

Integrating price responsive resources into the National Electricity Market: DRAFT High level implementation assessment

AugustSeptember 2024

Preliminary view for participants for their comment on how the rule change may be implemented by AEMO



Important notice

Purpose

AEMO has prepared this document to provide preliminary information about the implementation design of the *Integrating price responsive resources into the National Electricity Market* rule change before a final rule determination is made.

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Version control

Version	Release date	Changes
0.1	1 August 2024	Draft for industry comment
<u>0.2</u>	<u>12 September 2024</u>	<u>Draft for AEMC's consideration in determining the final IPRR rule.</u>

Contents

4	Introduction	5
1.1	Rule change process: Integrating price-responsive resources into the NEM	5
1.2	HLIA document purpose	6
1.3	Key dates	7
1.4	Stakeholder feedback invited	7
1.5	Stakeholder engagement	7
2	Market design	8
2.1	IPRR draft rule: Mechanism to enable participation of unscheduled price-responsive energy resources in the NEM	8
2.2	VSR incentive mechanism to further encourage VSR participation	12
2.3	IPRR draft rule: A monitoring and reporting framework	13
3	Summary of key AEMO impacts	16
4	AEMO procedure impacts	20
5	AEMO system impacts	24
5.1	System and data exchange overview	24
5.2	Data model, schemas, and technical specification impacts	27
5.3	Data growth impacts on system capacity	28
6	Participant impact assessment	29
6.1	IPRR high-level participant impact assessment	29
6.2	Indicative industry readiness approach	31
7	Implementation pathway	34
7.1	Key delivery considerations	35
7.2	Risks	36
8	Related reforms	37
9	Seeking feedback	38
A1.	Impact ratings	40
A2.	Glossary	41
1	Introduction	7
1.1	Rule change process: Integrating price-responsive resources into the NEM	7
1.2	HLIA document purpose	8
1.3	Key dates	9
1.4	Stakeholder engagement	9
2	Market design	11



2.1	IPRR draft rule: Mechanism to enable participation of unscheduled price-responsive energy resources in the NEM	11
2.2	VSR incentive mechanism to further encourage VSR participation	16
2.3	IPRR draft rule: A monitoring and reporting framework	18
3	Summary of key AEMO impacts	20
4	AEMO procedure impacts	27
5	AEMO system impacts	31
5.1	System and data exchange overview	31
5.2	Data model, schemas, and technical specification impacts	36
5.3	Data growth impacts on system capacity	37
6	Participant impact assessment	39
6.1	IPRR high-level participant impact assessment	39
6.2	Indicative industry readiness approach	41
7	Implementation pathway	45
7.1	Key delivery considerations	49
7.2	Risks	51
8	Related reforms	52
A1.	Impact ratings	55
A2.	Glossary	56



Tables

Table 1	Indicative IPRR rule and HLIA timeline	7
Table 2	High-level features of the provisional VSR incentive mechanism in the IPRR draft rule	12
Table 3	Tabular view of focus area impacts from the IPRR draft rule	17
Table 4	Proposed new AEMO procedures, guidelines, reviews and reports	20
Table 5	Current relevant AEMO procedures	22
Table 6	Tabular view of system impacts from IPRR draft rule	25
Table 7	Potential changes to MMS Data Model	27
Table 8	Potential impacts to technical specifications from the IPRR draft rule	27
Table 9	Schema Impacts from the IPRR draft rule	27
Table 10	Assumed Volume Cumulative Growth Projections (Progressive Change)	28
Table 11	Assumed Volume Cumulative Growth Projections (Step Change)	28
Table 12	Indicative IPRR high-level participant impact	29
Table 13	IPRR impacts to eligible market participants acting as VSRPs and to DNSPs	30
Table 14	AEMO's initial view of industry readiness for the draft IPRR rule	32
Table 15	Key delivery considerations	36
Table 16	Initial assessment of the IPRR implementation risks	36
Table 17	IPRR project's relationship with other key initiatives	37
Table 18	Key areas for feedback on this HLIA	38
Table 1	Indicative IPRR rule and HLIA timeline	9
Table 2	High-level features of the provisional VSR incentive mechanism in the IPRR draft rule	16
Table 3	Tabular view of focus area impacts from the IPRR draft rule	23
Table 4	Proposed new AEMO procedures, guidelines, reviews and reports	27
Table 5	Current relevant AEMO procedures	29
Table 6	Tabular view of system impacts from IPRR draft rule	33
Table 7	Potential changes to MMS Data Model	36
Table 8	Potential impacts to technical specifications from the IPRR draft rule	36
Table 9	Schema Impacts from the IPRR draft rule	36
Table 10	Assumed Volume Cumulative Growth Projections (Progressive Change)	37
Table 11	Assumed Volume Cumulative Growth Projections (Step Change)	37
Table 12	Indicative IPRR high-level participant impact	39
Table 13	IPRR impacts to eligible market participants acting as VSRPs and to DNSPs	40
Table 14	AEMO's initial view of industry readiness for the draft IPRR rule	43
Table 15	Key delivery considerations	50
Table 16	Initial assessment of the IPRR implementation risks	51
Table 17	IPRR project's relationship with other key initiatives	52



Figures

Figure 1	IPRR draft rule terminology and concepts	8
Figure 2	Theoretical example of IPRR participation in the NEM	9
Figure 3	Theoretical example of high-level VSR participation in NEM scheduling and dispatch	10
Figure 4	Heat map of focus area impacts from the IPRR draft rule	16
Figure 5	Indicative IPRR industry readiness approach	31
Figure 6	Indicative IPRR implementation timeline	35
Figure 1	IPRR draft rule terminology and concepts	11
Figure 2	Theoretical example of IPRR participation in the NEM	12
Figure 3	Theoretical example of high-level VSR participation in NEM scheduling and dispatch	13
Figure 4	Heat map of focus area impacts from the IPRR draft rule	21
Figure 5	Indicative IPRR industry readiness approach	41
Figure 6	Indicative IPRR implementation timeline	47

1 Introduction

This section explains:

- The background and high-level policy rationale for the Integrating price-responsive resources into the National Electricity Market (IPRR) reform-
- The purpose of this High-level Implementation Assessment (HLIA) document-
- How stakeholders can contribute to the development of the IPRR reform.

