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Dear Ms Knights

Comments on Energy Security Target Stakeholder Consultation

Thank you for this opportunity to comment on the Electricity (General) (Electricity Security Target) Variation Regulations 2017. Please accept the following comments from the Australian Energy Market Operator (AEMO).

Overall approach

AEMO can understand the objective of retaining a proportion of non-intermittent generation within South Australia both for the supply of energy and system services. AEMO also agrees that the current market arrangements do not adequately deal with all these issues and are not appropriate for the future with the changing generation mix and customer behaviour. However we consider that there are better ways of dealing with these deficiencies in the near term and that the National Electricity Rules are expected to change, potentially modifying the market construct and introducing the new services needed to manage the system in the future. Technology is also developing and new solutions are becoming available.

As a result, the concerns that have led to the introduction of the scheme at this time are expected to ease over time. We therefore suggest that the South Australian government include provisions in the regulations for a review after three years of operation.

Maintenance of Power System Security in the South Australian region

The maintenance of power system security in South Australia is an acute AEMO priority managed in real time. The evolution of the day to day management to meet the changing needs of the system is being progressed through our Future Power System Security (FPSS) work program, the Australian Energy Market Commission's (AEMC) System Security Frameworks Review and several proposed Rule changes.

AEMO understands one objective of the Energy Security Target (EST) is to improve South Australian power system security by incentivising certain generators who provide energy security services such as inertia within South Australia.

As the EST is an energy target, it will increase the output of these generators over time with a commensurate reduction in interstate energy imports. It is also likely to increase the running hours of these generators, which should lessen the number of hours when other sources of system strength and inertia must be procured.

However AEMO will still need to take action beyond the EST to ensure security is maintained under all circumstances. There will remain periods of high non-synchronous generation output and export where market incentives encourage the shutdown of all South Australian synchronous generators. To the extent that AEMO needs to continue to act to maintain

power system security in some periods, costs may be incurred through constraints or compensation for directions.

Use of National Electricity Rules terms

The draft regulation employs several terms cross-referenced to their definition in the NER. This can be convenient, however as the NER is subject to on-going change there is a risk these terms, or concepts, will alter over time in ways that may or may not be consistent with the policy objective. There is, for example, a current Rule change proposal that could affect the definition of a scheduled generator¹.

Eligibility – Scheduled Generator

Clause 44EC (1)(a) in the draft regulations requires an eligible generator to be "...a scheduled generator (within the meaning of the [NER])".

AEMO registers generating units as *scheduled* on the basis of criteria listed in NER 2.2.2. Determining eligibility based on them being classified as *scheduled* under these criteria could lead to unintended outcomes.

All the NEM's registered *intermittent*² generators are presently classified as semi-scheduled or non-scheduled generators, as these classifications are more suited to their operation. The NER does not however prohibit them classifying as scheduled if they can satisfy AEMO that they can comply with the requirements of NER 2.2.2. A number of wind farms in South Australia have been registered as "scheduled" generators in the past.

AEMO suggests that the policy intent may be better captured by either:

- Using the commonly understood term of "*synchronous*"; or
- By the exclusion of "*intermittent* generation" from eligibility; using a definition of intermittent generation similar to that used in the NER.

Eligibility – Fault current and Real Inertia

Clause 44EC(1)(b) in the draft regulations limits eligibility to the(non-zero) provision of fault current and "real inertia". We note that:

- Earlier model wind turbines (Type I and II³) use induction machines directly connected to the grid, and these are employed at some South Australian windfarms. These plants inherently provide a small amount of "real inertia".
- Machines using power converter technologies (Type III and IV wind turbines and photo-voltaic cells) do provide a small amount of fault current.
- Ancillary equipment sometimes installed within wind and solar farms to assist secure connection, such as small synchronous condensers, provide small amounts of both fault current and real inertia.

In each of these cases, the generator may meet the eligibility requirements as set out in the draft regulations, despite not meeting the intent of the provision. It may be possible to add quantitative thresholds, noting that this would be complex and that some gas-fired generators also have very low inertia.

¹ <http://www.aemo.gov.au/Rule-Changes/Non-scheduled-generation-in-central-dispatch>

² The term "intermittent" is used in its NER definition

³ See AEMO categorisation of wind turbines in this document https://www.aemo.com.au/-/media/Files/PDF/Wind_Turbine_Plant_Capabilities_Report.pdf

An alternative approach is to determine eligibility entirely on the basis of a machine being “synchronous”, which is a well understood term in electrical engineering. Induction machines and power converter connected equipment are asynchronous plants. This may also avoid the need to employ the problematic scheduled generator criterion outlined.

“Generating Plant” and “Sent out Generation”

The draft regulation has used the term “generating plant” without definition and in the apparent context of the NER’s definition of “power station”. The NER however uses “plant” in the context of all the equipment within a power station.

If the intent is to capture all the generation from an eligible power station, care should also be taken in the application of “sent out generation”, whose definition is cross referenced to the NER definition as the electricity supplied at the connection point. In a conventional power station configuration, sent out generation is the electricity generated minus auxiliary load, but other configurations exist. For example:

- Cogeneration involves supplying electricity to an industrial process upstream of the connection point.
- AEMO is aware of proposals to incorporate both synchronous and asynchronous plant within one power station facility.

If the scheme’s intent is to increase synchronous generation, then it may in fact be more consistent with the policy objective to create certificates in proportion to generation at the generator terminals, however this may be difficult due to the location of metering.

Thought should also be given to circumstances where asynchronous plant include elements of synchronous ancillary equipment, such as synchronous condensers, and how their presence will affect the eligibility of the power station complex.

For further discussion please call Ben Skinner, Market Development Specialist, on (03) 9609 8769.

Yours sincerely

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