14 October 2020

Ms Merryn York
Chair (acting)
Australian Energy Market Commission
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By online submission
AEMC ref: ERC0280

Dear Ms York

Integrating Energy Storage Systems into the NEM rule change consultation paper (ERC0280) – AEMO Submission

AEMO welcomes the opportunity to comment on the Australian Energy Market Commission's (AEMC) Consultation Paper on AEMO's Integrating Energy Storage Systems into the National Electricity Market (NEM) rule change proposal.

AEMO's proposed rule seeks to better integrate energy storage and 'hybrid facilities' into the NEM, address issues associated with grid-scale assets, and recognise connection points where bi-directional energy flows occur.

However, COVID-19 and the cost pressures across the energy supply chain means major reform initiatives such as this rule change, should be thoroughly assessed to ensure that there are net market benefits to their implementation. Given this context, AEMO considers it prudent to consider the congruence of this rule change with the Energy Security Board's (ESB's) post 2025 market design initiatives. In particular, the two-sided markets and valuing demand flexibility and integrating Distributed Energy Resources (DER) needs to be considered holistically to assess the merits of these reforms and possible timing. AEMO considers the release of the draft determination for this rule should consider the post 2025 market design initiatives in total to ensure congruency of all major market reforms.

We provide the attached submission on the Consultation Paper for the AEMC's consideration and welcome the opportunity to provide further input as the consultation on AEMO's proposed rule 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

Peter Geers
Chief Strategy and Markets Officer

Attachment: AEMO submission

ATTACHMENT: INTEGRATING ENERGY STORAGE SYSTEMS INTO THE NEM RULE CONSULTATION PAPER (ERC0280) – AEMO SUBMISSION

Given AEMO's rule change proposal sets out its position on many of the questions raised in the AEMC's consultation paper, this submission to is limited to the following matters:

- The relationship between AEMO's proposed rule for integrating energy storage systems (ESS rule change) and the Energy Security Board's (ESB's) Two-sided Market (2SM) initiative.
- How the proposed rule interacts with other related NEM workstreams, to give the AEMC and interested participants greater visibility of the inter-relatedness of the ESS rule change, 2SM and other market developments currently under way.
- New energy storage related issues AEMO became aware of since submitting the rule change proposal in August 2019.
- Clarification or further information on some areas of the AEMC's consultation paper.

1. The ESS rule change and other NEM initiatives

The primary objective of AEMO's ESS rule change is to address the participation and operation of energy storage and 'hybrid facilities' at the grid-scale or wholesale level. AEMO's proposed rule incorporates a number of foundational changes needed for a broader NEM transformation, consistent with the ESB's 2SM objectives and principles.

AEMO supports the 2SM objective for the NEM's framework to facilitate broader trading by Market Participants (as 'traders') of energy and services either consumed or produced by the connected assets for which they are responsible. AEMO's proposed 'Bi-directional Resource Provider' is a flexible registered participant category that represents an initial shift away from the traditional Market Generator and Market Customer categories. While the proposed rule retains these existing participant categories, it recognises that they may also provide and consume energy and services from assets and connection points where bi-directional flows occur.

The proposed rule also requests the AEMC amend the NER to address increasingly inefficient or inequitable market impacts of bi-directional flows, e.g. the recovery of non-energy costs where more 'load' connection points are frequently producing more energy than they consume.

AEMO acknowledges the complexity involved in transitioning the NEM's regulatory framework to address issues now and in future, and the inter-related nature of several ongoing and upcoming market development projects. As identified in the AEMC's consultation paper, the ESS rule change is being considered as part of the ESB's 2SM workstream. The following sections provide AEMO's view on:

- How the ESS rule change and the ESB's 2SM workstream is consistent and congruent.
- How the ESS rule change is inter-related with other ESB post-2025 initiatives.

