energy networks association

INTEGRATION OF ENERGY STORAGE: REGULATORY IMPLICATIONS

Response to AEMC Discussion Paper, 5 November 2015

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1. EXECUTIVE SUMMARY

The Energy Networks Association (ENA) welcomes the AEMC's Discussion Paper *Integrating Energy Storage – Regulatory Implications* released in October. The Discussion Paper and this program of Commission work represents a valuable step towards ensuring regulatory frameworks remain 'fit-for-purpose' in the face of technology change.

ENA considers that a fundamental principle of technology agnosticism or neutrality should inform AEMC's considerations on energy storage. In ENA's view, this is consistent with the National Electricity Objective, and flowing from that objective the goal should be to ensure the treatment of storage by the economic regulatory framework does not result in incentives for inefficient technology choices for any party.

Best practice regulatory design requires a rigorous, independent assessment of the costs and benefits of proposed new pro-regulatory measures that are the practical consequence of the current AEMC preliminary findings. In particular, the AEMC needs to fully consider and seek to quantify the potential loss of integration efficiencies and potential increased transaction costs arising from the ring-fencing and prohibition of market participation measures proposed in the Discussion Paper.

The Discussion Paper cites a range of international case studies, and details a variety of emergent and potential regulatory approaches on energy storage. This variety of differing approaches observed by the AEMC should represent a caution to avoid narrow approaches based on building inflexible barriers to market entry and participation.

Network businesses consider it is critical for further work to recognise that the overall regulatory approach on storage will be in effect a "joint product" between AEMC rules and AER guidelines and approaches. It is important that these are aligned from the outset, and that the effectiveness of the combined product is regularly reassessed. A jointly led ring-fencing guideline process and clear common understandings on what precisely constitutes the distribution system under the *National Electricity Rules* should be a first step in that process.

The Commission has correctly identified features of the existing regulatory framework that should support efficient deployment of energy storage, including cost allocation rules, scope for service classification flexibility, and shared asset guidelines. Any ring-fencing guideline development process should place weight on the potential for these mechanisms to adequately promote efficient outcomes.

2. REGULATORY IMPLICATIONS OF ENERGY STORAGE

2.1 Technology-neutral regulation

While fully supporting the proactive focus by the AEMC on the implications of emergent technologies, ENA considers that when it comes to recommending regulatory approaches a fundamental principle of 'technology agnosticism' or 'technology neutrality' should inform AEMC's considerations.

The overall policy goal should the promotion of the National Electricity Objective (i.e. the long-term interests of consumers). This would appear to be best met by ensuring the treatment of storage by the economic regulatory framework does not result in incentives for inefficient technology choices for any party. This highlights that the treatment of energy storage should be conceptually consistent and integrated with broader evolving regulatory investment and pricing frameworks for the full range of distribution energy resources (including for example embedded generation and solar PV).

2.2 Requirement to test the costs and benefits of restrictions

The AEMC Discussion Paper commences an important process of considering the appropriate treatment of energy storage by the economic regulatory regime and whether the current framework can accommodate changes in technologies and the services that technology can provide. In some areas the AEMC has set out preliminary views on potential approaches, including indicating a predisposition for 'strict' ring-fencing.

Best practice regulatory design requires a rigorous, independent assessment of the costs and benefits of proposed new regulatory measures (which are the practical consequence of the AEMC's preliminary findings), and the AEMC needs to fully consider, and seek to quantify, the potential loss of integration efficiencies and potential increased transaction costs arising from the ring-fencing and prohibition of market participation measures that are proposed. The introduction of any new regulatory measures should, in short, result in a clear net benefit.

It is currently unclear how the AEMC intends to objectively satisfy itself that prohibitions on market participation in behind-the-meter storage, for example, will have benefits higher than the potential costs. Individual market

participants (including potential direct beneficiaries of reduced levels of competition in household storage markets) are likely to express views on these issues through the current consultation process.

In ENA's view, however, decisions which have the practical effect of increasing regulatory restrictions, or prohibiting a class of businesses from an emerging market need to discharge a significantly higher evidential burden than solely relying on such views before they could be objectively assessed as being in the long-term interests of consumers. This principle is consistent with the principles set out in the original Hilmer Report, and the most recent Harper Competition Policy Review.

Transmission and distribution network service providers have significant experience in the provision of services on a competitive basis without evidence of adverse impact on competition.

Box 1: Hilmer Competition Principles on Regulatory Restrictions to Competition

I. There should be no regulatory restrictions on competition unless clearly demonstrated to be in the public interest. Governments which choose to restrict consumers' ability to choose among rival suppliers and alternative terms and conditions should demonstrate why this is necessary in the public interest.

II. Proposals for new regulation that has the potential to restrict competition should include evidence that the competitive effects of the regulation have been considered, that the benefits of the proposed restriction outweigh the likely costs, and that the restriction is no more restrictive than necessary in the public interest.

Source: Hilmer Report, Chapter 9, p.206-208

2.3 Better integrating framework design and application

The Commission has correctly identified a range of features of the existing regulatory framework that should support efficient deployment of energy storage, including cost allocation approaches, scope for service classification flexibility, and established shared asset guidelines. Any additional proposed steps developed through future ring-fencing guideline development processes should place weight on the potential for these mechanisms to adequately promote efficient outcomes.

