Integrating Price Responsive Resources into the NEM (IPRR)

Draft High Level Implementation Assessment (HLIA) Industry Briefing

7 August 2024

1. Welcome

Ulrika Lindholm (AEMO)

We acknowledge the Traditional Custodians of the land, seas and waters across Australia. We honour the wisdom of Aboriginal and Torres Strait Islander Elders past and present and embrace future generations.

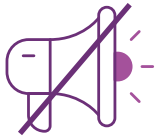
We acknowledge that, wherever we work, we do so on Aboriginal and Torres Strait Islander lands. We pay respect to the world's oldest continuing culture and First Nations peoples' deep and continuing connection to Country; and hope that our work can benefit both people and Country.

'Journey of unity: AEMO's Reconciliation Path' by Lani Balzan

AEMO Group is proud to have delivered its first Reconciliation Action Plan in May 2024. 'Journey of unity: AEMO's Reconciliation Path' was created by Wiradjuri artist Lani Balzan to visually narrate our ongoing journey towards reconciliation - a collaborative endeavour that honours First Nations cultures, fosters mutual understanding, and paves the way for a brighter, more inclusive future.

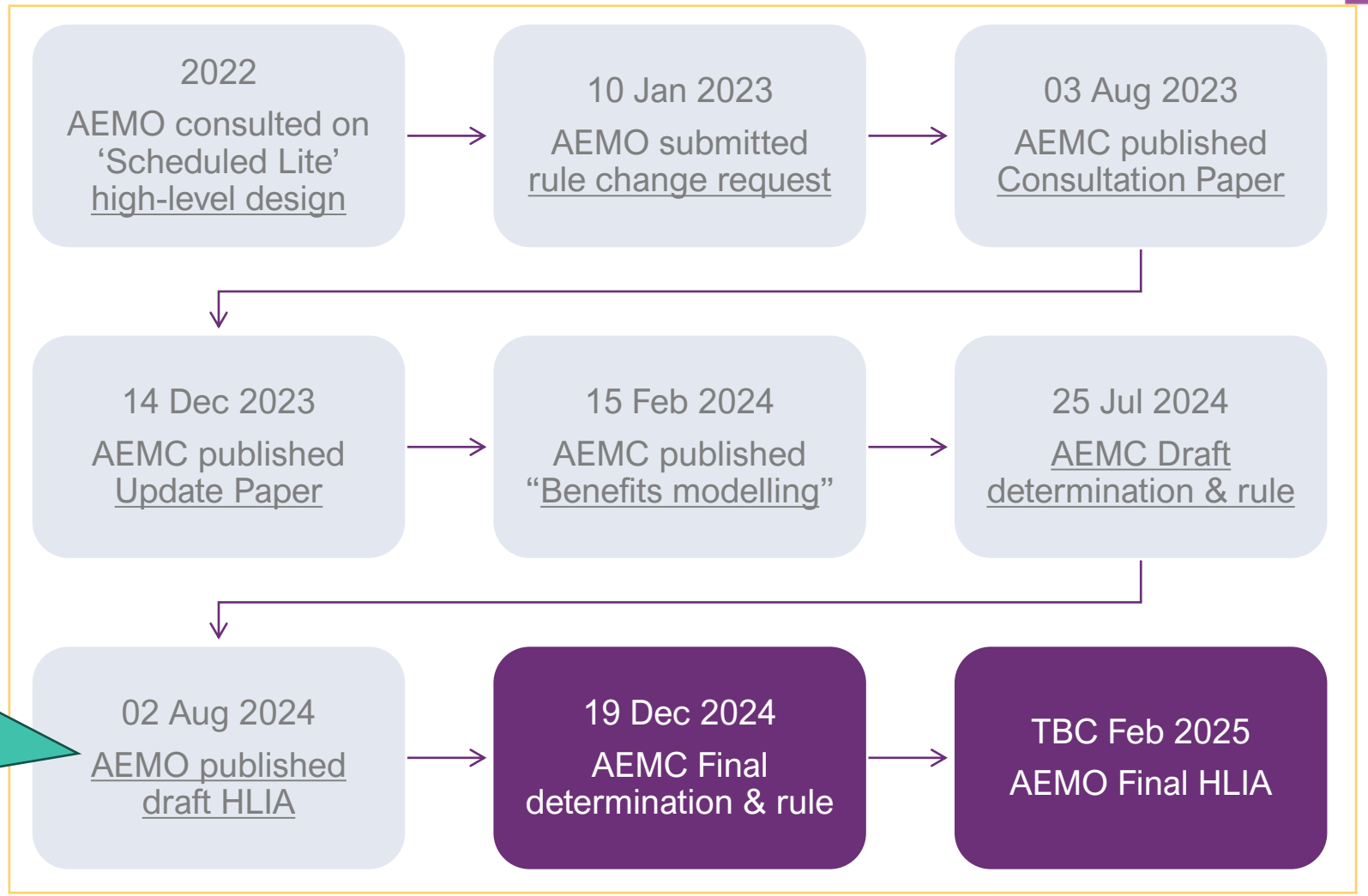
Read our RAP

General Housekeeping

1. Please mute your microphone. 
2. We look forward to your feedback and questions. Use the ‘Chat’ function to ask any questions or comments throughout the session.
   - AEMO SMEs are on the call, who will attempt to respond in the chat. 
3. Key questions or comments will be addressed verbally in dedicated Q&A sections.
4. In attending this meeting, you are expected to:
   - Contribute constructively.
   - Be respectful, both on the call and in the chat. 

Participants are asked to familiarise themselves with AEMO’s Competition Law Meeting Protocol as outlined in Appendix A and at AEMO’s website.

High-level policy timeline



AEMO's HLIA will help inform AEMO's and industry's submissions to the AEMC, providing input into the policy design and implementation timeframe

Objectives of today's session

Introduce draft policy and rationale

Discuss how it would be implemented

Focus of this session

AEMO's IPRR draft High Level Implementation Assessment was published on 1 August 2024

Invite stakeholders to get involved

Refresher: Energy market body roles

Market body roles

Australian Energy Market Commission

Rule maker, market developer and expert adviser to governments

Protects consumers and achieves the right trade-off between cost, reliability and security.

Australian Energy Regulator

Economic regulation and rules compliance

Polices the system and monitors the market.

Australian Energy Market Operator

Electricity and gas systems and market operator

Works with industry to keep the lights on.

Source: AEMC – National energy governance

Agenda

#	Time	Topic	Presenters
1	1:00-1:10pm	**Welcome**	Ulrika Lindholm (AEMO)
2	1:10-1:30pm	**Overview of the IPRR draft rule** • Policy rationale and design • Q&A	Ben Davis (AEMC)
3	1:30-1:50pm	**AEMO's proposed IPRR implementation approach**	Luke Barlow (AEMO)
4	1:50-2:30pm	**IPRR High level implementation assessment:** • Impacts to AEMO's processes • Impacts to AEMO's procedures • Impacts to AEMO's systems • Participant impacts • Indicative implementation milestones	Luke Barlow, Emily Brodie (AEMO)
5	2:30-2:35pm	**Feedback and next steps**	Ulrika Lindholm (AEMO)
6	2:35-2:55pm	**Q&A**	Ulrika Lindholm (AEMO)
7	2:55-3:00pm	**How to get involved & close**	Ulrika Lindholm (AEMO)
		Prereading: • AEMC draft rule • AEMO draft high level implementation assessment	
	Appendix A	**AEMO Competition Law - meeting protocol**	
	Appendix B	**Glossary**	

"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. Overview of IPRR draft rule

Ben Davis - AEMC

AEMC HLIA presentation

AEMC

Integrating price-responsive resources into the NEM

Ben Davis — Director, Consumers markets and analytics

Agenda

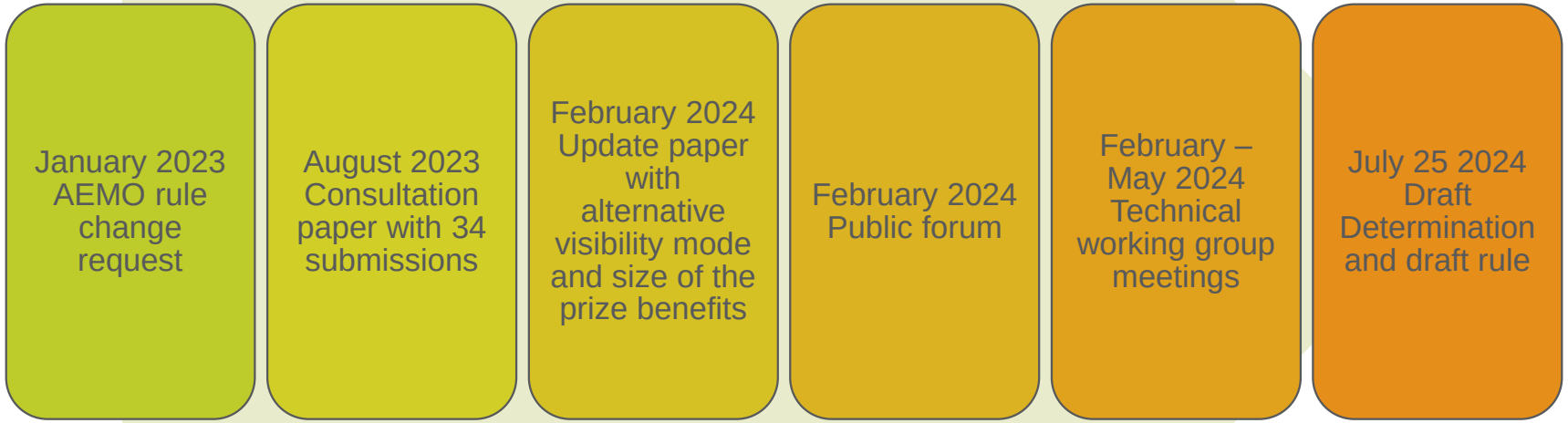
This presentation covers three main parts of the rule change:

1. Background, scope and problem definition
2. Solutions in the draft rule
3. Process and next steps

Background, scope and problem

Overview of the rule change process to date

Received a rule change request from AEMO, out of the ESB work program, to create a new way for unscheduled price-responsive resources to be centrally coordinated into the NEM dispatch



Problem

Unscheduled price-responsive resources, and their response to market price signals, are not integrated into the NEM's planning and operation functions. They are not visible to AEMO or the market and therefore cannot be appropriately considered when determining:

- how much energy demand needs to be met
- how to meet this demand
- the spot price
- when to intervene in the market.

They are also unable to participate in some services that are available to scheduled resource, such as regulation frequency control ancillary services (FCAS), limiting the value that customers can receive for their consumer energy resources (CER).