ESS rule change and the 2SM workstream

Question 6 in the AEMC's consultation paper requests stakeholders' feedback on the following options for energy storage integration:

1. Waiting for the ESB's 2SM reforms.
2. Introducing the ESS rule change as an interim step.
3. Implementing some aspects of the ESB's 2SM reforms through this rule change project.
4. An alternative approach to be identified.

AEMO understands the AEMC is considering alternatives to progressing the ESS rule change as proposed (option 2), to address a perceived risk that this could result in significant duplication of effort, and potentially a need to unwind the energy storage arrangements in any subsequent 2SM detailed design or regulatory change process.

AEMO considers that the ESS rule change proposal is consistent with the 2SM principles discussed between the AEMC, AEMO and the 2SM Technical Working Group, and that the proposed rule may provide foundational steps towards the ESB's 2SM reform. The proposed rule recognises that bi-directional assets and systems will be a part of the NEM's portfolio mix and seeks to recognise these assets and bi-directional flows through the NER and subsequent systems, procedures and guidelines to simplify and streamline requirements for industry. Further changes being conceptualised by the ESB's 2SM work program can build on these foundational changes, as illustrated in the table below.

Two sided market design principles		Relationship with ESS rule change
1. End user choice	• End users should continue to choose as to how they participate and engage in the market	Under AEMO's proposed registration model, end user participation options do not change, they can continue to participate: • as an end user • with an end user representative (known as an intermediary) as their nominated trader
2. Level playing field	• Design seeks to promote information symmetry, where end users, or their nominated trader, have access to the information required to make efficient decisions	• The market will be able to identify an energy storage more clearly. A single dispatch model for energy storage promotes information symmetry because it will make it easier to identify these assets instead of two relatively unrelated DUIDs • The proposed non-energy cost recovery changes may end the reliance on registration and classification categories, and move to an energy flow basis. It is a non-discriminatory approach that creates a level playing field for Market Participants ('traders'). Recovering non-energy costs based on energy flows allows Market Participants to make more efficient decisions on energy consumption and production as the true cost of energy flows (as identified for relevant intervals) would be recognised instead of being masked by using net metering data

Two sided market design principles		Relationship with ESS rule change
3. Market access	• Maximise opportunities for the participation of end users and trading of services in the market • Traders should be able to participate to provide services in markets if they are technically capable of doing so • Transparent price signals	• AEMO's proposed integration solution for grid-scale energy storage will require full integration of energy storage and 'hybrid facilities' to enable the provision and participation in all services they are technically capable of. • The NER changes (including drafting) will facilitate the necessary re-engineering of systems, procedures and guidelines to reflect bi-directional assets and ensure flows are accounted for. This takes the early steps for a 2SM and provides a foundational basis for future changes. • A single energy storage dispatch model would allow end users or their representative to co-optimise energy and frequency control ancillary services (FCAS) more efficiently, and reducing the costs involved in managing two DUIDs would maximise participation • Proposed non-energy cost recovery changes (to be based on consumed and sent out energy rather than connection points classified as "load" or "generation" tied to a registration category) may provide a more transparent price signal to consumers and would not penalise customers without energy storage or photovoltaic (PV) systems behind their connection point

4. Market and system efficiency	• Support transparent and efficient price formation and system visibility of behaviours in the market
	• Support appropriate cost and risk allocation
	• Minimise regulatory intervention and administration costs
	• Support trade to provide management of market risk and drive long term investments
		• Co-optimisation of energy and FCAS from energy storage facilitates efficient price formation and transparency. Additionally, it will improve visibility of these assets in the market because it would have a single DUID
		• The proposal supports cost and risk allocation by clarifying:
		  ○ TUOS and DUOS
		  ○ Non-energy cost recoveries
		• AEMO's proposed registration and energy storage dispatch models will assist in reducing operating and administration costs for Market Participants and AEMO

5. Market and system integration and transition	• Contribute to maintaining the secure and reliable operation of the NEM • Encourages business model development and innovation	• The proposed energy storage 10 price and volume band dispatch model seeks to minimise AEMO and industry costs and create a level playing field for all assets. • The proposal and resultant changes seek to encourage innovative business models needed to support the transitioning market

The main concern underlying the options in the consultation paper seems to be that adding another participant category (Bi-directional Resource Provider) would be a premature step if the ultimate ESB 2SM design leads to collapsing existing participant categories in favour of a trader and services-based model.