The Discussion Paper's assessment of these issues, for example, its assessment of potential service classification options, highlights an important point. This is that the overall regulatory approach on storage will in fact be a "joint product" between AEMC rules and AER guidelines and approaches.

Given this, it is critical that the objectives and definitions of any 'problems to be solved' are aligned from the outset. It is also important that the effectiveness of the combined product is regularly reassessed. In ENA's view a joint AER-AEMC led ring-fencing guideline process and agreement on what constitutes the distribution system under the Rules should be the first steps in ensuring this alignment of framework design and application.

2.4 Assessing the evidence from international practice

The AEMC has provided a set of short international case studies on the broad variety of emergent regulatory approaches on storage internationally. What is evident from reviewing these case studies, and additional regulatory practice from jurisdictions such as California and New York, is that there is currently no one 'settled' regulatory practice in the area of storage.

This dispersion of regulatory practice should indicate caution and highlight the value in avoiding early adoption of narrow approaches based on building inflexible barriers to market entry and participation. As an example, the international examples given by the Discussion Paper highlight that:

- Distribution network providers in New Zealand have delivered combined solar/storage solutions at no extra cost to consumers, lowering their electricity bills over time;
- Regulators in Italy have considered there to be net public benefit in offering specific investment incentives to develop and deploy grid-side storage facilities to help address intermittent energy sources;
- Ofgem has been similarly satisfied that customer-funded innovation programs should direct resources to pilot programs for grid-scale storage (such as the 6MW Leighton Buzzard storage facility deployed by UK PowerNetworks).

A striking feature of the international case studies cited in the Discussion Paper is that they have all focused on the

active diffusion and promotion of energy storage technologies through regulatory measures. It is unclear how this international evidence supports a preliminary view by the AEMC that it is appropriate to either strictly ring-fence or prohibit market participation of regulated network businesses in any aspect of storage deployment, control or ownership.

ENA would also highlight that there are also many suitable Australian case studies, as outlined in Box 2 below. Many of these projects (such as Transgrid's iDemand project) are undertaken on an 'open source' basis, contributing to collective learning and capability building in the Australian energy storage market.

Box 2: Australian case studies in network electricity storage

Today a wide array of storage technologies has been, or is in the process of being, developed and deployed by networks to ensure that the grid can meet our everyday energy needs. ENA member companies are currently undertaking a number of projects around the practical application of energy storage on their networks and are investigating how to optimise services from storage and support for domestic generation with storage. These projects encompass:

- Integrating customer-owned household storage and network tariffs (Ergon Energy);
- Development of a 2MW battery storage system in Buninyong, Victoria (Powercor);
- Transgrid's 'iDemand' hybrid embedded generation and storage project;
- Centralised Energy Storage Systems for network and isolated systems (Ergon and ENERGEX);
- Trial of 1 MW Grid Energy Storage System (AusNet Services);
- Use of controlled load hot water systems to store Solar PV output (ENERGEX).

See ENA *The Great Energy Quest: Case Studies in Australian Electricity Storage*, September 2015

3. TECHNICAL REQUIREMENTS

The Discussion Paper proposes a review of technical requirements applying to behind the meter storage to assess the appropriateness and consistency of existing arrangements.

ENA supports such a review noting that it should also consider the underlying reasons for different requirements, and the costs and benefits to customers of harmonisation of requirements.

Importantly, any investigation of technical requirements should be undertaken with regard to the operational safety and system security reasons for the technical equipment specifications and remote control requirements. As part of this, the first priority must be given to minimising safety risks to both customers and operational staff working on networks.

4. SERVICE CLASSIFICATION

The existing service classification process may be workable, with minor adaptions, to accommodate an increased uptake of storage. ENA considers, however, that there may be a case for looking more strategically at revised 'fit-for-purpose' service classification processes, form of regulation tests and institutional arrangements for the increasingly competitive environment around new and existing network service delivery.

ENA is of the view that the AER may not be the body best placed to undertake service classification assessments in isolation, as it will be effectively placed in the position of assessing the scope of its own regulatory powers, which is not consistent with best-practice regulatory design.

ENA concurs with the AEMC that that there may be tensions and ambiguities within the existing distribution service classification framework. As the AEMC has highlighted, the AER's current approach to the definition of a 'distribution system' as potentially encompassing assets extending beyond the meter is one example of this.

A lack of certainty over the treatment of service classification issues by the AER is likely to contribute a deferral of otherwise efficient investment by all parties, as the competitive landscape will be subject to regulatory uncertainty. The Discussion Paper sets out the 'likely distribution service classification' which would apply across a range of energy storage functions.[1] This analysis is explicitly caveated by the AEMC as being based on AEMC interpretations of previous AER determinations.

[1] AEMC Discussion Paper *Integration of Energy Storage – Regulatory Implications*, October 2015, Table 3.4

This fact highlights that the AEMC is in the position of being required to make assessments on the adaptability of existing rule arrangements in the absence of comprehensive information about the AER's intended practice around storage service classification. This in turn highlights that one possible area for positive broader reforms would be jointly coordinated conducting of service classification processes and ring-fencing guideline reviews on a national basis by the AER and AEMC.

