
Interim Pathway to Enable the Registration of Energy Storage Systems in the WEM

June 2019

Information paper

Important notice

PURPOSE

This paper is to provide information to stakeholders on potential arrangements to support the registration and connection of energy storage systems (ESS) in the Wholesale Electricity Market (WEM) in accordance with the current Wholesale Electricity Market regulatory framework. These arrangements will be provisional prior to the delivery of the Western Australian Government's broader reform, known as the Energy Transformation Strategy. This paper has been prepared by AEMO using information available as at June 2019.

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VERSION CONTROL

Version	Release date	Changes
1	10/5/2019	Initial document

Executive summary

The current regulatory framework supports a traditional electricity supply chain model, where electricity is produced by large generators (suppliers) and transported through transmission and distribution systems to industrial, commercial, and residential customers who purchase the electricity.

AEMO is receiving a number of enquiries and registration applications in the Wholesale Electricity Market (WEM) from proponents with 'non-traditional' business models and expects this growth to continue. These applications include requests to register energy storage systems (ESS) as stand-alone systems or as 'ESS-hybrid' systems (ESS coupled with new or existing generating systems and industrial Loads).

AEMO considers it has an obligation to ensure that any technology, that can meet the requirements outlined in the existing WEM Rules,¹ has a pathway for registration and participation.

These queries have raised questions about:

- How ESS could participate in the market under the current WEM regulatory framework,
- The appropriateness of applying existing Rule Participant and Facility Class categories to ESS, and
- The need to review the existing regulatory framework (including the Act, Regulations, WEM Rules and associated Market Procedures) and systems and processes associated with the participation of these new types of facilities and business models.

There are two perceived regulatory challenges, which fundamentally arise from two main elements and need to be navigated to enable the integration of ESS in the WEM/South West interconnected system (SWIS) in the future:

1. The absence of an explicit and specific pathway for ESS to register and participate in the WEM, and
2. The lack of access to sufficient revenue streams ESS can qualify for under the existing WEM Rules.

This paper outlines potential interim arrangements that could be implemented as a short-term measure. However, it also acknowledges that changes are expected to be applied in future to more broadly support the facilitation of registration of ESS as part of the Western Australian Government's Energy Transformation Strategy.

The registration project is an enabler for other reform projects to support the desired outcomes of reforms to scheduling and dispatch processes, the Ancillary Services framework, settlement processes, and the Reserve Capacity Mechanism, and development of the Distributed Energy Resources (DER) Roadmap.

A proposed pathway for the registration and participation of ESS within the current construct of the WEM Rules was considered. The current WEM Rules suggest supporting the registration of an ESS proponent as a Rule Participant in the Market Generator category; this represents a suggested interim pathway until a broader program of reform work to address the longer-term objectives can be delivered.

Interim options to facilitate the registration and participation of ESS in the WEM were deemed suitable if they:

1. Enable ESS proponents to participate in as many markets as possible in the WEM in the immediate term, while requiring minimal changes to the WEM Rules, market systems, and processes, and
2. Do not jeopardise the delivery of the longer-term objective of allowing full participation of ESS in all aspects of the WEM.

This paper also outlines proposals for a more holistic review to support registration, connection, and operation of ESS in the future, as part of the Energy Transformation Strategy.

¹ Refer to the objectives of the WEM outlined in clause 1.2 of the WEM Rules.

The WEM Rules define Facility Classes in respect of the specific, singular functions they perform, and the associated obligations of these functions. In contrast, an ESS can perform multiple functions. As a consequence, fundamental incongruities exist between the singular functions defined in the WEM Rules for Facility Classes and the multiple functions capable of being performed by an ESS, that overlap the existing Facility Class definitions in the WEM Rules, with a facility being either a Generator or a Load.

This means the proposed interim pathway is a compromise that balances the practicality of the provisional nature of a more immediate pathway of participation, with a more ideal, comprehensive pathway that must consider maximising access to revenue streams in the future.

A review of the registration and participation framework in the WEM will be undertaken as part of the Energy Transformation Strategy that will consider the future structure of the WEM regulatory framework, as part of the Energy Transformation Strategy with an aim of supporting all types of storage technology. This will necessitate significant amendment of the WEM Rules (and associated regulatory instruments). Two options exist:

1. To create a specific Facility Class for ESS, including definitions and obligations, or
2. To broaden the existing Facility Class definitions and obligations to encompass ESS.

