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Dear Ms York

Generator registration thresholds rule change – AEMO submission to Consultation Paper

AEMO welcomes the opportunity to respond to the AEMC's Consultation Paper for the above rule change, as well as the two proposals that have been consolidated in this process. The proposals contain changes to multiple aspects of the classification and registration process for generators, especially small generators under 30MW.

AEMO supports in principle key aspects of the proposals, including the lowering of the threshold below which generators are classified as non-scheduled. AEMO agrees with the logic contained in the rule change proposal. As the generation mix continues to rapidly change over coming years and decades, it will be necessary for AEMO to have greater visibility of the growing number of relatively small generating units in the power system.

As part of the making of any rule change, AEMO submits that further analysis is required to determine where the new upper limit for non-scheduling should be placed, i.e. whether 5MW is the appropriate level. AEMO sees two key sets of considerations here. Firstly, a technical assessment of the needs of the power system regarding the proportion of generation that must participate in central dispatch in order to maintain power system security. Secondly, an assessment of the costs and benefits of different options. While AEMO sees strong benefits in some reduction in the threshold, it may be that the costs associated with managing more generators in central dispatch varies materially depending on how much the number of units increases and the associated implications this change may have on AEMO's systems. Consideration should also be given to cost implications for Participants who would be required to comply with this rule change.

AEMO does not support other aspects of the proposals, including the creation of new obligations related to the publication of reasons for exemptions and the creation of a new Conditional Exemption. AEMO does not believe the proposal is capable of achieving its purpose, as AEMO understands it, of providing certainty to potential developers.

AEMO also notes the potential interactions between decisions in this rule change process and other significant reforms, especially the development of a two-sided market and the integration

of energy storage systems rule change. It is important that this work is appropriately synchronised to ensure the best possible process and outcomes.

We welcome the opportunity to provide further input as this rule change process progresses. Should you wish to discuss any of the matters raised in this submission, please contact Kevin Ly, Group Manager – Regulation, on kevin.ly@aemo.com.au.

Yours sincerely



Violette Mouchaileh
Chief Member Services Officer

Attachment 1: AEMO submission

ATTACHMENT 1:

GENERATOR REGISTRATION THRESHOLDS RULE CHANGE – AEMO SUBMISSION TO CONSULTATION PAPER (ERC0256)

1. Introduction

This submission responds to the Australian Energy Market Commission's (AEMC) Consultation Paper for the Generator Registration Thresholds rule change. The AEMC has consolidated two rule change proposals, from the Australian Energy Council (AEC) and Mr Damien Vermeer. The following sections outline AEMO's preliminary views on four key elements of the two rule change proposals and the Consultation Paper.

Firstly, AEMO comments on the issue of lowering the threshold for registering generators as scheduled or semi-scheduled from 30MW to 5MW and the related issue of the scheduling arrangements that should be put in place for units in that range. AEMO supports in principle lowering the threshold and would welcome analysis to determine the appropriate lower limit. AEMO also provides specific responses to AEMC questions regarding appropriate dispatch arrangements, as well as noting the importance of consistency with other reforms, such as the development of a two-sided market (2SM) and the integration of energy storage systems.

Secondly, AEMO comments on the AEC's proposed changes to clause 2.2.3(b) of the National Electricity Rules (NER). AEMO supports the removal of subclause (1), on the basis that the presence of load between a generator and its connection point (the level of 'embeddedness') does not mitigate the potential for that generation to have a negative impact on the power system of a certain magnitude. AEMO also proposes that the clause be amended to increase AEMO's discretion in classifying generators as non-scheduled.

Thirdly, AEMO outlines why it does not support the AEC's rule change proposal regarding new obligations for AEMO to publish reasons for granting exemptions. AEMO submits that current arrangements are more appropriate than the proposal.

Finally, AEMO comments on the proposal from Damien Vermeer to create a new Conditional Exemption category. AEMO does not believe this proposal is capable of achieving its intended purpose of providing certainty to some developers of embedded generation that they will receive an exemption from registration, before an investment decision is made.

2. Changes to scheduling arrangements for generators 5-30MW

The central issue of this rule change is the lowering of the threshold below which generating units are classified as non-scheduled. Closely related to any decision about lowering the threshold is the issue of what sort of arrangements should be applied to such generators.