Residential

Spot price pass-through contracts (e.g. Amber)

Controllable loads (e.g. air-conditioning, hot water, and pool pumps)

Battery storage within a virtual power plant (VPP)

Demand response with retailer provided incentives (e.g. Origin Spike plan)

Controllable loads (e.g. vehicle to grid)

Predicatable and controllable spectrum

More controllable

Commercial + Industrial

Spot price pass-through

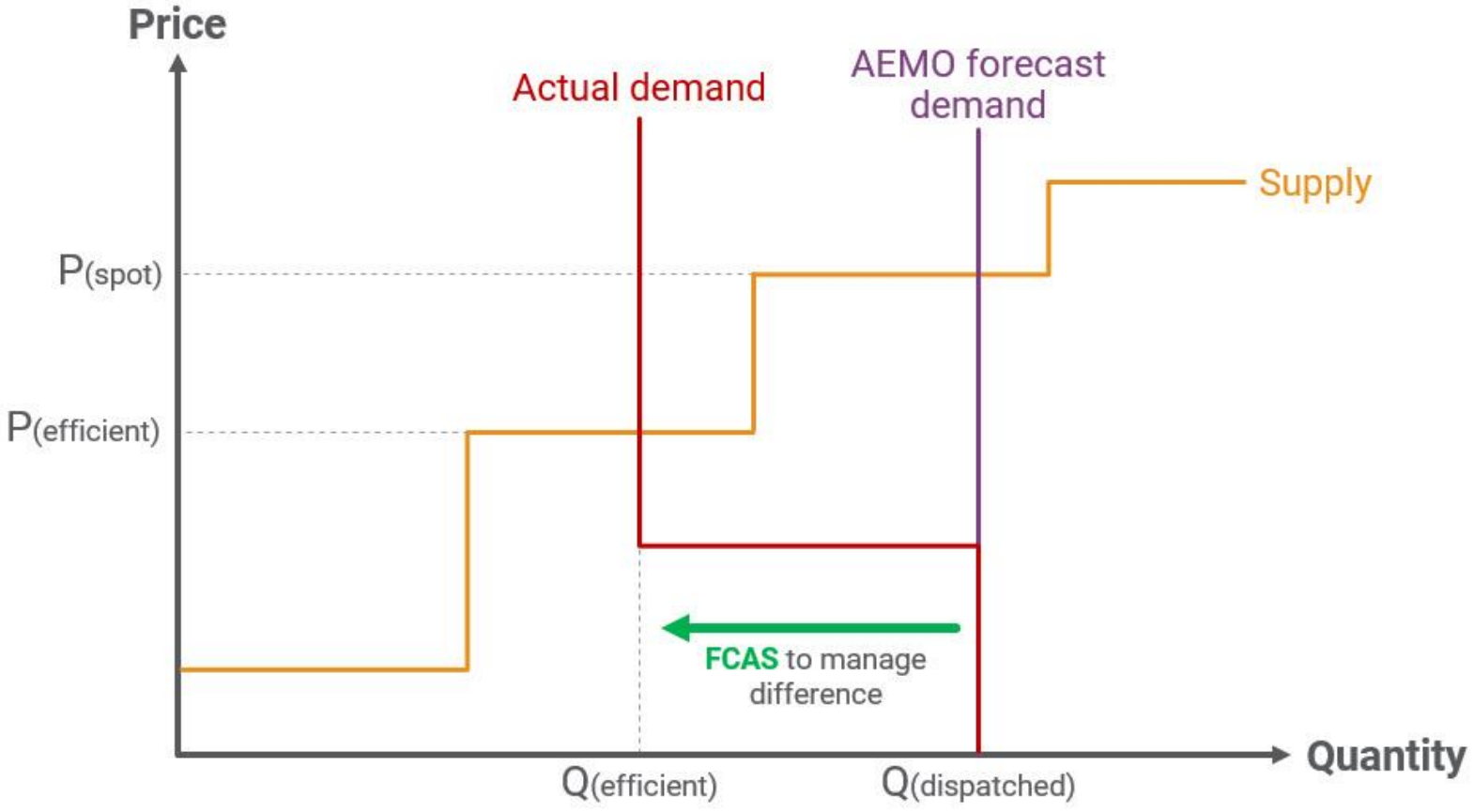
Demand response with retailer provided incentives

Customers with a battery / back-up generation on site

Partial spot price pass-through (e.g. with critical peak pricing)

Controllable loads (e.g. irrigation pumps)

Problems caused by price-responsive resources



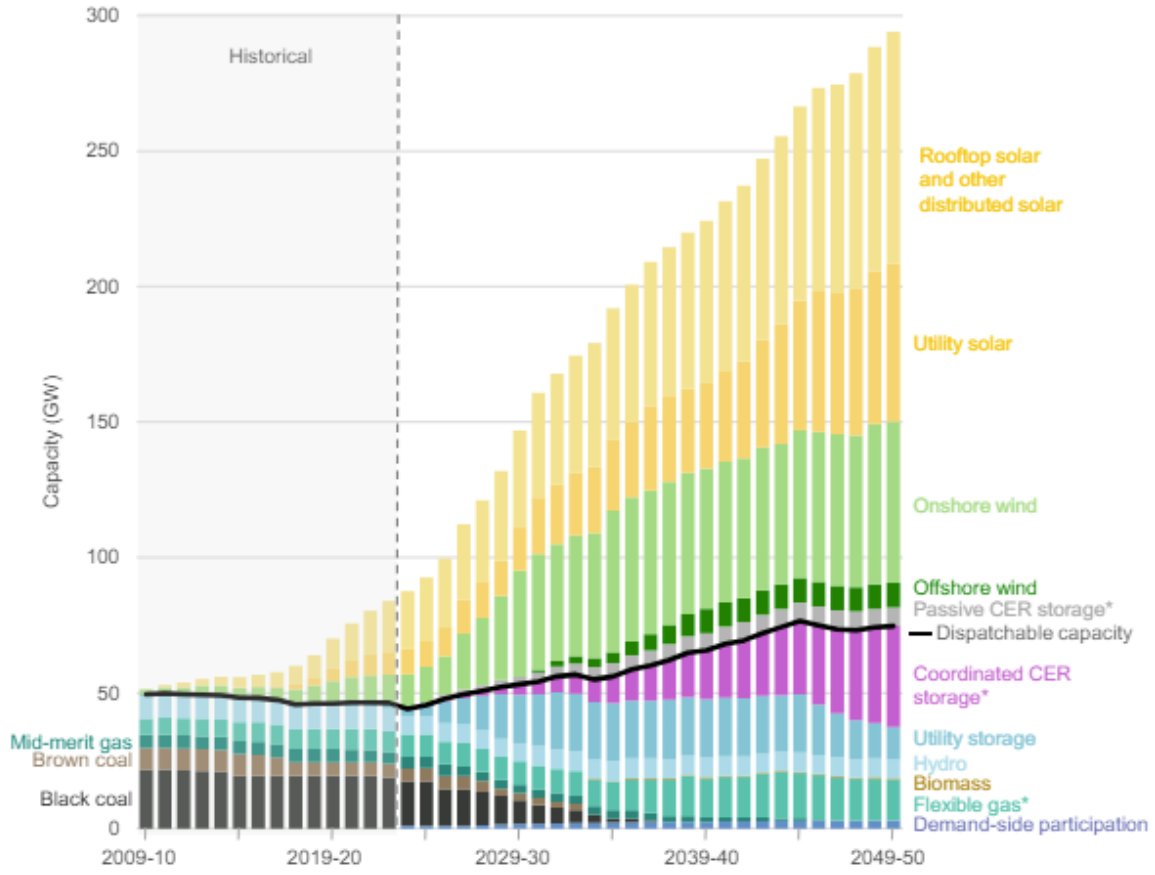
Unscheduled price-responsive resources can result in inaccurate demand forecasts.

Resulting in:

- Higher spot prices (P(s))
- Inefficient cost of scheduled generation
- Potentially use of higher emitting generation
- Higher generation costs
- To balance the system, increased use of FCAS and potentially emergency reliability measures

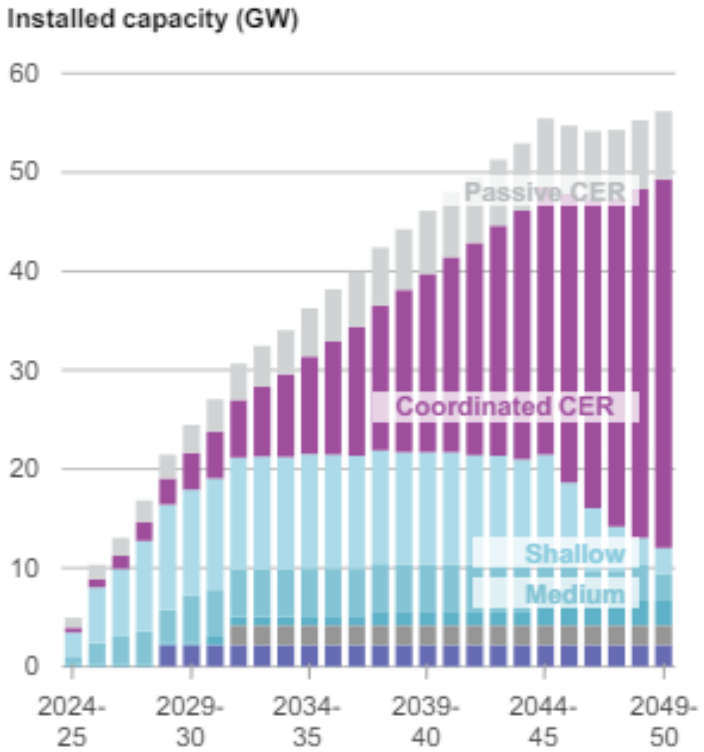
As these resources grow, so too will the issues

Figure 2 **Capacity, NEM** (GW, 2009-10 to 2049-50, *Step Change*)



Notes: "Flexible gas" includes gas-powered generation and potential hydrogen capacity.
"CER storage" means consumer energy resources such as batteries and electric vehicles.
Projections for "Rooftop solar and other distributed solar" and "CER storage" are forecast based on unit costs, consumer trends and assumptions about payments received to participate in the electricity market.

- Coordinated CER storage is forecast to rise from today's 0.2 GW to 3.7 GW in 2029-30, and then 37 GW in 2049-50 – by then making up 66% of the NEM's energy storage
- Coordinated CER storage is managed as part of a VPP, while passive CER storage is not.



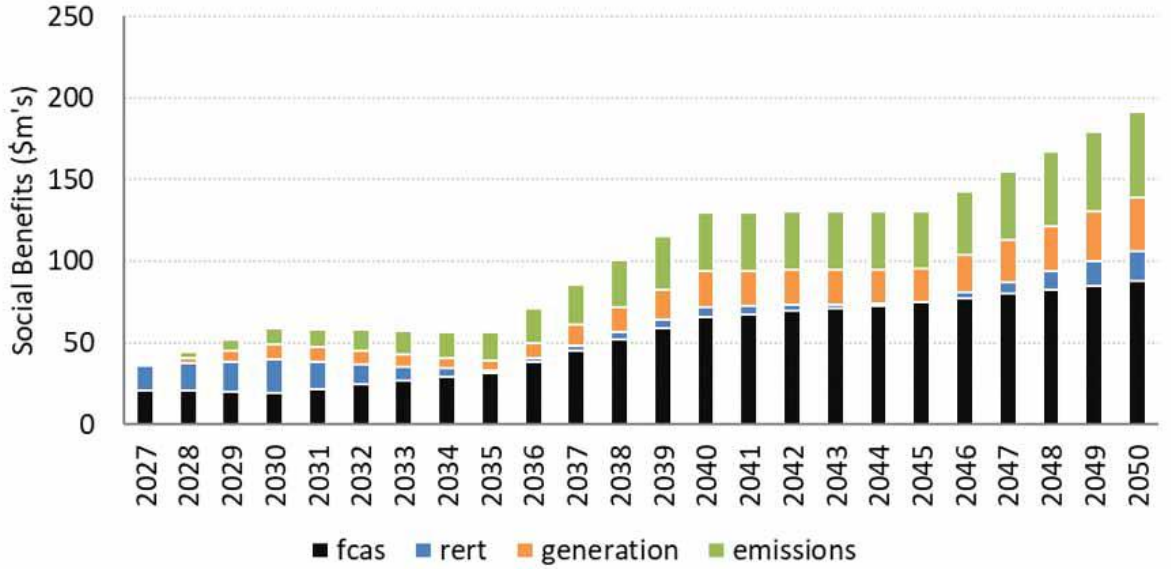
Estimated benefits – IES size of the prize modelling

- IES estimates cost savings of between $1.5 and $1.8b net present value (NPV, 2023) to 2050. These efficiency gains are made up of:
  - lower FCAS requirements (between $831m and $1,053m NPV)
  - lower generation costs (between $189m and $234m NPV)
  - lower emissions (between $325m and $423m NPV)
  - lower requirements for emergency reliability measures ($122m NPV).

