AUSTRALIAN ENERGY COUNCIL

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GPO Box 2603
SYDNEY NSW 2001

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Submitted online to: www.aemc.gov.au

Dear Mr Adams,

Reserve Services in the National Electricity Market Rule Changes Directions Paper
References: ERC0295, ERC0307

The Australian Energy Council (the "**AEC**") welcomes the opportunity to make a submission in response to the Australian Energy Market Commission's ("**AEMC**'s") Directions Paper on the two rule changes: Operating Reserve Markets ("**OR**") and Introduction of Ramping Services ("**RS**").

The AEC is the industry body representing 21 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.

Introduction

The incorporation of an OR/RS is part of a complex and overarching suite of reforms being contemplated in light of the Energy Security Board's ("**ESB**") Post 2025 review. The need for this reform is inextricably linked to others, as well as the changing characteristics of the industry itself.

As the paper has identified[1], AEC members have a range of views as to whether the National Electricity Market ("**NEM**") would benefit from the addition of a specific OR/RS mechanism at this time. This diversity continues and is unrelated to technology ownership. The matter however requires abstract judgement, and expert minds will differ regarding whether the uncertainty in the adequacy of existing arrangements justifies the costs of introducing a mechanism.

Chapter Four provides a useful discussion of the way in which short-term reserves are provided presently, being:

(1) energy-only market incentives, reinforced by hedging contracts, and supported by
(2) information provision, and, as a last resort,
(3) intervention.

The AEC fully agrees that in theory, and in practice to date, the first two can provide the NEM with adequate short-term reserves without reliance on (3).

As the AEC noted in its ESB submission, the NEM will face the challenge of a much greater volume and speed of short-term energy balance swings. Whilst this naturally creates uncertainty regarding industry confidence in the adequacy of (1) and (2), there are, on the other-hand, technological developments which can offer some optimism. Principally these are the introduction of technologies that can act to help the NEM respond, being:

- Large scale battery storage;
- Automatic or remotely controllable demand-side/behind the meter actions; and

[1] See page 8

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- Pumped hydro storage.

Furthermore, the AEC notes that whilst coal technology is in decline, the more flexible conventional generation sources of hydro and gas are not.

Nevertheless the future clearly has risks and thus a dedicated support mechanism, rather than the indirect mechanisms of (1) and (2), could provide additional confidence. However any mechanism will introduce new costs and complexities, and at worst, interfere with those existing beneficial incentives.

The AEC's preference is for an OR/RS which primarily relies on existing incentives to balance supply and demand, and during periods where they prove adequate, the OR/RS would remain insignificant. If such a "no regrets" mechanism is feasible, then the AEC would support its roll-out. If, however, the mechanism is necessarily intrusive, then the AEC would prefer its implementation wait until evidence of greater reliance on (3) emerges.

In the meantime focus should be on (2), i.e. incremental improvements in the current forecasting and dispatch systems. In that vein, the AEC provides a suggestion at the end of this submission.

Consideration of Options

The AEC appreciates the AEMC's illustration of four broad designs, each defining short-term reserves somewhat differently and delivering it in a different mechanism. Unfortunately the discussion remains too abstract for stakeholders to confidently arrive at a preference.

It is suggested that to take the designs forward, the following explorations could be undertaken:

- How the designs relate to the concept of "Operating Reserves" as it was imagined by the ESB, especially in their FTI Consulting report and in studies of overseas markets?
- What short-term reserve concerns were listed as most pressing in AEMO's Renewables Integration Study and which of the options most directly respond to those concerns?
- Investigation of the locational features (discussed further below).
- Exploration of the money flows, in particular the ability of market-exposed participants to manage financial risks.
- How the reserves, having been enabled, would actually be called into action when needed.
- Back-cast modelling of actual events in the NEM, exploring how the outcomes may/may not have changed in the presence of each of these designs.

Cost recovery and hedging

The paper has not yet engaged with the likely costs and funding sources. Presumably this will be a form of non-energy customer levy, which could be quite volatile and unpredictable. This leads to consideration of how Market Customers can manage the resulting financial risks on behalf of their customers.

The design of the Energy Market and the Frequency Control Ancillary Services ("**FCAS**") Markets were intentionally made common-clearing price in order to enable risk management products to develop. Financial risk management is yet to be explored in the options presented. The ability to manage financial risk is directly relevant to the intrusiveness of the mechanism, and therefore the industry's appetite for its introduction.

Quality assurance

A difficulty in a OR/RS arrangement is that providers will be dispatched and paid for promising to be capable of delivering a service rather than delivering a service. This is conceptually similar to contingency FCAS and System Restart Ancillary Service. These services are supported by detailed Ancillary Services Specifications that determine equivalent qualities and apply volume multipliers/discounts based on the performance of different plants. They incorporate a complex demonstration and testing regime.

Triggering delivery
With the 30 minute options, it appears intended that the reserves do not require immediate start-up capability. For example, reserves may be eligible even if they have a 15 minute start-up time.

