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**Submission of PowerNet Limited
To the Electricity Authority Te Mana Hiko
The future operation of New Zealand's power system**

19 April 2024

Introduction

1. PowerNet Limited (PowerNet) appreciates the opportunity to make a submission to the Electricity Authority Te Mana Hiko (the authority) on the future operation of New Zealand's power system.
2. PowerNet is an electricity management company with its head office based in Invercargill. It is a joint venture company, owned (50/50) by Electricity Invercargill Limited (EIL) and The Power Company Limited (TPCL). This submission is supported by EIL, TPCL, and OtagoNet Joint Venture (OJV) and we acknowledge this is an issues paper seeking feedback to determine options for the future.
3. EIL and TPCL established PowerNet in 1994 to achieve economies of scale through integrated network management across the Southern region's Electricity Distribution Businesses (EDBs). PowerNet manages the non-exempt EDBs of EIL and OJV, the exempt EDB of TPCL, and the non-grid connected Stewart Island Electric Supply Authority (SIESA).
4. PowerNet manages an asset base and investments in excess of NZ\$1 billion. The aggregated electricity distribution asset base managed by PowerNet is the fourth largest in New Zealand. It provides services to over 75,000 customers through more than 14,200 circuit kilometres. In addition to EIL operating in Invercargill and Bluff, TPCL operates in Southland and West Otago, OJV in the rural and coastal Otago region that surrounds Dunedin City, Lakeland Network (LNL) in the Frankton, Cromwell and Wānaka regions, and SIESA on Stewart Island.
5. PowerNet has long-term management agreements in place with EIL, TPCL, OJV and LNL. With the benefit of integrated business management systems in place, PowerNet has a core purpose and expertise in asset management capability and delivering operating efficiencies and a sustainable network for the future of the EDBs it manages.
6. Alongside our own submission, PowerNet supports the Electricity Networks Aotearoa (ENA) submission in principle. Our submission reinforces some of the key points made in the ENA submission and addresses where the networks PowerNet manage wish to highlight or emphasise issues. This is not intended however to lessen the relevance or emphasis of any of the points in the ENA submission.

Customer service is important to us at PowerNet. If for any reason, we do not meet your expectations we would like the opportunity to work through a solution with you, please call our office on 03 2111899. If we are unable to resolve your concern, there is a free and independent resolution service available through Utilities Disputes Limited www.udl.co.nz

7. PowerNet also supports aspirations to reach net zero emissions that are not cost prohibitive. We acknowledge the important role distribution networks will play in supporting New Zealand's transition to a low emissions economy.
8. PowerNet has provided responses to the Authorities submission questions in the template provided below. If there are any clarifications to be made, or queries in relation to our submission, please make contact as detailed below.

PowerNet Contact

PowerNet contact for this submission is: Michelle Fowler-Stevenson
Regulatory and Risk Manager