The proposed interim pathway is suggested for proponents seeking to advance their ESS projects in the immediate term. This pathway is explained in this paper and is complemented by a guideline, *Participation Guideline for Energy Storage Systems in the WEM* which is to be published on the AEMO website.

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1. Background

In May 2018, the Rule Change Panel released a paper entitled *Treatment of Storage Facilities in the Wholesale Electricity Market* as part of the Market Advisory Committee (MAC) meeting papers².

The paper noted that it may also be feasible to make interim changes to the WEM Rules that would support at least some participation of storage in the WEM. For example, it may be possible to make some relatively limited changes to allow storage to provide specific Ancillary Services to a Registered Facility. However, the benefits of making such changes would need to be balanced against the costs of making potentially short-term or interim changes to regulatory instruments and IT systems.

AEMO undertook a review to consider options which could be implemented, as an interim pathway, that would enable ESS to participate in the WEM with minimal changes to the current regulatory framework and AEMO's existing market and dispatch systems. Options were assessed against a broad assessment framework of regulatory, technical, operational, and implementation considerations.

AEMO provided an overview of the work undertaken at the Market Design and Operations Working Group (MDOWG) meeting on 12 March 2019³.

1.1 Purpose of this paper

This paper has been prepared to provide information to interested stakeholders to:

- Outline options and considerations identified as part of a detailed review undertaken by AEMO, and
- To propose an interim pathway to support registration of ESS systems in the WEM, in advance of a broader program of reform work to be delivered in the future.

A supporting document, *Participation Guideline for Energy Storage Systems in the WEM* is to be published on AEMO's website. That document can be referred to as a guide, and it outlines information for ESS proponents, who are considering registration in the near future, on registering an ESS under the current WEM Rules.

AEMO recommends ESS proponents contact AEMO in the early design phase of projects to confirm the latest. AEMO also recommends ESS proponents contact Western Power in the early design phase to confirm the latest connection requirements for ESS generally and their project specifically.

² See *Treatment of Storage Facilities in the Wholesale Electricity Market*, an embedded paper in agenda item 8(b) as a part of a collation of papers forming the wider meeting papers for the MAC May 2018 meeting at https://www.erawa.com.au/cproot/18987/2/MAC%202018_05_09%20-%20Meeting%20Papers.pdf

³ Refer to 12 March 2019 meeting papers and minutes at <https://www.erawa.com.au/rule-change-panel-mdowg>

2. Considerations to support an interim registration pathway

There are currently no ESS registered as Facilities in the WEM, nor is there an explicit Facility Class in the current WEM Rules for an ESS.

However, as an interim measure, it is AEMO's view that the interpretation of some existing Facility Classes could allow an ESS to register under the existing framework.

Section 2.3 of this paper provides an overview of the findings, analysis, and proposed recommended interim pathway to support the registration and participation of ESS proponents, by registering as Market Generators, in the WEM in the short term.

Section 3 of this paper outlines key interdependencies between the longer-term design of WEM registration and participation frameworks and other design elements of the Energy Transformation Strategy, such as the consideration of future Ancillary Services and Reserve Capacity Mechanism designs.

AEMO anticipates that the new design of the registration framework, implemented under the Energy Transformation Strategy, will require changes to systems, although the scope and extent of these changes has not been ascertained in any detail at this stage. Given this uncertainty, and to minimise potential re-work, AEMO has targeted an interim ESS registration pathway that requires minimal or no system changes.

2.1 Assumptions

As part of a detailed review, AEMO considered the following key assumptions in the formulation and application of the interim pathway for ESS to register and participate in the WEM:

- The obligations as outlined in the WEM rules for Rule Participants and Facility Classes will apply, registration will require supporting access contract arrangements, connection point and metering requirements, and licensing requirements.
- The interim pathway for registration and participation would be accessible to only utility-scale ESS (that is, not a Virtual Power Plant or aggregated behind-the-meter implementation) participating in the WEM and providing Ancillary Service(s).
- Registering the ESS as a Dispatchable Load was not considered, because a Rule Change (RC_2014_06 Removal of Resource Plans and Dispatchable Loads⁴) will remove this Facility Class from the WEM Rules from 1 July 2019. As outlined in the Final Rule Change Report⁵, the reason for this decision was that the current implementation of the Dispatchable Load Facility Class in the WEM Rules was deemed unworkable and developing a workable Facility Class for storage facilities will require extensive additional analysis and consultation, which was recommended for consideration within the scope of the future reform program.
- The interim pathway has been developed to allow an ESS to commence providing Ancillary Services from 1 July 2020, if it is technically capable and has been awarded a contract, given that the Ancillary Services procurement processes for the 2019-20 financial year have already commenced. The pathway also acknowledges that AEMO has some current system limitations that may impede the participation of ESS in

⁴ See https://www.erawa.com.au/rule-change-panel/market-rule-changes/rule-change-rc_2014_06.