2.1 Lowering the threshold for scheduling

The AEC proposes to lower the size thresholds for scheduled and semi-scheduled generation registration from 30MW to 5MW (through amendments to rules 2.2.2, 2.2.3 and 2.2.7). While this change would alter the default classification, the AEC states that "AEMO will retain the

ability to consider exemptions for larger generating systems on a case-by-case basis”.¹ The AEC suggests that as the proportion of overall generation supplied by flexible, small-scale generating technologies increases, such a change is necessary to ensure that “AEMO’s ability to coordinate the management of the power system is not compromised”.²

AEMO agrees with the logic contained in the rule change proposal. As the generation mix continues to rapidly change over coming years and decades, it will be necessary for AEMO to have greater visibility of the growing number of relatively small generating units in the power system. Such a change is also warranted given that the types of generators that are likely to be captured by a lower threshold increasingly demonstrate an ability to respond to wholesale prices and are technically equipped to be controllable, as is required to participate in any scheduling process.

As part of the making of any rule change, AEMO submits that further analysis is required to determine where the new upper limit for non-scheduling should be placed, i.e. whether 5MW is the appropriate threshold. AEMO sees two key sets of considerations here. Firstly, a technical assessment of the needs of the power system regarding the proportion of generation that must participate in central dispatch in order to maintain power system security and quality, both now and as the power system continues to transform over coming years. Secondly, an assessment of the costs and benefits of different options. While AEMO sees strong benefits in some reduction in the threshold, it may be that the costs associated with managing more generators in central dispatch varies materially depending on how much the number of units increases and the associated implications this change may have on AEMO’s systems (and the possible need to make upgrades to them). For example, potentially substantial changes would be required to the Australian Wind Energy Forecasting System (AWEFS) and the Australian Solar Energy Forecasting System (ASEFS). At present AWEFS/ASEFS produces forecasts for about 120 wind/solar farms in the NEM. Depending on where the threshold lands, the increase in the number of units could require changes to the systems to support this workload. The increased number of units would also increase the workload on the NEM dispatch engine (NEMDE). Depending on the extent of that impact, the increase may bring forward the need for the next NEMDE redesign. Costs would also stem from extending the energy management system (EMS) network model to include newly captured generators, as well as extending our area of direct oversight (operational zone), which would require additional constraint development and increase the scope of network outage planning.

The cost of these changes should not be underestimated, and an impact analysis and cost estimation exercise should be undertaken in order to provide an estimate. In addition, AEMO may face an increase in staff costs from the need to include more generators in our information collection, forecasting and reporting activities, as well as one off-changes to AEMO’s Generation Information Portal (which will occur regardless of where the new threshold is set).

AEMO looks forward to engaging with the AEMC as part of any such assessment, as this rule change process progresses. While noting the existence of likely cost implications for changes to

¹ AEC rule change, 2.

² AEC rule change 3.

registration/scheduling thresholds, consideration should also be given to cost implications for Participants who would be required to comply with this rule change. AEMO also affirms that unnecessary barriers to the connection of new generation must not be created.

AEMO also notes that increasing the number of price-responsive and active resources participating in central dispatch is consistent with the intent and direction of the process to develop a two-sided market (2SM) for energy services, which is currently being led by the Energy Security Board (ESB). These reforms are discussed further in the following section.

2.2 Alternative arrangements for scheduling generators below 30 MW

Any new arrangements for scheduling generators between 30MW and a lower limit should be designed with consideration of how it may apply in the future beyond the current consultation scope of alternative scheduling arrangements for small generators.³ This should include future objectives regarding how Market Participants (traders) of active, price-responsive resources or behaviours at single or aggregated connection points inform the market and participate in central dispatch. This should consider how participation of Market Participants will evolve in line with the objectives of the ESB's two-sided market (2SM) workstream.⁴

The AEMC has established some first principles and criteria to consider what information small generators could provide under a new scheduling arrangement that would be both:

- *'accessible and not too costly or onerous for generators between 5 and 30 MW to provide;*
- *valuable, in terms of making a meaningful improvement on system and market operation outcomes'*⁵