This would assist in producing clear and rule consistent determinations, by allowing for AER assessments to draw both on the AEMC's market development, competition assessment resources and analysis, and the underlying design considerations and expectations of the AEMC with respect to the rule provisions in question. ENA considers this outcome would be consistent with the proposals made by the recent Energy Market Governance review, aimed at ensuring greater regulatory coherence and consistency between rule development and the interpretation and implementation of rules.[2]

5. COST RECOVERY

The network sector supports the overall conclusion that existing efficiency sharing incentives, and normal commercial cost minimisation incentives should drive efficient trade-offs between storage and traditional network asset choices in the delivery of regulated services.

Similarly, ENA agrees that no special powers are needed for the AER to exclude non-proven technologies from the regulatory asset base (RAB), and introduction of such powers would contradict the principle that the regulatory regime should be efficiency focused and technology-agnostic.

The experience internationally and in Australia around network innovation and technology deployment demonstrates that ensuring sufficiently strong incentives for innovation within a regulatory context is likely to be the more relevant and pressing regulatory issue than a need to specifically empower a regulator to exclude cost recovery for unproven new technologies. This is consistent, for example, with the recent development of the electricity distribution Demand Management Incentive Scheme and innovation allowances commonly available (for example, administered by Ofgem).

The AEMC has provided a preliminary view that it is unlikely that networks purchasing storage for their network will prevent the development of a competitive market for storage devices - given the amount of activity by retailers and direct sellers. ENA agrees with this finding and observes that deployment of network-owned storage devices behind the meter would also be highly unlikely to prevent the development of a competitive market in storage, given that energy retail firms and others have already entered the storage and related markets.

One issue that would benefit from further explicit focus in the AEMC's next consultation step would be treatment of stand-alone power solutions which feature a significant storage component. Separate to questions of cost recovery for storage as part of the shared network is the need for cost recovery arrangements to be flexible enough to accommodate innovative stand-alone power solutions being trialed and explored by ENA members that can substantially reduce total end costs to consumers (i.e. by allowing for the decommissioning of single or low use customer lines) at a distribution and transmission level.

6. RING-FENCING

Ring-fencing guidelines need to provide sufficient clarity upfront to enable networks to efficiently plan and deploy storage as part of the efficient delivery of network services. The AER's development and interpretation of the ring-fencing guidelines over time must likewise be predictable and transparent.

ENA understands the AER is due to progress a review of ring-fencing guidelines over 2016, and considers that this should be developed through a coordinated and combined AER-AEMC consultation process.

As an initial observation, considering the combined package of existing cost allocation requirements, shared asset guideline approaches, and the regulatory investment test process, it is unclear what additional measures would be required to avoid impacting the emerging contestable market.

For example, it is not clear that Australian electricity networks will have any material opportunity to impact a fast moving global energy storage market. Further AEMC consideration should focus on identifying what 'impacts' are credible, their materiality, whether a regulatory response such as additional ring-fencing obligations are proportional having regards to the full potential costs and benefits, and potential alternative regulatory and non-regulatory solutions.

In this context, the *Stress test of the national electricity economic regulatory framework under future scenarios*

[2] Review of Governance Arrangements for Australia Energy Markets – Final Report, October 2015, p.12

report commissioned by the Council of Australian Governments Energy Council observed that inappropriately restrictive ring-fencing that prevented network innovation and business model development could easily represent a substantial risk to the long-term interests of consumers over a range of potential energy market scenarios assessed.[3]

In a context of rapidly emerging competitive forces, rapid technology change, and market development it is critical that ring-fencing arrangements affecting networks are flexible and subject to regular review. This is consistent with the findings of the original Hilmer report, which recommended that government regulations that have a discriminatory impact, particularly in relation to market entry or permissible market conduct be examined through regular review processes.[4] The need for this is reinforced by the fact that Australian transmission and distribution network businesses are currently operating under ring-fencing arrangements that are in most cases more than a decade old, and which have never been reviewed or assessed for their actual market impact or net benefit to consumers.

7. COMPETITIVE NEUTRALITY

7.1 Contestability

Energy network businesses support the principle of the deployment of storage being market-led, and for storage to be a contestable service. ENA considers there are likely to be strong public policy benefits in an approach that facilitates customer investment in storage technologies, innovative retailer storage offerings, new third party providers, as well as a capacity for networks to partner with customers directly to assist in the delivery of valued service (and to promote efficient network operation and investment).

ENA also considers that consistent with the case studies identified by the sector in the ENA Paper *The Great Quest: Case Studies in Electricity Storage*, and international examples highlighted by the Commission's Discussion Paper, there continues to be a valuable scope for positively funded 'learning by doing' innovation programs which produce and disseminate learnings under revised demand management incentive arrangements, for example.

7.2 Market-based rollout principle

The Commission has indicated it would 'not recommend' any policy decisions to actively encourage the deployment of storage by networks in contravention of a framework that assumes that competitive energy activities should be market-led.

ENA considers that to effectively deliver on the economic efficiency objective implicit in this judgement, the Commission should broaden its recommendation to not supporting *any* policy decisions to actively encourage deployment of storage on any basis other than a market-led rollout.

Such a recommendation should be broad enough to encompass any potential State, local or other government entities subsidising storage rollouts, or requiring them to occur through planning or other processes.

