

IESS: Aggregated dispatch conformance

Industry test information for
Target Aggregates
Thu 15 June 2023



We acknowledge the Traditional Owners of country throughout Australia and recognise their continuing connection to land, waters and culture.

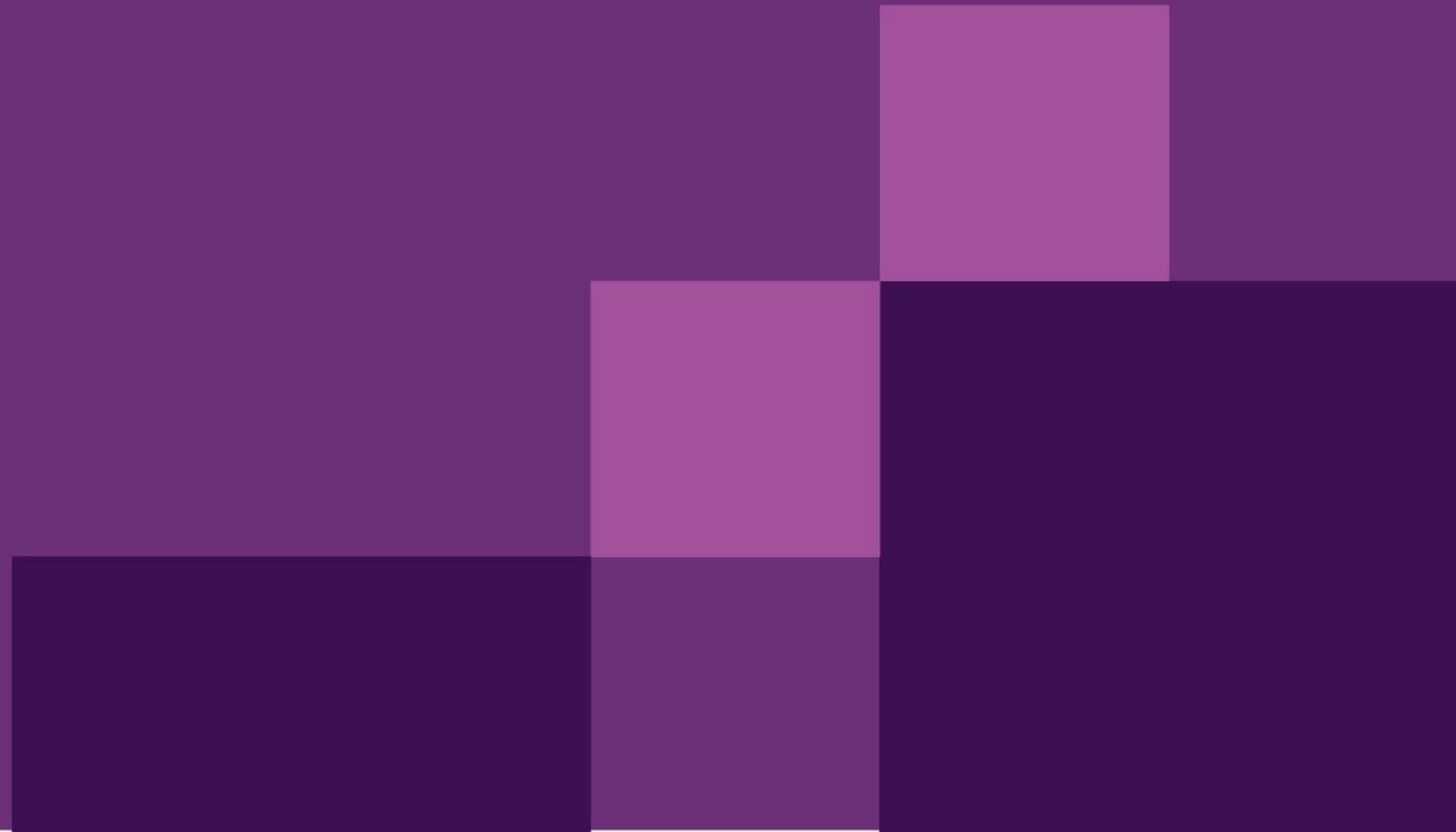
We pay respect to their Elders past, present and emerging.

Agenda

1. Welcome
2. Session aim & Context
3. Refresher on ADC and Target Aggregates
4. ADC conformance reports & industry testing
5. Readiness and Go-live

Please note that this meeting will be recorded by AEMO and may be accessed and used by AEMO for the purpose of compiling minutes. By attending the meeting, you consent to AEMO recording the meeting and using the record for this purpose. No other recording of the meeting is permitted.

