

# SO\_OP\_3705 Dispatch Procedure Consultation

Information Paper  
Integrated Energy Storage System  
Initiative

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New South Wales | Queensland | South Australia | Victoria | Australian Capital Territory | Tasmania | Western Australia

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## Executive summary

The publication of this Information Paper commences the consultation process (Consultation) conducted by AEMO to consider proposed changes (Changes) to the SO\_OP\_3705 Dispatch Procedure (Procedure)<sup>1</sup> 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 (Integrated energy storage systems into the NEM) Rule 2021 No. 13 (IESS Rule).

AEMO has prepared this Information Paper to inform stakeholders and initiate feedback by industry about the Changes.

In summary, the Changes are to set out:

- permitted forms of ADC by one or more scheduled resources comprised in an aggregate generating system;
- arrangements for AEMO to specify when resource level compliance is required; and
- consequential changes to dispatch instructions and AEMO's dispatch conformance monitoring and reporting processes to accommodate these arrangements.

AEMO invites stakeholders to:

- provide feedback and comments on this Information Paper, as well as the accompanying 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, including the questions which are identified in this Information Paper, by 5.00 pm (AEST) Friday 12 August 2022.

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<sup>1</sup> Other documents such as registration guidelines will also be changed to reflect this rule change.

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# 1. Stakeholder consultation process

AEMO has established a comprehensive stakeholder engagement program to ensure the effectiveness of the Consultation. This program comprises:

- This Consultation.
- More informal calls for feedback on, for example, technical specifications.
- IESS Working Group (IESS-WG) for affected participants and other related bodies.
- Focus groups, information sessions and Q&A sessions on technical matters as required.
- Discussion with individual stakeholders, as required.
- Dedicated webpage<sup>2</sup> and IESS mailbox ([IESS@aemo.com.au](mailto:IESS@aemo.com.au)) for stakeholder enquiries.
- Additional forums to be established in the second half of 2022 for the broader implementation of the NEM2025 Implementation Roadmap<sup>3</sup>.

AEMO's indicative timeline for this consultation is as follows:

| Deliverable   | Timing           | Status                   |
|---|------------------|--------------------------|
| Targeted one-to-one pre-consultations to inform options for ADC | May/June 2022    | Complete                 |
| Information Paper published                                     | 21 July 2022     | Complete (this document) |
| Stakeholder information session                                 | 26 July 2022     |                          |
| Engagement through the IESS-WG                                  | 27 July 2022     |                          |
| Submissions due on Information Paper                            | 12 August 2022   |                          |
| Final Procedure published                                       | 1 September 2022 |                          |

AEMO invites stakeholders to register to participate in the above-noted information session, where AEMO will share its ADC-related proposals, as well as invite feedback from stakeholders. Register at <https://forms.office.com/r/k02wkyZ1Rq>.

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](mailto:iess@aemo.com.au)).

Stakeholders are welcome to provide feedback on this Information Paper, as well as the draft Implementation Strawperson<sup>4</sup>, at the same time.

A glossary of terms used in this Information Paper is at Appendix A. A table of issues for feedback is at Appendix B.

<sup>2</sup> At <https://aemo.com.au/initiatives/major-programs/integrating-energy-storage-systems-project>.

<sup>3</sup> For current version of the Roadmap, see <https://aemo.com.au/consultations/industry-forums-and-working-groups/list-of-industry-forums-and-working-groups/reform-delivery-committee>.

<sup>4</sup> At <https://aemo.com.au/-/media/files/initiatives/submissions/2021/iess/integrating-energy-storage-systems---implementation-strawperson---draft.pdf>.

## 2. Background

On 2 December 2021, the Australian Energy Market Commission (AEMC) made its Final Determination on the IESS Rule, to integrate storage and hybrid systems into the National Electricity Market (NEM). Under the IESS Rule, there will be significant changes to registration and dispatch arrangements as well as in areas such as non-energy cost recovery, performance standards, and participation options for aggregation of small resources, including batteries.

Beyond the improved integration of storage and hybrid resources, the IESS Rule also takes a significant step toward a technology agnostic two-way market model for the NEM. These changes anticipate, and help prepare the NEM for, future steps being envisioned through the Energy Security Board's (ESB's) Post-2025 Market Design initiative.

To implement the IESS Rule, AEMO envisages:

- Initial Release of new registration and dispatch models on 31 March 2023 – this release will give effect to any transitional rules, including clause 11.145.16 which allows ADC implementation in accordance with the Procedure.
- Final Release to complete the full implementation of the IESS Rule on 3 June 2024 – AEMO estimates that 30 months is required for full implementation, including a market trial period prior to go-live.

