

# Intermittent Generator Session

29 July 2022

*AEMO will record this session for minuting purposes. Attendees do not have permission to record.*



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.**

# Our facilitators

## AEMO

Alicia Webb

Mike Davidson

Jack Fox

Petar Pantic

Emily Brodie

## Bureau of Meteorology

David McQueen



# Welcome and Introduction

Mike Davidson

Manager Operational Forecasting

# Session objectives

- **Inform stakeholders** on:
  - Updates and system enhancements made since the last intermittent generation forum held in December 2021.
  - Planned updates regarding intermittent generation forecasting.
- **Seek stakeholders' feedback** on prospective data model changes.
- **Inform stakeholders** of other upcoming items which relate to or may be of interest to intermittent generators.

# Agenda

Time (AEST)	Duration (min)	Item	Presenter
10:05 – 10:10	5	Welcome and Introduction	Mike Davidson
10:10 – 10:30	20	Changes and updates since previous forum (Dec 2021)	Petar Pantic Jack Fox
10:30 – 10:45	15	Planned updates	Jack Fox
10:45 – 11:05	20	Other business	Emily Brodie Petar Pantic David McQueen (BOM)
11:05 – 11:30	25	Further questions and discussion	

***Please note:*** AEMO will record this session for minuting purposes. Attendees do not have permission to record.

# Changes and updates since previous forum (Dec 2021)

Petar Pantic

Jack Fox

# Self-Forecasting (SF) – Update to assessment procedure

- AEMO proposed to reduce the minimum dispatch interval (DI) requirement from 80% to 60% for the performance assessment component.
- AEMO did not receive any concerns regarding this proposal and thus, proceeded with the update on/from 25 January 2022. This has consequently been reflected in the SF Assessment Procedure\*.
- The update has reduced delays in semi-scheduled generators receiving accreditation and has improved dispatch outcomes in the NEM.

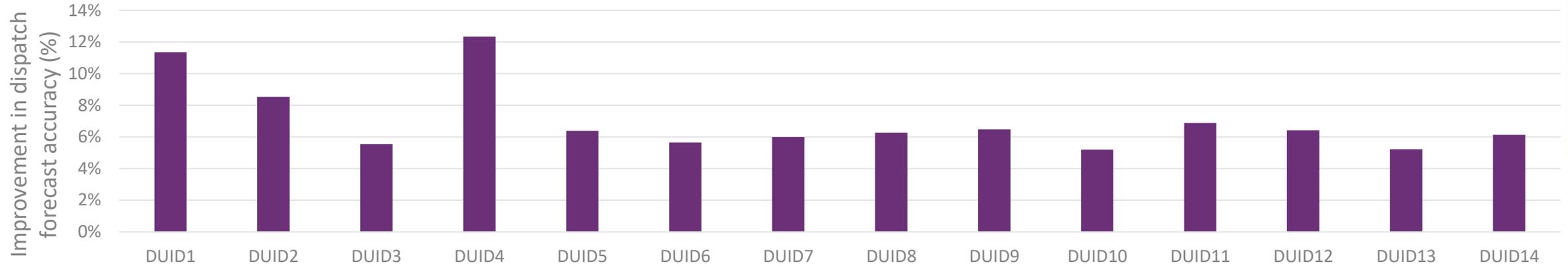
\*[https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security\\_and\\_Reliability/Dispatch/Policy\\_and\\_Process/Semi-Scheduled-Generation-Dispatch-Self-Forecast---Assessment-Procedure.pdf](https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Dispatch/Policy_and_Process/Semi-Scheduled-Generation-Dispatch-Self-Forecast---Assessment-Procedure.pdf)

# Self-Forecasting – Update to gate-closure time

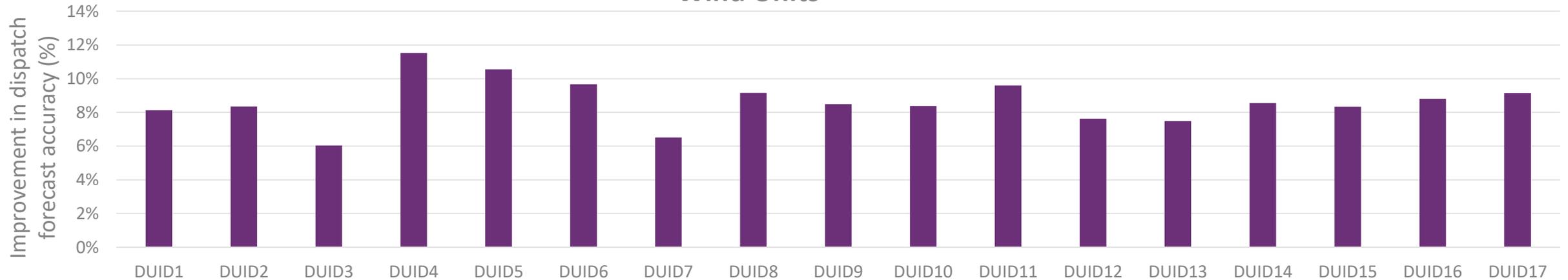
- As of 24 Nov 2021, AEMO further reduced the self-forecasting submission gate-closure time to 15s to allow more recent data and observations to be incorporated in dispatch self-forecasts.
- This has resulted in improvements in:
  - Dispatch self-forecast accuracy
  - Frequency deviations
  - Regulation requirements

