



16 September 2021

Ms Anna Collyer
Chair
Australian Energy Market Commission

Lodged via the AEMC website

Dear Ms Collyer,

PROJECT ERC0280: Integrating Energy Storage Systems into the NEM

The Clean Energy Council (CEC) is the peak body for the clean energy industry in Australia. We represent and work with hundreds of leading businesses operating in renewable energy and energy storage along with more than 7,000 solar and battery installers. We are committed to accelerating the transformation of Australia's energy system to one that is smarter and cleaner.

The CEC welcomes the opportunity to provide comment on the draft determination on the Integrating Energy Storage Systems into the National Energy Market (NEM) rule change request from the Australian Energy Market Operator (AEMO).

The clean energy industry has been advocating for changes to the rules to better integrate storage and hybrid facilities into the NEM for a number of years. The CEC therefore supports the intent of the draft rule change and considers that most of the recommendations will help in the process of better integration of storage into the NEM.

However, we do not support the draft decision not to explicitly exempt storage from transmission use of system (TUOS) and distribution use of system (DUOS) charges. This will create barriers to efficient investment in and operation of new and existing storage assets, which will in turn slow down the process of NEM decarbonisation, creating security, reliability and resilience risks for consumers.

The rest of this submission summarises our views on the other components of the rule change, then focusses on the issue of network charging for storage.

Integrated Resource Provider

Broadly, the CEC supports the introduction of the new proposed new participant category, the Integrated Resource Provider (IRP). The CECs earlier submissions to the rule change process suggested that the AEMC must provide enough flexibility for the registration and efficient operation of hybrid assets while improving clarity through clear and concise frameworks that support investment¹. The CEC believe this will be achieved if the proposed framework is implemented.

The CEC strongly supports the retention of 20 bid bands for storage assets to continue optimising their consumption and generation bids into the market. Reducing the number of bid bands available to

¹ CEC, Submission Integrating Energy Storage Systems into the NEM, 15 October 2020, available https://www.aemc.gov.au/sites/default/files/documents/clean_energy_council_0.pdf

storage assets would have been a significant reduction in operational flexibility for these assets. This is a good outcome, and the CEC commends the AEMC for engaging with industry and listening to our concerns.

The CEC supports the draft approach to performance standards, retaining two separate marginal loss factors (MLF) and the flexibility afforded to DC couple hybrid generating and storage assets behind an inverter. We also strongly support allowing small resource aggregators to provide ancillary services into the market.

It is unclear how large-scale generation certificates (LGC) will be treated for facilities that have hybrid storage and generation combinations. For example, when a storage asset charges from the grid, and then discharges in combination with a wind or solar generator, what impact does that have on that generator's LGC creation? Further clarity in this area is sought by industry.

The CEC also suggest the AEMC consider the protection of generators connection agreements for current generators considering adding storage. The consultation paper notes that current participants registered in another category that are seeking to move voluntarily, or those that are forced to move (current storage assets) into the IRP will face no fees to do so². This decision has been done to encourage participants to move swiftly into the new category and reduce barriers in doing so. The CEC suggest, to the extent possible, that a similar approach is taken for protecting agreed performance standards in generator connection agreements that would like to add storage assets to an operational generator. Re-opening these generator performance standards (GPS) involves significant cost, time and risk and is generally seen by industry as a step not worth taking. The re-opening of agreed GPS for an operational generator is a significant barrier to that generator becoming a hybrid facility. The CEC encourage the AEMC to consider ways to streamline the transition for generators to add storage, without materially impacting agreed upon performance standards, as an additional step under this rule change to further support the improvement of the storage framework.

Finally, we suggest the AEMC or AEMO clarify the forecasting obligations that will be applied to certain hybrid systems where it may not be clear. For example, a scheduled integrated resource unit that is DC coupled behind the inverter. Will the forecasting requirements applied to the participant recognise the intermittent nature of the solar or wind plant that is coupled? Or is this unit arrangement expected to meet scheduled forecast obligations? Further clarity is needed in this (and other) circumstances.

Retailer reliability obligation

There appears to be an oversight in the draft determination where retailer reliability obligations (RRO) capture auxiliary load and round-trip efficiency losses for storage units. The intent of the RRO is to ensure reliability during peak demand events through requiring large retailers demonstrate financial contracts with generation supply during said forecast events. Customers with a gross load over 10GWh become liable entities under the RRO. Storage units accrue round trip efficiency losses that will accumulate and could, if the unit is large enough, trigger liability under the RRO.

