

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

Question #	Question	Comment
Q1	<p><b>Intermittent generation is not always accurately forecast which is affecting participants' ability to make generation or consumption decisions ahead of real time</b></p> <p>Do you agree with the Authority's problem definition? If not, why not?</p>	Yes, the problem definition is accurate.
Q2	Do you agree that a new forecasting arrangement should apply to all grid-connected intermittent generators that are required to submit offers?	<p>Yes, there is considerable intermittent generation anticipated to come online and the cumulative effect from all assets, regardless of their size, will have an impact on the efficiency of the system.</p> <p>Given the likelihood that intermittent generation will end up geographically clustered, we agree the 30MW threshold be lowered to reflect the cumulative effect smaller sites may contribute to inaccuracy.</p>
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.	N/A
Q4	What else, if anything, should be considered when assessing the relative advantages and disadvantages of the four forecasting arrangements the Authority has identified?	<ul style="list-style-type: none"> <li>- Cost</li> <li>- Time to implement.</li> </ul>

		<ul style="list-style-type: none"> <li>- Ability to adapt to changes in technology and generation mix in the future</li> <li>- Systems that work for wind and solar forecasting</li> </ul>
Q5	What other types of forecasting arrangements, if any, should be considered to improve the issue of inaccurate and unreliable forecasts?	
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?	We agree the criteria has covered the major points although we suggest consideration is made for the ability to forecast the cumulative impact from smaller generators who are not required to place bids in the market.
Q7	Do you agree with the Authority's assessment of each forecasting arrangement above? If not, why not?	With the detail provided, it appears you have assessed the arrangements as would be expected.
	The Authority has not weighted the criteria based on importance. Are there particular criteria that you consider to be more important than the others?	<p>Given the main goal of this work is to improve market effectiveness, it seems more weighting should be given to the effectiveness and efficiency. We also consider it important to implement a futureproofed system that can deal with increased intermittent generation without the need for more upgrades and consultation.</p> <p>As discussed above, we anticipate seeing many new projects enter the market at a range of sizes and therefore suggest the new system allows for the cumulative impact from generators &lt;10MW to also be included. We have a skinny/weak grid and regional constraints are likely to emerge which may be caused by many &lt;10MW embedded projects connected to the system. It would be unreasonable for the burden of forecasting our (highly) variable weather patterns to fall only onto asset owners &gt;=10MW.</p>
	Are there additional criteria that the Authority should be considering?	You should consider the impact from regional intermittent generators <10MW.

	<p>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?</p>	<p>Forecasts should be updated every hour to allow for markets to monitor. Generator offer updates should be more frequent the closer it gets to gate closure but not so onerous in the outer days and hours due to inaccuracy of forecasting. This would mean hourly updates 40 hours out wouldn't add to accuracy and may in fact cause wild changes to market prices that wouldn't help other generators with offer efficiency.</p>
<p>Q11</p>	<p>Do you think the Authority should implement accuracy standards? If not, please explain why.</p>	<p>Yes, but we encourage the need to have these well thought out and appropriate for the stage of implementation. For example, it may be helpful to evolve standards over time to allow for industry learning and optimisation.</p> <p>We anticipate it will be challenging to define new standards without a full understanding of a new forecasting system. We therefore suggest implementing a new system along with frequent publication of accuracy reports as a first step. Accuracy standards could then be progressively introduced as the market learns and optimises.</p>
<p>Q12</p>	<p>If the Authority was to implement accuracy standards: do you think outcome process standards would be more effective? should there be a single standard or multiple standards across different timeframes? 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? should the accuracy standards be based on the percentage of installed capacity rather than a certain amount of MW?</p>	<p>Accuracy is likely to become better over time, regardless of accuracy standards, due to technology improvements and better understanding intermittent generation in New Zealand.</p> <p>A % basis would be the better process for accuracy as small generation inaccuracy over multiple sites can cause the same inaccuracies as forecasting one large site with an inaccurate generation forecast.</p>
<p>Q13</p>	<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 generations make</p>	<p>Persistence forecasting will perform differently for different types of generation technologies. e.g. Trading period to trading period similarities may exist for wind but may vary for solar given it's</p>

	<p>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>time of day variability. Whereas day-to-day forecasting may perform better for solar than wind.</p> <p>Given the relative volatility of New Zealand's weather systems, and the anticipated high proportion of intermittent generation entering the market, we encourage more accurate forecasting techniques are employed.</p>
Q14	<p>Do you think the Authority should implement accuracy incentives and/or penalties for non-compliance? If not, please explain why.</p>	<p>Yes, but as discussed in Q11, we encourage the need to have these well thought out and appropriate and we believe this is best achieved over time as the market first learns and optimises from the system it implements.</p> <p>This approach may differ by generation technology type based on current market knowledge. e.g. the market's understanding of how Wind generation performs in New Zealand is more advanced than Solar given the volume and tenure of Wind assets relative to solar.</p>
Q15	<p>If the Authority was to implement a decentralised forecasting arrangement, do you have any suggestions for what type of incentives could be applied?</p>	
Q16	<p>If the Authority was to implement a centralised forecasting arrangement:</p> <p>a) do you have any suggestions for what type of incentives could be applied?</p> <p>b) should penalties for not meeting the standard(s) be prescribed?</p> <p>c) should penalties be higher for over generating than under generating (or vice versa)?</p>	
Q17	<p>Do you have a view on who should have responsibility for submitting forecasts and who should pay for forecasting?</p>	<p>Forecasting submissions will depend on the structures that are adopted. If a centralised model is employed, we support a 'market cost' approach that was allocated across all intermittent generators of all scales. As the market learns and optimises it's</p>

		<p>forecasting system, it might be appropriate to move to a “causer pays” approach.</p> <p>The Centralised model with self-forecasting may encourage more self-forecasting if a causer-pays approach is employed which may result in lower costs for all generators (assuming lower CAPEX of a centralised system is achievable).</p>
Q18	Do you have a view on what types of information should be published and what platform it should be published on?	<p>Information disclosure and accessibility, as the proportion of renewables increases, should be increased and made available to all participants.</p> <p>With respect to the platform, WITS would be the logical platform to publish as this is where current forecasts and offers are made and market participants are familiar with the site.</p>