If a 15 minute start time was permitted, then this would be available to support variations in supply/demand that were not forecast before T-30 minutes, but emerged in the forecast between T-30 minutes and T-15 minutes. They however could not be of use to variations which emerged between T-15 and T. Thus it could provide some benefit, but could not immediately address last-minute swings. Some historical analysis of the 5 minute predispatch information could show how much variation is typically observed in the T-30 to T-15 minute window.

If a 30 minute option is pursued, it will open a question as to why the reserve mechanism doesn't recognise the greater system benefit of options that are instantly available.

For the 30 minute options, there is presently no tool to trigger such reserves into service: the dispatch engine has no look-ahead function. The triggering mechanism would appear to be too urgent and complex to rely on a manual process. The next stage of development should engage with this issue.

Locational matters
Reserves are only useful if there is spare network capacity to transport it to the location where the swing in supply/demand will occur. The following issues emerge that have not been addressed in the paper:

- How would the reserve requirement be distributed around the NEM? Presumably a volume of supply/demand uncertainty would need be allocated to each region, however this could:
    - If linked to regional risks, may overstate the global requirement; or
    - If a pro-rata distribution of the shares of a global requirement is used, may understate the local risks.
- Presumably the market would follow the same regional construct as energy by taking into account spare interconnector capacity and allowing effectively regional reserve prices to develop.
- Presumably intra-regional congestion will also need to be considered, and as a result reserve providers may be constrained off from the market where there is insufficient spare network capacity.
- There would need to be technical analysis as to which network constraint formulation can readily estimate hypothetical spare capacity. Some constraints, e.g. feedback constraints, rely on real-time measurements of the constrained system. It may be necessary to apply a pre-dispatch formulation which can be produce quite divergent results from dispatch formulation.
- Whether marginal losses should be incorporated into the development of a reserve dispatch and pricing function.

Energy Price impacts
The ESB originally proposed Operating Reserves as a form of "price adder" to sharpen spot market signals. To the AEC's mind, this would imply that supply is withdrawn from the normal merit order, such that price clears at a higher level. It is not obvious whether this would be achieved in these options as reserves participate in both the energy and reserve markets. In fact, the paper suggests Option 3 could actually suppress price when supply/demand suddenly tightens, which appears perverse.

A quantitative backcast of actual past events, with each of the options in place, could be useful in showing how these schemes would work in practice.

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Minimalist suggestion - fast ramp bidding

The AEC understands that interest in a ramping proposal was partly motivated by the ability of most conventional generators to operate at faster than normal rates of change ("**RoC**"), albeit at some plant damage penalty. This ability is however unknown by the dispatch engine, to which only one RoC may be offered by a scheduled unit. Yet generators are willing to utilise this ability if its value exceeds the cost.

As discussed in chapter 4, the existing incentives should encourage generators to exploit this faster ramping ability during periods of rapid supply/demand swings. In that regard, generators are permitted to re-bid their RoC, however this can only occur if the pre-dispatch has forecast the swing and traders have reacted. Figures 6.1-6.4 describe all the options as providing reserves to swings unanticipated by predispatch, and so by definition re-bidding is not possible.

The ability could be made continuously available to the dispatch process with a minimalist enhancement: permitting the bidding of two RoCs ("**FASTRoC"** and "**SLOWRoC**") along with a penalty price ("**FASTRoC Price**"). The current RoC Constraint Violation Penalty ("**CVP**") would be used for the FASTRoC constraint, whilst the CVP of SLOWRoC would use the FASTRoC Price.

In practice this would mean that if a regional price exceeded a unit's offer price by more than the FASTRoC Price, then the dispatch engine would move the unit at FASTRoC. The generator would express the plant damage cost penalty in the FASTRoC Price, knowing that the FASTRoC would only be used when the existing market's incentives exceeded the penalty.

The AEC encourages the AEMC to explore this minimalist dispatch enhancement with AEMO.

Conclusion

In its submission to the ESB Post 2025 review, the AEC recommended that the Operating Reserves concept be explored both for its potential benefits for Resource Adequacy, and for providing additional ability to retain security during sudden short-term demand swings. The AEMC, by conceiving four options, has begun that investigation process.

These four options are helpful more for the questions that they raise than those they answer. They lead to a realisation that the ESB's recommendation to implement an Operating Reserve was quite vague as to what problem the mechanism should seek to address.

The AEC remains supportive of this investigation, but has now realised the challenges, complexities and potential pitfalls and so would need much more confidence in a model before it could support its implementation. The AEC recommends much greater development of some of all of the models, including practical designs for implementation. Many key issues, such as funding, risk management and locational issues have not yet been explored. Having achieved those, the AEC suggests back-cast modelling through historical events.

In the meantime AEMO and AEMC should pursue incremental improvements in existing forecasting and dispatch processes. Permitting dual ramp rate bidding would be one such minimalist enhancement that goes directly to one motivation for this line of work.

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