The CEC suggest that this oversight is fixed in the final rule, possibly through an exemption to the RRO requirements for energy storage units, to ensure that the intent of the RRO is maintained. It would be counterproductive to require storage generation, required to firm supply of clean energy generation, to contract with ageing thermal plant to meet RRO liabilities. The CEC consider that this is within scope of this rule change process and must be resolved and not deferred into a later review.

² AEMC, Draft rule determination – Integrating Energy Storage Systems into the NEM, pg. 71, July 2021, available at https://www.aemc.gov.au/sites/default/files/2021-07/integrating_energy_storage_systems_into_the_nem_-_erc0280_-_draft_determination.pdf

Connection points

With the draft rule including broader flexibility within the IRP participant category to classify units and have individual dedicated unit identifiers (DUID), industry is unsure to what degree this changes the ability for AEMO to control assets behind a connection point. Traditionally, units behind a connection point are left for the market participant to manage. It is not clear if this arrangement will persist under the draft rule for hybrid participants. The CEC suggest this is clarified by outlining to what degree AEMO will be able to control plant on an individual basis.

Allocation of network charges to storage assets

The CEC strongly encourages the AEMC to reconsider its draft decision on treatment of network charges relating to storage assets in the NEM. A core intent of this rule change request was to provide clarity, certainty and to encourage the uptake of energy storage in the NEM. The rejection of an exemption for storage to pay transmission use of system (TUOS) and distribution use of system (DUOS) charges, will likely have the opposite effect.

This decision, if implemented in the final rule, will have major impacts for the efficient investment in new storage assets in the NEM, and for ongoing efficient operation of existing storage assets. This will potentially impose major costs on a per project basis, which will in turn have a number of implications for end use consumers, as explored below.

The need for dispatchable renewable storage capacity

The decision by the AEMC to reject a network charge exemption for storage effectively imposes a penalty cost on storage participants, relative to other energy generators. This will impose significant increases in capital costs for new storage capacity and projects that are currently progressing through the commissioning and construction process, with millions of dollars in unexpected costs through increased risk premiums during project feasibility and financing.

Modelling conducted by CEC members suggest the additional costs of this element of the draft rule could result in \$2 million to \$35 million in additional annual costs per project, depending on the project size. This will increase the upfront cost of sourcing capital to fund new investment in storage and will likely make it more costly to operate existing storage assets, the net effect of which will be to significantly reduce the amount of reliable, dispatchable, low emissions storage capacity in the NEM.

Such an outcome seems perverse, given the focus placed on the reliability and security benefits of flexible and dispatchable generation, by both the AEMC and Energy Security Board (ESB). At the extreme, the ESB's concerns with reliability of supply have led it to recommend the introduction of a highly distortionary capacity mechanism. A less distortionary approach to enhancing reliability would be to prioritise reforms that remove barriers or disincentives to new dispatchable storage capacity, or availability of existing capacity.

The need for massive scale investment in dispatchable storage capacity is now clear. AEMO's Integrated System Plan (ISP) predicts 6-19GW of new dispatchable (predominantly battery and pumped hydro) energy storage will be needed by 2040 to back up renewables depending on the eventuating scenario³. Following the publication of the 2020 ISP it has become obvious that the NEM is transitioning faster than even AEMO could have expected, meaning that closer to 19GW in new storage, and perhaps more, will be needed, well before 2040 to support the power system.

³ AEMO, 2020 Integrated System Plan, pg. 50, Available at <https://aemo.com.au/-/media/files/major-publications/isp/2020/final-2020-integrated-system-plan.pdf?la=en>

Dispatchable storage capacity will be needed to complement new investment in variable renewable generation, to form an aggregate replacement for thermal generation. These kinds of aggregate complementarities are central to jurisdictional schemes to replace exiting thermal generation, such as the NSW Roadmap, which consciously couples storage with VRE in REZ design. The AEMC must carefully consider how its proposed draft rule would impact on the rollout of these schemes and the achievability of jurisdictional supply reliability objectives.

To deliver energy reliably and securely to consumers, storage assets are required in a diversity of locations across the NEM. To underpin this reliable and secure energy supply, attributes of an efficient power system must be carefully managed, including coordination of fast-response flexible capacity (complementing the output of wind and solar to act as an energy sponge), efficient network utilisation, and provision of essential system services such as frequency and voltage control, inertia and system strength. Pumped hydropower and battery storage units are well placed to provide these traditional system services if the regulatory frameworks are set up correctly to support investment.

