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nova energy

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Submissions
Electricity Authority
PO Box 10041
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By email: forecasting@ea.govt.nz

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

Nova Energy (Nova) believes improved forecasting of generation from intermittent generation sources is critical to the orderly operation of the market. For too long the market has been subject to unnecessarily volatile prices due to poor wind generation forecasts. Quantifying the impact on Nova's margins is difficult, but the cost of not being able to respond to drops in wind output inside gate closure creates higher electricity prices and costs for wholesale market electricity purchases and as such represents a market inefficiency resulting in additional costs for consumers.

Nova favours a centralised model for forecasting intermittent generation output. Given one of the benefits of a centralised model is achieving economies of scale and integration with the System Operator's (SO) operations, the concept of a hybrid model would seem to be less efficient than either a centralised or fully decentralised model.

The benefit of the decentralised model is that the forecasting service can still be provided by one or two providers on a competitive basis, but the costs and performance expectations on the provider remain in the control of the generators rather than leaving that to the System Operator. The decentralised model would have to be supported by a well designed incentives / penalties framework to achieve the desired performance outcomes.

Nova's further responses to the Authority's questions are appended to this letter.

Yours sincerely

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Nova submission: Review of forecasting provisions for intermittent generators in the spot market

Q No.	Question	Response
Q1.	Do you agree with the Authority's problem definition? If not, why not?	Yes
Q2.	Do you agree that a new forecasting arrangement should apply to all grid-connected intermittent generators that are required to submit offers?	Yes. Although it is assumed the impact of 'behind the meter' resources will be monitored, and suitably tailored forecasting requirements will be introduced where embedded cumulative scale becomes an issue for demand-side forecast accuracy at the GXP. While the combined output of intermittent generators within a region can be closely correlated, it is still important the individual output forecasts are reasonably accurate.
Q3.	Note this question is referring specifically to generators who have thermal assets: 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.	
Q4.	What else, if anything, should be considered when assessing the relative advantages and disadvantages of the four forecasting arrangements the Authority has identified?	The accuracy of renewables output forecasting will have diminishing returns for the level of resources applied, and some regions may lend themselves to, or require more accurate forecasting than others. Also, there may be economies of scale in terms of groups of projects where weather data collection covers the whole group of schemes versus other more distinct locations that require bespoke resources. These factors should be considered carefully in decision making as it may be inefficient to socialise costs in cases where intermittent generation projects have unique challenges in determining accurate forecasts.

Q No.	Question	Response
		The accuracy of a centralised forecast will benefit from diversification across sites, however when potential transmission constraints or location factors come into play it can also be important to have accurate forecasts for individual sites.
Q5.	What other types of forecasting arrangements, if any, should be considered to improve the issue of inaccurate and unreliable forecasts?	So long as the incentives (or penalties) provided for decentralised forecasting are appropriate then it is likely that individual generators will contract out the forecasting to third party services. Competition in this market can be expected to lead to economies of scale and increased use of technology to make the process more accurate as well as efficient.
Q6.	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?	Yes, although the concept of 'Futureproofed' should also consider the incentives for enhancing forecasting accuracy and cost effectiveness over time. A centralised approach may not have the same commercial drivers to continually invest in improving forecasts, except when it comes time for service contract renewal.
Q7.	Do you agree with the Authority's assessment of each forecasting arrangement above? If not, why not?	No. The centralised model with an option for self-forecasting (opt-out) is likely to lead to duplication and excessive pass through expenses for those parties that rely on the central forecasts, as the SO will have a smaller base on which to spread its costs. The effectiveness of the opt-out model will rest heavily on what the incentives might be for parties to choose between one or the other, i.e. significant penalties on forecasting errors will incentivise reliance on the central forecast even if the costs seem excessive, while light penalties will lead to duplication of resources by parties opting out. The opt-out model therefore rates poorly in terms of 'Value for money'.
Q8.	The Authority has not weighted the criteria based on importance. Are there particular criteria that you consider to be more important that the others?	Arguably the criteria that are more directly aligned to the problem definition could have a higher rating (e.g. effectiveness, efficiency), though a balanced/even weighting is less subjective. Future proofing is a key consideration, while the electrification transition is underway, but Nova does not agree that the opt-out model should rate highly for this.

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Q9.	Are there additional criteria that the Authority should be considering?	If the party determining how much money is to be spent on forecasting has 'skin in the game' in terms of the benefits of improved accuracy and costs of acquiring the forecasts, then they are more likely to support appropriate investment. It has been apparent for over ten years that improved forecasts would be beneficial to the market and the capability to develop that could have been achieved in that time if the appropriate incentives were in place. For instance, the Authority notes that the generators with both wind and hydro capacity have done some work improving their wind forecasts.
Q10.	How frequently do you think intermittent generation forecasts should be updated, and how often do you think intermittent generators should be required to revise their offers to reflect updated forecasts?	The intermittent generators should operate within the same rules as the thermal and hydro generators to update their generation offers based on the information available to them. The timing and frequency of forecasts of intermittent generation output then becomes a function of nature and accuracy of the forecasting model employed. If the generator can achieve the required levels of accuracy based on 6-hourly updates and a model based on trend in the shorter term, then that should be satisfactory if it meets the target accuracy for energy offers. However, if it cannot achieve that then more frequent forecasts should be required. For example, in the case of solar, clearly the diurnal pattern of output is known, and output will generally be a percentage of that. Even then, however, high wind conditions can lead to panels being levelled to minimise damage and thereby reducing output.
Q11.	Do you think the Authority should implement accuracy standards? If not, please explain why.	Yes. That is the appropriate mechanism for imposing a requirement on using some form of forecasting methodology to base energy offers on. The tracking accuracy of energy offers should be monitored over a number of time frames as these all have relevance for offers from dispatchable generation. Suggested times are for 12-hr, 6-hr, 1.5-hr, and 30-minute. Under the centralised model the accuracy of the SO's forecasts will also depend on the quality and timeliness of data received from the generators, including changes to capacity and response of wind-turbines or solar panels to high wind conditions.

