Energy Security Target Consultation
Dept of Planning, Industry and Environment
NSW Government

22nd June 2020

Submitted by email to: energysecurity@environment.nsw.gov.au

Energy Security Target and Safeguard Consultation Paper

The Australian Energy Council (AEC) welcomes the opportunity to make a submission in response to the NSW Government's Energy Security Target and Safeguard consultation paper.

The AEC is the industry body representing 24 electricity and downstream natural gas businesses operating in the competitive wholesale and retail energy markets. These businesses collectively generate the overwhelming majority of electricity in Australia, sell gas and electricity to over ten million homes and businesses, and are major investors in renewable energy generation.

Energy Security Target

1. *Is the approach to assessing firm capacities from generators, interconnectors and demand response used to meet the EST reasonable and appropriate? Is there an alternative approach?*
2. *Is the approach to applying the capacity factors for wind and solar generators reasonable and appropriate?*
3. *Are AEMO's maximum demand forecasts appropriate for use in determining the EST? Should alternatives be considered (e.g. TransGrid's forecasts)?*
4. *How often should EST updates be published?*
5. *Are the entities required to provide information to the EST register that are listed above suitable and adequate?*
6. *Is there other information that should be provided for the register beyond that listed above?*
7. *Are the types of projects that may contribute to meeting the EST described above suitable and adequate? How could prospective projects, beyond those identified as committed, be considered within the EST forecast for firm capacity?*
8. *Many market participants already have requirements to report to AEMO or other market bodies. Where do you consider there may be overlap with these existing requirements that the NSW Government could leverage to ensure industry does not need to report twice? Are there other ways the NSW Government could obtain this information?*

In response to question 1, the AEC considers that the NSW should not impose an Energy Security Target, which is explained below. Questions 2-8 then become extraneous.

Existing market mechanisms and possible reforms to underpin investment for NEM reliability

The existing NEM has multiple mechanisms towards achieving reliability in NSW:

- Market settings, such as the wholesale price caps, are set at a level that is theoretically intended to provide sufficient return for enough dispatchable plant to be invested to achieve the reliability standard.
- The Retailer Reliability Obligation (RRO) ensures that retailers selling electricity to NSW customers have sufficient contract supply to meet their expected peak demand. This then in turn provides incentive for generators to build reliable plant to that contract level plus a reserve margin to cover their own outages.
- Safety-nets, such as the Reliability and Emergency Reserve Trader (RERT), where, if the above processes still fail to meet the standard, AEMO may contract for additional reserves held out of the market.

Thus the market already has robust arrangements to underpin reliability. Whilst the AEC sees no reason they are likely to fail, there is, quite reasonably, an open question as to whether the above multiple processes are the most cost-effective way of achieving reliability as the NEM transitions. Some other electricity markets

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employ quite different mechanisms. As such, this question is directly investigated and addressed in the Energy Security Board's (ESB) Post-2025 market design review, specifically its Resource Adequacy stream.

To the extent that the NSW government is unconvinced of the NEM's reliability mechanisms, the AEC urges it to present these views into the ESB process rather than apply unique arrangements in NSW.

Intra-state assessment

The AEC does not support the State Government applying its own approach to determining an adequate level of reliability within the region. Such an approach is in conflict with the National Electricity Market (NEM) structure which has delegated responsibilities for determining the appropriate standards to the Reliability Panel, and their operationalisation to the Australian Energy Market Operator (AEMO).

These bodies have the appropriate skills to determine the correct trade-offs between the cost of supply against the cost of the inconvenience of customer interruptions. They also have the powers to either:

- Set market settings such that the market provides adequate financial incentives to achieve these standards, and
- Have the powers to intervene, as a last resort, where those standards are breached. These interventions occur in a transparent manner, and use intervention pricing to avoid dulling market signals, which would compound the problem.

