

Via email: [operationsconsult@ea.govt.nz](mailto:operationsconsult@ea.govt.nz)

1 March 2024

## Potential Solutions for Peak Electricity Capacity Issues

Mercury welcomes to opportunity to submit on the Electricity Authority's (the Authority's) consultation paper *Potential solutions for peak electricity capacity issues*, 12 January 2024 (the Consultation Paper).

The Consultation Paper addresses capacity issues and management of security of supply over the short, medium and long term.

Mercury agrees that security of supply is a priority issue for the industry. We support developing mechanisms to improve security of supply, especially during winter peak periods, but increasingly for all periods.

Mercury submits, in summary:

- **Short term, winter 2024 and 2025, measures:** we agree with Transpower's assessment of risk in its Winter 2024 Outlook. The only measures that can be delivered to manage security of supply over the short term are those that continue to improve the coordination and monitoring of existing generation and demand response/flexibility capacity. Measures that cannot help manage this risk because they cannot be delivered within this period include new investment in BESS, demand response, and new integrated ancillary services<sup>1</sup>;
- **Medium & long term, after 2025, measures:** we support the evaluation, and if benefits exceed costs, then the development of a new broader range of market mechanisms to manage security of supply. An integrated standby ancillary service designed to address the present challenges may not be relevant in the future because the market is expected to change with investment in BESS and demand response capacity;
- **Thermal generation has a vital role in managing security of supply:** the Authority should not simply assume that BESS and demand side flexibility individually or together are equivalent to thermal generation for managing security of supply. At the present time, BESS and demand side flexibility are not equivalent to thermal generation and looking forward it is uncertain if, how and when they might be;
- **Collective action is crucial for managing risk to security of supply:** we support greater collaboration between the Authority, the sector, and the government more on problem definition and solution identification.

Our present submission expands on these points with further detail provided in response to the Authority's consultation questions.

### Short term, winter peak capacity for 2024 and 2025 is best addressed through coordination and monitoring

Mercury agrees with the Authority's assessment that during winter 2024 and 2025 market participants need clear signals that flexible resources are needed at times and the system operator will need to carefully coordinate resources provided to it to manage capacity issues.<sup>2</sup> Furthermore, we agree with the Authority's assessment that it is not feasible to design and implement an integrated ancillary service within this timeframe.

---

<sup>1</sup> The Authority notes in the Consultation Paper paragraph 7.1, when considering measures for managing security of supply in 2023, it considered that it would not have been possible to operationally integrate a new ancillary service at that time. The Authority also notes in paragraph 7.2 that it would prioritise investigation for such a service as a possible long-term solution.

<sup>2</sup> Consultation paper page 4.

Of particular concern for Mercury, as Transpower highlights in its recently published Winter 2024 Outlook, 31 January 2024, is that these short-term mitigation options are limited<sup>3</sup>:

*We have identified a need for short-term mitigation options to reduce capacity and energy risks in winter 2024. However, short-term mitigation options are limited to those that can be implemented in time for winter 2024 and largely relate to the use of existing assets and processes.*

This means that the only measures that can be delivered to manage security of supply over the short term is to continue to improve the coordination and monitoring of generation and demand response/flexibility.

Transpower lists its short-term mitigation options that include actions that the industry can take to help reduce risk, actions that the Authority has taken to improve information, and actions to improve communications, industry awareness and co-ordination. Mercury supports the industry and Authority on the delivery and implementation of these actions.

### **Medium & long term, new market mechanisms that enhance security of supply in the future**

The Authority proposes to investigate a range of hedge market mechanisms, addressing incremental product volumes, seasonal adjustment of product specifications, bid ask spreads and market making requirements<sup>4</sup>.

The Authority is also considering whether an integrated standby ancillary service is needed. Options canvassed in the Consultation Paper include contracts for out of market resource, out of market tender for emergency demand response, and payments to participants to commit their resources to market.

