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A Siemens and AES Company

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11 February 2021

Attn: Joel Aulbury
Australian Energy Market Commission
GPO Box 2603
Sydney NSW 2001

RE: ERC0280 - Integrating energy storage systems into the NEM

Dear AEMC Team,

Fluence is a global energy storage technology solutions and services company, and a joint venture of the U.S.-headquartered AES Corporation and Germany-headquartered Siemens AG. Our solutions are built on the foundation of industry-leading technology platforms that are optimized for different application groupings, and Fluence leads the energy storage industry with over 2,400 MW of projects deployed or awarded in 22 countries and territories.

Fluence also offers a comprehensive services suite to ensure customers are staying ahead of the market. From early-stage feasibility and cost-benefit analysis that stand up in the real world, to ensuring optimal performance of storage assets, Fluence provides expert advice and services to propel customers' projects forward.

Fluence is an active player for Battery Energy Storage Systems (BESS) in the Australian market with our solution installed at the 30MW Ballarat facility. In addition, Fluence recently acquired AMS – the NEM's leading supplier of algorithmic bidding software for semi-scheduled renewable generators and scheduled BESS, with over 1,700 MW of capacity currently trading in the NEM.

Energy storage is an essential need for the market in Australia to help achieve state based renewable energy targets and to transition to a carbon free energy system. Existing BESS deployments were connected to the grid, but through a very involved process of registration and alignment with AEMO. The value-add of storage has been clear and recognized by both market participants and regulators, but the risks and cumbersome process of connecting have continued to be a hurdle to further BESS deployment. Developers and investors have identified commercial structures to make a viable business case to invest, but time-consuming connection and registration processes, and the uncertainty of success creates a large disincentive for investment. Fluence would like to acknowledge and appreciate all the stakeholders including the AEMC and AEMO for envisaging proposed solutions to tackle the challenge of integration of energy storage system into the NEM and for further providing Fluence an opportunity to contribute to the consultation process.

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Relevant organization information and experience is enclosed in this submission along with Fluence's comments/responses to questions in the consultation. We have addressed some of the questions below, but would be pleased to contribute further on any of the topics outlined, upon request.

Please direct any inquiries pertaining to the enclosed submission to me at my contact details below.

Sincerely
[Signed]

Lara Panjkov
Market Applications Manager
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ORGANISATIONAL INFORMATION

	Response
Trading Name	Fluence Energy Pty Ltd.
Registered Name	Fluence Energy Pty Ltd.
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RELEVANT EXPERIENCE IN AUSTRALIA

	Response
Project name	Ballarat Terminal BESS for AusNet Services
Location	Ballarat Terminal Station, Warrenheip, VIC, Australia
Project description	Fluence's 13-year history of delivering and operating grid-scale energy storage technology solutions ensured that it was the partner of choice for AusNet Services, the owner and operator of Victoria's transmission network, leading energy retailer EnergyAustralia, and engineering, procurement and construction company Spotless/Downer in deploying an integrated battery storage solution to address certain issues facing Victoria's electricity grid. The project was a successful applicant for the Victorian Government's Energy Storage Initiative as well as grant funding from the Australian Renewable Energy Agency (ARENA). Fluence supplied a 30 MW/30 MWh Advancion BESS that was installed in the Ballarat Terminal Station. The BESS is owned by AusNet Services but is operated by EnergyAustralia, which uses it to provide a number of market and grid benefits, including: a) flexible peaking capacity to respond to periods of high load; b) frequency control ancillary services. The layering of these services enables the BESS to deliver maximum value to the benefit of all customers in the region.

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Commencement and completion	Commencement of installation: January 2018 Completion and commissioning: December 2018
Partnership organisational structure	The Ballarat Terminal BESS project was delivered by a consortium comprised of Spotless (as EPC contractor), AusNet Services (as owner), EnergyAustralia (as operator) and Fluence (as energy storage technology supplier). The Ballarat Terminal BESS Project was commissioned by the Victorian Government and was partly funded by the Australian Renewable Energy Agency.