Estimated benefits – IES sensitivity modelling

There is material uncertainty regarding the uptake of dispatch mode.

We had IES take a probabilistic approach to modelling the benefits. IES modelled high, medium and low participation sensitivities and then gave them weights based on the likelihood of them eventuating.



Benefit category	Low participation	Medium participation	High participation	Weighted probability
FCAS	220	403	617	411
RERT	100	100	100	100
Generation benefits	63	120	180	121
Emissions	140	199	274	203
Total	**523**	**821**	**1,170**	**834**

Solutions

Three areas in the draft rule

Small distributed resources cannot participate in central dispatch easily

New voluntary framework to allow resources participate – known as ‘dispatch mode’ – voluntarily scheduled resource (VSR)

- The draft rule has been designed so that participation's practical requirements will be less onerous and more flexible than those of a fully scheduled resource.

Being scheduled does not provide the scheduled participant with benefits

New incentive mechanism to get participation and benefits for all consumers from integration

Price sensitivity is not currently used by AEMO as an input for demand forecasting

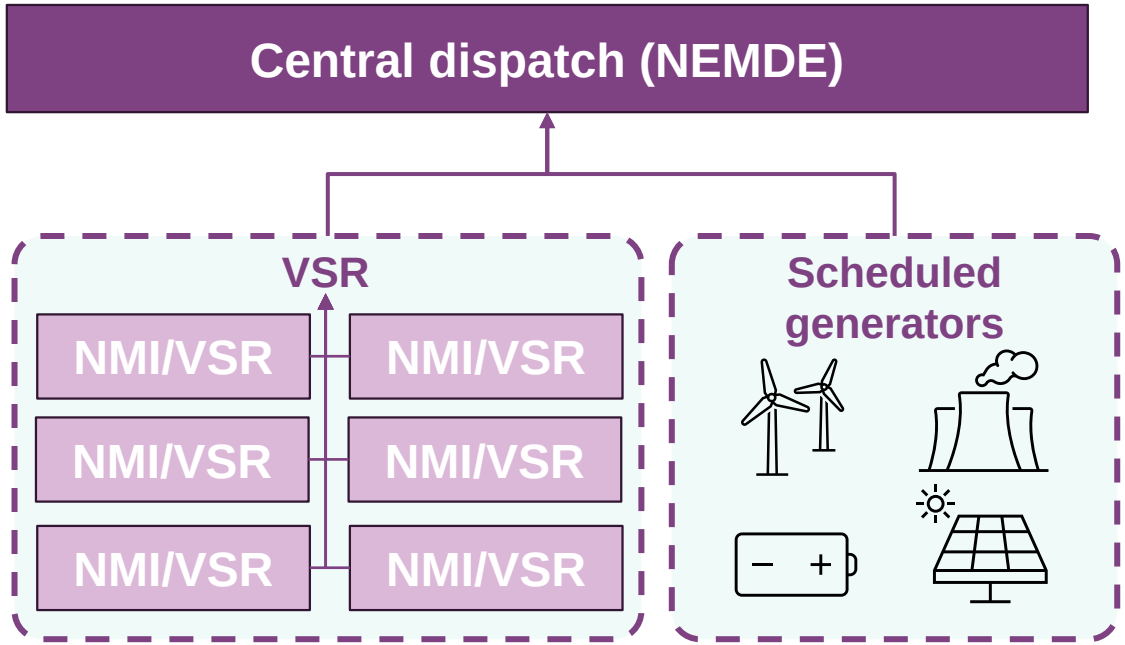
Monitoring and reporting by the AER and AEMO to:

- understand the impact of unscheduled price-responsive resources on demand forecasting
- increase transparency on the actions AEMO takes to improve forecasting.

Dispatch mode — Overview

Our draft rule introduces ‘dispatch mode’, a framework that allows currently unscheduled price-responsive resources to voluntarily be scheduled and dispatchable, either in aggregations or individually. Including these resources in dispatch, means AEMO doesn’t need to forecast their actions, reducing demand forecast errors and their consequential inefficiencies. The key features of dispatch mode are that it:

- is a voluntary mechanism, no consumer or market participant is required to participate or change their behaviour
- allows resources to be nominated as a voluntarily scheduled resource (VSR) and aggregated together to participate in dispatch as one unit.
- defines the key requirements for participation in the NER, with AEMO establishing the specific operational and technical details for participants through a new guideline.
- provides greater flexibility for participants than existing scheduling requirements, with the creation of new mechanisms that allow them to drop in and out of dispatch.



Dispatch mode — guideline

Our draft rule sets out the key participation requirements for dispatch mode and assigns AEMO responsibility to define the required technical details for how VSRs would participate in central dispatch through a new VSR guideline.

The technical requirements for VSRs may impact the level of participation. Given this we have proposed a set of principles to assist AEMO and stakeholders in balancing the trade-off between requirements and participation level.

Contents

- The requirements for nominating an NMI as a voluntary scheduled resource
- The requirements and processes for aggregating voluntary scheduled resources
- Operational requirements for participating:
  - the types of data to be provided to and from AEMO
  - information about the requirements for telemetry and communications equipment
  - the minimum threshold for participation
  - dispatch conformance criteria
  - acceptable types of metering installation for participating connection points
  - requirements for sharing data with Distribution Network Service Provider
- Guidance on aggregating voluntary scheduled resources, including:
  - a methodology for determining zones in which voluntarily scheduled resources participate in central dispatch;
  - guidance for Voluntary Scheduled Resource Providers on processes for automated aggregation of zones for voluntarily scheduled resources; and
  - validation processes for AEMO.

Principles

We are proposing that in developing these guidelines AEMO must:

a) seek to minimise total cost of facilitating the rule change, and in doing so balance the cost to participants in operating a VSR as well as AEMOs costs of facilitating VSRs
b) balance the technical requirements for VSRs with the expected level of participation from these requirements
c) any other matter determined by AEMO.

Incentives

Existing incentives will become available to participants:

- **Co-optimisation of energy and FCAS** — the draft rule enables VSRs to co-optimise VSR energy and FCAS bids when participating in dispatch.
- **Regulation FCAS** — dispatch participants would have access to regulation FCAS markets, subject to meeting the technical requirements.
  - VSRPs will receive a settlement payment for each trading interval where they provided FCAS.
  - AEMO's SCADA Lite initiative will facilitate a bidirectional communication stream between AEMO and a VSRP.
- **Frequency performance payments (FPPs)** — VSRPs will be eligible for FPPs. This aligns VSRs with other scheduled resources that are subject to FPP arrangements.
  - VSRs that contribute helpfully to frequency will receive payments from those that make unhelpful contributions.

Exclusion from RERT cost recovery:

- The draft rule amends the NER to exclude a VSRP's adjusted consumed energy from the RERT cost recovery calculation.
- This aligns with the Commission's decision to remove the adjusted consumed energy of scheduled bi-directional units from RERT cost recovery calculations.

Our current approach to incentives

- Recognising that in the longer-term some of the issues around participation may be resolved with structural reforms, a short-term explicit incentive may be warranted.
- Incentives of this nature are generally not ideal for the rules, so **our first preference is for a party such as ARENA or the CIS to create an incentive mechanism.**
- However, failing this, we created a design for a tender mechanism that would make AEMO provide incentives to the lowest cost participants.
- A price cap for tenders would be introduced based on the benefit that generation would provide to consumers.

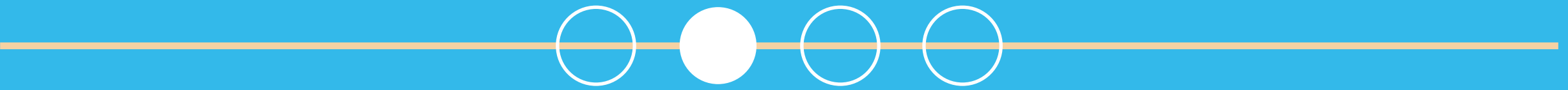
Our mechanism in the draft rule would operate as follows:

1) AEMO would undertake an exercise each year to determine the tender price cap for each auction. This would draw on:
   - Estimates of PRR from DSPIP
   - IES market modelling or updated market modelling
   - The price cap would be half of the $/MW of the market benefit an additional MW is expected to generate.
2) The tender process is run and successful tenders announced a few months prior to the contract beginning, with the lowest cost resources being procured first, where bids are below the price cap.
3) A total payment cap of the amount that could be paid out over the 5-year program is legislated at $50m.
4) Costs from payments under successful contracts would be recovered via market customer charges, in a similar way to RERT activation fees. Costs of running the auction would be recovered via participant fees.
5) The tenders would end after 5 years.

New monitoring and reporting framework for AEMO and the AER

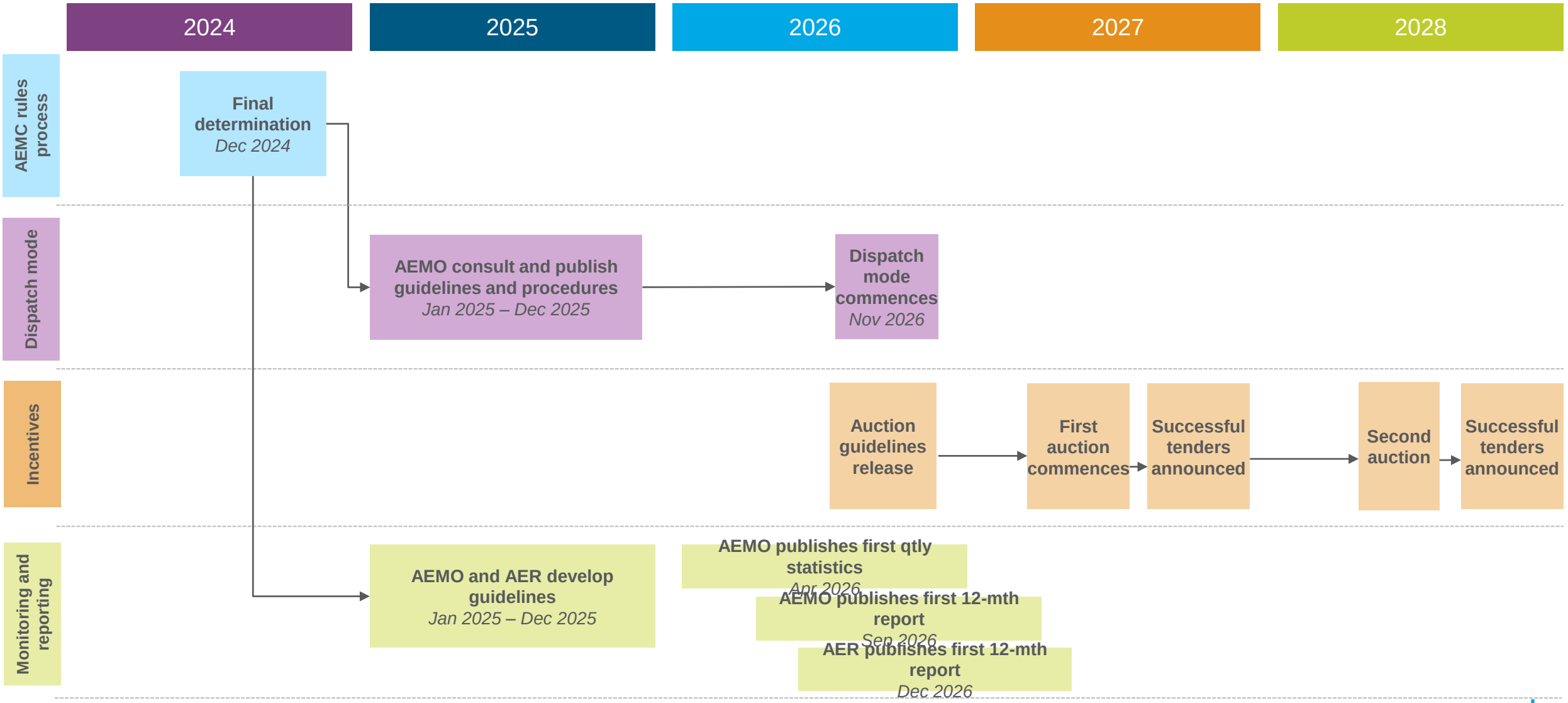
- **The draft rule** introduces new monitoring and reporting obligations for AEMO and the AER to transparently evaluate the effect of price-responsive resources on the accuracy of AEMO's short-term demand forecasts and the efficiency consequences of these effects.
- **This is a proportionate policy response in the long-term interest of consumers.** As the magnitude of these resources grows, they will create challenges for AEMO's demand forecasting and potential market inefficiencies. This will be particularly prevalent if there are a range of resources that are not capable or cost-effective to participate in dispatch mode.

