mercury, furthermore, submits that REZ developments should not become a *de facto* licensing regime as a result of administrative coupling with RSSs, for generation projects, where future viable non-REZ projects are penalised or disadvantaged for being developed 'out of zone'.

*Transpower and REZ coordinator should be independent of each other*

The REZ Concept Paper identifies the role of a "REZ coordinator" which is a person that, amongst other things, would facilitate the development of a REZ. The paper also highlights that Transpower has not attempted to assign ownership of activities to parties.

Mercury submits that Transpower and the REZ coordinator should be separate and independent of each other.

Maintaining this independence would help ensure that Transpower treats REZ and non-REZ grid upgrades and connections the same. It would help enhance the transparency of the selection of regions for REZ developments. It would also better align a REZ coordinator's incentives to meet the needs of investors in generation, while allowing Transpower to focus its resources on upgrading the grid.

This approach is consistent the examples of REZs in Texas and New South Wales cited in the REZ Concept Paper, which indicates that these REZs are not designed nor developed by the grid operator. In Texas, the Public Utility Commission of Texas in consultation with the Electric Reliability Council of Texas, designated competitive renewable energy zones. In New South Wales the Energy Corporation of NSW will be responsible for coordinating REZ transmission, generation, firming and storage projects.

### **Potential impact of Northland Pilot on Kaiwaikawe Wind Farm**

Mercury requests that Transpower address the potential impact of the Northland Pilot on Mercury's Kaiwaikawe windfarm development.

The Northland REZ Pilot would complicate and could slow the development of Mercury's Kaiwaikawe Wind Farm. The planned wind farm is being developed based on a 66kV transmission line from the wind farm to Dargaville. This has been enabled by uprating the Dargaville-Maungatapere lines to their designed operating voltage of 66 kV. Presently the line is insulated to 66kV, but operates at 50 kV. Mercury has recently received resource consent for the development and we are working to bring it to market.

The Northland REZ Pilot, however, includes a proposal to upgrade these lines to 110 kV. This raises significant uncertainty that has the potential to slow the development of the Kaiwaikawe Wind Farm because, for instance, we may need to revisit our resource consent mentioned above.

Mercury looks forward to engaging constructively with Transpower and industry stakeholders on the design of the REZ concept and its implementation on the Northland Pilot.

Yours sincerely



Nick Wilson  
**Head of Government and Industry Relations**



## ANNEX A: REZ National Consultation

### Mercury response to consultation questions

Consultation Questions	Mercury Response
Q1. Do you agree that the first mover disadvantage and high connection costs can be challenges for connecting new renewable generation and/or large electricity loads to the electricity network?	See the discussion under the heading <i>Scope of the connection gap where there is first mover disadvantage and high connection costs</i> in the body of our submission for our response to this question.
Q2. Do you think the concept of a Renewable Energy Zone could be beneficial in a New Zealand context?	As discussed in the introduction to the submission, we consider that the concept of the REZ is worth exploring. However, there is insufficient information at this point to determine whether the concept could be beneficial. Mercury's submission is aimed at moving the analysis forward in order to address this question.
Q3. What region(s) do you think would be suited to Renewable Energy Zones?	We do not have a particular view regarding which regions may be or may not be suitable for a REZ.
Q4. What benefits do you think should be considered in the decision-making process for Renewable Energy Zones in New Zealand?	See Q2 response.
Q5. Do you agree with the proposed guiding principles? Are there any that you would change or add?	See the key points listed in the introduction to the submission.
Q6. Do you agree with the proposed criteria for selecting suitable regions for REZ development? Are there any that you would change or add?	See the discussion under the heading <i>REZ site selection should consider impact of site diversity on supply security</i> in the body of our submission for an additional criterion that should be considered.
Q7. Do you agree with using a tender process for committing projects in a REZ? Are there alternative processes that could be considered?	Mercury considers that Transpower should resolve the strategic questions discussed under the heading <i>Strategic questions that should be addressed in order to better define the REZ concept</i> before considering implementation details. There is presently insufficient information to determine whether a tender process, defined even at the most general level, would be appropriate. For instance, the "lot" or "project" or "contract" that might be tendered would need to be specified, then options for the tender process considered, before a view can be taken regarding the merits of the tender process can be considered. Addressing the strategic questions would help inform these decisions.
Q8. Who should be involved with co-ordinating and undertaking the various steps within a REZ development process?	As discussed under the heading <i>Transpower and a REZ coordinator should be independent of each other</i> , we consider that the REZ coordinator should be independent from Transpower.
Q9. Do you agree with the proposed project criteria? Are there	In line with our response to Q7, we consider that Transpower should resolve the strategic questions noted above before considering implementation





