



WA DER Market Participation Forum

13 September 2022



Welcome

Tom Butler, Manager – Distributed Markets WA

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.

AEMO

Competition Law Meeting Protocol

AEMO is committed to complying with all applicable laws, including the Competition and Consumer Act 2010 (CCA). In any dealings with AEMO regarding proposed reforms or other initiatives, all participants agree to adhere to the CCA at all times and to comply with this Protocol. Participants must arrange for their representatives to be briefed on competition law risks and obligations.

Participants in AEMO discussions **must**:

1. Ensure that discussions are limited to the matters contemplated by the agenda for the discussion
2. Make independent and unilateral decisions about their commercial positions and approach in relation to the matters under discussion with AEMO
3. Immediately and clearly raise an objection with AEMO or the Chair of the meeting if a matter is discussed that the participant is concerned may give rise to competition law risks or a breach of this Protocol

Participants in AEMO meetings **must not** discuss or agree on the following topics:

1. Which customers they will supply or market to
2. The price or other terms at which Participants will supply
3. Bids or tenders, including the nature of a bid that a Participant intends to make or whether the Participant will participate in the bid
4. Which suppliers Participants will acquire from (or the price or other terms on which they acquire goods or services)
5. Refusing to supply a person or company access to any products, services or inputs they require

Under no circumstances must Participants share Competitively Sensitive Information. Competitively Sensitive Information means confidential information relating to a Participant which if disclosed to a competitor could affect its current or future commercial strategies, such as pricing information, customer terms and conditions, supply terms and conditions, sales, marketing or procurement strategies, product development, margins, costs, capacity or production planning.

Online forum housekeeping

Please note that this forum will be recorded for the purposes of assisting AEMO accurately capturing feedback.



1. Please mute your microphone to avoid distracting background noises.



2. Video is recommended for presenters only, as this helps with webinar performance and minimises distractions. However, we encourage you to turn it on via Q&A.



3. We encourage you to ask questions and provide feedback.



- Use the chat function at any time during the forum, we aim to respond to as many questions as possible.



- Raise your hand during Q&A and wait till you're called upon. Don't forget to unmute and lower your hand after.

Agenda

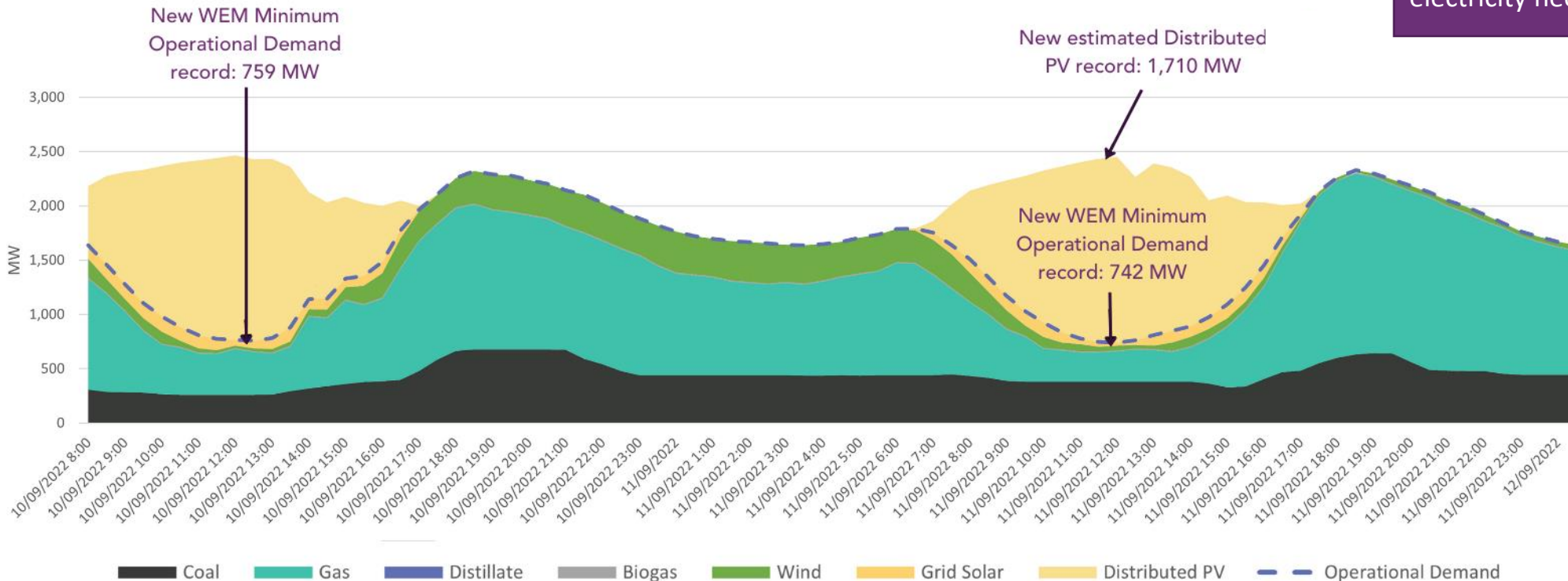
1. **Welcome** by Tom Butler, Manager WA Distributed Markets
 - Work program and recent highlights
2. **Energy Policy WA update** by Aden Barker, Director Network Regulation & Customer Participation
3. **DER Participation**
 - Consultation paper: Proposed Design for Visibility Framework by Natalia Kostecki, Workstream Leader and Allicia Volvricht
4. **Project Symphony**
 - PMO update by Megan Allan, Stakeholder and Communications Lead, Western Power
 - Platform Update by Bruce Redmond, Principal DER Product Owner
 - AEMO Research Approach and Topics Plan by Jason Hart, Senior Analyst, WA Distributed Markets
5. **Q&A**

The SWIS's record of minimum operational demand was broken twice this weekend

WEM operational demand and generation mix 10 and 11 September 2022



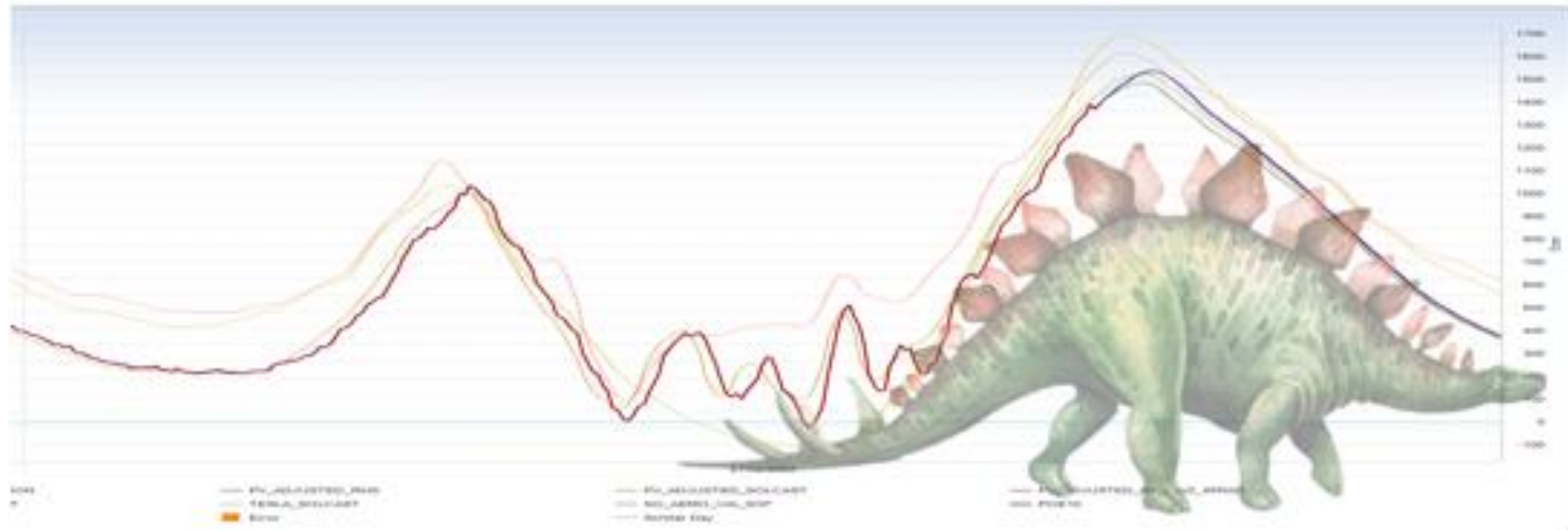
Rooftop solar provided more than two-thirds (70%) of the State's electricity needs at the time.