2. Session aim & Context



Session purpose and objective

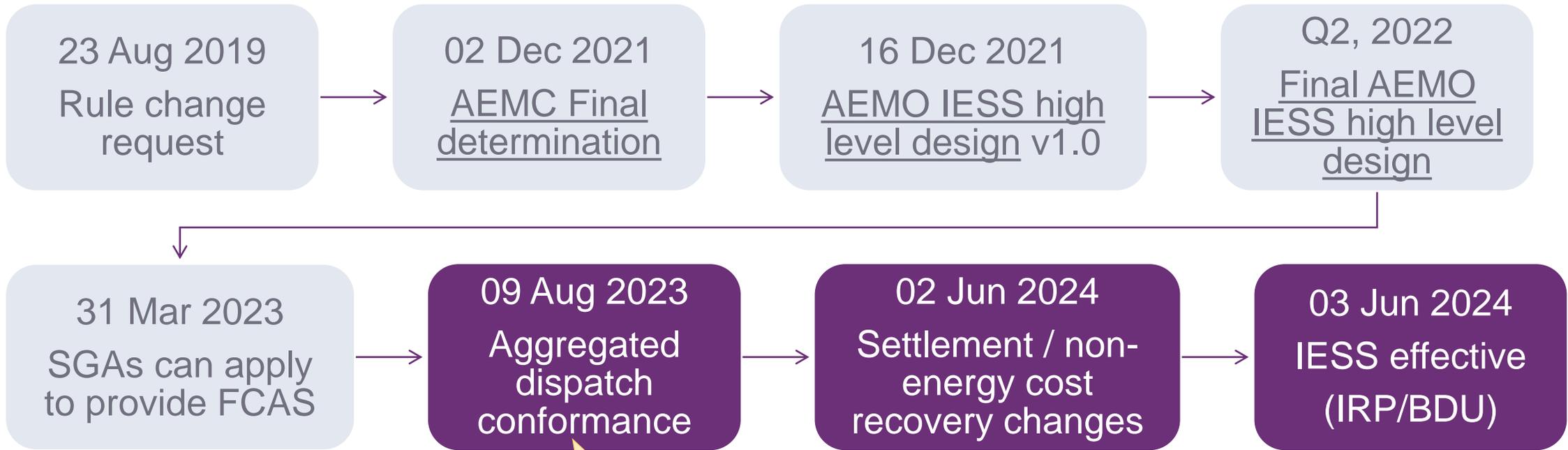
PURPOSE

- A session for impacted stakeholders to learn about the upcoming industry testing opportunities for aggregated dispatch conformance (ADC)

OBJECTIVE/S

- Explain the eligibility, scope and timing for ADC industry testing
- Confirm steps for participating in ADC industry testing.

