

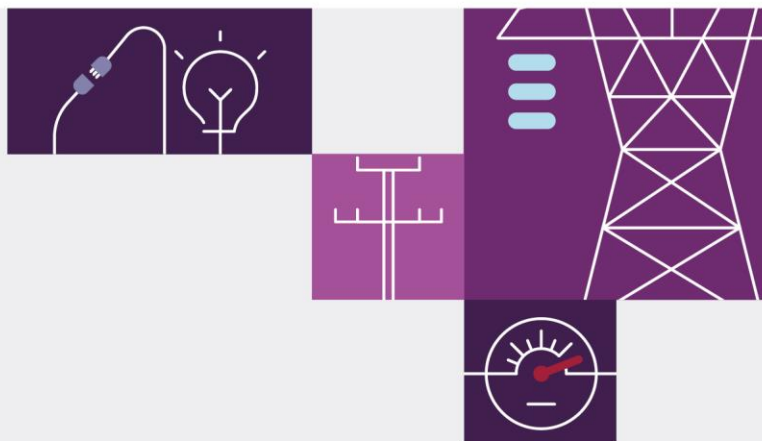
Wholesale Electricity Market

Procedure change report: AEPC_2023_03

December 2023

WEM Procedure: Dispatch Algorithm Formulation





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Executive summary

Purpose

The publication of this Procedure Change Report and the accompanying Wholesale Electricity Market Procedure (**WEM Procedure**) completes the Procedure Change Process conducted by AEMO to consider proposed amendments to the WEM Procedure: Dispatch Algorithm Formulation (**Procedure**) under the Wholesale Electricity Market Rules (**WEM Rules**).

Proposed amendments

AEMO introduced changes to the Procedure arising from:

- Allowances on ESS Trapezia: because of mandatory droop response, AEMO has observed multiple facilities were becoming unavailable for ESS when they dipped below their Enablement Minimum. AEMO proposes to modify the ESS Pre-Processing calculations in paragraph 2.5 of the Dispatch Algorithm Formulation.
- Removal of lower bound on Contingency variables: certain Network Contingencies can become negative when large loads occur (e.g. the Contingency is non-existent). To avoid violations, AEMO is removing the lower bound on the Contingency variable. These changes will commence immediately after publication of the Procedure Change Proposal.
- Several implementation bugs: AEMO has resolved several bugs and has made some minor clarifications to other areas of the formulation.

These changes were implemented on 12 October 2023 to address system issues and improve market outcomes. Under clause 7.2.3 of the WEM Rules, AEMO is able to make urgent changes to the Dispatch Algorithm to maintain Power System Security and Power System Reliability. If the change is not temporary, AEMO must then submit a [Procedure Change Proposal \(PCP\)](#) on the changes.

Consultation

AEMO published the PCP and issued a call for submissions on 26 October 2023.

AEMO held an AEMO Procedure Change Working Group meeting on 8 November 2023. No major feedback was provided.

The submission period closed on 23 November 2023. No submissions were received.

AEMO's decision

AEMO considers the revised Procedure is consistent with the WEM Rules, would better achieve Wholesale Market Objectives (a) and (d), and is consistent with all other objectives.

The revised Procedure is also consistent with the *Electricity Industry Act 2004* (WA), the *Electricity Industry (Wholesale Electricity Market) Regulations 2004* (WA) (**WEM Regulations**), and the WEM Rules.

As such, AEMO's decision is to accept the Procedure.

Executive summary

Next steps

- The revised WEM Procedure: Dispatch Algorithm Version 2.0 will commence at 8:00 am on 12 December 2023.



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1 Background

1.1 Regulatory requirements

AEMO has published this Procedure Change Report in accordance with the Procedure Change Process specified in section 2.10 of the WEM Rules.

1.2 Context

AEMO undertook this Procedure Change Process to implement changes to the WEMDE implementation and Dispatch Algorithm Formulation:

- Issue 1: Allowances on the ESS Trapezia,
- Issue 2: Removal of lower bound on Contingency variables,
- Issue 3: Addition of CVQ to Constraint 2.4.17.

The changes were implemented on 12 October 2023. Under clause 7.2.3 of the WEM Rules, AEMO is able to make urgent changes to the Dispatch Algorithm to maintain Power System Security and Power System Reliability. If the change is not temporary, AEMO must then submit a PCP on the changes. The PCP process is required, despite the ability for AEMO to amend the Procedure under the transitional process.

1.3 Procedure change process and timetable

On 26 October 2023, AEMO published the PCP and issued a call for submissions. The proposal was progressed using the Procedure Change Process specified in section 2.10 of the WEM Rules with submissions required by 23 November 2023.

2 Proposed procedure change

This section details the changes that AEMO proposed when the calls for submissions were published.

2.1 Detail of the proposed procedure change

2.1.1 Allowances on the ESS Trapezia

Due to mandatory droop response and minor SCADA measurement errors, AEMO observed multiple facilities becoming unavailable for ESS when they dipped below their Enablement Minimum. To address this, AEMO modified the ESS Pre-Processing calculations in paragraphs 2.5.3 and 2.5.4 of the Dispatch Algorithm Formulation.



