10 February 2022

Ms Anna Collyer
Chair
Energy Security Board

Lodged via the ESB website

Dear Ms Collyer,

Submission to Capacity mechanism Project Initiation paper

The Clean Energy Council (CEC) is the peak body for the clean energy industry in Australia. We represent and work with hundreds of leading businesses operating in renewable energy and energy storage along with more than 7,000 solar and battery installers. We are committed to accelerating the decarbonisation of Australia's energy system as rapidly as possible, while maintaining a secure and reliable supply of electricity for customers.

In particular, we are focussed on developing regulatory frameworks to support efficient investment in the large number of new renewable generation and storage projects that are needed to deliver secure, reliable and zero emissions energy for consumers.

The CEC welcomes the opportunity to comment on the ESB's Project Initiation paper for the next stage of the capacity mechanism reform project.

Any changes to these frameworks must be assessed in light of how they impact efficient investment in renewable generation and storage. The scale of the investment challenge in the NEM is extraordinary; under the most likely Step Change scenario, AEMO is forecasting a ninefold increase in required capacity, with 170,000MW of renewables and storage to be connected to the NEM by 2050. These numbers are even larger if the more ambitious hydrogen superpower scenario eventuates.

Any change to the regulatory frameworks must be assessed in terms of how it will help or hinder the investment needed to deliver this transition. The effectiveness and efficiency of this investment process will be central to delivering a reliable supply of low cost, low carbon energy to customers.

The CEC urges the ESB to exercise caution when considering these capacity mechanism reforms. While we agree with the need to support efficient investment in new renewable generation and storage, this is best enabled through a stable and predictable regulatory environment. This means that substantive changes to the regulatory frameworks only occur where it can be proven that this is necessary to address a clear and material problem.

With this in mind, the ESB must do more work to describe and quantify the reliability challenges it believes may emerge. While previous papers published by the ESB provide qualitative discussion about risk appetites and supposed barriers to investment over the longer term, this remains qualitative in nature and is not backed by any substantive evidence, or a description of the specific physical problems that may create reliability issues in the longer term.

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Similarly, the ESB must recognise the impossibility of designing a single capacity mechanism that can both provide certainty around the exit of thermal coal generation, while supporting early investment in new renewable generation and storage to replace that capacity. These two objectives are fundamentally incompatible and must be addressed through separate mechanisms. More generally, as highlighted throughout this submission, we consider it to be physically impossible for the ESB to design a single capacity mechanism that meets all of the principles set out by Ministers. This highlights the need to separate out the two key drivers of any new mechanisms, and develop them to be commensurate to the problem identified and to minimise regulatory complexity.

We look forward to working with the ESB to consider the full suite of measures to support efficient investment outcomes. However, a lot of that work falls outside of the current scope of the ESB's capacity mechanism design, particularly reforms to support investment in energy storage and improvements to the connection process. The CEC is keen to work further with the ESB, AEMO, the AER and the AEMC to progress work in these areas, which we believe are far more likely to support better outcomes in terms of efficient investment in renewable capacity.

Minimisation of regulatory complexity and uncertainty

As highlighted previously, the current environment for investment in renewable generation and storage is already complex and uncertain. Investors have to navigate an increasingly complex and changeable regulatory environment, in addition to the already challenging processes of project planning and financing.

Policy makers must therefore present a clear and unarguable rationale for regulatory change, in terms of striking the correct balance between benefit and increased complexity for investors.

The ESB should adopt a staged approach to the introduction of any capacity mechanisms. This should begin with assessment of a clear problem definition, that draws on both market and power system modelling, to identify any emerging reliability challenges.

If a problem can be clearly identified, the ESB should then assess solutions in terms of their regulatory complexity and likely cost/benefit impact for investors. This must start with assessing whether existing reliability frameworks can be minimally adapted to meet any identified reliability challenges. The ESB should only then consider the introduction of more complex mechanisms once it has been proven that small tweaks to existing frameworks cannot deliver.