# Self-Forecasting – Update to gate-closure time from 70s to 15s

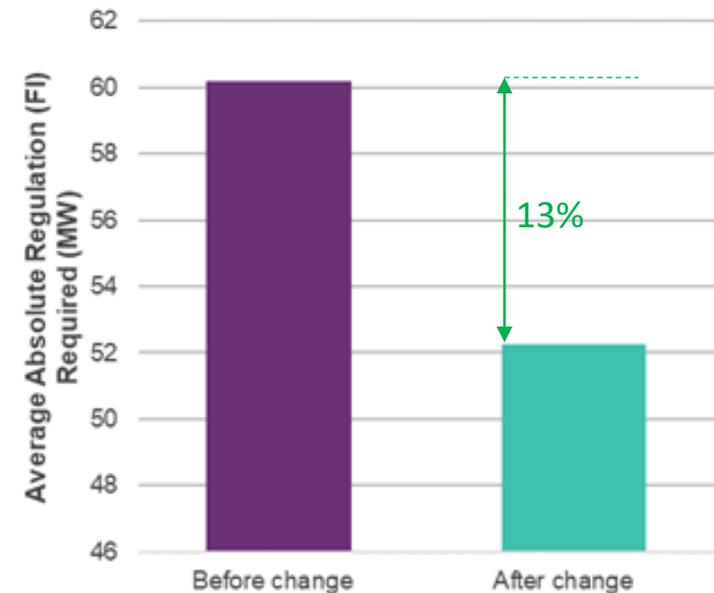
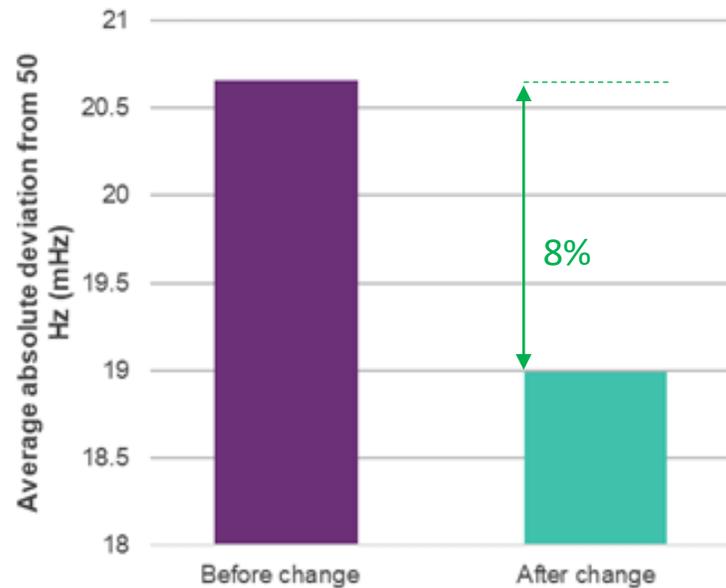
## Solar Units



## Wind Units



# Self-Forecasting – Update to gate-closure time



- It is difficult to ascertain the individual impact as there are other improvements AEMO is implementing, however, comparing to before the update was made, it is clear that the change in gate-closure has significantly contributed to this improvement.
- Also noting there are other factors such as natural perturbations, seasonality changes, generator behaviour, which contribute to deviations of frequency and regulation requirements.

Quarterly reporting of frequency and time error performance in the NEM can be found via:

<https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/system-operations/ancillary-services/frequency-and-time-deviation-monitoring>

# Self-Forecasting – Submission throttling limits

- On 29 June 2022, AEMO moved to a new API platform which resulted in new self-forecast submission throttling limits on an individual and overall participant basis.
- AEMO has recently increased these limits - current limit is as follows:

Submission throttling limit type	Current (updated) limit
Per participant	40/min
Overall limit	1200/min

- Note: high frequency submissions (eg. once every 10s) provide minimal value outside the short lead up window to the dispatch gate-closure (t-15s).
- Participants are encouraged to switch to a lower submission frequency outside this window if possible to reduce unnecessary load on AEMO's systems.

# Updates to participant file server interface for submitting plant availability

- In December 2021, AEMO implemented a JSON-based web API interface to replace the existing aseXML file submission interface for submitting intermittent generation availability (Upper MW Limit, Turbines/Inverters Available).
- On 31 May 2022, AEMO decommissioned the aseXML file submission method thus, participants can now only submit availability via the web API interface or EMMS Markets Portal.
- Further information on submitting availability can be found in the Guide to Intermittent Generation documentation\*.

\*<https://www.aemo.com.au/-/media/files/market-it-systems/guide-to-intermittent-generation.pdf>

# Enabling ‘MaxAvail’ function for semi-scheduled generators

- In Dec 2021, AEMO provided a proposal on how bid MaxAvail should apply to semi-scheduled generators’ availability:

Period ID	Period	Max Avail	PASA Avail	Fixed Load	Ramp Up	Ramp Down	Avail 1 \$-932.77	Avail 2 \$-890.36	Avail 3 \$-48.18	Avail 4 \$-38.35	Avail 5 \$-28.51	Avail 6 \$0.00	Avail 7 \$287.70	Avail 8 \$948.93	Avail 9 \$11987.65	Avail 10 \$14084.73
1	04:05	101	101		20	20	102	0	0	0	0	0	0	0	0	0

- The ‘Availability’ used by NEMDE to be the lower of the forecast (UIGF) and bid Max Avail.
  - When Max Avail < UIGF, Semi-Dispatch Cap will be set.
  - Publish a new field ‘UIGF’ in the Dispatch.UnitSolution table, as well as in 5min Pre-dispatch (PD) and 30min PD tables.
- No concerns were raised and AEMO is therefore planning to make the above changes, which will involve changes to NEMDE.