	AEMO	AER
Purpose	To identify the presence and issues created by increased unscheduled price-responsive resources	To assess the efficiency implications and costs associated with these issues.
Topics that must be considered	• Summary statistics to identify trends with DER uptake and price-responsive contracts. • Deviations between regional demand forecasts and actual outcomes, and the contribution of specific factors (such as unscheduled price-responsive resources, rooftop solar, etc.) to these deviations. • Analysis to identify the contribution of deviations from forecast demand to ancillary services costs using frequency performance payments. • The extent to which accounting for unscheduled price-responsive resources has helped or hindered demand forecasting in operational timeframes.	• Inefficient spot prices as a result of regional demand forecast deviations from unscheduled price-responsive resources. • Inefficient costs incurred by scheduled market participants as a result of regional demand forecast deviations. • Increased market ancillary service requirements as a result of regional demand forecast deviations • Increased emissions as a result of inefficient generation. • RERT use and associated costs as a result of inefficient generation use.
Frequency	Quarterly statistics and annual report	Annual report

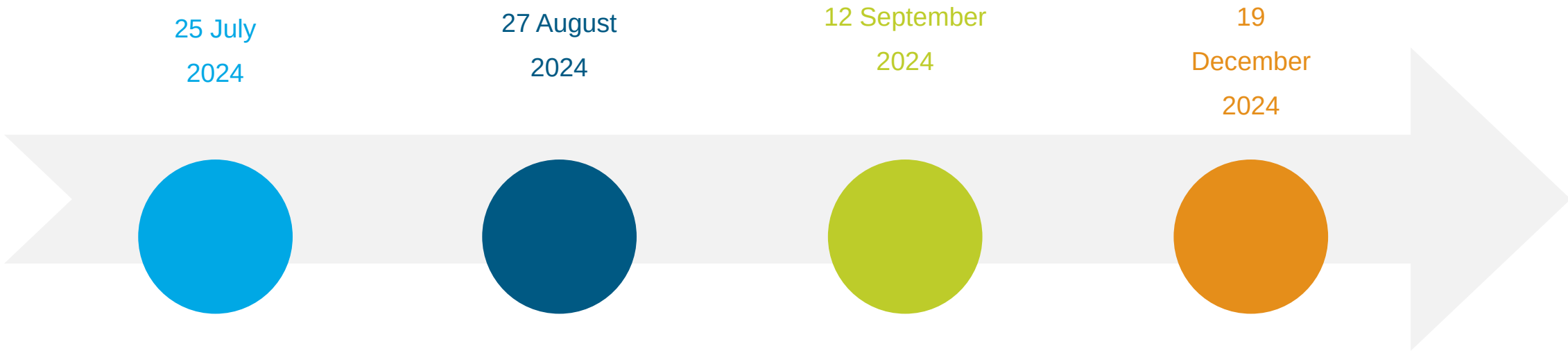


Process

Proposed implementation timelines



Indicative timeline for the final rule



Publication of draft determination

Public Forum

Allow stakeholders to ask questions and provide comments.

Submissions close

Stakeholder submissions to the draft determination due

Publication of final determination

3. AEMO's proposed IPRR implementation approach

Luke Barlow (AEMO)

Purpose of IPRR High-level implementation assessment

WHAT IS THE PURPOSE OF AEMO'S HLIA PROCESS?

- Provides an indicative and preliminary view to participants on how the IPRR draft rule may be implemented by AEMO and its high-level impacts to:
  - AEMO's processes
  - Market procedures
  - High level system and data exchange
  - Participant activities
- Intended to inform participants as they develop their own implementation timelines and impact assessments.

WHAT ISN'T AEMO'S HLIA PROCESS?

- Not intended to pre-empt the outcomes of the ongoing Rule Change process, but to add an additional element of rigour to this process between the AEMC's draft and final IPRR rule.
- It is hoped that this document and the accompanying consultation will elicit feedback from participants which the AEMC can use to inform its IPRR final rule and determination.

The AEMC is the decision maker on the final determination and rule.

IPRR HLIA

HLIA considers impacts of the IPRR draft rule to:

a) AEMO business processes
b) AEMO procedures
c) AEMO systems
d) Participants

These impacts have informed the HLIA's implementation **timeline** and **risks.**

Each set of impacts and the implementation approach are discussed in upcoming sections.

IPRR implementation based on draft rule: Three key components

1. IPRR mechanism

- To integrate presently unscheduled price-responsive energy resources into NEM scheduling processes.

Focus of today's session

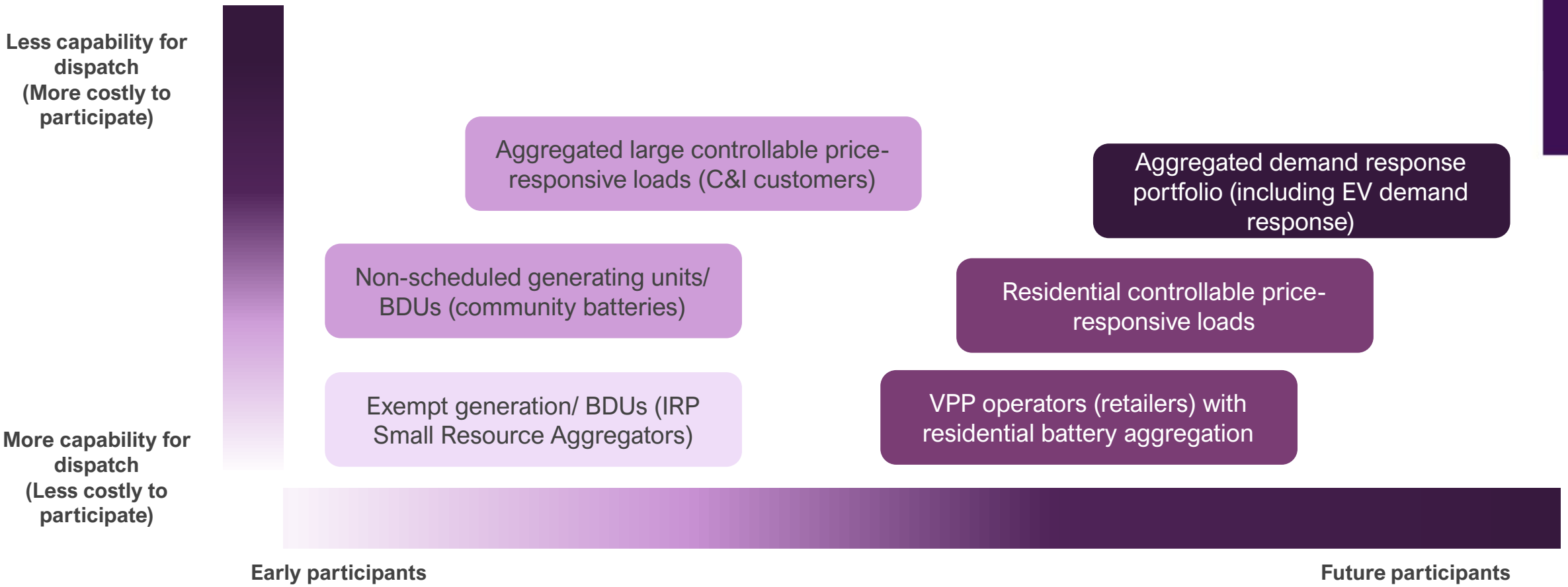
2. Provisional incentive framework

- To encourage participation in the IPRR mechanism.

3. Monitoring & reporting framework

- To understand and manage the impact of unscheduled price-responsive energy resources on demand forecasting processes and market outcomes.

Who would participate?



IPRR draft rule refresher: New terminology and concepts

No new participant category

An Integrated Resource Provider, Market Customer or Generator...

…applies to "nominate" a **QUALIFYING RESOURCE**…

- Non-scheduled generating units
- Non-scheduled bidirectional units (BDU)
- 'Market loads' i.e. market connection point that is a non-scheduled load
- Small resource connection points e.g. exempt small BDU or small generating unit (GU).

…as a **VOLUNTARILY SCHEDULED RESOURCE** (VSR)…

…and may apply for two or more qualifying resources to be aggregated into a single VSR, within a **ZONE.**

The market participant is taken to be a **VOLUNTARILY SCHEDULED RESOURCE PROVIDER** (VSRP) in respect of its VSR.

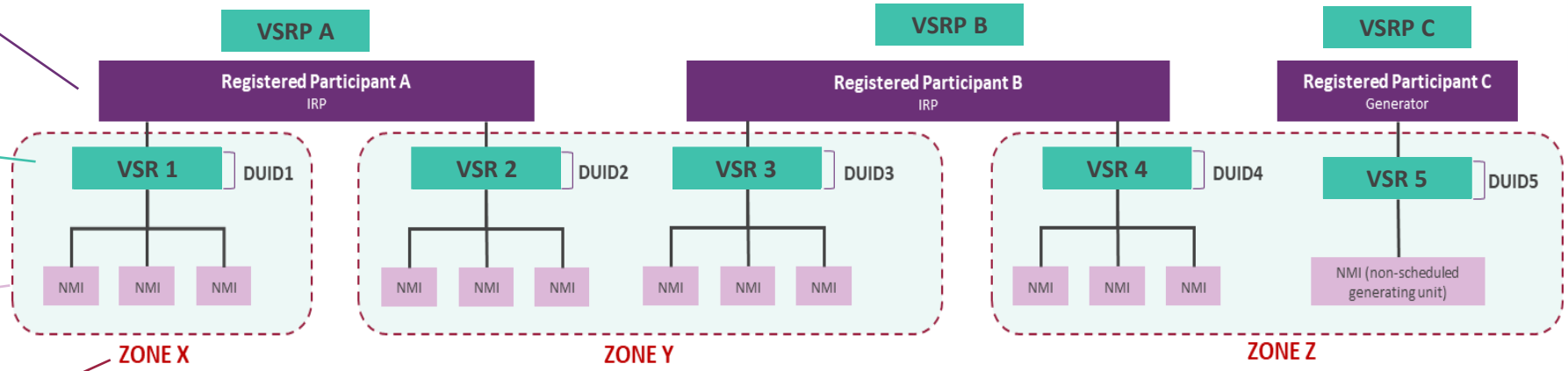
IPRR mechanism implementation: Participation building blocks

