



Government of Western Australia
Department of Mines, Industry Regulation and Safety
Energy Policy WA

Coordinator of Energy Determination: AEMO Non-co-optimised Essential System Service Trigger Submission

Reliability Services

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1. This Determination

The Coordinator of Energy (Coordinator) has determined, under clause 3.11A.4 of the Wholesale Electricity Market (WEM) Rules, to trigger a Non-Co-optimised Essential System Services (NCESS) procurement process for a Peak Demand Service and a Minimum Demand Service to commence from 1 October 2024 at the request of the Australian Energy Market Operator (AEMO).

In accordance with clause 3.11A.8 of the WEM Rules, the Coordinator is publishing this determination to outline the reasons for triggering the procurement process for an NCESS.

2. Background to the Determination

2.1 Purpose of the NCESS Framework

In accordance with the Government Energy Transformation Strategy, the Energy Transformation Taskforce developed a major suite of reforms to the WEM, the majority of which are due to commence on 1 October 2023. This includes the introduction of security-constrained economic dispatch, the move to shorter trading intervals and 'gate closure', and a new framework for competitive Essential System Services, which will be co-optimised with energy in the market dispatch process.

Previously, under the WEM Rules, Dispatch Support Services (DSS) contracts could be procured by AEMO to address system security issues not managed by existing ancillary services, and Network Control Service (NCS) contracts could be procured by the Network Operator as an alternative to network augmentation.

On 1 February 2022, DSS and NCS were replaced with the NCESS framework, which has been designed to ensure the rapidly evolving power system continues to meet emerging technical requirements and power system security and reliability standards.

The primary objective of the NCESS framework is to enable AEMO, a Network Operator or the Coordinator to identify and justify the need for services, not already available through existing market mechanisms, and procure those services in a transparent and efficient manner.

More specifically, the NCESS framework is intended to:

- enable the procurement of new services to respond to unforeseen events or changes in the power system that may threaten system security;
- create appropriate incentives for non-network services to be procured to meet power system security and reliability requirements in a more economically efficient manner when compared to network augmentation; and
- enable maintenance of power system security and reliability at the lowest efficient cost to consumers.

2.2 The interim NCESS Framework

An interim NCESS framework commenced on 1 February 2022 to allow for NCESS Contracts to be procured, settled and dispatched in accordance with existing market mechanisms. This interim framework will continue to apply until the new WEM commencement day, when it will be replaced with the enduring NCESS framework.

Under the interim framework, AEMO and the Network Operator may identify the need for NCESS through system planning processes, and if certain conditions are met, must submit a request to the Coordinator to trigger the NCESS procurement process under the WEM Rules.

The WEM Rules outline the process by which each of the entities must seek to trigger the NCESS procurement process and the factors the Coordinator must consider in assessing a submission by AEMO or a Network Operator.

3. The AEMO Submission

3.1 Submission Process

The Coordinator received a submission from AEMO on 15 December 2022, requesting that the Coordinator triggers the NCESS procurement process for reliability services - a Peak Demand Service and a Minimum Demand Service.

Under clause 3.11A.2A of the WEM Rules, to make a submission to the Coordinator, AEMO must consider that one or more of the following has occurred:

- in the course of its normal power system operations, that a significant threat to Power System Security or Power System Reliability exists or is emerging, and the existing mechanisms under these WEM Rules may not be sufficient to address the threat; or
- a modification to an existing WEM Technical Standard, or introduction of a new WEM Technical Standard, that may impact Power System Security or Power System Reliability, and the existing market mechanisms may not be sufficient to meet the modified or new standard.

AEMO's submission must also contain sufficient information and analysis regarding the potential or actual impact on Power System Security, Power System Reliability or costs for each trigger event to enable the Coordinator to make a determination.

The next section provides a brief summary of the issues raised in AEMO's NCESS submission. A more detailed version of AEMO's submission is available [here](#) on Energy Policy WA's website.

3.2 AEMO's Submission in brief

One of AEMO's primary functions under the WEM Rules is to ensure the South West interconnected system (SWIS) operates in a secure and reliable manner.

AEMO has identified material risks that, in the absence of a targeted response, may prevent the secure and reliable operation of the SWIS under peak demand and minimum demand operating conditions from October 2024 to October 2025. These risks are emerging due to several factors, including but not limited to:

- Peak demand risks:
 - the impact of fuel supply uncertainty and other factors on facility availability;
 - higher-than-expected Forced Outage rates; and
 - forecasted lack of new capacity in the 2022 Capacity Cycle to replace known facility retirements.
- Minimum demand risks:
 - increased penetration of Distributed Photovoltaics (DPV), which reduces operational demand below AEMO's forecasted Power System Security threshold;
 - lack of load participation during system minimum demand events; and
 - lack of alternatives to existing emergency mechanisms such as emergency solar management (ESM).