Mercury supports this work and will continue to participate in initiatives such as the Over The Counter Working Group. This work should focus on determining whether the expected total benefits are greater than or less than the costs of a proposed new market mechanism over the long term. This in turn entails, amongst other things, clearly defining the problem, the objectives, the scope of unintended (adverse) consequences, and the impact on upstream and downstream competition.

As the Authority notes in the Consultation Paper, it expects *the benefit of any integrated ancillary service would be short lived once the likely design and implementation timeframes were allowed for.*<sup>5</sup> Mercury agrees in general with the Authority's rationale for this conclusion. That is, in the long term, the Authority expects that tight residuals to ease due to<sup>6</sup>:

- a. *greater technological and geographic diversity of intermittent generation*
- b. *improvements in intermittent generation forecasting capabilities*
- c. *an increase in firming generation capacity, storage capacity and demand response*
- d. *retirement of slow start thermal generation, eliminating the unit commitment problem.*

In addition to these physical developments, another factor is the emergence of hedge contracts for mitigating peak capacity risk and promoting investment. Over time parties have strong incentives to negotiate and develop innovative hedge contracts that mitigate their risks and promote investment. Regulatory decisions that adversely impact this process of innovation would be detrimental to efficiency over the long run.

This is consistent with Transpower's view that market settings need to evolve to reduce uncertainty and increase incentives for flexibility:<sup>7</sup>

*Longer-term, more flexible supply and demand-side resources are needed in the market to meet the energy and capacity challenge and support increased electrification and decarbonisation of the economy. There must be sufficient market incentives to incentivise timely investment in flexible resources. In our role as System Operator we cannot build new plant or batteries or change market settings; we rely on other market participants to develop these options. While we are supporting multiple workstreams and projects*

---

<sup>3</sup> Transpower, Winter 2024 Outlook, page 29 & 30.

<sup>4</sup> Potential solutions for peak electricity capacity issues, Authority page 31.

<sup>5</sup> Consultation Paper, paragraph 7.45

<sup>6</sup> Consultation Paper, paragraph 7.39

<sup>7</sup> Transpower, Winter 2024 Outlook, page 31



*across the industry, alignment between these workstreams is imperative to ensure market settings evolve in a coordinated manner to incentivise appropriate investment in the right place at the right time.”*

An issue, therefore, that requires careful consideration is whether a measure is technologically neutral. In particular, without fast start dispatchable generation in the market it is unclear what technology would underwrite these products. However, the introduction of measures that, say, target a particular solution for the purpose of maintaining security of supply may inhibit investment in more innovative alternatives that over the longer term might be more efficient.

### **Thermal generation has a vital role to play in maintaining security of supply**

Transpower's Winter 2024 Outlook highlights the continuing importance of thermal generation:

*Increased availability of existing generation during peak load periods (by reducing planned outages and increasing thermal unit commitment) and increased demand-response will help mitigate the peak challenge in winter 2024.<sup>8</sup>*

Transpower further emphasises the role of thermal generation in maintaining security of supply and the risks of demand management and power cuts:

*The commitment of two Rankines in addition to both CCGTs and other available generation (not on outage) would provide a high likelihood of meeting the peak challenge. However, increased outages will require additional thermal generation commitment (if available) and increased demand-response. Even then we may be operating with reduced reserves during the coldest evening peaks with low intermittent generation, leaving the system vulnerable to changing conditions or sudden faults. This could lead to demand management, which could include power cuts.*

The fact that the system is vulnerable to unplanned thermal outages highlights the continued crucial role that it plays in maintaining security of supply.

Over the medium to long term, beyond the next two years, we will need investment in more flexible resources. The Authorities latest investment survey indicates this investment is happening.

*Committed generation has lifted significantly compared to the last survey, with its annual output capability (once built) rising from 2,600 GWh to nearly 5,000 GWh. This is slightly more than the amount of generation required to displace the uneconomic thermal generation on the system. The annual development rate (based on projects that have been completed or committed) for the period 2021-2025 is over three times the annual development rate achieved during 2011-2020.<sup>9</sup>*

Even though this rising investment in renewable generation may displace thermal generation on the system, it doesn't displace the role thermal generation in maintaining security of supply. In fact, it makes the challenge of firming more difficult.