Participants are registered under existing framework

Participants apply to nominate qualifying resources as VSR

Participants classify NMIs into VSR

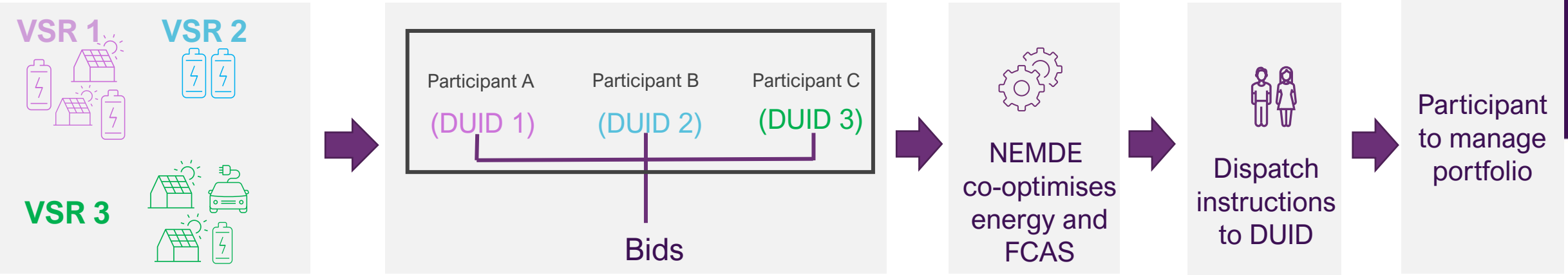
VSR corresponds to a DUID, with each DUID may containing NMIs from a single zone



Dispatch - Proposed Design

Consistent with existing framework for scheduled resources

Dispatch Process Overview



Every 5 minutes, Traders will receive a dispatch instruction per DUID:

- A single bi-directional dispatch instruction representing the net flow to be achieved by its DUID
- Enablement for each FCAS

Traders will need to:

- Disaggregate the dispatch instruction to manage its portfolio accordingly
- Comply with the Market Ancillary Services Specification (MASS) and the NER with respect to the services they provide

IPRR draft rule refresher: New terminology & concepts

TEMPORARILY DEACTIVATED VSR

For periods of at least one trading interval and no more than seven days during which the VSR only partially participates in central dispatch

- Deactivation request is for short-term opt-out (within operational timeframes) by application to AEMO.
- During the deactivation period, participants submit bids but do not need to conform to dispatch instructions.
- The deactivation status must apply to every qualifying resource aggregated in the VSR.
- Detailed criteria and process to apply for deactivation are to be determined in AEMO guidelines (including a notice period).

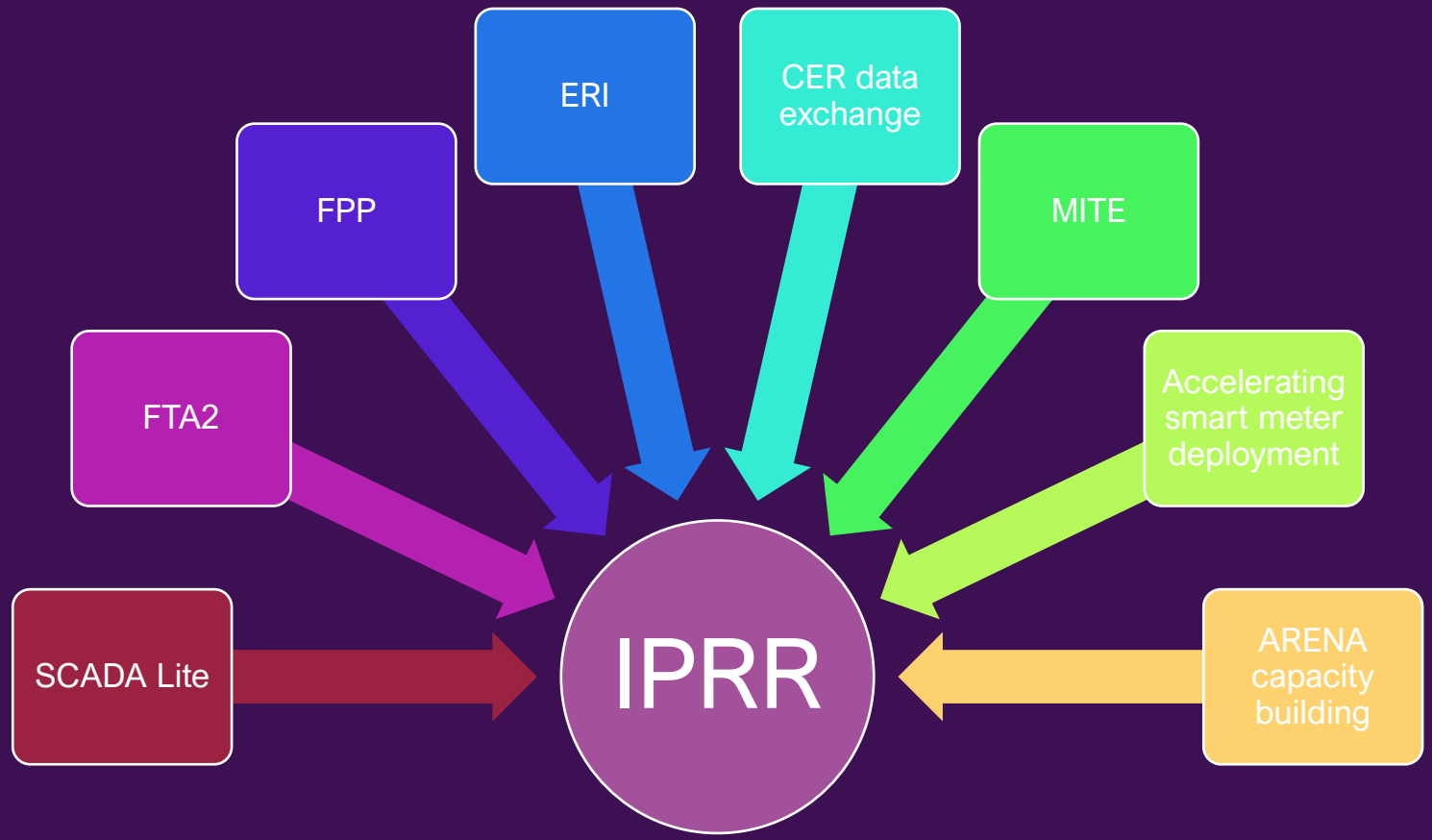
HIBERNATED VSR

For at least 7 days and no more than 18 months during which the VSR will not participate in central dispatch

- Hibernation request is for longer-term opt-out (without deregistration) by application to AEMO.
- The hibernation status must apply to every qualifying resource aggregated in the VSR.
- The previous classification approved by AEMO for that qualifying resource (e.g. as a non-scheduled generating unit, non-scheduled bidirectional unit, non-scheduled load (as applicable)) applies.
- Most criteria and process to be determined in AEMO guidelines (including a notice period).

Related reforms

Other energy reforms are a prerequisite for or complementary to IPRR.



REFORM	RELATIONSHIP TO IPRR
SCADA Lite	• VSRPs would use full SCADA or SCADA lite communications.
FTA2:Unlocking benefits of CER through flexible trading	• VSRPs can separate flexible resources to a secondary NMI. • Optional second FRMP on flexible resources for large customers.
FPP: Frequency performance payments	• VSRs would be eligible for Frequency Performance Payments.
ERI: Enhancing reserve information	• VSR assets to help signal to the market the aggregated levels of storage available.
CER data exchange	• Identifies use cases and exchange model to support CER coordination.
MITE: Market interface technology enhancements	• Enhanced identity and data exchange capabilities to support service providers & new CER use cases.
Accelerating smart meter deployment	• More 5-min capable meters available as a pre-requisite for a VSR.
ARENA capacity building	• Community battery investments are good VSR candidates.

Design assumptions

HLD ASSUMPTION	COMMENTS	IMPLEMENTATION
Participation is voluntary	Participation is voluntary but very important to address operational challenges and avoid duplicative grid-scale investment.	IPRR draft rule proposes the VSR incentive mechanism to encourage participation.
Minimum VSR threshold of 5MW	Changes to a VSRP's portfolio (e.g. churn) could result in a VSR dropping below the minimum size threshold for Dispatch mode participation e.g. because of NMIs moving out of a portfolio.	AEMO to consult on managing these types of scenarios via the VSR guideline development.
VSR performance standards	It is expected that a VSRP will be responsible for ensuring the resources within each VSR comply with their distribution connection agreements.	Performance standards agreed with their connecting NSP and/or any conditions in the VSR guidelines.
Flexible export limits	• Out of scope for IPRR. • VSRPs would be required to comply with any applicable FEL (or DOE) when submitting their bids for dispatch mode.	The AEMC's IPRR draft determination sets out an expectation that FELs are designed by DNSPs in a way that facilitates dispatch participation.
Power system data communications standard applies to VSRs	The design reflects the requirement for a participant to provide telemetry data as per requirements defined in the power system communication standard.	VSRs may be able to use SCADA Lite to communicate telemetry data.
New guidelines for VSR operations See also slide 32	• Requirements for nomination of qualifying resources into VSRs • Requirements and process for aggregation of VSRs • Framework for testing the capabilities of qualifying resources • Operational requirements for VSRs	AEMO to develop the guidelines in consultation with industry.

SEEKING FEEDBACK

AEMO considers that the system changes to implement a ‘hibernation’ mode (in addition to temporary deactivation) are likely to be complex.

→Under what circumstances is a hibernation feature likely to be used?

→How important is a ‘hibernate’ function expected to be in terms of reducing barriers to participation in the IPRR mechanism?

→What types of participation are supported by a hibernation mode that are not accommodated by the temporary deactivation function?

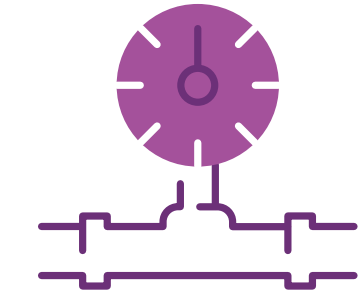
→How important is it that both modes are retained?

4. IPRR High level implementation assessment

Luke Barlow, Emily Brodie (AEMO)

IPRR draft rule: Impacts to AEMO's processes

Luke Barlow



IPRR draft rule: Summary of impacts to AEMO's processes

1. IPRR mechanism

- To integrate presently unscheduled price-responsive energy resources into NEM scheduling processes.

HIGH IMPACT

2. Provisional incentive framework

- To encourage participation in the IPRR mechanism.

VERY HIGH IMPACT

3. Monitoring & reporting framework

- To understand and manage the impact of unscheduled price-responsive energy resources on demand forecasting processes and market outcomes.