In comparison, the maximum operational demand record was set at 4,006 MW on 6 February 2016.

The challenges of maintaining system reliability and security with Distributed PV

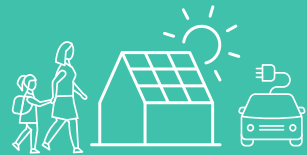
Moving from a duck to a dinosaur...



WA Distributed Markets

Our Vision

To enable distributed energy resources and new technologies to be an integral part of the SWIS through the WEM by supporting security and reliability, as we move towards a 100% instantaneous renewable energy power system.



Objectives

- Develop and ultimately manage a highly distributed power system and market with an increasing role for customer-owned DER devices.
- Register DER Aggregators to participate in the WEM consistently with AEMO’s roles for the dispatch and settlement of facilities, whilst adapting to the unique characteristics of DER aggregation facilities, technologies and platforms.
- Manage and support the continued evolution of AEMO’s capabilities and systems to encompass DER and DER aggregators.
- Engage with stakeholders to evolve the services and technologies that support DER aggregator participation in the WEM.
- Work closely with Government and stakeholders to enable a highly distributed system and market whilst supporting reliable and affordable energy for all Western Australians



AEMO DER Actions and Progress

DER Participation

Completed

DER Orchestration Roles and Responsibilities

- Engaged and provided advice to Energy Policy WA since release of the DER Roadmap.
- Coordinated planning for implementation.
- Leveraged knowledge and experience across WEM Reform design and implementation.

Underway

Visibility and predictability

- AEMO VPP Visibility framework consultation and guideline.

Project Symphony

- Leverage learnings from Project Symphony to provide critical insights confirming roles and responsibilities.

Interoperability

- Development of the CSIP-AUS requirements.

Upcoming

Roles and Responsibilities

- Ongoing support for Energy Policy WA to move roles and responsibilities forward.

Operations

Completed

Power system security

- Developed modelling approaches to represent DPV tripping.
- Developed dynamic system models inclusive of DER and Load behaviour during disturbances.
- Identified need for, and supported design and operationalisation of Emergency Solar Management.

Visibility and predictability

- Established the DER Register for the WEM
- Provided SWIS system security settings into AS4777:2020.
- Enhance stakeholder visibility of DER via AEMO's WEM Data Dashboard.

Underway

Power system security

- Energy Policy WA leading compliance reviews following AEMO identification of very low compliance to AS4777:2020.
- Collaboration on Under Frequency Load Shedding review with Western Power.
- Review of potential actions/roles for DER in System Restart.

Upcoming

Visibility and predictability

- Updates to the DER Register to enable collection of EV charging information.
- Consideration of further short term controllability options.

Pilot

Underway

Operational coordination

- Project Symphony roles, detailed design, platforms and data exchanges confirmed and build underway.

Device capability

- Establishment of Project Symphony test scenarios.

Upcoming

Visibility and predictability

- Demonstration of aggregator and aggregated device capability to provide services to the WEM and network.

Market Design

- Utilise pilot learnings to confirm registration, dispatch and settlement requirements for DER aggregators.
- Implementation of AEMO research plan under testing during the stability period.

Power system security

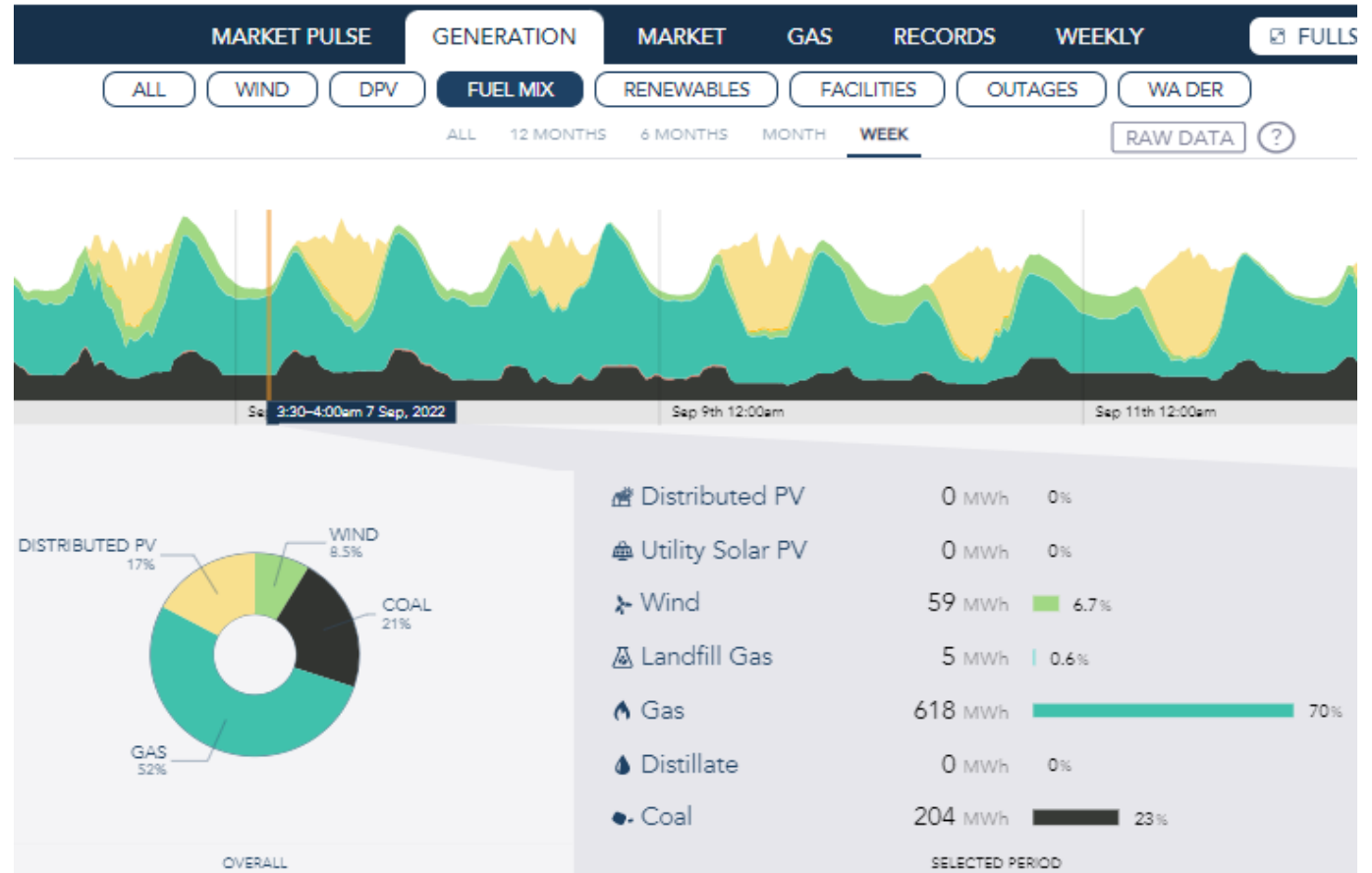
- Identify forecasting and planning impacts and opportunities with aggregated DER.

WEM Data Dashboard

DER enhancements

AEMO updates in place in recognition of the significant and growing impact DER (especially DPV) has on the WEM and SWIS.