Although AEMO is not required to formally consult on the Changes, AEMO considers it is important to seek feedback from participants on the Changes, particularly in respect of aggregated dispatch conformance.

AEMO will also publish the amended Procedure prior to go live of the Final Release on 3 June 2024, under the minor and administrative process described in the Transitional Rules.

### 2.1. Context for this consultation

The Procedure is a *power system operating procedure* made in accordance with NER 4.10s. 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.

While AEMO is not required to formally undertake a consultation on the Procedure, AEMO considers that the Changes are material. Specifically, AEMO requests feedback on the Change to allow ADC for two or more dispatchable unit identifiers (DUIDs) behind a connection point (or individual DUID dispatch conformance, if required by AEMO) with conformance information issued in dispatch instructions.

AEMO will revisit changes to the new bidding format for a bidirectional unit (BDU) (via a single bid form with 20 volume – price band pairs) in a subsequent consultation, prior to 3 June 2024, at which time NER 4.9.2A will also take effect.

### 3. Overview of changes

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

The IESS High Level Design (HLD)<sup>5</sup> Section 3.2 describes the mechanics of ADC.

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

- Potential inclusion of non-IRS in aggregate conformance i.e. mono-directional and mono-technology hybrids.
- Provision for two types of ADC, depending on hybrid composition.
- Managing the need for individual conformance in particular circumstances.
- Managing both ADC and frequency control ancillary services (FCAS) provision in a hybrid, particularly in cases where not all DUIDs in a hybrid are enabled for FCAS and/or, in the case of regulation FCAS, are not all on AGC control.

#### 3.1. Inclusion of non-IRS in ADC

Currently, the IESS Rule does not allow for hybrids and/or generating systems that do not meet the definition of an IRS (such as multiple-DUID mono technology, mono-directional systems) to elect for ADC.

AEMO is reviewing the IESS Rule to in respect of the option for mono-technology generating systems and/or mono-directional hybrids to participate in ADC.

The Changes accommodate the possible eventuality that non-IRS hybrids or generating systems will be permitted to elect for ADC. Accordingly, the Procedure refers to mono-technology generating systems and/or mono-directional hybrids as “aggregates” or “aggregate systems”.

#### 3.2. Types of ADC

The Procedure states that under NER 11.145.16, a generator with a generating system located behind a connection point that comprises two or more of the following scheduled resources (scheduled generating unit, semi-scheduled generating unit, scheduled load) is permitted to conform in aggregate to dispatch instructions for those scheduled resources, by ADC, excluding any scheduled resource for which AEMO requires individual dispatch conformance, or resource level compliance (RLC).

Two types of ADC are elaborated in the Procedure:

- (a) Cap aggregate – where the aggregate comprises only semi-scheduled generating units (for example, a generating system comprising a wind and solar semi-scheduled generating unit).
- (b) Target aggregate – where the aggregate includes one or more scheduled generating units (for example, a battery scheduled generating unit/scheduled load pair plus a solar semi-scheduled generating unit).

Section 2.6.1 of the change-marked Procedure provides further detail.

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

### 3.3. Managing the need for RLC in particular circumstances

Certain constraints (such as system strength constraints) are applied at the DUID level, where required, as they are intended to constrain the sent-out energy from a specific DUID, for example in relation to their technology type. When these constraints are applied, the constrained DUID needs to conform on an individual basis by RLC. The Changes include:

- Changes to dispatch instructions, to introduce a new conformance flag which will indicate whether a DUID within a hybrid is on ADC or RLC. Participants will be required to make system changes to use the conformance flag and to ensure that units can conform to ADC or RLC when required.
- Specification of what types of constraints may need to be applied at the DUID level, when required.
- Changes to AEMO's conformance monitoring process, to accommodate both a single aggregate conformance assessment and any individual conformance assessments for DUIDs that are individually constrained. Section 2.6.2 of the attached change-marked Procedure provides further detail.

### 3.4. FCAS enablement and aggregate conformance

AEMO recognises the importance of allowing the integration for ADC and FCAS<sup>6</sup> provision, noting that there are complexities associated with its integration. The Changes outline how a DUID on AGC<sup>7</sup> could provide regulation FCAS, while also participating in ADC.

#### 3.4.1. Complexities associated with ADC and FCAS

##### Changes to the way AGC operates are required to accommodate ADC

Currently, AEMO's AGC system:

- Does not cater for ADC, but instead will always attempt to control a DUID to conform individually, even if the participant wants to take advantage of ADC.
- Will control an individual DUID providing regulation FCAS to move away from its linear ramp (based on its dispatch target) in a way that improves power system frequency. The AGC system must be changed to account for a hybrid that can deliver regulation FCAS and energy in aggregate.