AEMO's analysis indicates there is a material risk that expected facility capability in the WEM will be insufficient to manage forecast demand at both peak and minimum demand levels. AEMO considers the existing mechanisms under the WEM Rules may not be sufficient to address this risk. Its trigger submission summarises AEMO's technical and economic assessment of this risk and proposes procurement of services under the NCESS framework.

3.2.1 Peak Demand

AEMO considers that emerging facility availability issues are a significant risk to Power System Security and the effectiveness of the Reserve Capacity Mechanism for the 2024-25 Capacity Year.

The Certified Reserve Capacity process in the 2022 Reserve Capacity Cycle (for the 2024-25 Capacity Year) is underway. If that process results in a capacity shortfall, then a supplementary capacity process for the 2024-25 Capacity Year may be required, but may not be able to fully address the capacity shortfall.

As such, AEMO considers that the existing mechanisms under the WEM Rules may not be sufficient to address the identified risk.

3.2.2 Minimum Demand

The SWIS minimum operational demand level continues to reduce as generation from uncontrolled DPV increasingly contributes to underlying demand.

The Western Australian Government introduced an ESM scheme to enable AEMO, when the SWIS is in an Emergency Operating State, to direct Western Power to maintain demand above AEMO's Minimum Demand Threshold. Where insufficient ESM is available, Western Power's last-resort mechanism to maintain demand levels is to curtail DPV at a feeder level, which also results in load-shedding.

As the WEM Rules do not provide other mechanisms for AEMO to ensure Power System Security in light of this risk, AEMO considers that existing mechanisms under the WEM Rules may not be sufficient to address the identified risk.

3.2.3 Services required

The services AEMO seeks to procure are:

- a Peak Demand Service (capability to increase injection or decrease withdrawal) – AEMO has identified a shortfall of up to 830 MW to be covered by this service based on AEMO's best estimates, at the time of drafting its submission; and
- a Minimum Demand Service (capability to increase withdrawal or decrease injection) – AEMO has identified an expected utilisation of 269 MW for this service.

AEMO has requested that the Coordinator triggers the NCESS procurement process for a Peak Demand Service and a Minimum Demand Service.

The contract term for the proposed NCESS services would commence on 1 October 2024 with a 2-year duration, with quantities of service set at the forecasted shortfalls for the 2024-25 Capacity Year. AEMO expects to gain feedback under the NCESS Expressions of Interest process to understand any economic or technical benefits associated with a longer contract duration or a change to the commencement date.

Each service would carry availability obligations for the appropriate Dispatch Intervals, which AEMO considers include:

- peak Dispatch Intervals specified in accordance with the WEM Rules as Electric Storage Resource Obligation Intervals; and
- minimum demand intervals between 9am and 3pm.

The analysis informing AEMO's submission was undertaken by AEMO in consultation with Energy Policy WA.

The Coordinator was satisfied with the amount of detail and analysis provided in AEMO's submission and did not request further information from AEMO to inform this determination.

4. Coordinator's Assessment

In accordance with clause 3.11A.7 of the WEM Rules, the Coordinator is required to take a number of factors into account when assessing AEMO's submission and determining whether to trigger the NCESS procurement process. This section provides a summary of the Coordinator's assessment of these factors, which has relied heavily on the analysis provided in AEMO's submission.

4.1 Where the issues relate to Power System Security or Power System Reliability, the extent to which an NCESS will address these issues (clause 3.11A.7(a))

The Coordinator has determined that the issues the NCESS is aimed at addressing relate to Power System Security and Power System Reliability, and that a Peak Demand Service and a Minimum Demand Service procured via the NCESS process has the potential to address these issues.

The Coordinator considers that, without procuring a Peak Demand Service and a Minimum Demand Service via the NCESS procurement process, there is a material risk that AEMO will be unable to operate the power system securely and reliably under certain operating conditions. As a result, there is a risk involuntary load shedding events may occur.

4.1.1 The issues the NCESS is aiming to address

Peak Demand

Operationally available capacity in 2022 is currently reduced due to fuel supply limitations, forced outages and delays in the entry of new certified capacity for the 2022-23 Capacity Year. This situation has resulted in the current supplementary reserve capacity (SRC) procurement for the 2022-23 Capacity Year and AEMO expects will continue in future years.