Power system reliability can only be sensibly forecast and managed by taking a whole of grid approach, i.e. by observing and managing the NEM as a whole. Intra-state analyses are fraught – for example the ability to rely on interconnectors is dependent on:

- The existence of spare capacity on the other side of that interconnector, which requires:
    - analysing the supply/demand balance in each region, and
    - the diversity of demand peaks and renewable energy troughs.
- The performance of the network on either side the state border that forms the concept of an interconnector. For example an importing interconnector's capacity is subject to:
    - the operation of network assets in other states, and
    - the dispatch patterns and availability of generation on each side.

It is only meaningful, and indeed simpler, to assess reliability simultaneously across the NEM using the sophisticated tools such as AEMO's Medium Term Projected Assessment of System Adequacy (MTPASA).

Deterministic Forecasting

The standard being proposed is a legacy deterministic standard similar to that used by the Electricity Commission of NSW prior to NEM start in 1998. Since then the NEM has targeted an output-based measurable quantity of unserved energy (USE). This has been the preferred and more accurate approach to power system reliability assessment since computing power made probabilistic forecasting feasible. It is now standard practice in good power system engineering.

Deterministic reserve margins require gross simplifications of inherently probabilistic concepts, such as:

- the variability of demand,
- diversity of demand between regions, and
- the stochastic failure rate of conventional units.

More recently however the stochastic availability of wind and solar and the energy limits of storage are making deterministic approaches unworkable.

AEMO recognised this in 2016 and discarded the last of their deterministic reliability assessments. They now purely assess reliability through direct probabilistic simulation in all medium and long-term timeframes. In this they were guided by an Ernst and Young consultancy which identified in relation to the then deterministic medium-term calculation:

> *Due to the use of Minimum Reserve Levels and the inability for the deterministic MTPASA reliability solve process to properly account for intermittent generation, the current reliability assessment process is not able to produce accurate or consistent projections of reliability. Therefore is should not*

be relied upon for the purpose. Instead, AEMO should rely on its probabilistic models for reliability assessment.[1]

Deterministic forecasting can appear attractive as a superficially simple and explainable calculation. This is false simplicity – the reader is only the seeing the final calculation that hides great complexity and assumptions in the preparation of its inputs. For example, the generator and wind reliability factors require complex simulations and assessment in themselves, and by forcing a one-dimensional capacity figure into the final calculation, introduce great error. It is in fact simpler to avoid the assumption entirely by directly simulating the plant performance within the one calculation. This is what AEMO now perform.

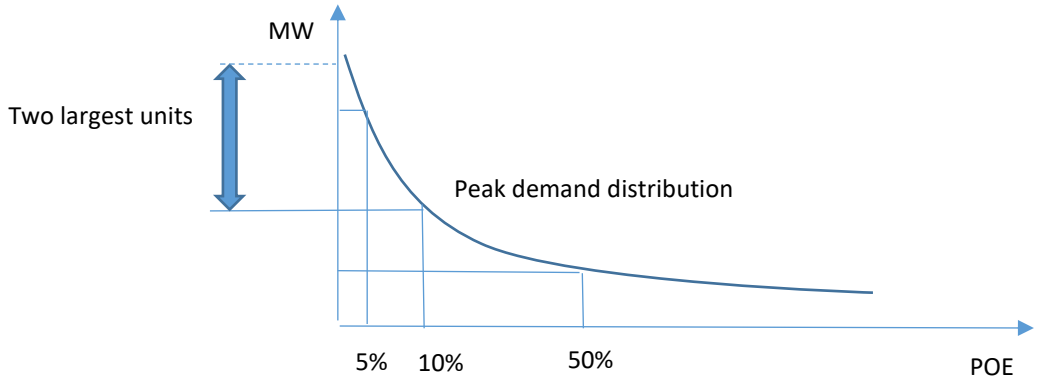
As Ernst and Young noted in respect of directly employing probabilistic forecasting:

The proposed alternative is practical, addresses current concerns and is resilient to a wide variety of future changes. It is consistent with the kind of model that many markets have or are moving towards elsewhere in the world. [2]

In contrast, the NSW Energy Security Target is proposing to revert to a superseded form of assessment.