Appendix 1

Q1.	Do you consider section 3 to be an accurate summary of the existing arrangements for power system operation in New Zealand? Please give reasons if you do not agree.
	PowerNet considers section 3 to be an accurate summary of the existing arrangements for power system operation in New Zealand.
Q2.	Do you agree that we have captured the key drivers of change in New Zealand's power system operation? Please give reasons if you do not agree.
	PowerNet agrees that the Authority has captured the key drivers of change in New Zealand's power system operation.
Q3.	Do you have any feedback on our description of each key driver?
	<p>PowerNet largely agrees with the descriptions of each key driver that the authority has put forward with a couple of additional points:</p> <p>Key driver 3 – Changes in operational technology: PowerNet suggests that the Authority should watch peer-to-peer schemes with caution. Peer-to-peer is largely a means to achieve more cost reflective pricing for customers where the available market conditions do not otherwise reward matching local generation and local consumption in a cost reflective way. It is likely that sufficiently granular and dynamic cost reflective pricing would more efficiently create the value that peer-to-peer schemes are designed for. Peer-to-peer could be considered a method of limiting buying and selling within a reduced sub-market and as such would be considered inefficient. There is potential for inefficiencies and subsidisation effects created to be paid for by those that can least afford it. Peer-to-peer is a very similar concept to "solar self-consumption" where the customer is incentivised and benefits from limiting export owing to non-cost reflective pricing from retailers. PowerNet first and foremost would like to see cost reflective retail pricing utilised to incentivise the most efficient consumption and generation of electricity efficiently and equitably.</p> <p>Key Driver 5 – Climate change and extreme weather events: PowerNet supports the comments made by ENA, that shareholders and stakeholders will need to make on-going, significant investments in the network. In order for adaptation and mitigation of climate change, network owners will need to ensure that long-term investments are in the right place at the right time to obtain the outcomes needed for a safe and efficient power supply.</p>
Q4.	What do you consider will be most helpful to increase coordination in system operation? Please provide reasons for your answer.
	<p>PowerNet supports the comments made in the ENA submission. We support the exchange of network planning and operational information being a key part of the long-term strategy to increase coordination in the system operation.</p> <p>In opposition to this are the difficulties in negotiating agreements between distributors and retailers (who remain unregulated), which results in challenges to efficient network operation. This has a flow on impact of hampering increased participation of consumers in the operation of the power system. In addition, ensuring that generators, distributors and retailers are all able to equitably share and gather information about power supply and usage will lead to a more coordinated and robust power system for the future.</p> <p>Cost reflective pricing and operational visibility are paramount for increasing coordination in system operation. As mentioned in Q3 above, cost reflective pricing ensures that the prices consumers pay for electricity accurately represent the costs associated with generation,</p>

	<p>transmitting, and distributing power. This alignment between costs and prices encourages consumers to adjust their electricity usage patterns in response to market conditions, such as peak demand periods or fluctuations in generation prices. By implementing cost reflective pricing mechanisms, distributors can incentivize consumers to reduce their electricity consumption during times of high demand, thereby alleviating strain on the grid.</p> <p>Additionally, visibility in system operation, achieved through advanced monitoring and control technologies, enables all parties to gain real-time insights into grid conditions, generation, and demand patterns. This allows for more accurate forecasting, better load balancing, and proactive management of assets. For example, parties can use real-time data to optimize the dispatch of renewable energy sources, integrate distributed energy resources, and mitigate potential network congestion or outages.</p> <p>Cost reflective pricing and visibility are indispensable tools for fostering coordination in system operation. By aligning economic incentives with efficient resource utilization and providing timely insights into grid dynamics, these strategies contribute to a more resilient, responsive, and sustainable energy infrastructure.</p>
Q5.	<p>Looking at overseas jurisdictions, what developments in future system operation are relevant and useful for New Zealand? Please provide reasons for your answer.</p>
	<p>Examining overseas jurisdictions can offer valuable insights into developments that could benefit New Zealand’s future system operation.</p> <p>EDBs are actively learning from overseas developments with particular focus on Australia and the UK due to their early technology uptake and solutions development as well as their similarity to the NZ context. It is noted that EDB equivalents in NZ have had to take an industry led approach assuming distribution system operators (DSO) functions and leveraging flexibility services in the first instance to protect their networks.</p> <p>EDBs are actively engaging with overseas jurisdictions to import relevant learnings from these early developments while noting the differences for a NZ context. For example, Dynamic Operating Envelopes are being investigated as a potential important means of communicating and operating within the limits of distribution networks’ capacity. However, we must be mindful that their development in Australia has been targeted at resolving issues from high penetrations of domestic solar generation whereas in NZ we will likely see a large uptake of EVs as the primary driver of network constraints to be managed.</p> <p>Firstly, advancements in visibility and data management systems have proven crucial in enhancing grid reliability and efficiency. European countries like Germany and Denmark have implemented smart grid technologies that enable real-time monitoring of grid conditions, integration of renewable energy sources, and demand response capabilities. These systems allow for better forecasting, grid optimization, and proactive maintenance, all of which can significantly improve the performance of New Zealand’s electricity grid.</p> <p>Secondly, capacity building and training initiatives are essential, particularly in addressing staff shortages and ensuring a skilled workforce of the energy sector. Countries such as the United Kingdom are investing in workforce development programs focused on renewable energy, grid modernization, and digital technologies. By adopting similar capacity-building strategies, New Zealand can cultivate a talent pool equipped to manage evolving system operation, implement innovative solutions, and drive sustainable energy.</p>

