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15 October 2020

Mr Joel Aulbury
Project Leader (ERC0280)
Australian Energy Market Commission
Level 15, 60 Castlereagh Street
Sydney NSW 2000

Re: ERC0280 – Integrating energy storage systems into the NEM – Response to Consultation Paper

Dear Mr Aulbury,

Beca Pty Ltd (Beca) welcomes the opportunity to provide comments on the Australian Energy Market Commission's (AEMC, the Commission) consultation paper *Integrating energy storage systems into the NEM* (ERC0280).

Beca is one of Asia Pacific's largest independent advisory, design and engineering consultancies. After a century of operation, we have grown from a family-owned business to one of the most progressive, client-centric professional services consultancies in our region. We have more than 3,300 employees in 21 offices around the world and have delivered projects in more than 70 countries.

We support the intent of AEMO's proposed rule change – however encourage the Commission to, through its review of the consultation paper feedback and draft determination:

- Ensure the connection process (of both greenfield and brownfield energy storage projects) and associated technical performance standards for new bi-directional facilities is clear, either through its rule making powers or the publication of clear guidelines from AEMO (which match the proposed rule change);
- Ensure that the changes implemented by this rule change consider not only the connection of new energy storage systems, but the transition of an existing generator or load to a bi-directional facility (such as a 'battery ready' solar farm to a hybrid battery/solar facility) and streamline this process as far as practical; and
- Clearly define a 'bi-directional unit' and 'bi-directional facility' and detail how those definitions correlate with similar terms such as 'energy storage system', 'battery system', 'pumped hydro' and 'hybrid facility' with a focus on being as technology agnostic and flexible as possible;

Our comments on several queries raised in the consultation paper follow. We note that our comments herein and any examples provided are examples only for the purpose of this consultation process and are not intended to comment on the performance or actions of any party or project.

If any further clarification is required about this submission, please contact me at the below details.

Yours sincerely

Damien Vermeer
Power Engineer

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Question 1: Proposed assessment framework (p. 5)

Do you agree with the proposed assessment framework or are there any additional assessment criteria the Commission should use when assessing identified issues and possible solutions?

We note the National Electricity Objective (NEO) explicitly mentions "price" (in relation to the best interest of consumers of electricity as per Section 7(b) of the National Electricity Law, NEL), however the assessment framework the Commission has identified only pertains to "reduc[ing] operating cost."

It is unclear to us which parties' operating costs (consumers, generators, NSPs, market operators?) is the focus of the Commission's proposed assessment framework. This would be good to clarify, noting that the NEL only highlights consumers.

Question 2: Current issues caused by the treatment of storage (and hybrids) under the NER (p. 14)

Do you agree with AEMO that there are currently significant issues for storage units and hybrid facilities being caused by the rules not including a storage definition? Why, or why not?

We support AEMO's conclusion that the NER (at time of writing) cannot easily facilitate the concept of energy storage, mostly due to the definition of any single customer connection point being a 'load' or a 'generator' – but not (easily) both.

Has AEMO identified all the current issues for storage and hybrid facilities that arise from its primary issue that the NER does not recognise and adequately define storage? If not, what are the other issues?

Whilst not explicitly raised by AEMO, we raise for discussion the fact that several generating systems (such as solar farms) are being designed and installed as to be 'battery ready.' That is, these generating systems are being designed in such a way that a battery energy storage system (BESS) can be cost-effectively installed in the future, either in parallel at the point of connection (AC coupled) or in parallel with the solar PV modules (DC coupled).

In that sense, whilst acknowledging the complexity of the rule change currently under consideration by the Commission, we recommend an additional item be added as per the below:

- The process to modify an existing generating system or load to add some form of energy storage (behind the connection point either AC or DC coupled) is unclear;

Our thoughts on this are further discussed in Question 40.

Question 3: Implications for storage forecasts (p. 21)

Do you agree that storage and hybrid facilities are likely to play a significant role in the future market? If so, do you agree that this indicates that the issues AEMO has identified in its rule change request, arising from the current treatment of storage under the NER, are likely to become worse over time? Why, or why not?