Reserve Margin

"Two largest units" is a deterministic, event based concept, which is being placed above a point in a probabilistic distribution of possible demand outcomes. It is not meaningful to mix deterministic and probabalistic concepts in this way.



The proposed reserve margin appears to have a comforting physical basis by having a linkage to the two largest units. But, as shown above, when used in the way proposed it has no such basis because it is anchored from a point arbitrarily selected from an infinite distribution of possible demand. Why, for example, choose the 10%POE for this anchor, rather than, say, the 5% or the 50% POE demand?

And why use the two largest units? Consider if the power system were instead comprised only of 1MW units: Whilst such a system would naturally be more reliable, the reserve margin to achieve the same customer outcome would clearly not be 2MW.

Level of Standard

The "two largest units above 10% POE" criterion appears to have been drawn from the criterion which was used prior to the NEM by the Electricity Commission of NSW for the planning of its power stations. This led to contemporary criticism of over-investment in NSW plant and was in fact one of the justifications for the introduction of Australian electricity markets.

Following the introduction of the NEM, the reliability panel promulgated the 0.002% unserved energy target which it showed as achieving the correct economic balance between the cost of supply and the cost of the

[1] https://www.aemo.com.au/-/media/Files/Electricity/NEM/Data/MMS/2016/EY-MTPASA-Final-Report-2016-11-23C.pdf
[2] Ibid.

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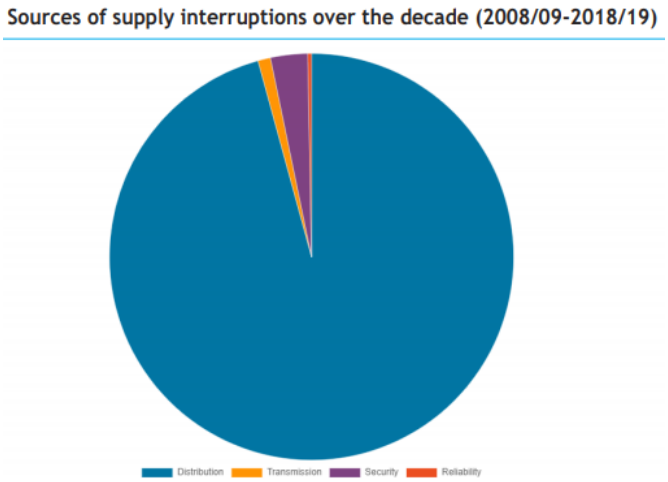
customer interruption. As the first versions of MTPASA, inherited from the pre-NEM arrangements, required application of a reserve margin from a 10% POE forecast, the system operator calculated what this margin should be to approximate 0.002% unserved energy. In 2011, this was determined for NSW to be *minus* 1218MW[3].

Whilst it seems superficially risky to have less plant than necessary to meet the peak demand, this result is appropriate and explainable. The 10% POE demand occurs only once in ten years, and only for a handful of hours: a "needle peak". Customers are best served, over the long run, by not paying to meet the tip of the needle. The resulting load interruption is still less than two in one hundred thousand units of energy demanded.

And this amount of customer interruption is insignificant compared to the other sources of interruption that customers will, predominately events in the distribution network. The following chart shows the relative causes of actual load interruption in the NEM. The only slice of the pie that can be reduced by the Energy Security Target is the Reliability slice, which comes to some 0.3%. Thus, the benefits of a considerably more conservative standard as is now being proposed in NSW will be entirely un-noticeable to customers.