Our submission describes this approach in more detail. The CEC looks forward to working collaboratively with the ESB to understand any emerging challenges to reliability, and what can be done to manage these challenges while minimising regulatory complexity for clean energy investors.

What is the problem?

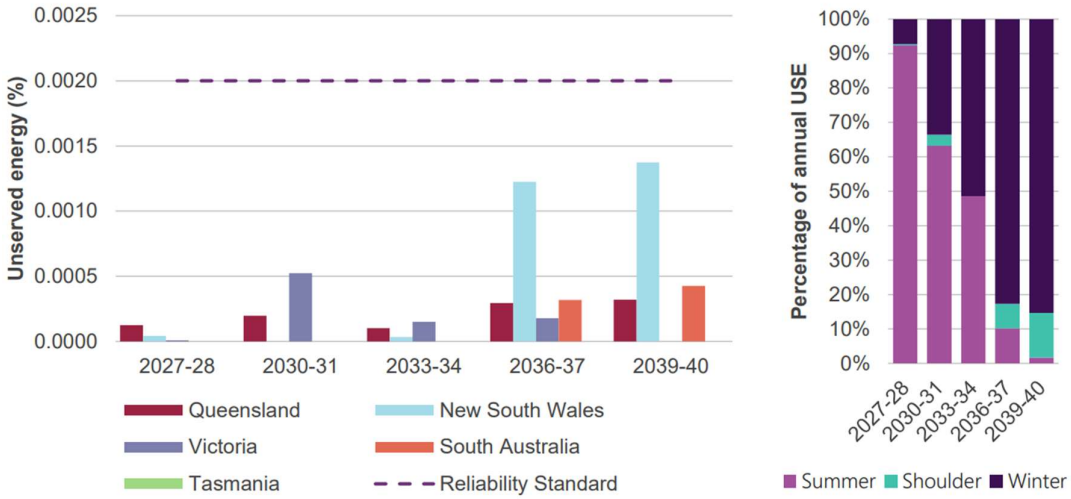
As the ESB has itself acknowledged, AEMO's analysis has not found any clear near term reliability problem under existing frameworks. Expected investment in new thermal projects, coupled with the much larger capacity pipeline of renewable generation and storage, means no obvious reliability shortfall is projected to occur in the NEM over the next decade. [1]

Further analysis from AEMO set out in the Draft 2022 ISP has further examined the potential for any reliability shortfalls out to 2040. This analysis, based around the ambitious Step change scenario, shows no breach of the reliability standard out to 2040. It does however demonstrate a changing seasonal distribution of the incidence of USE, with more USE in the winter months. This goes to the discussions

[1] AEMO, 2021 Electricity Statement of Opportunities, pp.6-8

of the changing drivers of reliability challenges as the generation mix changes, as set out later in this submission.

Figure 9 **Forecast expected unserved energy in *Step Change* Scenario (left) and seasonal share of NEM-wide reliability events (right)**



Soirce: AEMO, *2022 Draft Integrated System Plan*, Appendix 4, p.12

However, the ESB has pointed to longer term reliability issues, associated with participants not having 'sufficient incentive to manage long-term capacity risk'.[2] The ESB then suggests that this is also associated with the rapidly changing nature of the power system, and the difficulty in assessing risk.

The arguments made by the ESB in these earlier documents are not unreasonable; the degree of uncertainty currently affecting energy markets is significant. Physical changes in the system are creating new risks, which participants are learning to manage. However, its also true that adding yet another market reform to the mix, on top of other significant changes such as five minute settlement and access reform, can itself actually create new risks to manage, by increasing the degree of regulatory complexity and change faced by participants.

With this in mind, its imperative the ESB and Reliability Panel undertake further detailed analysis to identify and quantify the nature and extent of any such challenges to efficient investment, and any associated reliability problems, beyond those that AEMO has not been able to identify in its ESOO and ISP.