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Questions		Feedback
Chapter 1 – Registration and participation framework		
▪ **Question 1: Registration and classification (p. 17)**		
1	Is introducing a new participant category, an Integrated Resource Provider (option 4), to better facilitate entry and participation of storage and hybrid facility, more preferable than modifying existing participant categories (option 3)? Are either option 3 or 4 more preferable to options 1 and 2?	Fluence supports the introduction of a new participant category, an Integrated Resource Provider (IRP), as described in the AEMC's option 4. This aligns with the transition toward a two-sided market, defining capabilities and characteristics rather than asset type. A technology-neutral approach would reduce barriers for new technologies to participate. Fluence has vast experience in the U.S., with over 2GWh of storage assets built or under construction. The establishment of a clear registration category has assisted front-of-meter storage in the California ISO territory (CAISO), the Non-Generating Resource (NGR).[1] The NGR category accounts for the unique characteristics of BESS operating as both generation and load and is simpler for storage to register and meet access and performance standards. The proposed IRP category would include a broader scope of projects than CAISO's NGR, such as Market Small Generation Aggregators (MSGA) and hybrids, and would codify the need for services rather than asset types.[2] Of the four options presented, Fluence suggests that the IRP model (the AEMC's option 4) is the closest analogue to the Californian NGR concept, and most likely to facilitate simple and streamlined integration of storage into the NEM. Fluence considers that both options 3 and 4 are preferable to options 1 and 2, because: • Relative to option 1, options 3 and 4 will usefully facilitate the registration and dispatch of hybrid assets

[1] Note that in CAISO other participation models for storage exist, such as Proxy Demand Resource (PDR) and Distribution Energy Resource Provider (DERP). For more information, please refer to http://www.caiso.com/participate/Pages/Storage/Default.aspx.
[2] In CAISO, hybrids can register as NGR, however an initiative to further develop the participation model is underway, see https://stakeholdercenter.caiso.com/StakeholderInitiatives/Hybrid-resources.

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Questions		Feedback
		• Relative to option 2, options 3 and 4 minimise the need to unduly overhaul participant registration categories, and the need to unduly overhaul AEMO's dispatch systems.
▪ **Question 2: Classifying MSGAs (p. 18)**		
1	Do you agree that, if an Integrated Resource Provider category (option 4) is established, battery aggregators should use that category and MSGAs should not be allowed to classify storage units exempt from the requirements to register as a Generator? And in that case, should the current arrangements regarding the provision of market ancillary services by MSGAs be maintained?	[Intentionally left blank]
▪ **Question 3: Existing storage participants (p. 19)**		
1	Should existing storage participants be transitioned to a single participant category (as they are currently registered as both a Market Generator and Market Customer)?	The transition of existing storage assets to a single category would incur some costs for asset owners and should be optional. However, if this is desired, AEMO along with owners should consider the financial impact of undertaking a transition, and together work on a feasible approach (e.g., waivers or other compensation mechanisms). Transitioning sooner rather than later may assist AEMO identifying any issues in the process before new battery storage projects come online.
▪ **Question 4: Scheduling of hybrid facilities (p. 20)**		
1	What proportion of a hybrid facility's sent-out generation capacity would need to be dispatchable for the whole of the hybrid facility's sent-out generation to be able to follow dispatch instructions, under a single DUID?	We anticipate that future hybrid facilities will be capable of following dispatch instructions, regardless of the proportion of capacity that is dispatchable, and regardless of the combination of technologies comprising the hybrid facility. All of today's scheduled storage facilities are capable of following dispatch instructions. Similarly, all of today's semi-scheduled generators are capable of following dispatch instructions. Putting these two types of facilities behind a single connection point will result in a