Source: Reliability Panel Annual Market Performance Report 2018-19

The Energy Security Target's proposed level of reserve is inefficiently excessive. The market settings, set by the Reliability Panel, attempt to achieve only the efficient level of supply, i.e. that necessary to achieve 99.998% reliability, and by design are intended to discourage inefficient investment beyond that level. Thus, the NSW Energy Security Target seems destined to be breached, and therefore will present the NSW government a dilemma to explain why an otherwise quite functional market is breaching the government's own target. It will feel obliged to intervene, despite that target having been derived without a scientifically defendable basis.

Worse, investors will anticipate exactly this outcome, such that any investments that they might have made consistent with the market settings will be subsequently undermined by government interventions necessary for it to avoid falling short of its own target. Thus, the government's target could lead to less market investment than would have occurred without it.

Energy Security Safeguard (ESS)

9. *What would be a reasonable commencement date for the new energy saving and peak demand reduction targets? Please provide an explanation for your response.*
10. *Could elements of either scheme, such as the early accreditation of certificates ahead of surrendering requirements, be brought forward? Please provide an explanation for your response.*
11. *What support does industry need to prepare for the introduction of the scheme? Please provide an explanation for your response.*

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3 https://www.researchgate.net/publication/265814738_Calculation_of_minimum_reserve_levels_for_the_australian_national_electricity_market Table 2

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Industry requires the clearest indications possible as to how new activities and regulations will work. Quite simply, a failure to participate or meet compliance obligations in the early days of the scheme is likely where this criteria is not met prior to the new scheme commencing.

12. *What issues should the NSW Government consider when setting targets to 2030? At what rate should the targets be increased to reach 13% by 2030?*
13. *What are the most promising opportunities once commercial lighting reaches market maturity? What is the likely size and cost of these opportunities*?

It is difficult to predict where the greatest opportunities are likely to be, though thermal efficiency packages such as home insulation, draft proofing and even double glazing will probably be the next items up on the cost curve from lighting (though commercial lighting potentially has some way to go).

Incentives for these types of thermal efficiency retrofits will require a higher price, ie a greater reward for higher efficiency to be viable. If this was supported by further direct stimulus then that may also promote retrofits of energy efficient products compliant with ESS technical requirements. For instance, reverse cycle air conditioners, heat pump HWS, and others.

Smart home systems, rather than just smart lighting or in-home displays, that would allow almost complete energy and usage optimisation in the home both remotely as well as automatically is not yet readily available in Australia. Co contributions would be required and certificates awarded may have to be subject to a multiplier to get even close to being affordable.

14. *What would prevent the uptake of new opportunities? What support (including new standards and calculation methods) does industry need to transition to new opportunities?*

Australia is a small market by international standards with low certificate values by the same comparison. The combination of low returns on low volume, and fewer local importers or manufacturers is likely to hamper market development.

Combine this with processes for registering new products in the scheme having been complex and unwieldy and that quality control regimes have historically allowed dodgy installations to occur, such as the pink batts scheme, that has dented consumer confidence.

15. *What additional data sources are available that could inform assessment of the size and cost of the energy efficiency opportunity in New South Wales? Refer to Appendix B for technical assumptions.*
16. *What feedback can you provide to improve the other modelling assumptions set out in Appendix B?*
17. *Is the current penalty rate set at an appropriate level to incentivise retailers to buy and surrender certificates?*

The AEC believes that the current penalty rate has seen retailer performance at a consistent and more than acceptable level. Retailers are not keen on the publicity of default, regardless of the penalty. They are by and large compliance driven.

It should also be remembered that the higher penalty will correlate generally with a higher cost to risk, whereby greater risk will increase the value of certificates, driving up the certificate price

18. *Should small retailers be exempt? If so, up to what size?*

Consistency with exemptions is required, both internally and against other jurisdictions. Our preferred model is that small retailers be able to pay an annual penalty price based on MWh and GJ sales (the ACT model), as this more fairly addresses the fact that small retailers may not be able to develop direct delivery capability incrementally, and represents a more scaleable approach.

