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Charles Pople
Commissioner / Reliability Panel Chair
Australian Energy Market Commission
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Dear Mr Pople

2022 Reliability Standard and Settings Review – Issues Paper

Origin Energy Limited (Origin) welcomes the opportunity to provide comments on the Reliability Panel's 2022 Reliability Standard and Settings Review Issues Paper. With the National Electricity Market (NEM) undergoing a period of significant change, ensuring that the standard and settings are appropriate will be crucial to market resilience.

Our thoughts on the key issues discussed in the Issues Paper are summarised below with additional detail provided in Attachment 1.

Assessment approach

Origin generally supports the proposed assessment approach whereby the case for changing the standards or settings is dependent on the delivery of material benefits across a broad range of scenarios. A key area of focus for the Panel should be to evaluate the likely effectiveness of changes to the settings in incentivising investment in the resources needed to balance the system. The output of this analysis could help inform the Energy Security Board's (ESB) work on the design of a capacity mechanism.

Form of the standard

We do not think there is a need to change the form of the standard given the AEMC found in 2019 that the unserved energy metric (USE) remains appropriate in capturing high-impact, low probability events¹.

Level of the standard

There is no clear evidence to suggest that a change in the level of the standard is required. We note the effectively higher Interim Reliability Measure (IRM) has been introduced. While recognising the IRM is out of scope for this review, if there is a view that such a tighter standard is likely to be desired in the future, consideration should be given to the cost-effectiveness of relying on inherently expensive emergency reserve procurement arrangements to achieve it.

¹ AEMC, 'Enhancement to the reliability and emergency reserve trader', 2 May 2019, pg. 53-54.

Market settings

Origin considers there is a need to improve investment signals for flexible dispatchable resources such as long duration storage, that are required to complement renewables. However, the extent to which this can be achieved through changes to the reliability settings while also managing the associated trade-offs is unclear. A higher MPC could notionally strengthen investment signals by increasing revenue potential for market participants and incentivising more hedging by retailers to manage increased financial exposure. However, this may not resolve the fundamental uncertainties that make investment in dispatchable resources challenging, such as the adequacy of revenue to cover fixed costs (given increasing renewables penetration) and the outlook for demand.

It would be useful for the Panel to explicitly address the following factors when considering the merit/implications of changes to the MPC:

- how, and to what extent, an increase in the MPC would assist with resolving the key uncertainties that may impede investment in dispatchable resources as the market transitions;
- the level of change required to materially improve longer term investment signals; and
- the trade-offs associated with any increase to the MPC, including increased financial risk for retailers / market customers.

Origin supports the Panel considering whether the level/form of the MFP remains appropriate. We also note the proposal for technology specific or dual floor prices by Snowy Hydro.² However, it is important that the rationale for any proposed change, (and associated trade-offs) is clearly understood and evaluated.

Modelling

The Panel should exclusively apply five-minute modelling where possible rather than a hybrid approach that relies on a combination of 30 minute and five minute data. If it is determined that five minute modelling would be too computationally intensive, one option could be to undertake five minute modelling for a snapshot year or series of peak demand periods.

If you wish to discuss any aspect of this submission further, please contact Shaun Cole at shaun.cole@originenergy.com.au or on 03 8665 7366.

Yours Sincerely,



Steve Reid
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² Snowy Hydro, 'Rule change request – Dual-Floor Price – Transmission Access Risk', 20 December 2021.

1. Assessment approach

Origin generally supports the proposed approach for assessing whether changes to the standard or settings are required, which relies on demonstrating a clear case for change that would deliver material benefits under a broad range of scenarios. One of the key assessment criteria that will require detailed consideration in this respect is the impact of the reliability settings on investment in the National Electricity Market (NEM). This is particularly given the transition underway in the market, and the resources needed to balance the system.

Significant investment in additional capacity will be necessary to ensure the NEM remains secure and reliable as the market transitions toward higher penetrations of variable renewable energy (VRE). AEMO estimates over 60 GW of dispatchable firming capacity will be required by 2050, which includes approximately 45 GW of storage and 9 GW of gas-fired generation.³ However, as acknowledged by the Panel, there exists some uncertainty that is inhibiting further investment in generation capacity.⁴ In Origin's view, prospective investors face a heightened level of uncertainty around future revenue potential, largely due to the factors described below.

