

TO/

Commissioner Merryn York
Australian Energy Market Commission
GPO Box 2603
Sydney NSW 2000

15 October 2020

Dear Australian Energy Market Commission

Firm Power submission on integrating energy storage systems into the NEM, dated 20 August 2020 (Ref: ERC0280)

Firm Power is pleased to provide a submission to the Australian Energy Market Commission's (AEMC's) consultation paper on integrating energy storage systems into the NEM, dated 20 August 2020 (**Rule Change**).

Firm Power is an intending participant in the National Electricity Rules as a Generator and specialises in providing energy services as a non-network solution to network limitations and constraints. Firm Power leverages private investment to provide innovative solutions, actively participates in Regulatory Investment Tests (RITs) and works with NSPs to design efficient and cost-effective means to save customers money through non-network solutions.

Firm Power was recently awarded a grant under the NSW Emerging Energy Program to develop two battery energy storage systems in Western Sydney as a way of deferring network investment to meet peak summer loads (see here for further details: <https://energy.nsw.gov.au/renewables/clean-energy-initiatives/emerging-energy-program>).

Firm Power broadly supports the objectives and principles of the Energy Security Board's (ESB's) "two-sided market" in streamlining services for those who use electricity and those who sell electricity on behalf of end users. The Rule Change is a critical element of the ESB's vision of a two-sided market.

Scalable technologies, such as energy storage are increasingly offering cost-effective substitutes for grid infrastructure and conventional generation. Energy storage systems (ESS's) can help smooth variability locally rather than cause increasing spikes within the transmission system thereby flattening the "duck curve" which will become increasingly pronounced without a coordinated and efficient approach to integrating DERs.

Around the world, network operators are re-imagining the grid as an interactive network that provides value to connected end-users, however, the challenge is to implement change in a fair and equitable manner that does not have the potential to create stranded assets or provide perverse incentives to concentrate new technologies within specific regions of the grid whilst neglected other areas of the network where this technology can provide a positive benefit to end-consumers.

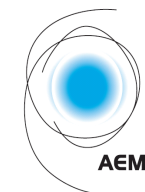
In light of the above and as a non-network service provider, we provide the following responses to the Rule Change:

Suite 6, Level 6, 201 Kent St Sydney NSW 2000

W www.firmpower.com.au

E info@firmpower.com.au

M +61 427 054 436



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.

Organisation: Firm Power

Contact name: Marcus Keller

Contact details (email / phone): marcus@firmpower.com.au / 0459 025 014.

Questions		Feedback
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?	Yes. We are supportive of the Bi-Directional Resource Provider classification however we would suggest recognition is provided for the fact that when acting as a load (scheduled or semi-scheduled), ESS do not consume the full sum of electricity recharged; it stores the gross amount of electricity less round trip efficiency and releases the net amount at an alternate time. Therefore imposing costs on this function via TUoS or DUoS might require alternative treatment that accommodates for the energy consumed during the round trip efficiency (kWh) vs a market customer who is a genuine load where there is no ability to re-serve electricity back to the market.
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?	Firm Power agrees with AEMO there is a lack of consistency in the way transmission and distribution network businesses treat ESS's and calculate TUoS and DUoS charges as opposed to loads or generators. We also agree this lack of consistency creates perverse incentives for locating ESS's in some regions with more favourable TUoS and DUoS tariffs while avoiding

		<p>other regions with higher charges even when a greater need and technical benefit could have been provided in both regions.</p> <p>As an example, if TUoS for ESS at transmission level is waived we would suggest this approach is reflected by also removing the TUoS component of NUoS charged by DNSP's. This follows the same rationale that requires DNSP's to provide payments of 'Avoided TUoS' to embedded generators; most notably ESS are able to navigate operation around peak periods or discharge into peaks to alleviate congestion.</p> <p>Within the existing TUoS/DUoS tariff regime we believe an alternate arrangement should be considered for capacity tariffs to reflect a Time of Use approach. As an example capacity (\$/kVA) tariffs, similar to energy (\$/kWh) tariffs, could be based on when the power is being consumed with a 'peak', 'shoulder' and 'off-peak' period arrangement. ESS able to recharge during off-peak periods would then be afforded a lower \$/kVA rate. This contrasts to the existing DUoS arrangement where a flat (fixed) 'peak' \$/kVA/day is charged and remains the same throughout the regulatory year. Capacity tariffs do not take into consideration the time in which the network capacity is utilised nor the long term changes in consumption behaviour an ESS could present. An ESS able to manage its energy consumption to move around periods of network congestion should be rewarded with a lower rate which covers the long run marginal cost of network management whilst reflecting the much lower utilisation during peaks. Further during periods of peak demand, ESS are able to discharge and proportionally alleviate congestion. We would suggest DUoS rates should be created which recognise the benefits ESS can deliver at peak periods when acting as a generator.</p> <p>In addition, the 'peak' window for ESS tariffs should genuinely be limited to the period the DNSP would not desire any charging of the ESS, even if it were constrained. As a maximum this 'peak' window should only be 4 hours in duration to reflect the controllable nature of ESS's.</p> <p>Further we believe that due to NSP's own internal tariff reform to meet the objectives of the AER, and apportionment of asset values to reflect the book value of connection assets, that tariffs are inherently 'unstable'. This contributes to the ambiguity in understanding NSP tariff calculations, especially when considered over the life of a project development.</p>
--	--	---