We believe the power system is currently in transition and hybrid storage/generation facilities will form a key part of the future Australian electricity system. However, without any changes to the NER/framework:

- Generators may be discouraged from investing in energy storage (due to the technical and regulatory uncertainty and associated cost risk);

- Consumers and retailers may be subjected to increasing wholesale spot-price variations and swings; and
- AEMO's technical burden for processing any energy storage connections will remain.

Thus, whilst not necessarily agreeing that they will become worse over time, we believe the issues identified by AEMO will persist to the detriment of the consumers of electricity, thus in objection to the NEO and hence should be addressed irrespective of whether they are becoming worse over time or not.

Question 5: AEMO's rationale for defining storage and hybrids in the NER (p. 27)

Do you have any comments on AEMO's wording for its proposed definitions of storage and hybrid facilities?

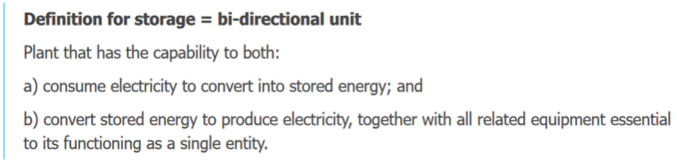
We support the intent of AEMO's proposed definitions. However, we have provided the following comments for consideration. As part of the rule making process, we assume the Commission will clarify the wording of the definitions to align with the definitions as per Chapter 10 of the Rules.

Bi-directional Unit

The proposed definition of a bi-directional unit does not clearly state that the definition refers to a single piece of plant, which to our reading appears to be the intention of AEMO's submission.

For example:

- A lithium battery energy storage system:
  - Meets definition a) as it is a piece of plant which consumes energy to convert into stored energy; and
  - Meets definition b) as it is a piece of plant which converts stored energy to produce electricity.
- However, a hydrogen-fuelled gas turbine in parallel with a hydrogen electrolyser:
  - Meets definition a) as the electrolyser can convert electrical energy into hydrogen for storage; and
  - Meets definition b) as the turbine can convert hydrogen back into electrical energy.



Definition for storage = bi-directional unit

Plant that has the capability to both:

a) consume electricity to convert into stored energy; and

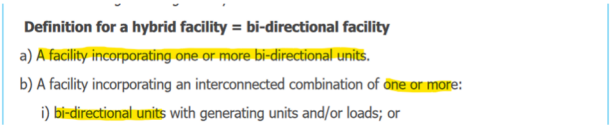
b) convert stored energy to produce electricity, together with all related equipment essential to its functioning as a single entity.

Figure 1: Extract from Box 1 from the consultation paper

In the above example, two physical pieces of equipment (likely with different electrical terminals) can be classified as a single bi-directional unit, which is likely not in alignment with AEMO's intentions.

Bi-directional Facility

The proposed definition of a 'bi-directional facility' seems to needlessly duplicate the inclusion of 'bi-directional unit' in part a) and b) of the proposed definition. See Figure below.



Definition for a hybrid facility = bi-directional facility

a) A facility incorporating one or more bi-directional units.

b) A facility incorporating an interconnected combination of one or more:

i) bi-directional units with generating units and/or loads; or

Figure 2: Extract of Box 1 from the consultation paper, with highlights by the author.

An alternative definition for a 'bi-directional facility' for consideration follows:

- A facility incorporating one or more:
  - bi-directional units; or
  - generators; or
  - loads, other than those used to provide auxiliary services for a generator;
- And where the facility can be controlled or operated as to, through a common connection point:
  - draw electrical power from the network; and
  - supply electrical power to the network;

Such a definition would also be flexible as to apply to registered generator/load combinations behind a common connection point, such as large industrial customers with behind-the-meter registered generating systems – though it is unclear if this is the intention of AEMO's proposed rule change.

Question 7: Understanding the interest in registering hybrid facilities and the challenges that exist (p. 35)

Why would you consider aggregating different technologies together in a hybrid facility? Which technologies do new participants propose to combine in hybrid facilities?