##### FCAS is currently enabled at the DUID level

- In order to provide FCAS, a unit must maintain the appropriate enabled MW as headroom (i.e. generation output can be increased, or load can be decreased, for raise service) and footroom (i.e. generation output can be decreased, or load can be increased, for lower service).
- As DUIDs move away from their individual dispatch targets to conform in aggregate, this gives rise to situations where DUIDs with different FCAS trapeziums could lead the aggregate to have insufficient head room or tail room to meet their contingency FCAS enablement in aggregate.
- FCAS and energy management for a hybrid in aggregate is complex in cases where not all DUIDs in a hybrid are enabled for FCAS, do not have similar trapezium parameters (such as maximum lower and upper angles), and/or are not all on AGC (for regulation FCAS).

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

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

### 3.4.2. Proposed solution: Participants manage dispatch within each individual DUID's FCAS trapezium

The Change which represents AEMO's proposed solution has been change-marked in Section 2.6.3 of the Procedure which is attached to this Information Paper.

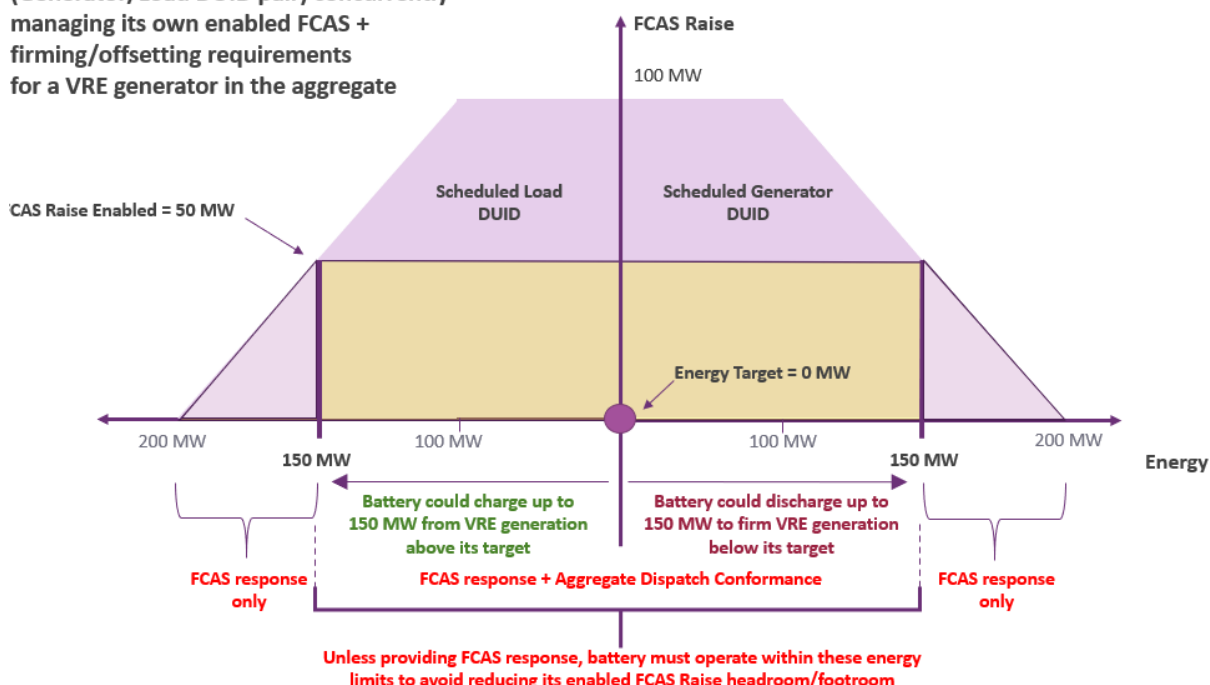
Under the Change, FCAS enablement will remain at the DUID level. FCAS-enabled DUIDs will be able to move away from their individual dispatch targets to conform in aggregate, subject to headroom and footroom being reserved, so that the DUID (and collectively the aggregate) is able to meet its FCAS enablement. This solution avoids the complexities which are associated with the concept of sharing headroom/tailroom for FCAS across DUIDs in an aggregate, where not all units are enabled for FCAS and/or have different trapezium parameters.