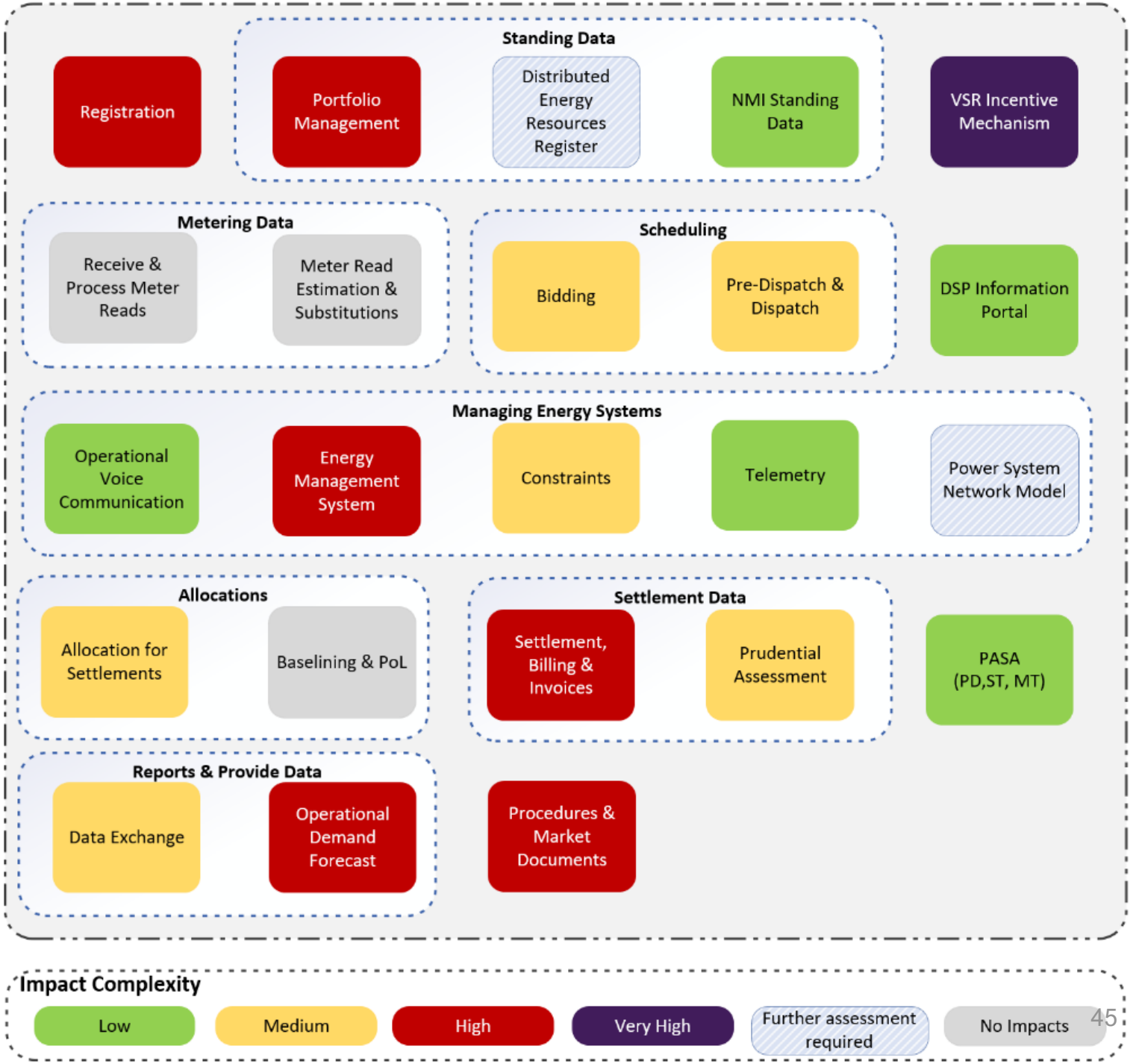
HIGH IMPACT

IPRR draft rule: Impacts to AEMO's processes

Table 3 Tabular view of focus area impacts from the IPRR draft rule

Focus area	Impact	Impact description
Registration	High	• No new unique participant registration category for market participants with VSRs. VSRPs will be registered as IRP, Market Customer or Generator in accordance with the existing participant registration framework. A VSRP must be the financially responsible Market Participant (FRMP) for the NMIs it is nominating into VSRs. • Introduction of a new 'unit type' of VSR and development of a new 'nomination' process to allow one or more qualifying resources to be nominated into VSRs by the FRMP (VSRP). • Development of a new initial capability assessment process for VSRs to ensure they have the technical capability to participate in scheduling and dispatch processes. • Introduction of minimum VSR capacity threshold for participation.
Portfolio Management	High	• New portfolio management processes to establish and maintain VSR portfolios, including nomination/de-nomination, addition/removal of NMIs, VSR configurations, updates to standing data, etc. • Impacts associated with implementation and management of new participation modes, including 'temporary deactivation' and 'hibernation'. • Portfolio management capabilities to manage customer churn. • Potential system updates to manage a greater volume of assets and data. • Updates to AEMO Validation processes to manage VSRs, for example VSR management within zones.
DER Register	TBC	• Further assessment required to determine impacts for the DER Register.
NMI standing data	Low	• Further assessment required to determine if there is a need to update Agg Flag assignment to RERT cost recovery carve-outs and FPP.
VSR Incentive mechanism	Very high	• Develop new VSR incentive procedures to establish VSR tender processes, see section 4 for more details. • Develop new VSR tender process including assessment criteria, methodology and contract development for selecting successful VSR incentive mechanism participants for each VSR tender. • Implement process changes to: – Assess VSR participation and make VSR participation payments – Recover costs of establishing, administering and conducting the VSR incentive mechanism (via fees) – Recover costs of VSR participation payments (via CRMPs). • Potential adjustments to include VSR incentive mechanism participation payments in prudential estimations. • Assessment of VSR benefits & calculation of 'incentive MW price cap'. • Reporting of participation payments after VSR tender process (IPRR draft rule 3.10.4A(n)). • Overall, requires development of new capabilities, governance arrangements, appropriate resourcing, etc.

Please refer to HLIA for full description of business process impact assessment



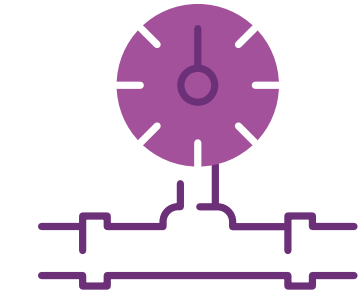
SEEKING FEEDBACK…

→To what extent do you agree with the impact and impact ratings AEMO has identified for each focus area?

→What changes do you propose and why?

IPRR draft rule: Impacts to AEMO's procedures

Emily Brodie



PLEASE REFER TO HLIA FOR FULL MARKET PROCEDURE IMPACT ASSESSMENT

Table 4 Proposed new AEMO procedures, guidelines, reviews and reports

NEW PROCEDURE	IPRR DRAFT RULE	EFFORT	PROPOSED CONTENT AND TIMING
Voluntarily scheduled resource guidelines	• 3.10A.3 • 11.17[X].3(a)(2)	High	Develop, consult and publish by 31 December 2025. Required to cover a range of details including: • Requirements for nomination of qualifying resources into VSRs • Requirements and process for aggregation of VSRs • Framework for testing the capabilities of qualifying resources • Operational requirements for VSRs, including: – Types of data to be submitted – Telemetry & communications requirements – Thresholds for participation – Dispatch conformance criteria – Acceptable types of metering installations – DNSP data sharing requirements – Zonal aggregation requirements – Temporary deactivation and hibernation requirements – Any other information AEMO considers reasonably necessary.
Review of the Voluntarily scheduled resource guidelines	11.17[X].3(c)	High	Complete review by 05 November 2029
AEMO price responsive reporting guidelines	• 3.10B.2 (e)-(g) • 11.17[X].3(a)(1)	High	Develop, consult and publish by 31 December 2025. Required to specify: • How AEMO will meet its annual reporting obligations on unscheduled price-responsive resources • The information and metrics that AEMO will include in its quarterly reporting on unscheduled price responsive resources.
Annual report on	• 3.10B.2(h)	High	Publish by 30 September each year. First report must be published by 30

Table 5 Current relevant AEMO procedures

TYPE OF PROCEDURE	EFFORT	CHANGE
Registration information resource & guidelines, including: • Guide to Application Registration Forms in the NEM • Application Guide for Registration as a Generator in the NEM • Guide to Registration Exemptions and Production Unit Classifications	Medium / High	• Most registration/classification documents will require updates to accommodate VSR nominations by Market Participants. • New application forms and guides are likely to be required. • The Guide to Registration Exemptions and Production Unit Classifications may require updates to reflect the new 'qualifying resource' nomination process. • Impact of IPRR to registration documents will depend on the extent to which VSR requirements are included in the VSR guidelines versus registration documentation.
System Operation Procedures, including: • SO_OP_3705 - Dispatch Procedure • SO_OP_3704 - Pre-dispatch Procedure • Spot Market Operations Timetable procedure • Short Term PASA Process Description • Market suspension compensation methodology and schedule of benchmark values • Communications and control systems	Medium	• Amendments will be required due to the inclusion of: – VSR (new unit type) – Changes to dispatch conformance process to manage VSRs in different modes of operation (active/temporarily deactivated/hibernated). – Data integration into market processes from new VSR unit type e.g. price adjusted demand curve definition, functionality and integration – Impact to System Operating Procedures will depend on the extent to which VSR requirements are included in the VSR guidelines.
Market ancillary services • Market ancillary services specification	Low	• May need updating to incorporate requirements for VSRs to participate in regulation FCAS.
Non-market ancillary services • SO_OP_3717 - Procedure for the Exercise of the Reliability and Emergency Reserve Trader (RERT)	Low	• Amendments to include: – New VSR unit type – Which modes of VSR operation are eligible to participation in RERT.
Directions • SO_OP_3707 - Procedures for Issue of Directions and Clause 4.8.9 Instructions	Low	• Update procedure to specify how directions apply to VSR units and whether they apply based on active/temporarily deactivated/hibernated modes of operation.
Loss factors resources, including: • Forward-looking transmission loss factors • Treatment of loss factors in the NEM	Low	• Procedures will need to describe the methodology for calculating loss factors for VSRs.
Constraints resources & guidelines, including: • Constraint Formulation Guidelines • Constraint implementation guidelines • Schedule of constraint violation penalty factors	Low/ Medium	• Additional sections may be required to describe how VSRs are represented in constraints and how they are formulated. • If switching VSRs between active/temporarily deactivated/hibernated modes should result in updates to constraints, then additional procedures should describe these processes.
Forecasting and Planning, including: • Demand Side Participation Forecast Methodology • Demand Side Participation Information Guidelines • Medium Term PASA Process Description	Low	• Updates to DSP methodology will be required to describe how VSRs are included in the Demand side participation forecasts.
Operational Forecasting	Medium	• Amend procedures to include VSR unit type.

Summary of impacts to key market procedures (1/3)

VSR guideline scope – next slide

IPRR MECHANISM		
AREA	**IMPACT**	**COMMENT**
• New VSR guidelines	**HIGH**	• Develop new guidelines, significant scope
• Registration	**HIGH / MEDIUM**	• To reflect VSR unit type & nomination process • Impact depends on extent to which VSR requirements are split between registration documents and the new VSR guidelines
• System Operations • Constraints • Operational forecasting	**MEDIUM**	• To reflect VSR unit type & participation modes
• Settlements	**MEDIUM**	• To reflect VSRs in settlements & non-energy cost recovery arrangements for VSRs.
• Retail/Metering	**LOW**	• Potential change to manage customer churn (would not require system changes)
• Other existing procedures	**LOW**	• Minor/administrative terminology updates to include VSR unit type
• B2B procedures	**NO IMPACT (TBC)**	• Seeking view from B2B Working Group

Summary of impacts to key market procedures (2/3)

IPRR MECHANISM: NEW VSR GUIDELINES

- Requirements for **nomination** of qualifying resources into VSRs
- Requirements and process for **aggregation** of NMIs into VSRs
- Framework for testing the **capabilities** of qualifying resources
- **Operational requirements** for VSRs, including:
  - Types of data to be submitted
  - Telemetry & communications requirements
  - Thresholds for participation
  - Dispatch conformance criteria
  - Metering installation requirements
  - Distribution Network Service Provider (DNSP) data sharing requirements
  - Zonal aggregation requirements
  - Temporary deactivation and hibernation requirements
  - Any other information AEMO considers reasonably necessary.

Summary of impacts to key market procedures (3/3)

PROVISIONAL INCENTIVE FRAMEWORK		
AREA	**IMPACT**	**COMMENT**
• New VSR incentive procedures	**HIGH**	Develop new procedures
• Settlements	**MEDIUM**	To reflect: • VSR participation payments • VSR incentive mechanism cost recovery.