1.1 Rule change process: Integrating price-responsive resources into the NEM

Background

In January 2023, AEMO submitted the [rule change request](#) for the 'Scheduled Lite Mechanism' to the Australian Energy Market Commission (AEMC) for its consideration. The rule change request was in accordance with the Energy Security Board's:

- [Post 2025 Market Design Final Advice to Energy Ministers](#)
- [Consumer Energy Resources \(CER\) implementation plan](#).

The rule change request proposed a voluntary mechanism to allow unscheduled price-responsive resources, such as exempt generation/storage and virtual power plants (VPPs), to participate in the National Electricity Market (NEM). Under this proposal, Market Participants, including retailers and aggregators, could use the mechanism to participate in dispatch with their currently unscheduled resources and participate in dispatch, including through aggregation. This will support predictability and dispatchability in the NEM and provide new opportunities for these resources to participate in energy markets.

Issue

Currently 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 price at which it is purchased, or decisions about interventions when required. 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).

Benefits

Over time, the integration of unscheduled price-responsive resources into NEM scheduling processes is expected to reduce total system costs and therefore likely decrease prices for all consumers:

- AEMC's recently published benefits analysis indicates \$1.5 to \$1.8b in potential cost reductions (net value between 2025 and 2050) from undertaking the IPRR reform, compared with doing nothing.

- AEMO’s 2024 Integrated System Plan (ISP) anticipates that ‘coordinated CER storage’ (or VPPs) could provide around half the NEM’s dispatchable capacity by 2050, subject to these resources being integrated into market scheduling processes.¹ The 2024 Integrated System Plan highlights that there is \$4.1 billion of potential avoided costs, predominantly associated with avoided investment in large-scale storage systems, that could be realised from integrating CER and having coordinated CER able to support dispatch. Therefore, integrating price-responsive resources provides an opportunity for distributed resources / CER to make valuable contributions to the firming capacity required by the future power system.

The AEMC has progressed this rule change request and on 25 July 2024 published a draft determination and draft rule titled **Integrating price-responsive resources into the NEM**. The draft rule proposes an IPRR commencement date of 05 November 2026.²

1.2 HLIA document purpose

This High-Level Implementation Assessment has been produced as the first stage of AEMO’s IPRR reform implementation process under the NEM Reform Program. It provides an indicative and preliminary view to participants on how the IPRR draft rule may be implemented by AEMO. It outlines the proposed system, data exchange, process and operational changes and the indicative timeline that would likely be required to give effect to the draft IPRR rule. This HLIA also provides a general assessment of what these changes may mean for NEM participants.

By publishing at an early stage in tandem with the AEMC’s draft determination and inviting participant feedback, the HLIA is intended to:

- Assist and inform affected participants in developing their own implementation timelines and impact assessments:
- Enable AEMO and participants to plan for this initiative in the context of the broader implementation roadmap (NEM Reform Implementation Roadmap), specifically looking for bundling opportunities, efficient sequencing and to reduce delivery congestion:
- Enable stakeholders to provide input on the early implementation design and timeframes, including whether AEMO’s HLIA is consistent with the draft IPRR rule:
- Provide a basis for stakeholders and AEMO to input into the AEMC’s IPRR rule change process, including in relation to implementation timeframes.

This HLIA document does not pre-empt the outcomes of the AEMC’s ongoing IPRR rule change process. It is intended to follow the draft determination as published by the AEMC. In the case of any inconsistency, the AEMC’s draft rule and determination will prevail. There are some instances where the HLIA presents alternative implementation approaches to the AEMC’s draft determination; in these cases AEMO has explicitly described these details to support industry to comment on those features. AEMO will also provide further detail in its own submission to the AEMC process.

¹ AEMO, *2024 Integrated System Plan for the National Electricity market*, Figure 2, p.11 and Figure 20, p66:

² AEMC, *Integrating price responsive resources into the National Electricity Market* project page at <https://www.aemc.gov.au/rule-changes/integrating-price-responsive-resources-nem>

1.3 Key dates

Table 1 Indicative IPRR rule and HLIA timeline

Activity	Timeline
AEMC IPRR Draft Rule and Determination published	Thu 25 Jul 2024
AEMO IPRR Draft HLIA v0.1 published	Thu 01 Aug 2024
AEMO Industry briefing on IPRR Draft HLIA	Wed 07 Aug 2024
Stakeholder feedback on IPRR Draft HLIA due	Mon 19 Aug 2024
AEMO IPRR Draft HLIA v0.2 published	Thu 12 Sep 2024
Stakeholder submissions on AEMC's Draft Determination due	Thu 12 Sep 2024
AEMC IPRR Final Rule and Determination published	Thu 19 Dec 2024
AEMO IPRR Final HLIA v1.0 published	Feb 2025 (TBC)

1.4 Stakeholder feedback invited

AEMO welcomes any stakeholder feedback on this IPRR Draft HLIA by Monday, 19 August 2024. Comments should be sent via email to NEMReform@aemo.com.au. A response template is available for stakeholders to use.

AEMO intends to publish an update to this HLIA in early February 2025 to:

- Align with the AEMC's final IPRR rule.
- Accommodate industry feedback where appropriate.
- Provide further, more detailed information on the IPRR implementation impacts and pathway.

Feedback on this HLIA is distinct from submissions to the AEMC's formal rule change process. AEMO is seeking feedback specifically on implementation matters given the content of the draft rule. Any feedback or submissions related to the rule change or draft determination should be provided to the AEMC as part of its rule change process.

1.5 1.4 Stakeholder engagement

The NEM Reform Program supports affected market participants in each reform phase from implementation design, procedures development, solution delivery and through to industry testing. In the mobilisation phase of AEMO's project, a stakeholder engagement plan will be developed in consultation with industry to identify the optimal touch points with participants affected by IPRR. The plan will include [engagement through](#) NEM Reform forums and direct email communications, other related CER forums, focus groups and one-to-one conversations.

For more information:

- [NEM Reform Forums](#)
- [NEM Reform newsletter](#)
- Contact us directly at NEMReform@aemo.com.au

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2 Market design

The IPRR draft rule has three major implementation components:

1. A mechanism to integrate presently unscheduled price-responsive energy resources into NEM scheduling processes.
2. A provisional incentive framework to encourage participation in the IPRR mechanism.
3. A monitoring and reporting framework to understand and manage the impact of unscheduled price-responsive energy resources on demand forecasting processes and market outcomes.

This section provides a high-level overview of each of these aspects of the IPRR draft rule. The following chapters provide an indicative and preliminary view to participants on how the IPRR draft rule may be implemented by AEMO.

