

SO_OP_3705 Dispatch Procedure Consultation November 2022

Information Paper

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Executive summary

The publication of this Information Paper commences the second consultation process (Consultation) conducted by AEMO to consider additional proposed changes (Changes) to the SO_OP_3705 Dispatch Procedure (Procedure)¹ to implement the relevant aggregated dispatch conformance arrangements (ADC) in accordance with clause 11.145.16 of the National Electricity Rules (NER), under the National Electricity Amendment (Integrating energy storage systems into the NEM) Rule 2021 No. 13 (IESS Rule). At this stage, the Effective Date for the Dispatch Procedure is still being determined. Once it has been finalised, we will update the linked documents and communicate this with you.

In summary, the Changes are as follows:

- Change to the definition of a Target Aggregate type, which is now limited to a battery with two DUIDs that are a scheduled generating unit/scheduled load pair. The assessment of ADC for a Target Aggregate remains unchanged from the previous version of the Procedure.
 - The purpose of the Target Aggregate is specific to batteries, to monitor conformance of the 2-DUID arrangement as an interim measure, before existing batteries transition to a 1-DUID arrangement as part of the IESS Final Release. All existing batteries will be automatically registered for ADC as a Target Aggregate from the ADC implementation date.
- Introduction of new Mixed Aggregate type, which comprises scheduled generating units, and which may also include semi-scheduled generating units or scheduled loads (formerly called a Target Aggregate).
- Changes to the participation in, and assessment of, ADC for a Mixed Aggregate:
 - If any unit with conformance mode = 1 is not conforming to its individual dispatch target for a trading interval, then all units are deemed to be participating in ADC for that interval (Dynamic ADC).
 - Units which participate in ADC are required to conform to their dispatch instructions as follows:
 - Aggregate active power cannot be greater than the aggregate dispatch target; and
 - Aggregate active power cannot be less than the aggregate dispatch target, if and only if the net active power of all scheduled units is less than the net dispatch target of those units. This allows semi-scheduled generating units (if any) to operate below their dispatch target without requiring scheduled units to operate above their dispatch target to make up the difference.
- Changes to how dispatch instructions are issued via AEMO's automatic generation control system (AGC), whereby a unit registered for FCAS regulation in a Mixed Aggregate will now have its own AGC model and receive AGC set-points for that unit (rather than

¹ Other documents such as registration guidelines will also be changed to reflect the IESS Rule change.

receiving a single AGC set-point for the aggregate). A Target Aggregate will continue to receive a single AGC set-point for the aggregate.

- Changes to when resource level compliance (RLC) is required (conformance mode = 2), to include intervals where any FCAS regulation is enabled for a unit in a Mixed Aggregate (to avoid situations where unmanaged firming plus FCAS regulation may result in power system security violations).
- Consequential changes to dispatch instructions and AEMO's dispatch conformance monitoring.

AEMO invites stakeholders to:

- provide feedback and comments on this Information Paper, as well as the accompanying yellow highlighted sections of the change-marked version of the Procedure; and
- identify any unintended adverse consequences of the Changes.

Stakeholders are invited to submit written responses on this Information Paper, by 5.00 pm Thursday 20 January 2023 to iess@aemo.com.au.

An optional **consultation response template** is available to assist stakeholders in giving feedback about the changes and is available on the SO_OP_3705 Dispatch procedure (Dynamic ADC) consultation page.

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1. Why AEMO is consulting again

AEMO has established a comprehensive stakeholder engagement program for the IESS project to ensure the effectiveness of consultations for changes to AEMO Procedures and other documents.²

On 21 July 2022, AEMO consulted³ with industry on the following proposed changes to the Procedure:

- Permitted forms of ADC by one or more scheduled resources comprised in an aggregate generating system.
- Arrangements for AEMO to specify when RLC is required.
- Consequential changes to dispatch instructions and AEMO's dispatch conformance monitoring and reporting processes to accommodate these arrangements.

This consultation closed on 26 September 2022 with the release of the change marked Procedure.⁴ During a subsequent IESS Working Group meeting, a participant tabled an alternative to the consulted ADC approach, being Dynamic ADC.

Subsequently, AEMO has investigated Dynamic ADC. Participants have indicated that the ADC would deliver greater benefit through the Dynamic ADC.