Link: <https://aemo.com.au/en/energy-systems/electricity/wholesale-electricity-market-wem/data-wem/data-dashboard>



We welcome your feedback to:
WA.Operations@aemo.com.au



Government of Western Australia
Energy Policy WA

DER Integration

Energy Policy WA Update

Aden Barker

Director Network Regulation & Customer Participation

Working together for a
brighter energy future.

DER Participation

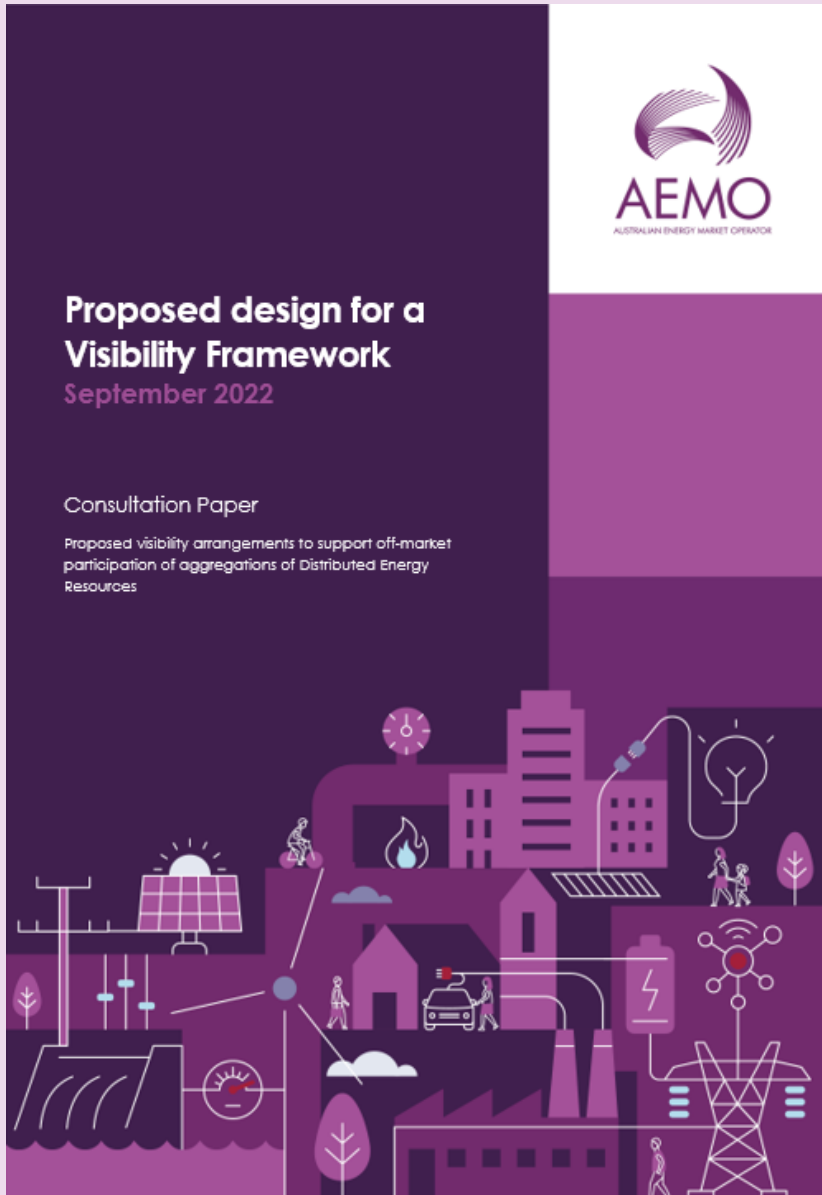
Consultation paper: Proposed design for a Visibility Framework



Proposed visibility arrangements to support off-market participation of aggregations of Distributed Energy Resources

Natalia Kostecki





AEMO is particularly interested in views on:

- Staged implementation of the Visibility Framework
- Matters to be covered in the VPP Aggregation Guideline
- Minimum Visibility Data Model and data provision and update requirements
- Proposed uses of Minimum Visibility Data
- Potential costs of providing Minimum Visibility Data

Stakeholder submissions due by Wednesday 12 October 2022.

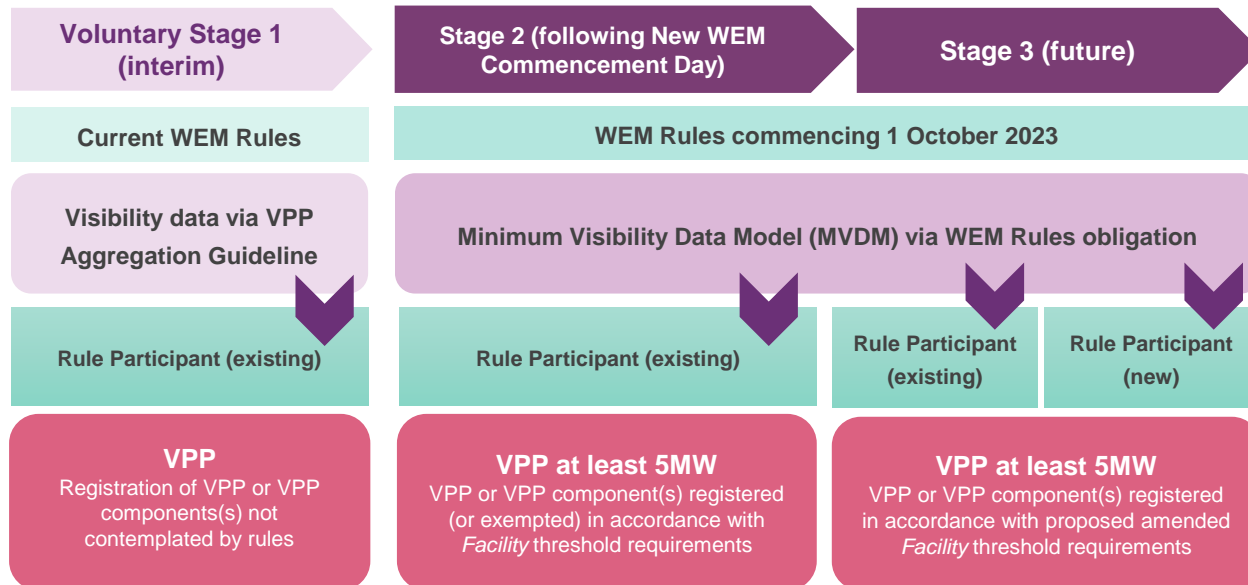
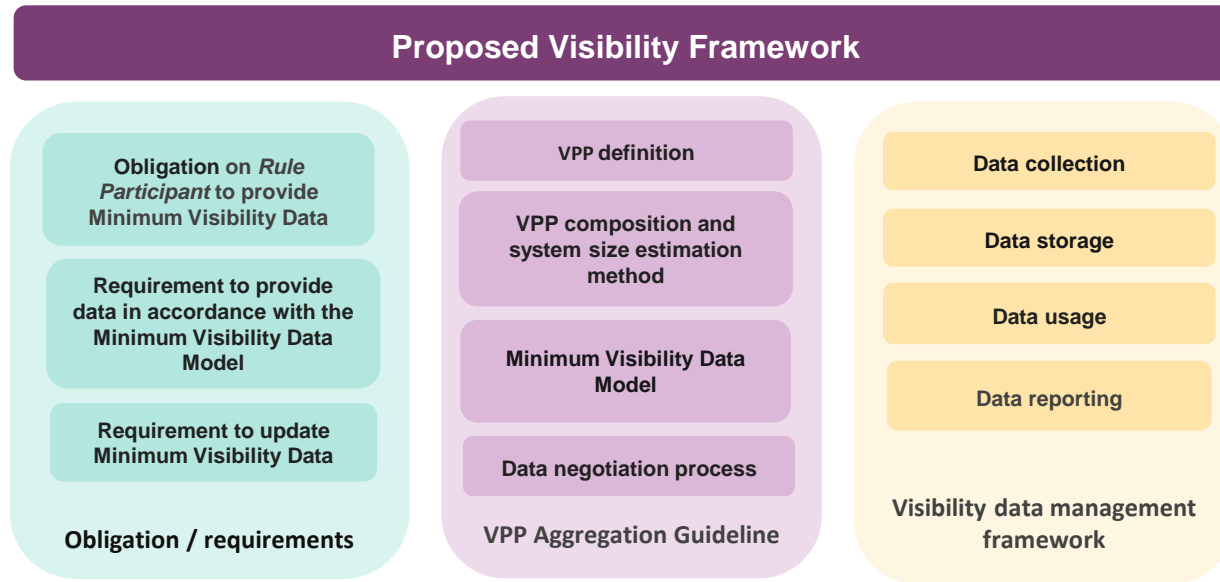
Email: WADERProgram@aemo.com.au