2.1 IPRR draft rule: Mechanism to enable participation of unscheduled price-responsive energy resources in the NEM

The draft rule establishes a mechanism to integrate unscheduled price-responsive energy resources into NEM scheduling and dispatch processes so that the benefits described briefly in section 1.1 and in more detail in the IPRR draft determination can be realised.

A key market design principle of the IPRR mechanism is that (the currently) unscheduled price-responsive energy resources should have similar NEM participation opportunities to those available to scheduled resources. As appropriate, these resources would have the opportunity to take part in the main NEM services, including:

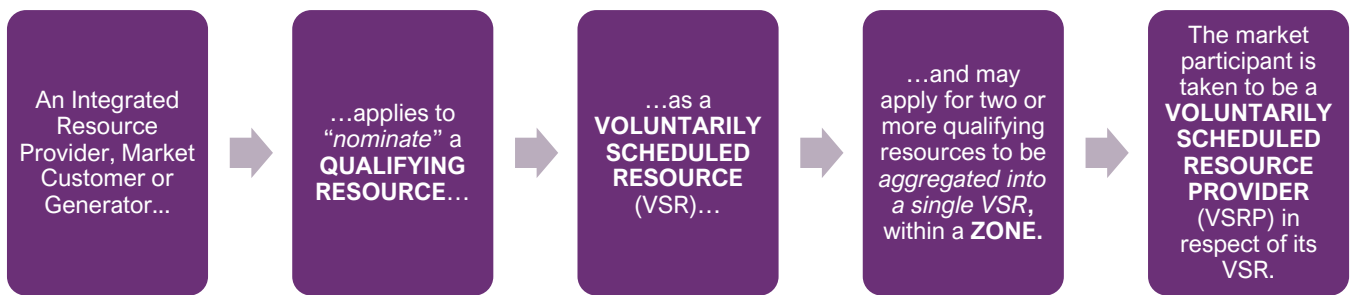
- Energy
- FCAS – both regulation and contingency services.

2.1.1 Voluntarily scheduled resource participation in the NEM

The draft rule introduces new terminology and concepts to facilitate a framework for participation by unscheduled price-responsive energy resources as shown in Figure 1 and explained further in the IPRR draft determination.

Figure 1 IPRR draft rule terminology and concepts



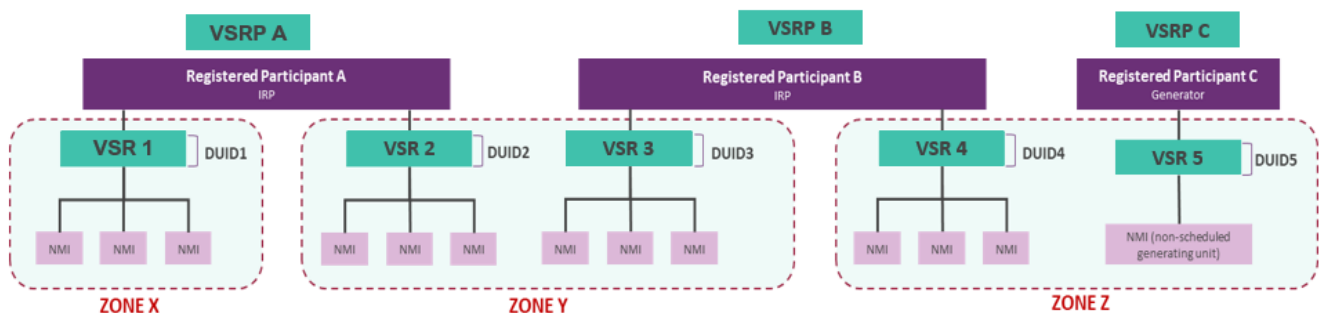


In Figure 1:

- There is no new unique participant registration category for market participants with VSRs. VSRPs will be registered as an Integrated Resource Provider (IRP), Market Customer or Generator in accordance with the existing participant registration framework
- The term ‘Qualifying resource’ could cover:
 - 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).
- The VSRP must be the financially responsible market participant (FRMP) for the connection point nominated as a VSR-
- The term ‘Zone’ refers to boundaries within which the connection points of a single VSR must be contained. Determination of zonal aggregation requirements will be undertaken as part of IPRR procedure development.

Figure 2 provides an indication of how VSRs would be organised under the IPRR mechanism set out in the draft IPRR rule. In this example, both VSRP A and VSRP B are registered as IRPs, and each have two VSRs in two different zones. Their VSRs are aggregates of many ‘qualifying resources’ (represented as NMIs). VSRP C, a registered Generator, operates one VSR which comprises a single ‘qualifying resource’ (a non-scheduled generating unit).

Figure 2 Theoretical example of IPRR participation in the NEM



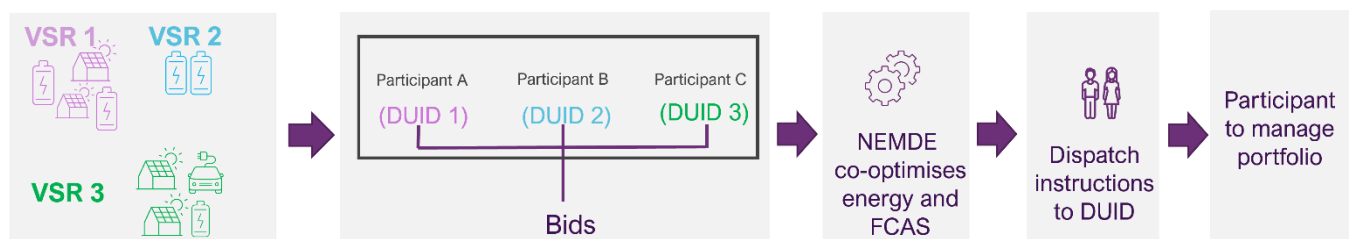
DUID = Dispatchable unit identifier

NMI = National metering identifier

Figure 3 is a stylised example of how the IPRR draft rule would require VSRs to be integrated into the NEM’s scheduling and dispatch processes. This approach is consistent with existing processes for scheduled BDU bidding and dispatch as follows:

- VSRPs will submit 5-minute bids for a VSR DUID reflecting the VSR’s physical capability. The bids can include both generation and load and may contain 20 price and quantity bands
- For every trading interval for which it is scheduled, a VSRP will receive a dispatch instruction for its VSR/DUID containing:
 - A single bi-directional dispatch instruction representing the net energy flow to be achieved by its DUID.
 - Enablement for each FCAS service for which it is registered.
- VSRPs will need to:
 - Disaggregate the dispatch instruction out to the resources within the VSR.
 - Ensure VSR conformance (at an aggregated level) with its dispatch instruction for the services it provides.

