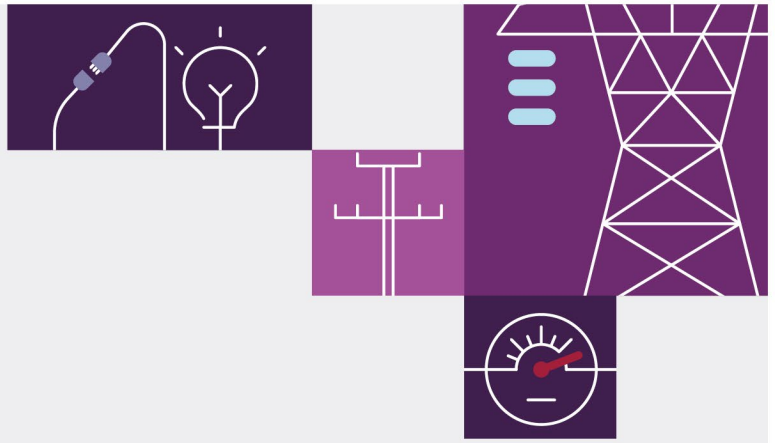# Release Notes: WEM Dispatch Engine 3.0

April 2024

Important notice

PURPOSE

The Australian Energy Market Operator has prepared this document to provide information about the WEM Dispatch Engine release as at the date of publication.

Disclaimer

This document or the information in it may be subsequently updated or amended. This document does not constitute legal or business advice and should not be relied on as a substitute for obtaining detailed advice about the Wholesale Electricity Market Rules, or any other applicable laws, procedures or policies. AEMO has made every effort to ensure the quality of the information in this document but cannot guarantee its accuracy or completeness.

Accordingly, to the maximum extent permitted by law, AEMO and its officers, employees and consultants involved in the preparation of this document:

- • make no representation or warranty, express or implied, as to the currency, accuracy, reliability or completeness of the information in this document; and

- • are not liable (whether by reason of negligence or otherwise) for any statements or representations in this document, or any omissions from it, or for any use or reliance on the information in it.

Document version control

Version	Release date	Changes
1.0	3/04/2024	Initial publication for the WEM Dispatch Engine 3.0 Release
1.1	26/04/0224	Additional clarifications on WDE2-18, WDE2-370 and WDE2-3

Document approval

Name	Position	Date
Rick Dolling	Manager, WA Real-Time Market Monitoring	24/04/2024

Contents

1 Introduction

These are the release notes for the WEM Dispatch Engine 3.0 release. This WEMDE release includes changes to the status property in the Case and Solution file schema, BESS charge state propagation in the forecast Market Schedules and fixes for the Dispatch Compliance Monitor, as well as several other fixes and improvements.

The changes introduced in this release are described in the sections below.

2 'status' property in Case file schema [WDE2-18]

This WEMDE Release will add the "status" property to Case File to indicate Affected Dispatch Interval status. The Status values are as below:

Table 1 Status Legend

Status	Description
Normal	The run proceeded as normal and is not adjusted.
DispatchEngineFailedToRun	WEMDE failed to complete a calculation for the specified Dispatch Interval.
MarketIsSuspended	AEMO has suspended the Real-Time Market therefore administered pricing and settlement outcomes calculations apply, refer to Market Advisory for more information.
OptimalSolutionNotFound	WEMDE failed to find a solution for the specified Dispatch Interval.
AffectedDispatchInterval	The Dispatch Intervals has been determined as an Affected Dispatch Interval, refer to the monthly Affected Dispatch Interval Report on the AEMO Website for more information.
MarketAnalystOverride	Substitute or corrected data for the Dispatch Interval has been used, refer to the Market Advisory or contact wa.rtm@aemo.com.au for more information.

This parameter will be available via the dispatchCase/dispatchData API as below:

```
{
    "data": {
        "primaryDispatchInterval": "2024-04-18T15:00:00+08:00",
        "dispatchDataIssueID": "20240418153750028_2718",
        "caseData": [
            {
                "status": "Normal",
                "scenario": "Reference",
                "dispatchInterval": "2024-04-18T15:00:00+08:00",
                "parameters": [
```

3 Inclusion of "In-Service Only" Scenario in Dispatch Schedules [WDE2-32]

An additional Scenario has been included for the Dispatch Schedule only, the Scenario includes RTMS where the quantities have been declared as In-Service.