	<p>Finally, PowerNet supports the ENA comments that overseas models that empower distributors to act as distribution system operators (DSOs) have demonstrated effectiveness in optimizing system operation.</p>
Q6.	<p>Do you consider existing power system obligations are compatible with the uptake of DER and IBR-based generation? Please provide reasons for your answer.</p>
	<p>Obligations are largely compatible with the uptake of these technologies given the infancy of new network operations activities. In time, obligations may evolve to become more specific as new roles and functions emerge, what entities they may sit within, and the overall appropriate electricity sector architecture becomes better understood.</p> <p>At this stage it is too early to modify obligations</p> <p>PowerNet supports the ENA submission in principle but would like to reinforce some of the key points, including:</p> <ul style="list-style-type: none"> • Timeliness: PowerNet would like to stress the importance of timely action and continuous progress in addressing compatibility issues. • PowerNet would like to highlight the need for a proactive and adaptive regulatory framework that can evolve alongside technological advancements and changing market dynamics.
Q7.	<p>Do you consider we need an increased level of coordination of network planning, investment and operations across the New Zealand power system? Please provide reasons for your answer.</p>
	<p>PowerNet agrees with ENA submission that if an increased level of coordination in network planning, investment, and operations across the NZ power system is needed, then the information exchanges should be the first step taken to address this.</p> <p>The focus on correct incentives, enabled by fit for purpose regulatory settings, is crucial. This ensures that stakeholders are incentivized to act in ways that benefit the system as a whole. For example, regulatory mechanisms can encourage investments in grid modernization, demand response programs, and energy storage technologies, all of which contribute to a more resilient and sustainable power system.</p>
Q8.	<p>Do you think there are significant conflicts of interests for industry participants with concurrent roles in network ownership, network operation and network planning? Please provide reasons for your answer.</p>
	<p>The Authority has noted where potential interest conflicts are possible due to concurrent roles. The 'gen-tailer' model is likely the greatest concern in the electricity sector currently. It would seem counterproductive for retailers to "manage input costs" by using cost reflective pricing to incentivise off peak consumption at the expense of generation profits made during peak consumption periods. Retailers effectively control the pricing interface between the electricity industry and customers. On the whole we have seen very little in the way of cost reflective pricing from retailers, particularly those that also have generation assets, and they have had more than enough opportunity to respond to input costs with strong (peak to off-peak) differentials in PowerNet's managed networks' line pricing.</p> <p>Regarding EDB ownership conflicts, EDBs favouring capital or traditional asset-based solutions as a path of least resistance due to familiarity and lower perceived risk to the extent that it might be an issue would not be resolved by separating ownership, planning and operation.</p> <p>The bias toward capex solutions to grow the regulatory asset base is not unique to flexibility solutions and there does not appear, for example, to be evidence of networks being gold plated currently and choosing inefficient capex solutions at customers' expense. The place to deal with these issues of incentive would surely be to design a fit for purpose regulatory regime that explicitly spells out outcome-based expectations and provides correct incentives</p>

to benefit customers. Transpower have demonstrated that network and system operations can be delivered within the one business where expectations are made clear and there are plenty of international examples of EDBs incorporating the DSO function effectively. The PowerNet network management model demonstrates separation of network ownership and network management however ultimately it is the commitment and expectation to deliver efficient solutions for customers that has the greatest influence regarding the conflict concerns highlighted by the Authority.