Figure 3 Theoretical example of high-level VSR participation in NEM scheduling and dispatch



VSR participation in NEM scheduling processes has largely been modelled on the scheduled BDU participation model. However, VSRs are expected to mainly be aggregations of resources (such as exempt stand-alone batteries/ generation, or household/ C&I scale resources) with different operational characteristics to typical scheduled BDUs.

2.1.2 VSR participation features

Recognising the operational characteristics of VSRs, the IPRR draft determination and rule set out market design features for these resources. These are listed below with respect to the life cycle of the participation of a VSR in the NEM, and further detail is provided throughout the document, including:

1. Options to change a VSR’s *participation mode*,³⁴ at the DUID level, recognising that some resources may only be able to participate in the NEM over specific periods:

³ IPRR draft rule, clause 3.10A.2

⁴ IPRR draft rule, clause 3.10A.2

–● **Deactivation:** VSRs could temporarily deactivate⁵ 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).

–● **Hibernation:** VSRs could hibernate⁶ 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).

2. VSRs would be excluded from providing mandatory Primary Frequency Response (PFR).⁷

3. VSRs would be subject to the same Short Term Projected Assessment of System Adequacy (ST PASA) requirements as other scheduled resources.⁸

4. VSRs would provide Enhanced Reserve Information (ERI).⁹

5. VSRs are eligible for co-optimisation of energy and FCAS.¹⁰

6. VSRs would not be able to be constrained-on in dispatch.¹¹

7. VSR load bid at the market price cap is to be considered a load requirement and under conditions of supply scarcity would be treated as a non-scheduled load (that is, it would be able to consume up to, and including the point of rotational load shedding rather than being dispatched to 0 MW).¹²

7-8. VSRs would be eligible to be directed (at the aggregate level), eligible for compensation for directions under certain conditions prescribed in NER 3.15.7 and would be liable to pay for directions cost recovery.¹³

⁵ IPRR draft rule, clauses 3.10A.2(b) to (l)

⁶ IPRR draft rule, clauses 3.10A.2(m) to (v)

⁷ IPRR draft determination, [p49p.49](#)

⁸ IPRR draft rule, clause 3.7.3

⁹ IPRR draft rule, clause 3.7G

¹⁰ IPRR draft determination, [p45-p.45](#)

¹¹ IPRR draft determination [p50-p.50](#)

¹² AEMO understands, from discussions with the AEMC, that the intent of the rule is that VSR load bid in at the market price cap is to be treated as a load requirement as it is likely to represent passive consumer load that should be able to consume up to and including the point of load shedding under conditions of supply scarcity, similar to how other non-scheduled consumer load is treated. As such, VSR load bid in at the market price cap that is subject to rotational load shedding would be considered unserved energy (USE) for the purposes of the reliability standard.

¹³ IPRR draft rule, 3.10A.3(d)

~~8-9.~~ VSRs would be eligible for Frequency Performance Payments (FPP).¹⁴

~~9-10.~~ VSR capacity would count as an offset in the Retailer Reliability Obligation (RRO).¹⁵

~~10-11.~~ The ramp rate calculation has been amended to accommodate VSRs such that the aggregated VSR capacity is used when calculating minimum ramp rates.¹⁶

~~11-12.~~ VRSPs would be excluded from the Reliability and Emergency Reserve Trader (RERT) cost recovery calculation.¹⁷

~~12-13.~~ VRSPs would be responsible for complying with any applicable distribution level limits that apply to a resource within their VSR, such as fixed or flexible export limits. That is, the VRSP would be responsible for ensuring that their bids and any subsequent dispatch comply with these limits.¹⁸

14. VRSPs would need to always have operational contacts available to receive and act on dispatch instructions.¹⁹ VRSPs would also need to advise AEMO of personnel responsible for power system operational communications (NER 4.11.3).

2.1.3 VSR guidelines

The IPRR draft rule 3.10A.3 requires AEMO to develop 'VSR guidelines' to establish the technical characteristics of VSRs and manage their operation. The content of the VSR guidelines will be wide ranging, including:

- 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, such as specifying how distribution network limits²⁰ and VSR dispatch interrelate.

¹⁴ IPRR draft determination, [p22-p.22](#)

¹⁵ IPRR draft rule, 3.7D-(b)

¹⁶ IPRR draft rule, clause 3.8.3A

¹⁷ IPRR draft rule, clause 3.15.9-(e)

¹⁸ IPRR draft determination, section A.4.2, [p54-p.54](#)

¹⁹ [IPRR draft rule, clause 4.9.2\(d\)](#)

²⁰ [Distribution network limits could include Flexible export limits \(FELs\) or Dynamic operating envelopes \(DOEs\)](#)

2.2 VSR incentive mechanism to further encourage VSR participation

The draft IPRR rule sets out a provisional mechanism to further encourage VSR participation in the NEM called the ‘VSR incentive mechanism’.²¹ The AEMC considers that an incentive scheme in the NER, with dollar and time limits, is in the long-term interests of consumers. However, the AEMC considers that while necessary, this incentive scheme is not a natural fit within the NER and is therefore not its ideal approach. Between the draft and final determination, the Commission intends to work with the Australian Renewable Energy Agency (ARENA), the Commonwealth and jurisdictional governments regarding alternatives to having the incentive scheme as an AEMO obligation in the NER. If an alternative VSR incentive becomes available, then the VSR incentive mechanism may not be required in the final IPRR rule.²²

For this HLIA, AEMO has assumed the VSR incentive mechanism is to be implemented in line with the draft determination, noting that many detailed design decisions will need to be resolved over the coming months to allow for successful implementation. AEMO provides some preliminary comments on the potential VSR incentive mechanism design through this document, including regarding assumptions that have been made for the purpose of developing this HLIA. AEMO will seek to work these through further with the AEMC and industry over the rule draft determination consultation process.

The key features of the VSR incentive mechanism are set out in Table 2.