⁵ Refer to section 6.2.2 of 'Removal of the Dispatchable Load Facility Class' (issue 2) in the Rule Change Panel's Final Rule Change Report for RC-2016_04.

the LFAS Market. This is outlined in further detail in AEMO's *Participation Guideline for Energy Storage Systems in the WEM*.

- Connections to Western Power's network are governed by the Electricity Networks Access Code and the related sub-instruments, including Western Power's Technical Rules and Applications and Queuing Policy. ESS proponents should contact Western Power directly to discuss the specifics of project proposals in relation to the Technical Rules and connection to the network. An assessment of whether changes to the Technical Rules will be required as part of the interim pathway will need to be conducted by Western Power.
- Any arrangements for the interim pathway will be provisional, prior to future full implementation of the deliverables that constitute the Western Australian Government's Energy Transformation Strategy program of work, which will consider registration for all technologies (including ESS) more broadly.
- In accordance with the current WEM Rules and the defined term in the Electricity Act 1945⁶ for 'generating works', AEMO concluded that an ESS would fall within the category of a Market Generator rather than the category of Ancillary Service Provider (ASP). A conclusion was also made, in relation to the current ERA's Licensing Guidelines,⁷ that an ESS would be more appropriately classified under the category of a generation licence.

2.2 Items not considered as part of the interim pathway

When considering what could be achieved now, and acknowledging the work which needs to be undertaken as part of a broader Energy Transformation Strategy program of work, AEMO did not consider the following as part of this review and the proposed interim pathway:

- Behind-the-meter battery storage that is not a part of a Registered Facility under the WEM Rules.
- Provision of Ancillary Services from aggregated Loads.
- Virtual Power Plants.
- The commercial viability of the revenue streams under the WEM Rules for which ESS can qualify under the interim pathway (Rule Participants that intend to own or operate ESS are best placed to assess this).

2.3 Recommended interim pathway

To deliver a pathway for registration of ESS in the immediate term, AEMO considered options that require minimal changes to the WEM Rules and AEMO's and Market Participants' systems and processes. On this basis, it was determined that:

- The proposed interim registration pathway is for a stand-alone ESS to register as Rule Participant in the Market Generator Facility Class under the current WEM Rules regulatory framework.
- The registration Facility Class most appropriate to an ESS will depend on its physical arrangement. AEMO's *Participation Guideline for Energy Storage Systems in the WEM* provides examples as to what registration options can be accommodated under the current WEM Rules.
- Scheduled Generators are able to provide the broadest range of Ancillary Services under the current WEM Rules⁸.

⁶ Under the *Electricity Act 1945* (WA) 'generating works' means any apparatus or other equipment or plant utilised or capable of being or intended to be utilised for generating electricity. See: https://www.legislation.wa.gov.au/legislation/statutes.nsf/main_mrtitle_285_homepage.html

⁷ See ERA Licensing Guidelines under 2.1 Electricity page 2 – 'if you intend to, or currently, generate, transmit, distribute, or sell electricity, you are required to hold a generation licence, which authorises the licensee to construct and operate one or more generating works; or to operate one or more generating works as opposed to a retail licence, which authorises the licensee to sell electricity to Customers.' See <https://www.erawa.com.au/electricity/electricity-licensing/regulatory-guidelines>

⁸ See http://www.aemo.com.au/-/media/Files/Electricity/WEM/Security_and_Reliability/ancillary_services_psop_july_2012.pdf, and section 3.9 of the WEM Rules

