



## Fact Sheet

## Aggregated Dispatch Conformance (ADC) in the NEM

As our electricity system transitions to a net zero system, energy storage and aggregate systems play an increasingly important role to firm up the expanding volume of renewable energy.

From 9 August 2023, participants in the NEM have had the option for scheduled resources (**Resources**) within a generating system or integrated resource system to participate in ADC as an Aggregate System.

This allows an Aggregate System the flexibility to conform to its dispatch instructions by dispatching energy at the connection point from any combination of its Resources (with some restrictions), rather than individually on a Resource-by-Resource basis.

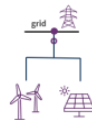
## What is an Aggregate System?

The AEMO Dispatch Procedure<sup>1</sup> defines three kinds of Aggregate Systems.

1. **Cap Aggregate:** An Aggregate System that comprises only semi-scheduled generating units.

### Example

Generating system comprising wind and solar generating units (both semi-scheduled).



2. **Target Aggregate:** An Aggregate System that comprises a scheduled generating unit and scheduled load pair for a single physical plant. This is a transitional arrangement. A battery energy storage system (**BESS**) will be deemed to be a Target Aggregate until it transitions from being a scheduled generating unit/scheduled load pair to a single bidirectional unit (**BDU**) under the IESS Rule.<sup>2</sup>

### Example

One battery (scheduled)



<sup>1</sup> Australian Energy Market Operator, SO\_OP 3705 Dispatch. Latest version available at power system operating procedures web page: <https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/power-system-operation/power-system-operating-procedures>

<sup>2</sup> The IESS Rule comprises:

- National Electricity Amendment (Integrating energy storage systems into the NEM) Rule 2021 No. 13.
- National Electricity Amendment (Implementing integrated energy storage systems) Rule 2023 No. 2.

3. **Mixed Aggregate:** An Aggregate System that comprises scheduled generating units or scheduled bidirectional units and which may also include semi-scheduled generating units or scheduled loads.

A Mixed Aggregate cannot comprise only:

- scheduled loads;
- semi-scheduled generating units (Cap Aggregate); or
- a single scheduled generating unit and scheduled load pair for a single physical plant (Target Aggregate).

### Example

Battery (scheduled) and solar generating unit (semi-scheduled).



Aggregate Systems exclude wholesale demand response units and scheduled network services.

## What is aggregated dispatch conformance?

ADC was introduced by the IESS Rule<sup>3</sup> and operationalised through the AEMO Dispatch Procedure. ADC allows the Resources in an Aggregate System to conform in aggregate with their dispatch instructions, excluding any Resource whose dispatch instruction requires the Resource to operate in accordance with its dispatch instruction (Resource level compliance, or **RLC**).

Accordingly, ADC provides the Aggregate System with the flexibility to manage its electricity flows behind the connection point.

For example, the Mixed Aggregate shown in the example above could:

- Use its BESS storage to firm up its semi-scheduled solar intermittent generation up to its dispatch target.
- Divert excess semi-scheduled solar generation above its dispatch target to charge the BESS if:
  - the forecast solar generation (upon which the dispatch target is based) is lower than its actual generation; or
  - the solar generation is otherwise constrained-off from exporting to the grid.

<sup>3</sup> AEMC, Integrating energy storage systems into the NEM, Rule determination, 2 December 2021, pp. 34 – 36.



## Limitations of ADC

ADC is subject to two main kinds of limitations:

- Network constraints: AEMO can require RLC instead of ADC in specified trading intervals in certain circumstances – for example, where RLC is required for stable power system operations.
- Frequency control ancillary service (FCAS) provision:
  - A Resource enabled for any regulation FCAS in a trading interval is subject to RLC in that trading interval.
  - A Resource enabled for contingency FCAS in a trading interval must be able to fulfil its contingency FCAS obligations for all enabled services – that is, the Resource can participate in ADC in that trading interval, but only to the extent that it:
    - operates within the FCAS trapeziums for which it is enabled; and
    - maintains sufficient headroom and foot room to deliver the energy and the enabled FCAS.