AEMO has assessed fleet sufficiency to meet Peak Demand through analysis of the Reserve Capacity Requirement for the 2024 Capacity Year according to the 2022 WEM Electricity Statement of Opportunities (2022 WEM ES00). The Reserve Capacity Requirement was assessed according to the Planning Criterion under clause 4.5.9 of the WEM Rules.

Taking into account changes to capacity forecasted for the 2024-25 Capacity Year from 2022-23 values, AEMO identified a shortfall of up to 830 MW based on AEMO's best estimates, at the time of drafting this submission. Factors included new entry, retirements and constrained access quantities.

Load growth assumptions considered as part of triggering the SRC procurement were integrated into this forecast by virtue of leveraging the latest AEMO forecasts in the 2022 WEM ES00. This included the increase in demand for the 2022-23 Capacity Year from the original Reserve Capacity Requirement in the 2020 WEM ES00, which was one of the factors for triggering the current SRC procurement. It also included the risk of additional load growth, which will be refined in 2023 WEM ES00.

AEMO's assessment of capacity in the 2024-25 Capacity Year included the following increases and decreases from current Capacity Credits in the 2022-23 Capacity Year:

- announced plant retirements from October 2024, including the retirement of PPP_KCP_EG1 (80.4 MW of Capacity Credits) and Muja 6 (193 MW of Capacity Credits);
- a conservative estimate of 75 MW reduction, based on known network limitations of the impacts of Constrained Access (estimated under the Network Access Quantity (NAQ) framework using AEMO's prototype NAQ model);

- reductions of 38 MW in capacity contribution for the 2023-24 Capacity Year, based on a linear projection of Capacity Credits for solar and wind intermittent Facilities and including other known reductions in Capacity Credits for the 2023-24 Capacity Year;
- entry of new facilities for the 2023-24 Capacity Year - Kwinana ESR1 (46.25 MW of Capacity Credits);
- forecasted entry of 43 MW of new facilities for 2024-25 Capacity Year, based on feedback from Western Power and responses to AEMO's Expressions of Interest for the 2022 Capacity Cycle;
- an increase of 31 MW to the Regulation requirement from the current 110 MW to 141 MW of Load-Following Ancillary Services (based on increased share of intermittent generation) plus an increase of 100 MW representing the risk of load growth, resulting in an overall revised Reserve Capacity Requirement of 4,657 MW¹;
- based on the above reductions and increases - a forecast capacity shortfall of 148 MW;
- the risks associated with long-term availability of plant including as a result of persisting fuel issues and prolonged unplanned plant outages, represented by unavailability of coal and gas capacity.

As a result of the above analysis, AEMO seeks to procure a Peak Demand Service to cover the identified shortfall of up to 830 MW. AEMO expects to refine this analysis following the Expressions of Interest phase of the NCESS procurement.

Minimum Demand

As AEMO's analysis demonstrates, the SWIS is continuing to experience a rapid uptake of DPV, which is resulting in declining levels of system load.

As system load declines, the power system becomes less resilient and more vulnerable to disturbances. Fewer synchronous generators can remain online to provide a level of inertia and reserves sufficient to suppress frequency deviations, and to provide other services essential for keeping the power system secure.

AEMO has projected SWIS minimum demand using the following inputs and assumptions.

- Demand: AEMO scaled the 2016-2020 operational load profiles to meet the 50% Probability of Exceedance minimum demand identified across relevant years of the 2022 WEM ES00.
- Minimum Demand Threshold: Minimum Demand Thresholds from 550 MW to 650 MW of operational demand indicate the lowest minimum demand range at which AEMO can ensure power system security. AEMO has assumed the most optimistic scenario (that is, 550 MW) and incorporated the assumed contribution of the Kwinana Battery Energy Storage System of 50 MW to set a forecast future Minimum Demand Threshold of 500 MW.

AEMO may utilise emergency powers to direct Western Power to increase load. The Western Australian Government introduced an EMS scheme to enable AEMO, when the SWIS is in an Emergency Operating State, to direct Western Power to maintain demand above AEMO's Minimum Demand Threshold. Currently the scheme has the following limitations:

- ESM is only accessible while in an Emergency Operating State, i.e. AEMO cannot rely on it for normal system operations;

¹ The Reserve Capacity Requirement for the 2024/25 Capacity Year, includes:

- the forecast peak demand for 2024/25 published in the 2022 WEM ES00 plus the risk of additional load growth – this forecast would not be expected to be exceeded in more than one year out of ten; plus
- the largest generation contingency - Newgen (335 MW of Capacity Credits); plus
- 141 MW of Load-Following Ancillary Services.