# Enabling 'MaxAvail' function for semi-scheduled generators

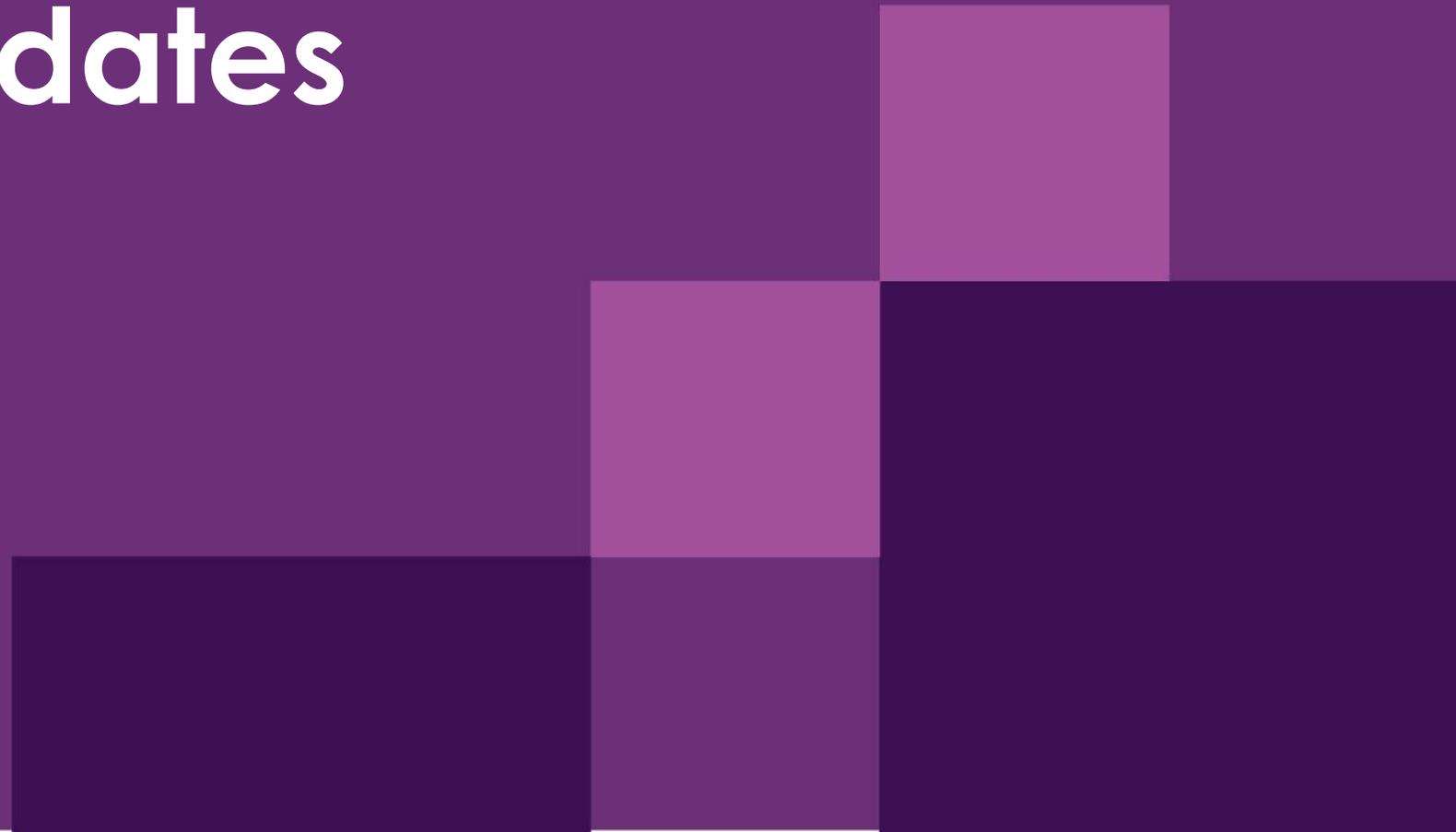
- Further scoping was conducted which also identified changes to PASA processes (dispatch PASA, PD PASA, Short-Term (ST) PASA).
- AEMO is proposing the 'AggregateCapacityAvailable' field in the PDPASA and STPASAs RegionSolution tables reflect the semi-scheduled capacity available component as  $\min(\text{UIGF50}, \text{bid MaxAvail})$ .
- Project scoping is expected to be finalised in due course with implementation scheduled in 2023. AEMO will notify participants and stakeholders of timing once confirmed.

Please provide any feedback via [op.forecasting@aemo.com.au](mailto:op.forecasting@aemo.com.au) by COB Fri 12 August 2022.