Webpage:

<https://www.aemo.com.au/consultations/current-and-closed-consultations/proposed-design-for-a-visibility-framework>

Proposed Visibility Framework

Purpose: to inform AEMO of the existence and operation of VPPs with the capability of moving material amounts of energy, so AEMO can make informed decisions when performing its function of keeping the power system secure as the power system transitions to a highly distributed energy future



Staged implementation

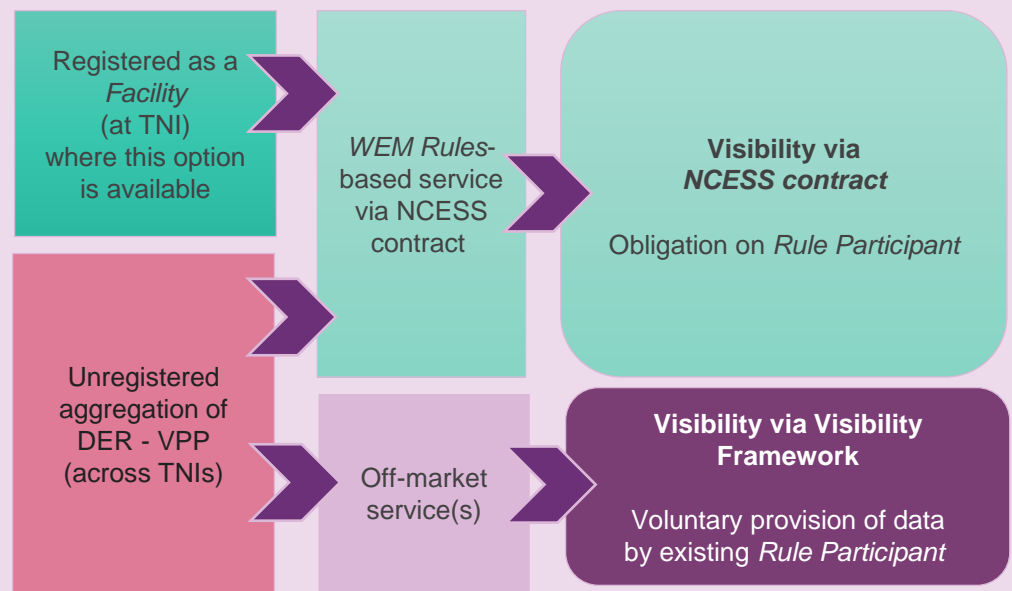


Proposed Visibility Framework: Stage 1

- **Voluntary**
- Interim
- Foundational
- Existing *Rule Participants*
- Any size VPP
- Any off-market activity
- Design consultation
- Data collaboration
- Learnings

Areas of focus

- * **Visibility of off-market arrangements**
 - VPPs utilised by existing *Rule Participants*
 - Learnings on data availability and use
 - Development of VPP Aggregation Guideline
 - Collaboration
- * **Foundational activities**
 - Embed Visibility Framework alongside New Market arrangements under *WEM Rules* commencing 1 October 2023
 - Consultation on design and rule changes



Proposed Visibility Framework: Stages 2 & 3

- Rules-based but 'lite touch'
- *New Market* arrangements
- Transition to market participation

- Existing / new *Rule Participants*
- **VPP at least 5 MW estimated size**
- Any off-market activity

