

15 October 2020



Ms Merryn York
Acting Chair
Australian Energy Market Commission
GPO Box 2603
SYDNEY NSW 2000

Dear Ms York

Consultation Paper: Integrating Energy Storage Systems into the National Electricity Market (NEM)

Energy Queensland Limited (Energy Queensland) welcomes the opportunity to provide comment to the Australian Energy Market Commission in response to the *Integrating Energy Storage Systems into the NEM* consultation paper.

The attached submission is provided by Energy Queensland, on behalf of its related entities, including:

- Distribution network service providers, Energex Limited and Ergon Energy Corporation Limited;
- Regional service delivery retailer, Ergon Energy Queensland Pty Ltd; and
- Affiliated contestable business, Yurika Pty Ltd including its subsidiary, Metering Dynamics Pty Ltd.

Should you require additional information or wish to discuss any aspect of this submission, please do not hesitate to contact me or Charmain Martin on 0438 021 254.

Yours sincerely

A handwritten signature in black ink, appearing to read "Trudy Fraser", enclosed in a thin black rectangular border.

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Energy Queensland

**Submission to the
Energy Security Board**

**Integrating Energy Storage Systems
into the NEM Consultation Paper**

Energy Queensland Limited
15 October 2020



About Energy Queensland

Energy Queensland Limited (Energy Queensland) is a Queensland Government Owned Corporation that operates businesses providing energy services across Queensland, including:

- Distribution Network Service Providers, Energex Limited (Energex) and Ergon Energy Corporation Limited (Ergon Energy);
- a regional service delivery retailer, Ergon Energy Queensland Pty Ltd (Ergon Energy Retail); and
- affiliated contestable business, Yurika Pty Ltd (Yurika), which includes Metering Dynamics Pty Ltd (Metering Dynamics).

Energy Queensland's purpose is to 'safely deliver secure, affordable and sustainable energy solutions with our communities and customers' and is focused on working across its portfolio of activities to deliver customers lower, more predictable power bills while maintaining a safe and reliable supply and a great customer service experience.

Our distribution businesses, Energex and Ergon Energy Network, cover 1.7 million km² and supply 34,000GWh of energy to 2.25 million homes and businesses each year.

Ergon Energy Retail sells electricity to 738,000 customers in regional Queensland.

Energy Queensland also includes Yurika, an energy services business creating innovative solutions to deliver customers greater choice and control over their energy needs and access to new solutions and technologies. Metering Dynamics, which is a part of Yurika, is a registered Metering Coordinator, Metering Provider, Metering Data Provider and Embedded Network Manager. Yurika is a key pillar to ensuring that Energy Queensland is able to meet and adapt to changes and developments in the rapidly evolving energy market.

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1 Introduction

On 20 August 2020, the Australian Energy Market Commission (AEMC) published the *Consultation Paper: Integrating Energy Storage Systems into the NEM* (consultation paper). The consultation paper follows the submission of a rule change request by the Australian Energy Market Operator (AEMO) seeking to amend the National Electricity Rules (NER) to support the participation of energy storage systems in the National Electricity Market (NEM).

The consultation paper seeks feedback on the following:

- the registration and classification framework for storage units and hybrid facilities;
- technical and operational challenges relating to utility scale storage and hybrid facilities, including participation in central dispatch;
- the application of fees and charges, including transmission use of system (TUOS) and distribution use of system (DUOS) charges that apply to storage and hybrid facilities and non-energy charges levied by AEMO;
- the intervention compensation framework; and
- the Retailer Reliability Obligation (RRO) technology-specific language and definitions used throughout the NER.

The AEMC is seeking feedback on the issues and questions raised in the consultation paper by 15 October 2020 to assist in assessing the proposed rule change. Energy Queensland's comments are provided in sections 2 and 3 of this submission.

2 General comments

Energy Queensland welcomes the opportunity to provide feedback in response to the AEMC's consultation on AEMO's rule change request relating to the integration of energy storage systems in the NEM. The Australian electricity industry has been undergoing a significant transformation over recent years, impacting all levels of the supply chain. A key component of the future energy landscape will be the increasing connection of energy storage systems, including grid-scale batteries, aggregations of smaller batteries and hybrid facilities, and the greater role these systems will play in the NEM.

Energy Queensland continues to monitor developments in the residential and commercial energy storage systems market. We have built on previous trials and extended the testing of energy storage systems to a real-world environment in customers' premises. The trials and tests we have performed in this area have enabled us to continue to engage with the energy storage market on standards, safety and connection requirements. We recognise the potential for energy storage systems to provide network benefits (through helping better manage the electricity network and supply during peak demand) as well as customer benefits (through optimising the use of their stored power to reduce wholesale market prices).

Across the Queensland distribution networks there are currently:

- One 4 MW large-scale energy storage system. However, Energex and Ergon Energy Network have received a number of enquiries to connect systems up to 200 MW;
- Two large-scale hybrid facilities, comprising renewable energy generation and storage; and
- Over 7,000 small-scale energy storage systems. However, while energy storage systems are currently in less than one per cent of homes, nearly 30 per cent of customers surveyed for the annual *Queensland Household Energy Survey* in 2019 stated their intention to install a battery in their homes over the next 10 years, providing greater opportunities for aggregation of small energy storage systems.