# Planned updates

Jack Fox

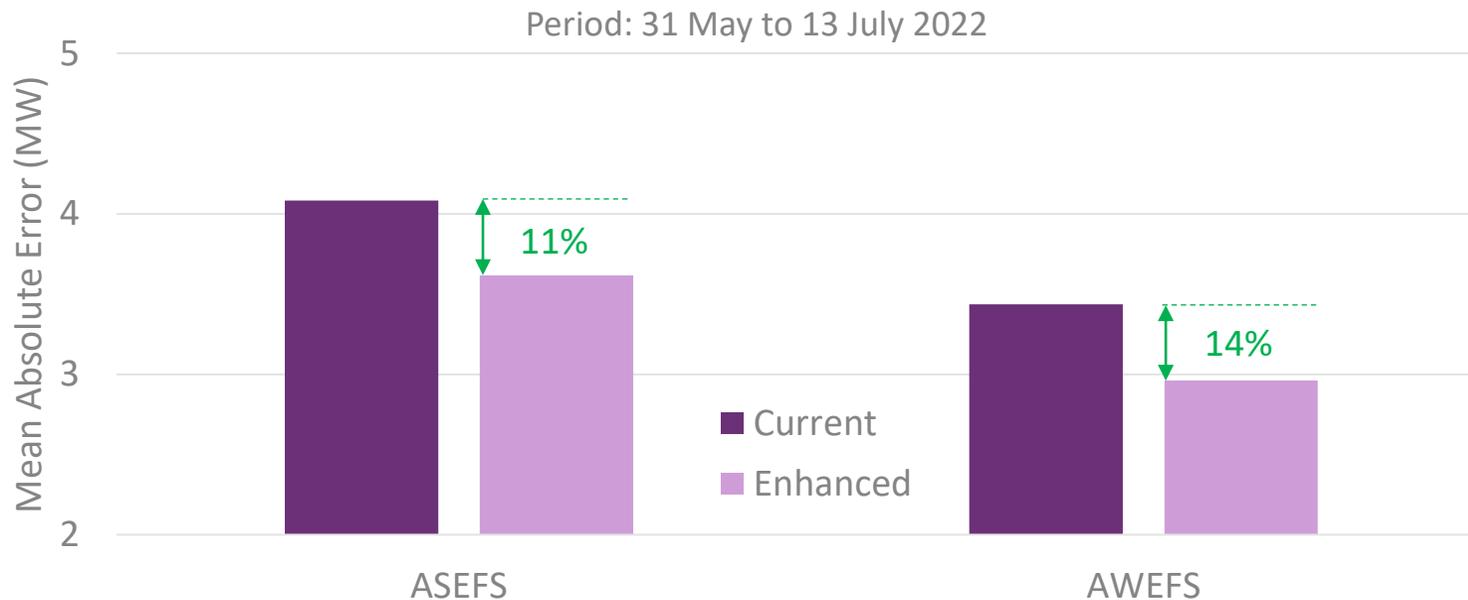


# Update to AWEFS/ASEFS dispatch forecast model

- The AWEFS/ASEFS forecasting system is currently maintained and updated by a vendor, in conjunction with AEMO.
- AEMO is currently transitioning from this vendor-based approach to adopting its own in-house forecasting system and methodology as part of the uplift in AWEFS/ASEFS forecast models.
- The first stage of this transition is the redevelopment and implementation of an enhanced AWEFS/ASEFS dispatch forecast model.

# Update to AWEFS/ASEFS dispatch forecast model

- Preliminary results show the enhanced AWEFS/ASEFS dispatch forecast model outperforming the existing dispatch model:



- AEMO’s current plan is for implementation by CAL Q4 2022, and participants will be notified via an IT change notification and email\* once implementation is scheduled.

\*Please email [op.forecasting@aemo.com.au](mailto:op.forecasting@aemo.com.au) to be added to the Operational Forecasting mailing list.

# Other Business

Emily Brodie

Petar Pantic

David McQueen (BOM)

# Integrating energy storage systems into the NEM



# NEM2025 Implementation Roadmap & the Reform Delivery Committee

- NEM2025 Implementation Roadmap aims to:
  - Implement ESB reforms in a timely and efficient manner
  - Co-ordinate regulatory and IT change
  - Provide transparency to stakeholders on the implementation program.
- RDC facilitates cross-industry collaboration to develop the Roadmap
- RDC comprises sector representatives for:
  - NEM market bodies
  - NEM participants
  - Consumers
  - Renewable energy
  - Demand management
  - Energy efficiency

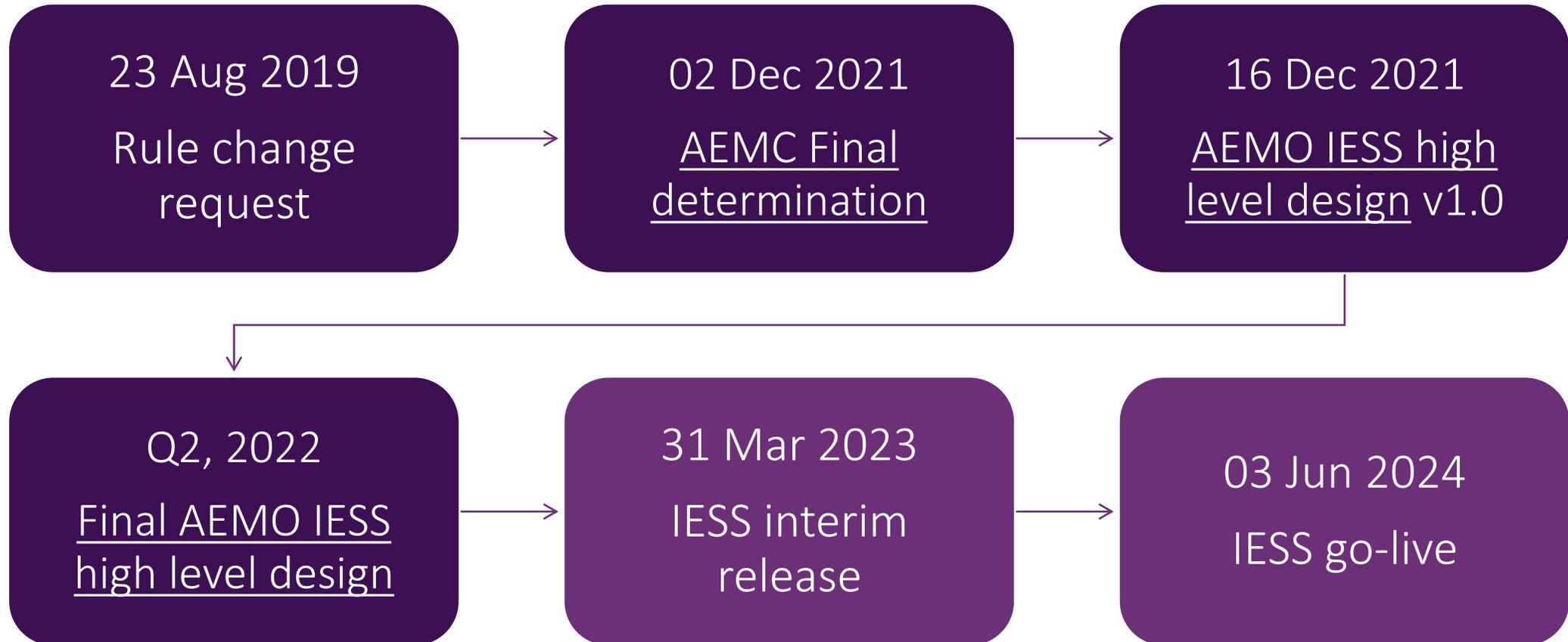
*Scope of NEM2025 Implementation Roadmap (Version 1)*