- Operational experience
- Ongoing engagement
- Learnings

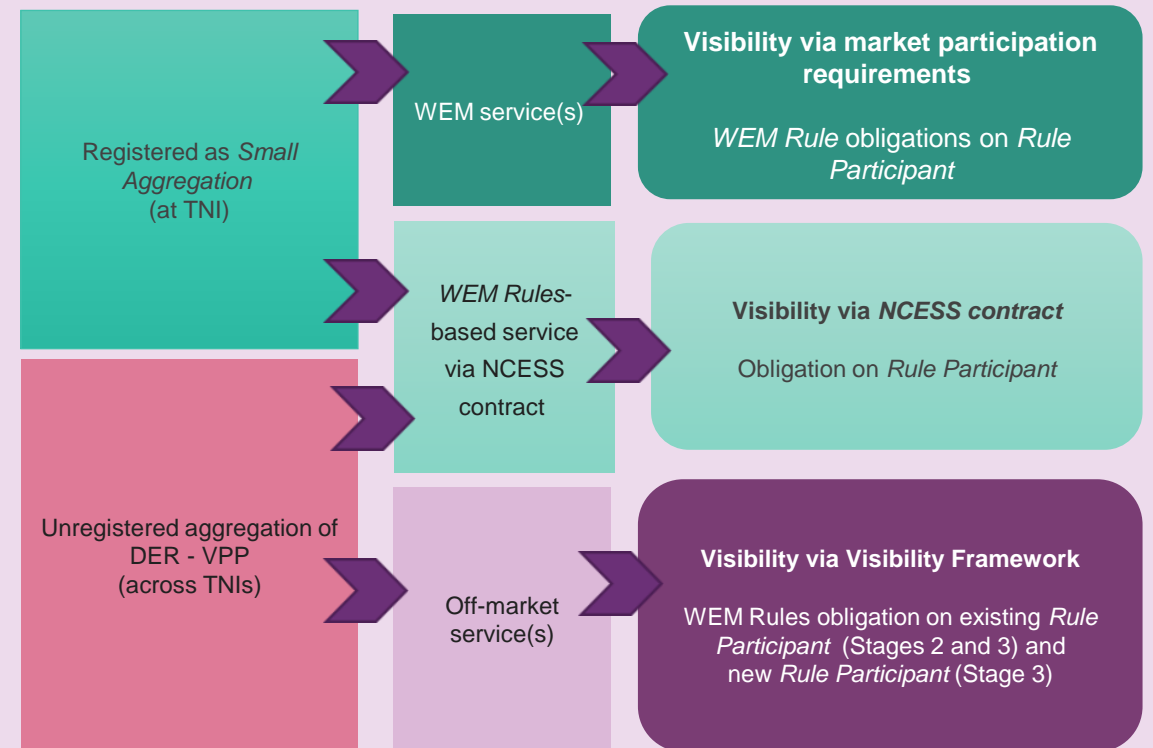
Areas of focus

* Practical operation of Visibility Framework

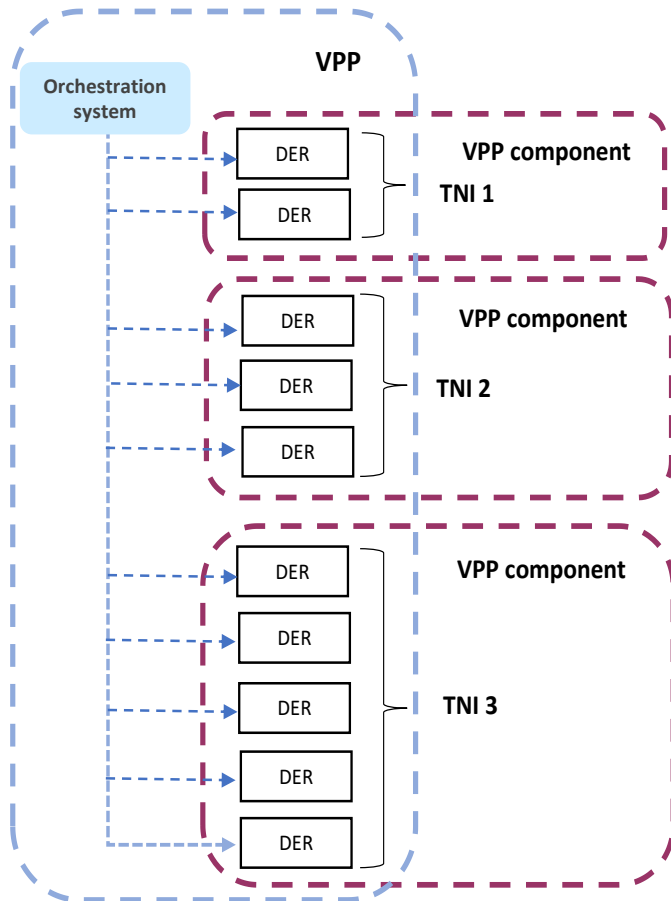
- VPPs utilised by existing / new *Rule Participants*
- Minimum Visibility Data collection, use and reporting
- Interaction with *Market Registration*
- On-going engagement, including consultation on rule changes

* Learnings

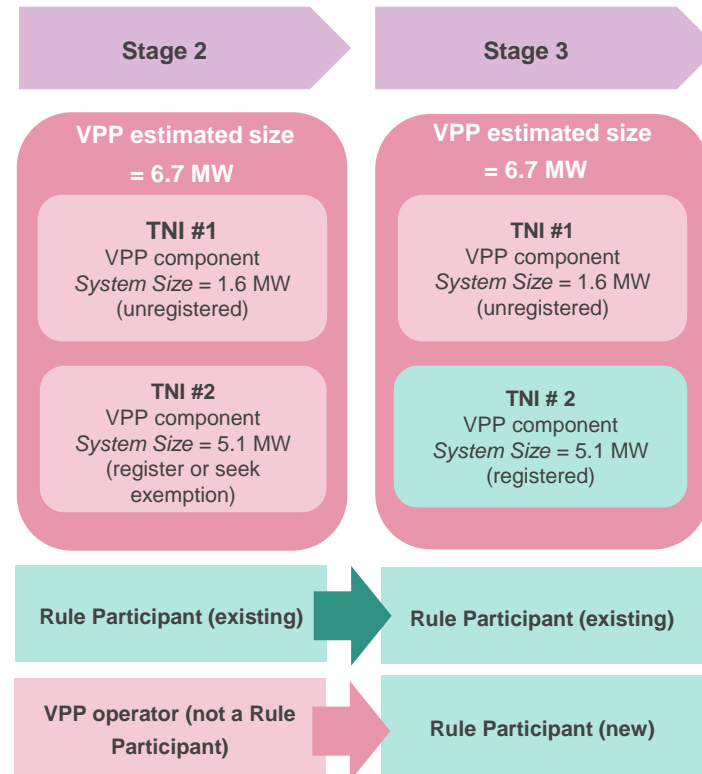
- Inform market participation models
- Evolve future design



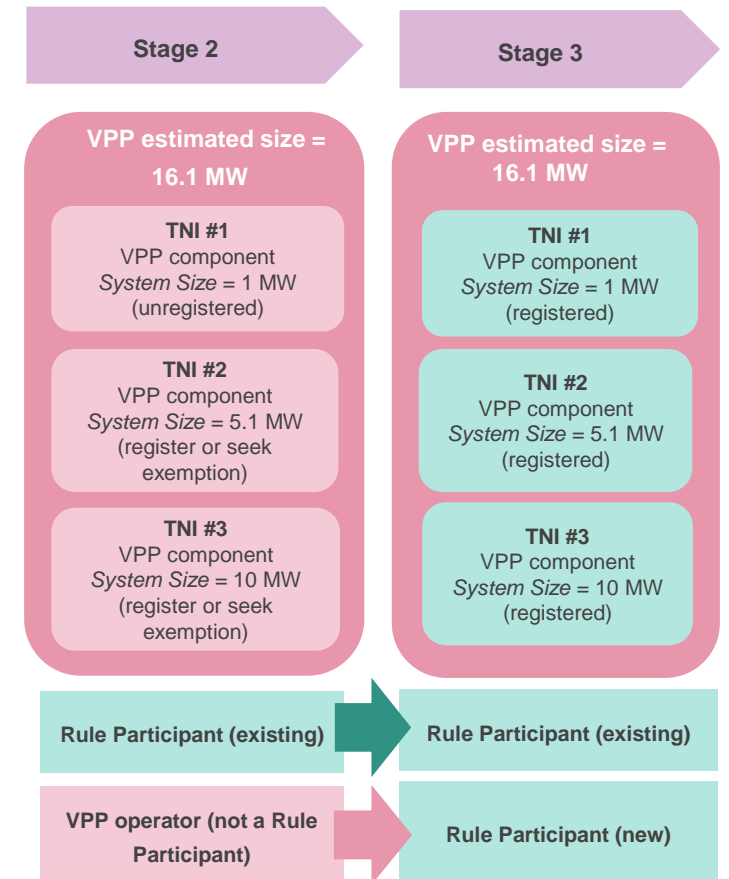
Interaction with *Market Registration* regime: Stages 2 and 3



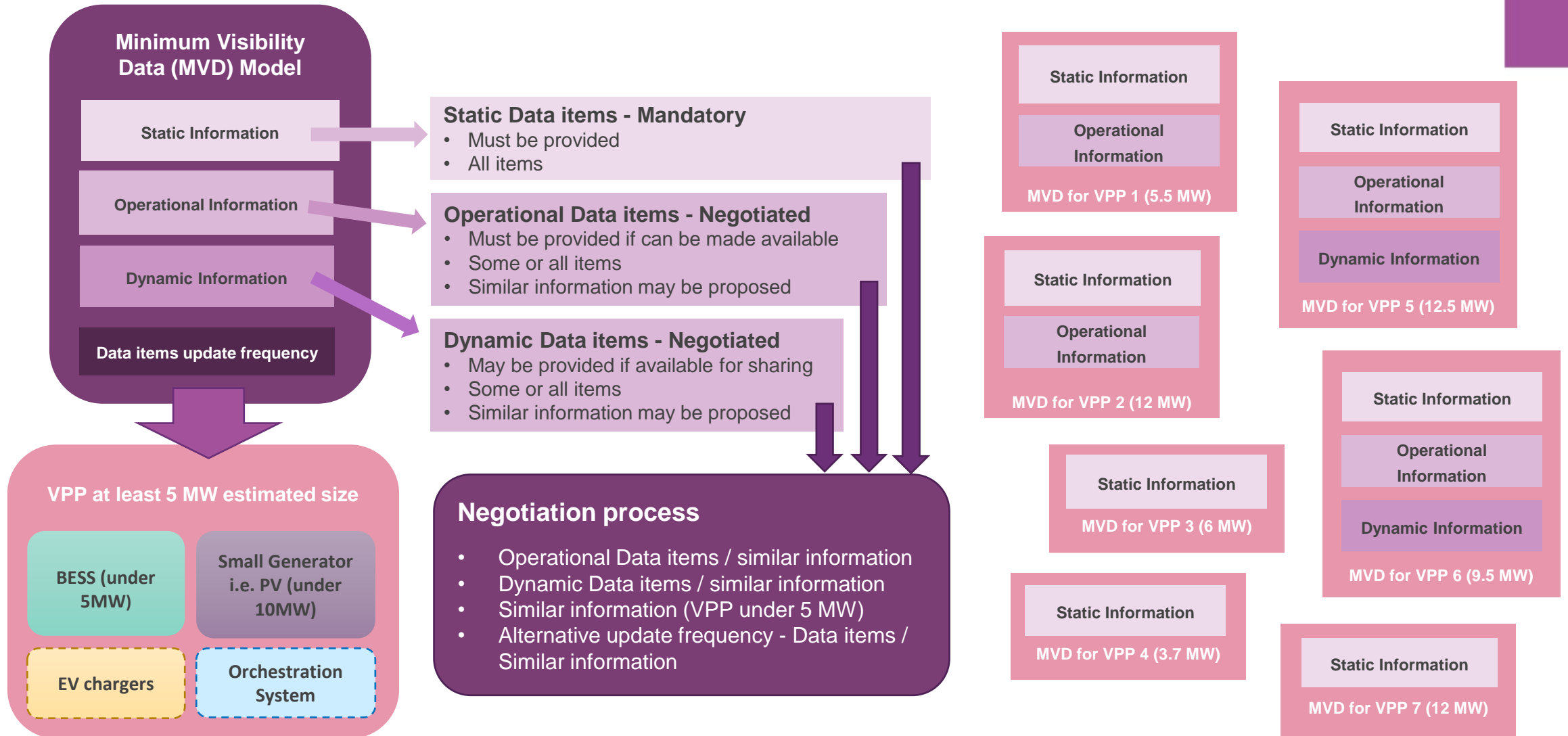
Treatment of small VPP with respect to 5 MW Facility registration threshold