- Existing registration criteria⁹, market obligations (along with Standing Data requirements¹⁰), fees and charges, as outlined in the WEM Rules, would apply if registering as a Market Generator.
- Existing AEMO processes that are followed each year to assess and determine Ancillary Service Requirements, as part of the Ancillary Service procurement process outlined in the Power System Operation Procedure¹¹, would apply, along with the ERA's existing processes for determination of these services¹².
- An ESS proponent could submit an Expression of Interest in response to AEMO running a competitive tender process for the procurement of Ancillary Services. The tender process run by AEMO typically occurs around April each year for the upcoming financial year. AEMO may subsequently enter into an Ancillary Service Contract with an ESS proponent as a result of this competitive tender process. The Ancillary Service Contract will cover all commercial and technical matters relevant to the supply of Ancillary Services and must be consistent with the WEM Rules and Market Procedures.
- The existing registration and de-registration processes, as outlined in AEMO's Market Procedure¹³, would apply to an ESS proponent.
- If changes to the Technical Rules are required to enable the connection of ESS to the SWIS, the scope of work and timeframes will be determined by Western Power. Obligations are covered under the Access Code, for which AEMO as the market and system operator is not responsible. ESS proponents should contact Western Power directly to discuss the specifics of their proposed project.
- AEMO's *Participation Guideline for Energy Storage Systems in the WEM* outlines information for ESS proponents on registering an ESS under the current WEM regulatory framework.

2.4 Availability of existing revenue streams

2.4.1 Energy market participation considerations

AEMO does not anticipate changes to the WEM Rules or Market Procedures, in the immediate term, to support an interim pathway to enabling ESS participation in the Balancing Market. Participation in the Balancing Market will require the submission of Balancing Submissions, by the Rule Participant operating an ESS, in accordance with the requirements under the WEM regulatory framework for a Scheduled Generator, or Non-Scheduled Generator.

AEMO has outlined specific issues regarding the obligations of Rule Participants in relation to ESS participating in the Balancing Market, and how these issues might be resolved, in its *Participation Guideline for Energy Storage Systems in the WEM* document.

2.4.2 Reserve Capacity Mechanism (RCM) and Capacity Credits considerations

The WEM Rules and AEMO's systems presently do not have a bespoke methodology to assign a Certified Reserve Capacity (CRC) to an ESS.

The WEM Rules currently specify two methodologies for Market Generators:

1. Clause 4.11.1(a) of the WEM Rules for Scheduled Generators, which requires AEMO to assess its reasonable expectation of the amount of capacity that is likely to be available, after netting off capacity required to

⁹ Refer to WEM Rules, clauses 2.28.6, 2.28.7, and 2.28.8.

¹⁰ Refer to WEM Rules Appendix 1: Standing Data.

¹¹ See http://www.aemo.com.au/-/media/Files/Electricity/WEM/Security_and_Reliability/ancillary_services_psop_july_2012.pdf.

¹² See <https://www.erawa.com.au/electricity/wholesale-electricity-market/ancillary-services-parameters>.

¹³ See http://www.aemo.com.au/-/media/Files/Electricity/WEM/Procedures/2017/MO_Market-Procedure---Rule-Participant-Registration-and-De-Registration---clean---18Apr2017.pdf.

serve Intermittent Loads, embedded loads and Parasitic Loads, for Peak Trading Intervals on Business Days for a specified period, assuming an ambient temperature of 41°C.

2. The Relevant Level Methodology (RLM), as detailed in Appendix 9 of the WEM Rules, is predominantly used for Non-Scheduled Generators. The RLM may be applied to Scheduled Generators at a Market Participant's request, subject to the conditions listed in clause 4.11.2 of the WEM Rules.

While the current RLM was not originally designed to cater for ESS, AEMO considers that no changes to existing rules or systems are required to use the current methodology in assessing CRC for a Facility that is an ESS. ESS proponents are encouraged to approach AEMO in the early stages of their project to discuss the methodology of the expert report to ensure it is appropriate for the purposes of the CRC application under the existing framework.

The RLM was recently reviewed by the Economic Regulation Authority (ERA) and a Rule Change Proposal is being developed that may have implications for the future application of the RLM to ESS. Further information on the review of the RLM can be found on the ERA's website¹⁴.

As the RCM operates on the basis that it is allocated two-years ahead, any amendments to the WEM Rules, adjusting the CRC allocation methodologies, must be in place two years in advance, that is, prior to the CRC application process. For example, for a Rule Participant that operates an ESS and is seeking to earn Capacity Credits revenue from 1 October 2022, relevant WEM Rule amendments would need to be in place for the 2020 Reserve Capacity Cycle, for which Certified Reserve Capacity applications can be submitted from 1 May 2020. Effort would be required to ensure changes to the WEM Rules are gazetted sometime in 2019 to allow enough time for any system and process changes to be implemented by Rule Participants, including AEMO.