We suggest this work should begin with an unpacking of the key physical changes in the system, with a view to understanding whether and how these physical drivers might create challenges and unmanageable risks for participants, thus hindering efficient investment and creating reliability problems.

It's encouraging to see the ESB acknowledging the importance of these physical drivers, and their relationship to risk, investment and reliability. Section 5.1 of the ESB's paper goes some way to articulating the nature of some of these issues, by exploring the nature of the 'at risk periods'. This work must be continued, with more detailed qualitative and quantitative description of the nature of these risks and associated reliability challenges.

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[2] ESB, Post-2025 Market Design Final advice to Energy Ministers Part B, p.19.

In particular, we encourage the ESB to consider whether traditional peak demand periods will remain the main challenge to reliability. Further work is needed to explore whether other kinds of challenges to reliability are emerging, such as intra day ramping, seasonal VRE availability and the challenges associated with minimum demand. This will steer the ESB towards mechanisms that are more appropriately tailored, and which can minimise unintended consequences.

With this in mind, its also encouraging to see that the ESB has committed to working with the Panel through the RSSR process. The Panel's review is the appropriate vehicle where the detailed modelling can be undertaken to firstly identify the nature of these emerging changes and risks, and secondly to explore how participants may respond to them through the existing reliability frameworks. As a body that includes industry membership, the Panel is also well placed to foster a more collaborative approach to examining this issue.[3]

What kind of capacity do we actually need?

Having identified the physical changes in the system, the ESB should then clarify what kind of capacity will actually be needed to manage these changes in a future power system.

Historically, capacity mechanisms have been simply focussed around the delivery of megawatts, without much consideration given to their relative 'flavour'. Given the rapid changes underway in the power system, more thought is needed in terms of exactly what kinds of MW will be needed, to meet what kinds of challenges.

For example, if analysis demonstrates emerging reliability risks associated with daily demand volatility (such as from diurnal ramping), then capacity definitions should be refocussed around flexibility of response. The kind of capacity needed to meet this kind of reliability issue is probably of short duration, with an ability to go from zero output to maximum in a short amount of time.

Similarly, if the reliability issue is that of seasonal, or HILP dunkelflaute type shortfalls, then capacity definitions may need to be focussed around overall energy availability. The kind of capacity needed to meet this kind of reliability issue is of longer duration, with an ability to sustain a shaped volume of energy for a prolonged period.

It's worth noting that AEMO has undertaken detailed analysis of the potential for dunkelflaute events to drive reliability issues in the Draft 2022 ISP. In its analysis, based on a detailed historic 10 year weather data set, AEMO has found that dunkelflaute events tend to be localised, with a lesser risk of more widespread NEM events. AEMO also identifies that technological and geographical diversity of renewable assets described in the Step change scenario go some way to managing the risks associated with these events.[4]

Finally, and probably most relevant to the NEM today, reliability risks may actually be based around minimum demand limits. These risks may arise if there is insufficient storage capacity to 'soak up' some of the excess energy during minimum demand periods, triggering shutdowns of thermal coal generators that may then not be available when needed in later higher demand periods. Storage capacity is likely to be needed to manage these kinds of reliability issues in the near term.[5] As such, the ESB should give

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[3] The CEC notes that AEMO's recent ISP includes significant detail on weather patterns and likely generation investment, which can be used to effectively model reliability outcomes in a high renewables future, through the RSSR process. The CEC will continue to work with the Reliability Panel to ensure that sufficient quantitative rigor is brought to bear on these problems through the RSSR.

[4] AEMO, *2022 Draft Integrated System Plan*, Appendix 4, p.13

[5] The CEC notes that such a solution must only be a short term fix. More sustainable outcomes will be associated with breaking the nexus between synchronous thermal coal unit commitment and maintenance of system stability.

consideration as to whether investment should be supported in storage capacity, which can also obviously help address reliability issues associated with ramping and seasonal availability.