Q No.	Question	Response
Q12.	If the Authority was to implement accuracy standards: do you think outcome process standards would be more effective? a) should there be a single standard or multiple standards across different timeframes? b) should the standard(s) be focused on ensuring actual generation is within 30 MW of the amount that was forecast, or should the MW compliance threshold be higher or lower? c) Should the accuracy standards be based on the percentage of installed capacity rather than a certain amount of MW?	The accuracy requirement should relate to the time elapsed till dispatch, i.e. a wider scope for forecasts 12 hours ahead of dispatch, and a tight margin for 30 minutes. Because it can be very difficult to forecast exactly when, for instance, a weather front arrives, the allowance for accuracy should be determined by long-run measures of tracking performance rather than measures of MW or % of capacity for individual trading periods. This can be measured by the standard deviation of the forecasting error. There are two key components of forecasting error, i.e.: • the net forecast error should net close to zero over time, i.e. not be consistently tracking under or over actual, and • the absolute size of forecast errors over a rolling period of somewhere between 7 – 30 days. The tracking error should be less than a specified limit, which could be the greater of: • a fixed MWh, or • percentage of actual generation. The standards should not look to 'ensure' individual forecast errors are within [x] MW of forecast as this could result in generators curtailing generation to stay within a band. A 'percentage of installed capacity' seems an arbitrary measure vs the more applicable 'percentage of available capacity'. More relevant is the gap between the forecast and actual generation. Even comparatively small intermittent generators should be able to avoid persistent under or over forecasting of output over reasonable timeframes.
Q13.	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 generations make more	No. That would be difficult to define. Should a simple persistence forecast modified by adding a second-order effect of adjusting for trend also be banned under such a rule? Wind generators need to be required to provide more accurate energy offers to the SO, and they need to demonstrate that they are not systemically under or over forecasting.

Q No.	Question	Response
	accurate offers to the system operator about supply. Do you agree that the Authority should amend the Code to disallow persistence forecasting?	Instead the Code should specify minimum requirements for accuracy of energy offers over time and how the measures are determined.
Q14	Do you think the Authority should implement accuracy incentives and/or penalties for non-compliance? If not, please explain why.	Under the centralised model mandatory accuracy requirements should not be required, at least initially, if the forecasting objective/standard is clearly specified with regular reporting to measure performance. Accuracy requirements could be introduced later if deemed required by the industry. The costs of providing accurate energy offers into SPD should be with the exacerbator.
Q15	If the Authority was to implement a decentralised forecasting arrangement, do you have any suggestions for what type of incentives could be applied?	It would seem reasonable for intermittent generators to pay for at least a proportion of frequency keeping costs on a pro-rata basis depending on the accuracy of their energy offers into the market. This would appropriately address scale issues and provide a link between costs and benefits. Demand should also contribute to the cost of frequency keeping.
Q16	If the Authority was to implement a centralised forecasting arrangement: 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 (or vice versa)?	a) Under a centralised forecasting model the incentive and penalties should only be considered once the performance outcomes of the centralised forecast can be duly assessed, as there may be diminishing returns in including them in up-front. Presumably the incentive would have to be included in the SO's performance contract. The size and type of penalties would then be reflected in price for the SO's contract, i.e. higher penalties are likely to equate to a higher contract cost. b) The penalties need to be carefully prescribed and defined as they will have a direct economic cost and should be related to tracking error rather than specific events or deviation. c) No, refer to Q.12. The penalties need to be symmetrical, and the net error factor (plus & minus) tracking close to zero.

Q No.	Question	Response
Q17	Do you have a view on who should have responsibility for submitting forecasts and who should pay for forecasting?	The generator needs to pay for the forecast as they are the party that creates the need for it, i.e. exacerbator pays. Given the SO is already responsible for the centralised demand-side load forecasts applicable for all offtake market nodes, and intermittent generator forecasts will become more critical for meeting its PPO, they could be responsible for submitting generation forecasts. A tailored EA levy cost recovery (via its SO service provider contract costs) can be pro-rata apportioned across identified industry participants. Under the centralised model market participants have no control over the forecasting costs yet would still be required to pay the fees or levies imposed. Under the decentralised model, generators should be required to submit offers to generate, not forecasts, albeit they amount to the same thing. The important difference under this model is that the SO should not have to make any changes to its operating system in order to accept energy offers from intermittent generators.
Q18	Do you have a view on what types of information should be published and what platform it should be published on?	Under the centralised model a decision would have to be made if the forecast is to be either: • applied as the generator's default energy offer, subject to the generator notifying the forecaster or SO of any adjustments to capacity due to maintenance etc, or • advised to the generator and it is for them to then submit their energy offer based on the forecast. If the central forecaster was to provide forecast data only, then they would need to provide a direct data feed to each of the generators. That could be centrally published on existing platforms. Under the decentralised model the existing pricing schedules with SPD runs would perform the task of projecting generation requirements and market prices. Either model is possible.