A principles-based approach is practical when exploring potential arrangements for small generators. As previously stated, it is important that any decisions made as part of this rule change are consistent with broader reforms on foot in the National Electricity Market (NEM), such as the 2SM and the Integrating Energy Storage Systems (ESS) rule change process. The 2SM process is exploring the concept of 'scheduled light' as an alternative arrangement for smaller active and price-responsive resources participating in market processes and dispatch. This could start by establishing a set of scheduling obligations that make it easier for currently non-scheduled participants to participate in central dispatch while still maintaining the integrity of central dispatch. This model could be applied for single connection points or potentially for aggregations of connection points to increase visibility in the market. The ESS rule change is examining issues related to how grid-scale storage can best be integrated into the NEM, including whether changes should be made to participant registration categories.

Responses to the specific consultation on this issue are provided below.

³ Considering any alternative scheduling arrangement should only follow the Commission's determination of whether and to what extent small generators are required to participate as a scheduled or semi-scheduled generating unit.

⁴ Refer <http://www.coagenergycouncil.gov.au/publications/post-2025-market-design-consultation-paper-%E2%80%93-93-september-2020>

⁵ AEMC Consultation Paper, 22.

Q 7.1: Do you have any suggestions for information which would satisfy these criteria to make the existing scheduling framework more accessible for small generators?

As technology and business models have and continue to evolve, the types of information valuable in market and dispatch processes is likely to becoming increasingly accessible to small generators. Small generators are increasingly active and controllable in response to market price. Accessible information includes forecasts of generation intentions (i.e. unit and energy availability over different time horizons) and behaviour in response to price (i.e. forecasts and bids). Accessibility and provision of information from small generators to AEMO should balance the accuracy and confidence with which this information may exist, recognising that accuracy will increase closer to real time.

The NER and AEMO's generator registration, connection, classification and exemption processes establish the types of information required of different generators when connecting to the NEM. For small, non-scheduled generators, AEMO may also impose additional terms or conditions.⁶ These conditions can include provision of ST PASA information, MT PASA information, submission of dispatch information, or provision of an energy conversion model. These requirements indicate the types of information that are valuable and meaningful in relation to improving system and market operation outcomes.

The method and input type sought from small generators should seek to closely align with the existing participant inputs described in current market processes including MT PASA, ST PASA and Pre-dispatch.⁷ Any information provision obligations should seek to utilise or leverage existing market processes and tools as far as practicable, so as to minimise duplication or customisation of market systems and tools.

Q 7.2: Would AEMO's forecasting and market scheduling process benefit from partial visibility of non-scheduled generators?

Visibility of all resources, including small and non-scheduled generators, is of importance to both AEMO and Market Participants in relation to market processes and system operations. Visibility of generation resources informs the investment and planning timeframes (i.e. bulk resource adequacy assessments); short- and medium-term forecast timeframe (i.e. PASA); through to the dispatch timeframe (i.e. system security assessments; unit self-commitment decisions).

Increasing visibility of non-scheduled generators can be enhanced via a range of existing tools over different timeframes. For example, visibility of unit and energy availability can be provided via MT and ST PASA processes; price-responsiveness and market intentions can be submitted into Pre-dispatch; and operational and real-time visibility can be achieved via the establishment of SCADA and telemetry arrangements.

⁶ Refer Section 5.3.4 https://aemo.com.au/-/media/files/electricity/nem/participant_information/new-participants/generator-exemption-and-classification-guide.pdf?la=en

⁷ AEMO's ST PASA replacement project is exploring how a broader range of technologies, such as battery storage, virtual power plants, and distributed energy resources can be more easily modelled in the current system.

Greater visibility of non-scheduled small generators from the ST PASA to dispatch timeframes would be most beneficial for AEMO's operational forecasting and system operations functions.

Greater visibility of non-scheduled generators would enhance AEMO's operational forecasting activities. Improved visibility of non-scheduled generators and unscheduled loads can improve the accuracy of the load forecast used in dispatch, pre-dispatch and PD PASA/ST PASA. The mechanism through which this improvement is possible is the underlying operational demand calculation on which the load forecast models are trained. At present, invisible non-scheduled generators are effectively "noise" in the load forecast models because any variations in the output of the non-scheduled generators result in unexplained variations in the measured operational demand.