AEMO notes that significant development and design work remains to be done before the form of 2SM can be settled. Depending on what the ESB identifies as the issue(s) to be addressed and benefits to be delivered by 2SM, the development work will need to consider alternative options (including leaving intact what currently exists), the extent of the changes required in the NER and re-development of material procedures and systems for implementation. A number of key factors need careful consideration in determining the extent to which existing Market Participant categories can be collapsed:

- The extent, value and cost of collapsing participant categories and introducing a trader and services-based model.
- The term "Market Participant" currently identifies the concept of 2SM trader in the NER. Regardless of terminology, as a person seeks to participate in the NEM or offer further services, some form of registration process will continue to be required.
- There will continue to be a need to assign specific technical rights and obligations associated with different types of connected assets on the person who owns, operates or controls them.
- For grid-scale assets, the challenges involved in separating obligations around services from the regulation of technical and operational performance of the underlying assets.
- At grid-scale, whether the differences between energy and FCAS provision remain. Currently, energy is provided, metered and settled at the connection point, however Market Participants typically provide FCAS from individual assets measured behind the connection point.

AEMO remains open to the concept of a single trader model replacing existing Registered Participant categories once the design options, expected efficiencies and costs/risks are identified by the ESB in consultation with stakeholders. The introduction of a Bi-directional Resource Provider now, should not make the task of any future consolidation of market participants into a trader model any harder. Further, the Bi-directional Resource Provider provides a two-sided participation model that could be leveraged for future reforms.

Consistent with the ESB's 2SM short-term and intermediate steps (as identified in the ESB's September paper), the ESS proposed rule will clarify for all Market Participants that SGA's can also classify "exempt" energy storage behind connection points they are financially responsible for. The ESB's 2SM program seeks to consider further improvements to facilitate flexible trading arrangements for small end users.

ESS and other related 2025 workstreams

The table below identifies the relationship between the ESS proposed rule and other related 2025 workstreams.

Project	Description	Relationship with ESS proposed rule
ESB Essential System Services Market Design Initiative	The objective is to identify new services required to efficiently operate the power system and market. This work is to define the capabilities and characteristics of new services, how system services are procured and valued and how they will be deployed, e.g. will they be co-optimised with energy dispatch. This ESB workstream is progressing alongside other new system service-related rule change proposals the AEMC is currently consulting on.	Energy storage would be another asset that any new services can be provided from. Defining this asset in the NER would also allow any specific information requirements to be identified from these resources. As the NEM becomes more complex with increasing numbers of services being co-optimised, if these services are provided from Market Participants with energy storage or 'hybrid facilities', existing complexities and operational inefficiencies associated with two separate dispatchable unit identifiers (DUIDs) may increase and will need to be managed by those Market Participants and AEMO. Having a single dispatch model for energy storage will reduce further operational complexity of these assets. The non-energy cost recovery arrangements identified in the ESS rule change proposal may also ensure Market Participants are appropriately recovered from.
ST PASA	AEMO is reviewing and re-developing the current ST PASA tool so that it considers all demand and supply changes including from new technologies and service types, including energy storage. This tool is used for power system operation purposes to assess reliability up to the 7-day timeframe.	The proposed rule will define and draft changes to identify those assets and energy flows. This will be helpful as the new ST PASA will require information from these energy storage Market Participants. A single energy storage dispatch model also allows for better calculation of energy storage impacts on the supply and demand balance.