**Table 2: Scenarios for when ADC can and cannot be used**

CAN ADC BE USED WHEN...						
Aggregate type	... a Resource is enabled for FCAS regulation		... a Resource is providing contingency FCAS		... a network constraint is applied to a Resource in the aggregate	
Target	✓	Yes, the Resource is always conforming in aggregate	✓	Yes, provided the Resource is operating within trapezium	✓	Yes, the Resource is always conforming in aggregate
Mixed	✗	No, the Resource must achieve RLC and follow its individual automatic generation control (AGC) set point	✓	Yes, provided the Resource: <ul style="list-style-type: none"> <li>• operates within trapezium</li> <li>• has sufficient headroom and foot room to deliver the enabled FCAS</li> </ul>	✗	The constrained Resource must achieve RLC
	✓	Any remaining Resources (not enabled for regulation FCAS) in the aggregate may use ADC			✓	Any remaining unconstrained Resources in the aggregate may use ADC
Cap	✗	No, the Resource must achieve RLC and follow its individual AGC set point	✓	Yes, provided the Resource: <ul style="list-style-type: none"> <li>• operates within trapezium</li> <li>• has sufficient headroom and foot room to deliver the enabled FCAS</li> </ul>	✗	The constrained Resource must achieve RLC
	✓	Any remaining Resources (not enabled for regulation FCAS) in the aggregate may use ADC			✓	Any remaining unconstrained Resources in the aggregate may use ADC



## Frequently asked questions

### 1. Is ADC mandatory?

ADC is optional for a Cap Aggregate or a Mixed Aggregate. A participant will need to make its own assessment as to whether ADC is suitable for its generating system or integrated resource system.

### 2. I am interested in my new development participating in ADC. What is the process for applying?

The intent to participate in ADC needs to be considered within the connections process with the relevant Network Service Provider (**NSP**) and AEMO. The Aggregate System's ability to participate in ADC will be assessed within the normal connections process.

A new generating system/integrated resource system, or existing generating systems/integrated resource system which is adding a new Resource, may register for ADC as part of the registration process or afterwards, through a separate standalone process managed by AEMO.

### 3. I am interested in my existing development participating in ADC. What is the relevant process to follow?

A participant may need to undergo a formal NER 5.3.9 or NER Schedule 5.2.2 change process to participate in ADC, depending on the case-by-case assessment by the NSP and AEMO of the specific generating system or integrated resource system, as well as the extent of the required change.

### 4. Do the Resources which comprise an Aggregate System all need to be located at the same connection point?

Yes.

The Resources must all belong to the same generating system or integrated resource system.

However, the single connection may be satisfied under the NER, even in scenarios where there are multiple physical connection points, for example a generating system where its auxiliary load is supplied from a separate connection point.

### 5. Does each DUID within an Aggregate System need to be registered under the same Participant ID?

Generally, yes. A generating system or integrated resource system comprising multiple dispatchable units (**DUIDs**) are usually configured in AEMO's market systems under a single Station ID. AEMO's market systems only enable a single Participant ID to be associated with a Station ID. A participant's access to AEMO's market systems for operational purposes is on a Participant ID basis.



### 6. How are existing scheduled batteries treated?

AEMO will be using the ADC mechanism to monitor dispatch conformance for a BESS as a Target Aggregate across its scheduled generating unit/scheduled load DUID pair. This is an interim measure, pending the transition of the BESS from being classified as a scheduled generating unit and scheduled load pair to being a single BDU in mid to late 2024<sup>4</sup> – at which time, AEMO will monitor individual BDU dispatch conformance and discontinue monitoring of the Target Aggregate.

### 7. Does ADC replace the need for rebidding?

No. The compliance obligations regarding rebidding remain, including under NER 3.8.22 and 3.8.22A.

### 8. Will existing generators opting into ADC reduce the frequency of curtailments?

Possibly. For example, the need for curtailment could be reduced where variable renewable energy generators can divert excess electricity into local storage, rather than being curtailed due to network congestion.

### 9. How does the causer pays methodology accommodate aggregates on ADC?

Market Participants who register to have ADC for their group of DUIDs will have these DUIDs aggregated into a single entity for causer pays purposes. This arrangement applies regardless of the status of their unit conformance mode in dispatch for a specific trading interval. If at least one Resource in the Aggregate System is enabled for regulation FCAS, the causer pays system will treat all Resources within the Aggregate System as enabled for regulation FCAS.