- ESM is not reliable for normal system operations as it is highly manual, involves multiple steps of communication between parties and has long lead times – this will likely lead to its “overuse” by AEMO;
- Available quantities of ESM in the future are uncertain, and may only be accessible from a small number of installations; and
- If insufficient ESM is available, Western Power’s last resort mechanism is to curtail DPV at a feeder level which would also result in load-shedding.

As a last resort, Western Power may trip distribution feeders that have greater DPV generation than underlying demand at that substation, which results in load-shedding of all underlying demand at that feeder.

The WEM Rules place specific obligations on AEMO to minimise involuntary load shedding in the SWIS. As outlined above, AEMO has considered whether it can effectively fulfil this obligation relying on other available WEM processes in the context of declining levels of system load.

AEMO has determined that the expected utilisation of 269 MW of minimum demand service would be required.

4.1.2 Extent to which NCESS will address this issue

Without procuring a Peak Demand Service and a Minimum Demand Service, AEMO’s analysis indicates that there is a significant risk that involuntary load shedding cannot be fully mitigated via other available measures.

AEMO’s analysis supports that a Peak Demand Service and a Minimum Demand Service will be required to mitigate risk beyond that achieved through existing mitigations. AEMO has indicated that this is critical for AEMO’s ongoing ability to maintain power system security and reliability.

AEMO has indicated that it continues to assess the inputs to this analysis to ensure risk factors are reflective of forecast operational conditions and expected operational practices, and that AEMO may refine this analysis during the NCESS procurement process.

Additional information relating to the identified shortfalls will become available as the 2022 Reserve Capacity Cycle progresses, which may alter the input assumptions associated with quantification of this service. However, industry feedback and AEMO’s own assessment of the development time to deliver new capacity in the SWIS suggests that the NCESS procurement needs to be initiated ahead of completion of the 2022 Reserve Capacity Cycle to allow sufficient time for proponents to deliver capacity.

4.2 The extent to which an NCESS will minimise costs in the WEM (clause 3.11A.7(b))

The Coordination considers that procuring a Peak Demand Service and a Minimum Demand Service via the NCESS framework can reduce risks associated with the identified trigger conditions and can be procured at an efficient cost.

AEMO’s submission concluded that existing mechanisms under the WEM Rules are unlikely to mitigate the identified risks, and that the economic impacts of this are likely to increase costs in the WEM.

AEMO performed an economic analysis regarding the economic impacts of **not** procuring a Peak Demand Service and a Minimum Demand Service via the NCESS framework. The Coordinator recognises that this was a simplified economic assessment but considers it provides sufficient approximation of cost impacts, which indicate that an NCESS can minimise costs in the WEM.

Subject to responses under the NCESS Expressions of Interest process, these services may be provided concurrently or individually under each NCESS Contract. Proponents capable of

delivering both services may present a superior operational dispatchability (able to be called upon in real-time or close to real-time) and/or best value for money.

Contracts will be structured in a manner that ensures availability and delivery of the service without exceeding the value of the service to consumers, by accounting for any relevant market revenues received outside of the NCESS Contract. For example, in accordance with clause 3.11B.7(i), an availability payment must not exceed the incremental fixed costs, which would be incurred to make the capability available for the NCESS, that are not already covered by any Capacity Credit payments.

At the request of AEMO, the Coordinator has redacted commercially sensitive information from the analysis in accordance with 3.11A.8.

4.3 The relative merits between procuring an NCESS or augmenting the network (clause 3.11A.7(c))

In making its assessment of the emerging risks to its ability to manage Power System Security and Power System Reliability, AEMO did not find any instances of relevant network augmentation being able to mitigate the risks. The Coordinator, therefore, accepts that appropriate market services will be required to mitigate risk.

4.4 The outcome of any investigation of behaviour that reduces the effectiveness of the market, including behaviour related to market power (clause 3.11A.7(d))

The Coordinator is not aware of any investigations relating to the issue identified in AEMO's submission.

4.5 Whether the procurement of an NCESS is consistent with the Wholesale Market Objectives (clause 3.11A.7(e))

The Coordinator considers that the proposed procurement of an NCESS as a mitigation of the risks identified in the AEMO submission is consistent with the Wholesale Market Objectives.

The current Wholesale Market Objectives, under section 122 of the *Electricity Industry Act 2004* and clause 1.2.1 of the WEM Rules, include to:

- promote the economically efficient, safe and reliable production and supply of electricity (clause 1.2.1(a));

The Coordinator considers that:

- a competitive procurement process for a Peak Demand Service and a Minimum Demand Service via the NCESS will ensure the cost of the service is as efficient as possible; and
- the issue of a Peak Demand Service and a Minimum Demand Service are aimed at addressing relates to Power System Security and Power System Reliability, and a Peak Demand Service and a Minimum Demand Service procured via the NCESS have the potential to adequately address the issues.

