

17 June 2025

Electricity Authority  
By email: [fsr@ea.govt.nz](mailto:fsr@ea.govt.nz)

### **Promoting reliable electricity supply: Frequency-related Code amendment proposals**

Meridian appreciates the opportunity to provide feedback on the Authority's consultation paper 'Promoting reliable electricity supply: Frequency-related Code amendment proposals'.

#### **Proposed introduction of a maximum permitted dead band**

As stated previously, Meridian's preference is to move directly to a capability market for governor response.<sup>1</sup> We consider this would be a fairer and more efficient solution for managing system frequency as it would ensure that least cost options for frequency support are utilised and that service providers receive compensation for the costs incurred. However, we recognise such an approach would take time to develop and the Authority is prioritising shorter term solutions.

Assuming the Authority moves forward with introducing a maximum permitted dead band, Meridian considers that the deadband should be based on the technology of the generating station. In particular, we recommend that a maximum deadband of +/- 0.15 Hz is adopted for wind turbines. This is in line with the current arrangements Meridian has agreed with the System Operator and would therefore avoid imposing additional costs on Meridian and other wind generators.

Wind turbines typically respond faster than other technology types (e.g. hydro) to frequency changes due to their low inertia. As such, they will face additional wear and tear costs from any increased frequency keeping obligation. We agree with the Authority that these costs are difficult to quantify but we disagree they are likely to be minor. Meridian's previous estimates suggested these costs are likely to be in the millions of dollars over plant lifetimes.

Further, imposing frequency controls on wind turbines inevitably results in wind being spilled. This is a system inefficiency as this resource cannot be stored or recovered. This is particularly detrimental during dry periods, when there is a need to maximise preservation of hydro storage. Meridian has previously estimated the expected energy loss from wind

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<sup>1</sup> See, for example, [Meridian's submission](#) on 'Addressing more frequency variability in New Zealand's power system'.

generation at various deadbands. The table below shows the respective energy losses at current settings (+/- 0.15Hz) and with a maximum deadband of +/- 0.1Hz, as proposed by the Authority. This analysis indicates, across New Zealand's installed wind capacity, the Authority's proposal will result in 6.1 GWh of energy spilled per annum (enough to power over 700 homes). Assuming a wholesale price of \$150/MWh, this equates to \$912,000 of lost energy each year. As installed wind capacity increases in the coming years, this cost will only increase.

Scenario	Deadband (Hz)	Energy spilled (%)	NZ installed wind output: 3,200 GWh	
			Annual energy spilled (GWh)	Annual lost value assuming \$150/MWh
Existing deadband on some sites	0.15	0.09%	2.88	\$432,000
Proposed deadband setting	0.1	0.28%	8.96	\$1,344,000
<b>Delta</b>		<b>0.19%</b>	<b>6.08</b>	<b>\$912,000</b>

The costs of energy loss from imposing a tighter maximum dead band on wind generators are additional to increased wear and tear costs which, as previously noted, Meridian considers are more than minor. While it may still be the case that the Authority's proposal would result in net benefits with these costs taken into account, this analysis indicates that an alternative approach whereby different deadbands are adopted for different technologies could result in *higher net benefits*.

Potential impacts on the operation of Battery Energy Storage Systems (BESS) for frequency keeping also support the adoption of different deadbands for different technologies. While BESS are ideally suited to provide frequency regulation due to their fast response times, in doing so they incur partial cycling which materially impacts their expected lifetime. This, combined with reducing the reliability of offers in the markets BESS are currently able to operate in, will disincentivise investment in this technology until BESS providers are able to recoup revenue through providing this service. Meridian has undertaken a high-level estimate of the additional costs imposed on a BESS from a requirement to provide frequency support when idle.<sup>2</sup> We conservatively calculate these costs to be \$640,000 per annum. The actual cost is likely to be significantly higher.