2.4.3 Ancillary Service streams

The table below summarises the Facility type and Facility Classes in the WEM, and the various Ancillary Services each Facility Class may provide in accordance with the current WEM Rules:

¹⁴ See <https://www.erawa.com.au/electricity/wholesale-electricity-market/methodology-reviews/review-of-method-used-to-assign-capacity-to-intermittent-generators-2018>.

Participant Class	Facility	Facility Class	Ancillary Service type
Market Generator	Generation System	Scheduled Generator	LFAS Up LFAS Down SRAS LRR System Restart DSS
		Non-Scheduled Generator	LFAS Down System Restart DSS
Market Customer	Connection Point ("Load")	Interruptible Load	SRAS DSS
		DSP	DSS
		None	DSS
	Demand Side Programme	DSP	DSS
ASP	-	-	DSS

2.4.4 Load Following Ancillary Services (LFAS) considerations

Enabling participation of ESS in the LFAS Market, as part of an interim pathway, presents difficulties for the WEM, the extent of which depends on how ESS are registered, and how it is proposed each ESS will provide LFAS Up and/or LFAS Down across its charging and discharging range. Specific considerations in relation to LFAS participation by ESS are explored in AEMO's *Participation Guideline for Energy Storage Systems in the WEM*.

The accommodation of an interim pathway for the provision of LFAS by ESS was not considered to meet the relevant criteria as outlined in the executive summary section of this paper, for enabling delivery of a solution during a short timeframe, that is, requiring minimal analysis to identify changes required under the current WEM Rules, and/or requiring minimal change to market systems and processes.

There are several features of the LFAS Market and AEMO's related systems that are anticipated to pose specific challenges. These include:

- The existing LFAS Gate Closures may make participation of ESS in the LFAS Market more challenging, as the relevant Rule Participant would need to commit to LFAS delivery quantities up to 11.5¹⁵ hours before the final Trading Interval of an LFAS Horizon. Current LFAS Gate Closure timeframes present issues for the following reasons:
 - Participation of ESS is dependent on an ESS maintaining its charge state within a certain range, so it will have the capacity to provide LFAS when required. Dispatch outcomes in earlier Trading Intervals may result in the ESS reaching a charge state that prevents it from providing upwards LFAS or downwards LFAS when it is called upon.
 - It may be difficult to forecast the likely dispatch outcomes up to 11.5 hours ahead of time in order to ensure the ESS maintains LFAS delivery capability.
 - Considering this limitation, AEMO would require an ESS proponent to provide AEMO adequate evidence that it could reliably provide LFAS to a level sufficient to meet the standards required for LFAS certification.

¹⁵ This is the time between the LFAS Gate Closure and the end of the final Trading Interval within a given LFAS Horizon.

- Existing AEMO systems are designed to accommodate only traditional Scheduled Generators providing LFAS, and this would limit the capability of ESS to provide LFAS while charging. Due to limitations caused by current and planned work being undertaken to transfer the existing dispatch (and related) systems from Western Power to AEMO, it is unlikely that AEMO would be able to implement any significant changes to these systems until at least 2020. Any changes would also need to demonstrate positive benefits for the functioning of the WEM and not have a negative impact on AEMO's efforts to deliver the intended reform of the WEM by October 2022.
- Clause 7A.3.5(b) of the WEM Rules would present an impediment to ESS wishing to provide downwards LFAS while charging (that is, for any output less than zero¹⁶). Potential changes have been identified to this clause that would address this issue, and AEMO proposes that these changes should be advanced as an urgent deliverable of the broader Energy Transformation Strategy program.
- If an ESS was to participate in the LFAS Market, as a part of the proposed interim pathway that is to be applied prior to the implementation of the full Energy Transformation Strategy, this participation may increase the possibility of undesirable market outcomes that are already possible under the existing framework. These outcomes include:
 - Failure by a Facility to provide LFAS will require AEMO to enable backup LFAS at additional cost to the market, but not at any additional cost to the Facility that fails to provide the service.
 - The ability to bid for the provision of LFAS for single, discrete Trading Intervals (one interval on, one interval off). This may require the constant enabling and disabling of other Facilities providing LFAS, which could raise the total cost of LFAS provision.