Capacity to maintain security of supply needs to be considered systematically across fuels, technology, and time periods to ensure we have sufficient generation when and where we need it. The diagram below highlights Mercury's view that thermal generation is the only firm and reliable technology currently able to provide flexibility across all relevant time periods. The red box highlights how vulnerable the system is to outages or intermittency of renewable generation supply that may last longer than a day.

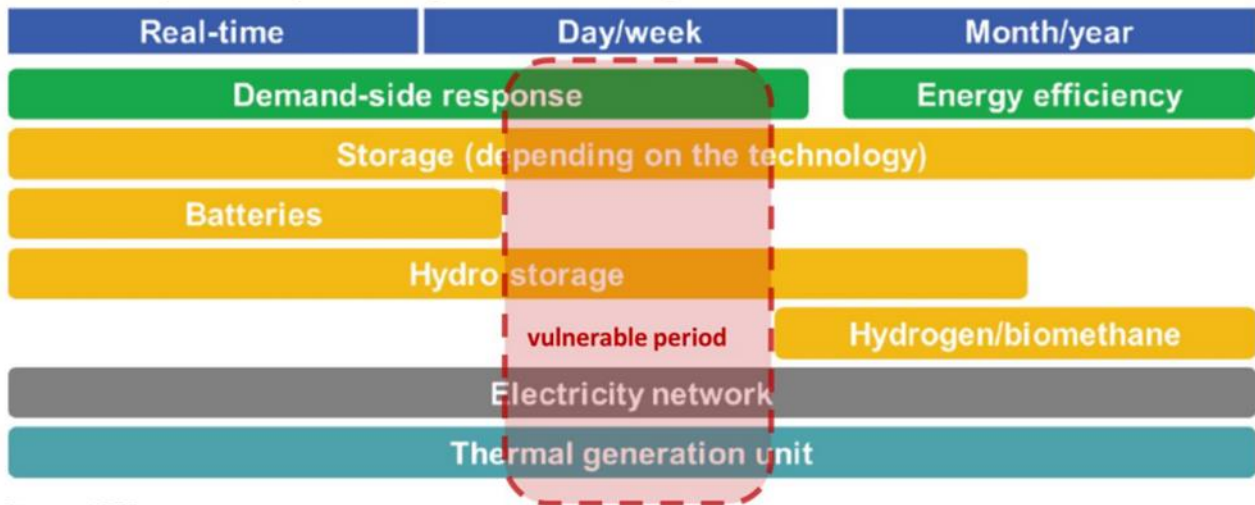
---

<sup>8</sup> [https://static.transpower.co.nz/public/bulk-upload/documents/Winter\\_2024\\_Outlook.pdf?VersionId=DPFASMT6ciqNPngxy5oXP4ZEuH.RrFEJ](https://static.transpower.co.nz/public/bulk-upload/documents/Winter_2024_Outlook.pdf?VersionId=DPFASMT6ciqNPngxy5oXP4ZEuH.RrFEJ) page 5.

<sup>9</sup> [https://www.ea.govt.nz/documents/4414/Generation\\_Investment\\_Survey\\_-\\_2023\\_update.pdf](https://www.ea.govt.nz/documents/4414/Generation_Investment_Survey_-_2023_update.pdf)



### Flexibility services provided by various technologies



Source: ACER.

The system currently faces the dual challenges of having to compensate for a sustained reduction in intermittent wind and solar generation. Mercury is seeing swings of around 500MW during periods where intermittent generation falls away and expects this figure to increase through the transition. Prolonged periods of cold, windless, and cloudy periods will significantly reduce the ability of battery storage to provide capacity and energy. The key takeout is that batteries and gas peaking capacity are not directly interchangeable across all time periods in terms of the flexibility services they provide. Currently thermal generation is the only known and firm technology able to provide security in the period to 2030.<sup>10</sup>

Another way to frame this is, as system demand grows through electrification, intermittent renewables may provide sufficient energy to meet demand growth but cannot be relied on for a capacity contribution. Depending on how soon thermal assets are retired, which is dependent on the market signals and support available to them, it is likely that the net growth in peak shortfall is too high and wide for BESS and demand flexibility to maintain reliability.

