Integrating storage – consultation paper: stakeholder feedback template

The template below has been developed to assist stakeholders in providing their feedback on the questions posed in this paper and any other issues that they would like to provide feedback on. The AEMC encourages stakeholders to use this template to assist it to consider the views expressed by stakeholders on each issue. Stakeholders should not feel obliged to answer each question, but rather address those issues of particular interest or concern. Further context for the questions can be found in the consultation paper.

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Questions		Feedback
Chapter 1 – Introduction		
Question 1: Proposed assessment framework (p. 5)		
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?	Reposit agrees with the proposed assessment criteria, however suggests that this proposal be considered as a substantial contribution to the current reform discussion, rather than as a proposal in and of itself. This collection of proposed rule changes represents some of the deepest thinking on reforms to the NER to support storage in transition. The proposal comes at a time where a large number of companion proposals have been put forward, and also in the midst of the ESB's 2025 market reform processes. Many of the individual rule change proposals made here should be considered as valuable and valid outside of the context of the wider proposal. It would be a mistake to disregard the thinking put into this proposal where the regulatory environment migrates to a service-based structure.
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)		
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?	Reposit does not agree that there are significant issues caused by the rules in integrating storage units. Reposit has been successful in registering and growing a multi-MW FCAS-providing VPP under the rules, even under 12 months of AEMO scrutiny during registration. The rules used to register the VPP were examined closely by AEMO and Reposit internal and external legal teams and found to not be prohibitive. This FCAS providing VPP currently operates and grows in the NEM without difficulty. **Please note that the VPP is not registered under AEMO's VPP trial. It operates under the NER and MASS v6.0 independently of the AEMO VPP Trial. No trial arrangements exist to allow this VPP to provide FCAS services.** Reposit operates Wholesale Energy VPP capacity for Market Customers under the rules also without difficulty, and has done so for several years. It is Reposit's experience that AEMO NER difficulties are not rooted in the NER, but instead in AEMO's reluctance to allow the NER to operate in a way that AEMO staff at the time are not already familiar with, or otherwise comfortable with for one reason or another.
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?	Reposit does not think it is possible to identify all of the current issues. This is a complex and rapidly evolving space, in a very complex and increasingly fragmented and uncertain regulatory environment. Regulators should be adopting a stance that allows for flexibility and agility while maintaining strict boundaries solely intended to protect the physical demand/supply balance, and the investment signals that are essential for the transition to be successful.
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	Yes. Storage (but perhaps not Hybrid facilities) will play a more significant role over time. Reposit does not agree that the issues will become worse over time. Reposit suggests that increasing AEMO familiarity with new technology, stronger guidance from the AER post-ANAO review, and a willingness to operate the market as a market, will see storage-related issues remain steady, or perhaps even decrease at AEMO.

	change request, arising from the current treatment of storage under the NER, are likely to become worse over time? Why, or why not?	
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?	No. Reposit believes that an efficient market should not distinguish MWh and MW from different sources, or delivered to different consumers. The NEM will work most efficiently, and with minimal side-effects where it is allowed to operate as closely to the perfect competition ideal as possible. Fundamentally the NEM is about matching demand and supply across all time scales, at all connection points. The more complexity that is added to the notions of demand (consumption) and supply (production), the more inefficient the NEM will become, and the less it will be likely to deliver demand/supply matching.
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), 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?	Reposit agrees that service-based regulation is the right approach and that technology classes should not be considered by the NER.
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?	
Question 6: Alternative to AEMO's proposed solution to integration issues for storage (p. 29)		

1	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? a. Waiting for the implementation of the two-sided market reforms to address the integration issues facing storage and hybrid facilities b. Introducing AEMO's rule change proposal as an interim step prior to the implementation of the two-sided market reforms 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 d. Taking an alternative approach - please specify.	Option A. There is too much regulatory uncertainty being generated by ESB processes at the moment. It is unclear who is making what reforms, and under what structure. The ESB process should conclude and make its recommendations to the SCER. The industry can then work from ministerial direction to a point of stability and certainty.
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	Why would you consider aggregating different technologies together in a hybrid facility? Which technologies do new participants propose to combine in hybrid facilities?	No. Other than causer-pays (which is subject to its own detailed reviews and reform proposals), Reposit can see little reason for this “Hybrid” structure where the generating units are larger than 5MW. Reposit suggests that this Hybrid structure is most likely not something that would be good for the efficient operation of the NEM as large amounts of power at a small number of connection points are hidden from the market.