All of the above demonstrates the clear physical need for more storage to support a secure and reliable decarbonisation of the NEM. However, the AEMC's emphasis on technological neutrality, through a focus on the 'trader services model', actually creates a risk that this underlying physical need for storage in the NEM power system will not be met.

Technological neutrality

The AEMC has pitched its draft decision in light of the ESB's two-sided market reform, which aims to move to a 'trader services' model of NEM regulatory design. Under this regulatory model, emphasis shifts from a focus on assets, to the 'services' provided by each participant.

This is an interesting concept and warrants further investigation. However, its specific application in this draft rule focuses on 'technological neutrality', by reducing the extent to which the NER frameworks talk to the different physical characteristics of specific assets. The end effect of this is to treat storage and load as one the same, and to apply the same network charging approaches to both.

Such an approach fails to recognise the central role played by storage in a safe, secure and reliable NEM decarbonisation. Investment in dispatchable, renewable storage will be critical to meeting the physical needs of the power system. Regulatory frameworks should therefore be designed to align financial incentives with these physical needs of the power system⁴. A key part of this is to ensure that technologies like storage that will deliver a safe, secure and reliable NEM decarbonisation are not artificially discouraged.

It is worth noting that regulators in other jurisdictions have recently made decisions in this light. For example, the Office of Gas and Electricity Markets (OFGEM) in the United Kingdom, made the recent decision to only recover use of system charges from final demand⁵.

Of course, technological neutrality is a critical and important concept. In fact, it is listed as a fundamental market design principle in clause 3.1.4(a)(3) of the NER. The intent of this inclusion is that the AEMC should not make rules to specifically encourage (or discourage) investment, use or operation in any particular type of technology, over another.

We consider that the specific interpretation of technological neutrality taken by the AEMC firstly does not align with the specific requirements of clause 3.1.4(a)(3). More generally, we consider that this

⁴ AEMC, Our forward looking work program, available at <https://www.aemc.gov.au/our-work/our-forward-looking-work-program>

⁵ OFGEM, Reform to BSUoS charges - analysis of proposal to remove BSUoS from generation, 7 July 2021, available at <https://www.ofgem.gov.uk/publications/reform-bsuos-charges-analysis-proposal-remove-bsuos-generation>

focus also does not take into account broader questions of reliability and security, and how to most efficiently decarbonise the power system.

Firstly, storage assets should not be equated with a traditional load. Storage assets are fundamentally supply-side assets that temporarily store electrons and then inject them into the power system at a later time, for end use by a consumer. Considering storage to be equivalent to an end use load consumer fails to recognise this fundamental difference: namely that a storage asset is not an end consumer of energy in the same way as a traditional load. The only consumption of energy from a storage asset is that associated with transmission losses and round-trip efficiency, each of which are already accounted for through transmission loss factors and the costs borne by the operator of the storage asset due to internal losses.

Applying network use of system (NUOS) charges to both technologies is not at all technologically neutral - it artificially applies the same rule to two completely different technologies which 'use' (and contribute) to the network in fundamentally different ways.

Secondly, storage assets should be treated equally to other supply side assets. However, the kind of 'technological neutrality' envisioned through applying the same legal NER drafting to load and storage, can actually deliver outcomes that are anything but. In this case, by placing a specific supply side technology, such as battery storage or pumped hydro, at a critical disadvantage to other, equivalent supply side technologies who do not pay use of system charges. Such an outcome runs directly contrary to the AEMC's statement that application of TUOS and DUOS for storage and hybrids will remove barriers and promote competition.⁶

It is also worth noting the original rule change request from AEMO stated their suggestion that storage should receive an exemption due to the fact that connecting storage to the network does not drive augmentation of the network. In fact, storage will typically enhance network hosting capacity for other generators and loads. Furthermore, storage projects do not receive firm access, and therefore do not increase network fees for others connected to the network. The CEC suggest that these points remain valid.

The recent slides published by the AEMC in response to stakeholder questions regarding the draft rule displayed a confusing approach to the justification for technology neutrality. The AEMC noted the argument that exempting storage would qualify as a subsidy for those assets, on the basis that coal and gas generators also have to pay for the transport of their fuel⁷. This is illogical, as coal and gas plants **consume** fuel in order to generate, whereas energy storage systems simply **delay the continued 'transportation' of electrons** created elsewhere on the network (aside from losses, which as argued above, are already accounted for in existing frameworks). Finally, in regard to the AEMC's obligation to meet broader power system obligations, we consider that the apparent focus on technological neutrality will in fact deliver negative outcomes in reliability, price and security.