BACKGROUND: IESS high-level Timeline

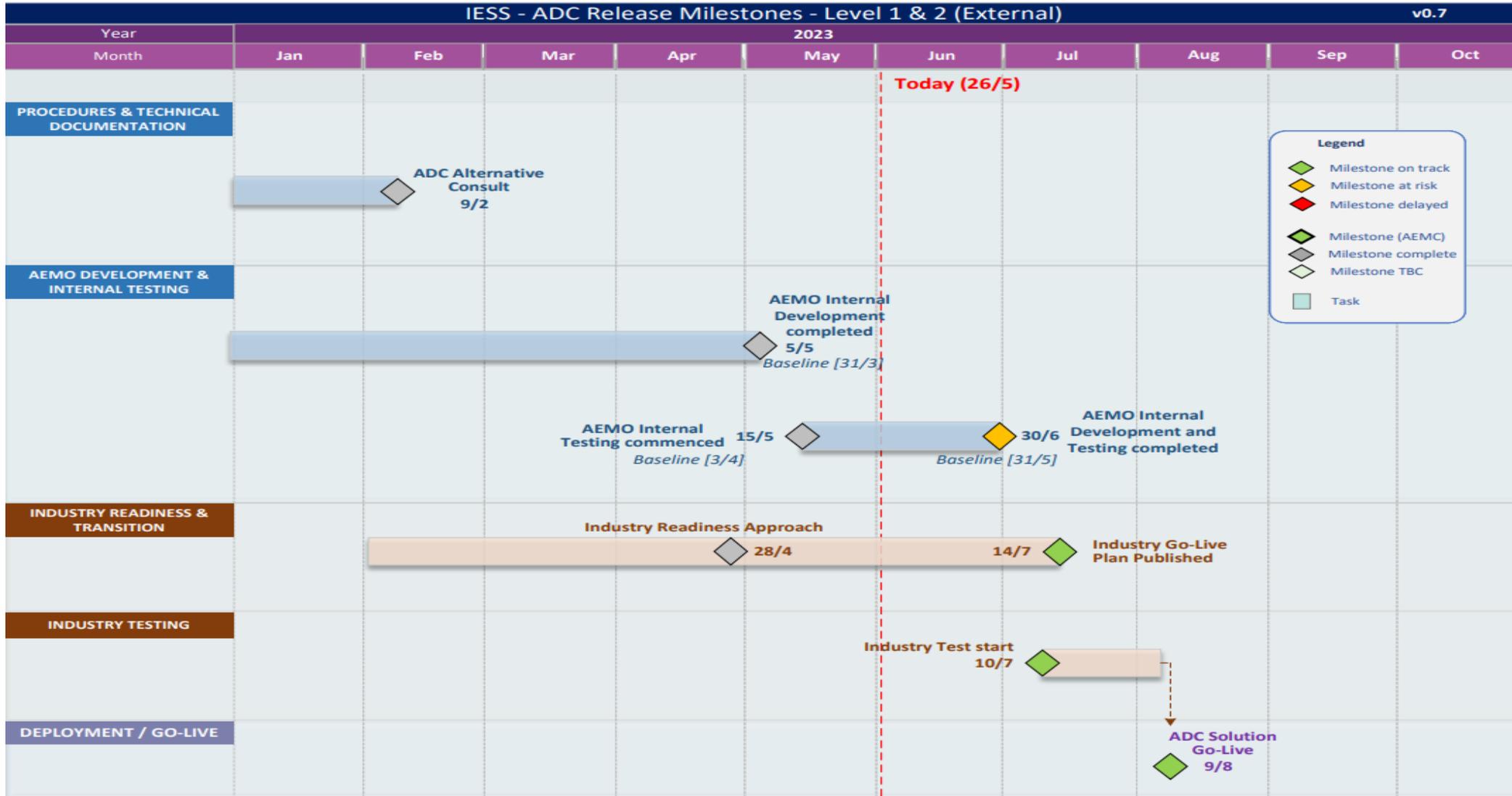


This session relates to ADC implementation

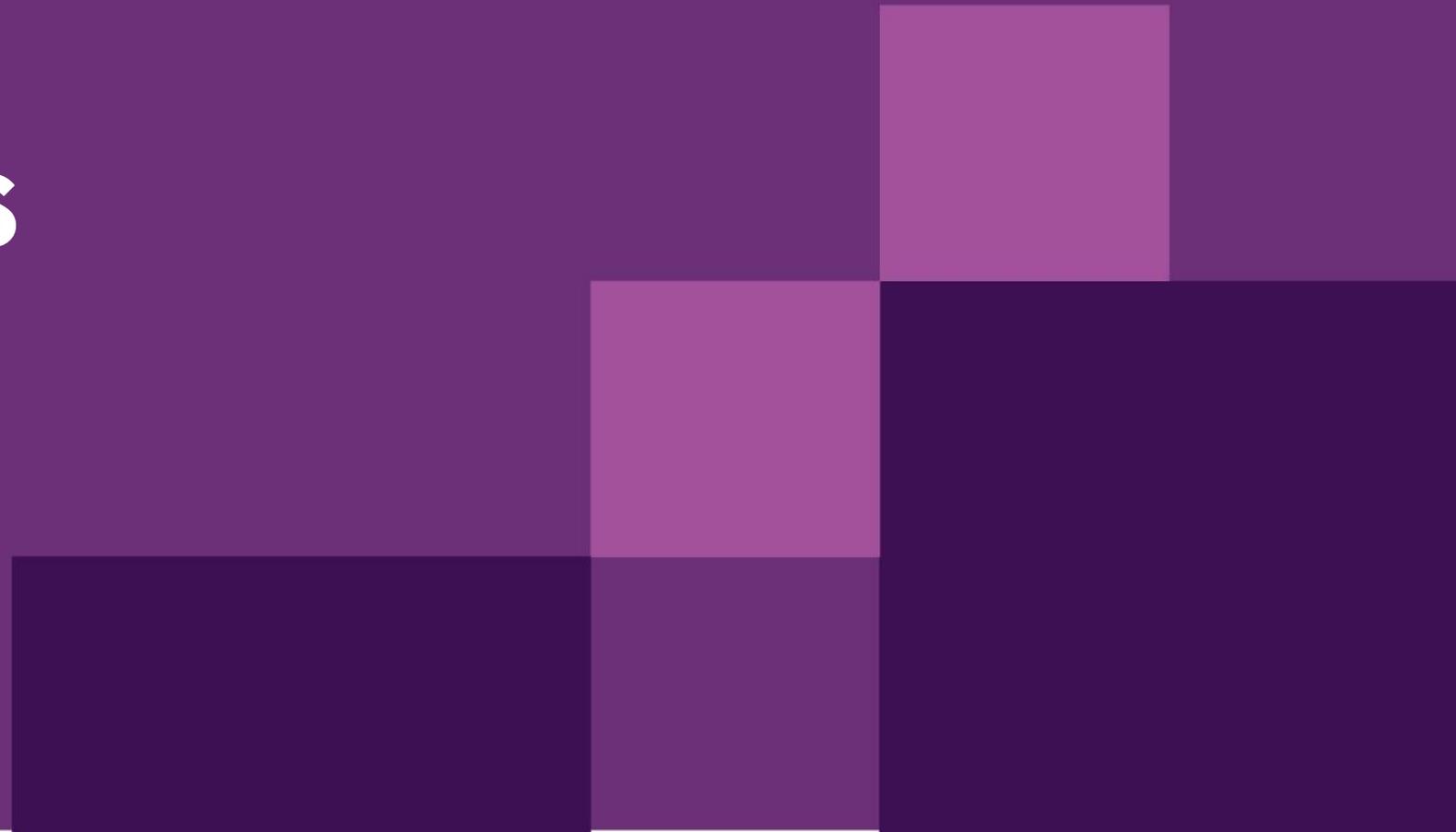
SGA	Small generation aggregator
FCAS	Frequency control ancillary service/s
IRP	Integrated resource provider
BDU	Bidirectional unit

- REFERENCES**
- [AEMC IESS rule change](#)
 - [AEMC Implementing IESS rule change](#)
 - [AEMO IESS High Level Design and Implementation Strawperson](#)
 - [AEMO IESS Participant Toolbox](#)

CONTEXT: IESS (ADC) milestones & progress



3. Refresher on ADC and Target Aggregates

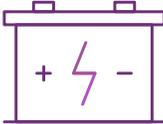
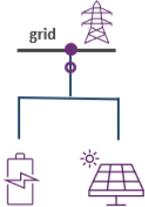
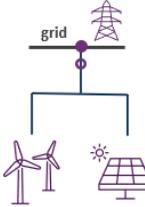


REFRESHER: Aggregated dispatch conformance

- ADC allows the units in an Aggregate System (aka Aggregate Dispatch Group or ADG_ID) to conform in aggregate with their dispatch instructions rather than conform individually
- ADC provides the Aggregate System with the flexibility to manage its electricity flows behind the connection point
- For more information and FAQs, please see the [ADC fact sheet](#).