2	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?	
3	Would you prefer to balance output and consumption across multiple connection points or combine technologies behind an individual connection point?	
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?	
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?	
Question 8: Registration process issues (p. 36)		
1	What are your experiences with the current registration categories for storage projects and hybrid facilities?	Registration of Reposit's FCAS VPP with AEMO was difficult. This was not caused by the NER, but instead by continual AEMO misinterpretations of the MASS and the NER. These misinterpretations were corrected over the course of 12 months at some cost to both AEMO and Reposit and registration, classification and operation has since proceeded smoothly.
2	Do you agree the existing approach imposes high administrative and financial costs for	No. The costs are immaterial in comparison to the market opportunity. The costs provide a useful filter for those intending participants' seriousness to contribute to the market. Reducing the costs is likely to simultaneously increase AEMO workload, while also robbing AEMO of revenue to

	participants registering storage units and hybrid facilities or create barriers to entry?	cater for this increased workload. Inevitably, these costs would be inefficiently levied on existing market participants through a cost recovery mechanism.
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 fact sheets now solved the identified registration issues for storage and hybrid facilities?	No. Reposit does not agree that registration and participation should be in the NER. It is much too much detail for the NER to accommodate efficiently. Repost suggests that the AER be resourced to operate as an advocate for market participants, while strictly adhering to the NER/NEL. Much of the difficulty currently being experienced in the market could be alleviated by a much stronger AER presence around storage.
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. Reposit expects the situation to remain static. AEMO will be comfortable with things they are familiar with, and will be uncomfortable with things they are not familiar with. As time passes, AEMO will become familiar with more things, and still be unfamiliar with new things.
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?	Undoubtedly so. This is precisely the reason that classifying storage and hybrid facilities in the NER will not solve the problem, but instead increase the surface area of the problem.
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?	Yes. SGAs are well-defined. The SGA framework is an example of some of the best reform done in the NEM.
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	No.

	participants seeking to classify storage units and hybrid facilities?	
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)?	Reposit believes the current NER restrictions are appropriate.
Question 11: Registering pumped hydro facilities (p. 44)		
1	Do you support AEMO's proposed approach to registration and classification for pumped hydro facilities?	
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?	
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?	
2	Should owners/operators of existing standalone storage units be grandfathered, i.e. permitted to remain on their current registration and classification arrangements?	No. Where arrangements change, existing participants should be migrated rather than grandfathered. The system costs and side-effects associated with supporting legacy regulation will be easily shown to not be cost-effective. There are not enough existing operators to make grandfathering efficient.

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?	Reposit sees no harm in the proposal (other than cost) but considers it unnecessary. A reading of the NER makes it clear that storage is not precluded from an SGA.
2	Does AEMO's solution provide flexibility for an SGA to include DER, other than storage, that may have bi-directional energy flows?	Reposit suggests that AEMO's solution is not necessary.
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?	No. An additional technology-specific category would result in a net increase in complexity.
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 registration and unit classification? Are there alternatives or ways to potentially improve it?	
Chapter 4 – Technical and operational challenges relating to utility scale storage and hybrid facilities		
Question 16: Bidding in scheduled storage facilities (p. 54)		
1	How complex are the current arrangements for bidding for a scheduled storage facility compared to bidding for a scheduled generator or load?	

2	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?	
Question 17: Dispatch conflicts (p. 55)		
1	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?	
2	To what extent can these conflicts be, or to what extent have they already been, remediated through experience and through improved bidding systems?	
3	Would moving to a single DUID model be an appropriate and proportionate response?	
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?	
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)?	
Question 19: Forecasting and energy availability (p. 60)		
1	Are there problems arising from energy-limited plant not being reflected in forecasts?	Yes. Reposit appreciates that this is probably the case.

2	Could this problem be addressed by requiring storage facilities to provide additional information on energy limits in their bids, as proposed by AEMO?	Unfortunately not. How are AEMO to know how the stored energy will be used? For example, stored energy could be deployed in a Delayed FCAS response, which would be a significant amount of energy, but also non-deterministic in volume or timing as it depends on frequency conditions. Or perhaps the losses on the storage are non-linear and are related to ambient temperature, recent past activity, or the future power output at which the stored energy will be provided. A similar, but converse situation exists for charging energy.
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?	
2	Could these challenges be mitigated by having a single set of performance standards for each asset, as proposed by AEMO?	
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?	
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?	

3	Do you consider the burden of costs will be exacerbated as exempt generating units increase behind the meter?	
4	Are there any other issues that the Commission should consider with respective to fees and charges, and non-energy cost recovery?	
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)?	
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?	
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?	