1.1. Background

The Procedure is a power system operating procedure made in accordance with NER 4.10. The Procedure provides instructions and guidelines in respect of the operation of the power system, including the requirements on Registered Participants to respond to dispatch instructions.

The IESS Rule provides for the following two go-live dates covering four main changes. AEMO has grouped the four key IESS Rule-related changes into the following two releases, which correspond to the two IESS Rule go-live dates:

- Initial release on 31 March 2023:
 - Introduction of ADC (subject of this Consultation), which is optional for participants.
 - Enabling Market Small Generation Aggregators (MSGAs) to participate in contingency FCAS markets, which is optional for participants.
- Final release on 3 June 2024:

² Available at <https://www.aemo.com.au/initiatives/major-programs/integrating-energy-storage-systems-project/integrating-energy-storage-systems-procedure-changes>

³ <https://www.aemo.com.au/consultations/current-and-closed-consultations/dispatch-procedure-consultation-iess>

⁴ Available at https://www.aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2022/dispatch-procedure-consultation/soop3705-dispatch-procedure-change-marked-draft.pdf?la=en

- Introduction of the integrated resource provider (IRP) registration category and bidirectional unit (BDU) bidding.
- Changes to non-energy cost recovery calculations.

As previously advised, AEMO will revisit changes to the new bidding format for a BDU (via a single bid form with 20 volume – price band pairs) in a subsequent consultation on the Procedure, prior to 3 June 2024 (the commencement date of NER 4.9.2A). AEMO will publish the amended Procedure prior to 3 June 2024, most likely as a minor and administrative amendment under NER 11.145.9.

1.2. Context for this consultation

The IESS High Level Design (HLD)⁵ Section 3.2 described the initial mechanics of ADC.

AEMO anticipates that the Changes would increase benefits to participants, which would encourage uptake and participation in the integration of energy storage systems. AEMO proposes to consult on the Changes for a sufficiently extended time period to enable detailed and comprehensive engagement on the design and benefits of Dynamic ADC design, including the impact on ADC of the operation of regulation FCAS.

AEMO's indicative timeline for the Consultation is as follows:

Deliverable	Timing	Status
Information Paper published	29 November 2022	Complete (this document)
Stakeholder information session	30 November 2022	
Engagement through the IESS-WG	30 November 2022	
Submissions due on Information Paper	20 January 2023	
Final Draft Procedure published	10 February 2023	

AEMO invites stakeholders to register to participate in the information session noted above to be held at 11-12pm on Wednesday 30 November 2022. Register at <https://forms.office.com/r/f5Cq3iCkUQ>.

Prior to the due date for submissions on the Information Paper, stakeholders can request a meeting with AEMO to discuss any issues in respect of the Changes, or more generally, via email (iess@aemo.com.au).

A glossary of terms used in this Information Paper is at Appendix A.

⁵ Available at <https://aemo.com.au/initiatives/submissions/integrating-energy-storage-systems-iess-into-the-nem>.

2. Overview of changes

The IESS Rule introduces the concept of ADC. Participants with aggregate systems will – subject to some exceptions – be able to use ADC to firm the output of variable renewable energy (VRE) resources.

The Changes are proposed principally to accommodate Dynamic ADC. These include:

- Provision for three ADC types – Cap Aggregate, Mixed Aggregate and Target Aggregate.
- Managing the need for Dynamic ADC in particular circumstances.
- Managing both ADC and FCAS provision in an aggregate.

2.1. Aggregates Type

Under NER 11.145.16, a generator for a generating system that comprises more than one of the following scheduled resources (scheduled generating unit, semi-scheduled generating unit, scheduled load) may conform in aggregate to dispatch instructions for those scheduled resources (ADC), excluding any scheduled resource for which AEMO requires individual dispatch conformance (RLC).

AEMO has defined three types of ADC in the Procedure, compared to two previously:

1. Cap Aggregate – where the aggregate only comprises semi-scheduled generating units (for example, a generating system comprising a wind and solar semi-scheduled generating unit).
2. Mixed Aggregate – where the aggregate comprises scheduled generating units and which may also include semi-scheduled generating units or scheduled loads. If FCAS regulation is enabled for a unit, RLC is required for that unit.
3. Target Aggregate – where the aggregate comprises a scheduled generating unit and scheduled load pair, for a single physical plant.