Types of Aggregate Systems

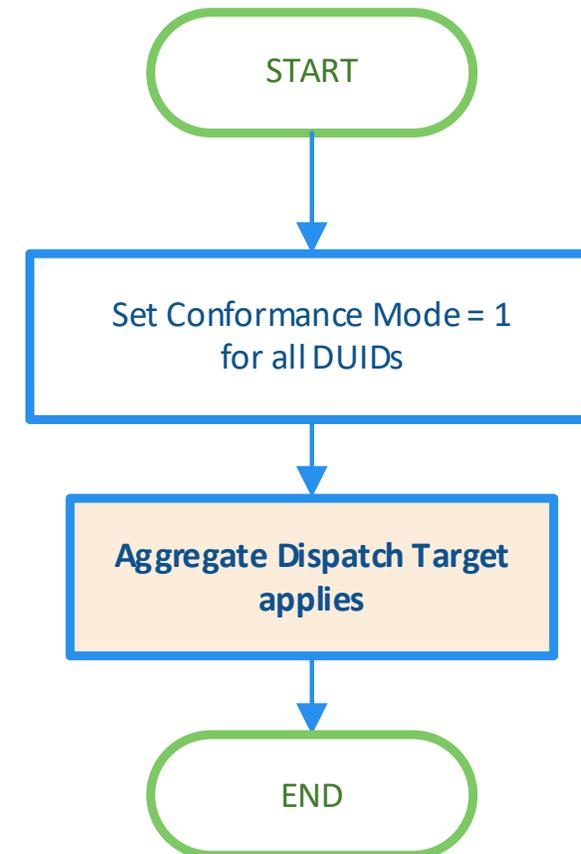


Conformance Type (ADG_Type)	Description	Example	
TARGET	<p>Scheduled generating unit/scheduled load pair pertaining to a single physical plant.</p> <p><i>Transitional arrangement for BESS until transition to single-DUID operation (on and from 3 Jun 2024)</i></p>	A scheduled battery or pumped hydro	
MIXED	Comprises scheduled generating units and which may also include semi-scheduled generating units or scheduled loads. Excludes battery-only aggregate	Battery (scheduled) and solar generating unit (semi-scheduled).	
CAP	Only comprises semi-scheduled generating units.	Generating system comprising wind and solar generating units (both semi-scheduled).	

Target aggregates: Transitional measure

- AEMO will be using the ADC mechanism to monitor net dispatch conformance for a BESS across its scheduled generating unit/scheduled load pair, as a Target Aggregate.
 - AEMO will ensure all existing BESS's have their generator and load DUIDs registered (in pre-prod and production) and associate these DUIDS to an ADG_ID
- This is an interim measure until BESS transition from being classified as a scheduled generating unit and scheduled load pair to being a single BDU in mid to late 2024.
- At this time, AEMO will monitor individual BDU dispatch conformance and discontinue monitoring of the Target Aggregate.

Setting the conformance mode



Transition of BESS into aggregated dispatch conformance

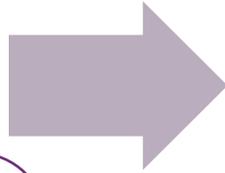
09 Aug 2023
ADC starts

All 2-DUID BDUs that are BESS will be linked to an Aggregate Dispatch Group (ADG), either:

- Automatically by AEMO, and assigned a Conformance Type = Target; or
- If requested by the participant, assign a Conformance Type = Mixed if the BDU is part of a generating system with other scheduled resources.

For Conformance Type = Target:

- Conformance Mode in dispatch instructions always = 1, and can be ignored



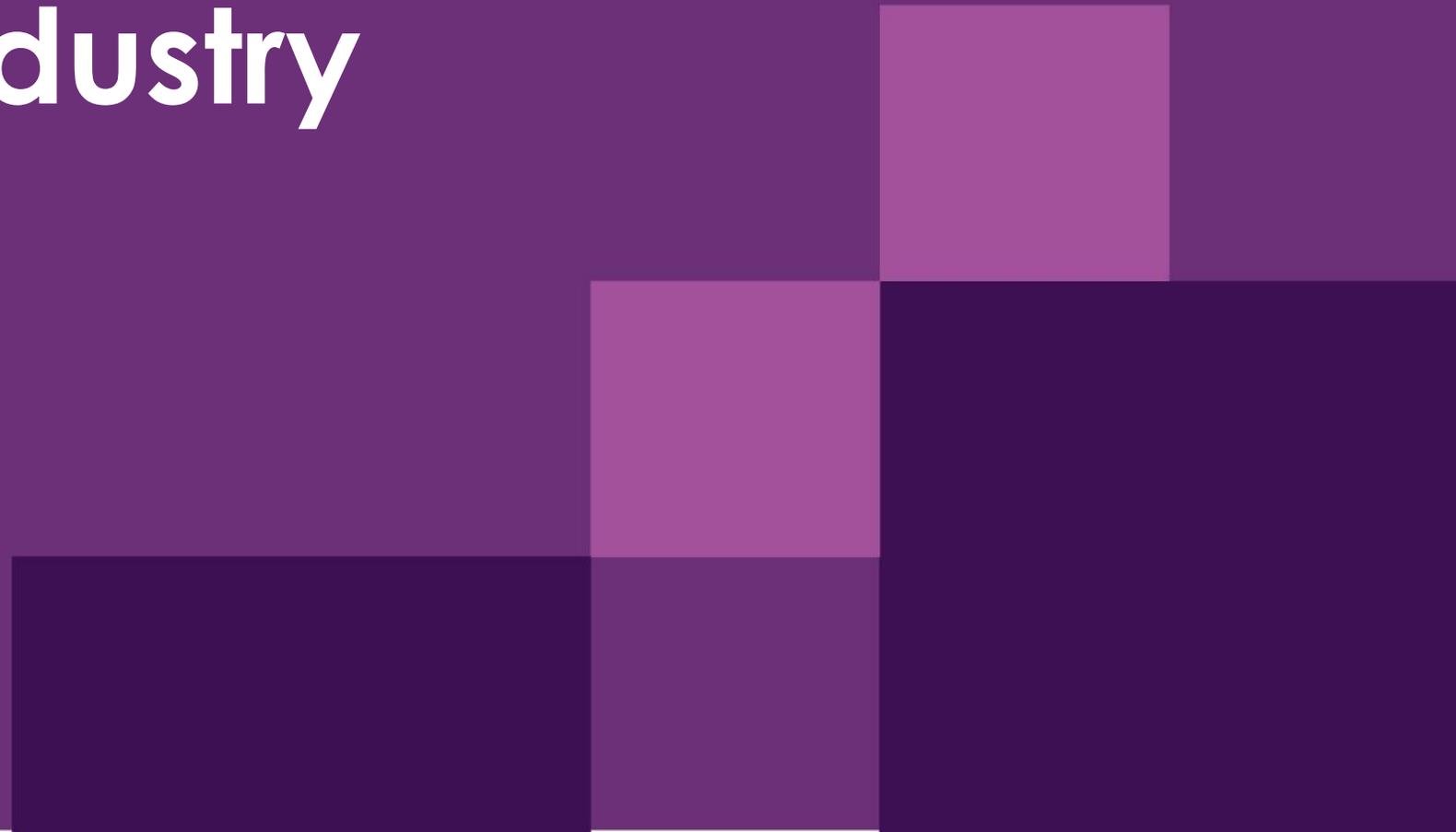
From 03 Jun 2024
Move to 1-DUID

- When a two-DUID BDU transitions to a single DUID, its ADG linkage will be removed if its Conformance Type = Target

For more information:

- [Dispatch procedure](#) – updated for ADC
- [ADC Fact Sheet](#)

4. ADC conformance reports & industry testing



ADC industry testing – July 2023

<p>WHO?</p>	<p>Stakeholders able to participate in the ADC industry testing period (July 2023) are:</p> <ul style="list-style-type: none"> • BESS operators, as all two-DUID BESS will be registered as Target Aggregates by AEMO from 09 Aug 2023. This temporary arrangement will be continued until a BESS is registered and participating in the NEM as a single DUID bidirectional unit (BDU), on and from 03 June 2024. • Two other non-BESS facilities that have currently have bespoke ADC-like arrangements <p>ADC opens for registrations on 09 Aug 2023. Participants who opt into ADC from this time will be granted access to AEMO’s pre-production to undertake their own testing.</p>	
<p>WHEN?</p>	<p>10 Jul to 08 Aug 2023</p>	<p>“Formal” ADC industry test period</p>
	<p>From 09 Aug 2023</p>	<ul style="list-style-type: none"> • ADC live in production • ADC opens for registration • BAU testing (and support) for ADC will remain available in pre-production for ADC-registered participants.
<p>WHAT?</p>	<p>Participants can:</p> <ul style="list-style-type: none"> • Prove updated systems and processes against AEMO’s updated market systems • Validate and confirm the instructions, reports and market notices received from AEMO, and understand and reconcile data. 	

Industry testing scope

#	ADC TEST ACTIVITY
1	ADC enhancements to registration and dispatch data models : <ul style="list-style-type: none"> → Verify that can receive and correctly interpret ADG registration report for your DUIDs → Verify that, at the individual DUID and aggregate (ADG_ID) level, can receive and correctly interpret the ADC updates to: <ul style="list-style-type: none"> • Dispatch instructions (PDM table: DISPATCHLOAD) • Unit solution from 5MPD (PDM table: P5MIN_UNITSOLUTION) • Unit solution from Pre-dispatch (PDM table: PREDISPATCHLOAD)
2	Verify ADC enhancements to NEM reports and market notices : <ul style="list-style-type: none"> → Subscribe to updated NEM reports: DISPATCHIS and DISPATCH_CONFORMANCE → Verify that can receive and correctly interpret the DISPATCH_CONFORMANCE reports at the individual DUID and ADG_ID level → Verify that can ingest and correctly interpret the new Aggregated Non-Conformance market notices with the updated ADC wording change

EMMS data model

IT change and release management information

<https://aemo.com.au/energy-systems/market-it-systems/it-change-and-release-management>

Participant Data Model changes – May 2023 (includes ADC and FFR)

<https://aemo.com.au/-/media/files/market-it-systems/emms/emms-technical-specification-data-model-v52.pdf?la=en>

Includes:

- Forward schedule of IT changes
- Outage and maintenance windows
- Market Systems User Group (MSUG) meetings
- Technical specifications

REGISTRATION Reports



NEM Reports/PDM tables – ADG Registration (1)

- **File ID:** AGGREGATE_DISPATCH_GROUP
(new, auto-subscribed)
- **PDM Tables:**
 - AGGREGATE_DISPATCH_GROUP (new)
 - ADG_DETAIL (new)
- **File ID:** (existing, can subscribe to update)
- **PDM Tables:**
 - DUDETAIL (updated)
 - DUDETAILSUMMARY (updated)
- BESS operators should be aware of their ADG_ID if using AEMO's DISPATCH_CONFORMANCE NEM reports to monitor aggregate dispatch conformance
- Proposed ADG_ID format is:
<STATIONID>appended by 1, increasing for each group with the same STATIONID
- For Lake Bonney BESS, DUIDs 'LBBG1', 'LBBL1' belong to StationID 'LBBESS', so its ADG_ID = 'LBBESS1'

PDM Table – ADG Registration (2)

AGGREGATE_DISPATCH_GROUP Table (new)

Field name	Data type	Primary key	Comment
ADG_ID	VARCHAR2(20)	Yes	Aggregate Dispatch Group ID
COMMENTS	VARCHAR2(100)	No	A participant provided comment
LASTCHANGED	DATE	No	Last date and time record changed

PDM Table – ADG Registration (3)

ADG_DETAIL Table (new)