Table 2 High-level features of the provisional VSR incentive mechanism in the IPRR draft rule

Feature	Summary description
Form	<ul style="list-style-type: none"> Tenders for ‘VSR participation agreements’ (and associated ‘VSR participation payments’).
Objective	<ul style="list-style-type: none"> To maximise VSR participation in the IPRR mechanism through VSR participation agreements and participation payments. In turn, this is expected to maximise the benefits to consumers through increased VSR participation in central dispatch providing benefits such as reduced system costs, avoided generation, avoided emissions and reduced RERT costs.
Eligible VSR tender participants	<ul style="list-style-type: none"> VSRPs or ‘intending VSRPs’ could take part in the VSR incentive mechanism subject to criteria set in the VSR incentive procedures. If successful, these VSRPs would receive VSR participation payments.
Tender service provider	<ul style="list-style-type: none"> AEMO would be required to design and conduct the tenders. AEMO would establish VSR tender process details via the development of ‘VSR incentive procedures’. <ul style="list-style-type: none"> These procedures would be aligned with the VSR incentive principles and other criteria set out in the draft IPRR rule e.g. assessment criteria, price caps, settlement of payments and aspects of the VSR participation agreements.
Timing	<ul style="list-style-type: none"> AEMO would conduct at least two VSR tenders across a five-year ‘incentive period’ of 1 January 2027 to 31 December 2031.
Cost recovery	<ul style="list-style-type: none"> Costs of establishing, administering, and conducting the VSR incentive mechanism would be recovered from all NEM registered participants through fees imposed under NER 2.11. Costs of VSR participation payments would be recovered from Cost Recovery Market Participants (CRMPs; Market Generators, Market Customers and IRPs) in each region, based on the CRMPs’ CRMPs’ adjusted consumed energy. <ul style="list-style-type: none"> CRMPs are Market Generators, Market Customers and IRPs.
Reporting	<p>AEMO would be required to report:</p> <ul style="list-style-type: none"> Annually: The aggregate amount of all participation payments payable in each financial year under VSR participation agreements.

²¹ IPRR draft rule, clause 3.10A.4

²² IPRR draft determination, section 3.3.3, p23-

Feature	Summary description
	<ul style="list-style-type: none">• At the end of the five-year incentive period: A summary of outcomes, trends and learnings from the VSR incentive mechanism.

2.3 IPRR draft rule: A monitoring and reporting framework

The IPRR draft rule introduces a new framework to monitor and report on unscheduled price-responsive resources.²³ The reporting framework includes reporting by AEMO and the Australian Energy Regulator (AER) on the impacts, efficiency implications, and costs associated with unscheduled price-responsive resources in the market. The AEMC will consider if a “visibility market model” is warranted if reporting reveals an emerging material problem over time through a review process informed by the AER’s annual reporting.

The AEMO monitoring and reporting framework introduced in the IPRR draft rule has two key elements:

- To monitor and report on the magnitude and impact of unscheduled price-responsive resources on deviations of actual demand from forecast in operational timeframes.
- To describe any actions AEMO has taken to reduce forecast deviations by accounting for unscheduled price-responsive resources.

2.3.1 AEMO price responsive reporting guidelines

AEMO is required to develop and publish the ‘AEMO price responsive reporting guidelines’ in accordance with the Rules consultation procedures by 31 December 2025.²⁴ The Guidelines must specify how AEMO will meet its reporting obligations and the information and metrics that will be included in its annual and quarterly reporting/ data publication.

2.3.2 AEMO annual reporting

The IPRR draft rule requires AEMO to prepare and publish a report by 30 September each year, starting in 2026, analysing medium-term implications of monitored issues and outlining changes made to forecasts for unscheduled price-responsive resources. The IPRR draft determination and rule describes the topics AEMO must cover in its reporting, in accordance with the ‘AEMO price responsive reporting guidelines’. They include:

- Analysis of statistics and trends around volumes of unscheduled price-responsive resources, patterns in the use of these resources, and their approximate contribution to forecast deviations.
- Estimation of the contribution of unscheduled price responsive resources to forecast deviations in relation to additional amounts paid to Ancillary Service Providers and CRMPs.
- An assessment of the degree of forecast deviations in regional demand across a range of market conditions, and the factors contributing to the size of forecast deviation, and analysis of impacts of unscheduled price responsive resources on the load forecast used by AEMO for pre-dispatch and dispatch.
- Identification of additional information or inputs required to improve or account for unscheduled price responsive resources in load forecasts and any actions taken by AEMO to reduce forecast deviations by accounting for unscheduled price responsive resources.

²³ IPRR draft rule, clause 3.10B. See also IPRR draft determination, section 3.4 and Appendix C:-

²⁴ IPRR draft rule, clause 11.17[X].3:-

- A description of the methodologies used by AEMO to consider and manage the impacts of unscheduled price responsive resources on load forecasts for pre-dispatch and dispatch; and any barriers to using those methodologies.

2.3.3 AEMO quarterly statistics

In addition to the annual reporting framework, the IPRR draft rule requires AEMO to publish statistics on its website on a quarterly basis as a single source of information for unscheduled price responsive resources. The information and metrics AEMO is required to include in the quarterly publication will be specified in the 'AEMO price responsive reporting guidelines' described above. The purpose of the quarterly statistics would be to give a view of trends over time, including comparing seasonal trends from year-to-year. AEMO would be required to consult with stakeholders as part of developing the reporting guidelines to determine what metrics and format of publication would be most beneficial for industry.

2.3.4 AER annual reporting

The IPRR draft rule introduces a new reporting requirement for the AER to periodically consider the impact of unscheduled price-responsive resources on efficiency in the wholesale market and inform future market reforms. Under the new reporting framework, the AER would be required to provide transparency on the impacts of unscheduled price responsive resources on efficient market outcomes to inform future market reform. The IPRR draft determination requires the AER to publish 'AER price responsive reporting guidelines' and provides a range of topics for the AER to report on. These topics are reflected in the draft IPRR rule. The draft rule also contains an obligation for AEMO to provide the AER with information to fulfill its reporting obligations.

2.3.5 Implementation schedule

The IPRR draft determination proposes a 12-month implementation period for the reporting framework:

- AEMO publishes the 'AEMO price responsive reporting guidelines' by 31 December 2025.
- AEMO publishes its first quarterly statistics by 1 April 2026.
- AEMO publishes its first annual report by 30 September 2026.
- AER publishes its first annual report by 31 December 2026.