In our experience, adding energy storage with a generating system (either a generator with or without intermittent energy source availability) may:

- Add the ability to deliver higher revenue, by storing and releasing energy to the market when the spot price is high; or
- Add the ability to store a resource (sun/wind energy in electrical form) until the local electricity network can accept the energy (such as network constrains); or
- (Not currently common but becoming more common) add the ability to absorb energy when the energy market price is negative.

Where one or more of the above reasons may be a motivating factor for developers to consider developing a bi-directional facility.

Combining battery style energy storage with intermittent resources (wind/solar) is typical, but we are not aware of any technical reason which prevents energy storage from being combined with other 'constrained' resources (either constrained by grid constraints, access to the energy source, etc).

Would you prefer to balance output and consumption across multiple connection points or combine technologies behind an individual connection point?

We note for smaller generators without energy storage in the < 5 MW range, multiple small facilities with multiple independent connection points are common.

However, in our experience, projects with energy storage tend to be registered with AEMO (in order to unlock FCAS and arbitrage revenue streams) and thus have a desire to combine as many assets behind a single connection point, as multiple connection points:

- Will require duplicated primary assets (IUSAs / DCAs including substations, transformers, protection equipment, etc); and
- May interact with each other (such as requiring multiple Full Impact Assessments as per the system strength assessment guidelines).

These factors usually lead to higher connection costs for the future bi-directional facility, discouraging the multiple connection points approach.

Are you considering aggregating renewable plant and batteries together as a scheduled generating unit under the current rules? What regulatory challenges do you see with this approach?

We question if the Rules even allow such an approach.

- Clause 3.8.3 of the Rules does not allow the aggregation of dissimilar generating units (example given of a [semi-scheduled] wind turbine and a [scheduled] gas turbine in the consultation paper[1]);
- However, it is unclear if a [semi-scheduled] wind turbine and a [scheduled] battery system could be aggregated?

If such aggregation is only possible by converting the wind turbine (in this example) into a scheduled generator, then such an arrangement would be to the generator's detriment as the battery will be predominantly used to ensure compliance with dispatch instructions.

Do you consider that the lack of clarity in the NER on whether different technologies can be aggregated is a significant issue for registering hybrid facilities? If so, why?

We agree, with our confusion as per the question immediately above being indicative of the lack of clarity on the current arrangements.

Question 12: Proposed approach for transitional arrangements (p. 44)

Would participants with storage that are currently registered as a Market Generator and Market Customer want to transition to AEMO's new category and classification? If so, what advantages would it offer?

If the Generator/Customer Performance Standards (GPS/CPS) require renegotiation to transfer between the existing framework and AEMO's proposed new classification, then we doubt any existing participant would initiate such a transition.

If the Commission wishes to move all existing dual generator/load classifications towards the new bi-directional unit/facility classifications, we encourage the Commission to investigate transferring without progressing through the clause 5.3.9 process (similar as to what was adopted for the mandatory Primary Frequency Response changes).

Should owners/operators of existing standalone storage units be grandfathered, i.e. permitted to remain on their current registration and classification arrangements?

We believe so, as per our comment above, unless there is a transition with minimal financial and technical impact to the existing participants. Otherwise, such an approach may be interpreted as one where the Commission is actively disincentivising or penalising early adopters of technology.

[1] Consultation paper pg.35

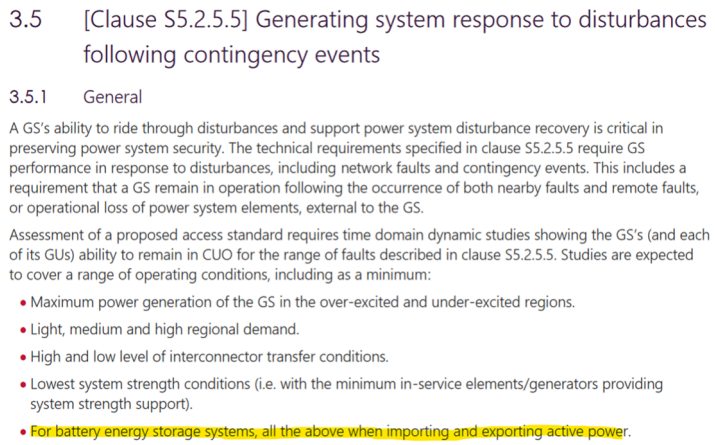
Question 20: Performance standards (p. 62)