MONITORING & REPORTING FRAMEWORK		
AREA	**IMPACT**	**COMMENT**
• AEMO price responsive reporting guidelines	**HIGH**	Develop new guidelines
• Annual & quarterly reporting on unscheduled price responsive resources	**HIGH**	Develop new reports

SEEKING FEEDBACK…

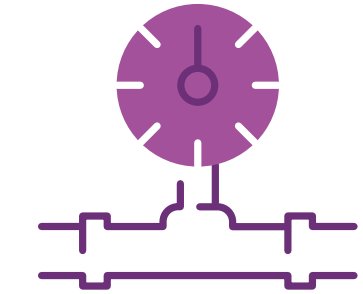
Noting that the Electricity Wholesale and Retail Consultative Forums (EWCF and ERCF) will consider prioritisation and bundling of procedure consultations:

→To what extent do you agree with the impact and impact ratings AEMO has identified for each grouping of procedures?

→What changes do you propose and why?

IPRR draft rule: Impacts to AEMO's systems

Luke Barlow



Summary of impacts to AEMO's systems

1. IPRR mechanism

- To integrate presently unscheduled price-responsive energy resources into NEM scheduling processes.

HIGH IMPACT

2. Provisional incentive framework

- To encourage participation in the IPRR mechanism.

MEDIUM IMPACT

3. Monitoring & reporting framework

- To understand and manage the impact of unscheduled price-responsive energy resources on demand forecasting processes and market outcomes.

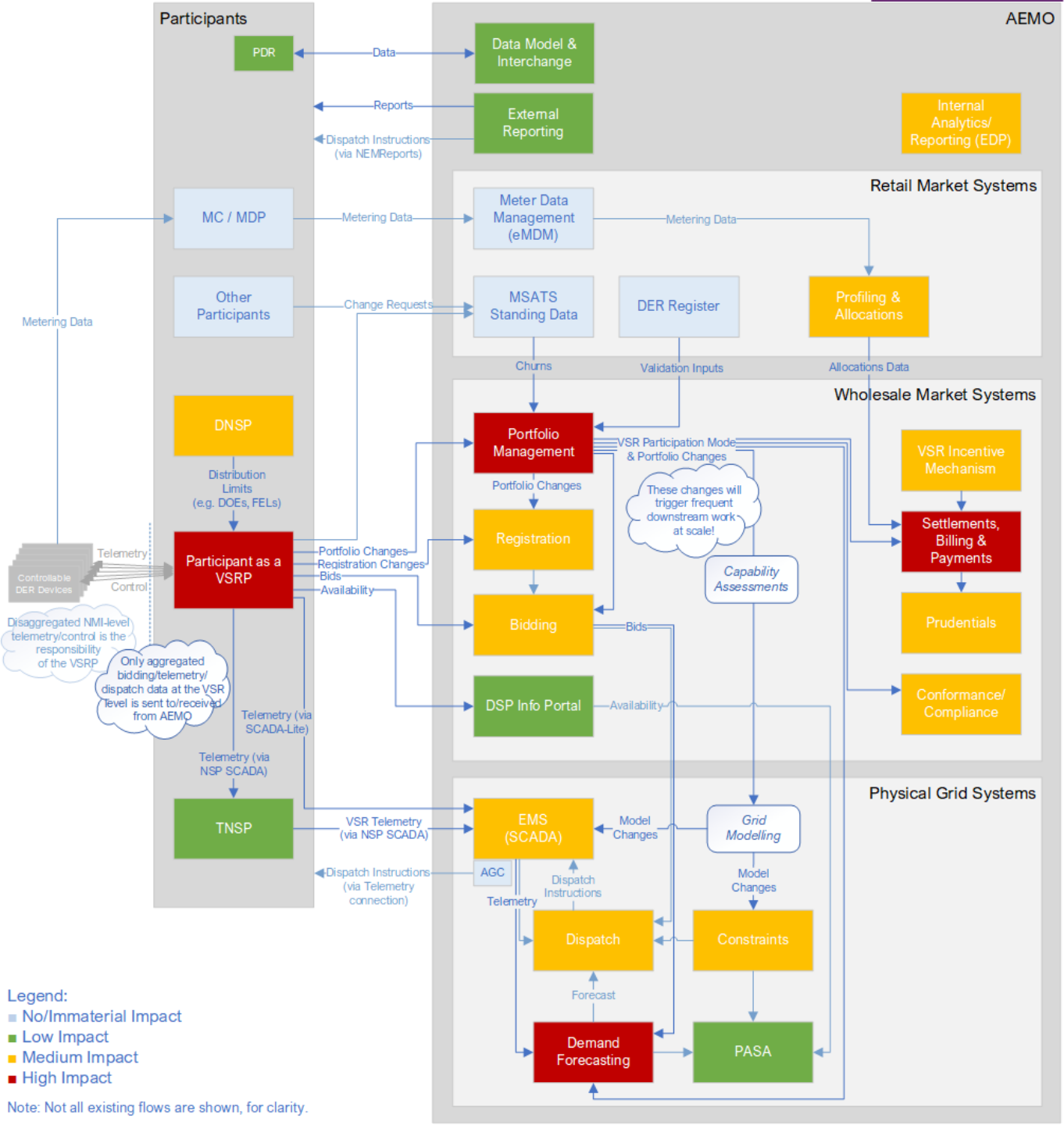
LOW IMPACT

IPRR draft rule: Impacts to AEMO's systems

Table 6 Tabular view of system impacts from IPRR draft rule

AEMO System	Summary
High System Impact	
Portfolio Management (PMS)	• Management of 'Zones' for validation purposes • Manage the VSR Participation Status of Active/Deactivated/Hibernated for time periods, including approval workflows. • Cater for an increased number of NMI enrolments in an aggregation. • Cater for an increased frequency of NMI enrolment changes – automation of these changes is highly recommended to improve turn-around times. • APIs will be added to PMS to allow automation of data input from Participants to support the above points. • Cross-validation of input data against DER Register.
Settlements, Billing & Payments	• Settlement logic is not expected to be impacted for Energy transactions, including in the case of 'hibernated' or 'temporarily deactivated' VSRs. • Exclusion of VRSPs from the RERT cost recovery calculation will need to be modified here. Consideration will be given to move some calculations into Allocations to avoid performance implications for VSRs composed of many NMIs. • Exclusion of Contribution Factor Calculated DUIDs from the FPP Residual Calculation will need to be modified to cater for VSRs given they will have multiple NMIs provided as an aggregate read. • Incorporation of VSR participation payments.
Demand Forecasting	• The stop/start nature of telemetry from VSRs during hibernation will require either manual work to keep models up-to-date or complex logic to deal with the conditional treatment of these inputs to produce accurate forecasts.
Medium System Impact	
Registration	• A new Dispatch Subtype of 'VSR' to be added under Dispatch Type 'Bidirectional' to drive logic in downstream systems. • Allow for changing capacity against a DUID as the portfolio composition changes over time on a frequent basis. Although it is not currently supported data flow, this may be fed automatically

Please refer to HLIA for full description of system impact assessment



SEEKING FEEDBACK…

→ To what extent have the potential impacts to AEMO systems from the IPRR draft rule been appropriately described?

→ What changes do you propose and why?

IPRR draft rule: Impacts to participants

Emily Brodie

Disclaimer

This presentation includes material outlining AEMO's interpretation of indicative impacts of national energy market (NEM) reforms to energy market systems and processes for energy industry participants, as at 7 August 2024.

The interpretations expressed in this presentation are not binding on AEMO. The interpretation of the impact of NEM reforms may change at any time.

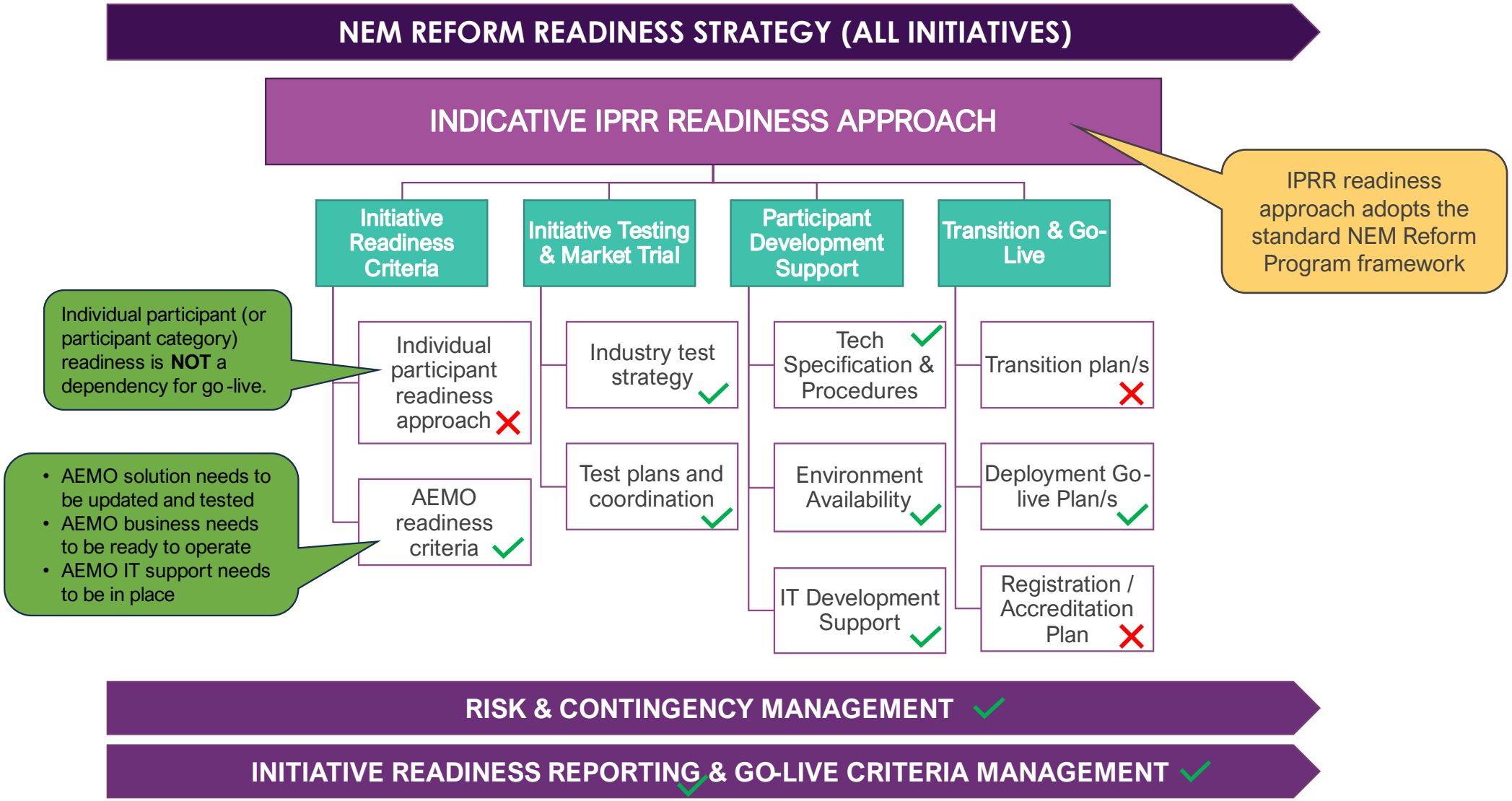
Anyone participating or intending to participate in the NEM should obtain detailed advice about the application of the National Electricity Rules and applicable laws, procedures and policies to their specific circumstances.

To the maximum extent permitted by law, AEMO and its employees or consultants are not liable for any statements in, or omissions from, these materials, or for any use of or reliance on them.