3 Summary of key AEMO impacts

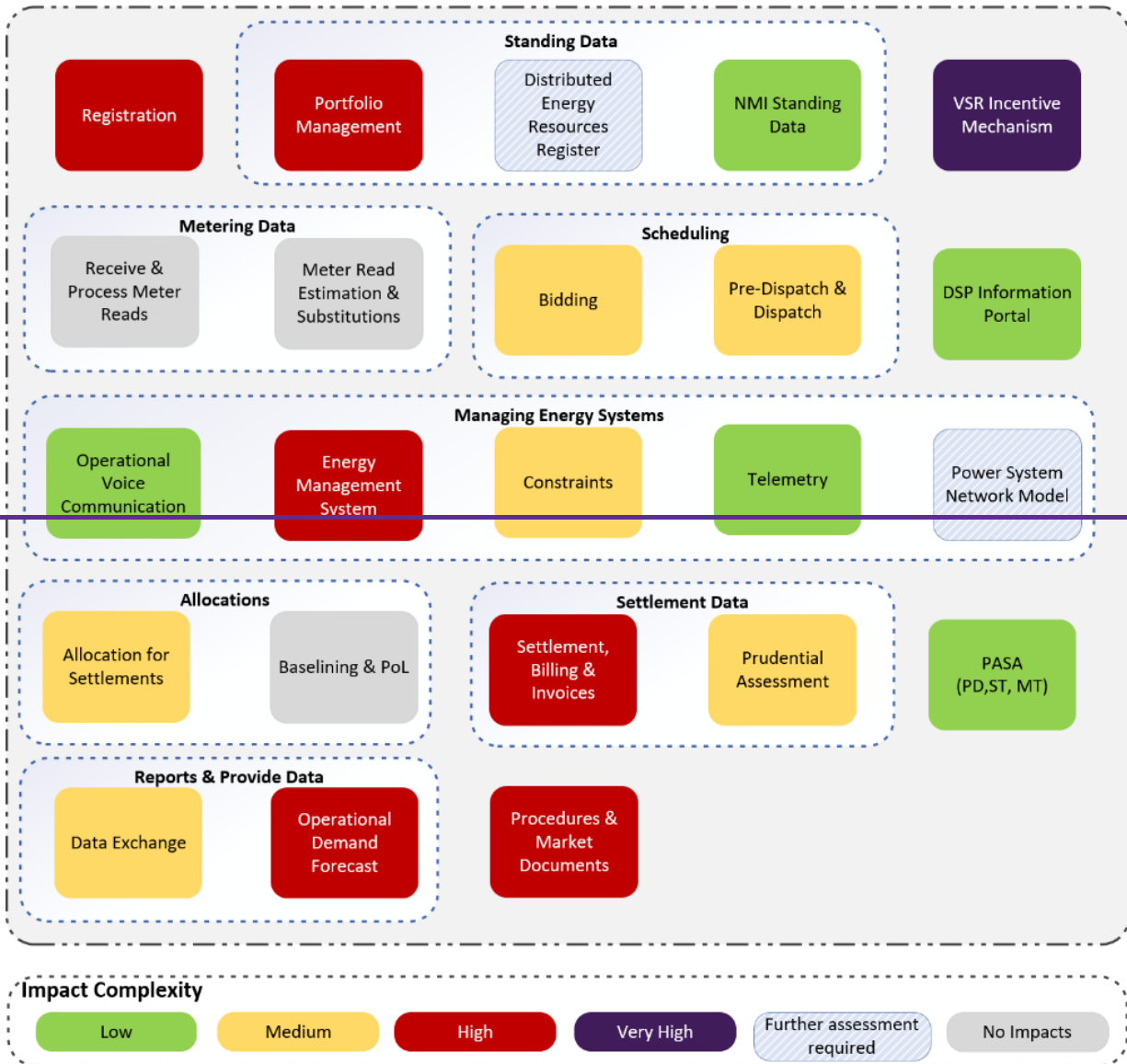
This section provides an indicative heatmap of impacts to AEMO’s processes from the IPRR draft rule.

Figure 4 shows the impact complexity of the IPRR draft rule for key business areas (focus areas) and highlights those that need further assessment.

Table 3 then lists these focus areas alongside descriptions of each impact from the IPRR draft rule.

