

26 July 2023

Electricity Authority

By email: forecasting@ea.govt.nz

Issues and options paper: Review of forecasting provisions for intermittent generators in the spot market

Meridian welcomes the opportunity to comment on this issues paper.

Forecasting intermittent generation is inherently difficult

It is clear in the paper that the Authority appreciates that perfectly accurate forecasts are not feasible. New Zealand's location means that forecasting is fundamentally more difficult than other jurisdictions.

Perfection is not a realistic benchmark to strive for in forecasting, and any improvements will have increasing costs and diminishing returns. Meridian thinks that it is crucial that any anticipated benefits of improved forecasting exceed the costs.

Meridian supports efforts to improve forecasting accuracy, and tentatively supports centralised forecasting of intermittent generation

Meridian acknowledges that as the proportion of intermittent generation in the electricity market increases substantially in the coming decades, more accurate forecasts could help with system stability and reliability. However, better forecasting alone won't necessarily ensure this.

As a generator of both wind and hydro, and soon solar, it is important that our forecasting information is accurate. This allows us to coordinate efficiently across our portfolio. Other

generators may be in similar positions, with internalised incentives providing pressure to get forecasts as accurate as possible. Meridian currently has an ongoing programme of work to improve our forecasting capabilities. We note that we have been forecasting for wind farms since 2007. As there are five large wind farms in our portfolio, with a nameplate capacity of around 420MW, there are significant natural incentives on us to maintain accurate forecasts.

However, we acknowledge that the changing shape of the industry as it decarbonises means that the issue will be more widespread than it is currently, with only 6% wind as a proportion of the total supply. We also note that the incentives will differ across different generators, with things playing out differently for smaller generators, or those who have a much higher concentration of intermittent generation assets in their portfolio.

Meridian's preferred options at this stage are options 2 and 3, which are the centralised forecasting options. We support the idea to beta test a new forecasting service by contracting a service provider for a trial period to assess the data. Our tentative support assumes that the costs will be reasonable. We would also like more information about whether and how a centralised forecasting service would require data to be supplied by intermittent generators and how that data sharing (including any commercial sensitivity) would be managed. A beta test would be a good way to work through issues such as these.

The benefit of option 3 (centralised forecasting but with an ability for generators to use their own forecasting provided they meet certain criteria) could be to reduce any duplication of forecasting efforts and costs. Some generators may continue to undertake forecasting for their own portfolio management purposes, and it could be inefficient to duplicate forecasting costs with a central provider. The option for generators to use their own forecasting could overcome this potential inefficiency. The extent to which generators would be likely to use their own forecasts will depend on:

- the criteria that intermittent generators would need to meet and whether or not any regulatory incentives/standards act as a disincentive for self-forecasting; and
- whether the intermittent generator could reduce its costs, for example if self-forecasting meant the generator did not need to contribute to the costs of a centralised forecast.

Meridian does not support the introduction of an ahead and balancing market as we do not think that it is justified at this time. We agree with the consultation that introducing this would be complex and time-consuming, and unlikely that the benefits would outweigh the costs.

9 August 2021 and wider lessons for the electricity industry

Care should be taken when considering the events of 9 August 2021, as the operating conditions have changed since then, and will likely continue to change during the energy transition. A major concern post 9 August 2021 has been around slow-start thermal generation, and the very long lead time that is required to get thermal generation running. However, we are now seeing thermal generation being run differently, at lower levels and more frequently. This means that there is now an increased ability to quickly ramp up thermal generation in times of need.

We also note that slow-start baseload thermal generation is likely to retire within a decade according to the modelling commissioned by the Authority for its paper on ensuring an orderly thermal transition. This means that the problem as it relates to the interaction between thermal responsiveness and the ability for generation to react to variation in intermittent generation will also change as thermal generation exits the market and forecasting accuracy may become less of a practical concern.