19. *Which cleaner fuel switching activities should the scheme provide incentives for?*

Bioenergy – electricity, gas, fuel (transport, aviation).

Geothermal heat pumps for HVAC: all sectors, with no discrimination against the fluid used in the geothermal earth pipes.

20. *Should the scheme cover technologies that are being wound down under the SRES? If so, what is the best way to do this?*

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The AEC is concerned that without continuing financial support, solar water heaters and heat pumps will be passed over in favour of cheaper, less efficient and potentially higher emission water heaters. The AEC suggests that support for these technologies could be in the form of a multiplier that increases as the SRES decreases.[4]

21. *How should energy savings be counted for these cleaner fuel switching activities?*
22. *What would be the likely scale of uptake of cleaner fuel switching activities? Please consider the number, size, and cost of projects.*
23. *Under what circumstances should the NSW Government consider extending scheme liability beyond the electricity sector?*

The liability should be extended to all forms of energy use, thereby implicating gas and fuel sellers given the inclusion of fuel switching opportunities within the certificate production space.

Peak Demand Reduction Scheme (PDRS)

24. *How can the scheme's certificates best capture capacity, timing, duration and availability factor?*

The scheme design should value actual peak consumption reduction, and not burden customers with deemed costs for technologies which may or may not deliver reductions.

Therefore trials are required to determine how capacity, timing, duration and availability(firmness) can be treated in the scheme. Trials are required for determining firmness of capacity, with that most firm being presumably the first contracted. Once determined, less firm capacity can be valued and added into the scheme incrementally and under competitive arrangements and with regard to practical limitations (such as availability and effectiveness during peak events).

It will be important to engage in consultation after more detailed work has progressed on the scheme's design, and once the cost and benefit calculations are better developed.

25. *Who is best placed to manage the financial risk that capacity is not made available when needed?*

We suggest that who should bear the financial risk should be determined by those who are best positioned to manage it, and that the market will determine that. There is no need to define those parties in detail in the scheme. Risk is then addressed by those parties via agreement, or contract. Attempting to assign greater risk to one party over another, especially where that assignment does not reflect contracting arrangements, inevitably increases the financial risk that the capacity that is not available when called upon bring to one party to the contract. This will have the practical effect of (unnecessarily) driving up the cost of the scheme.

26. *Are there other activities the NSW Government should consider for inclusion in the peak demand reduction scheme?*

The AEC considers the following could be realistically contemplated:

- Batteries: Batteries offer:
    - Certainty – they are unlikely to be switched off, or if managed remotely, exhausted
    - Known capacity
    - Can be activated as required
    - Consumers (purchasers of battery systems) will obtain benefit from increased retail market demand, both in price (affordability) and performance.
- Behavioural demand response.

Research indicates that with increased participation and long-term behaviour change, behavioural response programs can be valuable, especially with larger customers. There is doubt whether small customers can be relied upon heavily for dispatch except where DRED controls exist. Nonetheless, behavioural demand response could, with conditions, be considered for the scheme.

27. *What is the size and cost of the peak demand reduction opportunity available in New South Wales?*
28. *Are there alternative ways in which the peak demand scheme could complement national schemes?*

[4] Under the SA REES, solar hot water systems are eligible for STCs as well as REES gigajoule credits. This makes it possible to offer efficient solar hot water systems at about half the normal retail price.

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The consultation paper makes reference to other programs currently addressing peak demand, and outlines the principle that the scheme is intended to create / pay for capacity, and that the other programs will focus on dispatch. However, the paper does not provide much detail on to how possible conflicts or overlaps will be dealt with, especially at the customer level.

Distribution network businesses are seeking greater direct control for constraining/curtailing devices through connection agreements. Much of this is currently an expropriation of value, especially where, such as frequency control, it is not a localised network issue. It is unclear how network support and other distribution services would be treated, valued or compensated under the scheme. At worst, if the network is directly managing devices and during high price events in the designated hours of the scheme, were to curtail devices, this creates significant and unmanageable risks for contracting parties in attempting to meet their obligation on the proposed PDRS.