It is clear that declining costs, continuous technological development and changing consumer attitudes make it likely that the uptake of energy storage systems will continue to grow and drive an evolution in networks to accommodate two-way power flows and enable customers to optimise the value of their investment in these new technologies. As volumes increase, the integration of energy storage systems will become more challenging, with transmission and distribution systems needing to adapt from traditional, uni-directional systems to platforms that enable bi-directional flows and more dynamic energy markets. Energy Queensland therefore acknowledges that it is timely to review how energy storage systems register and participate in the market and whether the current regulatory framework requires amendment to better facilitate their integration.

With respect to AEMO's proposed rule change, Energy Queensland considers that:

- Rather than adding further registered participant categories specifically for energy storage systems and hybrid facilities, consideration should be given to a single, bi-directional participant category;
- The framework should apportion costs appropriately and minimise cross-subsidies;
- Current DUOS and TUOS arrangements are clearly defined under Chapter 6 of the NER and do not require amendment; and
- It is essential that any changes considered as part of this rule change process are aligned with future market design reforms currently underway.

Our feedback on the questions raised in the AEMC's consultation paper is provided in section 3 of this submission. We are available to discuss this submission or provide further detail regarding the issues raised.

3 Specific comments

Energy Queensland provides the following comments on the questions raised in the consultation paper:

Questions	Feedback
Chapter 1 – Introduction	
Question 1: Proposed assessment framework (p. 5)	
<p>1 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?</p>	<p>Energy Queensland generally agrees with the AEMC’s proposed assessment framework. However, we also highlight the following for consideration:</p> <ul style="list-style-type: none"> • <i>The interaction of the proposed rule change with the broader transformation work being undertaken.</i> Given the significant energy market reform projects currently in progress, including the Coordination of Generation and Transmission Investment and the Post-2025 Market Design projects, it is important to ensure that any non-critical changes that may become redundant in the longer-term as the market continues to evolve should be avoided. • <i>The overall costs to implement the rule change.</i> While AEMO has indicated that the cost to implement the rule change will be approximately \$8 to \$10 million, it is our understanding that this estimate does not include expenditure that would be incurred by market participants. As these costs will ultimately flow through to customers, including customers without energy storage systems, further consideration of the overall cost impacts of implementing this rule change is required.

Questions	Feedback
Chapter 2 – The threshold question: should storage be defined in the NER?	
Question 2: Current issues caused by the treatment of storage (and hybrids) under the NER (p. 14)	
<p>1 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?</p>	<p>It is not clear to Energy Queensland whether the barriers identified by AEMO are caused by definitional issues within the NER or whether AEMO’s operational practices may no longer be fit-for-purpose.</p> <p>In Energy Queensland’s view, the operational environment should be simplified as far as is practicable to both streamline the process for energy storage proponents and enable the system operator to undertake its responsibilities with respect to ensuring system reliability and security.</p> <p>While energy storage is fundamentally different to a typical load, the functions performed by storage systems and how they participate in the market will vary widely, depending on market and customer needs and tariff benefits. Therefore, care needs to be taken to ensure that any proposed definitional changes relating to how energy storage is accounted for in the NER do not create unintended consequences for some proponents or flow-on impacts for future participants, such as embedded networks, self-island networks and stand-alone power systems.</p> <p>Energy Queensland also suggests that further consideration of the rule change is required in light of the Energy Security Board’s (ESB’s) proposal to take a technology-neutral approach that attaches obligations to services rather than assets.</p>
<p>2 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?</p>	<p>In terms of access standards, there are some definitions that are awkwardly worded when considering load and generation as binary terms. However, it is not clear that new hybrid facility or energy storage system definitions would resolve those issues.</p>

Questions		Feedback
		Rather than including further differentiation between load, generation and storage participant types, it may be more appropriate to move towards having a single, consolidated 'bi-directional' participant type, with obligations applying to how the asset (or assets) behave at the connection point.
Question 3: Implications for storage forecasts (p. 21)		
1	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?	<p>Energy Queensland agrees with AEMO's assessment that storage will form a significant part of the future energy mix, noting that not all use cases for storage will include direct participation in the NEM.</p> <p>Considering other initiatives currently being progressed, such as financial transmission rights and locational marginal pricing, it is unclear whether the issues raised are likely to become worse over time. It may be worthwhile allowing these new initiatives already in progress to be embedded and their effectiveness to be reviewed before proceeding with further changes.</p>
Question 4: AEMO's rationale for defining storage and hybrids in the NER (p. 25)		
1	Do you agree with AEMO that there is a strong rationale for defining storage and hybrid facilities in the NER (as different to load and generation)? Why or why not?	Energy Queensland agrees there is a case for recognising the role and function of bi-directional energy resources. For instance, even at the residential level, many customers already have dispatchable loads (e.g. hot water) along with variable generation at a single connection point. However, the benefits of creating a third participant category, rather than a single participant type, is not clear. Any changes to participant categories in the NER should remain as technology-neutral and flexible as possible.
2	Bearing in mind that the two-sided market reforms (as discussed in section 2.2.4) propose to move towards service-based requirements (rather than technology-based requirements),	<p>Energy Queensland supports a technology-neutral approach and a focus on service-based requirements rather than technology-based requirements, for the following reasons:</p> <ul style="list-style-type: none"> • It is more important to focus on policy objectives rather than particular technologies;