If a participant elects ADC for an aggregate, and if any units in the aggregate are registered for regulation FCAS (or if the DUID otherwise requests to receive dispatch instructions via AGC), then AEMO will set up its AGC system to issue a single dispatch instruction covering all units in the aggregate (referred to as the aggregate set-point). The participant's AGC will allocate the single AGC setpoint across all DUIDs within the aggregate<sup>8</sup>. Participants must implement a complying AGC system for this arrangement to take place. Section 2.6.3 of the change-marked Procedure sets out the relevant conditions.

The operating limits will need to be determined for the DUID for each trading interval to ensure its enabled FCAS reserves are maintained, based on the FCAS bid trapezium and the enabled volume for each FCAS. Figures 1 and 2 below provide a generalised example.

**Figure 1 Operating limits for managing FCAS and aggregated dispatch in a target aggregate**

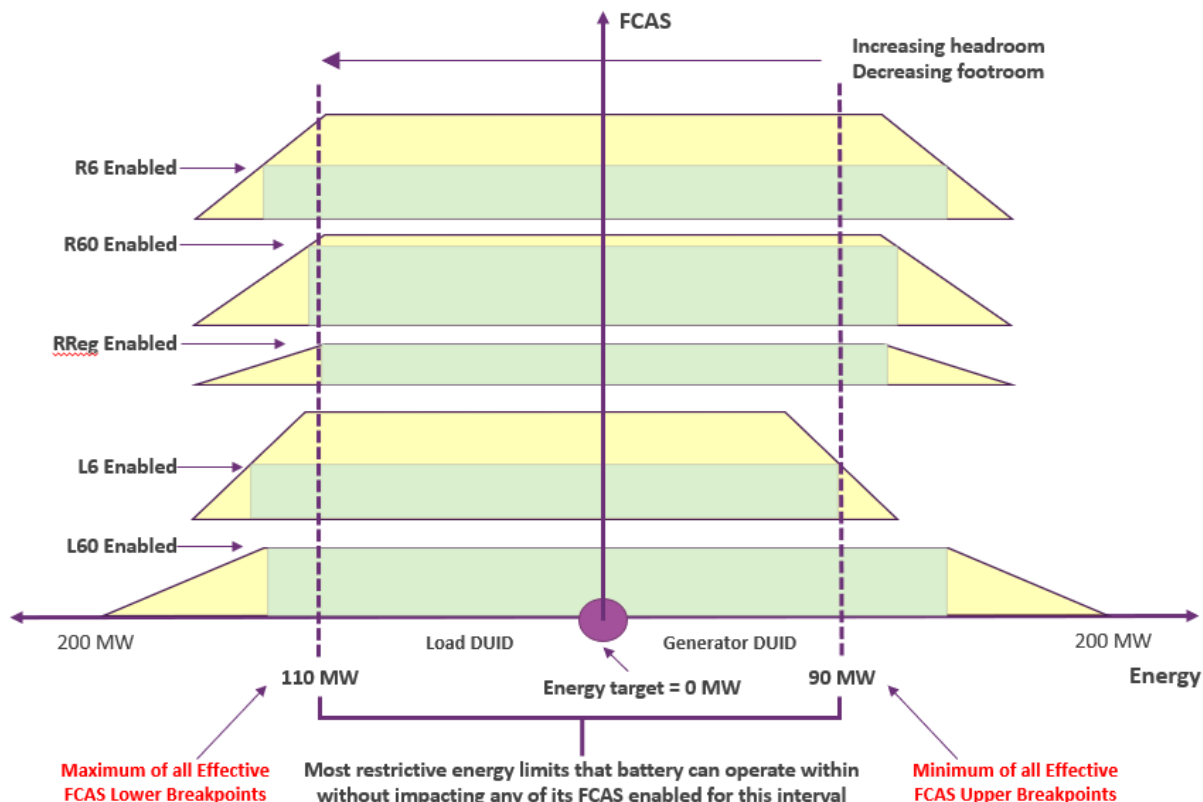
This example shows a 200 MW battery (Generator/Load DUID pair) concurrently managing its own enabled FCAS + firming/offsetting requirements for a VRE generator in the aggregate



<sup>8</sup> Note the participant's AGC must account for estimated losses to each DUID's dispatch point, if also controlling flow at the connection point.



Figure 2 Operating limits based on the most restrictive FCAS breakpoints



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.

### 3.4.3. Alternative option considered

AEMO considered two options as part of its development of the proposed solution.

#### Prohibiting systems with FCAS units from accessing ADC

Under this alternative option, any of the units with FCAS within an IRS would be prevented from accessing ADC.