This has been included to improve the information available to Market Participants to make commitment decisions for Facilities. Market Participants are strongly encouraged to update their systems to consume this additional schedule.

This Scenario will be available via the Dispatch Solution APIs by setting the dispatchScenario parameter to "inServiceCapacityOnly".

4 Include Fast-Start Formulation in Forecast Intervals [WDE2-68]

This release of WEMDE updates the dispatch core logic to propagate Fast-Start variables and include the Fast-Start constraints in forecast intervals in the Dispatch Schedule.

This update will improve the forecast accuracy due to:

1. Facilities that have been dispatched in the Primary Dispatch Interval on Fast-Start profiles will be constrained to the profile.
2. Future Intervals where a Fast-Start enabled Facility is forecast to be dispatched would be limited to the defined Fast-Start profile rather than on a pure energy dispatch basis.

5 Additional ESR Charge Constraint [WDE2-370]

This change includes an additional constraint for Energy Storage Resource (ESR) Facilities that opt-in to the Facility Storage Constraints. The additional constraint limits the ability of the Facility to withdraw energy and provide Regulation Lower and Contingency Lower Reserve based on an available charge state provided by the Facility via SCADA.

Pure Storage Charge Constraint:

$$IF\ FacilityStorageConstraintFlag_f = True$$

$$\frac{IntervalLength}{60} \cdot TrancheSum_{f,energy} - \frac{5}{60}TrancheSum_{f,regulation\_lower}$$

$$-\frac{15}{60}TrancheSum_{f,contingency\_lower} + StorageDeficit \geq FacilityChargeMWh_f$$

$$ELSE$$

$$SKIP\ CONSTRAINT$$

$$for\ f\ in\ \boldsymbol{F}$$

6 ESR charge state propagation in forecast Market Schedules [WDE2-3]

This change allows the propagation of forecast charge levels for Energy Storage Resources (ESR) in Market Schedules. This will reduce instances in forecasted intervals of physically impossible dispatch of ESR beyond their charge or discharge capabilities.

WEMDE will calculate the new "projectedChargeLevel" and "projectedDischargeLevel" properties within a Market Schedule. Market Participants can determine the projected charge state from the SCADA section of the case file from the FACILITYCODE.chargeLevelV2 and FACILITYCODE.dischargeLevelV2 tags.

```
{
    "tag": "KWINANA_ESR1.chargeLevelV2",
    "value": "-12.233",
    "valueDataType": "number",
    "qualityFlag": "good",
    "dataSource": "WEMDE",
    "asAtTimeStamp": "2024-04-18T14:59:14.14419+08:00"
},
{
    "tag": "KWINANA_ESR1.dischargeLevelV2",
    "value": "185.463",
    "valueDataType": "number",
    "qualityFlag": "good",
    "dataSource": "WEMDE",
    "asAtTimeStamp": "2024-04-18T14:59:14.14419+08:00"
},
```

EXPLANATORY NOTE

FOR [WDE2-370] and [WDE2-3]

Although the functionality for the addition ESR constraint and propagation of charge state are included in WEMDE 3.0 they will not be active at the point of deployment.

AEMO will issue a Market Advisory before activating this new functionality.

7 Tie-Breaking Formulation Change [WDE2-401]

The Tie-Breaking Constraints have been modified to improve how they scale with Tranche Size. Under rare circumstances utilising the product of the Tranche Upper Bound and Tranche Quantity could result in non-negligible contributions to the Objective Function.