7.3 Storage supporting network services

Storage offers a host of potential valuable services to networks, including network deferral, congestion relief, voltage support, frequency regulation and 'black start' capabilities.

As storage costs falls, it should be expected by all stakeholders that networks will increasingly utilize storage facilities to deliver efficient core network services. Indeed, battery technologies already play a supporting role across many electricity grids, with an estimate 100 000 battery storage systems installed at utility substations across the United States, for example.[5]

ENA agrees with the Commission's conclusion that it will be important to monitor and adjust ring-fencing approaches through time in a fast-changing environment. It is not clear that present arrangements will achieve this, given that most networks are operating under ring-fencing rules set more than a decade ago designed for the purpose of governing networks involvement in the retail supply and wholesale generation markets.

ENA recommends requiring joint AEMC-AER reviews of market developments and, critically, the impacts of the regulatory restrictions embedded in ring-fencing requirements on a regularly scheduled basis.

[3] Synergies Consulting, *Stress test of the national electricity economic regulatory framework under future scenarios*, June 2015, Appendix E-F

[4] Hilmer Committee Report, 1993, p.304

[5] Deloitte, *Energy Storage: Tracking the technologies that will transform the power sector*, October 2015, p.11

7.4 Energy trading

In relation to the recognition and treatment of wholesale market revenues by any network owned or operated storage facilities, the Oncor model in Texas and the approaches outlined in Electranet's battery storage trial are positive avenues for exploration through the Commission's consultation process.

In ENA's initial view these provide pragmatic low cost mechanisms to avoid potential distortions in wholesale market impacts arising from network deployed storage facilities while capturing the full benefits of these technologies.

An alternative approach may be to require the dispatch of the wholesale energy in a network controlled storage device to be at the NEM spot price, with these revenues treated in accordance with other similar shared assets (i.e. with network customers benefitting collectively).

A further potential approach – a variant of the ElectraNet model - would see the market facing component auctioned to market participants and the proceeds of those auctions returned to customers in a similar manner to the current settlements residue auction process.

7.5 Behind-the-meter storage

The basis for a proposed policy-based restriction on behind-the-meter storage is as yet unestablished, especially given the emergent nature of small scale battery deployment.

A simple prohibition on network control or ownership of storage behind the meter may result in a substantial loss of benefits to all customers at all levels through lost synergistic gains, increased transaction costs, and an inability to explore innovative and efficient least cost delivery of network services. Conversely, it is unclear what benefit would be delivered to consumers through this restriction.

An example of the potential for lost synergistic gains was provided by a recent Rocky Mountain Institute, which highlighted that an energy storage system dispatched solely for demand change reduction is only utilized for 5-50 per cent of its useful life.[6] Further relevant considerations for the Commission are the potential for inefficient over-investment in household storage devices in the context of current tariff structures, which are due to be in the process of transitioning to a more cost-reflective basis.

A further potential consideration is the potential of co-optimised distribution system planning and storage development, a process unlikely to be practically replicable in the short to medium term at the local distribution level by alternative coordination mechanisms (by either information sharing requirements or fully nodal pricing at the distribution level). In progressing any consideration of absolute prohibitions on behind-the-meter storage the Commission should consider:

- what is the empirical evidence available to support a view that the long-term interests of consumers are maximised by the introduction of a new regulatory prohibition on direct ownership and operation by the regulated entity?
- what analysis or evidence is available on whether the loss of consumer benefit through foregone synergies and additional competitive tensions arising from networks having the capacity to offer behind-the-meter solutions is likely to be outweighed by the consumer benefits of the regulatory restrictions proposed?
- in the likely absence of fully distributed pricing signals over the short and medium term, what is the potential scale of inefficiencies that may arise due to restrictions on a network being able to offer behind-the-meter storage solutions as part of an integrated network management planning solution tailored to deliver a least cost service outcome?
- how will the AEMC ensure that any initial assumptions made on the above questions are regularly retested in the light of emerging information and market structures as storage technologies and markets develops?
- what are the potential unintended consequences arising from prohibitions on direct market participation by the regulated entity?

The questions above will require substantive and detailed investigation by AEMC if future policy approaches are to maximise consumer benefit. ENA notes that there is a broad acceptance of the difficulty of reaching definitive assessments on these questions, with, for example a recent PIAC funded study acknowledging that there are a number of conceptually sound reasons why networks should potentially be permitted to employ batteries within the regulated asset base.[7]

[6] RMI, *The Economics of Battery Storage*, October 2015, p.7

[7] CME *Batteries and electricity network service providers in Australia: regulatory implications*, September 2015, p.49

Finally, an early foreclosing prohibition by the AEMC of direct network participation in behind the meter storage also appears at odds with the AER's contention that the regulated distribution system can encompass assets beyond the meter. Lack of alignment between AEMC and the AER on this core definition issue has potential to create disincentives for efficient investment and regulatory uncertainty.

It appears untenable, for example, for the AER to base a view on the most efficient means of delivery of regulated distribution network services on a differing definition of the extent and nature of a distribution system than that used by the AEMC in defining the types of individual technologies able to be owned or controlled by the regulated NSP.