The Authority gives only brief consideration to the alternative of technology-based dead bands as part of its regulatory statement on the proposal, noting its concern that this approach could distort investment decisions and operational practices. It does not make any attempt to quantify the difference in costs between this alternative approach and its proposal. Meridian recommends the Authority consider in further detail the relative costs and benefits of these alternatives – including quantification where possible – before adopting these Code changes.

Lastly, while we consider that technology-based dead bands should be considered as an alternative, Meridian's preference remains – as noted above – a market-based solution to procure frequency keeping services from the most efficient providers of that service.

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<sup>2</sup> This was shared with the Authority by email in March 2025. Meridian can resend this analysis, if helpful.

Our responses to the Authority's specific consultation questions are attached as Appendix A.

Please contact me if you have any queries regarding this submission. This submission can be published in full.

Nāku noa, nā

Matt Hall

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## Appendix A: Responses to consultation questions

	Question	Response
1.1	Do you support the Authority's proposal to amend the Code to require smaller generating stations to comply with frequency-related asset owner performance obligations?	Yes.
1.2	Do you consider the 'legacy clause' provisions in the Code amendment proposal should apply to a generating station for a finite period of time (eg. 10 years)? Please explain your answer.	No. The duration of any exemption is effectively addressed by the provision that the legacy clause will no longer apply if a generation station is subsequently altered such that it has the capability to meet the Code obligations or otherwise increases its generation export capacity.
1.3	Do you see any unintended consequences in making such an amendment? Please explain your answer.	As Meridian has previously noted, we consider there is some risk that the costs in relation to compliance, monitoring and testing these requirements could be significant and disproportionate to the relatively little frequency support provided by these smaller plants. This is for the Authority to determine.
1.4	Do you agree the proposed Code amendment is preferable to the other options identified? If you disagree, please explain why and give your preferred option in terms consistent with the Authority's main statutory objective in section 15 of the Electricity Industry Act 2010.	Yes, notwithstanding our wider point that moving to a capability market for governance response will ultimately be a fairer and more efficient solution.
1.5	Do you agree with the analysis presented in the Regulatory Statement? If not, why not?	Yes.
1.6	Do you have any comments on the drafting of the proposed amendment?	No.
2.1	Do you consider there to be any type of generation technology that cannot, and never will be able to, comply with a dead band of $\pm 0.1\text{Hz}$ ? Please explain your answer.	The generation technologies that Meridian operates should be able to technically comply with this requirement. However, as described in our cover letter, we consider that some technologies will face additional costs from the introduction of a maximum permitted deadband which should be considered.

2.2	Do you support the Authority's proposal to amend the Code to specify a permitted maximum dead band of $\pm 0.1\text{Hz}$ , beyond which a generating station must contribute to frequency management and support?	As set out in our cover letter, we consider that an alternative technology-based approach (which would see existing arrangements preserved for wind generation) could have a higher net benefit than the Authority's proposal, given wear and tear costs and energy losses associated with imposing tighter deadband requirements on wind turbines.
2.3	Do you see any unintended consequences in making such an amendment? Please explain your answer.	As described in our cover letter, we consider that this proposal will impose additional costs on both generation owners and the system as a whole (from energy losses). A technology-based dead band would reduce these impacts.
2.4	Do you agree the proposed Code amendment is preferable to the other options identified? If you disagree, please explain why and give your preferred option in terms consistent with the Authority's main statutory objective in section 15 of the Electricity Industry Act 2010.	No. We consider a technology-based dead band is preferable to the Authority's proposal for the reasons set out in our cover letter.
2.5	Do you agree with the analysis presented in the Regulatory Statement? If not, why not?	The Regulatory Statement has given only brief consideration to the alternative of adopting a technology-based dead band. We consider such an approach could avoid some of the costs associated with the Authority's proposal and may have higher net benefits overall. We recommend the Authority consider this alternative in more detail, including quantification of costs and benefits, where possible.
2.6	Do you have any comments on the drafting of the proposed amendment?	No.