Questions		Feedback
	are there differences in the nature of the services provided by or to storage facilities that require these services to be distinguished from generation and load?	<ul style="list-style-type: none"> • Focussing on particular technologies by pricing 'winners' may thwart innovation and create market distortions; • Energy storage systems should be part of an energy mix based on efficiency; and • Technologies evolve and change quickly. Being technology-neutral will future-proof regulatory frameworks.
Question 5: AEMO's rationale for defining storage and hybrids in the NER (p. 27)		
1	Do you have any comments on AEMO's wording for its proposed definitions of storage and hybrid facilities?	<p>It is noted there may be some unintended flow-on impacts as a result of ambiguity in the proposed definitions, particularly the proposed definition for hybrid facilities. For instance, it may be appropriate to differentiate micro-grid facilities from hybrid facilities.</p> <p>Issues may also arise if technologies such as rail traction stations or draglines are included. Given these systems do not participate in generation dispatch (due to the very short time period of export), including these types of connections would lead to increased industry burden and complexity.</p>
Question 6: Alternative to AEMO's proposed solution to integration issues for storage (p. 29)		
1	<p>In light of the alignment issues between AEMO's rule change request and the direction the ESB's two-sided market reforms are taking, which of the following approaches do you support and why?</p> <p>a. Waiting for the implementation of the two-sided market reforms to address the integration issues facing storage and hybrid facilities</p>	<p>Any reforms must align with the Post-2025 market design. In Energy Queensland's view, only critical reforms to address an urgent need should be brought forward.</p>

Questions		Feedback
	<p>b. Introducing AEMO's rule change proposal as an interim step prior to the implementation of the two-sided market reforms</p> <p>c. Implementing certain aspects of the two-sided market reforms through this rule change project, such as combining the different types of market participants and imposing obligations based on services rather than assets</p> <p>d. Taking an alternative approach - please specify.</p>	

Chapter 3 – Registration issues for storage units and hybrid facilities

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

1	<p>Why would you consider aggregating different technologies together in a hybrid facility? Which technologies do new participants propose to combine in hybrid facilities?</p>	<p>Energy Queensland has received enquiries from wind-solar-battery hybrids and solar-hydro hybrids, and we understand that several existing solar connections are considering the addition of either DC- or AC-coupled energy storage systems in the future. We do not consider that only near-identical resources can be aggregated into a hybrid system. It is ultimately the impact and risks imposed on the connection point that is of primary concern to other market participants.</p>
2	<p>Are you considering using storage to minimise causer-pays liabilities by balancing the output of your units across multiple connection points under the current NER? What are the challenges of this approach?</p>	<p>No comment.</p>

Questions		Feedback
3	Would you prefer to balance output and consumption across multiple connection points or combine technologies behind an individual connection point?	From a network perspective, the connection agreement and subsequent billing arrangements will be based on a single, defined point in the network (i.e. the connection point). Any additional points behind that connection point need to be defined appropriately to provide transparency and avoid confusion.
4	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?	No comment.
5	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?	It is noted that the fees charged for registration are determined by AEMO. Changes to AEMO's fee structure and registration processes could be made to improve efficiency when considering energy storage and hybrid facility registration applications. Energy Queensland's preference is that the NER should be as technology-neutral as possible.
Question 8: Registration process issues (p. 36)		
1	What are your experiences with the current registration categories for storage projects and hybrid facilities?	No comment.
2	Do you agree the existing approach imposes high administrative and financial costs for participants registering storage units and hybrid facilities or create barriers to entry?	No comment.
3	Do you consider that the NER should set out how participants with storage units and hybrid facilities should register and participate in the market, rather than AEMO guides? Or have AEMO's guides and	Energy Queensland does not consider that registration process details should be set out in the NER.

Questions		Feedback
	fact sheets now solved the identified registration issues for storage and hybrid facilities?	
4	Do you consider the registration issues AEMO has raised in its rule change request will become worse in the future if the current NER are retained?	No comment.
5	Are there other registration issues for intending participants with storage and hybrid facilities that arise from the fact that the NER do not fully consider these technologies, which are not detailed in AEMO's rule change?	We acknowledge there are some gaps in the AEMO registration process, for example with respect to the treatment of DC-coupled systems and differences relating to the energy market and frequency response market.
Question 9: Issues with small storage units (p. 38)		
1	Do you agree that there is not sufficient clarity regarding whether SGAs and other market participants, can include small storage units in their portfolios?	Energy Queensland acknowledges that proponents have approached network service providers (NSPs) and AEMO for clarification on these matters. For example, proponents often seek to understand whether their storage systems can participate in frequency raise and lower markets without being registered as a generator. It is suggested that further clarification could be provided through education and guidelines rather than changes to the NER.
Question 10: Proposed approach to registration categories and classifications (p. 43)		
1	Do you consider that AEMO's proposed solution will make the registration process simpler and less expensive for intending participants seeking to classify storage units and hybrid facilities?	The NER defines terms for 'generating plant', 'generating system' and 'generating unit'. Careful use of these terms is required to ensure there are no flow-on implications for single inverters in a generating system for large-scale solar. If the intent is to capture all common technology types within an installation, then the term should describe this clearly.