8. APPENDIX A - RESPONSES TO CONSULTATION QUESTIONS

Consultation questions or AEMC preliminary findings	ENA response
Section 1 - Introduction	
Scope of AEMC work *• Do stakeholders agree that the appropriate scope for the AEMC's work is the NEL and the NER as they relate to the integration of energy storage?* *• Are there elements of the current consumer protection framework that need to be reviewed in relation to the penetration of energy storage?* *• Are there jurisdictional and sub-jurisdictional instruments relevant to energy storage that the AEMC should also consider?*	• Agree with the proposed scope focusing on NEL and NER related matters, noting there are also a number of consumer protection issues that arise that would need to be dealt with in other processes (i.e. COAG Energy Council). • The AEMC has stated that the *Discussion Paper* is not intended to cover technical standards as they do not fall within AEMC's remit. However, the *Discussion Paper* proceeds to address and raise potential issues around AS4777, which is a technical standard. Clarity and consistency around scope of future consultation steps will be important.
Section 2 - End users and aggregators using storage	
Connection processes under Chapter 5A *• Connection processes are new and still being implemented. Do you anticipate any issues with the connection process associated with storage?* *• Do connection processes represent a barrier to storage? If so, what specifically is the issue?*	• No comment • Notwithstanding the potential market benefits to be derived through the integration of energy storage devices, there remains the potential for energy storage devices to disrupt the operation of the network, e.g. through capacity, voltage and frequency disturbances. As such robust connection processes should be viewed as a necessity, rather than a barrier to storage. In this regard

	we note that the connections framework under the NER provides for simplified connection processes where the level of risk associated with a particular connection type is reduced
• Should DNSPs be required to have a connection offering that separately addresses the connection of micro storage capability?	• No comment
• Do connection costs represent a significant barrier to storage? If so, what specifically is the issue?	• ENA does not consider connection costs represent a significant barrier to storage. Specifically, we note that connection costs are regulated and approved by the AER, meaning protections are already in place to ensure customers are paying a fair and reasonable price for connection to the grid.
Standards for the installation, connection and operation of storage Devices *• Does standard AS 4777 represent a potential barrier to the deployment of storage by providers other than networks? What elements of the standard are problematic?*	• ENA considers that the new AS4777.2-2015 and the proposed DR AS4777.1-2013 are well developed Standards that make use of standard inverter capabilities in a manner that facilitates greater micro-EG and EG connections, by addressing concerns around safety, protection, and operation.
Section 2.5 AEMC Preliminary findings *1. The existing connection process under the NER for micro-embedded generation appears to accommodate a consumer seeking to install storage behind the meter. However, there may be value in DNSPs being required to have a basic connection offering that separately addresses the connection of storage capability.*	• No comment
2. The technical requirements that apply to storage behind a customer's meter should be investigated to assess their appropriateness and whether there is potential for standardisation. *— Consider a review of the different requirements being applied to behind-the-meter storage by distributors in different regions.*	• Such a review should consider the reasons underlying different requirements, and the costs and benefits to customers of harmonisation of requirements • The investigation of technical requirements should be undertaken with regard to the operational safety and system security reasons for the technical

— Consider whether the technical requirements, including AS 4777, give network businesses too much control over what is connected to their networks, both in terms of: *(i) specification of the equipment and technical performance; and* *(ii) remote control.*	equipment specifications and remote control requirements. As part of this, priority must be given to minimising safety risks to customers or operational staff working on networks.
3. We recommend investigating, for the existing registration category of small generator aggregator, whether the ensuing rights and obligations are suited to storage behind the meter, for instance thresholds on what can be offered into competitive markets, and if so when scheduling requirements would apply. *- Consideration should also be given to whether the operation of end-user storage – either individually or in aggregate – creates system operation or network operation concerns. This is discussed in Chapter 4. We are of the view that small generation aggregators should be able to offer FCAS into the wholesale market. We therefore recommend that further consideration be given to whether there are any technical limitations to them doing so, and whether any changes to market arrangements and procedures (eg data validation) would be necessary to facilitate their participation in FCAS markets.*	• Support such an investigation, and support the focus being on the potential for unintentional system operation or network operation issues to be created by new aggregation arrangements, and steps to cost effectively mitigate their impacts on all network consumers. • Initial feedback from ENA members suggests that the simple integration of storage into this existing FCAS arrangements may not be feasible as these may not be fit for purpose
Section 3 - Network businesses integrating storage	
Service classification	• While the existing service classification process may be workable with minor adaptions to accommodate an increased uptake of storage, ENA considers that there is a case for looking more strategically at 'fit-for-purpose' service classification processes, form of regulation tests and institutional arrangements for the increasingly competitive environment around new and existing network service delivery.
• Do stakeholders agree that there may be tensions and ambiguities within the distribution service classification framework that would benefit from clarification?	• Agree that there may be tensions and ambiguities within the distribution service classification framework. As the AEMC has highlighted, the AER's current definition of a 'distribution system' as potentially encompassing assets extending beyond the meter is an example of this.