2. New energy storage issues

This section identifies issues AEMO has identified, since submitting the rule change proposal in August 2019, that the AEMC may wish to consider as a part of its consultation.

Network Service Provider connection points

As the NEM transitions, the importance of grid-scale energy storage for network support is becoming more apparent. Some network service providers (NSPs) have invested in large energy storage primarily for network support purposes, but funded at least partly by trading energy and FCAS. Current AER ring-fencing guidelines do not prevent NSP ownership or operation of market energy storage up to a threshold value, and AEMO expects this trend to continue.

While the market trading operations of these ESS have previously been conducted by an intermediary (which registers, currently, as the Market Generator and Market Customer), the energy storage is nevertheless owned by the NSP whose network it is connected to. This means there is no ownership boundary between a network and the 'connected' asset. With no actual point of transfer between one person's facilities and another, the NER connection concepts, in theory, will simply fail. There is no 'connection' between facilities as envisaged by the rules (no

facilities belonging to separate parties, no connection assets, no identified user shared assets, and no connection point). In turn, there can be no document that fits the current definition of a connection agreement, and nothing for the rule 5.3 access negotiation process to attach to, including performance standards and system strength assessments and remediation.

AEMO considers it is necessary for the NER to provide a clear pathway for NSP-owned ESS to establish a set of performance standards and system strength requirements for operation in the market.

Chapter 2 ancillary services provisions

FCAS are currently provided from ancillary services generating units and ancillary services load. Consistent with the existing NER drafting approach, AEMO proposed that the ESS rule would introduce an ancillary services bi-directional unit (for energy storage). Where a Market Participant wishes to provide these services, they must apply to AEMO to classify the unit and meet various requirements under the NER. In effect, the term "classify" in these clauses refers to the approval process and ensuring the Market Participant is technically capable of providing FCAS and AEMO has the necessary information to set these up in its market systems.

After further consideration and with a view both to reflecting current reality and reducing the potential for duplicated effort for subsequent reforms, AEMO proposes that the drafting of NER Chapter 2 regarding market ancillary services could be simplified. Existing NER clauses 2.2.6 (ancillary services generating unit), 2.3.5 (ancillary services load) and proposed clause 2.2A.4 (ancillary services bi-directional unit) include similar requirements that are repeated in each clause. These clauses could be consolidated by:

- Defining an umbrella term (e.g. "ancillary services facility") to replace the separate definitions of "ancillary services generating unit", "ancillary services load" and the proposed "ancillary services bi-directional unit". Alternatively, this definition could be specified in the market ancillary service specification (MASS).
- Allowing a Market Customer, Market Generator or Market Bi-directional Resource Provider to provide market ancillary services from "ancillary services facilities" in accordance with the MASS.
- All other policy requirements remaining the same (but consolidated), noting most are currently replicated requirements for each asset.
- The MASS identifying the service (consumption-side or production-side) that can be provided from an asset or connection point.
- A MASP (or DRSP) should not be allowed to "unbundle" the consumption of a bi-directional facility, this is inconsistent with the original policy. Note, this is also an amendment to AEMO's proposed rule.

This simplified drafting would be more consistent with the 2SM view that the regulatory framework should be more adaptable to change and facilitate innovation, supported by technical requirements within service specifications.

By moving away from the "load" (customer) and "generation" terms that reference the delivery of energy either out of or into the grid at a connection point, these changes will better accommodate the reality that the assets that connect to the grid no longer result in those 'traditional' directional flows. In particular, "loads" are increasingly flowing energy in the opposite direction at the connection point. For the purposes of providing FCAS, it is desirable to clarify that "ancillary service loads" can provide FCAS by varying both the import and export quantities at a connection point.

AEMO acknowledges that the definition of load may require further consideration to support this outcome.

