



20 August 2024

Electricity Authority
By email: fsr@ea.govt.nz

Consultation Paper – Addressing larger voltage deviations in New Zealand’s power system

Meridian Energy Limited (**Meridian**) appreciates the opportunity to comment on the Electricity Authority’s (**Authority**) consultation paper ‘Addressing larger voltage deviations in New Zealand’s power system’.

We support the Authority’s review of common quality obligations in the context of increasing intermittent generation. It is timely to ensure system settings are consistent with the expected increase in intermittent generation.

In general, Meridian favours the use of market-based mechanisms to ensure that common quality outcomes are achieved at least cost and participants are compensated for costs incurred in providing system support. A market-based approach is generally preferable to imposing regulated requirements on generators or other service providers which may result in unavoidable and unrecoverable costs being incurred and/or an increase in applications for dispensation. We therefore support the inclusion by the Authority of the assessment criteria that ‘the option is a market-based approach’.

However, we note that, according to the Authority’s own assessment, none of the three options proposed to be shortlisted to manage larger voltage deviations in New Zealand’s power system are market-based approaches. While we accept that some regulated obligations may need to be imposed in the interim, Meridian’s view is the Authority should be seeking over the longer term to establish a market-based framework to incentivise the provision of voltage support. We recommend that these longer-term objectives are considered before making any final decisions on the options proposed to ensure that any interim measures are necessary and are consistent with the desired future state for voltage support arrangements.

Our responses to the Authority’s specific consultation questions are included as Annex One.

This submission is not confidential and can be published in full. Please contact me if you would like to further discuss any of the matters discussed in our submission.

Nāku noa, nā

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Meridian Energy

Annex One: Meridian responses to the Authority’s specific consultation questions

<p>Q1. Do you consider it likely that distributors will, in the absence of a Code requirement, place voltage support obligations on some or all generating stations and energy storage systems (when discharging) that connect to their networks? Please give reasons for your answer.</p>	<p>As part of any network connection investigation, the impacts on the ability to manage network voltage are considered. As such, appropriate measures may be put in place to ensure this. Our experience is this already happens for materially sized generation connections.</p>
<p>Q2. Do you agree generating stations and energy storage systems connected to local distribution networks at the GXP voltage (which varies by local distribution network) should be required to support voltage, or do you consider the obligation should be placed on generating stations and energy storage systems connected at a uniform voltage (eg, 33kV)? Please give reasons for your answer.</p>	<p>There are several material aspects that impact the ability of a generating station to provide voltage support. These include the location of the generating station on the distribution network, and the nature of other voltage control systems and equipment on the distribution network.</p> <p>Examples of issues that we have observed in this space include:</p> <ul style="list-style-type: none"> • An inability to exercise reactive power range without pushing local voltage outside the Code requirements; and • Interaction between a generating station voltage controller and existing voltage controls on the network. <p>The ability of a distribution network-connected generating station to provide voltage support to the grid will be impacted by these matters. The first priority will be to manage the voltage limits of the immediate network to which the generating station is connected.</p>
<p>Q3. Do you consider there should be a capacity threshold (eg, a nominal net export or nameplate capacity of 5MW or 10MW) for generating stations and energy storage systems connected to local distribution networks to support voltage? Please give reasons for your answer, including any implications of having/not having a capacity threshold.</p>	<p>We consider a capacity threshold would be appropriate. It may make sense to align this with the capacity threshold adopted for frequency keeping obligations. However, we note that a distribution network is already likely to impose requirements on connecting plant, depending on the plant’s capacity.</p>
<p>Q4. What do you consider to be the pros and cons of requiring generating stations / energy storage systems connected to local distribution networks to have a</p>	<p>This change is likely to allow more generation stations using equipment supplied internationally to comply as this standard</p>