• *Do these issues relate in particular to the potential for development of competition in the provision of energy services from storage?* • *How should network business-controlled storage on the network be regulated – as standard or alternative control, or other?*	• A lack of certainty over the treatment of service classification issues by the AER is likely to contribute a deferral of otherwise efficient investment by all parties, as the competitive landscape will be subject to regulatory uncertainty. • The form of regulation should follow from the nature or function of the service being delivered and the beneficiaries from the service. • The *Discussion Paper* sets out the 'likely distribution service classification' which would apply across a range of energy storage functions. This analysis appears to be based on AEMC interpretation of previous AER determinations. • This highlights that one issue is that the AEMC must make assessments on the adaptability of existing rule arrangements in the absence of comprehensive information about the AER's intended practice around storage service classification. This in turn highlights that one possible area for positive broader reform would be the joint coordinated conducting of service classification processes and ring-fencing guideline reviews on a national basis by the AER and AEMC. • This would assist in producing a clear and rule consistent determination, by allowing for AER assessment to draw both on the AEMC's market development, competition assessment resources and analysis, and the underlying design considerations and expectations of the AEMC with respect to the rule provisions in question.
• *Do stakeholders agree that the current rules applicable to networks are capable of integrating storage?* • *Is the incentive framework for distribution and transmission businesses creating any barrier to the deployment of storage where it is cost effective to do so?*	• Broadly, the current regulatory rules surrounding network regulatory revenue, and innovation incentives, appear capable of integrating storage. • ENA considers that the regulatory investment test may require review in the future to provide a sound platform for truly technology agnostic assessments of network and distributed energy resource alternatives. • The broad incentive framework applying to transmission and distribution

	networks promotes the most efficient configuration of assets and services required to deliver network services. In principle, this does not create any barrier to efficient deployment of storage. • An issue to consider, however, is the potential for a regulatory asymmetry to arise where a network may be liable for STPSIS penalties to arising from an inability to control or effectively risk-share with a distributed energy resource, even in circumstances where such a resource is the least cost technology to deliver, for example, network support services. • Electricity transmission network businesses have also reported that some aspects of the revised STPIS arrangement, in particular, the way 'network capability' is defined for the purpose of assessing market benefits, may create unintentional barriers to storage deployment
• Given the relatively unproven nature of battery storage should it be treated differently to other assets? *• Are any of the timelines associated with regulatory processes likely to be problematic?— For instance are the lead times in the planning process sufficiently long to capture the value of an incremental storage solution as a substitute for traditional network investment?*	• This issue is appropriately dealt with by well-designed innovation support and incentive schemes. Storage as a technology should not be treated differently to other maturing technologies capable of contributing to efficient delivery of services. • No specific concerns.
TNSP ring fencing *• Would current ring fencing guidelines address any concerns about a TNSP being able to impact the wholesale market or does storage raise unique issues? If changes are required, what are they?*	• The current ring-fencing arrangements, and the 5 per cent revenue cap, may provide a sufficient safeguard that TNSP storage deployment will not adversely impact on the wholesale market, however, transmission ring-fencing guidelines have not been subject to thorough review since their original development and therefore, combined review with the distribution ring-fencing guideline may be warranted.

DNSP ring-fencing *• What will be required in the ring fencing guidelines to maximise the benefit of network use of storage?* *• What will be required in the ring fencing guidelines to minimise a network business's ability to unduly impact a contestable market?*	• Ring-fencing guidelines need to provide sufficient clarity upfront to enable networks to efficiently plan and deploy storage as part of the delivery of network services. The AER's development and interpretation of the ring-fencing guidelines over time must likewise be predictable and transparent. • Beyond the existing cost allocation, and shared asset guideline approaches, and the regulatory investment test process, it is unclear what additional measures would be required to avoid impacting the contestable market. • It is not clear that Australian electricity networks will have any material opportunity to impact a fast moving global energy storage market. Further AEMC consideration should focus on identifying what 'impacts' are credible, their materiality, whether a regulatory response such as additional ring-fencing obligations are proportional having regards to the full potential costs and benefits, and potential alternative regulatory and non-regulatory solutions.
Cost allocation *• The current cost allocation arrangements do not appear to raise any issues in relation to the use of storage assets. Do you agree?*	• Agreed • Further, ENA considers the scope for appropriate cost allocation approaches to address a number of potential concerns and obviate the need for more costly ring-fencing approaches may have been underestimated in the 'Preliminary findings' made by the AEMC.
Shared asset guideline *• The current shared asset arrangements do not appear to raise any issues in relation to the use of storage assets. Do you agree?*	• Agreed
Section 3.4 - AEMC Preliminary findings *1. Service classification. There is scope for the AER to classify storage for use by network businesses under existing service classifications. It is the AEMC's preliminary view that the provision of storage behind the meter is a contestable service and should therefore be unclassified. Networks should not be able to install storage behind the meter unless they do so through a ring-fenced business. Where storage behind the meter would be useful for providing network support, these*	• This finding amounts to a forecast of likely or preferred future application of the relevant National Electricity Rules provisions by the AEMC. • As discussed previously, ENA considers closer coordinated implementation of the relevant rules and policy framework would enhance regulatory certainty and rigour in this area. As a goal, ENA proposes that the AEMC and AER should jointly undertake future service classification processes on an integrated national basis.