Are the current rules unclear on how performance standards should apply in facilities with a mix of asset types? Do the current rules create barriers for storage hybrid facilities? To maintain power system security, should AEMO have greater visibility of the assets behind a connection point?

Project experience has shown that negotiating and connecting new battery storage systems, either stand-alone or as part of a hybrid facility, requires substantial interpretation of the Rules by the connecting generator / ESS operator, the NSP and AEMO.

As a storage system is currently both a Market Load and a Scheduled Generator, we understand that it must comply with the Generator Performance Standards (GPS, S5.2 of the NER) and Customer Performance Standards (CPS, S5.3 of the NER). Unfortunately, these two performance standards are not compatible.

- AEMO, and thus by that extension NSPs, require demonstration of GPS for batteries operating as a load. But when the batteries are a load, they are not acting as a generator, thereby should not have to meet the GPS criteria? See below as an example.



3.5 [Clause S5.2.5.5] Generating system response to disturbances following contingency events

3.5.1 General

A GS's ability to ride through disturbances and support power system disturbance recovery is critical in preserving power system security. The technical requirements specified in clause S5.2.5.5 require GS performance in response to disturbances, including network faults and contingency events. This includes a requirement that a GS remain in operation following the occurrence of both nearby faults and remote faults, or operational loss of power system elements, external to the GS.

Assessment of a proposed access standard requires time domain dynamic studies showing the GS's (and each of its GUs) ability to remain in CUO for the range of faults described in clause S5.2.5.5. Studies are expected to cover a range of operating conditions, including as a minimum:

- Maximum power generation of the GS in the over-excited and under-excited regions.
- Light, medium and high regional demand.
- High and low level of interconnector transfer conditions.
- Lowest system strength conditions (i.e. with the minimum in-service elements/generators providing system strength support).
- For battery energy storage systems, all the above when importing and exporting active power.

Figure 3: Extract from AEMO's Access Standard Assessment Guide[2]

- S5.3.5 (CPS) requires a market load to operate at a power factor (typically within 0.90 lagging or better) however it is unclear if this requirement overrides the requirement as per S5.2.5.13 (GPS) which requires the battery to operate in a voltage control mode (where it may present a 'worse' power factor under AEMO instruction)?
- S5.3.10 (CPS) requires Market Customers who have peak demands in excess of 10 MW to provide automatic interruptible load (i.e. under-frequency load shedding) which is surely not desirable for a battery system, especially considering the new mandatory Primary Frequency Response requirements?

We support AEMO's proposal to remove the requirement for bi-directional units to comply with CPS (S5.3) and only require compliance to GPS (S5.2) insofar as such a requirement is not extended to loads not part of a bi-directional unit within a bi-directional facility.

[2] Available at https://aemo.com.au/-/media/files/electricity/nem/network_connections/access-standard-assessment-guide-20190131.pdf

Could these challenges be mitigated by having a single set of performance standards for each asset, as proposed by AEMO?

If a set of performance standards for each bi-directional / generating unit, or aggregation of identical units, is agreed at a point that is *not* the formal asset boundary (i.e. not the formal connection point as per the NER) then we are in support of this approach.

Based on our experience, attempting to negotiate performance standards for different generating systems behind a single connection point is complex, even more so if there is an existing generating system in parallel with the new proposed bi-directional unit(s).

We understand this concept is being considered as part of the *Connection to dedicated connection assets*[3] (ERC0294) rule change and we encourage the Commission to align the requirements for performance standards between those for shared IUSAs/DCAs and bi-directional facilities.

Question 21: Issues with how fees and charges, and non-energy costs are recovered (p. 69)

Are there any other issues that the Commission should consider with respective to fees and charges, and non-energy cost recovery?