Questions	Feedback
<p>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?</p>	<p>TUoS and DUoS tariffs, and their quantum relative to the forecast project revenue, impacts significantly on the commercial viability of energy storage projects. The majority of investment decisions in regard to proceeding with energy storage projects is made during the feasibility stage at the beginning of project planning. At this stage of the project various scenarios can occur:</p> <ol style="list-style-type: none"> 1. The amount of TUoS and DUoS calculated by the project team is based on the published TUoS and DUoS tariffs available from the respective Network Service Provider, 2. The TUoS and DUoS tariffs are calculated based on 'experience' (fees and charges levied from prior project experience) <p>The Network Service Provider is not obligated to confirm the calculations are correct nor will they comment on any intent to deviate from the published tariffs. There is a generic understanding that tariffs will be negotiated closer to the Offer to Connect stage.</p> <p>This process poses significant price risk to the project that the final tariffs will not align with the original published tariffs due to alterations in:</p> <ol style="list-style-type: none"> 1. How the grid connection has been designed and therefore 2. How the energy storage system needs to operate to align with these grid requirements. <p>If a Network Service Provider could provide confirmation (via a pricing band between X and Y) of forecast TUoS or DUoS during either the System Planning Advice or Connection Options Report, this would provide clarity on the potential OPEX liability for the project. We recognise this would require a reporting framework to be established between the Network Service Provider's Connections Team and Customer Service Team.</p> <p>Further the TUoS and DUoS tariffs are published often only two years in advance and subject to change year on year. This affords the project no price protection of these variable costs. We suggest that site specific tariffs be considered and apply for the life of the ESS Connection Agreement and not be subject to change.</p> <p>We also recognise that if 'discretionary DUoS tariffs' are implemented, which enable NSP's to reward an ESS for providing localised services of benefit to the grid, that any validation/approval</p>

Questions		Feedback
		<p>by the AER could take a further 12 months before this approach is approved. We would encourage a more expeditious review process by the AER, where new 'project specific' or 'DNSP specific' tariffs can be approved in an 8-12 week period, and enable investors to make decisions.</p>
3	<p>What are the pros and cons to allowing each NSP discretion in developing and applying TUoS and DUoS charges? On balance, should the approach and method to applying TUoS and DUoS charges be harmonised among NSPs?</p>	<p>We would suggest that a framework be established to harmonise TUoS and DUoS calculations across each NSP. This would be efficient especially if energy storage based Virtual Transmission Lines (VTL's) are considered in support of interconnectors. Achieving alignment in TUoS calculations in particular for each NSP located at their respective end of the VTL would be necessary to manage commercial reconciliation of capacity and power flows.</p> <p>A key benefit of a coordinated TUoS and DUoS tariff approach across NSP's is that it avoids perverse impacts which may see inequitable regional allocation of generation, load and storage.</p> <p>A harmonised framework could also encourage NSP's to reward energy storage projects with discounted TUoS and/or DUoS based on:</p> <ul style="list-style-type: none"> • Reducing unserved energy through improvement in supply reliability to customers from the relevant substation, • Reduced dispatch costs through reduction of constraints, • Avoided TUoS payable by a DNSP to a TNSP, and • Utilisation of existing network assets which are either redundant or operating well below its nameplate capacity. <p>Once again, we would encourage a more expeditious approval process by the AER for any DNSP directed tariff discounting which supports ESS deployment and localised grid support.</p>
4	<p>Is there a regulatory risk when NSPs interpret how to apply the current rules to battery systems?</p>	<p>NSP's may not be motivated to support an alternative TUoS or DUoS tariff framework which enables the propagation of energy storage projects in the NEM, if these projects do not enable the NSP to attract additional revenue or have the asset value considered under their respective Regulated Asset Base.</p> <p>Further NSP's have not historically assessed or selected energy storage projects under RIT/T and RIT/D procurement efforts when these projects have been offered as 'non-network</p>