- Child table to AGGREGATE_DISPATCH_GROUP
- Shows EffectiveDate of the ADG_ID

Field name	Data type	Primary key	Comment
ADG_ID	VARCHAR2(20)	Yes	Identifies the Aggregate Dispatch Group
EFFECTIVEDATE	DATE	Yes	Effective calendar date of record
VERSION_DATETIME	DATE	Yes	Date and time of the version of Dispatchable Unit details
ADG_TYPE	VARCHAR2(20)	No	Conformance Type for the Aggregate Dispatch Group. One of the following: 'CAP', 'MIXED', 'TARGET'
AUTHORISEDDATE	DATE	No	Date record authorised
AUTHORISEDBY	VARCHAR2(15)	No	User authorising record
LASTCHANGED	DATE	No	Last date and time record changed

PDM Tables – ADG Registration (4)

DUDETAIL, DUDETAILSUMMARY Tables

- Added ADG_ID field, which links two or more DUIDs to an ADG_ID

New columns

Field name	Data type	Primary key	Comment
ADG_ID	VARCHAR2(20)	No	Identifies the Aggregate Dispatch Group

DISPATCH INSTRUCTION REPORT



NEM Reports/PDM Table – Dispatch Instruction (1)

- **File ID:** DISPATCHIS (auto-subscribed)
- **PDM Table:** DISPATCHLOAD (updated)
- Added CONFORMANCE_MODE field, which defines for a trading interval whether aggregated (=1) or individual (=2) dispatch conformance is required for a DUID in an ADG_ID
- **For BESS, CONFORMANCE_MODE is always =1 for each DUID and can be ignored**

New columns

Field name	Data type	Primary key	Comment
CONFORMANCE_MODE	NUMBER(6,0)	No	Mode specific to units within an aggregate. 0 - no monitoring, 1 - aggregate monitoring, 2 - individual monitoring due to constraint

NEM Report – Dispatch Instruction (2)

- Sample file for a Mixed Aggregate

C NEMP.WORLD DISPATCHIS AEMO HYBRID1 21/10/2021 09:30:13							Energy targets to meet in aggregate (230 MW) across all DUIDs belonging to Aggregate System, subject to DUID 'SF1' capping to its individual energy target (100 MW) and DUID 'BESS1G' to meet its energy target (80MW) and be enabled for Regulation FCAS (10MW).				
I DISPATCH	CONSTRAINT	5	SETTLEMENTDATE	RUNNO	CONSTRAINTID	MARGINALVALUE	Participant will need to determine aggregate energy target as: Sum(Gen) - Sum(Load)				
D DISPATCH	CONSTRAINT	5	21/10/2021 09:35	1	#SF1_E	20					
I DISPATCH	UNIT_SOLUTION	2	SETTLEMENTDATE	RUNNO	DUID	CONNECTIONPOINTID	TOTALCLEARED	LOWERREG	RAISEREG	SEMIDISPATCHCAP	CONFORMANCE_MODE
D DISPATCH	UNIT_SOLUTION	2	21/10/2021 09:35	1	SF1	QSF1	100	0	0	1	2
D DISPATCH	UNIT_SOLUTION	2	21/10/2021 09:35	1	WF1	QWF1	50	0	0	0	1
D DISPATCH	UNIT_SOLUTION	2	21/10/2021 09:35	1	BESS1G	QBESS1	80	10	0	0	2
D DISPATCH	UNIT_SOLUTION	2	21/10/2021 09:35	1	BESS1L	QBESS1	0	0	0	0	1

DUID 'SF1' is in a binding network constraint '#SF1_E'

Energy targets to meet in aggregate (230 MW) across all DUIDs belonging to Aggregate System, subject to DUID 'SF1' capping to its individual energy target (100 MW) and DUID 'BESS1G' to meet its energy target (80MW) and be enabled for Regulation FCAS (10MW).

Participant will need to determine aggregate energy target as:
Sum(Gen) - Sum(Load)

SF1, WF1 are semi-scheduled gens
BESS1G is scheduled gen
BESS1L is scheduled load

DUID 'WF1' is enabled for Regulation FCAS

Aggregate System ignores the SEMIDISPATCHCAP flag and uses the new CONFORMANCE_MODE instead

Note the SEMIDISPATCHCAP flag = 1 for DUID 'SF1' because it is in a binding constraint '#SF1_E'

If CONFORMANCE_MODE = 1 then DUID can operate as part of an aggregate to meet the aggregated energy target

If CONFORMANCE_MODE = 2 then DUID must conform to its individual energy target. This is set because DUID 'SF1' alone is in a binding network constraint '#SF1_E' and DUID 'BESS1G' has Regulation FCAS enabled.

DISPATCH CONFORMANCE REPORT



NEM Reports/PDM Table – Dispatch Conformance (1)

- **File ID:** DISPATCH_CONFORMANCE
- **PDM Table:** DISPATCH_UNIT_CONFORMANCE
- Added ADG_ID, SEMIDISPATCHCAP and CONFORMANCE_MODE fields

New columns

Field name	Data type	Primary key	Comment
ADG_ID	VARCHAR2(20)	No	Aggregate Dispatch Group to which this dispatch unit belongs
SEMIDISPATCHCAP	NUMBER(3,0)	No	Boolean representation flagging if the Target is capped
CONFORMANCE_MODE	NUMBER(6,0)	No	For an individual unit in an aggregate dispatch group (where DUID <> ADG_ID), Mode specific to that unit. 0 - no monitoring, 1 - aggregate monitoring, 2 - individual monitoring due to constraint. For the aggregate dispatch group (where DUID = ADG_ID), 0 - no aggregate monitoring, 1 - aggregate monitoring