Any PERCs attached to an active participation contract be administered by the participant's electricity retailer to avoid unnecessary hedging and administrative costs.

29. *What are the key issues, and potential mitigation measures, the NSW Government should consider on consumer protection?*

Provided they meet the terms of their contract, the rational consumer would be better off overall as a result of their direct or indirect participation in the PDRS. Adapting that approach to all consumers means applying the better of overall test. This is more complex than might appear at first glance, as load shifting could unintentionally place consumer consumption into expensive time of use periods.

30. *Which calculation methods should be developed first?*

We are concerned that there is limited understandings the full reach of the PDRS, in particular we are not confident in the preliminary assessment on the device control build, or costs to participants to enable the program to operate. The PDRS will require significant IT spend from all participants. There is insufficient evidence to support that the value of the capacity can in fact be realised at a lower cost than other theoretical options. Building evidence through a controlled, incremental trial of the PDRS is required. We would encourage NSW Government to undertake a cost-benefit analysis once further detail is understood on the scheme (e.g. projected scope, year 1 focus, and potential expansions of the scheme (such as batteries).

We recommended modelling the scheme on the SRES market in terms of having a clearing house.

31. *Should location-based multipliers or activities that are specific to certain locations be considered?*

The complexity of such an approach would be large, both in terms of upfront equipment purchase subsidies and in the different retailer rebate / incentive rates provided to participating customers. If this approach were to be trialled it may exclude through that complexity those very customers it was trying to reach

The AEC support the inclusion of location-based multipliers as occurs under the EES. Regional areas are more difficult to access and service. The multiplier will assist with the costs of servicing these areas and therefore may see greater regional uptake.

32. *What are your views on the proposed approach to scheme liability? Please align your response with the topics above.*
33. *What would be the implications for the available dependable peak demand reduction capacity in New South Wales if the scheme allows carry forward?*
34. *What qualifications should certificate providers be required to have?*
35. *Should certificates expire every compliance year or should they be transferable to future compliance years? What implications would your preferred approach have for ensuring dependable peak demand reduction capacity in New South Wales?*
36. *What is working well with the administration and regulation of the ESS? What features would you want to see continuing, and potentially replicated for the peak demand reduction scheme?*
37. *Should the annual Rule review and three-year major Rule review process for the ESS and new peak scheme be changed or is it working effectively? Please provide an explanation for your response.*
38. *Would the above ideas help make the Safeguard more customer-centric? Do you have other suggestions?*
39. *What improvements could be made to the administration and regulation of the ESS that would encourage the creation of effective energy saving activities? Please provide an explanation for your response, including an indication of your key priorities.*

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40. *Who should be responsible for developing the capability of service providers to deliver effective activities, the Scheme Administrator or the Department?*
41. *What is the best way to develop the capabilities of service providers?*
42. *What are your views on the options to enhance the compliance and enforcement framework of the ESS?*
43. *Are the current provisions for the NCAT review of decisions by the Scheme Regulator and Administrator sufficient? Please provide an explanation for your response.*
44. *What key performance indicators and service standards should be considered for the Scheme Regulator and Administrator?*
45. *What else can the NSW Government do to ensure the continuous improvement of the ESS?*

Conclusion

The AEC does not support the Energy Security Target due to its intra-state nature and flaws in its design. The NSW government is encouraged to set the concept aside and instead work within the national process.

The AEC broadly supports the NSW government's proposals to evolve its energy efficiency scheme in the ways described. The AEC emphasises a need for simplicity and confidence in their implementation. The AEC supports inclusion of valuable controllable new technologies and those beneficial technologies whose alternative support arrangements are declining.

A peak demand scheme may be useful, but it will need careful development in its design before implementation. NSW should seek to encourage provision of these services from the competitive rather than monopoly sector.

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