- *Changing market dynamics:* VRE directly impacts market dynamics, with increased output driving a greater prevalence of negative spot prices across some NEM regions. In South Australia where renewables penetration is already around 50 per cent, spot prices were negative 28 per cent of the time during Q4 2021, surpassing the previous quarterly high of 23 per cent.⁵ Given the expected growth in VRE, it will likely become increasingly difficult for dispatchable resources to predict the duration and frequency of higher prices, which is crucial to the recovery of fixed costs and the overall investment case.
- *Outlook for NEM operating demand:* The rapid uptake of distributed solar PV continues to reduce minimum operational demand across the NEM, with solar PV accounting for 40 per cent of underlying demand on Sunday 17 October 2021 at 1pm.⁶ SA operational demand in the middle of the day is also projected to potentially reach zero by late 2022.⁷ Coupled with ongoing energy efficiency improvements and uncertainty around the longevity of major industrial loads (some of which are dependent on government subsidy), the future level of operating demand to be served by the centralised system is unclear. This dampens the business case for investment in centralised dispatchable resources despite them being critical to reliability.
- *Investment in government sponsored projects:* Substantial investment in interconnection and other major projects are being progressed/considered. While increased interconnection is vital in managing a system with greater levels of VRE, it can also dissuade investment in dispatchable plant with an interconnector essentially serving as a competitor to native generation.

The Panel should remain cognisant of the above issues, and explicitly evaluate the likely effectiveness of changes to the reliability settings in incentivising the required level of investment. The output of this analysis should have some bearing on the Energy Security Board's (ESB) consideration of a capacity mechanism, the design and application of which, implies that the existing settings alone may not be sufficient in *ensuring* the required level of investment.

³ AEMO, 'Draft 2022 Integrated System Plan', December 2021, pg. 46.

⁴ Reliability Panel, '2022 Reliability Standard and Settings Review – Issues Paper', 27 January 2022, pg. 60.

⁵ AEMO, 'Quarterly Energy Dynamics Q4 2021', January 2022, pg. 16.

⁶ Ibid, pg. 8.

⁷ AEMO, "Minimum operational demand thresholds in South Australia", May 2020, pg.18.

2. Reliability Standard

Form of the standard

Origin does not consider there is a clear justification for revising the form of the standard at this time. As noted in the Consultation Paper, the reliability risk profile of the NEM is likely to change over time as the proportion of VRE increases, with reliability events increasingly driven by weather patterns rather than unplanned outages of large thermal plant. However, the AEMC recently assessed the adequacy of the unserved energy metric (USE) in capturing such high-impact, low probability events and determined it remained appropriate.⁸ The Commission also suggested the National Electricity Rules (NER) are flexible enough to accommodate changes in the reliability risk profile that may occur, given AEMO has flexibility and discretion as to how the reliability standard is operationalised.⁹

These findings aligned with supporting advice provided by the Panel, which affirmed that the best way to determine if there has been sufficient capacity investment to meet customer demand is to measure the extent to which all customer demand has been met.¹⁰ A volumetric measure of energy demand met, such as USE, therefore provides an optimal measure of the relative effectiveness of the NEM to meet customer demand.¹¹ In contrast, time-based measures such as loss of load probability (LOLP) and loss of load expectation (LOLE) provide information about the frequency of interruptions, but say nothing about actual volumes of energy not served.

The Panel notes a potential shortcoming of relying on the USE metric alone is that it may not provide sufficient information to the market on the characteristics of the USE events occurring within an annual period and by extension, the type of investment required to address them. There may be some merit in exploring whether such information could be provided to supplement AEMO's existing reporting on reliability. However, we do not consider the information is critical to facilitating investment in the *right* mix of technologies. This is because prospective developers typically base their investment decisions on detailed modelling of expected wholesale prices and operating patterns over the life of an asset, which should account for any variability in the supply/demand balance that could give rise to USE. A more relevant issue for the Panel to consider is therefore whether market price signals are sufficient to facilitate the type and level of investment required to support the changing reliability risk profile.

Level of the standard

Given the Australian Energy Regulator's (AER) estimate of the Value of Customer Reliability (VCR) has not materially changed in recent years, there is no clear evidence to suggest consumers are willing to pay for higher levels of reliability and by extension, that the current level of the standard is inadequate. However, as acknowledged by the Panel, it is difficult to determine a VCR that reflects the preferences of all consumers, which makes it challenging to rely on that figure as a single point of reference. Governments have also expressed a view that the value consumers place on reliability is higher than what the existing standard/settings are expected to deliver, as evidenced by the implementation of the NEM-wide Interim Reliability Measure (IRM).

We recognise the IRM is out of scope and intended to be temporary only. However, it would be useful for the Panel to explore the veracity of the analysis underpinning the IRMs implementation, which suggested there were demonstrable net benefits to tightening the reliability standard to between 0.0005 and 0.001 per cent of expected USE (for a region, averaged over a year).¹² Further, if there is a view

⁸ AEMC, 'Enhancement to the reliability and emergency reserve trader', 2 May 2019, pg. 53-54.