NEM Reports/PDM Table – Dispatch Conformance (2)

- **Sample file for a Target Aggregate**
- Aggregate-level dispatch conformance data appears under the DUID = ADG_ID record
- ADG_ID record appears in the Participant ID file of the alphabetically first DUID in the ADG_ID (if DUIDs registered to different with different ParticipantIDs – not relevant to BESS)

INTERVAL_DATETIME	DUID	ADG_ID	CONFORMANCE_MODE	TOTALCLEARED	ACTUALMW	ROC	AVAILABILITY	STRIGLM	LTRIGLM	MWERROR	LECOUNT	SECOUNT	STATUS	PARTICIPANT_STATUS_ACTION
02/06/2023 9:05	LBBESS1	LBBESS1	1	0	0.15	10	24	6	6	0.15	0	0	NORMAL	No action required
02/06/2023 9:05	LBBG1	LBBESS1	1	0	0.15	5	24	6	6	0.15	0	0	SUSPENDED	No action required. Unit is excluded from the conformance process at this time
02/06/2023 9:05	LBBL1	LBBESS1	1	0	0	5	24	6	6	0	0	0	SUSPENDED	No action required. Unit is excluded from the conformance process at this time

NEM Reports – Dispatch Conformance (3)

- Sample file for a Mixed Aggregate

													NEW REPORT FIELDS					
													ADG_ID	SEMIDISPATCHCAP	CONFORMANCE_MODE			
C	NEMP_WORLD	DISPATCH_CONFORMANCE	AEMO	HYBRID1	21/10/2021	17:45:10	359599397	DISPATCH_CONFORMANCE										
I	DISPATCH	UNIT_CONFORMANCE	1	INTERVAL_DATETIME	DUID	TOTALCleared	ACTUALMW	ROC	STATUS	PARTICIPANT_STATUS_ACTION	OPERATING_MODE	LASTCHANGED	ADG_ID	SEMIDISPATCHCAP	CONFORMANCE_MODE			
D	DISPATCH	UNIT_CONFORMANCE	1	21/10/2021 9:35	ADG_01	230	230	9	NORMAL	No action required. Aggregate is following aggregate dispatch target	AUTO	21/10/2021 17:45	ADG_01	0	1			
D	DISPATCH	UNIT_CONFORMANCE	1	21/10/2021 9:35	SF1	100	100	3	NORMAL	No action required.	AUTO	21/10/2021 17:45	ADG_01	1	1			
D	DISPATCH	UNIT_CONFORMANCE	1	21/10/2021 9:35	WF1	50	150	3	NORMAL	No action required.	AUTO	21/10/2021 17:45	ADG_01	0	1			
D	DISPATCH	UNIT_CONFORMANCE	1	21/10/2021 9:35	BESS1G	80	0	3	OFF-TARGET	No action required.	AUTO	21/10/2021 17:45	ADG_01	0	1			
D	DISPATCH	UNIT_CONFORMANCE	1	21/10/2021 9:35	BESS1L	0	20	3	OFF-TARGET	No action required.	AUTO	21/10/2021 17:45	ADG_01	0	1			
C	END OF REPORT																	

This is the aggregate conformance record for the ADG_ID

These are the DUIDs that belong to that ADG_ID

Conformance Type for the ADG_ID is one of: 'CAP', 'MIXED', 'TARGET'. This is called the ADG_TYPE in the registration table ADG_DETAIL.

Conformance is monitored differently for each ADG_TYPE. Refer to AEMO Dispatch Operating procedure SO_OP3705 for further details

For the ADG record:
(ADG_ID not null and DUID = ADG_ID)
SEMIDISPATCHCAP=0

ELSE

For each DUID record:
SEMIDISPATCHCAP from DISPATCH.UnitSolution

For info only - only CONFORMANCE_MODE is used for conformance monitoring

For the ADG record:
(ADG_ID not null and DUID = ADG_ID)
CONFORMANCE_MODE=1 if CompMan assesses ADC
CONFORMANCE_MODE=0 if CompMan does not assess ADC

For each DUID within ADG:
(ADG_ID not null and DUID <-> ADG_ID)
CONFORMANCE_MODE from DISPATCH.UnitSolution

ELSE (ADG_ID is null)
CONFORMANCE_MODE is NULL

Changes to DISPATCH_CONFORMANCE report status messages

- [Dispatch Procedure](#) has been updated, to include a minor change to Participant Action message text at the DUID and ADG_ID level when SUSPENDED
- Affects Participants who filter notifications by the text string instead of Status.

STATUS	CURRENT PARTICIPANT MESSAGE	NEW PARTICIPANT MESSAGE (from 09 Aug 23)
SUSPENDED	'No action required. Unit is excluded from the compliance process at this time'	'No action required. Unit is excluded from the conformance process at this time'
NC-PENDING	'Unit not responding to dispatch target. Non conformance action pending'	'Unit not responding to dispatch target. Non-conformance action pending'



AGGREGATE NON-CONFORMANCE Market Notice Report



Aggregate Non-Conformance Market Notice

- **File ID:** MARKETNOTICEDATA
- **PDM Table:** MARKETNOTICEDATA

Sample Notice

- DUIDs 'GEN1' & 'LOAD1' belong to StationID 'TARGET' in RegionID = 'SA1'
- ADG_ID = 'TARGET1'
- DUIDs 'GEN1' & 'LOAD1' linked to ADG_ID = 'TARGET1'
- Maximum net dispatch error during non-conformance period Amount = -20 MW
- Aggregate Non-Conformance Constraint Set 'NC-<RegionID>_<ADG_ID>' invoked, of form:

$$\text{GEN1 tgt} - \text{LOAD1 tgt} = \text{GEN1 act} - \text{LOAD1 act}$$

AEMO ELECTRICITY MARKET NOTICE

NON-CONFORMANCE SA1 Region Tuesday, 6 June 2023

AEMO declared the following DUIDs within the Aggregate Dispatch Group TARGET1 as non-conforming