any that you would change or add?	details. There is presently insufficient information to identify the appropriate criteria for selecting projects, as the criteria for selecting projects should follow from the specification of the lot/project/contract being tendered and the tender process itself.
Q10. Do you agree with the challenges we have identified?	The challenges are discussed in the body of the submission along with proposals for moving forward.
Q11. What are some of the ways to overcome these challenges and who should be involved?	The challenges are discussed in the body of the submission along with proposals for moving forward.
Q12. Do you see any other potential challenges that need to be considered?	There are a number of additional challenges that transmission and generation builders need to consider including obtaining sites, landowner access, resource consents, consistency in application of the adaptive management approach by DoC, Many of these challenges are resource management issues, and while REZ development needs to be cognisant of them, it should not result in a dual approval regime. Other challenges may include securing a PPA, insurance underwrite, prudential requirements, and bank loans.

## ANNEX B: REZ Northland Pilot Concept Consultation

### Mercury response to consultation questions

Consultation Questions	Mercury Response
Q1. Do you support the development of a pilot REZ in Northland? Please provide your reasons as to why or why not.	In line with our response to Q7 and Q9 in Annex A, there is insufficient information to form a view at this point to determine whether or not a pilot REZ is expected to promote efficient outcomes. A key piece of information that would help inform a view regarding the merits of a pilot REZ would be the specification of the lot/project/contract that might be tendered, the design of the tender process, and associated criteria for selecting the winning bidders.
Q2. What potential benefits of a REZ are important to you? Consider economic, social, cultural and environmental factors.	There is insufficient information at this point to form a view regarding the incremental benefits of the REZ compared with non-REZ developments. Addressing the questions discussed under the heading <i>Strategic questions that should be addressed in order to better define the REZ concept</i> would help inform this view.
Q3. What potential costs of a REZ are important to you? Consider economic, social, cultural and environmental factors.	There is insufficient information at this point to form a view regarding the incremental detriments of the REZ compared with non-REZ developments. Addressing the questions discussed under the heading <i>Strategic questions that should be addressed in order to better define the REZ concept</i> would help inform this view.
Q4. Do you support enabling developments through upgrades to existing lines and substations as demand for connections to the networks emerge? If not, what alternatives would you propose?	<p>Yes, to the extent that the upgrades promote economic efficiency and enhance the economic welfare of New Zealand.</p> <p>For instance, we would observe that generally, generation developments do not require the same degree of network security/redundancy as load has traditionally required, so low cost upgrades to allow connection of generation at lower levels of reliability than load may well be cost effective. Such upgrades may include special protection schemes, variable line ratings, tactical thermal upgrades, removing protection and metering related constraints, short term/increased transformer ratings and the like. Such upgrades should be considered for both REZ and non-REZ projects.</p>
Q5. If new lines needed to be built to connect resources, where should they be constructed/not constructed?	<p>There is insufficient information at this point to form a view as to where lines should or should not be constructed.</p> <p>As a general comment, however, investments in new lines should promote economic efficiency and enhance the economic welfare of New Zealand.</p>
Q6. Are there alternative proposals that you think we should consider?	We do not have a view regarding alternative regions that might be considered for a REZ pilot.
Q7. Do you have development projects that a REZ might assist you to construct and connect?	See discussion under the heading <i>Potential impact of Northland Pilot on Kaiwaikawe Wind Farm</i> .