services must be contracted from a third party or ring-fenced business. *Storage used to provide services on the network would be subject to the AER's usual service classification.* *— Metering for small customers has been treated as an alternative control service but in future advanced metering will be non-regulated and subject to competition. Similarly, storage technologies should also be considered in this way as a contestable service.*	• There is an apparent unresolved tension between the AER's current interpretation that a distribution system may encompass assets beyond the meter, and the AEMC's apparent reliance upon the meter as the defining terminating point of the shared regulated network. This re-emphasises the need for coordinated, shared processes to minimise uncertainty and the potential for conflicting or unforeseen outcomes.
2. Cost recovery. Once service classification is determined, the efficiency sharing incentives should lead network businesses to seek the most efficient trade-off between storage and traditional network assets, and between owning storage assets and procuring their services under contract. We do not recommend any blanket prohibitions on networks owning storage or requirements that they only competitively tender for storage services on their networks. It is unlikely that networks purchasing storage for their network will prevent the development of a competitive market for storage devices - given the amount of activity by retailers and direct sellers. *— We do not think extra powers are needed for AER to exclude non-proven technologies from the RAB.*	• Agreed • ENA would argue that deployment of network owned storage devices behind the meter would also be unlikely to prevent the development of a competitive market in storage, given that energy retail firms and others have already entered the storage and related markets. • Agree that no special powers are needed for the AER to exclude non-proven technologies from the RAB. The experience internationally and Australia around network innovation and technology deployment demonstrates that adequately incentivising innovation within the regulatory context is likely to be the more relevant regulatory policy tool. • There is a need for such arrangements that are reached to be flexible enough to accommodate innovative stand alone power solutions that reduce total end costs to consumer being trialed and explored by ENA members
3. Ring fencing. It will be very important that strict ring-fencing provisions are in place for network businesses looking to set up separate entities to install storage behind the meter. These provisions must prevent any ability of the network to favour affiliated businesses or provide advantage to the affiliate in areas like connection processes. Strong enforcement and compliance obligations will also be required to give the market confidence that a level playing field is being maintained. This is also applicable to transmission businesses looking to enter contestable markets. *- Cross-ownership considerations may also need to be applied if the policy principles that underlie vertical separation of monopoly from competitive*	• In broad terms, the policy goals of providing for a level playing field for investment in, and deployment of, contestable technologies is supported. • ENA supports approaches that minimise any artificial barriers to competition, and which are proportional and based on clear evidence. There does not appear to be a strong empirical case for the conclusion that it is "very important" and "strict" provisions are in place. Rather, the AEMC has pointed to traditional theoretic rationales for ring-fencing approaches established in the context of generation and retail supply markets, which are then applied by analogy to the emergent storage market. For this assessment to be complete, it should consider the potential loss of integration benefits and efficiencies of 'strict' ring-fencing arrangements.

electricity activities are threatened – see next chapter.	• The case studies that are provided by the AEMC (Vector, Italian network Terna, and the Oncor proposal) in fact highlight that other alternative approaches are feasible (from allowing behind the meter assets to be part of the a NSP's RAB, to offering specific WACC incentives to spur deployment, or using auctioning off mechanisms as a low cost alternative regulatory measure).
4. Annual planning process. The existing network planning requirements and investment tests should lead network businesses to consider storage as an alternative to traditional network solutions. The option value element of the investment test should also lead them to value the potentially incremental nature of a storage solution (as opposed to a "lumpy" network investment.) However, the lead times in the planning process should be reviewed to test whether they are sufficiently long to capture an incremental solution, especially one that needs to be implemented incrementally as loading of a network element increases in order to indefinitely defer an augmentation.	• No comment
Section 4 - Ownership and control	
• Are the connection requirements that are being imposed by different distribution businesses for consumer- or retailer-controlled storage being used as a barrier? If so, how? *• Does the ongoing degree of control that is being required by distribution businesses for consumer- or retailer-controlled storage represent a genuine safety, security or reliability need, or is it more appropriately a network interest that should be negotiated or signalled through prices?*	• ENA is not aware of any connection requirements being imposed by distribution businesses that are being used as a barrier. • AS4777does not require Demand Response Enabling Device (DRED) control modes other than Demand Response Mode Zero (DRM0). DRM0 is essential as it allows for disconnection for safety reasons, if doing so is required to perform works on the network, or is required by the Australian Energy Market Operator • All other control provisions in AS4777 do not provide DNSPs control over the inverter, but rather provide the customer with a choice as to whether to participate in a demand control program offered by either the DNSP or another party. Having this capability built into the inverter at very minimal cost upfront (mostly via software capabilities) means consumers will not have to invest more capital on specific products or add-ons, if they seek demand control options in the future.