Questions		Feedback
		<p>It is suggested that a 'bi-directional' category may be more useful than a specific 'storage' category, noting that an increasing number of connections can be considered bi-directional.</p> <p>Energy Queensland does not see the benefit in each element within a hybrid facility submitting separate bids, rather than a single export and a single import bid. It may be more appropriate for proponents to specify the services and capabilities at the connection point.</p> <p>Additionally, when considering a future where it is expected that most participants will have some component of load and generation, it may be more useful to have a sole participant category, with options applying to the services provided.</p>
2	In relation to the registration of hybrid facilities, do you agree that the NER should provide that participants cannot aggregate units with different classifications or different technology types (unless AEMO approves it on a case-by-case basis)?	In Energy Queensland's view, it may be more appropriate to consider the behaviour of energy flows at the connection point. As such, we are not opposed to several different technologies registering as one 'generator' with the appropriate performance description provided in the generator performance standard.
Question 11: Registering pumped hydro facilities (p. 44)		
1	Do you support AEMO's proposed approach to registration and classification for pumped hydro facilities?	Energy Queensland does not agree that pumped hydro would need to be treated differently to a battery system. This proposed approach would introduce confusion between energy storage providers and appears to be out of step with the remainder of AEMO's proposal.
2	Is a storage unit's ability to ramp linearly from production to consumption the best way to determine whether it should classify as a bi-directional unit, or classify as a scheduled generating unit and scheduled load?	Additional complexity in registration classifications may not be the preferred solution.

Questions		Feedback
Question 12: Proposed approach for transitional arrangements (p. 44)		
1	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?	No comment.
2	Should owners/operators of existing standalone storage units be grandfathered, i.e. permitted to remain on their current registration and classification arrangements?	Grandfathering should be considered carefully given the potential for confusion and costs that would be incurred as a result of maintaining different registration and classification arrangements.
Question 13: AEMO's solution to clarify what small units SGAs can aggregate (p. 45)		
1	Do you agree with AEMO's proposal to clarify how an SGA can include storage units in its portfolio?	No comment.
2	Does AEMO's solution provide flexibility for an SGA to include DER, other than storage, that may have bi-directional energy flows?	No comment.
Question 14: Adding further registered participant categories (p. 47)		
1	Is there a strong case to add a participant category for storage or are there other alternative solutions that could help to reduce complexity?	Energy Queensland suggests that arrangements should be simplified by having a single 'bi-directional' registered participant category, with appropriate limits and dispatch participation obligations to reflect connection point performance.
Question 15: Alternative solutions for registered participant categories (p. 48)		
1	Is AEMO's proposed rule the most efficient and effective way to address the identified issues relating to participant	Energy Queensland sees merit in removing the generator and load categories altogether and instead moving to a single, bi-directional participant category.

Questions		Feedback
	<p>registration and unit classification? Are there alternatives or ways to potentially improve it?</p>	<p>The technology behind the connection point, while having implications for performance such as frequency or fault response, has less meaning for the wider system than its performance in terms of energy inflow or outflow.</p> <p>Having each technology bid separately appears to be an unnecessarily complex method of implementing the generation / load mix and places the management of each generation system with AEMO, rather than the generation owner or operator.</p>
<p>Chapter 4 – Technical and operational challenges relating to utility scale storage and hybrid facilities</p>		
<p>Question 16: Bidding in scheduled storage facilities (p. 54)</p>		
1	<p>How complex are the current arrangements for bidding for a scheduled storage facility compared to bidding for a scheduled generator or load?</p>	<p>No comment.</p>
2	<p>If available and if you had storage facilities, would you opt to change from the existing arrangements to a single DUID model, with 10 price bands rather than 20?</p>	<p>No comment.</p>
<p>Question 17: Dispatch conflicts (p. 55)</p>		
1	<p>How often these conflicts occur in relation to energy and FCAS, and how material are they for the operators of scheduled storage units and other market participants?</p>	<p>No comment.</p>
2	<p>To what extent can these conflicts be, or to what extent have they already been, remediated through experience and through improved bidding systems?</p>	<p>As the onus for compliance is on the participant, any issues that affect the market should be managed through penalties for non-compliance. This should be achieved via a market mechanism rather than changes to the NER.</p>

Questions		Feedback
3	Would moving to a single DUID model be an appropriate and proportionate response?	No comment.
Question 18: Aggregation and ramp rates (p. 57)		
1	What problems arise under the current arrangements in relation to the application of minimum ramp rates?	No comment.
2	Do you agree with AEMO's proposal to rely on the aggregation approach set out in Chapter 3 of the NER (rather than the one set out in Chapter 2 of the NER)?	Energy Queensland agrees with the approach proposed for Chapter 3 of the NER, noting however, that we do not consider that only near-identical resources can be aggregated into a hybrid facility, as proposed in the rule wording.
Question 19: Forecasting and energy availability (p. 60)		
1	Are there problems arising from energy-limited plant not being reflected in forecasts?	Energy Queensland considers that an informed market will operate more efficiently. As such, we would prefer that as much information as possible is available to inform forecasting.
2	Could this problem be addressed by requiring storage facilities to provide additional information on energy limits in their bids, as proposed by AEMO?	No comment.
Question 20: Performance standards (p. 62)		
1	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?	In Energy Queensland's experience, hybrid facilities will have a single generator performance standard that defines performance at the connection point (including all generation types). In our view, this arrangement is workable and encourages optimisation across the whole system, ensuring each generation type will work together. It is suggested that best practice for supplying information and assessing performance may be required to inform intending participants on how to present the generator performance standard and generator compliance report.