DC connected systems

Recently, AEMO has received enquiries from proponents seeking to connect VRE and energy storage sharing an inverter. The NER provide no guidance on how different technologies that share an inverter, known as DC coupled, are to be registered and participate in the NEM. When an inverter is shared, this is the point at which the system is capable of producing and consuming electricity. Where these are registerable assets (typically grid-scale), this raises several challenges associated with how to register and classify, and how these should operate in the market. No matter the technology classification (e.g. bi-directional asset, the proposed classification for energy storage, scheduled or semi-scheduled generating unit), to operate in existing market systems these 'hybrid facilities' the "generation" would need to have a single DUID. For non-registerable assets, this may impose less of an issue because the energy and any FCAS (where applicable) is not needing to be co-optimised in dispatch.

AEMO requests the AEMC to consider how these assets should participate in the NEM. It may be reasonable to require this type of configuration to be classified as a scheduled asset because typically the energy storage is being connected for the purpose of shifting energy, this implies the Market Participant has controllability over providing energy and FCAS.

3. Clarifications or further information

This section responds to question and statements in the AEMC's consultation paper that AEMO considers require clarification or where stakeholders may benefit from additional information.

Are Registered Participant categories growing?

In section 3.3.1 of its consultation paper the AEMC identifies that Registered Participant categories have grown, and seeks feedback on whether adding another category contributes to a growing problem that is making participation unclear for stakeholders.

AEMO agrees with the AEMC's observation that the NEM participation structure is unclear, but this is unlikely to be the result of the number of Registered Participant categories. Confusion is more likely to arise from the matrix of "classifications" which apply to each connection point of a Registered Participant based on the technical characteristics of the connected facility (e.g. semi-scheduled), whether the connection point or facility is settled on the market, or the types of service it is approved to provide. The classification terms are then used in the NER as descriptors

both for the facility type and for a Registered Participant when referring to its rights and obligations in respect of its facilities or services of that type.

Previous inconsistent approaches to the introduction of new Registered Participant categories and other non-registered roles has added to the general confusion. AEMO provides the following clarifications and observations on the AEMC's assessment of this issue:

- A Metering Data Provider (MDP) is not a Registered Participant. Under NER Chapter 7, MDPs are accredited by AEMO to perform certain roles under that chapter and the retail market and metering procedures. The National Electricity Amendment (Provision of Metering Data Services and Clarification of Existing Metrology Requirements) Rule 2010 renamed and clarified the MDP's role, but did not add another Registered Participant category.
- The National Electricity Amendment (Wholesale Demand Response Mechanism) Rule 2020 will not introduce a new Market Participant category, instead it replaces the Market Ancillary Service Provider category and expands the services that can be provided (which is indicated by "classifying" them, as described above)[1].
- The AEMC also identifies that Hydro Tasmania's synchronous services markets (including inertia) and Delta Electricity's capacity commitment mechanism for security and reliability services rule change proposals would "propose new classifications and categories". While these are focussed on services from generating systems, AEMO understands they could be offered by any Market Participant that is technically capable of providing them. These changes at most suggest a classification process (noting that "classification" indicates that a Market Participant can provide that service).
- Where new services are to be integrated in the NEM, it is not a foregone conclusion that a new classification or category will be added. For example, inertia might be considered a market ancillary service, avoiding the need for any new classification label. Any capacity commitment mechanism could be designed in a similar way to non-market ancillary services, where AEMO procures these services from a registered participant, which is anyone capable of meeting the technical and contractual requirements as determined by AEMO.

AEMO notes there have been only three distinct Registered Participant categories added to the NER since market start - including the Small Generation Aggregator, the Market Ancillary Service Provider (being replaced with the Demand Response Service Provider) and the Metering Coordinator.

Performance standards - question 20, part 2

The AEMC suggests that AEMO has proposed a single set of performance standards for each asset. AEMO's proposed rule is for a single performance standard to apply to a "bi-directional facility" and this be reflected in Chapter 5, recognising that a bi-directional facility may include more than one asset (e.g. generating units, bi-directional units or loads).