Section 4.1.7 - AEMC Preliminary findings *1. Storage has the potential to generate a number of value streams, but control of the device will be required for this to occur. The NEM's current framework is built on the idea that market-based outcomes tend to be the most efficient. Control of storage devices should therefore, in all but a narrow band of circumstances related to system security and safety, be based on market-based price signals.* *2. AEMO should investigate the potential system operation effects of a prevalence of distributed energy devices, in particular in a scenario with a lower amount of synchronous generation, identify issues and their extent.*	• Agree in principle, noting that the term 'market-based prices' could encompass a wide range of potential methodologies and pricing approaches. • Agree
4.2 Competitive neutrality	
Section 4.2.1 - AEMC Preliminary findings *1. Storage is a contestable service and participation of network businesses in this market must be done on a level playing field with other market participants. The market-led installation of storage is most likely to lead to efficient outcomes. The Commission would not recommend any policy decisions to actively encourage the deployment of storage by networks in contravention of a framework that assumes that competitive energy activities should be market-led.* *2. It will be important to monitor the impact of ring-fencing requirements to ensure the vertical disaggregation of the electricity supply chain between regulated monopoly and competitive activities is maintained. In relation to energy storage, we take this to mean:* *(a) Network businesses should use energy storage where it substitutes for traditional network (not behind the meter), where it is efficient to do, so long as it does not significantly displace competitive energy services. It is appropriate for the storage to be financed from regulated expenditure to the extent that it is providing network services.*	• Support at this stage, noting that there continues to be a valuable scope for 'learning by doing' positively funded innovation programs which produce and disseminate to the market learnings under revised demand management incentive arrangements, for example. • The Commission should broaden its recommendation to not supporting *any* policy decisions to actively encourage deployment of storage on any basis other than a market led rollout (i.e. picking up any potential State, local or other government entity subsidising storage rollouts, or requiring them to occur through planning or other processes) • Agree with the conclusion that it will be important to monitor and adjust ring-fencing approaches through time in a fast-changing environment. It is not clear that present arrangements will achieve this, given that most networks are operating under ring-fencing rules set more than a decade ago designed for the purpose of governing NSPs involvement in the retail supply and wholesale market. • One option to consider is requiring joint reviews of market developments and the impacts of the regulatory restrictions embedded in ring-fencing

(b) If a network business installs storage on its network to provide network services, then its use for energy trading (or other competitive energy services) should be strongly separated from the regulated network business. The auctioning of energy trading rights from network-connected storage that has been proposed by Oncor, or the transfer of those benefits to a retailer in the ElectraNet trial, are attractive models. *(c) It is not appropriate for network businesses to own or directly control storage behind the meter except through a ring-fenced entity which is subject to strict compliance requirements and robust enforcement. If storage behind the meter is of value to network businesses, then they should contract with consumer, retailers or third parties to gain services, or create price signals or offer rebates that would reward consumers for operating storage in the desired way.*	requirements on a regularly scheduled basis. ENA is of the view that the AER may not be the body best placed to undertake this assessment in isolation, as it will be in the position of assessing the scope of its own regulatory powers. • The Oncor model and the approaches in the Electranet trial are positive avenues for exploration. An alternative approach may be to require the dispatch of the wholesale energy in a network controlled storage device to be at the NEM spot price, with these revenues treated in accordance with other similar shared assets (i.e. with network customers benefitting collectively). • The basis for a policy restriction on behind-the-meter storage is as yet unestablished, especially given the emergent nature of small scale battery deployment. A simple prohibition on network control or ownership of storage behind the meter may result in a loss of benefits to all customers through lost synergistic gains, increased transaction costs, and an inability to explore innovative and efficient least cost delivery of network services, for no obvious corresponding benefit to consumers. • Such a foreclosing prohibition also appears at odds with the AER's contention that the distribution system extends beyond the mete Lack of alignment between AEMC and the AER on this core definition issue has potential to create disincentives for efficient investment and regulatory uncertainty. • It appears untenable, for example, for the AER to base a view on the most efficient means of delivery of regulated distribution network services on a differing definition of the extent and nature of a distribution system than that used by the AEMC in defining the types of individual technologies able to be owned or controlled by the regulated NSP.
Section 5 - Storage at the wholesale electricity level	
• Is more clarity required in the definition of a 'generating unit'? If so, what changes would be necessary? How would such changes be necessary to preserve the registration requirements and eligibility criteria currently in place for generators?	• No comment

• Are current registration requirements appropriate for storage that may be used both as generation and load? Should a person operating storage to both buy and sell electricity through the spot market be required to register as both a market customer and a generator?	• No comment
• Do you see any issues with the current connections framework? For storage as a generator? For storage as a load? *• Do performance standards represent a barrier to storage connection? For storage as a generator? For storage as a load?*	• Unclear at this stage. One important issue is ensuring that future frameworks provide that networks are able maintain clear 'line of sight' of the installation and development of energy storage systems behind the meter, to assist in long-term network planning decision-making, and efficient operation of the shared network. • No comment
• What are the implications of current arrangements for ancillary service provision and cost recovery for storage? *• Are there other services that could potentially be provided by storage – such as a substitute for inertia through very fast response services – and does a lack of a market for these represent a potential barrier or opportunity?*	• No comment • No comment
Section 5.5 AEMC Preliminary findings *1. We do not see the need for a new category of registered participant to be introduced for persons operating a storage device. A person seeking to participate in the NEM using a storage device should be registered according to the value stream from the storage device in relation to which that person intends to participate in the NEM. This would mean that the owner/operator of a storage device could be registered as a generator, customer, or both.* *2. AEMO will need to be satisfied that the person intending to register can comply with the associated requirements of that role. It is not yet clear whether the obligations and requirements for each category of registered participant under the NER are appropriate to the operation of the storage device. For example, the following issues will need to be worked through:* *(a) whether the relevant technical standards are appropriate for the connection of*	• Agree.

a storage device; *(b) whether the thresholds for registration continue to be appropriate in the context of storage;* *(c) the implications of registering in more than one category of registered participant, eg, participant fees, prudential requirements and other financial obligations.*	