Is a capacity mechanism about retaining old capacity, or bringing in new investment?

The ESB should reconsider its description of what a capacity mechanism is designed to do. A key part of this problem definition must be to separate out two key components:

1. providing greater certainty through a controlled exit of existing thermal coal and gas plant; and
2. incentivisation of investment in new renewable generation and storage capacity to address the specific reliability issues identified

These are two very different objectives, and as we have identified previously, it's unlikely that any single mechanism can achieve both outcomes. Capacity payments to delay the exit of thermal generation can only act to in turn slow down investment in necessary new renewable capacity.

It follows that the ESB must consider whether separate mechanisms should be developed to address 1 and 2 above. We also consider that this would be consistent with the principles set out by Ministers.

The ESB should firstly note point 8 of the principles set out by Ministers, which states that any capacity mechanism must "provide greater certainty around closure dates of exiting generation". It is not clear how either of the proposed centralised or decentralised capacity mechanisms can meaningfully meet such an objective. While some form of targeted bilateral contract for managed closure with individual generators might drive this outcome, it is unlikely to occur through the functioning an open 'market' for capacity certificates. Such a mechanism, by its very nature, means that owners of thermal coal and gas assets retain absolute discretion as to when they will retire these assets. While the presence of additional revenue streams from a capacity market may impact this decision, it provides governments and consumers with no certainty as to how and when thermal asset owners will retire those assets.

Secondly, the ESB should then note Principle 13, which states that the mechanism must 'enable jurisdictions to opt out, via the National Electricity Law framework'. For the reasons set out above, it appears unlikely that a single capacity mechanism can provide meaningful certainty around closure dates of thermal generation. This is probably the key political driver for most jurisdictions, having observed the energy price impacts of the unexpected exit of the Hazlewood thermal coal generator in March 2017. It follows that this lack of certainty is very likely to trigger jurisdictions opting out of the entire mechanism.

This in turn creates a marked risk of general inefficiencies, with multiple reliability and capacity schemes operating across region boundaries - which would be inconsistent with both principle 7 (to ensure sharing of resources across the NEM by supporting inter-regional contracting) and the more general principles 1 and 2 (be consistent with the National Electricity Objective; and focus on affordability, reliability, security, and continued emissions reduction of electricity supply).

For this reason, we consider that development of a single mechanism to try and address these two fundamentally different objectives is entirely inconsistent with the principles set out by Ministers.

More generally, it is also worth noting that AEMO has predicted thermal coal exit may happen markedly faster than even the relatively conservative projections set out in the Step change scenario. Noting that recent years have seen thermal coal units bring forward exit timeframes, AEMO advises that assumptions that thermal coal exits will progress in accordance with current schedules is optimistic.[6] As noted below, it's likely that the time taken to design and implement a capacity mechanism will be

[6] AEMO, 2022 Draft Integrated System Plan, Appendix 4, p.4

substantial. The CEC therefore considers a key risk to the ESB's approach is that by the time any capacity mechanism has been designed, politically processed and then implemented by market participants, many of the coal exits it is theoretically designed to address may very well already have happened.

Finally, given the extreme financial pressures that thermal generation assets are likely to face in coming years, the necessary strike price of any capacity certificate will become correspondingly extreme. The cost of these certificates, which will be passed through to consumers in their entirety, are therefore unlikely to represent good value - especially as they are unlikely to drive improved reliability outcomes, or provide greater certainty as to dates of closure.

The CEC considers that more targeted mechanisms may be appropriate to address this risk of uncontrolled thermal generator exit. In particular, the ESB must carefully consider this through the orderly generator exit contracts.

The ESB should focus on the physics of the transition, and the rate at which these physical transitions are likely to occur, when identifying the key challenges to reliability. This will help to appropriately tailor any necessary regulatory interventions. As we have described above, this will ensure that increases in regulatory complexity are kept to a minimum, while also supporting reliability of supply for customers.