Section 2.6 of the change-marked Procedure provides further detail, with the Changes highlighted in yellow.

2.2. ADC Types

2.2.1. Cap Aggregate

The conformance mode for a unit in a Cap Aggregate is set = 1 in its dispatch instruction if the semi-dispatch cap flag is set for any unit in the Cap Aggregate, unless RLC is required on the unit (conformance mode = 2).

The units in a Cap Aggregate with conformance mode = 1 are required to conform to their dispatch instructions by capping their aggregate active power at their aggregate dispatch target.

2.2.2. Mixed Aggregate

The conformance mode for a unit in a Mixed Aggregate is set = 1 in its dispatch instruction, unless RLC is required on the unit (conformance mode = 2).

If any unit in a Mixed Aggregate with conformance mode = 1 is not conforming to its individual dispatch target for a trading interval, then all units in the Mixed Aggregate are deemed to be participating in ADC for that trading interval.

The units in a Mixed Aggregate that are participating in ADC are required to conform to their dispatch instructions as follows:

- their aggregate active power cannot be greater than their aggregate dispatch target; and
- their aggregate active power cannot be less than their aggregate dispatch target, if and only if the net scheduled active power is less than the net scheduled dispatch target.

2.2.3. Target Aggregate

The conformance mode for a unit in a Target Aggregate is set = 1 in its dispatch instruction.

The units in a Target Aggregate with conformance mode = 1 are required to conform to their dispatch instructions by controlling their aggregate active power to meet their aggregate dispatch target.

Discussion

AEMO has retained the Target Aggregate specifically to apply to batteries, to monitor conformance of the 2-DUID arrangement as an interim measure before batteries transition to a 1-DUID arrangement as part of the IESS Final Release. AEMO intends to automatically register batteries for ADC (as a Target Aggregate) from the ADC implementation date.

As existing batteries receive a single AGC setpoint, no AGC changes are envisaged to implement this change. This change simply allows AEMO to affect conformance monitoring of a battery's scheduled generating unit/scheduled load DUID pair under the new ADC conformance monitoring arrangements.

AEMO is considering whether the Target Aggregate arrangement should be retained after the IESS Final Release, to apply to BDUs that are incapable of transitioning linearly (which, therefore, will continue to operate as a 2-DUID scheduled generating unit/ scheduled load pair).

QUESTION 1

Are there any scenarios where the Target Aggregate arrangement should be retained after the IESS Final Release (3 June 2024)?

2.3. FCAS enablement

AEMO recognises the importance of allowing the integration for ADC and FCAS⁶ provision, noting that there are complexities associated with this integration.

The proposed ADC arrangements allow a participant the flexibility to choose between regulation FCAS enablement and ADC participation on a dynamic basis.

2.3.1. Cap Aggregate and Mixed Aggregate

- A unit in a Cap Aggregate or a Mixed Aggregate that is registered for FCAS regulation will receive a separate AEMO AGC⁷ set-point for that unit (rather than an aggregated AGC set-point, as was the case under the previous version of the Procedure).
- A unit in a Cap Aggregate or Mixed Aggregate that is enabled for any FCAS regulation in an interval must undertake RLC and AEMO will set conformance mode = 2 in the unit's dispatch instruction.

QUESTION 2

AEMO has included the FCAS regulation enabled logic in the Cap Aggregate, despite it being unlikely that there will be any semi-scheduled units providing FCAS regulation. Are there scenarios where this is likely to be possible?

2.3.2. Target Aggregate

- A battery with a scheduled generating unit/scheduled load pair will continue to receive a single AGC set-point for the aggregate.
- Accordingly, since a Target Aggregate comprises a single battery asset, the DUIDs comprising a Target Aggregate can continue to be enabled for any FCAS regulation, whilst simultaneously participating in ADC.

AEMO has designed the Target Aggregate to include simultaneous FCAS regulation and ADC participation, reflecting the current practice of batteries receiving a single AGC set-point and being dispatched as a 2-DUID scheduled generating unit/scheduled load pair. In order for AEMO to broaden the definition of Target Aggregate beyond existing batteries to include other scheduled unit technologies, AEMO would need to either provide those Target Aggregates with a single AGC set-point, or resolve technical challenges associated with FCAS regulation provision while aggregates are on individual AGC setpoints.