This alternative option was considered as a simple solution for avoiding the complexities associated with FCAS delivery by an IRS (on ADC).

AEMO considered that this option was unattractive, as many hybrid participants (with a battery energy storage system [BESS]) would desire the ability to participate in both FCAS markets and ADC.

#### Placing all units on RLC if any of the units are FCAS enabled

Under this alternative option, no DUIDs in the system would be eligible for ADC at times when any of the DUIDs within the system were FCAS-enabled.

This option offered participants some flexibility to select between FCAS participation and ADC participation (relative to the prior alternative option). However AEMO considered this option would be unattractive also, given the relatively infrequent times that a BESS in a hybrid would not be enabled for any FCAS. Further, AEMO considered that the option was not viable due to the additional complexity and expense involved in its implementation.

## 3.5. Other matters

### 3.5.1. Transition to a single BDU model

From 31 March 2023, for all “2 DUID” scheduled BDUs, AEMO will apply ADC to the DUIDs to allow conformance monitoring to occur. In doing so, AEMO will waive system change and self-reporting participant requirements for ADC.

From 3 June 2024, all “2 DUID” BDUs (that are capable of linearly transitioning from consuming to producing electricity) will transition to a single BDU model, and the participant can choose to withdraw from ADC.

### 3.5.2. FCAS Conformance reporting

AEMO is proposing that Ancillary Service Providers, including aggregates, be required to periodically report on their FCAS conformance and management of enabled FCAS headroom and footroom. Section 3.1.1 of the changed-marked Procedure provides further detail.

## 4. Drafting for proposed changes

To help stakeholders respond to this Information Paper, AEMO has also published the change-marked version of the Procedures, which incorporates the Changes.

In summary, AEMO seeks comment and feedback on the key Changes to the Procedure which set out:

- 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; and
- consequential changes to dispatch instructions and AEMO's dispatch conformance monitoring and reporting process to accommodate the above arrangements.

**Submissions on these and any other matter relating to the Procedure discussed in this Information Paper are invited by 5.00 pm (AEST) Friday 12 August 2022.**

## 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                     |
| API          | application programming interface                   |
| ASL          | ancillary service load                              |
| ASU          | ancillary service unit                              |
| B2B          | business to business                                |
| B2M          | business to market (AEMO)                           |
| 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                 |
| FTP          | file transfer protocol                              |
| FRMP         | financially responsible market participant          |
| IESS         | integrating energy storage systems                  |
| IRP          | integrated resource provider                        |
| IRS          | integrated resource system                          |
| MSATS        | Metering Settlement and Transfer Solution           |
| MT PASA      | Medium Term Projected Assessment of System Adequacy |
| NEM          | National Electricity Market                         |
| NEMDE        | NEM Dispatch Engine                                 |
| NER          | National Electricity Rules                          |
| PAE          | Profiling and Allocation Engine                     |
| PASA         | Projected Assessment of System Adequacy             |
| PMS          | portfolio management system                         |
| RLC          | resource level conformance                          |
| RMC          | registration manager client                         |
| SCADA        | Supervisory Control and Data Acquisition            |
| SGA          | small generation aggregator                         |
| SGU          | small generating unit                               |
| SOC          | state of charge                                     |
| SRA          | Small resource aggregator                           |
| ST PASA      | Short Term Projected Assessment of System Adequacy  |
| VRE          | variable renewable energy                           |

## Appendix B. Issues for feedback

| Topic/Reference                                | AEMO's comment  | Stakeholder comment |
|--|---|---------------------|
| <b>Automated Processing (Section 3.2.2)</b>    | AEMO is considering the best way to communicate conformance for Aggregates. The model in the Dispatch Procedure describes our current thoughts but we expect the list will extend to disambiguate between aggregated and individual unit level monitoring   |                     |
| <b>Scheduled Loads (Section 3.3)</b>           | <p>AEMO is considering an enhancement to the automatic conformance monitoring to recognise the generation and load pair (e.g. battery – scheduled generating unit and scheduled load pair) as an interim arrangement. This will allow the generation and load pair to progress into the bidirectional unit model.</p> <p>The enhancement will also allow AEMO to automate the non-conformance notices for the battery scheduled load.</p> |                     |
| <b>Conformance Calculations (Appendix A.2)</b> | <p>When the error threshold is calculated for the generator and load pair (for the interim arrangement), the combined impact of the two units would be considered.</p> <p>e.g. MWO = sum of MaxAvails of the two units, ROC = minimum directional ROC of the two units.</p> <p>Details will be discussed at the Stakeholder Information session (26 July 2022)</p>  |                     |