Questions		Feedback
		It is noted that AEMO and the NSP can already require visibility of different aspects of plant behind the connection point.
2	Could these challenges be mitigated by having a single set of performance standards for each asset, as proposed by AEMO?	No comment.
Chapter 5 – Issues with fees and charges		
Question 21: Issues with how fees and charges, and non-energy costs are recovered (p. 69)		
1	Do you agree that there is an inconsistency with how fees and charges and non-energy costs are recovered from Market Participants?	<p>Energy Queensland acknowledges the potential for some participants to avoid costs due to the existing cost recovery approach. We support in principle the equitable recovery of fees from participants who benefit from the services provided by AEMO.</p> <p>However, we are mindful that, regardless of the class of participant paying the fee, that fee will pass through the energy supply chain to customers.</p>
2	What is the impact of this issue? Does it create an uneven playing field and does it create (or has it the potential to create) perverse behaviours and outcomes?	No comment.
3	Do you consider the burden of costs will be exacerbated as exempt generating units increase behind the meter?	No comment.
4	Are there any other issues that the Commission should consider with respect to fees and charges, and non-energy cost recovery?	Energy Queensland notes that participant fees are within AEMO's control and do not need to be addressed by a rule change. We also note that AEMO is currently consulting on the participant fee structure that is to apply from 1 July 2021.

Questions	Feedback
Question 22: Solutions for issues with fees and charged and non-energy cost recovery (p. 71)	
1 Do stakeholders agree with AEMO's proposed solution that MSGA and the proposed bi-directional resource provider participant categories should pay non-energy cost recovery and NEM Participant fees and charges based on consumed and sent out energy separately (as is the current practice for a grid-scale battery registered as both a Market Generator and Market Customer)?	No comment.
2 Will AEMO's proposed solution level the 'playing field' between existing grid-scale batteries, MSGAs and participants under the proposed new category bi-directional resource provider? That is, will AEMO proposed solution more efficiently allocate fees and charges and non-energy costs between these Market Participants categories?	No comment.
3 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?	No comment.
4 Are there practical or implementation issues associated with charging MSGAs non-energy costs and NEM Participant fees based on consumed and sent out energy?	No comment.

Questions	Feedback
Question 23: Alternative solutions for issues with fees and charges and non-energy costs recovery (p. 73)	
<p>1 Do you consider it appropriate to recover non-energy costs from Market Customers and Market Generators in the same way AEMO recovers costs from grid-scale batteries? That is, should participant fees, charges and non-energy costs for Market Generators and Market Customers be calculated on energy consumed and energy sent out separately, not on netted energy as is the current practice?</p>	<p>No comment.</p>
<p>2 If changes are made to how participants' fees, charges and non-energy costs are recovered, do you consider creating a new participation category, bi-directional resource provider, is the best way to do this? Or could it be appropriate to make changes to existing market participant categories to achieve the same outcome?</p>	<p>No comment.</p>
<p>3 Do you consider that there are other changes that could be made to Participant fees and non-energy cost recovery that would create a more consistent and level the playing field across Participant categories?</p>	<p>No comment.</p>

Questions	Feedback
Question 24: Issues with TUOS and DUOS charging arrangements (p. 76)	
<p>1 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?</p>	<p>Energy Queensland does not agree that there is ambiguity and uncertainty associated with the network tariff arrangements applying to customers with energy storage systems for the following reasons:</p> <ul style="list-style-type: none"> • These customers are assigned or reassigned to a tariff class and a network tariff in accordance with the procedures set out in the distribution network service provider's (DNSP's) Tariff Structure Statement (TSS) which is assessed and approved by the Australian Energy Regulator (AER). The TSS framework is designed to provide certainty to retailers, customers and stakeholders by 'locking in' the tariff assignment procedures, tariff structures and the number of network tariffs available over the regulatory control period. • The price levels applying to the network tariffs are approved by the AER as part of the annual pricing proposal process. This is a transparent process involving the publication of a pricing proposal document that aims to demonstrate that the proposed prices comply with the TSS and Chapter 6 of the NER. • Energex and Ergon Energy Network treat grid-scale energy storage systems like any other customer. Regardless of the type of technology behind the meter, the tariffs have been developed to comply with the pricing principles, i.e. to develop cost-reflective tariffs and provide incentives to use the network efficiently. Energy storage systems are particularly well placed to take advantage of these incentives. Treating technologies differently would appear to imply a form of price discrimination which would, in our view, be incompatible with the overall objectives of the NER.

Questions		Feedback
		<p>Energy Queensland considers that the NER requirements are sufficient in terms of providing certainty on how to charge customers regardless of their technology.</p>
2	<p>Does this ambiguity and uncertainty create a material issue for investment in battery storage projects now, or in the future as the number of energy storage projects increase across the NEM?</p>	<p>Energy Queensland does not believe there is any material distortion to investment and usage decisions regarding energy storage projects that is directly related to any perceived or actual ambiguity and uncertainty over the network tariff arrangements applying to this type of customer.</p> <p>This is not to suggest that there is no scope to further improve the design of these tariff arrangements from an economic efficiency perspective. The current distribution pricing arrangements set out in Chapter 6 of the NER are adequate to ensure that these reforms are designed to enhance economic welfare and take appropriate regard of the impact to customers.</p> <p>As an alternative to further prescriptive network pricing requirements in the NER, we suggest that connection approval processes should be tailored to energy storage system projects and major customers, placing in the early stages of the application process a greater emphasis on network pricing options available, network pricing arrangements (including tariff class assignment procedures) and demand side management opportunities.</p>
3	<p>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?</p>	<p>It is noted in the consultation paper that there appears to be a lack of consistency among DNSPs when applying network charges to energy storage systems. The paper does not go into any specific detail and, as a result, it is unclear what these (perceived or real) differences are. We are therefore seeking further details from the AEMC regarding these differences to enable informed discussions.</p> <p>Notwithstanding the lack of details of potential variations in the treatment of energy storage systems among DNSPs, as a matter of general principle we consider that it is in the long-term</p>