Pathway	Reform Initiative
Resource Adequacy Mechanism	<ul style="list-style-type: none"> <li>• Increased MT PASA Information</li> </ul>
Essential System Services	<ul style="list-style-type: none"> <li>• Fast Frequency Response</li> <li>• Mandatory Primary Frequency Response</li> <li>• Operating Reserve Market</li> <li>• System Strength (Planning)*</li> <li>• Structured Procurement &amp; Scheduling Mechanism</li> </ul>
Integration of DER & Flexible Demand	<ul style="list-style-type: none"> <li>• <b>Integrating Energy Storage</b></li> <li>• Flexible Trading Arrangements (Model 2)</li> <li>• Scheduled Lite</li> <li>• Dynamic Operating Envelopes</li> <li>• Distribution Local Network Services</li> <li>• Turn-up Services</li> <li>• DER Platform Registry Services</li> <li>• Market &amp; System Operator Integration</li> </ul>
Transmission & Access	N/A at this time
Data Strategy	<ul style="list-style-type: none"> <li>• Data Services</li> <li>• EV Charging Standing Data Register</li> <li>• Bill Transparency</li> <li>• Network Transparency</li> </ul>

To learn more, visit: <https://aemo.com.au/consultations/industry-forums-and-working-groups/list-of-industry-forums-and-working-groups/reform-delivery-committee>

\*Led by transmission network service providers

# IESS rule change



# IESS Rule Overview

## Registration

**Integrated Resource Provider (IRP)** is a new category for use by participants with storage and hybrid systems

**Bidirectional Units** for resources that can consume and produce energy (other than generator auxiliary load)

Market Small Generation Aggregators will transfer to IRP with **Small Resource Aggregator** label.

Market Small Generation Aggregators will be able to **provide market ancillary services**

## Participation and Scheduling

Outlines scheduling obligations for **hybrid systems** (including DC coupled systems)

Scheduling arrangements for **bidirectional units** include:

- single DUID
- 20 bid bands for energy
- 10 bid bands for each FCAS service

Introduces assessment of **dispatch conformance** in aggregate.

*\* In some dispatch intervals, particular units may be required to conform individually*

## Settlement

**Non energy cost recovery framework** updated so that payments apply equally to all Cost Recovery Market Participants, removing existing differences due to registration category

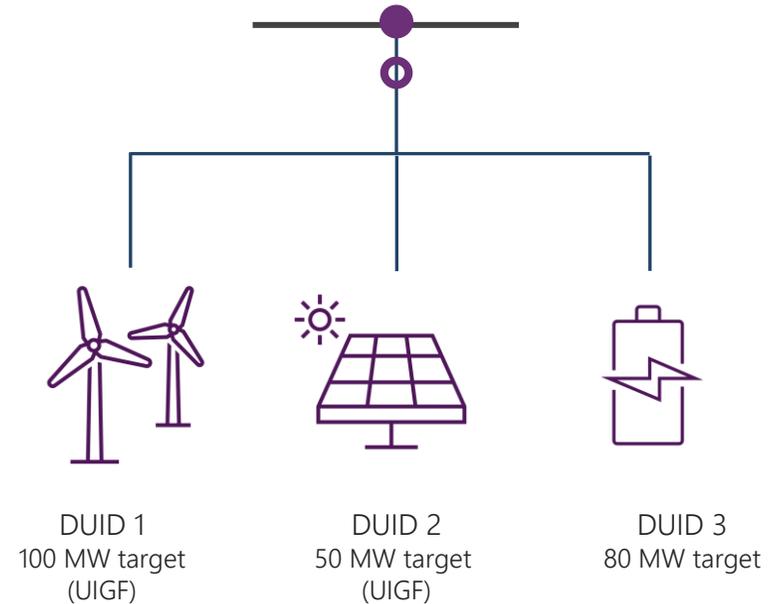
Recovery will be based on a participant's share of gross consumed energy and/or gross sent out energy in an interval across its connection points (netting of production and consumption removed)

Transitional rules apply from 31 March 2023

# IESS rule introduces aggregated dispatch conformance

## For example:

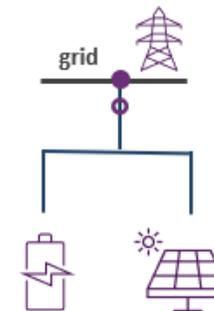
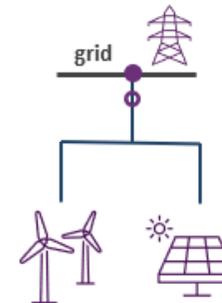
- Individual conformance requires that each DUID meet its individual target (100 MW, 50 MW, 80 MW)
  - Semi scheduled units may exceed or underperform target as dictated by resource availability
- Aggregate conformance requires that the aggregate target, 230 MW in this case, is met.
  - Target is firm and can be delivered from any combination of DUID outcomes