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?	
Question 23: Alternative solutions for issues with fees and charges and non-energy costs recovery (p. 73)		
1	Do you consider it appropriate to recover non-energy costs from Market Customers and Market Generators in the same way AEMO recovers costs form 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?	
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?	
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?	
Question 24: Issues with TUOS and DUOS charging arrangements (p. 76)		
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?	
2	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?	
3	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?	
4	Is there a regulatory risk when NSPs interpret how to apply the current rules to battery systems?	
Question 25: Solutions for clarifying the application of TUOS and DUOS charging (p. 79)		
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?	
2	If battery systems are exempt from TUOS charges does this: 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?	
3	If battery systems are not exempt from TUOS charging does this: 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?	
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 another option? Are there technical or implementation issues with this?	
5	Do you agree that battery systems should pay DUOS charges for consumed energy? Please explain why or why not.	
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.	
2	If all Market Participants were charged TUOS and DUOS, would this have any impact on existing external arrangements?	
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?	
4	Are there technical issues or complications with implementing AEMO's proposed solution or an alternative solution?	
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?	
6	Does the introduction of LMP and FTRs as contemplated through transmission access reform impact whether storage should face TUOS?	
7	Are there any other approaches that could be considered to address the issues raised by AEMO?	

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?	Reposit suggests that the concepts of “load” and “generation” in the NER underlie much of the uncertainty in the integration of storage into the NEM. These terms are **overly specific** for a system that is concerned with demand and supply. It is understandable how demand would be equated to demand, and generation equated to supply in the original drafting of the NER, but the increased specificity of these terms has created some very large side-effects. These side effects are managed today with the use of negative loads and negative generation, both of which have been with the NEM since market start. They cater for net load from a Market Generator, and net generation from a Market Customer. Reposit considers this approach to be workable, but it must be universally accepted that this is the NEM treatment for “reverse flows”. AEMO has been inconsistent in the past in recognising the universality of this treatment. Perhaps *Load* and *Generation* as terms can be struck from the NER, but along with *Connection Point* they are primary to the rules. The costs and risks associated with adopting an alternative treatment/mechanism would be very large. An alternative abstraction of demand and supply in electrical quantities, perhaps in the form of a service focus would be very interesting to consider however. Reposit expects the ESB to deliver thinking along these lines.
1	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, provided “negative” load and generation is universally accepted, these terms function in the NER without ambiguity.
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?	Perhaps, but Reposit considers a change of this magnitude to be something that would need to be considered very seriously. The side-effects associated with these changes are unknown and potentially very large. The update of these terms should absolutely be considered separately. These terms are the foundation of the NER.
2	Do you think the benefits of this proposed drafting solution would likely outweigh the costs, given the scale of the changes?	No. The benefits are marginal and the costs are unknowable, but very large.
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 changes cause you to incur costs or other difficulties? What implementation period would be needed to address these issues?	Yes, the scale of impact of changing these terms should not be underestimated. Reposit would incur external documentation costs, but of an unknowable scale. It is also expected that there would be system change costs, particularly in settlement and billing processes. This is likely to be true across all market participants.
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?	
2	What are some other drafting approaches which could be used to make the NER more technology neutral?	
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?	

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?	
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?	
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?	
2	If you consider a separate compensation framework should be developed, how should it differ from the existing frameworks?	
3	If you consider that the current frameworks should continue to apply to storage and hybrid assets, are any additional amendments required?	
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?	
2	Should operators of storage assets be liable entities under the RRO?	
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)?	
2	Would alternative or additional changes to the application of the RRO to load for storage be more appropriate?	
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?	
2	Are there any other issues to consider when evaluating the treatment of load used for storage under the RRO?	
Question 35: RRO – implementation issues (p. 101)		
1	Should RRO liabilities for hybrid facilities continue be calculated at the connection point? If not, where?	

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?	
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?	
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)?	
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?	No. Reposit agrees that the Reliability Panel should make use of its three variable panel members to bring in expertise as required. Storage and hybrid assets will be owned and operated by one of the interest groups already represented by existing panel membership requirements.
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. However Reposit does agree that many of the changes should be made and applauds AEMO's eye for detail in identifying them. There are several changes in here that are material however and should be more carefully considered in separate rule changes.
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?	Yes. Clause 7.15.5(e) should be modified such that Market Ancillary Services Participants (MASP) are also able to receive NMI Standing Data.
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?	