These variations could be of different type, e.g. price responsive variation or weather condition variation such as scudding cloud passing over a small non-scheduled solar farm. The variations are also over different time frames such as within or across dispatch intervals or over the course of a day (e.g. the aggregate variation of all non-scheduled solar farms due to the daily solar cycle).

Improved visibility could also allow the inclusion of the small non-scheduled generators in the measured operational demand, ultimately improving the accuracy of the load forecast models as the underlying drivers of demand changes are better identified and weighted due to the removal of the unexplained "noise". This is not having a significant impact yet but is expected to do so in the future as the installed capacity of aggregate non-scheduled generators increases and as they increasingly become price-responsive.

When considering the introduction of any obligations to enhance visibility for market and system operations, consideration must be applied to whether this information can be feasibly relied upon for market clearing. AEMO notes the following relevant initiatives underway:

- AEMO is exploring alternatives to the traditional SCADA links provided via NSPs to accommodate more flexible SCADA solutions suitable for smaller generators, DER and Wholesale Demand Response. AEMO would expect any solution to provide participants with an easier, cheaper, more direct and potentially more reliable means of exchanging SCADA data with AEMO, including future capability to receive dispatch instructions from AEMO's AGC or similar.
- AEMO's Virtual Power Plant (VPP) demonstrations include the ability to collect (via APIs) aggregated forecasts of anticipated active power flows and aggregated actual performance data from each participating VPP portfolio. Access to this data has improved AEMO's operational visibility and monitoring of the regional supply and demand balance while enhancing overall operational awareness of flows across the network.
- Some distribution network service providers (DNSPs), such as South Australian Power Networks (SAPN) are already requiring small embedded generators (>200kW) to establish SCADA links with the network and AEMO for the purposes of distribution network security objectives and in managing distribution network constraints. Access to

this data has enabled AEMO to gain an important insight into the operation and capability of VPPs and will enable our Operational Forecasting team to update their models to improve our understanding of supply demand balance and overall operational awareness of flows across the network.

Q 7.3: Can you suggest ways that participants could provide this information without becoming bound to the obligations of the existing dispatch process? Would the New Zealand approach, or the approach taken in relation to wholesale demand response in the NEM, be appropriate?

There may be two different starting points when approaching the design and operation of any new scheduling alternative for small non-scheduled generators:

1. Arrangements for small generators which enhance AEMO's centralised visibility and ability to forecast within the operational timeframe without requiring participation in central dispatch (*bottom-up*)
2. Arrangements for small generators which seek to emulate those of scheduled generators, however with potentially altered compliance obligations (i.e. NZ Electricity Authority 'dispatch lite' arrangement;⁸ or Wholesale Demand Response Mechanism (WDRM)-like models) (*top-down*)

Any model should seek to maximise the efficient participation of price responsive generating units while not undermining the efficiency of central dispatch.

A bottom-up approach may be suitable in the first instance to encourage and maximise participation of active, price-responsive small generators. This type of model could place obligations on small generators to provide information and forecast intentions over the planning and operational timeframes while not requiring submission of bids for centralised scheduling and dispatch purposes. This would increase the breadth and amount of information available to AEMO and to the market over different time horizons, enhancing overall market transparency while increasing the amount of information at hand to support improved decision making or unit commitment decisions.

Alternatively, a top-down approach may be practicable where it is determined that small generators are increasingly price-responsive and controllable in respect of real-time market and system conditions.

- The setting of requirements for Demand Response Service Providers to provide wholesale demand response (WDR) serves as a point example of the breadth, type, granularity and veracity of information required for market and system operations. This includes arrangements for telemetry and communications equipment; and classification and aggregation requirements. These arrangements for the provision of WDR will seek

⁸ While the Consultation paper seeks feedback on the Transpower dispatch-capable load station (DCLS) market participant category, AEMO is aware that the Electricity Authority is considering a 'dispatch lite' model (which seeks to accommodate smaller-scale generation in dispatch) as part of its ongoing market reform initiative. Refer <https://www.ea.govt.nz/assets/dms-assets/24/249302019-RTP-consultation-paper.pdf>

to recognise and balance the objectives and constraints of the provision of demand response as a service and its relationship to clearing the market.⁹

- The Electricity Authority's 'dispatch lite' arrangement presents an interesting model warranting further consideration in the context of the NEM.¹⁰ This arrangement would require small generators to participate akin to scheduled generators but with a range of lighter requirements or obligations (i.e. accommodating alternate telemetry arrangements; issuing dispatch 'notifications' as opposed to 'instructions'; offering an ability to 'opt-out').