Questions		Feedback
		<p>interests of electricity users to continue to allow DNSPs discretion to design their network tariffs to reflect their unique circumstances, particularly in a highly dynamic and rapidly evolving energy market. Any attempt to harmonise the TUOS and DUOS tariff arrangements across jurisdictions will stifle innovation and undermine the ability of DNSPs to pursue pricing strategies that are most appropriate for their circumstances.</p> <p>Energy Queensland is of the view that the issue raised by AEMO would appear to put into question the very foundation of the regulatory framework on which DNSPs' tariff strategies are based. These rules have been designed to provide DNSPs with a certain degree of discretion within the confines of strict regulatory requirements and prescribed economic-based principles. Furthermore, AEMO's concerns would seem to overlook the role of the AER in assessing the compliance of DNSPs' TSSs and pricing proposals. We therefore consider that providing the AER with flexibility is more appropriate in terms of achieving the intent of the regulatory framework than a mandated, inflexible harmonisation objective.</p>
4	Is there a regulatory risk when NSPs interpret how to apply the current rules to battery systems?	<p>Energy Queensland does not consider that there is a compliance risk regarding the network tariff arrangements applying to customers with energy storage systems. Under the current distribution pricing arrangements, DNSPs must demonstrate that their proposed tariffs, tariff structures and prices comply with the pricing principles. Ultimately, if the AER is satisfied that this is the case, the DNSP's proposal is approved and implemented. Although there is no ex-post review of compliance undertaken by the AER, we do not believe there should be any other regulatory risk once a proposal has been approved.</p>

Questions	Feedback
Question 25: Solutions for clarifying the application of TUOS and DUOS charging (p. 79)	
<p>1 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?</p>	<p>Energy Queensland does not consider that it is appropriate to exempt energy storage systems from contributing to the residual costs associated with the provision of standard control network services. We believe that it is reasonable that all customers that utilise the electricity network should contribute towards the cost of the network service. We also consider that there are economic benefits to be realised in the sense that the provision of locational TUOS price signals may encourage investment in energy storage in parts of the electricity network where the economic benefits are likely to be greatest.</p>
<p>2 If battery systems are exempt from TUOS charges does this:</p> <ul style="list-style-type: none"> a. create a subsidy for battery technology and therefore an advantage over other generation technologies? 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? 	<p>We do not support an exemption from TUOS charges due to our concerns over the economic and equity implications (see responses to question 24 above).</p> <p>Furthermore, Energy Queensland's network pricing strategy has been developed in a manner that is technology-neutral. We are of the view that by waiving the TUOS charges, DNSPs would be influencing the competitive market by favouring one technology over other, potentially better or cheaper options. This would not be in the long-term interests of customers.</p> <p>Furthermore, it is our view that supporting particular technologies (or industries) is a government policy matter and is therefore not for DNSPs to manage.</p> <p>Finally, when importing energy to recharge their batteries, energy storage systems are using the transmission network. From a cost reflectivity standpoint, energy storage systems should not bypass TUOS charges as this would not meet the pricing principles and would provide an inappropriate price signal.</p>

Questions	Feedback
<p>3 If battery systems are not exempt from TUOS charging does this:</p> <ul style="list-style-type: none"> a. create double charging of TUOS /DUOS for end use customers? b. distort investment signals and not align with the need for significantly more storage investment across the NEM? 	<p>As noted in our previous responses above, Energy Queensland does not support the waiving of TUOS charges to energy storage systems.</p> <p>We consider that the issue of double charging of TUOS is not a valid concern for the following reasons:</p> <ul style="list-style-type: none"> • Energy storage system owners are investing in a business which includes transmission services as a key enabling input resource. Energy Queensland is of the view that an exemption from TUOS would result in distortions in investment decisions by signalling that energy storage systems can avoid charges for a service they use. To the extent that there are alternative investment options to those provided by energy storage systems, these technologies would be paying the full cost of their full input mix, and as a result would be at a competitive disadvantage relative to their competitors. To get the efficient investment choices where energy storage system services are part of an energy mix, TUOS needs to be charged equally to all proponents regardless of their technology, and form part of the direct cost stack where TUOS is one of the input services. • We are of the view that exempting energy storage systems from paying TUOS would potentially result in a subsidy that would undermine energy storage competitors who choose and invest in self-generation systems to generate on-site the energy they require to charge their battery system. Charging TUOS to energy storage systems ensures a level playing field for competitors who do not access transmission services. • By paying for the TUOS services, energy storage systems will be provided with incentives to use transmission services optimally. In contrast, a free service would result in a bias towards inefficient overuse of TUOS services, ultimately resulting in higher costs passed through to all customers.