Figure 4 Heat map of focus area impacts from the IPRR draft rule

Summary of Key Impacts for IPRR



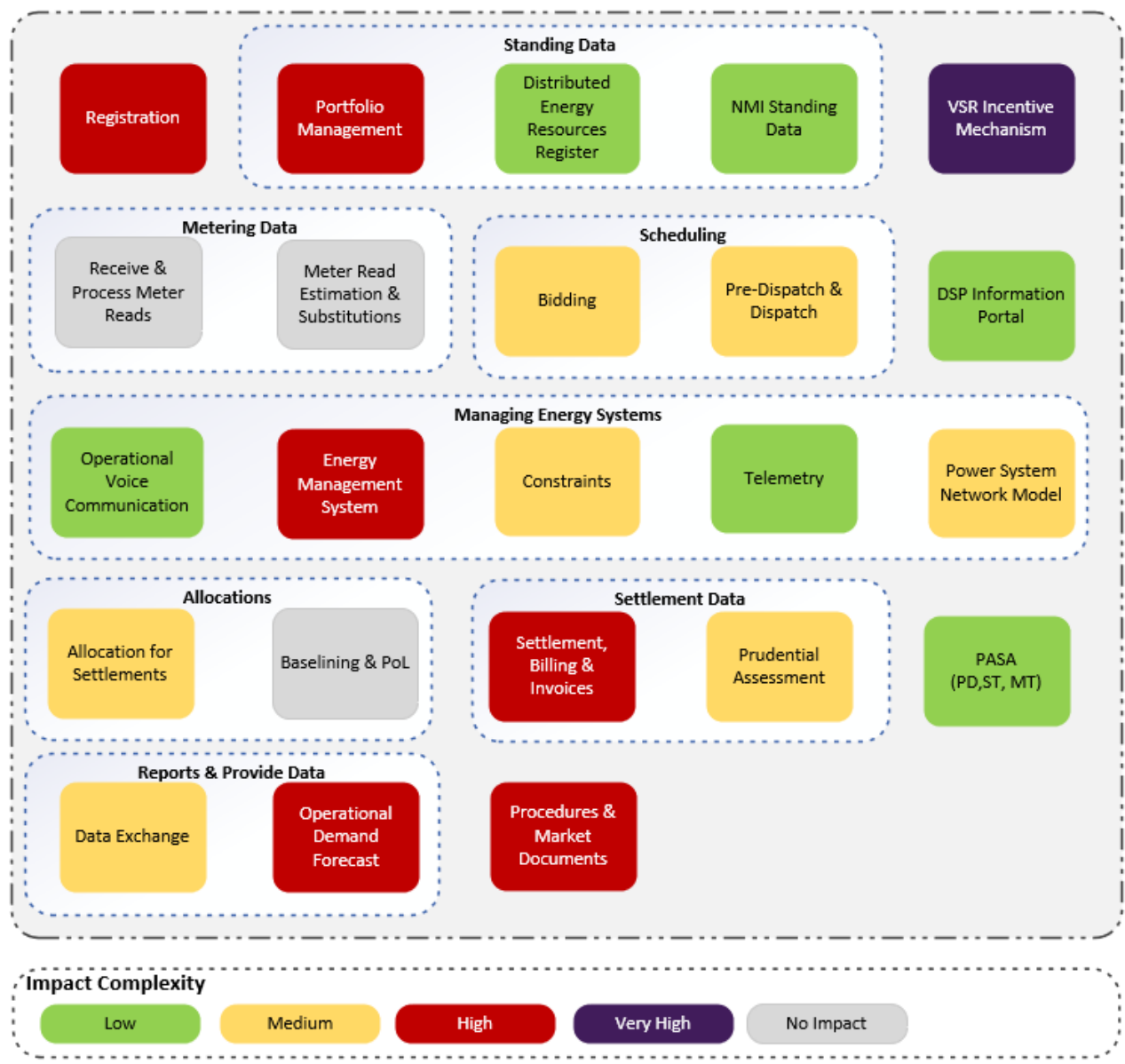


Table 3 Tabular view of focus area impacts from the IPRR draft rule

Focus area	Impact	Impact description
Registration	High	<ul style="list-style-type: none"> 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 NMI's 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	<ul style="list-style-type: none"> New portfolio management processes to establish and maintain VSR portfolios, including nomination/de-nomination, VSR aggregation, addition/removal of NMI's, VSR configurations, updates to standing data, etc. Existing processes will need to be streamlined and automated wherever possible to provide a timely experience for Participants.

Focus area	Impact	Impact description
		<ul style="list-style-type: none"> 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 Validationvalidation processes to manage VSRs, for example VSR management within zones.
DER Register	TBCLow	<ul style="list-style-type: none"> Further assessment required to determine impacts for the DER Register. VSRPs will provide asset details first in the portfolio management system as part of the nomination process. AEMO believes there is an opportunity to improve the DER Register information based on asset details provided in the VSR nomination process. Further consultation will be required with NSPs on whether this information could be automatically populated into the DER Register.
NMI standing data	Low	<ul style="list-style-type: none"> Further assessment required to determine if there is a need to update Agg-Flag assignment to RERT cost recovery carve-outs and FPP. Potential changes may be required to Market Settlement and Transfer Solutions (MSATS) procedures to manage churn. Note: This should not require system changes in MSATS.
VSR Incentive mechanism	Very high	<ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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.
Meter Read Estimation & Substitutions	None	<ul style="list-style-type: none"> No impacts identified for meter read estimations and substitutions.
Receive & Process Meter Reads	None	<ul style="list-style-type: none"> No impacts identified because the same data management processes will apply for VSR NMLs.
Bidding	Medium	<ul style="list-style-type: none"> Manage bidding processes and systems to accommodate all participation mode changes for VSRs including temporarily deactivated and hibernated modes. Use existing BDU bid format and bidding channels for VSRs.
Pre-dispatch & dispatch	Medium	<ul style="list-style-type: none"> VSRPs to build capability to receive & conform with dispatch instructions for VSRs in active mode using existing BDU dispatch instruction format. Changes are needed to reflect participation modes in dispatch and conformance, including when VSRs are temporarily deactivated and hibernated for a duration of time (see section 2.1.1 for more detail). Further assessment is required to determine full impacts. Manage greater volume of assets as VSRs increasingly provide scheduling information. Adjustments to appropriately treat VSR load during conditions of supply scarcity.
Demand Side Participation (DSP) information Portal	Low	<ul style="list-style-type: none"> Potential to add new information or a flag in the DSP Information Portal to identify VSRs. VSRPs need to provide information to DSP Information Portal to support long term planning processes (as operators of VPPs or price-responsive aggregations would be required to do today).
Allocation for Settlements	Medium	<ul style="list-style-type: none"> Process & system changes needed to exclude VRSPs from the RERT cost recovery calculation and from Frequency Performance Payments residual calculation, including consideration of how data will be used to indicate NMLs within a VSR.

Focus area	Impact	Impact description
		<ul style="list-style-type: none"> Further assessment required to include NMI-level processing into allocations to avoid future performance issues on current settlement systems as the scale of VSRs increases.
Baselining & Predictability of Load (PoL)	None	<ul style="list-style-type: none"> No impacts identified as VSRs will not participate in wholesale demand response.
Prudential Assessment	Medium	<ul style="list-style-type: none"> Adjustments for prudential estimation and prudential forecasting processes to accommodate VSRs, including for when VSRs are temporarily deactivated or hibernated.
Settlements, Billing & Invoice	High	<ul style="list-style-type: none"> Settlement of VSR energy transactions uses existing settlement processes because VSRPs are the FRMPs for the NMIs within VSRs. However, the treatment of VSRs in non-energy cost recovery (NECR) processes will impact how NMIs within a VSR need to be managed for settlement purposes. For example, excluding VSRPs from RERT cost recovery may require VSR NMIs to be treated as individual (rather than aggregate) reads in wholesale settlements. The inclusion of a greater volume of individual reads may impact the performance of settlements calculations and data loading for AEMO and participants. AEMO may need to consider alternative approaches, such as: <ul style="list-style-type: none"> changes to profiling and settlement data aggregation processes to provide data at the VSR aggregation level implementing a parallel process for VSR NECR processing using data sources such as aggregate VSR telemetry in the NECR calculations. Further assessment is required if VSRPs would need to see energy at an aggregated VSR level for purposes other than the exclusion of VSRPs from RERT cost recovery. Adjustments in settlement NECR (RERT) calculations to reflect VSRs that are 'temporarily deactivated' or 'hibernated'. Changes to format of Settlement statements and/or reports for VSRs dependent on VSR treatment in settlements. Settlement changes related to VSR incentive payments & cost recovery of VSR participation payments 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
Operational Voice Communication	Low	<ul style="list-style-type: none"> VSRPs would provide operational communications system in accordance with Power System Procedure for communication NER 4.9.2(d), 4.11.3 and control systems Section 3.3.1 of the NEM Generator Registration Application Guidelines.
Energy Management System (EMS)	High	<ul style="list-style-type: none"> Process and system changes may be required to manage geographically dispersed VSRs in physical model of network Tuning & potential changes to Automated Generation Control (AGC) to work with distributed aggregations
Constraints	Medium	<ul style="list-style-type: none"> Changes to constraint systems to manage geographically dispersed VSR at transmission level Further assessments required to determine if adjustments for constraints calculations are needed to reflect VSRs that are 'temporarily deactivated' or 'hibernated'
Telemetry	Low	<ul style="list-style-type: none"> VSRPs would provide aggregated telemetry for VSRs in accordance with the 'Power System Data Communications Standard'. It is expected this could include telemetry via: <ul style="list-style-type: none"> SCADA via NSP direct 'SCADA-Lite' connection once available²⁵ Aggregated telemetry will likely be validated against revenue metering in the capability assessment phase.
Power system network model	TBCMedium	<ul style="list-style-type: none"> Further assessment Process changes required to determine if changes are required to the network model for accommodate VSRs at i.e. represent aggregated distributed resources across transmission level node identifiers (TNIs). Frequent changes to the composition of VSRs will increase the workload of the grid modelling function.