Any Resources which are not registered to have ADC will continue to be assessed at the DUID level unless:

- they are aggregated under NER 3.8.3 bid aggregation; or
- AEMO considers it appropriate to assess DUIDs with more than one NER classification as a single Aggregated System (e.g. a BESS Target Aggregate).

Causer pays arrangements will be replaced by Frequency Performance Payments from 8 June 2025, as a consequence of the procedure and system changes arising from the Primary Frequency Response Incentive Arrangements rule. Under the final Frequency Contribution Factors Procedure, the Resources which participate in ADC will be assessed as a single eligible entity. This arrangement applies regardless of the status of their unit conformance mode in dispatch for a specific trading interval.

<sup>4</sup> AEMO's [IESS project implementation](#) sets out more information.



### 10. How does AEMO propose to treat an Aggregate System with grid following and grid forming inverters subject to system strength constraints?

AEMO does not propose to treat an Aggregate System with grid following or grid forming inverters differently for the purpose of ADC, except in circumstances where RLC is required. While each site will need to be assessed individually, a plant would only need to be subject to RLC if required, based on the technical characteristics of the plant's inverters/turbines.

### 11. If we have an integrated resource system with a solar farm and a grid-forming BESS and the connection point export capacity is the aggregate of the two, will the facility be treated as one entity for dispatch including system strength constraints?

It depends. The integrated resource system will be modelled as two DUIDs – a semi-scheduled generating unit for the solar DUID and a scheduled bidirectional DUID for the BESS. From a system strength perspective these DUIDs may be treated differently, depending on how the inverters/turbines react to the contingency and whether this reaction differs between each of the plant in the integrated resource system. The network topology at the time (outage or system normal) is another factor to be considered.

### 12. Once my generating system (or part of a generating system) is registered for ADC, when can I commence operating in ADC?

In AEMO's market systems, DUIDs are registered for ADC by linking those DUIDs to an Aggregate Dispatch Group (**ADG\_ID**).

If:

- New DUIDs within a generating system are also registered for ADC as part of the Generator registration process, the ADG\_ID effective date and DUID registration effective date will be the same.
- Existing DUIDs within a generating system are subsequently registered for ADC, you will advise AEMO of the future date from which you want to commence ADC operation (**ADG\_ID Effective Date**). AEMO will record the ADG\_ID Effective Date in its systems.

You only will be permitted to commence ADC operation on or after the ADG\_ID Effective Date.

If ADC operations commence prior to the ADG\_ID Effective Date:

- AEMO will not recognise the ADG\_ID; and
- There is a risk that AEMO will declare individual DUIDs as non-conforming.

Prior to an ADG\_ID change being implemented into market production systems, the ADG\_ID change will be implemented into market pre-production systems, to enable the Generator's development of integrations prior to the ADG\_ID Effective Date.

The arrangements above also apply to an Integrated Resource Provider that is registering an integrated resource system for ADC.



### 13. How do I confirm my registration details for ADC?

- Check that your DUIDs are registered to an ADG\_ID in the DUDETAIL table of the participant data model.
- Check the Conformance Type (ADG\_Type) and Effective Date of the ADG\_ID in the ADG\_DETAIL table of the participant data model.

### 14. What system changes do I need to implement?

The relevant NEM reports have been changed to accommodate ADC, including new and updated Participant Data Model (**PDM**) tables.

A participant with an ADG\_ID should subscribe to, and interface with, the latest DISPATCH\_CONFORMANCE NEM report and DISPATCH\_UNIT\_CONFORMANCE table in the PDM, to enable the participant to monitor the ADC of its ADG\_ID.

### 15. How do I subscribe to the DISPATCH\_CONFORMANCE NEM report and non-conformance market notices?

For help on subscribing, refer to [AEMO | Markets portal help > EMMS > Data Interchange > Data Subscription > Subscribe to Files](#).

### 16. What has changed in my dispatch instructions?

A new CONFORMANCE\_MODE field has been added to the DISPATCHLOAD table of the PDM:

- **CONFORMANCE\_MODE = 0 (Cap Aggregate only):** DUID is not capped either individually or in aggregate and can generate to the available energy.
- **CONFORMANCE\_MODE = 1:** DUID can use ADC with other DUIDs in the ADG\_ID with CONFORMANCE\_MODE = 1.
- **CONFORMANCE\_MODE = 2 (Cap or Mixed Aggregate):** DUID must achieve RLC to dispatch instructions.