AEMO considers that the provision of LFAS by ESS Facilities will be challenging under the existing framework. Despite this, AEMO has concluded that downwards LFAS provision may present more opportunities in the WEM currently, due to the wider range of Facility Classes that can provide this service, as well as the typically higher prices that have occurred for downwards LFAS provision historically.

2.4.5 Dispatch Support Service (DSS) considerations

A Dispatch Support Service (DSS) is any other ancillary service that is needed to maintain Power System Security and Power System Reliability that are not covered under any other Ancillary Service categories, including the service of controlling voltage levels in the SWIS where that service is not already under any Arrangement for Access or Network Control Service Contract.¹⁷

AEMO does not have any DSS contracts in place currently and does not anticipate needing to procure any DSS in the near future. However, in the event AEMO determines that tendering for this service is appropriate, an ESS that meets the technical requirements to provide the requested service could tender for this service. The creation of any new contracts would also require ERA approval.

2.4.6 System Restart Service (SRS) considerations

SRS is the ability of a Registered Facility which is a generation system to start without requiring energy to be supplied from a Network to assist in the re-energisation of the SWIS in the event of system shut down¹⁸.

Current contractual arrangements for SRS are in place until June 2021 and beyond, and AEMO does not currently anticipate a need to procure additional services prior to the current contractual arrangements expiring. It is therefore unlikely SRS would be required to be included as part of an interim pathway to enable an ESS to register for this service .

In the event AEMO determines that procuring additional SRS is appropriate, an ESS that meets the technical requirements of the WEM regulatory framework could tender for this service.

¹⁶ See AEMO, *Participation Guideline for Energy Storage Systems in the WEM* to be published on AEMO's website for further information on this point

¹⁷ Clause 3.9.9 of the WEM Rules.

¹⁸ Clause 3.9.8 of the WEM Rules.

2.4.7 Load Rejection Reserve Service (LRR) considerations

LRR is the service of holding capacity associated with a Scheduled Generator or Dispatchable Load¹⁹ in reserve so that the Scheduled Generator can reduce output rapidly in response to a sudden decrease in SWIS load,²⁰ and a provider of LRR must ensure the relevant Facility responds appropriately, as outlined in the WEM Rules²¹.

LRR is currently provided solely by Synergy's Balancing Portfolio. AEMO may contract for LRR (MR 3.11.8A).

As outlined under Section 2.3 of this document, AEMO runs a tender process for the procurement of Ancillary Services, typically around April each year, for the commencement of the operation of Ancillary Service Contracts at the beginning of the upcoming financial year.

An ESS, that meets the technical requirements to provide LRR, could tender for this service should AEMO proceed with a tender process for LRR.

AEMO sent a request for expression of interest on 5 March 2019 for Rule Participants to indicate their interest in providing LRR for the 2019-20 financial year.

2.4.8 Spinning Reserve Service (SRAS) considerations:

SRAS is the service of holding capacity associated with a synchronised Scheduled Generator or Interruptible Load in reserve, so the relevant Facility is able to respond appropriately in the specific situations outlined in the WEM Rules²².

A provider of SRAS must be able to ensure the relevant Facility can respond appropriately to the specified level and in the relevant timeframes, as outlined in the WEM Rules²³. In addition, existing criteria for AEMO to enter into a contract for SRAS with a Rule Participant other than Synergy will apply²⁴.

AEMO sent a request for expression of interest on 5 March 2019 for Rule Participants to indicate their interest in providing SRAS for the 2019-20 financial year.

2.4.9 Registering as an Ancillary Service Provider (ASP)

The ASP Rule Participant class exists as a concept in the WEM Rules and has historically been used to separate payments for Ancillary Services from the responsibility to settle energy, which would sit with a Market Participant.

AEMO considers that registering as an ASP does not provide a practical pathway for utility-scale ESS participation. A person registered as a Market Customer and/or a Market Generator cannot also be registered as an ASP (MR 2.28.11B). A prospective ESS will have a connection point that will need to be settled by a Financial Responsible Market Participant. This means that any ESS will still require a Market Customer or Market Generator to be the Financial Responsible Market Participant for the connection. As such the ASP concept does not assist in facilitating the participation of utility-scale ESS in the WEM at this time.

2.4.10 Registering in multiple Facility Classes

Under clause 2.29.2 of the WEM Rules, no facility in one Facility Class can simultaneously be registered in another Facility Class.