Treatment of large VPP with respect to 10 MW Facility registration threshold

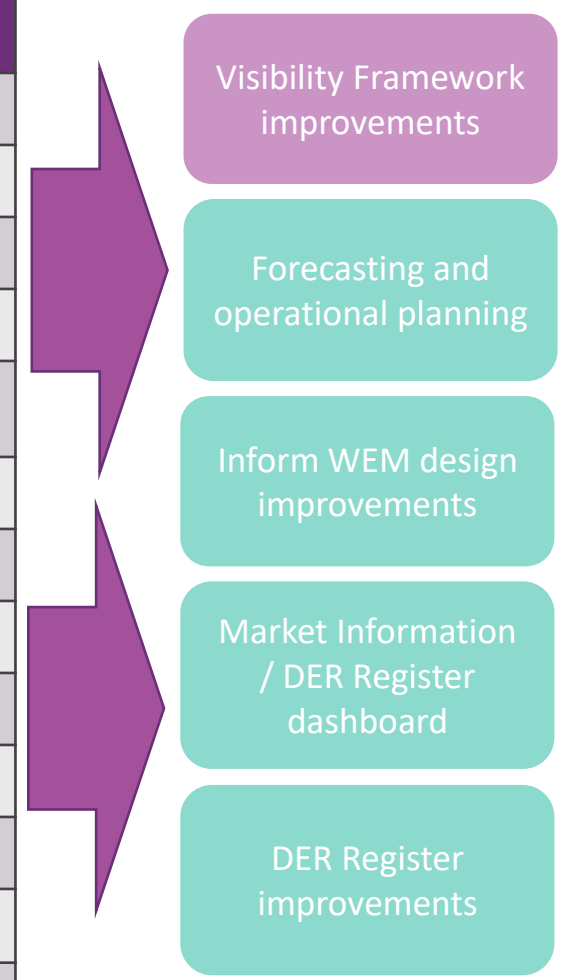


Minimum Visibility Data: Stages 2 & 3



Proposed Data items and potential uses

Data item	Information type	Provision requirement	Description summary	Update frequency
NMIs joined onto the VPP	Static	✓	List of NMIs currently included in the VPP	Small VPP – Quarterly Large VPP – Monthly
NMI joining date	Static	✓	Date NMI was included as part of the VPP	Small VPP – Quarterly Large VPP – Monthly
NMI removal date	Static	✓	Date NMI was removed from the VPP	Small VPP – Quarterly Large VPP – Monthly
VPP estimated size	Static	✓	As per method set-out in the VPP Aggregation Guideline	Small VPP – Quarterly Large VPP – Monthly
VPP service(s) type	Static	✓	Examples might include site optimisation, load shifting, voltage management, reducing IRCR exposure	Small VPP – Quarterly Large VPP – Monthly
Orchestration System	Static	✓	Description of the technology used to coordinate VPP assets to support service delivery	Small VPP – Quarterly Large VPP – Monthly
Control capability - MW change	Static	✓	Rule Participant’s estimation of the VPP’s MW capability (up and down, in total)	Small VPP – Quarterly Large VPP – Monthly
Device identity	Static	✓	Unique identifier for the device(s) actively controlled by the VPP	Small VPP – Quarterly Large VPP – Monthly
Standing profile - controlled MW change	Operational	Negotiated	Expected MW change per Trading Interval, per service	Small VPP – Quarterly Large VPP – Monthly
Deviation from standing profile	Operational	Negotiated	Expected MW change per Trading Interval, per service	Small VPP – Quarterly Large VPP – Monthly
Actual net change in controlled MW	Operational	Negotiated	Actual MW change per Trading Interval, per service	Small VPP – Quarterly Large VPP – Monthly
Notice of service activation / deactivation	Dynamic	Negotiated	Close to real-time confirmation of service activation / de-activation	Close to real-time
Forecast net change in controlled MW	Dynamic	Negotiated	Close to real-time forecast of MW change per Trading Interval	Close to real-time



Project Symphony

Our energy future

Project update

Megan Allan, Stakeholder and
Communications Lead

In partnership with:



Project Symphony has received support from the Australian Renewable Energy Agency (ARENA) as part of ARENA's Advanced Renewables Program.

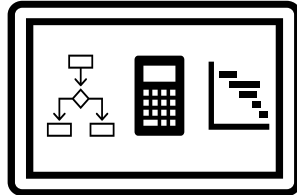
Project Symphony Success Criteria & Achievements to Date

Customer participation



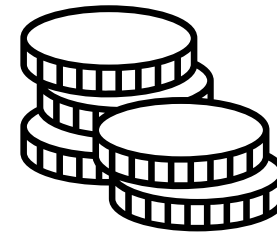
259/500 customers with a combined 639/900 assets

Technology solutions



MVP completed.
Full end to end testing for Network Support Services completed with continued integration testing for the Constrain to Zero scenarios up to the launch of the stability period in October

Value



\$1.4B
Potential economic value.
Cost Benefit Analysis
Scope of work drafted in preparation for procurement process'