2.5.3. For the purpose of paragraph 2.5.4:

$$\begin{aligned}
 & \text{IF } EnablementMin_{f,m} \geq 0 \\
 & \quad EnablementMinPreProcessing_{f,m} = EnablementMin_{f,m} - MAX(0.06 * EnablementMin_{f,m}, 3) \\
 & \text{ELSE} \\
 & \quad EnablementMinPreProcessing_{f,m} = EnablementMin_{f,m} + MIN(0.06 * EnablementMin_{f,m}, -3) \\
 & \text{and,} \\
 & \text{IF } EnablementMax_{f,m} \geq 0 \\
 & \quad EnablementMaxPreProcessing_{f,m} = EnablementMax_{f,m} + MAX(0.06 * EnablementMax_{f,m}, 3) \\
 & \text{ELSE} \\
 & \quad EnablementMaxPreProcessing_{f,m} = EnablementMax_{f,m} - MIN(0.06 * EnablementMax_{f,m}, -3) \\
 & \quad \text{for } f \text{ in } \mathbf{F}, \text{ for } m \text{ in } \mathbf{M} \text{ where } m \neq \text{energy}
 \end{aligned}$$

2.5.4. ESS Flag Condition 1:

$$\begin{aligned}
 & EnablementMinPreProcessing_{f,m} \leq EnergyInitialMW_f \leq EnablementMaxPreProcessing_{f,m} \\
 & \quad \text{for } f \text{ in } \mathbf{F}, \text{ for } m \text{ in } \mathbf{M} \text{ where } m \neq \text{energy}
 \end{aligned}$$

2.1.2 Issue 2: Removal of Lower Bound on Contingency Variable

Certain Network Contingencies can become negative when large loads occur (e.g. the Contingency is non-existent). To avoid violations, AEMO removed the lower bound on the Contingency variable.

The Largest Contingency variable retains a ≥ 0 bound, meaning no impact on actual dispatch or settlements.

2.3.5. **Contingency:** A variable representing each Credible Contingency Event for Injection in megawatts.

$$\begin{aligned}
 & \text{Contingency}_c \text{ for } c \text{ in } \mathbf{C} \\
 & \text{where } Contingency_c \in \mathbb{R}, \geq 0
 \end{aligned}$$

2.1.3 Issue 3 Addition of CVQ to Constraint 2.4.17

The addition of ESSEnablementSurplus to this constraint allows AEMO to force MW (or MWs) onto Facilities that would otherwise fail ESS Pre-Processing.

2.4.17. Essential System Service Enablement Constraint:

IF ESSFlag_{f,m} = True

SKIP CONSTRAINT

ELSE

TrancheSum_{f,m} – ESSEnablementSurplus = 0

for f in F, for m in M where m ≠ energy

2.1.4 Minor Changes

Additionally, AEMO identified several implementation bugs that have been resolved and has made some minor clarifications to other areas of the formulation.

2.2 Proposed drafting

AEMO published drafts of the proposed Procedure for consultation. Clean and change-marked versions are available at: https://www.aemo.com.au/consultations/current-and-closed-consultations/aepc_2023_03.

3 Consultation process

3.1 Market Advisory Committee and Working Group

3.1.1 AEMO Procedure Change Working Group

An overview of the proposed amended WEM Procedure was presented at the APCWG meeting held on 8 November 2023. There was no major feedback provided at the meeting. The papers and minutes from the meeting can be found at: <https://aemo.com.au/consultations/industry-forums-and-working-groups/list-of-industry-forums-and-working-groups/wem-aemo-procedure-change-working-group>.

3.2 Submissions received during the consultation period

AEMO published the PCP and issued a call for submissions on 26 October 2023. The submission period closed on 23 November 2023. AEMO received no submissions.



4 AEMO's assessment

4.1 Consistency with Electricity Industry Act, WEM Regulations, and WEM Rules

The revised Procedure has been reviewed by AEMO to ensure compliance with the relevant provisions in the:

- *Electricity Industry Act 2004* (WA).
- WEM Regulations.
- WEM Rules.

4.2 Consistency with Wholesale Market Objectives

AEMO considers the revised Procedure is consistent with the WEM Rules, would better achieve Wholesale Market Objectives (a) and (d), and is consistent with all other Wholesale Market Objectives.

4.3 AEMO's decision

AEMO's decision is to accept the Procedure, as amended during the consultation process.

AEMO has made this decision on the basis that:

- The revised Procedure is consistent with:
 - The *Electricity Industry Act 2004*, WEM Regulations 2004, and WEM Rules.
 - The Wholesale Market Objectives and may better address objectives (a) and (d).
- AEMO received no submissions on the proposed amendments.
- The amendments support Market Participant operations and align the Procedure with standard business practices and changes to the *Corporations Act 2001* (Cth).

4.4 Implementation of the Procedure

The amended Procedure will commence at 8:00 am on 12 December 2023.

The revised WEM Procedure: Dispatch Algorithm Formulation is available at https://www.aemo.com.au/consultations/current-and-closed-consultations/aepc_2023_03.