⁶ See <https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/ancillary-services>.

⁷ Automatic Generation Control (AGC) is a centralised AEMO system which allows generators to be remotely controlled via SCADA by AEMO.

QUESTION 3

Should the definition of Target Aggregate broaden beyond batteries to include other scheduled unit technologies?

AEMO invites feedback from stakeholders on:

- Whether there is stakeholder appetite for registering Aggregates for ADC that comprise scheduled units only (without any semi-scheduled generating units)
- From a technical perspective, whether remaining on individual AGC setpoints, or moving to a single AGC setpoint, is preferred.

2.3.3. Contingency FCAS provision

As per the previous version of the Procedure, participants must prioritise delivery of FCAS enablement to respond to frequency deviations, and can make use of reserved headroom and/or footroom for its delivery. This applies to all types of Aggregates.

Figures 1 and 2 below provide a generalised example of the operating limits within which an FCAS unit must operate to ensure its enabled FCAS reserves are maintained while allowing room for ADC with other units in the Aggregate.

Figure 1 Operating Limits for managing Contingency FCAS and Aggregated Dispatch in a Mixed Aggregate

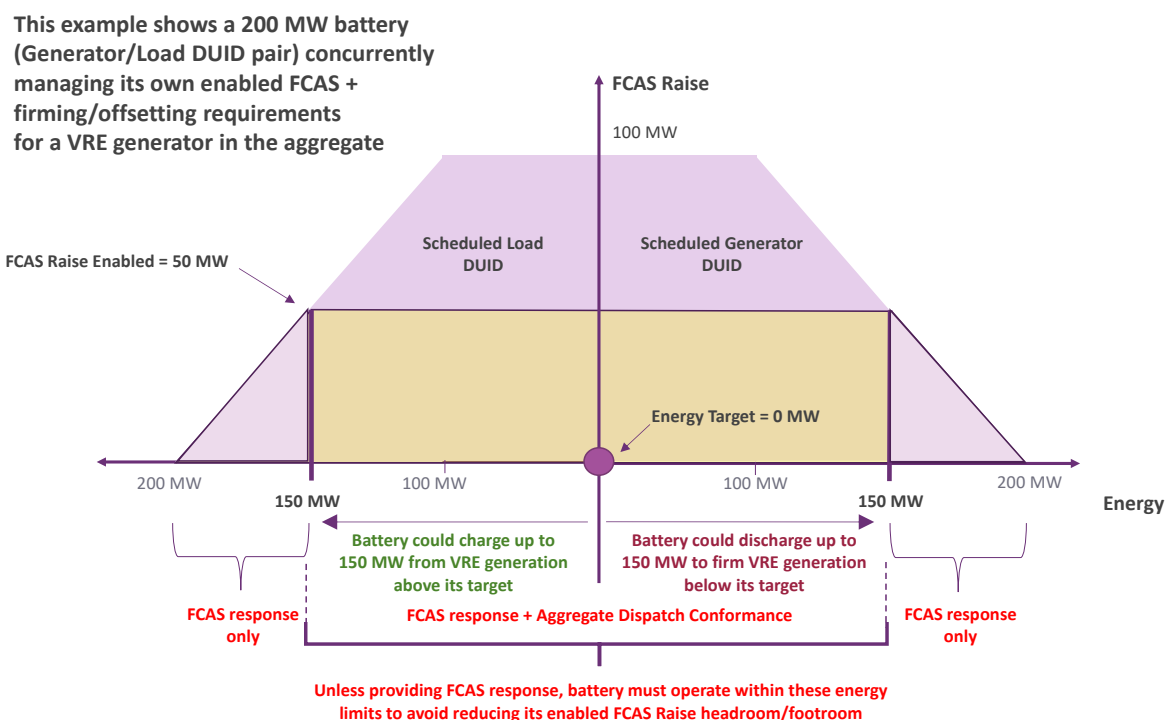
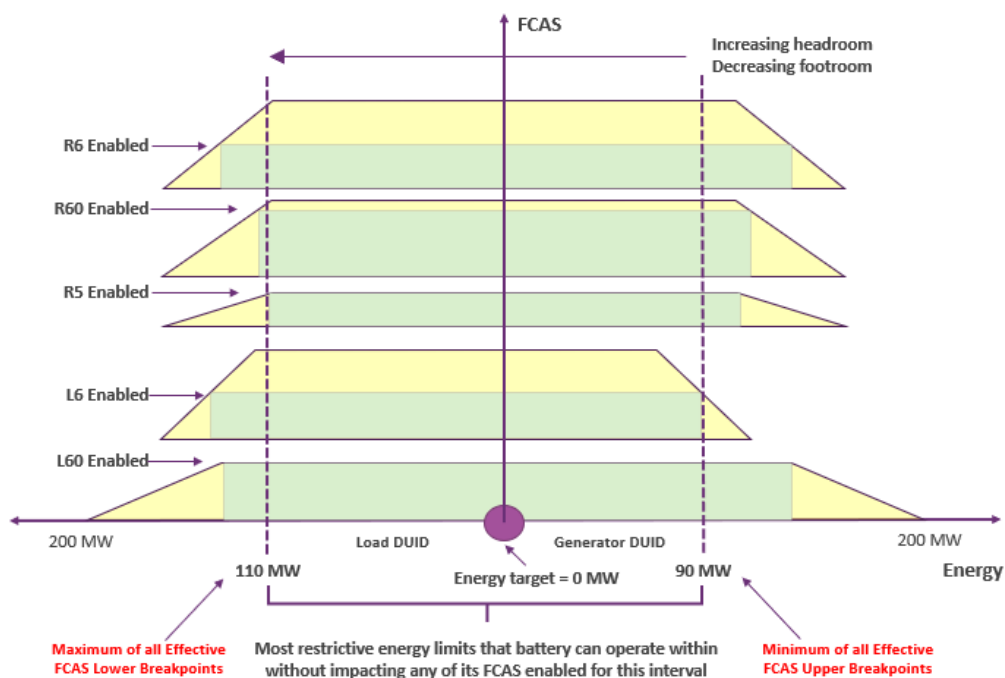