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		hybrid facility that is fully capable of following a single dispatch instruction. Today's semi-scheduled generators are able to curtail output to limit generation to any dispatch target (as when semi-dispatch capped), and are able to control ramping between targets. The only limitation on a semi-scheduled generator's capabilities is its inability to increase output to meet a dispatch target that was set too high, based on an incorrect forecast of the available natural resource. Adding dispatchable storage behind the connection point of an existing semi-scheduled generator would give a participant the opportunity to remedy this issue by self-dispatching the storage facility to make up the shortfall from the incorrect resource forecast, and allow the dispatch target to be met. Alternatively, the facility could choose to signal its availability to AEMO in a manner that ensures it receives a more conservative dispatch target, to cater for the possibility of error in the resource forecast (and to reduce the need to self-dispatch the battery to make up a gap). Making hybrid facilities responsible for their own resource availability forecasts would allow a hybrid facility the flexibility to decide what dispatch target it is comfortable receiving (as a function of say, forecasted wind availability, and available battery SOC), and also the flexibility to decide which facilities they want to employ to meet that target (via self-dispatch or self-curtailment of individual facilities behind the connection point). Scheduled hybrid facilities will possess the ability operate in this manner by utilising advanced software tools to engage in the availability management and bidding process. Software tools will ensure each facility bids its availability to AEMO in a manner that will result in a dispatch targets it is confident it can achieve, based on the combined availability and technical capabilities of its constituent facilities. Fluence already supplies optimised bidding software to more than 15% of the semi-scheduled generation capacity in the NEM, and we expect that software solutions like ours will continue to see increasing adoption and will play a significant role in assisting hybrid facilities with engaging in the bidding, dispatch, and availability management process in a reliable and compliant manner. In general, we agree with the AEMC's approach to let the *Generator registration thresholds* rule change determine appropriate thresholds for unit scheduling. In addition, we suggest that any hybrid facility is

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Questions		Feedback
		comprised of 1) a battery large enough to warrant being scheduled if it were stand-alone and 2) a renewable generator large enough to warrant being semi-scheduled if it were stand-alone is technically capable of being classified as a single scheduled facility. Whether a single DUID is employed, or two DUIDs are employed will ultimately be an immaterial consideration for the participant, but a major consideration for AEMO and its dispatch systems - as AEMO would have to overhaul its systems to transition to bi-directional dispatch using one DUID. We suggest that the status quo two DUID arrangement has proven to be manageable for both participants and AEMO, and is thus appropriate for continued use under any future storage registration framework, including the AEMC's new options 3 and 4. We suggest that any potential dispatch conflicts arising from the use of two DUIDs can be easily remedied with logic validations in participant bidding systems and/or AEMO dispatch systems.
2	Would a dynamic approach to scheduling obligations, for example shifting between scheduled and semi-scheduled obligations based on the state of charge of the storage unit, be appropriate, and how should this operate?	No. A dynamic approach to scheduling obligations – as described – adds undue complexity to the dispatch process and would require AEMO to undertake a costly and intensive overhaul of its dispatch management systems. As per our above response to question 4.1, most hybrid facilities of significant size will be technically capable of being fully scheduled at all times, and it is appropriate to make them so.
3	Could the same approach be taken to scheduling load where storage is added to a Market Customer's site, or should different considerations apply?	It seems reasonable that different considerations should apply. Whereas renewable generators large enough to be semi-scheduled are capable of accurately forecasting their own future availability (in order to receive achievable dispatch targets) most (traditional, non-dispatchable) end-user loads not able to do so. Accordingly, in these situations it may be more appropriate to allow the load to remain non-scheduled, while the storage is separately metered and treated as scheduled for purposes of dispatch.
▪ **Question 5: Number of price bands (p. 21)**		
1	Do you agree that 20 price bands would be appropriate for grid-scale batteries or would another number of bands be more appropriate?	Fluence suggests that the status quo arrangements for price bands is appropriate for continued use under any future storage registration framework. The status quo arrangements have proved functional and fair, and we see no pressing need to reform them. We note that technically, grid scale batteries are not afforded 20 price bands, but