Questions		Feedback
		<ul style="list-style-type: none"> • From the perspective of the end customer, they will pay for the TUOS charge once for the energy they consume regardless of whether it comes from a grid coal generator, battery storage or their neighbour's PV system. A further consideration is that in some instances, the energy injected by energy storage systems can flow back into the transmission network. It would therefore be impossible to determine whether the amount of energy consumed by end customers is generated locally or comes from other parts of the NEM. • Customers are unlikely to be paying twice for TUOS services. While they may be paying indirectly for TUOS that is embedded in the cost of energy purchased from energy storage systems, under a revenue cap regime the amount of TUOS revenue received from energy storage systems will result in a corresponding reduction in TUOS revenue to be recovered from all other customers. TUOS charges will fall across the board and all non-energy storage system customers will pay less than if energy storage systems received TUOS for free. • Finally, under a revenue cap regime, any potential over-recovery of the TUOS charges will be redistributed to customers through the unders and overs mechanism as per the requirements prescribed in the NER. <p>Considering the abovementioned points, Energy Queensland is of the view that not charging TUOS to energy storage systems is fundamentally and economically flawed and an amendment to the existing set of pricing arrangements is therefore not warranted.</p>
4	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	We do not see any advantage at this stage in moving away from the current approach of applying network tariffs to the charging parameter quantities as measured at the applicable metering / connection point to our electricity

Questions		Feedback
	another option? Are there technical or implementation issues with this?	<p>network. Currently, we charge at a single connection point. From a network perspective, we are primarily concerned with the net impact to the network.</p> <p>However, for billing purposes, we are aware that there can be export / import data issues relating to hybrid facilities generally. This issue, while not specifically relating to hybrid facilities with energy storage systems, can result in unusually high kVAr recorded on customers' Q channel. Energy Queensland is working with contestable metering providers to understand the cause of the issue and will continue to monitor hybrid facilities with energy storage.</p>
5	Do you agree that battery systems should pay DUOS charges for consumed energy? Please explain why or why not.	<p>Energy Queensland believes that it is in the long-term interests of all customers that energy storage systems are treated in the same way as other customers from a network tariff perspective, i.e. that they pay their fair share of the residual costs of transmission and distribution network service provision and receive efficient marginal price signals. Depending on the network tariff, these price signals are designed to strongly incentivise energy storage systems to charge at times when network capacity is the least constrained. This is particularly true with our time of use or primary load control tariffs.</p>
Question 26: Alternative solutions for issues with TUOS and DUOS charging (p. 82)		
1	How would charging all Market Participants TUOS and DUOS, based on the services received by participants (energy consumed) rather than based on the asset type, impact participants' behaviour and market outcomes? This would mean that all Market Participants would be liable for TUOS and DUOS charges for the energy that is consumed at their network connection point.	<p>Energy Queensland believes that the viability of the proposed alternative approach to charge based on network services (rather than asset type) may be impacted by proposed rule changes, such as the DER Integration – updating regulatory arrangements rule change request currently under consideration.</p> <p>As noted in several submissions to the AEMC's consultation on DER integration, anticipated increases in export services will require future capital investments in the grid. These costs will need to be allocated and recovered appropriately if they are to be managed effectively.</p>

Questions		Feedback
		Another matter when considering service-based pricing is the need to preserve the price signals which could impact a DNSP's ability to incentivise and manage the impact of energy storage systems on the network.
2	If all Market Participants were charged TUOS and DUOS, would this have any impact on existing external arrangements?	Energy Queensland does not believe there would be any significant impacts. However, this matter would need to be investigated further.
3	Is a definition for storage technologies needed to clarify TUOS and DUOS charging, or could AEMO's proposed solution or an alternate solution be implemented using the existing Market Participant categories, such as a scheduled load?	Energy Queensland does not consider there is any need to specify energy storage systems in the NER. As noted in previous responses, these systems should not be treated any differently to other customers with respect to charging DUOS and TUOS.
4	Are there technical issues or complications with implementing AEMO's proposed solution or an alternative solution?	See response to question 26.1 above.
5	Do stakeholders consider there is an inconsistency in the approach NSPs use to calculate network prices? If yes, would a more harmonised approach to network pricing provide clearer investment signals across the NEM and reduce costs for battery system proponents?	As noted in response to question 24 above, Energy Queensland does not consider there are inconsistencies in the approaches used by DNSPs when calculating network charges and does not support the need for a harmonised approach.
6	Does the introduction of LMP and FTRs as contemplated through transmission access reform impact whether storage should face TUOS?	Yes, any changes made in terms of locational marginal pricing and financial transmission rights should also apply to energy storage systems.
7	Are there any other approaches that could be considered to address the issues raised by AEMO?	Given the current proposals to charge generating systems in distribution networks for export (ERC0309, ERC0310, ERC0311), potential changes to firm access rights and marginal loss

Questions		Feedback
		factors, the proposed two-sided market design and locational pricing, it is suggested that generator, storage and load charging should be examined in a holistic manner to ensure appropriate outcomes for end-users and networks.
Chapter 6 – Storage and hybrid integration drafting and other issues		
Question 27: Technology specific drafting in the NER – issues (p. 88)		
1	Are you concerned that the terms relating to load and generation, or other terms in the NER, are not sufficiently technologically neutral? If so why?	No comment.
2	Do you consider key terms in the NER such as 'generation' and 'load' are ambiguous when applied to storage and hybrids? If so, why?	No comment.
Question 28: Technology specific drafting in the NER – proposed solution (p. 91)		
1	Would AEMO's proposed changes to these key terms in the NER assist with the effective integration of storage and hybrids in the NER? Are there other terms or definitions that are more appropriate than those suggested by AEMO?	As mentioned in answer to question 10, Energy Queensland sees some risk of confusion if 'unit' is used to refer to multiple units within a system.
2	Do you think the benefits of this proposed drafting solution would likely outweigh the costs, given the scale of the changes?	No comment.
3	Would changes to these fundamental terms in the NER affect related external documents such as contracts, procedures and guidelines (other than AEMO's), and if so would the	No comment.