Returning to the Winter 2024 Outlook, Transpower sets out the current short-term economic dependency of thermal generation commitment to the intermittency of inflows required for hydro generation:

*Currently, hydro storage is sitting at around average levels for this time of year (January). If there are low inflows in 2024 leading to lower hydro storage over winter, there would likely be higher spot prices and increased thermal unit commitment. This would reduce the thermal commitment risk to the winter peak capacity challenge, but it will also mean the system is vulnerable to unplanned thermal outages.*

That is, currently in the short-term the economic commitment of thermal generation increases/decreases as hydro generation inflows decrease/increase.

However, in the long-term this dependency between the economics of thermal and hydro generation reduces as the level of investment in intermittent generation increases. The amount of hydro generation available for firming intermittent renewables is finite in long term and it cannot increase with the increase in investment in intermittent renewables, whereas the potential for investment in thermal generation is scalable and technically it can increase. Furthermore, this physical limitation of hydro generation may improve the economics of suitable thermal generation as a source of flexibility in the long term.

<sup>10</sup> Ensuring an Orderly Thermal Transition, Mercury submission on Electricity Authority Consultation paper, July 2023.



The ability to rely on existing hydro generation as a firm source of flexibility over the long term is an assumption that Mercury continues to raise.<sup>11</sup>

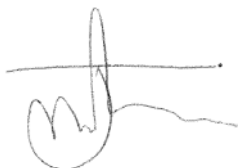
### **Collective action is crucial for managing risk to security of supply**

Mercury supports greater collaboration between the Authority, the sector, and the government on the design and development of solutions for managing security of supply.

The Consultation Paper and our submission underlines that managing security of supply from the short to long term is a challenge spanning supply and demand sides of the market, covering technological, market, hedge contract, and investment decisions across the system value chain. The dynamic nature of this problem, and the fact that there may be measures at the boundary of the market (e.g. integrated v non-integrated ancillary services) requires ongoing dialogue between the Authority, customers, the industry, and government.

We look forward to continuing to engage with the Authority, the industry and key stakeholders on solutions for addressing peak electricity capacity issues over the short to long term.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Tim Thompson', written over a horizontal line.

**Tim Thompson**  
**General Manager Wholesale**

---

<sup>11</sup> Mercury has raised this previously in response to Authority's consultation *Ensuring an Orderly Thermal Transition* and the Ministry of Business, Innovation & Employment's *Consultation on advancing New Zealand's energy transition*