Indicative participant impacts

STAKEHOLDER TYPE	INDICATIVE IMPACT	COMMENT
Integrated resource provider, Market generator, Market customer	Opting to participate in IPRR: High Not participating in IPRR: Low	• High impacts to those market participants that choose to participate as VSRPs. Obligations would include registration, establishing VSRs, portfolio management, bidding, dispatch, settlement etc • To be able to fully reconcile the cost recovery of VSR participation payments, CRMPs would need to adopt the updated data model. However existing use of the data model would not be impacted.
Transmission NSPs	Low impact expected	• TNSPs may need visibility of VSR operation: • For incorporation into constraint equations • For future non-market services • To manage the interface between transmission and distribution systems.
Distribution NSPs	Low/medium impact	• VSRPs would be responsible for ensuring that their bids and any subsequent dispatch complies with applicable distribution connection agreements. • Receive any new VSR-related reports or data feeds: – Visibility of NMIs that are part of a VSR – Aggregated scheduling information (pre-dispatch/dispatch timeframes) • IPRR draft determination notes that it is AEMC's expectation that distribution limits are to be designed to facilitate VSR participation.
Metering providers	No impact expected	• As part of the VSR guidelines development, AEMO must consult on and determine acceptable types of metering installations for participating connection points. • AEMO expects that the revenue meter at the participating site would need to adhere to requirements in NER Chapter 7. For small customers, this would typically mean a type 4 meter that is capable of recording data in five-minute intervals.
Metering data providers	No impact expected	• No change to current metering data processes for VSRs.
Embedded network managers	No impact expected	• VSRPs could nominate resources at embedded network child connection points, if they are an on-market connection point.
Market SAPs resource providers	No impact.	• MSRPs would not be able to nominate VSRs.

IPRR: Indicative readiness approach



SEEKING FEEDBACK…

→To what extent do you agree with the impact and impact ratings AEMO has identified for each stakeholder type? What changes do you propose and why?

→What additional participant impacts and challenges do you anticipate?

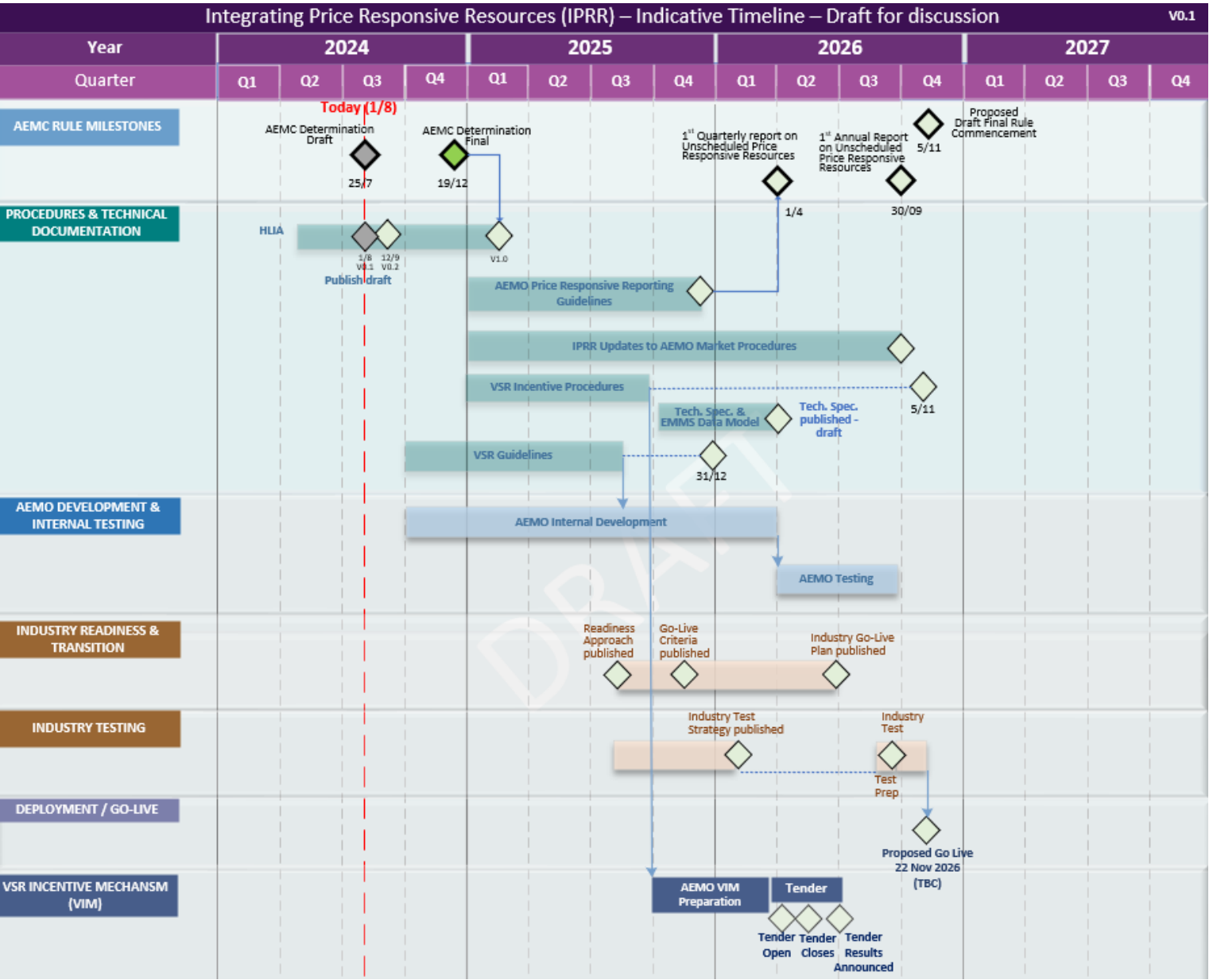
→What are your views on each of the elements of the indicative readiness approach and their timings?

→What are your current views on need for a separate participant development support environment?

Indicative implementation milestones

Emily Brodie

IPRR indicative implementation timeline



AREA	KEY DELIVERY CONSIDERATIONS
Start date	Suggested change to start date to **Sun 22 Nov 2026**: • Aligns with the start of billing week to support settlement changes. • Provides additional development time • In relation to other concurrent reforms, likely to work better with the Unlocking CER benefits deployment for AEMO and industry.
Procedure consultation	• Allow sufficient consultation time. • Prioritise critical path consultations that have dependencies with AEMO's and industry's development and testing. • Look to prioritise and/or bundle procedure consultations (via EWCF/ERCF), including discussion of 'critical path' consultations.
VSR Incentive Mechanism	Bring VIM procedure development & first tender process forward: • Dependency to Settlements build • Benefits from running tender earlier - more certainty for participants, earlier payments, and earlier IPRR participation.
Industry support & test	• Standard pre-production environment available for industry testing. • Initial assessment is that a Participant development support environment would not be needed as changes to participant interfaces are not expected to be significant. → AEMO will engage on the need for development support for new/intending VSRP participants • Provide 1 month of industry testing based on assumption that a market trial is not required. → AEMO will engage with intending VRSPs on any need for extended testing support beyond the IPRR commencement date. • Publish draft tech specs & EMMS Data Model with sufficient time before commencement of Industry testing to support participant development.

SEEKING FEEDBACK…

→ To what extent have the key IPRR implementation considerations been appropriately described?

→ AEMO has proposed alternative timing for two implementation components, including:

- a slightly later 22 November 2026 commencement date
- earlier development of VSR incentive mechanism procedures and earlier commencement of the first tender process.

→Do you agree with AEMO's suggested timeframes for these components, and are there any other relevant considerations for the timing of the incentive mechanism?

5. Feedback and next steps

Ulrika Lindholm

Next steps

STAGE	DATES	RESPONSIBLE
AEMC draft rule & determination published	Thu 25 Jul	AEMC
AEMO draft HLIA v0.1 published	Thu 1 Aug	AEMO
AEMO industry briefing on draft HLIA	Wed 7 Aug	AEMO
AEMO feedback period on draft HLIA closes	Mon 19 Aug	Industry to provide feedback
AEMO presents HLIA at Reform Delivery Committee	Thu 29 Aug	AEMO
Publish draft HLIA v0.2 • Incorporates industry feedback where appropriate	Thu 12 Sep	AEMO
AEMC consultation period on draft rule closes	Thu 12 Sep	Industry to provide feedback
Final rule determination	Thu 19 Dec	AEMC
Publish final HLIA	Feb 2025 (TBC)	AEMO

AEMO is seeking feedback on its draft HLIA

- Please provide your feedback on the draft HLIA via nemreform@aemo.com.au **by Monday 19 August.**
- A response template is available should you prefer to use it.
- Feedback on the draft HLIA will inform the next draft version.

6. Q&A

7. How to get involved & close

Ulrika Lindholm

NEM Reform Program Engagement

Forums	Forum focus	Cadence	Approach
Executive Forum	Program overview and status update	3 per Year	Nomination
Reform Delivery Committee (RDC)	Long term implementation planning perspective	Quarterly	Nomination
Program Consultative Forum (PCF)	Inflight initiatives status & co-ordination	Monthly	Open
Implementation Forum	Implementation of reforms	Monthly	Open
Electricity Wholesale (EWCF) & Electricity Retail (ERCF) Consultative Forums	Procedures working groups	Monthly	Open
Industry Testing Working Group	Testing	Monthly	Open
Working Groups	Inflight	As appropriate	As appropriate

Focus / working groups for inflight initiatives include:

- Initiative working groups
- Market Integration Technology Enhancement WG (IDX/IDAM/PC)
- Industry Testing Working Group (ITWG) – IT technical implementations

To learn more, please visit:

- AEMO | NEM Reform Program Forums
- AEMO | NEM Reform Program Initiatives
- AEMO | Industry Meetings Calendar
- or contact the program at NEMReform@aemo.com.au.

Subscribe to the NEM Reform Newsletter here

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Appendix A – AEMO Competition Law Meeting Protocol

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, all participants agree to adhere to the CCA at all times and to comply with appropriate protocols where required to do so.

AEMO has developed meeting protocols to support compliance with the CCA in working groups and other forums with energy stakeholders. Before attending, participants should confirm the application of the appropriate meeting protocol.

Please visit: https://aemo.com.au/en/consultations/industry-forums-and-working-groups

Appendix B –Glossary

Glossary

TERM	DEFINITION
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
API	Application Programming Interface
ARENA	
B2B	Business to business
B2M	Business to market
BDU	Bidirectional Unit
CER	Consumer Energy Resources
COAG	Council of Australian Governments
CRMP	Cost recovery market participant
DER	Distributed energy resources
DNSP	Distribution network service provider
DRSP	Demand response service provider
DSP	Demand side participation
DUID	Dispatchable unit ID

TERM	DEFINITION
ERI	Enhancing reserve information
ESB	Energy Security Board
EV	Electric vehicle
FCAS	Frequency control ancillary service
FEL	Flexible export limit
FPP	Frequency performance payments
FTA2	Unlocking benefits of CER through flexible trading
FRMP	Financially responsible market participant
HLIA	High level implementation assessment
IESS	Integrating energy storage systems
IDAM	Identity access and management
IDX	Industry data exchange
IPRR	Integrating price responsive resources
IRP	Integrated resource provider
ISP	Integrated system plan
MASS	Market ancillary services specification

TERM	DEFINITION
MITE	Market interface technology enhancement
NEM	National electricity market
NEMDE	National electricity market dispatch engine
NEO	National electricity objective
NER	National electricity rules
NMI	National metering identifier
NSP	Network service provider
PASA	Projected assessment of system adequacy
PMS	Portfolio management system
PoL	Predictability of load
RDC	Reform Delivery Committee
SCADA	Supervisory control and data acquisition
V2G	Vehicle-to-grid
VPP	Virtual Power Plants
VSR	Voluntarily scheduled resource
VSRP	Voluntarily scheduled resource provider
WDRM	Wholesale Demand Response Mechanism