¹⁹ Dispatchable Loads will be removed from the WEM Rules on 1 July 2019 as a result of the changes associated with RC_2014_06. See [here](#) for more information:

²⁰ Refer to clause 3.9.6 of the WEM Rules.

²¹ Refer to clauses 3.9.7 and 3.10.4 of the WEM Rules.

²² Refer to clause 3.9.2 of the WEM Rules.

²³ Refer to clauses 3.9.3 and 3.10.2 of the WEM Rules.

²⁴ Refer to clause 3.11.8 of the WEM Rules.

A proposed rule change to remove this restriction and allow registration in multiple Facility Classes was considered in order to support the interim pathway for ESS participation in the WEM. This was found to be an infeasible solution, because it would result in:

1. Inconsistencies regarding obligations that would apply to an ESS.
2. The requirement for significant redesign of AEMO's existing IT systems, as they are not designed to support registration in multiple Facility Classes. At present, the registration system implemented in WEMS is designed on a one-to-one basis for Facilities matching the respective Facility Classes.
 - The implementation of the registration in multiple Facility Classes would require a significant re-working of the registration system implemented in the Wholesale Electricity Market Systems, and flow-on changes to Market Procedures, which would need to outline how obligations would overlap and be implemented. The extent of this change is anticipated to come at significant cost and effort, therefore, it was not considered a viable option to be accommodated as a short-term measure.

The broader Energy Transformation Strategy, as described in Section 3.1 of this document, should consider whether it is necessary to create a specific Facility Class for ESS with appropriate definitions and obligations, or whether it would be appropriate to broaden the existing Facility Class definitions and obligations to encompass ESS under the context of the current WEM Rules.

3. The registration framework for the Energy Transformation Strategy

3.1 Longer term objectives for ESS as part of the Energy Transformation Strategy

Reforms to the registration framework for the WEM are fundamental to facilitating other reforms that constitute part of the Energy Transformation Strategy. Registration is the basis for adherence to operational standards and market obligations and is essential to support participation by stakeholders in the resultant modified markets that make up the WEM in a technologically neutral manner. The registration framework is also the foundation for scheduling and dispatch of energy, the Reserve Capacity Mechanism, and the Ancillary Services framework.

ESS are a varied technology class, capable of providing a wider variety of services to the electricity system as a whole, across generation, transmission, distribution, and to end users. The services they can deliver depend on how they are configured. Changes to the relevant regulatory framework should aim to provide a high level of flexibility to accommodate ESS and future emergent technologies.

The broader program of work should consider the following key elements:

- A design to accommodate the participation of ESS and other technologies in the WEM. In order to accomplish this, a comprehensive review of the WEM Rules will be required, which should:
 - Identify issues or barriers to entry and participation within the regulatory framework, including participation in the provision of Ancillary Services and the Reserve Capacity Mechanism.
 - Consider options for the potential classifications of Facilities and Market Participants under the WEM Rules.
 - Identify Standing Data requirements for ESS and other obligations that may be specific to ESS.
- The necessary amendments to the associated regulatory instruments and the governance that may be required to support the connection and operation of ESS in the WEM. For example, the Technical Rules requirements, licensing requirements, access contracts, and connection points and metering requirements.

The paper *Treatment of Storage Facilities in the Wholesale Electricity Market* included in the MAC meeting papers in May 2018²⁵ outlines the broader issues and questions identified by the MAC with regard to the treatment of storage facilities.

²⁵ See *Treatment of Storage Facilities in the Wholesale Electricity Market*, an embedded paper in agenda item 8(b) as a part of a collation of papers forming the wider meeting papers for the MAC May 2018 meeting at https://www.erawa.com.au/cproot/18987/2/MAC%202018_05_09%20-%20Meeting%20Papers.pdf

3.2 Interdependencies with other projects in the Energy Transformation Strategy program of work

As part of the Energy Transformation Strategy's broader program of work on the future WEM design, other key market design elements will interact with the requirements of the work on registration, such as:

- Ancillary Services procurement and definitions of services.
- Capacity assignment.
- Scheduling and dispatch.
- Settlement processes.
- Outage management.
- Market information.
- Market monitoring.
- Power System Security and Power System Reliability – technical rules and change processes.
- DER roadmap.

3.3 NEM Review – Emerging Generation and Energy Storage

The National Electricity Market (NEM) is also undertaking a review to consider how to better integrate grid-scale ESS into the NEM and enable the NEM regulatory framework to incorporate new business models.