Units: GEN1, LOAD1,

Duration: 06/06/2023 12:25 to 06/06/2023 18:25

Amount: -20 MW

Constraint: NC-S_TARGET1

Auto-generated on behalf of Manager NEM Real Time Operations

5. Readiness & Go Live

Go-live criteria

INITIATIVE	AGGREGATED DISPATCH CONFORMANCE (9 Aug 2023): Aggregate Systems can apply to opt-in to Aggregated Dispatch Conformance	
CRITERIA	DESCRIPTION	STATUS
Go-live criteria	<ul style="list-style-type: none"> AEMO solution tested in-line with requirements for: <ul style="list-style-type: none"> Enabling Aggregate Systems to register for and participate in ADC Conformance monitoring of Target Aggregates AEMO business ready to support ADC registration, dispatch and monitoring. 	<ul style="list-style-type: none"> SIT execution >95% passed. UAT execution in progress. Target completion Fri 30 Jun 2023. All business readiness preparations are completed or on target for completion by Fri 14 Jul 2023.
	Optional participation for Aggregate Systems i.e. participant readiness activity is not a pre-requisite for go-live.	n/a
CONTINGENCY	Defer registration for ADC until go-live criteria are met.	No current indication that contingency will be needed.

August 2023 release: ADC

DRAFT Industry test and go-live communications

#	AEMO actions	Industry impacts and actions	Planned Time (Market Time)	Communication Channel/s
1	<p>Prepare pre-production environment AEMO will implement changes to its Registration and Dispatch systems in the pre-production environment.</p>	n/a	Prior to Mon 10 Jul 2023	n/a
2	<p>Industry test period starts AEMO notifies Target Aggregates and existing Aggregate Systems that industry test period has opened.</p>	<ul style="list-style-type: none"> Target Aggregates and existing Aggregate Systems can choose to undertake ADC test activities. 	Mon 10 Jul 2023	Email to participants who have indicated to AEMO that they would like to participate in PreProd Testing
3	<p>Prepare production environment</p> <ul style="list-style-type: none"> AEMO will implement changes to its Registration and Dispatch systems in production. AEMO notifies existing Aggregates and BESS they will be placed on aggregate conformance and need to subscribe to new DISPATCH_CONFORMANCE reports to reconcile conformance status. 	<ul style="list-style-type: none"> Target Aggregates and existing Aggregate Systems prepare for ADC go-live. 	Prior to Wed 09 Aug 2023	<ul style="list-style-type: none"> Support Hub Notification Email to NEM Reform Implementation Forum members and impacted participants.
4	<p>ADC go-live</p> <ul style="list-style-type: none"> AEMO notifies Target Aggregates and existing Aggregate Systems that new ADC arrangements are operational AEMO notifies stakeholders when ADC registration opens 	<ul style="list-style-type: none"> Target Aggregates and existing Aggregate Systems are advised that the new ADC arrangements are operational. Stakeholders are advised that AEMO has opened ADC registration 	Wed 09 Aug 2023	<ul style="list-style-type: none"> Email to NEM Reform Implementation Forum members and impacted Participants. A notification will be posted on the IESS project website. “NEM Reform Announcement” e-newsletter to subscribers of newsletter
5	<p>Participant support AEMO to facilitate ADC industry Q&A session if there is sufficient demand from Participants</p>	Participants to advise AEMO if ADC Q&A required.	Aug/Sep 2023 (date TBC)	<ul style="list-style-type: none"> NEM Reform Implementation Forum ieess@aemo.com.au

Next steps

- To participate in ADC industry testing, please contact us via iess@aemo.com.au at any time
- AEMO will also provide email reminders about signing up for industry testing prior to 10 July 2023
- [Subscribe](#) to updated NEM reports: DISPATCH_CONFORMANCE to reconcile conformance status prior to 9 August.

ADDITIONAL RESOURCES

- [ADC fact sheet](#)
- [Dispatch procedure](#) – updated for ADC
- [IT change and release management information](#)
- [IESS Project webpages](#)



For more information visit

aemo.com.au

APPENDIX



IESS Glossary

Term	Definition
5MPD	5-minute pre-dispatch
ADC	Aggregated Dispatch Conformance
ADG_ID	Aggregate Dispatch Group identifier for an Aggregate System
AGC	Automatic generation control
ASL	Ancillary service load
ASU	Ancillary service unit
B2B	Business-to-business
B2M	Business-to-market
BDU	Bidirectional unit
BESS	Battery energy storage system
CR	Change request
CRMP	Cost recovery market participant
DRSP	Demand response service provider
DUID	Dispatchable unit identifier
FRMP	Financially responsible market participant
IESS	Integrating Energy Storage Systems rule
IRP	Integrated resource provider

Term	Definition
IRS	Integrated resource system
MSATS	Market settlements and transfer solutions
MSGA	Market small generation aggregator
MT PASA	Medium-term PASA
NCC	NMI classification code
NECR	Non-energy cost recovery
NEM	National electricity market
NEMDE	National electricity market dispatch engine
NMI	National metering identifier
PAE	Profiling and allocation engine
PASA	Projected assessment of system adequacy
PD	Pre-dispatch
PDM	Participant Data Model
PMS	Portfolio management system
SCADA	Supervisory control & data acquisition
SoC	State of charge
UFE	Unaccounted for energy
WDRU	Wholesale demand response unit