## Appendix: Consultation Questions

Consultation Question	Mercury Response
<p>Q1: Do you agree with the principle that the winter capacity margin should be based on the trade-off between the cost of the hours of reserve or energy shortfall and the cost of the peaking generation needed to mitigate it? Do you have any other suggestions on factors the Authority should consider and why?</p>	<p>Mercury agrees with the general principle that the winter capacity margin should be based on the trade-off between the cost of the hours of reserve or energy shortfall and the cost of the peaking generation needed to mitigate it. However, the key challenge will be to determine the cost of the hours of reserve or energy shortfall and the extent to which it should focus on quantifiable economic costs or extend to broader more qualitative social costs.</p>
<p>Q2: Do you agree with our assessment of the incentives for demand response? If not, what is your view? Are there other criteria that the Authority should consider?</p>	<p>Yes, we do agree with the assessment of incentives for demand response.</p>
<p>Q3: Other than financial incentives, what are the other barriers to entry for demand response participation in the wholesale market that you have identified?</p>	<p>In general, market participants along the energy value chain recognise the significant potential value that demand response in general. BCG highlight that a <i>smarter, more flexible electricity system will save around \$10 billion on an NPV basis to 2050, incorporating demand response, smart electric vehicle (EV) charging, and distributed energy resources. Investment in new technologies like distribution network visibility and coordination will unlock many of these measures, enabling at least 2 GW of demand-side flexibility by 2030 and 5.8 GW of demand-side flexibility by 2050.</i><sup>12</sup> However, the novelty of demand response solutions means that business models for realising and translating this value into financial incentives are still emerging. Mercury considers that finding these solutions involves a process of learning by doing and competition, which spans the wholesale and ancillary markets, as well as the markets for access to distribution and transmission networks.</p>
<p>Q4: Do you agree that the Authority should focus its resources on identifying and lowering barriers for BESS and demand side flexibility to participate in the wholesale and ancillary markets? If so, where do you think the Authority should focus first</p>	<p>See our comments in the letter above.</p>
<p>Q5: Do you agree that any solutions should satisfy these principles? If not, what is your view and why? Are there other principles that the Authority should consider?</p>	<p>See our comments in the letter above.</p>
<p>Q6: Do you agree that a standard product for financial 'super peak' hedges is required?</p>	<p>No, because a range of "peak" products are emerging to meet a range of different load and generator requirements. Attempting to impose a standard product risks expending limited resources on a product that the market does not value and limit a process of</p>

<sup>12</sup> BCG report *The future is electric*, Page 11



	<p>competition and innovation at a crucial time in the development of these products.</p> <p>As these products develop, Mercury supports improved disclosure and monitoring of the OTC market in order to gain better insights to inform the consideration of potential options for exchange traded solutions in the future.</p>
Q7: What factors do you think we should consider in the design of such a product?	With reference to the ASX, the Authority should consider the cost of market making, the expected demand for such products (particularly smaller parties), who would be required to supply the product, how this might impact smaller generators, and therefore whether or not the total benefits of such a product exceed the costs.
Q8: Do you agree with our assessment of the risk for the medium to long term?	See our comments in the letter above.
Q9: Do you think it would be beneficial to create a new integrated standby ancillary service? What is your view and why?	See our comments in the letter above.
Q10: How should the costs for a standby ancillary service be allocated?	If consumers in general are going to benefit from the security of supply delivered by the standby ancillary service, then its cost should be allocated over them.
Q11: How should the residual requirement be set? Should it be an operational setting or dynamically calculated? If it is dynamically calculated, what factors should be considered in the calculation?	Mercury considers that residual requirement should be dynamically calculated similar to current instantaneous reserve market.
Q12: How should deficit (scarcity) standby residual be priced in relation to scarcity energy and scarcity reserve prices?	<p>Mercury proposes that the deficit scarcity standby price should be less than the scarcity energy and scarcity reserve prices.</p> <p>These prices need to be reviewed and determined together as there are dependencies between them.</p>
Q13: Do you agree with our assessment of the issues associated with procuring additional resource out of market? If not, what is your view and why?	Yes, we agree in general with the issues associated with procuring additional resource out of market.
Q14: Do you think it would be beneficial to create an out-of-market tender for emergency demand response? If not, what is your view and why?	<p>There may be value to create an out-of-market tender for emergency demand response as it could provide information regarding demand response that might be incorporated into the market in the future.</p> <p>That is, it might help identify how costs vary between different customer segments impacted by blackouts which may affect everyone.</p>
Q15: Do you think it would be beneficial to provide payments to resource providers for any uncleared generation and/or dispatchable demand? If not, what is your view and why?	



<p>Q16: What do you consider to be an appropriate scaling factor to determine the price for residual and why?</p>	
<p>Q17: What is your view on the factors the Authority should consider when valuing the costs associated with a standby ancillary service?</p>	<p>The Authority should consider the scale of the issue at risk with the cost of a loss of energy and the cost of the demand or supply side solution required to address the loss.</p>
<p>Q18: What other options should be considered to better manage residual supply risk for winter 2024?</p>	
<p>Q19: Do you have information on any other international standby ancillary services and their positive impacts? If yes, please share your information.</p>	