We are unclear on why AEMO made the comment as highlighted below. A bi-directional facility co-located with load is an efficient way to supply that load with electrical power (due to the minimisation of transmission and distribution losses and use-of-system costs) hence we cannot understand why behind-the-meter power flow needs to be measured for fee or charge purposes.

We hope to discuss this more with the Commission, however reinforce that we will not support the creation of a regulatory framework which discourages the creation of 'microgrids' or co-location of load with generation.

Metering and hybrid facilities

AEMO also notes that, since the NER currently requires a single metering installation at each connection point, it is challenging to determine the energy flows occurring between individual assets in 'hybrid' facilities to calculate fees, charges or non-energy cost recoveries for separate energy flows into and out of an individual asset.[191]

Figure 4: Extract from pg.68 of the consultation paper.

[3] For example, Section 5.1.2 of the Commission's draft determination for ERC0294

Question 22: Solutions for issues with fees and charged and non-energy cost recovery (p. 71)

For hybrid facilities are further requirements needed, for example, should each asset in a hybrid facility be required to have a revenue meter or is supervisory control and data acquisition (SCADA) data appropriate?

It is unclear to us what AEMO describes as 'perverse incentives' in relation to hybrid facilities (see below figure). We believe an efficient power system is one where load is co-located with generation, hence we believe the NER should not discourage this structure.

Based on the lack of reasoning (to our reading) in AEMO's submission on the purpose of the sub-revenue metering, we do not support the requirement for sub-revenue metering within bi-directional facilities as it may discourage co-location of generation with load, which we believe is not in the best interest of consumers of electricity (in objection to the NEO).

> Further, since the NER currently requires a single metering installation at each connection point it is challenging to determine the energy flows occurring between individual assets in 'hybrid' facilities to calculate fees, charges or non-energy cost recoveries for separate energy flows an individual asset. For example, if the policy is for an ESS to be exempt from TUOS charges (as proposed in section 4.2.3) and the 'hybrid' facility includes a load, battery and generating unit, the load's consumption from the national grid is impossible to determine on the basis of the metering data from a single metering installation at the connection point. Further consideration of the appropriate metering arrangements for 'hybrid' facilities is needed to prevent any perverse incentives for the co-location of assets (particularly loads in 'hybrid' facilities with ESS) or Registered Participants switching between categories to avoid obligations. Some questions to be considered:

Figure 5: Extract from pg.18 of AEMO's rule change request.

We understand that AEMO may desire greater visibility of the load behind the connection point for SCADA purposes, however we disagree with the statement highlighted below.

The co-location of a load with a generator does not in itself imply that the load is actively controlled and can be easily curtailed (for example, a prison with a large solar farm cannot easily curtail its load).

On this basis, we believe this should be managed on a case by case basis via the Chapter 5 negotiation and connection framework, not mandated under a proposed change to the Rules.

> Also, under NER Chapter 5 technical requirements are based on the registered participant category, instead of the asset. Performance standards that apply to a Customer's load are less onerous than a Generator's generating system, reflecting the assumption that load would play a passive role in the NEM. Where a registered participant has a 'hybrid' facility including a load, the load is not passive and can be controlled (the entire facility is likely to be operated with one control system). It is necessary for AEMO to have greater visibility of all assets in a 'hybrid' facility to ensure AEMO understand the impact these facilities have on the power system.

Figure 6: Extract from pg.18 of AEMO's rule change request.

Question 24: Issues with TUOS and DUOS charging arrangements (p. 76)

Do you agree that there is ambiguity and uncertainty around how transmission and distribution network businesses calculate and charge TUOS and DUOS for battery systems?

We understand that each NSP is free to set their distribution tariffs (with AER oversight) and due to geographic distance and network size there is natural variation in the tariffs for large distribution connected load.

However, a bi-directional facility consuming power from the distribution network does not necessarily present a load during peak network times. In this sense, the bi-directional facility may be unfairly allocated network costs, which may discourage investment (which is a barrier to entry for this specific technology type).