### 17. What is Conformance Mode and how is it determined?

Conformance Mode specifies whether a Resource is currently under ADC or RLC conformance monitoring. AEMO's Dispatch Procedure provides further details of the circumstances under which RLC may be required.

### 18. How do I know if my unit is not conforming to dispatch instructions, either individually or in aggregate?

AEMO's DISPATCH\_CONFORMANCE NEM report will enable a participant to monitor ADC or RLC.



For dispatch conformance of an individual DUID (where  $DUID \neq ADG\_ID$ ), if the DUID's "Status" field is not one of ('NORMAL', 'SUSPENDED') then it is off target and may progress to being declared NON-CONFORMING.

For dispatch conformance of the ADG\_ID (where  $DUID = ADG\_ID$ ), if the DUID's "Status" field is not one of ('NORMAL', 'SUSPENDED') then the ADG\_ID is off target and may progress to being declared NON-CONFORMING in aggregate.

### 19. How do I know if RLC applies?

When RLC applies, the CONFORMANCE\_MODE field will have the value as 2.

### 20. How do I know if conformance is being assessed as all individuals or in aggregate?

There is an added CONFORMANCE\_MODE field in the dispatch instructions with values 0,1 or 2, which defines for a trading interval whether aggregated (=1) or individual (=2) dispatch conformance is required for a DUID in an ADG\_ID. For DUIDs with CONFORMANCE\_MODE = 0 (only applies for an ADG\_Type = 'CAP'), those DUIDs are not required to cap and can generate to the available energy.

### 21. How will the conformance of a BESS (as a Target Aggregate) be assessed while providing Regulation FCAS?

If a BESS is registered for regulation FCAS, the amount of regulation FCAS enabled in the relevant direction is added to the error threshold before assessing whether the BESS is OFF-TARGET. That is, BESS delivery of up to the full enabled regulation FCAS response (by following AGC setpoints from AEMO) will not under normal circumstances cause the BESS to be assessed by AEMO as off-target.

However, if a BESS ADG\_ID is consistently over-target (that is, above its energy target + FCAS Raise Reg enabled + error threshold) or consistently under-target (that is, below its energy target - FCAS Lower Reg enabled - error threshold), then the ADG\_ID will eventually be declared non-conforming.

While a BESS ADG\_ID can progress to 'non-conforming' status its individual scheduled generating unit and scheduled load DUIDs will not progress beyond 'off-target' status unless AEMO suspends the ADG\_ID from the conformance monitoring process. If this occurs, the individual DUIDs will be monitored for conformance.





### Where can I find more information?

<b>AEMC's IESS determination and rule</b>	<a href="https://www.aemc.gov.au/rule-changes/integrating-energy-storage-systems-nem">https://www.aemc.gov.au/rule-changes/integrating-energy-storage-systems-nem</a>
<b>AEMO's latest version of the Dispatch Procedure (SO-OP 3705)</b>	<a href="https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/power-system-operation/power-system-operating-procedures">https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/power-system-operation/power-system-operating-procedures</a>
<b>AEMO's IESS participant toolkit</b>	<a href="https://aemo.com.au/initiatives/major-programs/integrating-energy-storage-systems-project/integrating-energy-storage-systems-faqs">https://aemo.com.au/initiatives/major-programs/integrating-energy-storage-systems-project/integrating-energy-storage-systems-faqs</a>

For any further enquiries, please contact AEMO's Information and Support Hub via

- [Support.hub@aemo.com.au](mailto:Support.hub@aemo.com.au) or
- call 1300 236 600

This Fact Sheet is only a summary of the ADC arrangements. AEMO has taken all reasonable care in the preparation of this Fact Sheet. However, the information in this Fact Sheet should not be construed as advice. Applicants are responsible for ensuring they understand the relevant NER provisions and other applicable instruments, which prevail in the case of any inconsistency with this Fact Sheet.

To clarify ADC registration matters, please consult [AEMO's website](#) or contact us via [onboarding@aemo.com.au](mailto:onboarding@aemo.com.au)

For individual connection proposals that consider ADC, please consult the relevant NSP.