<p>reactive power range of $\pm 33\%$ rather than the $+50\%/-33\%$ range specified in clause 8.23 of the Code?</p>	<p>more closely aligns with common international specifications.</p> <p>It should be noted that there are many situations where larger generating stations on distribution networks cannot exercise their full reactive range due to the local impact on voltage.</p>
<p>Q5. Do you agree the Authority should be short listing the first voltage-related option to help address Issues 2 and 3? If you disagree, please explain why.</p>	<p>This option proposes imposing voltage control obligations on Battery Energy Storage Systems (BESS) irrespective of operating mode (load / generation / idle). When idle, this is essentially obligating a BESS to operate as a statcom while providing no ability to recover any costs associated with providing this service. This is in contrast to other providers of such services who receive compensation. There are also many large loads on the network that provide no voltage support (other than possibly power factor correction). As such, this approach seems to place an unfair burden on BESS.</p>
<p>Q6. What do you consider to be the main benefits and costs associated with the first voltage-related option?</p>	<p>As noted above, this approach would impose costs on BESS without providing any opportunity to recover these costs. We do not consider this to be a sustainable approach.</p>
<p>Q7. Under the first voltage-related option, what costs are likely to arise for the owners of distributed generation, embedded generating stations, and energy storage systems with a point of connection to the local distribution network?</p>	<p>The costs will depend on the size of the relevant generating station. Larger stations will generally have the capabilities required, while smaller stations may incur costs in achieving this capability. There will also be ongoing costs on all captured stations from determining and demonstrating compliance.</p>
<p>Q8. Under the first voltage-related option, what costs are likely to arise for the owners of energy storage systems with a point of connection to the transmission network?</p>	<p>As noted above, this option would impose voltage control obligations on BESS irrespective of operating mode (load / generation / idle). This will impose costs on BESS while providing no ability to recover these costs. We do not consider this to be a sustainable approach.</p>
<p>Q9. Do you agree the Authority should be short listing the second voltage-related option to help address Issues 2 and 3? If you disagree, please explain why.</p>	<p>Meridian agrees with shortlisting this option for further consideration.</p>

<p>Q10. What do you consider to be the main benefits and costs associated with the second voltage-related option?</p>	<p>We broadly agree with the costs and benefits as outlined by the Authority.</p>
<p>Q11. Under the second voltage-related option, what costs are likely to arise for the owners of energy storage systems with a point of connection to the transmission network?</p>	<p>As noted above, this option would impose voltage control obligations on BESS irrespective of operating mode (load / generation / idle). This will impose costs on BESS while providing no ability to recover these costs. We do not consider this to be a sustainable approach.</p>
<p>Q12. Do you consider it likely that distributors will, in the absence of a Code requirement, place fault ride through obligations on some or all <30MW generating stations that connect to their networks? Please give reasons for your answer.</p>	<p>Meridian considers this question will be best answered by distributors.</p>
<p>Q13. Do you consider it appropriate to include in the Code fault ride through curves for generating stations connected to a local distribution network at a nominal voltage equal to the GXP voltage, which take into account network protection considerations? Please give reasons for your answer.</p>	<p>Meridian's view is this shouldn't be necessary given the existing fault ride through envelopes in clause 8.25A are modelled based on the location of the relevant generating station on the power system.</p>
<p>Q14. Do you consider there should be a threshold based on connection voltage and capacity (eg, a nameplate capacity or nominal net export of 5MW or 10MW) for generating stations connected to distribution networks to ride through faults? Please give reasons for your answer, including any implications of having / not having a capacity threshold.</p>	<p>We consider a capacity threshold would be appropriate. It may make sense to align this with the capacity threshold for generating stations and energy storage systems connected to local distribution networks to support voltage. However, we note that proving compliance would potentially require complex system studies, which could be disproportionately expensive for smaller capacity generating stations.</p>
<p>Q15. Do you agree the Authority should be short listing for further investigation the third voltage-related option to help address Issue 4? If you disagree, please explain why.</p>	<p>Meridian agrees with shortlisting this option for further consideration.</p> <p>We note that the requirements to prove compliance with the fault ride through obligations can be onerous, and that this may be additionally burdensome on smaller plant. We recommend that any decision to extend fault ride through obligations to smaller plant should also consider the appropriateness of</p>

	associated testing, monitoring and compliance obligations.
Q16. What do you consider to be the main benefits and costs associated with the third voltage-related option?	We broadly agree with the costs and benefits as outlined by the Authority.
Q17. What costs are likely to arise for the owners of (single site and virtual) generating stations under the 30MW threshold if these generating stations must comply with the fault ride through AOPOs because they are connected to a distribution network at a nominal voltage equal to the GXP voltage?	As noted above, the requirements to prove compliance with the fault ride through obligations can be onerous, and this may be additionally burdensome on smaller plant. We recommend that any decision to extend fault ride through obligations to smaller plant should also consider the appropriateness of associated testing, monitoring and compliance obligations.
Q18. Do you have any comments on the Authority's assessment of options to help address Issues 2, 3 and 4 identified in our 2023 Issues paper?	Meridian notes that none of the three options assessed are market-based options. As noted in our covering letter, we have a preference for market-based options to ensure that common quality outcomes are achieved at least cost and participants are compensated for costs incurred in providing system support. While we accept that some regulated obligations may need to be imposed in the interim, Meridian's view is the Authority should be seeking over the longer term to establish a market-based framework to incentivise the provision of voltage support. We recommend that these longer-term objectives are considered before making any final decisions on the options proposed to ensure that any interim measures are necessary and are consistent with the desired future state for voltage support arrangements.