This work, known as the Emerging Generation and Energy Storage (EGES) project, identifies improvements to the regulatory arrangements for registration and participation of grid-scale resources in the NEM. This project has identified challenges and opportunities facing proponents of new generation and load, and is exploring improvements to the NEM arrangements to facilitate better integration of grid-scale energy storage and 'hybrid' models.

AEMO has published a stakeholder paper with potential improvements for the NEM and has held stakeholder sessions to discuss and obtain feedback on the key topics. Key items outlined in the paper included potential modification to registration categories and options for aggregation of facilities, versus creating a new ESS registration category and specific corresponding definitions. Stakeholder submissions to this paper closed on 4 December 2018²⁶, and AEMO is currently considering stakeholder feedback received as it develops its work program. This is likely to include changes to the National Electricity Rules (NER), Procedures, registration applications and AEMO's IT systems.

It is anticipated rule changes will be considered in stages, with an initial rule change proposal being submitted to the Australian Energy Market Commission in December 2018²⁷. This rule change proposal is a consolidation of requests raised by the Australian Energy Council, AEMO, and Energy Networks Australia (ENA).

The first stage of consultation on the proposed rule change was initiated on 18 April 2019, and submissions closed on 23 May 2019²⁸. This initial rule change proposal considers allowing developers to have access to NEM information that is required in order to build a generating system or an industrial development (a large load), by enabling them to register as an Intending Participant under the NER if they do not meet the current eligibility requirements for registration.

²⁶ See <http://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Initiatives/Emerging-Generation-and-Energy-Storage-in-the-NEM---Grid-Scale>.

²⁷ See <https://www.aemc.gov.au/rule-changes/transparency-new-projects>

²⁸ See <https://www.aemc.gov.au/rule-changes/nem-information-project-developers>

While the relevant stakeholders NEM, including AEMO, consider a review of the NEM and the longer-term objectives for incorporating ESS into the NEM regulatory framework, an interim approach has also been introduced in the NEM²⁹.

Unlike the NEM, the WEM Rules contemplate registration of a person who intends to enter the market and own or operate facilities or sell electricity in the SWIS. Some key variances between the NEM and the WEM include differences in registration categories for participants and facilities, and the corresponding requirements and eligibility (such as rated capacity, Capacity Credits, and aggregation of facilities) and participation obligations. This means the treatment of ESS in the WEM cannot simply replicate the approach that is formulated and adopted in the NEM.

A further review of the NEM EGES project, as it progresses, will identify any synergies which could be contemplated by the broader program of work striving to enable registration of ESS in the WEM, as part of the broader Energy Transformation Strategy program for the WEM.

²⁹ See <http://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Participant-information/New-participants/Interim-arrangements-Utility-Scale-Battery-Technology>.

4. Next steps

1. AEMO will continue to work with ESS proponents to support registration requests and queries where they arise. AEMO will assess proposals and applications for registration on a case-by-case basis in accordance with the existing WEM regulatory framework and in alignment with AEMO's existing registration processes.
2. Interested proponents should refer to AEMO's *Participation Guideline for Energy Storage Systems in the WEM* for more information, and contact AEMO directly in the early stages of their projects as follows:
 - Facility Registration – wa.operations@aemo.com.au.
 - Reserve Capacity Mechanism participation (including CRC) – wa.capacity@aemo.com.au.
3. ESS proponents interested in connecting to the SWIS should approach Western Power in the first instance to discuss the connection process and their options under the current Technical Rules.

AEMO welcomes further engagement and discussion with interested stakeholders. Enquiries related to this document can be directed to wa.marketdevelopment@aemo.com.au.

Glossary

This document uses terms and abbreviations as outlined below.

Term	Definition
CRC	Certified Reserve Capacity
DSS	Dispatch Support Service
ESS	energy storage system
EGES	The Emerging Generation and Energy Storage (EGES)
ERA	Economic Regulation Authority
LFAS	Load Following Service
LRR	Load Rejection Reserve Service
MAC	Market Advisory Committee
MDOWG	Market Design Operations Working Group
NEM	National Electricity Market
NER	National Electricity Rules
RCM	Reserve Capacity Mechanism
RLM	Relevant Level Methodology
SRAS	Spinning Reserve Service
SWIS	South Western Interconnected System
WEM	Wholesale Electricity Market