Overarchingly, important considerations include the extent to which the information provided by small generators informs market price formation; whether the information sought is technical or financial; and how that information is used by AEMO and Market Participants in pre-dispatch and in the economic clearing and dispatch of generating units.

AEMO notes that Demand Side Participation Information (DSPI) portal is another avenue via which Registered Participants provide information to AEMO in a centralised way, however it is specific to demand-side participation information.¹¹ This portal is useful for the collection and consolidation of standing data related to unscheduled generation used in certain contractual or market conditions. While this portal is an avenue for the collection of some standing data (i.e. trigger prices; resource type), further consideration is required in how this type of standing data and whether the portal itself is an appropriate tool to be used in market and forecasting processes and the certainty with which it can be relied upon.

Q 7.4: Do you consider the benefits of implementing these alternative arrangements would outweigh the prospective additional system costs they might impose on the market by increasing the complexity of AEMO's operations?

The Consultation paper seeks feedback on the benefits and costs of implementing an alternative scheduling arrangement. A more fulsome model or high-level design would need to be established for AEMO to ascertain and cost the required changes to AEMO's market and operations systems and processes to facilitate any new arrangement. As outlined above, AEMO would support a more detailed assessment of the costs and benefits of any change through the remainder of this consultation process. The costs associated with any implementation should also be considered within the context of the current reform program, which contains a number of elements that are closely related to the issues under consideration in this rule change process. In particular, the 2SM process and the proposed rule changes on integrating energy storage systems.

⁹ Refer https://www.aemc.gov.au/sites/default/files/documents/final_determination_-_for_publication.pdf

¹⁰ Refer Chapter 3: <https://www.ea.govt.nz/assets/dms-assets/24/249302019-RTP-consultation-paper.pdf>

¹¹ The portal consolidates contractual arrangement under which a person and the Registered Participant agree to the curtailment of non-scheduled load or the provision of unscheduled generation in certain specified circumstances (ref NER 3.7D).

3. Amending clause 2.2.3(b)

NER clause 2.2.3(b) outlines the basis on which AEMO must classify a generating unit as non-scheduled. Specifically, "AEMO must approve the classification if it is satisfied that:

- (1) the primary purpose for which the relevant generating unit operates is local use and the aggregate sent out generation at its connection point rarely, if ever, exceeds 30 MW; or
- (2) the physical and technical attributes of the relevant generating unit are such that it is not practicable for it to participate in central dispatch."¹²

The AEC contends that "the presence of load between a generator's terminals and its network connection point is relevant only to market settlement, and is irrelevant to the generator's importance in the dispatch and scheduling process".¹³ Accordingly, the AEC proposes that subclause (1), above, be deleted from the NER. The AEC further proposes that subclause (2) should refer to generating *systems* rather than *units*, to remove the option for developers to build a series of units that can readily be granted exemptions but which, once aggregated, form a much larger system.

AEMO supports the AEC's proposals. Firstly, the presence of load between the (embedded) generation and the connection point does not mitigate the extent to which that generation could negatively impact the power system (if, for example, the generators maximum output was injected into the power system). Consequently, such a test should not form part of an assessment of whether a generating system (or unit) can be classified as non-scheduled.

Secondly, AEMO agrees that as the power system transforms, it is appropriate for subclause (2) to refer to *systems* rather than *units*. As large-scale wind and solar farms and hybrid facilities continue to be installed, many of which are designed to compose a number of different units, such a change will support AEMO's ongoing management of the power system.