Questions		Feedback
		<p>solutions' where services are offered to the NSP under an OPEX arrangement. There is little incentive for NSP's to consider innovative projects able to provide medium term solutions when the availability levels are less than traditional network solutions.</p> <p>We would encourage any new TUoS or DUoS framework to prescribe an NPV calculation methodology which enables third parties to readily interpret how the cost base of an energy storage project has been assessed by an NSP within a RIT/T or RIT/D process. In this process there may be the opportunity to consider rewarding energy storage projects for extracting greater value from existing network assets which are otherwise under-utilised or stranded.</p>
Question 25: Solutions for clarifying the application of TUoS and DUoS charging (p. 79)		
1	<p>Do you agree with AEMO's proposal to exempt all energy storage systems from TUoS charges? If you agree with an exemption, should the exemption of TUoS charges also apply to energy used on site (auxiliary load) i.e. energy that is not stored and sent out into the network?</p>	<p>Whilst we agree with AEMO's rationale for not charging TUoS to ESS's (i.e. NSPs would not increase capacity of shared networks to provide unrestricted access to batteries and not charging TUoS would not result in an increase in costs to others), we believe this same rationale also applies to distribution connected ESS's which we believe should also be exempt from DUoS.</p> <p>As AEMO argues, a consistent approach to TUoS and DUoS would eliminate any perverse incentive to locate ESS's in a particular region of the network and not in other parts of the network. By recommending ESS's are exempt from TUoS but not DUoS this will lead to a concentration of ESS's in the transmission system which reduces the value of this technology to provide network services and alleviate constraints and limitations, particularly in the distribution system.</p> <p>The further downstream ESS projects are located, the more opportunities they have to support network constraints and reduce losses within the system. This is particularly relevant with the</p>

Questions		Feedback
		<p>growing numbers of DER's being located within distribution networks which is a key element of the ESB's two-sided market vision.</p> <p>If DUoS exemption (or the TUoS component of DUoS) is not possible there may be a framework within which the localised benefits of a Distribution level connected ESS can be weighted and calculated to reduce its total annual DUoS obligation.</p> <p>With regard to energy used on site (i.e. energy not stored and sent out) we agree that this may not be exempted from DUoS charges as this represents an auxiliary load that generators are typically expected to pay in charges. In this instance we would support a kWh charge as consumed energy.</p>
2	<p>If battery systems are exempt from TUoS charges does this:</p> <ul style="list-style-type: none"> a. create a subsidy for battery technology and therefore an advantage over other generation technologies? b. remove the ability to provide an efficient location and/or price signal to potential battery system proponents, and therefore impact on the efficient entry and location of new battery system participants? 	<ul style="list-style-type: none"> a. We do not agree that exemption from TUoS and DUoS charges creates a subsidy for ESS's. As AEMO note, ESS's do not receive firm (or guaranteed) access to the network. Similar to generators, ESS's can be dispatched down or off if the network is constrained. Acting as a load, ESS's can also be controlled in the way they charge and consume energy so they do not create additional burden on the network and require network augmentation to provide connection capacity. b. There are other location and/or price signals that impact ESS's outside of TUoS or DUoS charges such as MLF, TLF and DLF. In addition, as mentioned above, ESS's are not provided with firm (or guaranteed) access to the network so there is an inherent advantage in locating ESS's within parts of the network that are unconstrained or are designed to alleviate constraints.
3	<p>If battery systems are not exempt from TUoS charging does this:</p> <ul style="list-style-type: none"> a. create double charging of TUoS /DUoS for end use customers? b. distort investment signals and not align with the need for significantly more storage investment across the NEM? 	<ul style="list-style-type: none"> a. We agree that not exempting ESS from TUoS/DUoS is akin to double charging because it applies network tariffs when the energy is stored in the ESS and then again when the energy is used by the end consumer. In principle, an ESS is a market intermediary. TUoS and DUoS charges should be cost reflective and allow for NSPs to recover their costs to build and maintain their network assets. ESS's can be designed to act as a load during low demand / high generation times and vice versa act as a generator during high demand / low generation times which leads to a better utilisation of network assets and extends the value and life of network assets before they become constrained or limited, particularly during peak demand periods. If ESS's are not exempt from TUoS / DUoS