What is the appropriate solution?

The ESB must assess any new solutions in light of minimising increases in regulatory complexity for participants. In practice, this should translate to the ESB assessing potential solutions as a 'ladder', beginning with assessment of the existing reliability mechanisms, and then considering more complex approaches.

The Reliability Panel's current Reliability Standard and Settings review (RSSR) should therefore be the starting point for the ESB's consideration of mechanisms to enhance reliability. Through this review, the Panel and ESB should give consideration to the physical drivers of any reliability challenges, and whether changes to the existing frameworks can manage any identified challenges.

This should include consideration of the full suite of potential changes to the existing reliability standard and settings, and how this might support investment in new renewable capacity to enable improved reliability outcomes. In particular, the Panel and ESB should assess whether changes to the cumulative price threshold (CPT) could form an appropriate mechanism to support needed capacity. Relaxing the frequency with which the CPT binds will create new contracting incentives, which will reduce investment risk and support the kinds of capacity needed to meet specific reliability challenges. Such a change to the CPT also defuses some of the political sensitivity associated with changes to other reliability settings, particularly increases in the market price cap (MPC).

More generally, the Reliability Panel's analysis in the 'base case' must consider as wide a range of scenarios as possible, when testing the capabilities of the existing reliability mechanisms to deliver needed capacity to maintain reliability. This should include all the various permutations of changes to the MPC, CPT, MFP and APC, as well as all the various inputs, such as technology costs and detailed weather data.

To be clear, the CEC is not suggesting that changes to the reliability standard or settings necessarily represent 'minor' regulatory adjustments. On the contrary, increases in the MPC or CPT are likely to trigger participants to reassess their contracting and investment strategies, which is itself a complex exercise. The ESB and Panel must therefore carefully weigh the nature of any identified reliability challenges against the regulatory implementation costs stemming from any changes to the standards or settings.

The ESB has identified various other capacity mechanisms that could be adopted. At this stage, the CEC doesn't consider a clear case has been made for introduction of these other more complex mechanisms. Given the significant regulatory complexity associated with all of the models proposed, we haven't yet seen evidence to suggest that either a centralised or decentralised capacity mechanism is warranted at this time.

Having said this, the ESB should consider the following, if and when it decides to progress development of these mechanisms:

Participants should retain as much capability as possible to manage their own risk: A central element of NEM design is that risk is borne by private investors, who are best placed to assess and manage that risk. In the context of any capacity mechanism, this translates to a preference for more decentralised mechanisms over more centralised options.

Of course, in practice there may be little difference between the so called 'centralised' and 'decentralised' models proposed in the ESB's paper. In the end, even decentralised mechanisms will require a central agent to determine factors such as derating methodologies, plant eligibility and penalty factors, all of which are fundamental to the design of the scheme. The degree to which individual participants therefore have much freedom to manage their own risk exposure may not differ much between these two types of mechanism.

Impacts on wholesale / contract markets must be avoided: Some of the commentary from the ESB on page 25 of the paper is concerning, particularly references to "prevent[ing] generators (or demand response providers) being paid 'twice' for their capacity, there may need to be recalibration of the reliability settings (such as the market price cap)."

The ESB should note here Principle 4 agreed by ministers, that the capacity mechanism must "complement existing energy only market design and well-functioning markets for financial contracts…"

Any reduction in the MPC or CPT can hardly be described as complementing existing energy only markets, and it will most certainly not support good outcomes in contract markets. Secondary contract markets can only function effectively where there is certainty around key parameters of the underlying spot market design. The risk of an arbitrary regulatory intervention that fundamentally shifts the entire underlying spot market is therefore not conducive to maintaining that effective function.

Any reduction in the MPC or CPT will have significant implications for participants, and will undermine the value of existing assets. This will have the contrary effect to that desired through introduction of the capacity mechanism, in that it can only act to reduce investment in new capacity (as well as reducing value of existing assets).