- encourage competition (clause 1.2.1(b));

The Coordinator considers that the two-stage NCESS procurement process in the WEM Rules has been developed to encourage maximum competition and, therefore, the proposed use of this process meets the objective in clause 1.2.1(b).

- avoid discrimination in the market against particular energy options and technologies (clause 1.2.1(c));

In accordance with clause 3.11B.1, AEMO must prepare a draft NCESS service specification, which amongst other things must include the **maximum** quantity of the service required.

The Coordinator considers that, to meet the Wholesale Market Objective in clause 1.2.1(c), a service specification can be developed by AEMO such that the service can be delivered by a range of technologies.

Importantly, in accordance with clause 3.11B.3A, AEMO must develop and publish, an Expressions of Interest form, setting out the details prospective service providers must provide, which must include whether the facility or equipment that may be able to provide the service can **fully or partially** meet the draft NCESS Service Specification. This would allow a range of technologies to compete for the Peak Demand Service and the Minimum Demand Service.

- minimise the long-term cost of electricity supply to customers in the SWIS and encourage measures to manage the amount of electricity used.

The Coordinator considers that the proposed procurement of NCESS has the potential to minimise the long-term cost of electricity supply to customers in the SWIS, as follows:

- In accordance with clause 3.11B.10, AEMO must select one or more NCESS offers which meet the NCESS Service Specification and will result in the highest value for money for providing the NCESS;
- In accordance with clause 3.11B.11, AEMO must, when assessing highest value for money conduct cost-benefit analysis or other assessments to demonstrate how a NCESS offer will maximise value for money; and
- In accordance with clause 3.11B.12, AEMO may decide to not select any NCESS offers if it considers that none of the NCESS Submissions represent value for money.

4.6 Whether procurement of an NCESS will be in the long-term interests of consumers (clause 3.11A.7(f))

The Coordinator considers that the mitigation of the risks identified in AEMO's submission are in the long-term interest of consumers as the alternative is insecure and unreliable operation of the power system and the potential for load-shedding.

The Coordinator also notes that ESM is intended to be used as a last resort measure. A Minimum Demand Service would reduce the incidents when AEMO is required to increase load via ESM, which is also in the long-term interest of consumers.

5. Determination Summary

On the basis of the Coordinator's assessment of the factors in this determination, the Coordinator considers that without an NCESS procurement for a Peak Demand Service and a Minimum Demand Service, there is a risk that AEMO will be unable to operate the power system in a secure and reliable manner.

AEMO's submission included both technical and commercial analysis to demonstrate that the existing mechanism under the WEM Rules are unlikely to be sufficient to mitigate the identified risks.

AEMO has indicated that it continues to assess the inputs to this analysis, and that AEMO may refine this analysis following the Expressions of Interest phase of the NCESS procurement.

The Coordinator is satisfied that the trigger conditions in section 3.11A of the WEM Rules have been met, and that a NCESS procurement process should be conducted in accordance with section 3.11B of the WEM Rules.

6. Next Steps - NCESS Procurement Process

Based on the information in AEMO's submission, the Coordinator has determined that AEMO is the procuring party for this NCESS and will be responsible for paying for the Peak Demand Service and the Minimum Demand Service once the commercial terms are determined.

On this basis, AEMO must prepare a draft NCESS Service Specification for the Peak Demand Service and the Minimum Demand Service in accordance with clause 3.11B.5 of the WEM Rules. AEMO must consult with Western Power in the preparation of this draft specification.

Within 20 Business Days of the publication of this determination, unless otherwise agreed with the Coordinator, AEMO must advertise a call for Expressions of Interest on the WEM Website and in a major Australian newspaper.

Respondents must be given at least 20 Business Days to respond to the Expressions of Interest call, from the time it is published.

This first step of the process will enable AEMO to determine what suitable Peak Demand Service and Minimum Demand Service providers exist and what solutions they can provide to meet fully or partially the requirements. Suitability may depend on several factors such as the type of technology, operational limitations, etc. If suitable providers are not found, the service specification may need to be modified.

If the NCESS procurement is to proceed based on the Expressions of Interest received, AEMO will issue a request for tender and publish a final service specification to commence the procurement process.

Any existing or new facility or equipment whether belonging to registered or intending market participants is able to participate in an NCESS procurement. New providers that did not participate in the Expressions of Interest step can also apply.

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