4. AEMO to publish reasons for exemptions from scheduling and semi-scheduling

The AEC proposes a new rule, 2.2.3 (g), which would require AEMO to publish its reasons for classifying any generator greater than 5MW as non-scheduled. The proposed rule would require AEMO to publish the reasons an exemption was sought, the reason the exemption was granted and any conditions that are attached. This information would be required to be published within ten business days of AEMO making its decision.¹⁴

AEMO does not support this change. As outlined below, AEMO's view is that current practice provides an appropriate level of transparency to stakeholders. AEMO further submits that implementing the proposal would be difficult and resource intensive. In short, the costs of this proposal outweigh any benefits, which are minimal when AEMO's current practice is fully considered.

¹² NER cl 2.2.3(b)

¹³ AEC rule change, 2.

¹⁴ AEMC Consultation Paper, 5.

AEMO currently publishes the basis on which a generator has been classified as non-scheduled. This information is contained in AEMO's NEM Registrations and Exemptions List, on the tab titled 'Exemption – Central Dispatch' (tab 12), in Column D: 'Basis for classification as a non-scheduled generator'.¹⁵ This column provides a reference to the NER provision that forms the basis of the non-scheduled classification, for example that the generator is intermittent (NER cl 2.2.3(b)(3)) or that the physical and technical attributes of the unit mean participation of the unit in central dispatch is not practicable (2.2.3(b)(2)). In providing this information, AEMO generally refers to the NER provision under which the decision was made, rather than specific characteristics of the plant in question. Doing so allows AEMO to easily avoid disclosing characteristics of plant that are commercially sensitive.

AEMO further notes that, if the AEMC is considering adopting this aspect of the AEC's proposal, no requirement regarding the timeframe under which information must be published should be included. The current registrations framework does not contain any similar provisions requiring AEMO to publish information within a certain number of business days. In practice, AEMO publishes the required information regarding a new registration within two business days of the Participant Registration Committee (PRC) making a decision. In AEMO's view, the rule change proposal does not define a specific problem that this new requirement is seeking to address. If such justification were available, AEMO would happily engage with its merits and the likelihood of the proposal (or an alternative approach) achieving the desired outcome.

5. The creation of a Conditional Exemption from registration

Damien Vermeer has proposed the creation of a new Conditional Exemption from registration for generators who intend to be exempt, to be granted relatively early in the connection and registration process. The key rationale for this new provision is that prospective connection applicants (of embedded generation) will receive comfort that they will not be assuming the regulatory risks associated with being a registered generator before they are required to make an investment decision. Mr Vermeer's contention, based on his professional experience, is that uncertainty about gaining an exemption from registration lead many potential developers of embedded generation between 5-30MW to shy away from making such investments. Such exemptions would be valid for at least two years, and subject to a range of potential conditions.

AEMO does not believe that the creation of a Conditional Exemption from registration could provide the certainty about a final decision on exemption from registration that the proponent desires. AEMO cannot assess the potential system security impacts of a new generation facility, and therefore whether ongoing visibility of the plant's output is necessary, until AEMO knows precisely what assets are being connected. Because generation equipment is often made to order, AEMO cannot have the required level of certainty until the specific plant has been procured, which will always be after the developer has made an investment decision. This is why AEMO's current process requires photographic evidence of what is being installed as part of a new connection and registration.

¹⁵ The AEMO NEM Registration and Exemption List is available at: <https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/participate-in-the-market/registration>

The proposed new category would, therefore, only provide certainty to the developer up until AEMO conducts an assessment of the specific equipment and can provide no certainty about the outcome of that assessment. The new exemption would instead create a two-step registration process, with developers required to pay twice. While AEMO accepts that uncertainty about the final outcome of registration process may present a hurdle to certain developers investing in small generation, AEMO is opposed to any departure from one of the key tenets of the registration process. Assessments about the impact of a new generator on the power system (and therefore whether that generator can be non-scheduled) must be based on characteristics of the equipment that is delivered and to be installed, rather than a description of what a connection applicant intends to order or expects to receive.

If the AEMC were to consider such a change, AEMO notes that issues that would need to be considered include whether:

- such exemptions only valid until commissioning of the units;
- a conditionally exempted site be connected to the NEM without an actual assessment;
or
- alternatively, whether AEMO would have the ability to define the Conditional Exemption in the Generation Classification and Exemption Guide.

AEMO welcomes the opportunity to provide further input as this rule change process progresses.