[1] The Demand Response Service Provider category will replace the Market Ancillary Service Provider.

Does AEMO's proposed rule include NEM participant fee methodology changes – question 22?

In section 5.1.2 of its consultation paper, the AEMC identifies that "AEMO seeks to address the issues with the way participant fees and non-energy cost recovery is calculated by changing the methodology of their calculation for the proposed bidirectional resource provider and the existing MSGA category."[2].

AEMO's proposed rule did not discuss changes to NER clause 2.11, which deals with NEM participant fees. The NER already requires AEMO to consult on participant fees in accordance with the Rules consultation procedure. Any changes to participant fee structures to reflect a Bi-directional Resource Provider category would be undertaken in accordance with clause 2.11. AEMO is currently consulting with stakeholders on the structure of NEM Participant fees[3].

On that basis, the methodology that AEMO uses to determine NEM participant fees is not within the scope of the ESS rule change.

Technology-specific drafting in the NER – question 28, part 2

The AEMC queries whether the benefits of the proposed drafting solution would outweigh the costs given the scale of the changes-. While not underestimating the size of the drafting task, AEMO submits that the amount of drafting should not be a material factor in evaluating the costs and benefits of making a rule, or a more preferable rule. From a drafting perspective, AEMO supports any rule that achieves the objective of equitable dispatch and settlement of energy storage and 'hybrid facilities' as a single entity, in a clear and unequivocal way. Achieving this outcome may require more drafting changes rather than less.

AEMO's proposed drafting was to incorporate a new Bi-directional Resource Provider and a description of bi-directional facilities and units in a manner that is consistent with the current format of the NER. At the same time, the proposal presents an opportunity to simplify concepts and terms that are associated with a particular direction of flow, clarify obligations and replace lists of participants with umbrella terms where appropriate.

Revising the concepts of "generation" and "load" (and related unit, facility and participant descriptions) to very clearly accommodate energy storage and 'hybrid facilities' is, with careful analysis, a potential alternative drafting solution to adding the concept of bi-directional resources. However, AEMO considers this is likely to present a more significant and complex drafting challenge, with the need to ensure that all references to those terms and related obligations correctly apply to appropriate facilities and energy flows.

Importantly, AEMO's proposed rule was designed to provide foundational terms to reflect the existing physical reality of bi-directional flows. Taking this opportunity now would result in fewer drafting changes to accommodate any DER/2SM models. The bi-directional dispatch model

[2] AEMC, Consultation Paper – National Electricity Amendment (Integrating Energy Storage Systems in the NEM) Rule, 20 August 2020, p. 69.
[3] Refer to AEMO's website for more information.

could be used for future participation models where Market Participants operate in dispatch and schedule consumption and sent out energy.

Retailer reliability obligations (RRO) – question 32, part 1

The AEMC consultation paper questions if it is appropriate for the electricity consumed by energy storage from the grid to form part of a liable entity's liable load under the RRO. AEMO's rule change proposal stated "an ESS is likely to produce electricity in period of high demand and … be regarded as improving system reliability"[4]. In its consultation paper, the AEMC reviewed the performance of existing batteries during times of high price events and found that they can be charging a small percentage of the time. It is not clear if the provision of regulation lower FCAS or local system support was considered in the AEMC's analysis, this would also provide an explanation for that activity.

The focus should be on the RRO objective which is to promote investment in dispatchable capacity in response to an identified reliability gap and storage is one of the resources that retailers are encouraged to invest in when a gap is identified at T-3. If retailers do invest in energy storage these decisions will be reflected in the Electricity Statement of Opportunities (ESOO) and reduce the size of the gap. If a gap persists at T-1 the retailer will be able to count its financial contract with the energy storage provider as a qualifying contract.

[4] AEMO, Electricity Rule Change Proposal – Integrating Energy Storage Systems into the NEM, August 2019, p. 23.