Finally, we note that the modelled financial impact of inaccurate forecasting is still relatively small in the context of the wider market. The modelled impacts of inaccurate forecasting on wholesale prices¹ would not in Meridian's opinion generally be enough to have an impact on thermal commitment. This means that it is possible that there might be very limited benefits from improving the accuracy of intermittent generation forecasting. However, we acknowledge the modelled numbers are averages and there may be instances where forecast inaccuracy has a greater impact. More monitoring and data would help to inform views on the impact of inaccurate forecasts on the wholesale market.

Meridian's responses to the consultation questions are appended.

¹ Under forecasting of wind, which occurred 32.5 percent of the time, resulted in an average impact on spot prices of **-\$6.90/MWh** while over forecasting of wind, which occurred 67.5 percent of the time, resulted in an average impact on spot prices of **\$3.77/MWh**.

Nothing in this submission is confidential and it can be released in full. Please contact me if you have any queries regarding this submission.

Nāku noa, nā



Evealyn Whittington

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Meridian's responses to the consultation questions

	Question	Meridian comment
1.	Do you agree with the Authority's problem definition? If not, why not?	Although wind forecasting has been cited as a problem in a lead up to the events of 9 August 2021, our experience is that forward prices do not necessarily lead to thermal commitment, and that it is similar for forecasting too. Given the very small impact on wholesale prices due to under/over forecasting, we think it is unlikely that increases in accuracy of forecasting will impact on thermal commitment. However, given the increasing proportion of intermittent generation, we can see that accuracy will become an more pressing issue, and so a level of intervention is justified.
2.	Do you agree that a new forecasting arrangement should apply to all grid-connected intermittent generators that are required to submit offers?	Yes, however we are supportive of the hybrid option, which would allow some flexibility for generators to use their own forecasts in certain circumstances.
3.	Thermal generators: For all trading periods between 1 November 2019 and 31 October 2022, how often do you think you made the incorrect decision whether to start or stop your thermal unit(s)? please provide reasons why this occurred.	No comment (Meridian is not a thermal generator).
4.	What else, if anything, should be considered when assessing the relative advantages and disadvantages of the four forecasting arrangements the Authority has identified?	We think it would be helpful if the Authority would consider how pragmatic or appealing the four arrangements would be to participants.
5.	What other types of forecasting arrangements, if any, should be considered to improve the issue of inaccurate and unreliable forecasts?	None that we have identified.
6.	Do you agree with the proposed evaluation criteria? If not, what is your view and why? Are there other criteria that the Authority should consider?	Some of the categories seem a bit repetitive (for example, "efficiency" is probably not very different to "uses an 'exacerbators pays' approach").

		The Authority could also consider how useful the option would be for participants, as none of the evaluation criteria quite get at this. It would give a consideration of what is commercially pragmatic, having regard to the New Zealand market. This seems fair given that the changes are likely to have a cost to participants.
7.	Do you agree with the Authority's assessment of each forecasting arrangement above? If not, why not?	Yes in the main.
8.	The Authority has not weighted the criteria based on importance. Are there particular criteria that you consider to be more important than the others?	Meridian thinks that value for money is a very important criterion, and we would like to see this given more weight.
9.	Are there additional criteria that the Authority should be considering?	Please see our response to question 6.
10.	How frequently do you think intermittent generation forecasts should be updated, and how often do you think intermittent generators should be required to update their offers to reflect the forecasts?	The consultation suggests that forecasts could be updated as frequently as half-hourly, to fit with trading period timeframes, but that this would have an associated cost for generators. It is difficult to comment on whether this would be useful or not without more information on the level of cost and the way in which this would work. Although more frequently updated forecasts could aid accuracy, it is unclear if the benefits from this would exceed the costs.
11.	Do you think that the Authority should implement accuracy standards? If not, please explain why.	Although forecasting is inherently inaccurate, Meridian thinks that some level of accuracy standards could be helpful, given the rate of change and increasing levels of intermittent generation in the future.
12.	If the Authority was to implement accuracy standards: a) Do you think outcome process standards would be more effective?	Meridian has a preference for outcome standards, as this would allow some flexibility to change methods to achieve better results. There are many tools, techniques and approaches to forecasting and being too prescriptive around process could negatively affect innovation and improvements.