What are the pros and cons to allowing each NSP discretion in developing and applying TUOS and DUOS charges? On balance, should the approach and method to applying TUOS and DUOS charges be harmonised among NSPs?

An advantage of this approach is that encouraging NSPs to compete on price for tariffs may encourage energy storage systems to connect to their network, however as per our commentary on Page 11 of this submission and above, the existing tariff structure may not be suitable.

A substantial disadvantage is that if each NSP is allowed complete discretion with no regulatory requirement for a ‘energy storage friendly’ tariff, then the existing framework may further distort investment as a single NSP may consistently be cheaper (in terms of DUOS) than others due to geographic distance, network size, asset age etc. This may lead to ‘clustering’ of bi-directional facilities in that NSP’s distribution area.

This ‘clustering’ of bi-directional facilities, which are also by definition generators, means under heavy load conditions generation may travel backwards through the distribution network, onto the transmission network towards load (possibly in a different NEM region). This may increase distribution and transmission network flows and concentrate investment, likely to the detriment of the consumers of electricity, who may incur higher TUOS or DUOS charges themselves (as loads) to cover the cost of this increased network flow (which we interpret as being in objection to the NEO).

Question 25: Solutions for clarifying the application of TUOS and DUOS charging (p. 79)

Do you agree with AEMO's proposal to exempt all energy storage systems from TUOS charges? If you agree with an exemption, should the exemption of TUOS charges also apply to energy used on site (auxiliary load) i.e. energy that is not stored and sent out into the network?

We agree that bi-directional facilities should be exempt from TUOS charges, though as per our comment in Question 40 recommend the Commission clarify that they are seeking feedback in relation to the exemption of TUOS charges for all bi-directional facilities, not just energy storage systems themselves?

If battery systems are exempt from TUOS charges does this:

One clarifying note, the Commission's question relates to 'battery systems' but we have assumed that the Commission is seeking feedback applicable to all bi-directional facilities.

a) *create a subsidy for battery technology and therefore an advantage over other generation technologies?*

We do not believe so, on the basis that a transmission network would not be expanded at the TNSPs cost to incorporate a bi-directional facility, as such network expansions are normally funded by the bi-directional facility proponent themselves (such as an IUSA for a new solar/battery facility).

b) *remove the ability to provide an efficient location and/or price signal to potential battery system proponents, and therefore impact on the efficient entry and location of new battery system participants?*

In our experience, price signals given to the market/industry are predominantly the direct connection costs (such as IUSAs) and not tariff structures (for large transmission connected bi-directional facilities or loads).

To our reading, the core of the Commission's question seems to be "would the lack of TUOS charges promote locating energy storage systems far away from load centres?" To this, we note that the potential for low system strength (requiring remediation under the Rules) may in a sense disincentivise the remote location of energy storage systems compared to load. However, we don't believe the current DUOS framework incentivises the connection of energy storage within the distribution network either, even though it may be closer to load.

On that basis we support making bi-directional facilities exempt from TUOS.

How should TUOS and DUOS charges apply to hybrid facilities? Should TUOS and DUOS charges be based on metered data at the network connection point, or another option? Are there technical or implementation issues with this?

As per our answer to Question 26, we caution the Commission to not implement a framework which discourages investment in behind-the-meter style hybrid facilities or microgrids. We do not understand AEMO's concern that they cannot calculate the behind-the-meter customer load at a hybrid facility for application of charges (assuming such as DUOS) where this load may not be consuming any electrical power from the distribution network, hence should not be penalised as such?

We note there may be a technical implementation issue with any approach which uses sub revenue metering. Consider the example of a large single consumer of electricity with multiple small loads and generators (such as a university campus). There is substantial cost involved in measuring TUOS/DUOS charges at any point other than the connection point because of the quantity of sub-revenue metering required. We believe such an approach would unfairly penalise these bi-directional facilities for efficient design (co-locating generation locally with load).

Do you agree that battery systems should pay DUOS charges for consumed energy? Please explain why or why not.