# Aggregated dispatch conformance

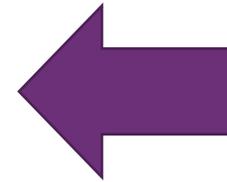
*ADC is optional. There is complexity if units also provide FCAS.*

ADC type	
<b>Cap aggregate</b>	Generating system behind a connection point with semi-scheduled generating units only
<b>Target aggregate</b>	Generating system behind a connection point with one or more scheduled generating units (which includes a scheduled battery)

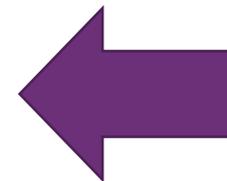


# Open consultations

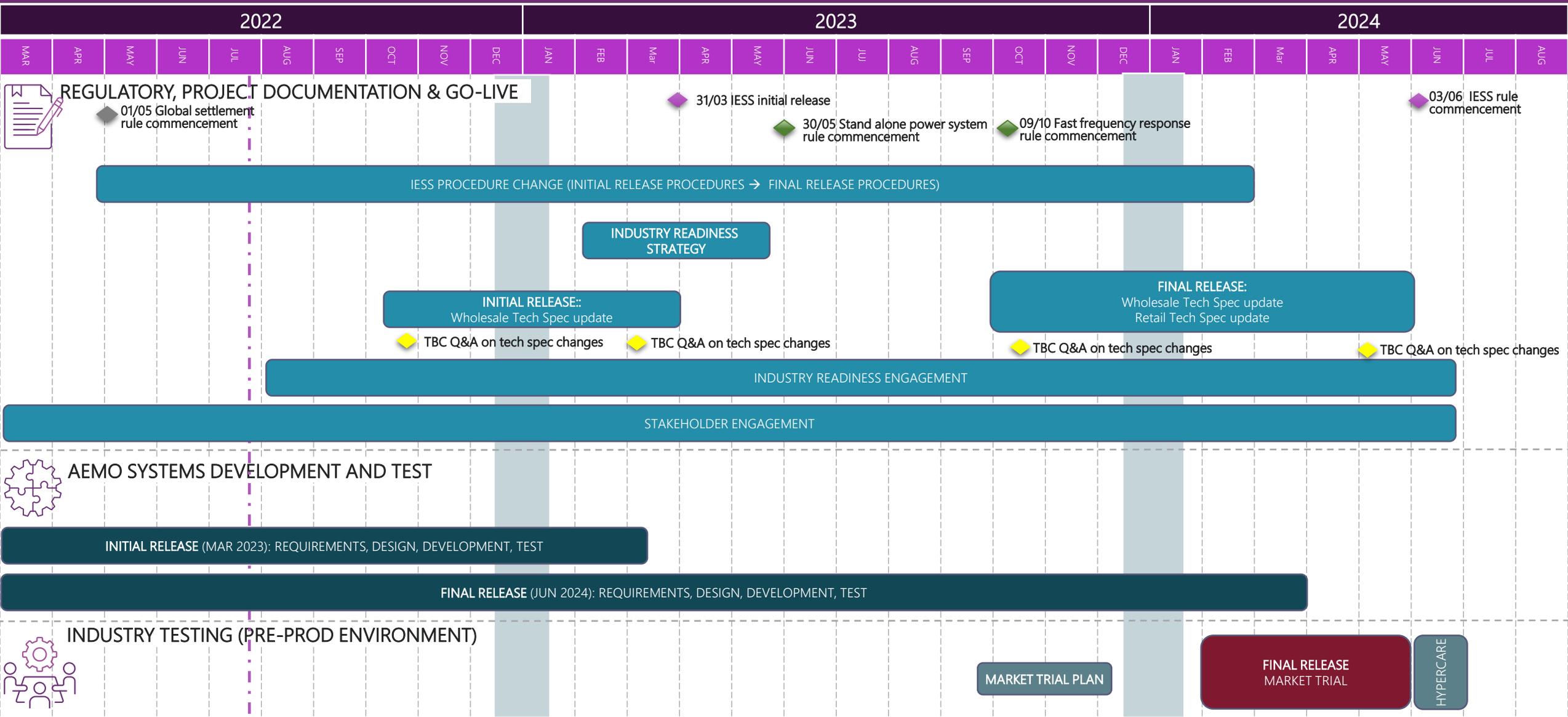
<b>Draft Implementation Strawperson</b>	<b>TIMING</b>
Publication of <a href="#">draft Implementation Strawperson</a> and <a href="#">final High Level Design</a>	7 July 2022
Written stakeholder feedback on <a href="#">draft Implementation Strawperson</a>	12 Aug 2022
Publication of final Implementation Strawperson	1 Sep 2022



<b>SO_OP_3705 Dispatch Procedure</b>	<b>TIMING</b>
Publication of <a href="#">draft Dispatch Procedure information paper</a>	21 July 2022
Stakeholder information session on information paper	26 July 2022
Written stakeholder feedback on draft information paper	12 Aug 2022
Publication of final Dispatch Procedure	1 Sep 2022



# IESS – Indicative Industry Timeline



- IESS Confirmed
- IESS Indicative
- Concurrent initiatives
- Completed activities
- Summer holiday periods: Avoid industry IESS activities where possible
- Market trial:** Feb-24 configure environment; Mar-24 1<sup>st</sup> test cycle; Apr-24 2<sup>nd</sup> test cycle; May-24 remediation

# IESS project contact



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



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

# Weather monitoring capability project

A joint AEMO and Bureau of Meteorology (BOM) project to support renewable energy zones (REZs).