Platform update

Bruce Redmond, Project Symphony Product Owner

Project Symphony – AEMO’s Vision and Product Goals

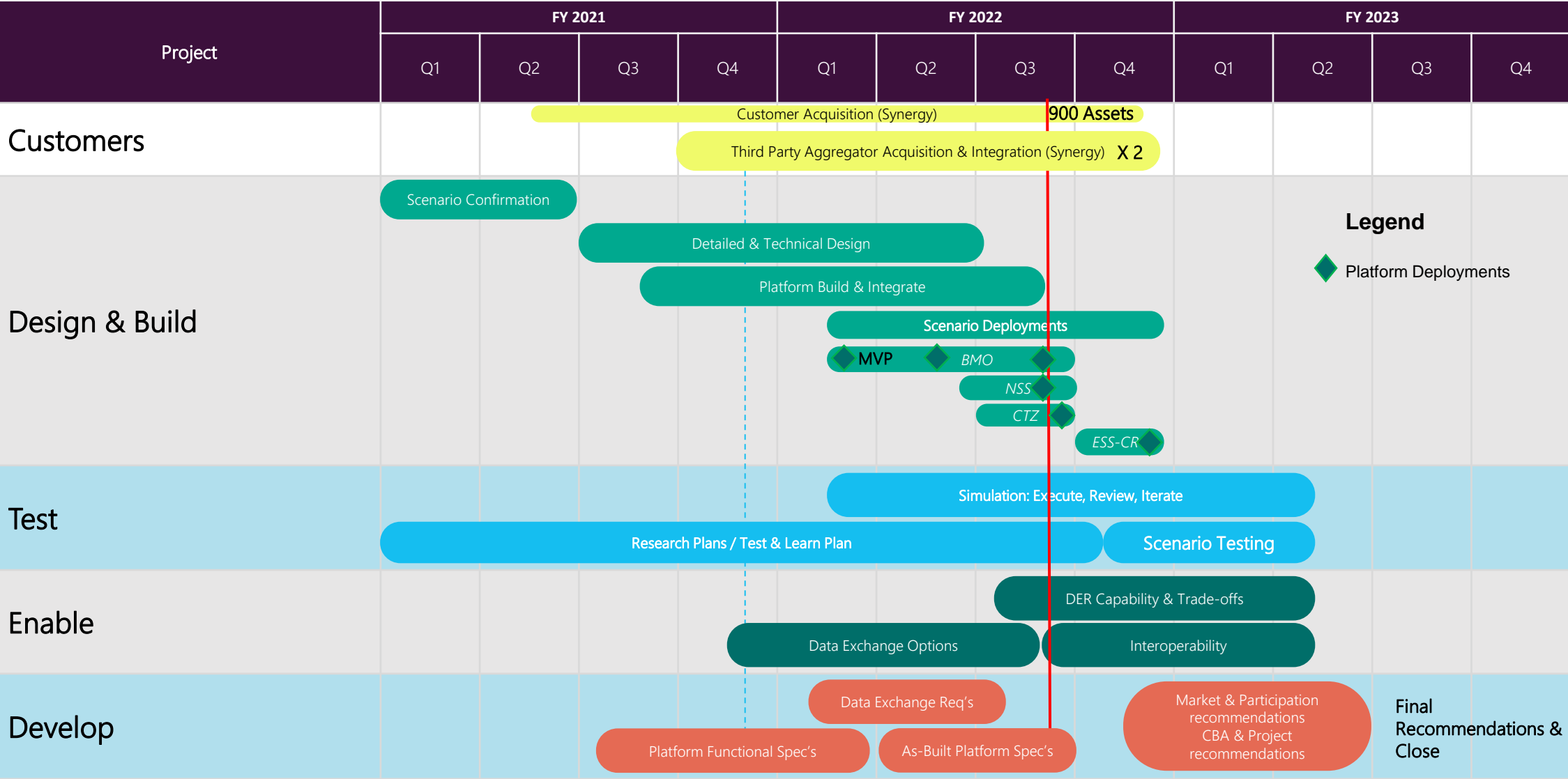
Vision

To build a future where DER competitively participates to provide services to the WEM and to the network.

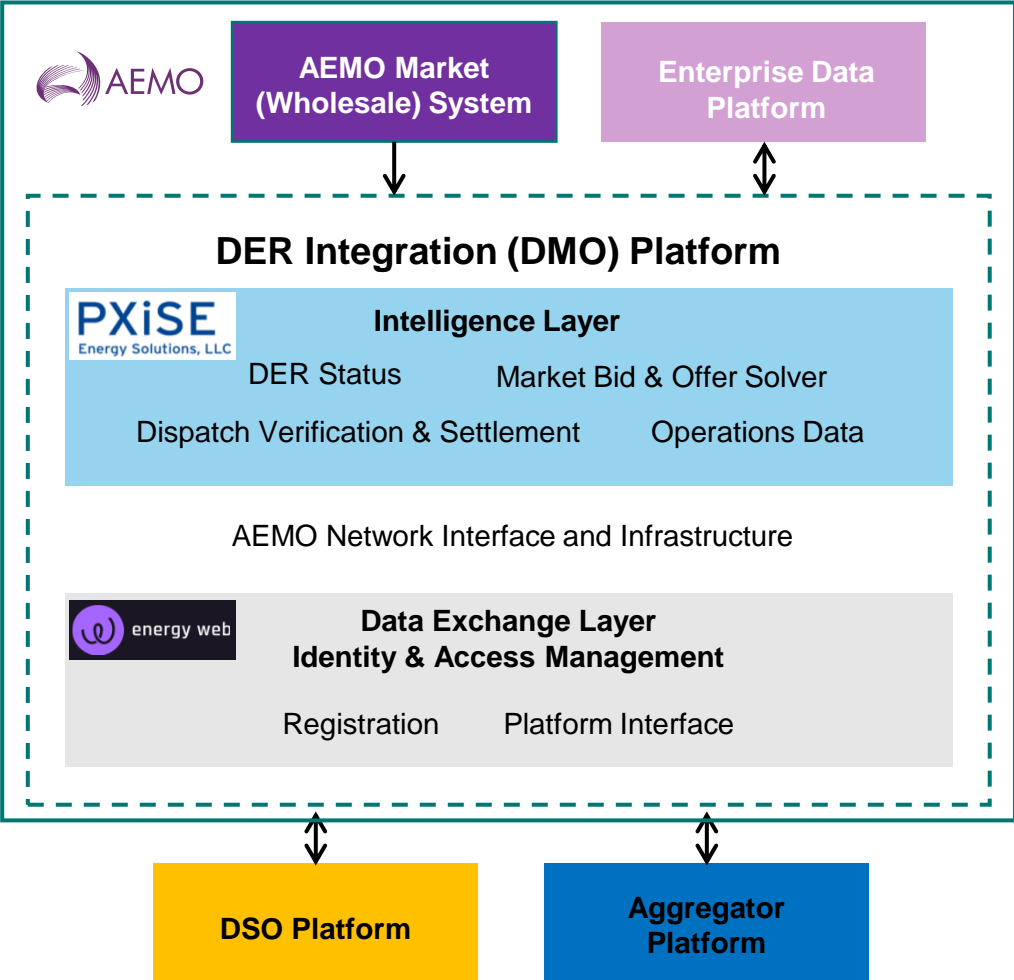
- *Deliver the systems and processes to create the opportunity for all small scale ‘behind the meter’ devices – such as solar PV, batteries and controllable load – to support the SWIS and participate in the WEM.*
- *In achieving this DER will become an integrated part of the SWIS and WEM. DER devices and equipment will provide the technical capability to allow Western Australia to increase the use of these resources as a foundational component of the energy mix.*

- **Product Goal 1: *Build*** a pilot DER Orchestration platform ...
- **Product Goal 2: *Test*** the ability for DER Aggregators to interact with AEMO (via the DER Orchestration platform) ...
- **Product Goal 3: *Enable*** AEMO to develop the services that will enable DER Aggregators to participate in the WEM...
- **Product Goal 4: *Develop*** technical and policy solutions aimed at enabling the future implementation of AEMO’s role in DER Orchestration as the market operator and system manager...

Project Symphony: Where are we at?