Questions		Feedback
		<p>then charges need to be cost reflective based on the burden they place on network assets. In addition, ESS's should also be rewarded for the improvement in utilisation of network assets and extending the life of the existing network asset base by providing support to the network and by improving system stability and reliability.</p> <p>b. As above, TUoS and DUoS charges need to be cost reflective and actually reward ESS's for improved utilisation of existing network assets. Otherwise this will distort investment signals and not lead to further uptake of storage across the NEM.</p>
4	<p>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?</p>	
5	<p>Do you agree that battery systems should pay DUoS charges for consumed energy? Please explain why or why not.</p>	<p>Yes, we suggest that if ESS are to be liable for any TUoS or DUoS, that this applies to ESS auxiliary loads only. This could be separately metered to total consumed energy for the purposes of ESS recharge. If not then we would suggest TUoS and DUoS apply to kWh of consumed energy (consumption charges) using a Time of Use approach only, vs the current arrangement of capacity charging (\$/kVA).</p> <p>If an alternate arrangement to waive the capacity charging cannot be considered we would suggest the capacity price should be discounted to reflect:</p> <ol style="list-style-type: none"> 1. Most ESS projects typically pay for the capital cost of connection and any upstream augmentation costs. Therefore capacity charges in addition to CAPEX charges for

Questions		Feedback
		<p>connection could be perceived as 'double dipping' by an NSP in an attempt to reflect the amount of network capacity set aside for an individual customer.</p> <p>2. The benefits afforded by the battery;</p> <ol style="list-style-type: none"> i) An ESS is able to operate as a controlled load when necessary, and ii) An ESS can operate around demand peaks. <p>Further whilst we are comfortable to consider paying for consumed energy, we would encourage a Time of Use tariff that reflects:</p> <ol style="list-style-type: none"> 1) A shorter evening peak period, nominally 4 hours. 2) Inclusion of shoulder and off-peak periods. to reflect decreasing levels of demand.
Question 26: Alternative solutions for issues with TUoS and DUoS charging (p. 82)		
1	How would charging all Market Participants TUoS and DUoS, based on the services received by participants (energy consumed) rather than based on the asset type, impact participants' behaviour and market outcomes? This would mean that all Market Participants would be liable for TUoS and DUoS charges for the energy that is consumed at their network connection point.	<p>We support this approach and suggest that TUoS and DUoS charging should be aligned around not only the services received but the services offered by a given Market Participant. This approach will:</p> <ul style="list-style-type: none"> • Encourage all generator and load participants to effect bidding and trading behaviour which will contribute to system strength and alleviate congestion. • Encourage NSP's to recognise and incorporate a charging regime for other Market Participants based on energy (kWh) rather than power (kVA) • Recognise the value of fast response technologies able to offer services which support future market development including Fast Frequency Response and Inertia.
2	If all Market Participants were charged TUoS and DUoS, would this have any impact on existing external arrangements?	Yes, we suggest the need to generate investment community confidence in ESS based projects and the runway for their respective development and construction. With any significant variation

Questions		Feedback
		in how TUoS and DUoS is calculated, we would suggest a well communicated phase-in period to allow for refinancing and support of project bankability.
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?	<p>We suggest that a definition for storage technologies is required for the purposes of TUoS and DUoS charging, and the “Bi-directional Unit” within the Storage classification (able to ramp linearly and provide ancillary services) could provide this context.</p> <p>In the context of charging, what remains important is the “services” received by or provided by ESS be recognised, defined and the TUoS and DUoS charging arrangement aligned to each service. This will remove ambiguity in how NSP's may interpret the charging arrangement, whilst providing some measure of flexibility for rewarding localised services provided by an ESS to an NSP.</p> <p>Some flexibility may also be needed for new “services” to be added to the Bi-directional Resource Provider classification as technology evolves, alternate business models considered and greater value offered to the NEM by respective market participants.</p>
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?	<p>Currently we believe there is inconsistency in how NSP's calculate TUoS and DUoS. The existing NSP approach is reflective of a single sided market and not in alignment with the existing ESB, AER and AEMC approach to transformation of the NEM.</p> <p>We support a harmonised approach to network pricing across all NSP's to provide clearer investment signals for ESS proponents. NSP's need the tools to recognise and define the “services” provided by (and required by), an ESS and creation of a charging matrix to align with these services would be a natural first step. NSP's could then use this matrix to communicate a clear charging regime during the System Planning Advice or Connection Options Report stages and enable ESS proponents to analyse project feasibility with greater accuracy.</p>

We thank you for the opportunity to provide a submission to the Rule Change. If you have any questions in relation to this submission please don't hesitate to contact Marcus Keller at marcus@firmpower.com.au.

Your sincerely,



Chris Wilson
Director, Firm Power
Email: chris@firmpower.com.au