Figure 2 Operating Limits based on the most restrictive FCAS breakpoints



3. Drafting of proposed changes

To help stakeholders respond to this Information Paper, AEMO has also published the change-marked version of the Procedure, which incorporates the Changes. The change-marked version is available on the SO_OP_3705 Dispatch procedure (Dynamic ADC) consultation page.

In summary, the Changes are to inform stakeholders and seek feedback on:

- Change to the definition of a Target Aggregate type.
- Introduction of new Mixed Aggregate type.
- Changes to the participation in, and assessment of, ADC for a Mixed Aggregate.
- Changes to how dispatch instructions are issued via AEMO's AGC.
- Changes to when RLC is required, to include intervals where any FCAS regulation is enabled for a unit in a Cap or Mixed Aggregate.
- Consequential changes to dispatch instructions and AEMO's dispatch conformance monitoring.

AEMO invites stakeholders to:

- provide feedback and comments on this Information Paper, as well as the accompanying yellow highlighted sections of the change-marked version of the Procedure; and
- identify any unintended adverse consequences of the Changes.

Stakeholders are invited to submit written responses on this Information Paper, by 5.00 pm Thursday 20 January 2023 to iess@aemo.com.au.

An optional **consultation response template** is available to assist stakeholders in giving feedback about the changes.

Appendix A. Glossary

This document uses many terms and acronyms that have meanings defined in the NER. The NER meanings are adopted unless otherwise specified.

Abbreviation	Term
AGC	automatic generation control
ADC	aggregated dispatch conformance
BDU	bidirectional unit
BESS	battery energy storage system
DC	direct current
DUID	dispatchable unit identifier
ECM	energy conversion model
EMS	energy management system
FCAS	frequency control ancillary service
IESS	integrating energy storage systems
IRP	integrated resource provider
IRS	integrated resource system
NEM	National Electricity Market
NEMDE	NEM Dispatch Engine
NER	National Electricity Rules
RLC	resource level conformance
SCADA	Supervisory Control and Data Acquisition
SGA	small generation aggregator
SGU	small generating unit
SOC	state of charge
SRA	Small resource aggregator
VRE	variable renewable energy