We support a framework where NSPs get reasonable cost recovery for costs they incur to supply bi-directional facilities with electricity on the basis that such a framework does not create unreasonable cost recovery given the nature of the electricity consumption of such bi-directional facilities.

Whilst completely removing DUOS for bi-directional facilities is likely unmanageable and could be exploited, an alternative for discussion follows.

- Most tariff structures for large distribution customers charge a fixed cost per kVA as a network demand charge;
- This demand charge typically has no inter-day time component – that is, it is a rolling average (typically monthly);
- This means a bi-directional facility will be subjected to the same demand charge for drawing power from the network at 3:00am (when distribution network loading is typically low) as 7:00pm (when distribution networking is typically high);
- This discourages a distribution-connected bi-directional facility from consuming energy from the network at all.

A solution for consideration to the above is mandating the creation of a time based (peak, shoulder or off-peak) demand charge structure for large distribution customers including bi-directional facilities. The demand cost for consuming energy during low network loading would be made to align (unfortunately via regulation) with the costs of the NSP providing that service during low network loading.

Such an arrangement will unfortunately require regulatory involvement by the Commission & the AER's through creation of a new mandated tariff offering, however it (in our opinion) provides a compromise by aligning the tariff structure for bi-directional facilities with that of the electricity spot price (the price is higher when the electricity demand is higher) to encourage distribution connected bi-directional facilities.

Question 40: Other drafting issues – issues (p. 106)

Do you consider it appropriate to address these additional drafting issues identified by AEMO in the course of this rule change process?

Not to increase the workload for the Commission, but we discourage that minor amendments which may be unrelated to the current rule change (or intent of the current rule change) be considered, especially given the complexity of this rule change. If the drafting changes directly relate to the proposed rule change, then we have no objection in principle to these changes being included in a single rule change.

For example, AEMO's proposed changes to clause 2.2.1 of the NER do not appear to be included in their submitted marked-up rule change (possibly a printing error?) but also may require consideration with the *Generator registration thresholds* rule change (ERC0256).

We support AEMO's proposed changes to 2.2.6(d), 2.3.5(d), 2.9.1(c), and 2.9A.2(d) in principle, noting there is limited detail (to our reading) in AEMO's rule change submission to explain the background of the proposed change. Our opinion is that an applicant for market participation registration (or exemption from registration) who is paying AEMO for a service should be able to request additional time to provide the further clarification requested and such a request will not be unreasonably withheld.

Are there any other issues similar to those presented in Table 6.3 which have not been identified by AEMO, which you consider should be addressed in the course of this rule change process?

Although not minor drafting errors, a few closing queries or comments follows:

- We cannot identify any discussion on the applicability on avoided TUOS for generators which form part of a bi-directional facility (similar to embedded generators, although in this case they will be typically registered rather than exempt from registration). The co-location of generation with energy storage may lead to avoided TUOS (in addition to only being exempt from TUOS) and we encourage the Commission to discuss its applicability to bi-directional facilities (both with and without bi-directional units) in the draft determination;
- The consultation paper does not appear to discuss the process to convert an existing generator or load into a bi-directional facility;
  - We acknowledge that clause 5.3.9 of the NER is the process for altering an existing generating system. Based on its writing, this clause was written with the intention of a party altering or upgrading an existing generating unit, not adding a new generating unit (which may be of a vastly different technology type compared to the existing plant);
  - To streamline the integration of energy storage into the NEM, we recommend the Commission review the pathway to convert an existing generating system or market load into a bi-directional facility, with a focus on encouraging efficient investment and act in the best interest of consumers (i.e. avoid needless duplication of connection assets and avoid re-negotiation of the performance standards for existing generating plant which is not being modified by the addition);
- The consultation paper uses multiple terms to describe energy storage and we are unclear what terms are synonyms with others. We encourage the Commission to clearly clarify the terms in their draft determination to avoid future confusion. For example, are:
  - *Hybrid facility* and *bi-directional facility* synonymous?
  - *Energy storage system*, *battery system*, *battery* and *bi-directional unit* synonymous?