⁹ Ibid.

¹⁰ Reliability Panel, 'Reliability Panel advice on the Enhancement to the Reliability and Emergency Reserve Trader rule change', 28 September 2018, Pg. 3.

¹¹ Ibid, pg. 5.

¹² ACIL Allen, 'Reliability Standard – Economic Analysis to Support Review', Report to ESB, 6 March 2020, pg. ii.

that such a tighter standard is likely to be desired in the future based on the value governments/consumers place on reliability, consideration should be given to the cost-effectiveness of relying on inherently expensive emergency reserve procurement arrangements to achieve it. As noted by ACIL Allen when assessing the IRM, relying on reserve procurement to meet a tighter reliability standard is a second-best solution relative to revising the broader NEM standard/settings.¹³

3. Market settings

Origin agrees with the overarching principle that market settings should be set at the level required to support achieving the reliability standard at least cost for consumers. This requires parameters to provide strong operational and investment signals aligned with reliability expectations, while also minimising overall cost/risk for market participants and by extension consumers.

We generally consider the existing settings provide strong incentives for plant to make capacity available when required to support demand in operational timeframes. This is evidenced by the fact that historically, AEMO directions have predominantly been used for system security rather than to support reliability. The use of the reliability and emergency reserve trader (RERT) has also generally been limited to periods when temperature and demand are high, and all available capacity is being dispatched.¹⁴

As discussed above in Section 1, we consider there is a need to improve investment signals for flexible dispatchable resources that are required to complement renewables. However, the extent to which this can be achieved through changes to reliability settings while also managing the associated trade-offs is unclear. In contemplating changes to the reliability settings, the Panel should provide commentary on this issue supported by qualitative or quantitative analysis as appropriate. It is our expectation that this would then be a key input into the ESB's deliberations into the design and possible implementation of a capacity mechanism.

Market price cap (MPC)

The MPC is the primary lever for supporting investment in the energy only NEM, as it is designed to allow the marginal generator to recover long run marginal costs, with sustained periods of high pricing providing a signal for new investment. A higher MPC could notionally strengthen investment signals by increasing revenue potential for market participants and incentivising more prudent hedging by retailers / market customers to manage their increased financial exposure. However, such a change is unlikely to resolve the fundamental uncertainties that are likely to make investment in dispatchable resources challenging as the market transitions.

Even with a higher MPC, prospective investors in resources such as long duration storage would still be unsure of capturing sufficient high price periods to recover fixed costs given uncertainty around the duration and frequency of price spikes. This was acknowledged in recent analysis undertaken by NERA for the ESB which noted, *'even if a new generator could credibly earn the market price cap frequently enough to earn back its investment cost, these occurrences may be infrequent and random enough that they do not deliver assurances to satisfy lenders and investors that an asset is bankable.'* A retailer's willingness to enter into longer-term capacity contracts to support investment would also likely remain subdued given uncertainty around forecast retail load and the value of capacity as the market transitions.

It's possible the MPC could be increased to a level where the impact of any investment uncertainty is minimised, but this would likely require a substantial uplift and greater price volatility risk for retailers /

¹³ Ibid, pg. 39.

¹⁴ Reliability Panel - AEMC, *2021 Annual Market Performance Update*, 16 December 2021, pg. 14.

market customers. It is also unlikely governments / policy markets would permit the MPC to be increased to such a level, noting the MPC has historically been held well below the AER's estimated VCR.

Given the above concerns, it would be beneficial for the Panel to explicitly address the following factors when considering the merit/implications of changes to the MPC:

- how, and to what extent, an increase in the MPC would assist with resolving the key uncertainties that may impede efficient levels of new investment in dispatchable resources as the market transitions;
- the level of change required to materially improve longer term investment signals; and
- the trade-offs associated with any increase to the MPC, which would include increased financial risk for retailers / market customers and potentially an increased risk of price shocks for consumers in the event timely investment is not ensured.

Market floor price (MFP)

Origin supports the Panel considering whether the level/form of the MFP remains appropriate. We also note the proposal for technology specific or dual floor prices by Snowy Hydro.¹⁵ However, it is important that the rationale for any proposed change, (and associated trade-offs) is clearly understood and evaluated.

Given the increased prevalence of negative pricing in the NEM, increasing the floor price for VRE plant (as recommended by Snowy) would likely improve the ability of less flexible plant to remain online during high VRE periods and generally provide dispatchable plant with firmer access. However, the trade-off of this approach is that it could also weaken incentives for investment in more flexible technologies such as storage that derive revenue through arbitrage between low and high price periods. The need to rely on spot price signals to ensure sufficient levels of base-load plant remain online to support system security would also be reduced in circumstances where essential system services are adequately defined and procured through separate arrangements.