As described above, investment in dispatchable, renewable storage represents a clear physical need of the power system. Dispatchable renewable storage will be central to replacing retiring thermal coal units. Storage such as synchronous hydro units and batteries also provide the full suite of critical system services that are essential to keeping the power system secure. Focussing on these physical needs, and the capability of storage to meet them, will deliver significant broader consumer benefits, through improved reliability and security, as well as by enhancing supply side competition and therefore delivering lower prices for consumers.

⁶ AEMC, AEMC, Integrating energy storage systems into the NEM, Draft rule determination, 15 July 2021, p.37

⁷ AEMC, Overview and Q+A from stakeholder engagement, August 2021, available at <https://www.aemc.gov.au/sites/default/files/2021-08/Overview%20and%20QandA%20of%20draft%20determination%20-%202026%20August.pdf>

However, as identified above, imposition of NUOS on storage will stymie investment and reduce operational incentives, reducing all of these reliability, price and security benefits.

For this reason, the AEMC must reassess its interpretation of what is meant by technological neutrality in light of a broader interpretation of the NEO, to ensure that actual outcomes are in line with what is needed to maintain overall efficiency.

Application of NUOS to storage – changed incentives will reduce investment in storage and withholding of existing storage capacity when most critical

The AEMC draft determination includes clarifying that storage will pay network charges for *prescribed transmission services*. As part of this determination, the AEMC have included the ability for storage projects to negotiate with the primary transmission network service provider (TNSP) for a *negotiated transmission service*, which may be higher or lower than the prescribed level of service.

To be fair, it appears that the intent in doing so is to allow for proponents to engage with the TNSP to strike a cost reflective tariff, which may in fact be zero (as per current examples in the market). However, the CEC does not support this approach for a number of reasons, primarily on the basis that this approach will not provide certainty and clarity to support the development of storage in the NEM.

An effect of this rule change will be that storage proponents will have reduced certainty as to what network charges they will face, unless they opt for a prescribed level of service and face millions of dollars in costs. If they opt for a negotiated charge, this cost remains an unknown until entering into the connection agreement with the primary TNSP. Both of these options will make it difficult to achieve financing for storage projects. Not knowing what the network charge will be during project financing will increase the risk premium applied. Conversely, if it is known and in the expected range of \$2-\$35 million annually as modelled by CEC members, it may very well make projects uneconomic.

It is made even more difficult for the project developer in that the prescribed level of service will set the benchmark costs in the rules for the service to be provided and the burden is on the proponent to prove the avoided costs deserve a reduction in charge. This is compounded by the fact that the negotiations will occur with the primary TNSP for whom the revenue from a negotiated transmission service sits outside the maximum allowable revenue. Developers will be entering a negotiation for a project cost with a monopoly entity that may have its own commercial incentives. This also means that for negotiated services, there is no reduction in actual consumer charges due to storage paying for network services.

Further, for units that are already operational, this charge may cause the need to withhold supply from the market in order to better manage network charges. For example, depending on the basis of the locational component of TUOS in each region, an existing pumped hydro system with multiple units could well face step changes in their network charges each time an additional pump is run (in a certain period). There will be situations where this step change in cost is unlikely to be recovered through expected wholesale market revenue. This could well lead to the proponent making the commercial decision to withhold its capacity in order to avoid said cost. Depending on outcomes in the market, this could very well see removals of large volumes of capacity, precisely when it is most critical to support reliability and system security.

The CEC also request the AEMC clarify how use of system charges will be applied on designated network assets (DNA) as this is not clear in the draft determination. We would also like the AEMC to clarify how it will ensure equal treatment of privately owned storage assets and network service provider (NSP) owned assets for the purposes of TUOS and DUOS.

Complexities associated with reform interactions

If the AEMC decides to maintain its draft position not to exempt storage, it should then provide a detailed explanation of exactly how the specific costs imposed by storage on the network can be identified and reflected in TUOS.

As noted above, a storage asset uses the network in different ways to that of an end use consumer. For example, physics aside, it can be argued that as a load, storage assets only use the 'sections' of the power system between it and the generator that produces the electrons. It should therefore only pay TUOS for those sections that it has used as a load, but not for those sections it uses when it operates as a generator and sends electrons on to an end use customer. In contrast, an end use customer load uses the entire network between it and said generator, as a load, and therefore should pay TUOS for both sections. Any network charges would need to recognise this very different usage pattern and allocate network costs accordingly.