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Questions		Feedback
		rather classified market loads are afforded 10 price bands, and classified market generators are afforded 10 price bands.
Question 6: Dispatching hybrid facilities (p. 21)		
1	Are there certain configurations of hybrid facilities that cannot, or should not, be dispatched at a single connection point?	[Intentionally left blank]
2	What benefits are achieved by dispatching a hybrid facility at a single connection point, and what issues arise?	Fluence has addressed this in our response to question 4.1
▪ **Question 7: Performance standards (p. 22)**		
1	What issues may arise if performance and access standards are set at the connection point for hybrid facilities? Would these standards need to be amended to provide appropriate flexibility for hybrid facilities?	When applying performance and access standards at the connection point, flexibility must be granted to hybrid plants. A major concern is that a BESS may need to over-compensate to meet performance standards when an issue occurs with other technologies e.g., a PV inverter issue. It is especially difficult if the BESS capacity is much smaller than the other technology. This also affects equipment suppliers, when sourced from different providers, who would be more comfortable complying with separate standards for BESS and other technologies. One option that could help developers is AEMO providing 'parent-child' guidelines for hybrid facilities. In this model, there would be one set of standards for the connection point (parent) but also clear guidelines to help developers outline an internal subset of standards for each technology in the hybrid facility (child). Guidelines would vary depending on the level and type of hybridisation of the facility. This would help developers more easily differentiate and allocate responsibilities. This method may not apply to DC coupled systems.
Chapter 3 – Recovery of non-energy costs		
Question 8: Options for the recovery of non-energy costs (p. 27)		
1	Which option do you consider to be the most appropriate for the recovery of non- energy costs from market participants? Please provide	[Intentionally left blank]

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Questions		Feedback
	detail on why it would be the most appropriate option.	
2	Are there any other factors the Commission should consider when deciding how non-energy costs should be recovered from market participants?	[Intentionally left blank]
3	Are there any implementation issues the Commission should consider?	[Intentionally left blank]
Chapter 4 – Additional issues relating to storage		
Question 9: Network service provider connection points (p. 34)		
1	Do you support the solution outlined in this options paper for resolving the potential issues with establishing standards for NSP owned energy storage?	[Intentionally left blank]
2	If not, do you consider there to be other potential solutions for resolving this issue?	[Intentionally left blank]
Question 10: DC coupled systems (p. 38)		
1	What capital, operational or efficiency benefits do DC-coupled systems provide participants and the NEM as a whole, and how might these benefits help consumers in line with the NEO?	[Intentionally left blank]
2	Do you support amending the NER to permit the registration and operation of DC-coupled systems? If so, how should they register and operate?	Yes, the NER should be amended to permit the registration and operation of DC-coupled systems. Such systems can play a large role in the future NEM. Their technical characteristics are fundamentally similar to AC-coupled systems, and the dispatch of a DC-coupled system should present no additional technical complications for AEMO. The only complications appear to be procedural, and linked to lack of definition/guidance in the NER. We suggest operating DC-coupled systems under a single set of obligations. As previously described, such assets should be capable of operating at scheduled assets, and managing their own availability such

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Questions		Feedback
		that they retain agency over choosing dispatch targets that they can always physically achieve. In contrast, the mooted 'dynamic trigger-based obligations' are needlessly complex and would require costly changes to AEMO's dispatch systems – the downsides articulated in the options paper are significant, and seem to dwarf the potential upsides.
Question 11: Provision of ancillary services (p. 40)		
1	Do you support AEMO's proposal to redraft ancillary services provisions in Chapter 2 of the NER to make it more consistent with the services approach to regulation currently being considered by the ESB's two-sided market work? Please explain why or why not.	[Intentionally left blank]