Questions		Feedback
	changes cause you to incur costs or other difficulties? What implementation period would be needed to address these issues?	
Question 29: Technology specific drafting in the NER – other options (p. 91)		
1	Are there other terms and definitions in the NER that are not sufficiently technology neutral?	No comment.
2	What are some other drafting approaches which could be used to make the NER more technology neutral?	No comment.
Question 30: Intervention compensation – issues (p. 97)		
1	What other specific issues relating to storage and hybrid assets need to be considered in formulating appropriate intervention compensation arrangements?	No comment.
2	Are the current arrangements for applying the market suspension framework and administered price period compensation framework to storage and hybrid appropriate in light of the increasing numbers of these facilities in the NEM? If not, what changes do you consider are required?	No comment.
3	Should changes be made to clause 3.15.7B to create consistency with the existing definition of direct participant and address the omission of scheduled loads?	No comment.

Questions		Feedback
Question 31: Intervention compensation – solutions (p. 97)		
1	Do you consider that a separate compensation framework should be developed for storage and hybrid assets, or should they continue to be compensated in line with existing intervention compensation frameworks in order to minimise market distortions, subject to the amendments currently under consideration?	No comment.
2	If you consider a separate compensation framework should be developed, how should it differ from the existing frameworks?	No comment.
3	If you consider that the current frameworks should continue to apply to storage and hybrid assets, are any additional amendments required?	No comment.
Question 32: RRO – issues (p. 100)		
1	Is it appropriate for the electricity imported from the grid for the purposes of energy storage to form part of a liable entity's liable load under the RRO?	No comment.
2	Should operators of storage assets be liable entities under the RRO?	No comment.

Questions		Feedback
Question 33: RRO – solutions (p. 100)		
1	Do stakeholders agree with AEMO that the RRO should apply to storage only when the storage system is co-located with a separate load in a hybrid facility (this does not refer to the battery's own load)?	No comment.
2	Would alternative or additional changes to the application of the RRO to load for storage be more appropriate?	No comment.
Question 34: RRO – storage contribution to reliability issues (p. 101)		
1	What are your views on the issues which relate to whether or not storage contribute to reliability issues?	No comment.
2	Are there any other issues to consider when evaluating the treatment of load used for storage under the RRO?	No comment.
Question 35: RRO – implementation issues (p. 101)		
1	Should RRO liabilities for hybrid facilities continue be calculated at the connection point? If not, where?	No comment.
Question 36: RRO – other options (p. 102)		
1	Can the issues (if any) related to the application of the RRO to storage and hybrids be resolved without establishing a new market participant category for these facilities?	No comment.

Questions		Feedback
Question 37: Marginal loss factors – issues (p. 103)		
1	Are the current arrangements for calculating and applying MLFs to storage and hybrids appropriate in light of the increasing numbers of these facilities in the NEM? If not, what changes do you consider are required?	It is noted that separate loss factors for import and export in terms of distribution loss factors also applies. Pending future changes to marginal loss factors, Energy Queensland considers this approach appropriate and in line with the intended purpose of loss factors.
Question 38: Marginal loss factors – solution (p. 103)		
1	Do you agree with AEMO's proposed solution of applying the existing arrangements for applying MLFs to its proposed new market participant category (if this category were to be established)?	No comment.
Question 39: Reliability Panel representation (p. 104)		
1	Is it appropriate to require that the Reliability Panel include a member to specifically represent storage and hybrid asset proponents, or are the current mandatory and discretionary membership provisions adequate?	Energy Queensland does not see a need to change the current configuration of the Reliability Panel at this time. There does not appear to be a need for an additional 'storage / hybrid' member, when the concerns of those parties can be represented by the generator member.
Question 40: Other drafting issues – issues (p. 106)		
1	Do you consider it appropriate to address these additional drafting issues identified by AEMO in the course of this rule change process?	No comment.

Questions		Feedback
2	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?	No comment.
Question 41: Other drafting issues – solution (p. 108)		
1	Do these solutions proposed by AEMO in 6.3 effectively resolve the issues identified in 6.2? If not, what solution would be preferable?	Energy Queensland seeks details as to how potential amendments to the pricing arrangements set out in the NER will align with the DNSP’s revenue determination regulatory cycle.
Appendix A		
1	It is stated on page 112 that: “Network businesses can potentially install batteries within congested parts of the network to avoid and defer the need to increase network capacity, improve power quality, improve system reliability, and achieve more optimal use of assets.”	It must be noted that network businesses are not permitted to use energy storage systems (or generation) other than to provide direct control services. If there is an identified network need, then an energy storage system owned by a third-party may be selected as the preferred option to address the need (subject the regulatory investment test for distribution or regulatory investment test for transmission as applicable).