



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

## Minimum Demand Service

27 April 2023

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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, at the request of the Australian Energy Market Operator (AEMO), a Non-Co-optimised Essential System Services (NCESS) procurement process for a Minimum Demand Service to commence on 1 October 2023. This procurement process will be for the expected utilisation of up to 125 MW of Minimum Demand Service during the 2023/24 Capacity Year.

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's 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 21 April 2023, requesting that the Coordinator triggers the NCESS procurement process for a Minimum Demand Service to commence on 1 October 2023.

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 minimum demand operating conditions from October 2023 to October 2024. These risks are emerging due to several factors, including but not limited to:

- Increased penetration of Distributed Photovoltaics (DPV), which reduces Forecast Operational Demand below AEMO's forecasted Power System Security threshold (hereafter referred to as minimum demand threshold (MDT)) of 500 MW;
- 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 that there is a material risk that expected facility capability in the WEM will be insufficient to manage forecast minimum demand levels. AEMO considers the existing mechanisms under the WEM Rules may not be sufficient to address this risk.

This submission follows AEMO's request to trigger an NCESS procurement process for Power System Reliability services (a peak demand service and a minimum demand service) for the 2024/25 and 2025/26 Capacity Years. The timing of that earlier request reflected the lead-time for construction of new facilities to mitigate the identified peak and minimum demand risks.

AEMO has since further explored the residual risks in the 2023/24 Capacity Year, which it expects may only be mitigated by existing capabilities from facilities and equipment, and is now seeking to trigger a separate process for short-term mitigation of minimum demand risks.

AEMO's trigger submission summarises its technical and economic assessment of this risk and proposes procurement of services under the NCESS framework.

### 3.2.1 Minimum Demand – 2023/2024

The SWIS minimum Operational Demand level continues to reduce, as generation from uncontrolled DPV increasingly contributes to offsetting underlying demand. AEMO identified this issue as a priority action in the Renewable Energy Integration – SWIS Update report, published in September 2021.

As a result of that report, the Western Australian Government introduced an emergency solar management scheme to enable AEMO, when the SWIS is in an Emergency Operating State, to direct Western Power to maintain demand above AEMO's MDT.

Currently the scheme has the following limitations:

- An operational forecast that (if it were to eventuate) would require AEMO to frequently issue directions under the WEM Rules (as applicable from 1 October 2023) to restore or maintain Power System Security, including directions to the Network Operator;
- 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;
- DPV installation volumes continue to outpace load growth; 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.

AEMO considers that an operational forecast that (if it were to eventuate) would require AEMO to frequently issue directions under the WEM Rules (as applicable from 1 October 2023) to restore or maintain Power System Security, including directions to the Network Operator.

The Coordinator agrees that this meets the threshold for AEMO's request to trigger an NCESS procurement process under 3.11A.2A(a) of the WEM Rules.

### 3.2.2 Service required

AEMO seeks to procure a Minimum Demand Service (capability to increase Withdrawal or decrease Injection). The NCESS Contract term for the proposed services would commence on 1 October 2023 with a one-year duration, with quantities of service set at the forecasted shortfalls for the 2023/24 Capacity Year.

The service would carry availability obligations for the appropriate Dispatch Intervals, which AEMO considers include minimum demand intervals between 10 am and 2 pm. AEMO expects to gain feedback under the Expressions of Interest (EOI) process to understand any economic or technical benefits associated with a longer NCESS Contract duration or a change to the commencement date.

In its trigger submission, AEMO has indicated that it will set a minimum service size of 10 MW. The Coordinator considers that AEMO should use the feedback under the EOI process to further assess the minimum service size.

AEMO has also indicated that the NCESS 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, for example, accounting for any relevant market revenues received outside of the NCESS Contract.

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 Minimum Demand Service procured via the NCESS process has the potential to address these issues.

The Coordinator considers that, without procuring 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

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 2016-2020 operational load profiles to meet the 50% Probability of Exceedance minimum demand for 2023-2024 Capacity Year identified in the 2022 WEM ES00.
- Minimum Demand Threshold: Energy Policy WA's Low Load Project Stage 1 report explored minimum demand across a range of scenarios according to fleet availability and capability, assessing a range of thresholds from 550 MW to 650 MW of Operational Demand.

AEMO has assumed the most optimistic scenario (that is, 550 MW) and incorporated the assumed contribution of the Kwinana Battery Energy Storage System to set a forecast future MDT of 500 MW. This is consistent with the MDT that AEMO used for analysis in the NCESS Trigger Submission (for the Minimum Demand Service) in December 2022.

Using the 50% POE load profiles and an MDT of 500 MW, AEMO calculated the Minimum Demand Service requirements for Capacity Year 2023/24.

AEMO calculated maintaining SWIS minimum demand above the MDT using interventions to maintain and restore power system security and reliability, AEMO's only alternative to a NCESS service.

AEMO may utilise emergency powers to direct Western Power to increase load. As a last resort, Western Power may trip distribution feeders which 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 in its submission, 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.

Forecast occurrences and magnitude of demand below the MDT (excluding ESM) indicated the expected utilisation of up to 125 MW of Minimum Demand Service for the 2023/24 Capacity Year.

**Table 1 Additional service required to ensure minimum demand exceeds the 500 MW MDT**

Capacity Year	Number of Breaches	Maximum Service Required (MW)	Longest Activation (h)	Total Hours required (h)	Annual Energy (MWh)
2023/24	8.4	125	3.4	18	917.6

AEMO has determined that the expected utilisation of up to 125 MW of Minimum Demand Service would be required.

### Regional minimum demand risks

As part of its analysis, AEMO has identified locational minimum demand risks associated with those areas of the network supported by a Network Control Service contract with Western Power.

While AEMO did not consider locational risks to be triggers under AEMO’s obligations under the WEM Rules, it considers there may be market benefits in mitigating both system minimum demand and locational demand risks. AEMO is therefore proposing to encourage service provision located in areas north of the Three Springs terminal.

#### 4.1.2 Extent to which NCESS will address this issue

Without procuring 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 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.

### 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 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 Minimum Demand Service via the NCESS framework. The Coordinator recognises that this was a simplified economic assessment but considers that it provides sufficient approximation of cost impacts, which indicate that an NCESS can minimise costs in the WEM.

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.

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 Minimum Demand Service via the NCESS will ensure the cost of the service is as efficient as possible; and
- the issue a Minimum Demand Service is aimed at addressing relates to Power System Security and Power System Reliability, and a Minimum Demand Service procured via the NCESS has 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 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 of 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 EOI 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 Minimum Demand Service once the commercial terms are determined.

On this basis, AEMO must prepare a draft NCESS Service Specification for 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 EOI on the WEM Website and in a major Australian newspaper.

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

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This first step of the process will enable AEMO to determine what suitable 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 EOIs 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 EOI step can also apply.

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