	<p>b) Should there be a single standard or multiple standards across different timeframes?</p> <p>c) Should the standard(s) be focussed on ensuring actual generation is within 30MW of the amount that was forecast, or should the MW compliance threshold be higher or lower?</p> <p>d) Should the accuracy standards be based on the percentage of installed capacity rather than a certain amount of MW?</p>	<p>In our view it would be most suitable to have staggered standards, with accuracy obligations increasing closer to real time, however, the suggested 10MW threshold for T – 3 hours would be too restrictive given the inherent uncertainties in forecasting intermittent generation. In our view, the current 30MW threshold is a good starting point. One idea is to take a probabilistic approach – for example, assess compliance as being within 30MW of forecast 98% of the time. Hard limits create hard boundaries and as the consultation notes can drive perverse behaviours.</p>
13.	<p>Following the 9 August 2021 grid emergency, reports from two investigations recommended that the Authority amend the Code to disallow persistence forecasting and require wind generators make more accurate offers to the system operator about supply. Do you agree that the Authority should amend the Code to disallow persistence forecasting?</p>	<p>In Meridian’s view, it has not shown that persistence forecasting is inaccurate. Persistence forecasting works well for our business in coordinating our portfolio of mixed generation types. As noted in our submission, the significant size of our wind portfolio means that there are strong incentives on Meridian to ensure that our forecast information is accurate and timely.</p> <p>Our view is that the Authority should not disallow persistence forecasting, and we would like to see more monitoring of forecast accuracy to build an evidence base before this is taken forward as a proposal.</p>
14.	<p>Do you think the Authority should implement accuracy incentives and/or penalties for non-compliance? If not, please explain why.</p>	<p>Penalties could be hard to design, given that the inaccuracies only result in small impacts to wholesale prices. This means that the “harm” is often quite small.</p> <p>One way to approach penalties or incentives could be to design in an element of needing to be persistently inaccurate in forecasts within a range. For example, small and infrequent instances of under/over</p>

		forecasting wouldn't attract penalties, but larger and more consistent ones would.
15.	If the Authority was to implement a decentralised forecasting arrangement, do you have any suggestions for what type of incentives could be applied?	One possible area for incentives could be to have a lowered compliance burden upon participants who can demonstrate consistently accurate forecasts (effectively the opposite of clause 13.86A(2), which requires intermittent generators to supply a monthly report if they generate at a level that is 30MW below their forecast of generation potential on one occasion or more in a given month).
16.	If the Authority was to implement a centralised forecasting arrangement: <ul style="list-style-type: none"> a) Do you have any suggestions for what type of incentives could be applied? b) Should penalties for not meeting the standard(s) be prescribed? c) Should penalties be higher for over generating than under generating (and vice versa). 	Meridian's view is that in a centralised forecasting arrangement, there should not be incentives and penalties for inaccurate forecasts on intermittent generators. This is because generators will have no real control over the forecasts. If there were to be penalties, they should be tied to wilful non-compliance or error, rather than the accuracy of the forecasts.
17.	Do you have a view on who should have responsibility for submitting forecasts and who should pay for forecasting?	As noted in our submission, Meridian tentatively favours the centralised forecasting models. We think that it is reasonable that users of the services contribute to the costs. Forecast information should be provided directly to generators. The Authority should also consider having multiple third-party forecasters as part of the centralised options. A key downside to the centralised options is that they concentrate risk in one provider, and potentially risks introducing bias. We note that some other jurisdictions (Ireland and Texas) have centralised models with multiple forecasters.
18.	Do you have a view on what types of information should be published and	We note that some information might be commercially sensitive (for example, data

	what platform it should be published on?	inputs provided by intermittent generators). The Authority should be mindful of this and put in place appropriate safeguards.
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