Similarly, if the AEMC decides to maintain its draft decision, it must also consider exactly how other reforms will interact with application of TUOS to storage. For example, if under the new system strength frameworks, a TNSP engages a battery or pumped hydro project to help meet its obligations under the system strength standard, this will result in a flow and counterflow of payments – with the storage asset paying TUOS, but then receiving a network support payment for system strength. It is possible to envisage other complex arrangements, such as where a battery connected with a grid following inverter is paying TUOS, *and* is subject to the system strength SSMR charge, but is also being paid by the network to provide a network loading control ancillary service to relieve a thermal or stability limit. Imposition of a locational marginal price, as proposed by the ESB, would render arrangements even more complex.

In this context, the AEMC must carefully consider whether the imposition of yet another charge on storage will actually improve outcomes for consumers. This complexity of payment flows and counterflows demonstrates that a simpler, and far more effective solution, would simply be to exempt storage from TUOS in the first place.

Alternative options

The CEC continues to advocate that an exemption for storage from having to pay TUOS is the best outcome. An exemption accurately reflects the nature of storage as fundamentally a supply side asset, which competes with other forms of generation to provide consumers with reliable and secure electricity. It is also consistent with the approach taken by AEMO and generally endorsed across industry, which is that storage is not equivalent to load, and should not be treated as such.

However, if this exemption isn't delivered, there may be other second-best options that may help to minimise some of the disruption caused by a simple charging approach. However, it is important to note that these outcomes are distinct 'second bests' and will still result in higher consumer costs relative to an exemption.

Below we outline a number of suggested ideas the AEMC may want to explore to improve the framework, without applying a clear exemption or definition for storage in the rules. These suggestions are not exhaustive and would require considerable exploration to develop the detail. The CEC and its members would welcome the opportunity to explore these options with the AEMC.

1. The CECs preference (in the absence of exemption) would be that the negotiated transmission service framework be updated to include explicit requirements as to how network businesses may levy network charges for storage assets. Importantly, this must include that the starting point for a negotiated charge should be \$0 for storage projects. This would also move the negotiating framework to place the burden of proof that costs are justified on to the primary TNSP. This would then allow for the TNSP to negotiate upwards from \$0, only if it can

clearly prove that the storage asset has imposed costs. The AER would be required to develop clear pricing principles and guidelines that the TNSP must follow when making its case that any specific storage asset should face charges.

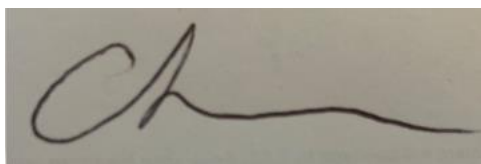
2. Adjust definitions in the rules other than adding a clear definition for storage in the rules. This could be done a number of different ways to achieve the desired impact.
 - a. The definition of load could be amended in a way that would make it clear that network charges only apply to end consumers of electricity and exclude those parties who act as a temporary 'storage vessel' for electricity.
 - b. Expanded the definition of load to make it clear that controllable load (e.g., scheduled load) will not face network charges unless incurring a proven cost demonstrated by the NSP
 - c. Expand the definition to include that consumption on the basis of generating (storage charging) is not considered load
3. Apply a storage rebate for network charges so that when a storage asset is generating it would be rebated back its network charges on the basis that has no longer 'consumed' those electrons from the network
4. If cost reflectivity is maintained as the basis for justifying negotiated network charges, then the starting point should be moved to \$0 and allowed to move both positive and negative. This would allow storage assets that are appropriately located and providing net-benefits to be compensated for those benefits. It would also centralise the power in negotiating a network charge. If the rules do not currently allow for this to occur, the rules could be adjusted to do so

Conclusion

The AEMC is to be commended for working to solve this important issue. Effective integration of storage is a central component of a safe and stable decarbonisation of the NEM. We look forward to working with the AEMC to explore alternative solutions to the network charging issue identified above.

Thank you for the opportunity to comment on the draft rule and determination. If you would like to discuss any of the issues raised in this submission, please contact Tom Parkinson, Senior Policy Officer, on tparkinson@cleanenergycouncil.org.au or myself, as outlined below.

Yours sincerely,



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