Market Platform: What we are building



Reporting & Analysis

EDP Model

- Visuals & Tables
- Dashboard and Reporting

Platform Functionality

Market Scenario's

- Balancing Market – Bi-directional
- Network Support Services
- Constrain to Zero
- ESS-CR

Dashboard UI

Capability & Automation

Scalability
Performance
Capability

Platform Integrations

UI – Upload & Download
Automated API-API

In Progress Complete

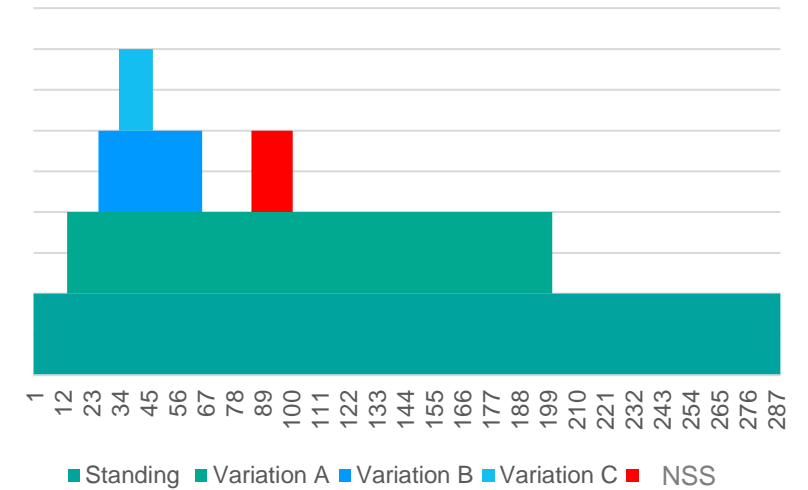
NSS Scenario - Test Results

Objectives	Objectives Met
NSS Scenario (with additional BMO functionality)	Defined NSS operation requirements
	A bilateral contract service between the DSO and Aggregator can be recorded in the Market Platform
	The NSS deployment request and dispatch can be orchestrated successfully
	The performance of the provision of the NSS service can be assessed by the DSO
	Forecast energy price sent from Market Platform to the Aggregator
	Submission of Bids and Offers between Aggregator and DMO including NSS provision
	Publishing of Dynamic Operating Envelopes (DoE) between DSO and Aggregator
	Pre-Dispatch Instructions (inclusive of Price and DI) created by Market Platform and sent to Aggregator

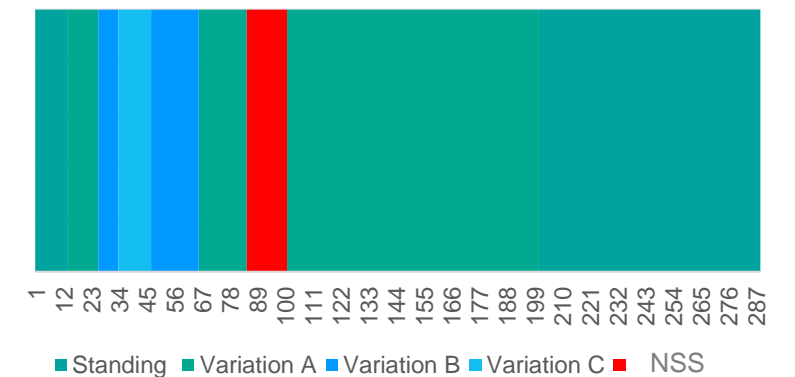
	PASSED	FAILED	NOT COMPLETED	NO RUN	BLOCKED	Total
AEMO	14	0	0	1	0	15
ALL	1	0	0	1	0	2
Synergy	6	0	0	2	2	10
WP	7	0	0	0	0	7
TOTAL	134	6	6	30	5	181

* Tests not categorized are shown only in the 'TOTAL' Row

RTMS – Bid & Offer Submission



Valid RTMS – Bid & Offer Submission



In partnership with:



AEMO Research Approach and Topics

Jason Hart, Senior Analyst

AEMO Research Approach

The Research Approach will guide the delivery of Project Symphony Test & Learn stage by

- Creating an empirical evidence base to support decisions and framework for collaboration using topics
- Comparing designed capability against expected outcomes (hypothesis) as a benchmark
- Enabling the extension and iteration of findings when outcomes do not match expectations
- In collaboration with Energy Policy WA's Roles & Responsibilities, Inform future enhancements to AEMO capabilities to enable Aggregator participation in the WEM, and requirements for Aggregator capabilities to do so



Organising the Research Topics

Design Topics

Features built into Symphony design being 'piloted'

Design topics focus on regulatory design and platform/technology design

Build & Execution Topics

Topics identified during build where the design does not enable the hypothesis

Topics identified during test & learn execution where results do not match the hypothesis

For some topics we can trial alternative arrangements developed within project

Other topics will be discussed based on analysis

External Topics

Topics to include in reports

Topics not built or tested to discuss in Work Package 7

Include collaboration with Project EDGE

Design Topics

Group	Research Topic	Summary of Requirement
Real Time Market simulation	Real Time Market simulation	Simulate RTM including registration, RTMS, pre-dispatch, dispatch and DI compliance
Functionality amendments	Aggregated facility registration	No existing process for Small Aggregation Project based dynamic process developed
	Pre-aggregated telemetry	No process for pre-aggregated telemetry Project requirement for accurate signal received from aggregator
	Data exchange	Real time telemetry (every 4sec) exchange appropriate for DER aggregator platform to communicate with DMO (and DSO)
Monitoring and assessment capabilities	HSDR aggregation	High speed data recorder measurements need to be aggregated to enable ESS accreditation and verification
	Controlled loads	Loads are not included in System Size calculation. Project based process developed to include controlled load in facility capacity as used in DI compliance assessment

Design Topics

Group	Research Topic	Summary of Requirement
Integration	Dynamic Operating Envelope (DOE)	No current process for DOE's Project based process developed with DOE applied by aggregator and included in pre-constrained RTMS
New market services	Dispatch inclusive of NSS	No process for dispatching a NSS. Process expected to be negotiated via NCESS. Project based process developed based off existing NCS process.
Performance validation	New market services	If developed, process expected to be negotiated via NCESS. Project based process developed for Constrain to Zero (Net and Gross)
	Performance against GPS	GPS principles used as a general assessment of performance capability
	Performance against FCESS performance requirements	Meet performance requirements as per WEM Procedure: Frequency Co-optimised ESS Accreditation and have accreditation parameters calculated representing service capability
	Roles, responsibilities and interactions for DER orchestration	Validate DSO, DMO and Aggregator interaction as designed

Build Topics

Research Topic	Summary of Requirement	Comment
Representing uncontrolled load at connection point	Provide RTMS with a price to control all quantities	Challenge to represent uncontrolled load as part of a price-quantity pair
Representing DER not under control	Provide RTMS with a price to control all quantities	Challenge to represent uncontrolled DER as part of a price-quantity pair
Representing NSS in dispatch	NCESS is generally represented as a set point or constraint	NSS as contracted cannot be represented in WEMDE
Service delivery at the connection point	Energy and CR service delivery measured at the connection point	Aggregators control to deliver service is at the equipment
ESS Requirements - Households do not meet requirements for high speed data recorders	10-40ms with storage requirements and GPS clock	Project specific requirement created using 50ms with workaround for storage and clock. This applies to majority of installations
ESS Requirement - Contingency raise response delayed by control loop	Speed of primary response is measured and assigned upon accreditation.	Delay may result in a lower speed service

Test & Learn: Project Limitations

- Where project-specific requirements are being trialled the question is whether the amended requirements can be achieved
- Operational input has been sought to ask if project requirements are a reasonable test case to develop learning, but project-specific requirements have not been contemplated as operational requirements.
- *A successful test case against a project requirement cannot directly translate into a capability or recommendation to operationalise, however the results will help define the requirements to operationalise*.*
- Symphony will advise on achievable requirements, but an assessment of whether these requirements are operationally desirable or acceptable is a separate task to be undertaken following and potentially outside the scope of Project Symphony.
- At this stage other industry trials, pilots and available technology will be reviewed alongside Project Symphony findings.

*This is particularly relevant for Data Exchange and findings for performance against FCESS performance requirements.

Ongoing Research

The Pilot is a step along the journey to market participation and deployment at scale

- Designed to get up and running and identify and demonstrate technical capability
- Many design and approach decisions are made to enable testing and to uncover challenges and opportunities rather than being an end state, for example testing as a Scheduled Facility
- Entry capability is being assessed and will be enhanced through project testing
- Recommendations from Project Symphony will be a key input into market participation actions under the DER Roadmap
- Any coordinated solution needs to be assessed as a complete operational coordination model

Q&A



WA DER Market Participation Forum

13 December 2022

WA DER Program web pages:

[AEMO | WA DER Program](#)

[WA DER Market Participation Forum](#)

Project Symphony reports:

[ARENA's knowledge sharing bank](#)

Contact us:

WADERProgram@aemo.com.au 36



For more information visit

aemo.com.au