2.4.33. Tie-Breaking Constraint 1:

$$Let \; \mathbf{S} \; be \; the \; set \; of \; price\text{-}tied \; tranches \; within \; a \; Market \; Service \; m$$

$$such \; that \; the \; absolute \; value \; of \; the \; difference \; in \; TranchePrices \; within \; a \; unique \; tranche \; pair \; k \; is \; within \; 1e^{-6} \; in \; value$$

$$where \; any \; k = \{s_{1k}, s_{2k}\}, \; s_{1k}, s_{2k} \in \mathbf{S}$$

$$and \; where \; \sout{either} \; the \; Tranche U\sout{L}B \; quantity \; is \; non \; zero \; \sout{or \; the \; TrancheUB \; associated \; with \; the \; TranchePrice \; is \; non \; zero}$$

$$TBSlack1_{k\_UB} - TBSlack2_{k_{UB}}$$
$$= \sout{TrancheUB_{s1k}} * TrancheQuantity_{s2k} / TrancheUB_{s2k} | - \sout{TrancheUB_{s2k}}$$
$$* TrancheQuantity_{s1k} / TrancheUB_{s1k}$$

$$for \; each \; k$$

$$for \; each \; Market \; Service$$

2.4.34. Tie-Breaking Constraint 2:

$$Let \; \mathbf{S} \; be \; the \; set \; of \; price\text{-}tied \; tranches \; within \; a \; Market \; Service \; m$$

$$such \; that \; the \; absolute \; value \; of \; the \; difference \; in \; TranchePrices \; within \; a \; unique \; tranche \; pair \; k \; is \; within \; 1e^{-6} \; in \; value$$

$$where \; any \; k = \{s_{1k}, s_{2k}\}, \; s_{1k}, s_{2k} \in \mathbf{S}$$

$$and \; where \; \sout{either} \; the \; TrancheLB \; quantity \; \sout{or \; the \; TrancheUB} is \; non \; zero \; \sout{associated \; with \; the \; TranchePrice \; is \; non \; zero}$$

$$TBSlack1_{k\_LB} - TBSlack2_{k_{LB}}$$
$$= \sout{TrancheLB_{s1k}} * TrancheQuantity_{s2k} / TrancheLB_{s2k} - \sout{TrancheLB_{s2k}}$$
$$* TrancheQuantity_{s1k} / TrancheLB_{s1k}$$

$$for \; each \; k$$

max... revision: BreakageSurplus	2.4...	Registered Facility	.
TBSlack1	2.4.33, 2.4.34	Tie-Break Set(s)	1e-~~6~~9
TBSlack2	2.4.33, 2.4.34	Tie-Break Set(s)	1e-~~6~~9

8 Dispatch Compliance Monitor

In this release a number of fixes and changes will be applied to the Dispatch Compliance Monitor, including:

1. DCM correctly applies linear ramping to SSF upon change of Dispatch Cap [WDE2-245].
2. Fix to the DCM to minimise false positive identifications of dispatch non-compliance [WDE-296].
3. Change to DCM notification template for Dispatch Caps to include expected operation range [WDE-359].

9 Resolved Issues & Changes

In addition to the functionality above, the following issues have been resolved in this release:

Table 2 Resolved Issues

Reference	Summary	Resolution
● WDE2-381	Bug fix to Not In-Service Capacity calculation for Facilities capable of Withdrawal to avoid under-counting offered Injection Capacity.	Fixed
● WDE2-344	Price-setting information in the Solution File for OCD iterations now uses information from the OCD iteration, noting that this will not always be useful in complex OCD cases.	Change
● WDE2-343	Reduced MIP range for Intervention Pricing runs to aid performance.	Change
● WDE2-245	Change to issuance of Look-Ahead targets to minimise possibility of late delivery.	Change
● WDE2-122	Calculation of CRR Performance Factors now also account for level of distributed PV on SWIS.	Change
● WDE2-10	AEMO will now use forecasts of the Contingency Reserve Lower (CRL) Offset in the CRL calculation. This new logic will mean that there is consistency between forecast values for the CRL Requirement and the actual value in the Primary Dispatch Interval, reducing the step-change in the CRL Offset between these periods.	Change

Table 3 Status Legend

Status
● Internal AEMO changes. No impact to Market Participants.
● Additional functionality. Market Participants awareness only.
● Change to Market Participant functionality. Needs Market Participant attention.