Origin does not consider there is a material justification for introducing a negative CPT. The role of the CPT is to protect market participants in circumstances where there may be no spare capacity available to ramp up in the event of a major supply failure, irrespective of price. This is not relevant in the context of negative pricing periods, given the supply-side always has the ability to ramp down in response to low prices, accepting that the costs of doing so are different across individual providers. Consistent with our comments above, a negative CPT may also undermine the utilisation and economics of storage by reducing arbitrage potential.

Cumulative price threshold (CPT)

As with the MPC, increasing the CPT could notionally improve investment signals by increasing revenue potential for resources and encouraging more prudent hedging by retailers. However, such a change may not necessarily improve the level of investment certainty for prospective resources and would heighten market participants' financial exposure to sustained high prices. The case for change is also highly dependent on the interaction between the CPT and MPC, noting an increase in the MPC would have a direct impact on the efficacy of the CPT in limiting market participant risk.

Origin generally considers the current seven-day time period against which the CPT is assessed to be appropriate. However, an issue that should also be considered by the Panel is whether the increasing

¹⁵ Snowy Hydro, 'Rule change request – Dual-Floor Price – Transmission Access Risk', 20 December 2021.

prevalence of negative pricing may impact the effectiveness of the CPT as a risk management tool. For example, it is possible the application of administered price periods (APPs) could be delayed if a significant number of negative price periods occur over a period of six days and precede a major supply shortfall/demand event. One option to address this would be to exclude negative prices from the CPT calculation. However, the appropriateness of such a change would need to be weighed against any potential diminution of investment signals, particularly for storage resources.

Administered price cap (APC)

The APC is not a material factor when assessing the economics of new investment. We also consider the current level of the APC (\$300/MWh) to be appropriate, as it aligns with the ASX cap price and therefore ensures capacity providers are incentivised to operate during APPs to defend their contract position and support reliability.

Notwithstanding the above, Origin agrees consideration should be given to the impact of the APC on incentives for demand response, noting the Panel's observation that it can lead to large amounts of demand response load switching back on due to the lowering of the market price, potentially exacerbating any reliability issues.

4. Modelling for the review

Origin broadly supports the proposed modelling principles and high-level design approach. Our views on some of the specific issues being considered by the Panel are noted below

- Modelling resolution: Origin considers the Panel should exclusively apply five-minute modelling where possible rather than a hybrid approach that relies on a combination of 30 minute and five minute data. As noted in the Consultation Paper, time sequential modelling of price and dispatch outcomes at a five-minute resolution is crucial to capturing potential differences in revenues accruing to highly flexible resources relative to less flexible thermal generation. This then provides for a more accurate assessment of the investment case for different firming technologies. 30-minute modelling could underestimate the value of more flexible technologies such as storage in circumstances where there is sudden price spike within a five minute period (e.g. due to an unexpected reduction in VRE output).

If it is determined that five minute modelling would be too computationally intensive, one option that could be adopted is to undertake five minute modelling for a snapshot year or series of peak demand periods. This would assist with capturing the characteristics of different firming technologies without significantly increasing modelling complexity.

- Frequency Control Ancillary Service (FCAS) revenue: We agree the Panel should undertake fully co-optimised modelling of both energy and FCAS markets, given revenue from FCAS can materially impact the economics of battery storage in the NEM.
- Reference case and scenarios: In establishing the level of available supply under a reference case, the modelling should account for both committed and expected changes to generator capacity. This should include capacity to be delivered under legislated targets such as the New South Wales Government's *Electricity Infrastructure Investment (EII) Act*. A separate scenario can then be applied that assesses the impact of delays to new entry, which will be important in understanding the potential impact of investor uncertainty. In the event capacity expected to be delivered under legislated targets is excluded from the reference case (i.e. due to it not being committed), this would lead to overly conservative estimates of expected USE, particularly when alternate scenarios are applied that further reduce the level of supply.

- Sensitivity analysis: Sensitivity analysis should be appropriately calibrated to each scenario such that it reflects an outcome that could reasonably be expected to eventuate under certain circumstances. For example, in testing the impact of higher forced outage rates on the output of thermal generation, a lower weighting may need to be applied to that sensitivity under a heat wave scenario where outage rates are already likely to be higher relative to the reference scenario.
- Modelling new entrants: Origin agrees the modelling should be undertaken on a technology neutral basis and assume multiple potential new-entrant technology options, including stand-alone and hybrid renewable / storage resources. To the extent there are challenges in modelling the level and nature of new entrant price responsive demand as a supply-side resource, we agree a simpler approach may be to consider the sensitivity of demand response to different possible levels for the MPC.