Any reduction in the MPC or CPT may also result in an unwinding of existing contracting positions, which is itself a difficult and complex process.

Consideration of carbon uncertainty on efficiency of investment: One of the key uncertainties that is negatively impacting on the investment environment is a lack of national carbon policy. Despite commitments to 'net zero' by 2050, there is still insufficient clarity as to how Australia will decarbonise its economy in a manner consistent with limiting climate change to levels below a 1.5 degree increase.

Ministers have instructed the ESB to consider the degree and speed of emissions reduction that must occur in the NEM, by requiring the ESB to take into account the fact that "Australia's Emissions Projections 2020 report anticipates emissions reductions in the NEM of approximately 50 per cent on 2005 levels by 2030, driven by increased levels of renewables and the closure of coal-fired generation, with further reductions expected beyond 2030." Further to this, the second principle set out by the Ministers requires the ESB to "focus on affordability, reliability, security, and **continued emissions reduction of electricity supply**".

It follows that any design of a capacity mechanism must be designed around this central reality of a rapid NEM decarbonisation. As mentioned above, this is relevant to splitting the two 'halves' of the capacity problem – the controlled exit of thermal coal, and the entry of new renewable capacity. It suggests that the sheer speed of NEM decarbonisation makes a new capacity mechanism manifestly incapable of controlling the exit of coal, as this exit will happen faster than the time necessary to implement a new capacity mechanism.

It's also worth noting that the ESB cannot satisfy both Principle 2 (focus on affordability, reliability, security, and **continued emissions reduction** of electricity supply) and Principle 11 (…be technology neutral…). The only way to ensure a continued reduction in emissions is to actively favour and promote investment in new renewable generation and storage technologies, ahead of any activities to maintain profitability, or even drive new investment, in high emissions technologies.

As an independent body, the ESB should show leadership and do what is needed to address this uncertainty. This could include factoring in an emissions intensity target into any capacity mechanism design. Such an approach would be consistent with achieving the goals stated above. It would also go a long way to addressing investor uncertainty.

Timeframes for implementation: The scope of issues identified in the ESB's paper highlights the extreme complexity associated with the introduction of any new capacity mechanism. Given the time needed to address this regulatory complexity, plus a likely long lead time for implementation - in terms of new AER and AEMO processes, as well as participants having to reconfigure their investment and operational strategies – it seems unlikely that a new capacity mechanism can be brought into being in a timeframe where it will have a meaningful effect.

Specific design elements – derating decisions: The discussions on page 19 are encouraging, in that they demonstrate the ESB addressing some of the more thorny issues associated with actually making a capacity mechanism work. Our preference in regards to how derating should be applied is that detailed modelling will be preferable to any 'rule of thumb' approach. This is particularly important given the stochastic nature of aggregate wind and solar generation output, which is not readily applicable to simple rule of thumb approaches to determining availability.

Derating decisions must also be carefully applied to hybrid plant. Putting aside challenges with connection processes, its likely that an increasing number of generators connected to the NEM will be of hybrid design. A key feature of hybrids is that they allow the operator greater control over output, and mean that there is a greater degree of certainty as to the output of the plant. For this reason, any derating criteria should reflect the capability of the hybrid plant to control this output, rather than applying a simple rule of thumb derating to the wind or solar component of the plant.

Specific design elements – AEMO discretion to determine demand curves: The discussion on page 21 highlights the importance of transparency and certainty around how AEMO goes about determining 'demand curves' for capacity. As identified by the ESB, the shape of the demand curve can be used to achieve various policy aims.

For this reason, its critical that AEMO be subject to some form of standardisation when determining this demand curve. As with the existing reliability standard, or other operational standards like the system restart and frequency operating standards, these standards guide and restrict how AEMO goes about procuring system services and ensures that efficient volumes are procured.

If you would like to discuss any of the issues raised in this submission, please contact me at czuur@cleanenergycouncil.org.au.

Yours sincerely,

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