Potential regulatory intervention being hinted at here must wait until there is a clear issue arising that needs to be solved. Separation would also create inefficiencies which regulators should have regard to. Coordination between the multiple electricity industry sections is already providing a challenge without creating more separated entities to then get to communicate and coordinate effectively.

Q9. Do you have any further views on whether this is a good time for the Authority to assess future system operation in New Zealand, and whether there are other challenges or opportunities that we have not covered adequately in this paper? Please provide reasons for your answer.

PowerNet is cognisant of the impact on local consumers costs due to electrification. We see postcode lotto price increases for general consumers where significant long-term network and Transpower upgrades have occurred, to cater for decarbonisation initiatives driven by centrally set national carbon targets.

This is apparent at the Invercargill GXP with network customers picking up a portion of the costs of future capacity being built into Transpower's Invercargill GXP upgrade, driven by the electrification of a large commercial customer. That customer is already talking about taking up additional capacity. It will not cost them any more for the new 66kV line as they are already paying 100% for this, but they will pick up a higher portion of the Invercargill GXP costs that other customers are paying for.

Now is the time to enable by removing barriers. It is too early to consider imposing constraints for the possibility of issues that have not yet materialised. Ringfencing, separation, or other constraints risks removing the most efficient delivery arrangements without just cause. Especially in the early stages of flexibility services arising it may be necessary for EDBs to stand up a minimum viable product or part of the initial solution which may then be improved on once competitive parties are able to see a market developing.

Visibility is critical and it has taken far too long for this to be sufficiently supported. The Authority have advised security/privacy concern as being the remaining barrier to enabling efficient access to smart meter data for EDBs. PowerNet notes;

- EDBs may currently purchase data at excessive cost from MEPs that effectively have a monopoly position in regard to data for any ICP. This means privacy, to the extent it may be considered an issue, is not altered between the current and ideal smart meter data access arrangements for EDBs; instead it is a matter of cost-efficiency. It will be customers that have to pay twice if current arrangements persist. EDBs are starting to wear this cost and pass onto their customers as they sense they are falling behind networks that have access without restrictions. This demonstrates the EA has been too slow to resolve this issue.
- It is also noted that retailers currently have access to metering data because it is necessary to fulfil their function. As such they are trusted to manage access and use of this data accordingly. It is now similarly the case that metering data is becoming critical to distributors fulfilling their role. Customers are already missing out on critical safety gains and network operations efficiencies that smart meter data access would enable. Directly applicable to future network operation is the EDBs requirement to access consumption data so that they may understand constraints on

their networks and therefore be positioned to signal the required flexibility response mechanism. Pressure is already felt by EDBs to start sharing capacity and constraint information and there is concern at being unfairly seen as the bottleneck when it is data access barriers outside of EDBs' control blocking these developments. It is certainly already the case that EDBs may provide a superior service to customers with data access as evidenced by the developments of EDBs that have access enabled by their ownership of meters. All genuine service providers that benefit customers by leveraging smart meter data should now be treated equivalently. Where privacy and security concerns remain, the focus needs to be on ensuring service providers have appropriate policy and procedures in place to ensure the protection and appropriate use of data.

The other key barrier already mentioned and that should be an immediate focus area for the Authority is the lack of dynamic cost reflectivity seen in retail electricity pricing. Given the pressure the Authority has applied to EDBs to reform pricing, and the significant effort PowerNet has put into reforming its line charge pricing, PowerNet are now keen to see the Authority address the lack of line charge pass through by gen-tailers. Regardless of the recent pricing updates PowerNet have progressed, there have been many prior years of significant incentives for efficient consumption behaviour built into its lines prices, so it is not at all surprising that recent EDB pricing reforms have not been reflected by large retailers.