**Australian Government**  
**Bureau of Meteorology**



# AEMO-BOM: Weather monitoring capability project

- In the initial NEM Engineering Framework roadmap<sup>i</sup>, a list of potential gaps were identified in collaboration with stakeholders.
- Two gaps (ID117, ID372) were identified under the ‘Operability’ focus area for monitoring and control room situational awareness purposes.
- These gaps have been developed into the following priority action for 2022-23<sup>ii</sup>:

Action ID	Target end-state objective for action	AEMO commitment for financial year 2022-2023	Action status and implementation pathway	Related gap IDs from Initial Roadmap report
<b>A30</b>	Deploy new weather monitoring infrastructure to support renewable energy zones (REZs).	Advocate for new weather monitoring infrastructure requirements to support REZs.	New AEMO-coordinated action. Bureau of Meteorology (BOM), other weather providers, and jurisdictions.	ID117, ID372

<sup>i</sup> <https://aemo.com.au/-/media/files/initiatives/engineering-framework/2021/nem-engineering-framework-initial-roadmap.pdf>

<sup>ii</sup> <https://aemo.com.au/-/media/files/initiatives/engineering-framework/2022/nem-engineering-framework-priority-actions.pdf>

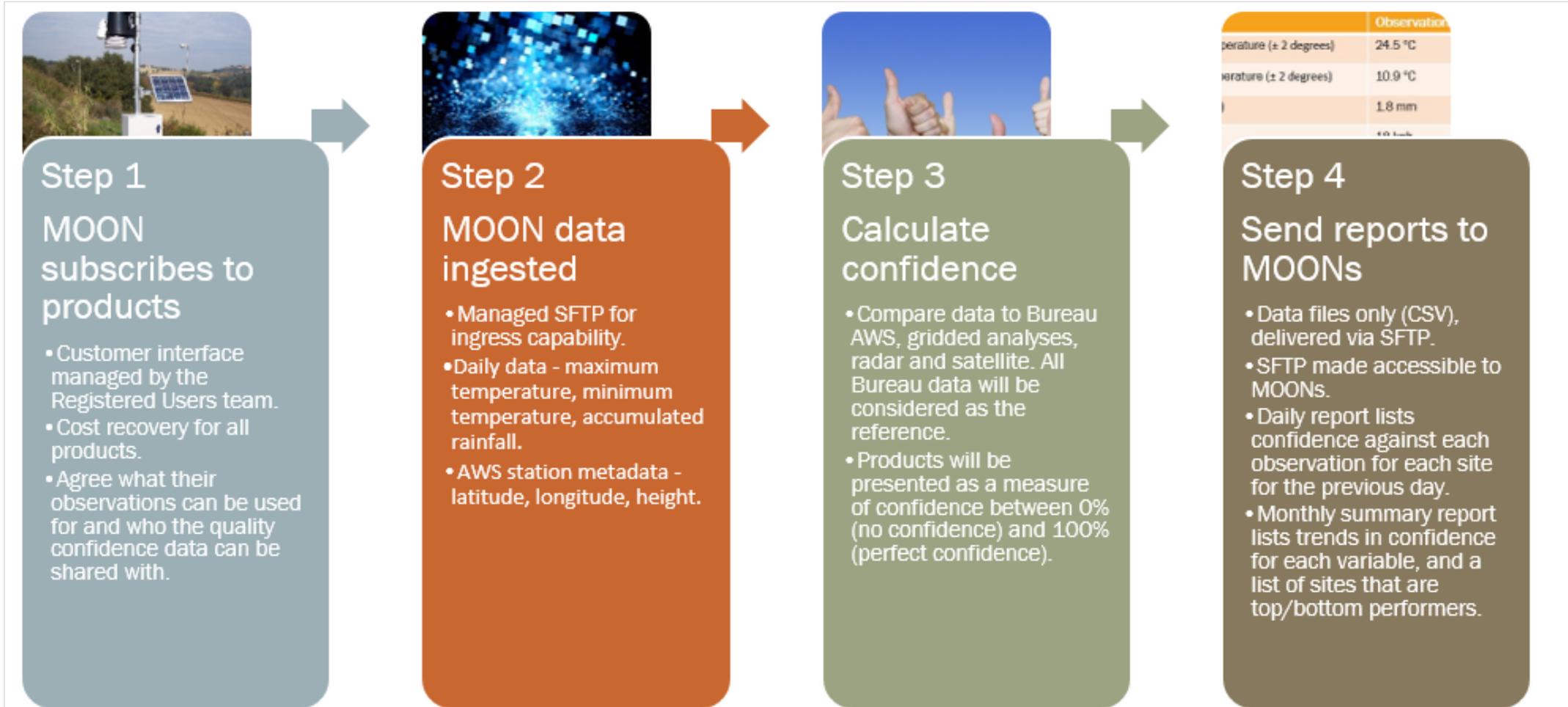
# AEMO-BOM: Weather monitoring capability project

- AEMO and the BOM recently commenced discussions, and are scoping project requirements. Potential solutions identified include:
  - Installing additional observation equipment.
  - Obtaining observations from the energy industry.
  - Improving data processing and synthesising methods.
- The BOM could collect, store and curate the data and make it available to participants and weather providers to enhance overall Australian forecasts, specifically for (but not limited to) the energy industry.
- Further information will be provided to participants via email as the project progresses.

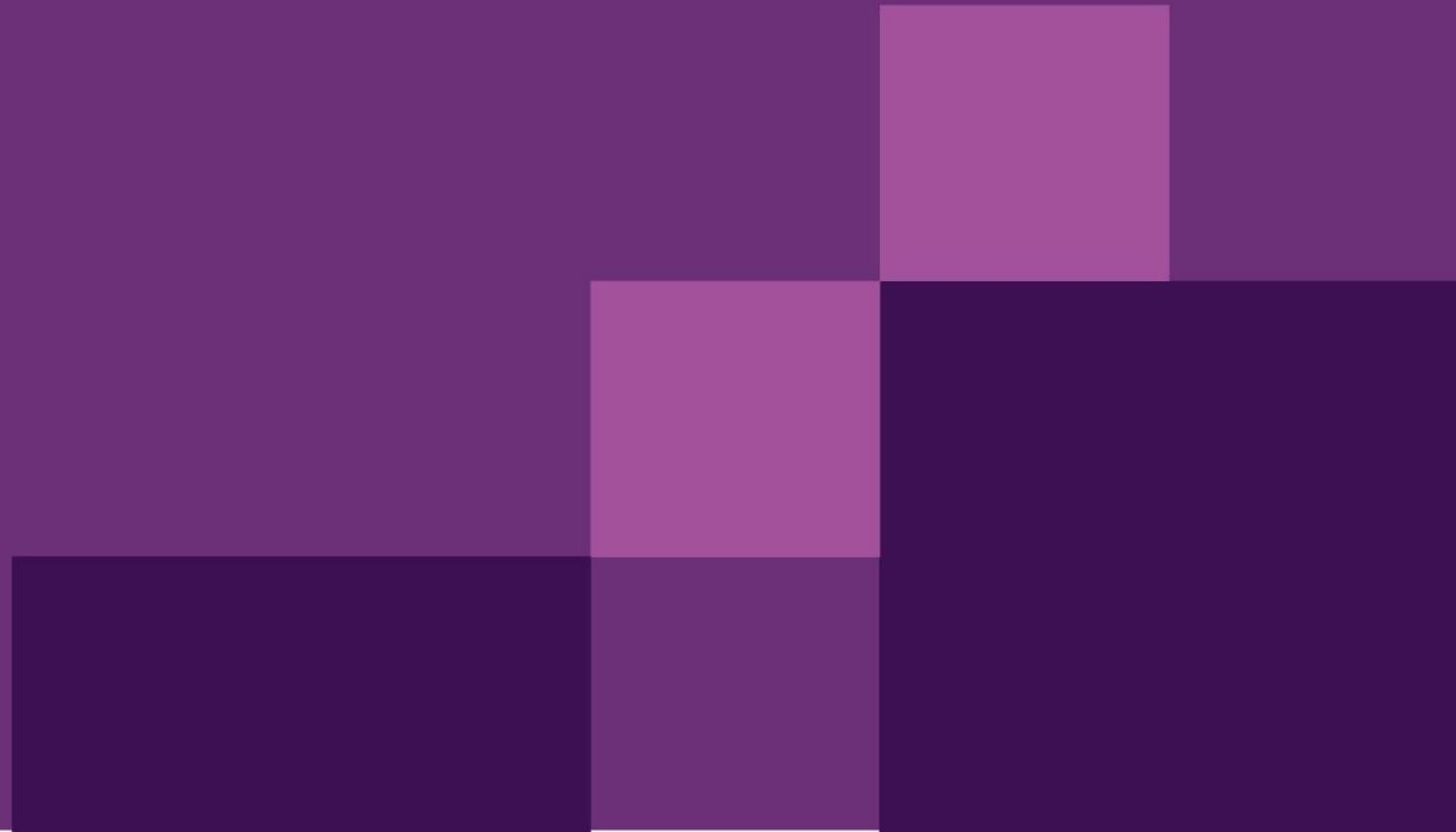
# Example: TPAWS and ObsCheck

- The Trusted Private Automatic Weather Station (TPAWS) project developed a capability to QC 3<sup>rd</sup> party data (insurance claims)
- ObsCheck - automated QC of MaxT, MinT and daily rainfall.
- Managers and Operators of Observation Networks (MOONs) submit data and receive quality confidence reports.
- Foundations for a real-time QC solution.

# Example: TPAWS and ObsCheck



# Questions and Discussion



# Further information and resources

- Frequency and time error performance in the NEM:  
<https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/system-operations/ancillary-services/frequency-and-time-deviation-monitoring>
- Guide to Intermittent Generation:  
<https://www.aemo.com.au/-/media/files/market-it-systems/guide-to-intermittent-generation.pdf>
- IESS Project:  
<https://aemo.com.au/initiatives/major-programs/integrating-energy-storage-systems-project>
- NEM Operational Forecasting and Dispatch Handbook for wind and solar farms:  
[https://aemo.com.au/-/media/files/electricity/nem/security\\_and\\_reliability/dispatch/policy\\_and\\_process/nem-operational-forecasting-and-dispatch-handbook-for-wind-and-solar-generators.pdf](https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/dispatch/policy_and_process/nem-operational-forecasting-and-dispatch-handbook-for-wind-and-solar-generators.pdf)
- Self-forecasting Assessment Procedure:  
[https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security\\_and\\_Reliability/Dispatch/Policy\\_and\\_Process/Semi-Scheduled-Generation-Dispatch-Self-Forecast---Assessment-Procedure.pdf](https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Dispatch/Policy_and_Process/Semi-Scheduled-Generation-Dispatch-Self-Forecast---Assessment-Procedure.pdf)

# Contact Information

- AEMO Operational Forecasting  
[Op.forecasting@aemo.com.au](mailto:Op.forecasting@aemo.com.au)
- AEMO Support Hub  
<https://aemo.com.au/en/contact-us>
- IESS Project information  
[IESS@aemo.com.au](mailto:IESS@aemo.com.au)



For more information visit

[aemo.com.au](http://aemo.com.au)