²⁵ SCADA Lite will enable NEM non-NSP participants to establish a bi-directional connection to exchange operational information (telemetry and control) with AEMO. See SCADA Lite project page for more information: <https://aemo.com.au/initiatives/trials-and-initiatives/scada-lite>

Focus area	Impact	Impact description
PASA (PD, ST, MT)	Low	<ul style="list-style-type: none"> • VSRPs would provide same information as other scheduled resources <ul style="list-style-type: none"> – bid prices and quantities – available capacity for each trading interval – PASA availability for each trading interval – if applicable, projected operational energy limits • Aggregate reporting of regional reserve contribution from VSRs • No information required from VSRPs for MT PASA • Further assessment required for ST PASA to ensure that changes currently being implemented will cater for VSRs. If the changes implemented to accommodate the Wholesale Demand Response (WDR) cannot be leveraged, then the impact will be higher.
Data Exchange	Medium	<ul style="list-style-type: none"> • IPPR project will use the existing data exchange channels and potentially newer capabilities developed by the Market Interface Technology Enhancements initiative (IDX and IDAM), if available. • New reports or data feeds to support distribution system operation functions at network service providers, specifically <ul style="list-style-type: none"> – visibility of NMIs that are part of a VSR – aggregated scheduling information in the dispatch and pre-dispatch timeframes.
Operational Demand Forecast	High	<ul style="list-style-type: none"> • Develop capability for new monitoring & reporting obligations • Management of VSR modes when they are hibernated & temporarily deactivated • More frequent demand forecast model changes triggered by hibernation
Procedure & Market Documents	High	<ul style="list-style-type: none"> • Refer to section 4 for more details.

4 AEMO procedure impacts

This chapter indicates the high-level impact to AEMO’s procedures and guidelines of implementing the IPRR draft rule.

Table 4 sets out the new documents that would be required by the draft IPRR rule. Table 5 lists AEMO’s existing procedures and other documents that would likely need updating to accommodate the draft IPRR rule.

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

NEW PROCEDURE	IPRR DRAFT RULE	EFFORT	PROPOSED CONTENT AND TIMING
Voluntarily scheduled resource guidelines	<ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 3.10B.2 (e)-(g) 11.17[X].3(a)(1) 	High	Develop, consult and publish by 31 December 2025. Required to specify: <ul style="list-style-type: none"> 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 unscheduled price responsive resources	<ul style="list-style-type: none"> 3.10B.2(b) 11.17[X].4(c) 	High	Publish by 30 September each year. First report must be published by 30 September 2026. Required to be in accordance with the AEMO price responsive reporting guidelines and include: <ul style="list-style-type: none"> An analysis of the statistics and trends of the volumes and types of unscheduled price responsive resources, and the approximate contribution of these resources to forecast deviations. AEMO’s best estimate of the impact of unscheduled price responsive resources on forecast deviations in relation to additional amounts paid to Ancillary Service Providers. An assessment of the degree of forecast deviations in regional demand across a range of market conditions, as well as the factors contributing to the size of forecast deviation. Analysis of impacts of unscheduled price responsive resources on the load forecast used by AEMO for pre-dispatch and dispatch. Identification of additional information or inputs required to improve or account for unscheduled price responsive resources in load forecasts. A description of any actions taken by AEMO to reduce forecast deviations by accounting for unscheduled price responsive resources.

NEW PROCEDURE	IPRR DRAFT RULE	EFFORT	PROPOSED CONTENT AND TIMING
			<ul style="list-style-type: none"> A description of the methodologies used by AEMO to consider and manage the impacts of unscheduled price responsive resources on load forecasts for pre-dispatch and dispatch
Quarterly reporting on unscheduled price responsive resources	<ul style="list-style-type: none"> 3.10B.2(c)-(d) 11.17[X].4(c) 	High	<p>Publish at least once per calendar quarter. First publication by 1 April 2026 in respect of the preceding calendar quarter.</p> <p>AEMO must develop, publish and maintain a single source of information for unscheduled price responsive resources that presents the information and metrics specified by the AEMO price responsive reporting guidelines.</p>
VSR incentive procedures	3.10A.4(e) 3.10A.4(g)	High	<ul style="list-style-type: none"> Develop, consult and publish by 05 November 2026 Required to cover a range of details including the: <ul style="list-style-type: none"> – eligibility criteria for the tender process – assessment criteria for the tender process – procedures for conducting the tender process – timing of the tender process – offer requirements – procedures and timetable for participation payments – requirements of any standard participation agreements, including clarifying the consequences for non-compliance with the agreement.
Report after completion of incentive period	3.10A.4(t)	High	By 31 December 2032, AEMO to publish report that includes a summary of outcomes, trends and learnings from the VSR incentive mechanism.

Note that the IPRR draft rule also imposes an obligation on the AER to develop and publish:

- AER price responsive reporting guidelines
- AER annual report on unscheduled price responsive resources

See section 2.3.4 for further details on these impacts of the IPRR draft rule to the AER.

In relation to AEMO’s existing procedures, the IPRR draft rule requires AEMO to review and where necessary amend and publish its procedures, guidelines and other documents by 1 June 2026.²⁶ It makes specific reference to:

- Market suspension compensation methodology and schedule of benchmark values
- Demand Side Participation Information Portal and associated demand side participation information guidelines
- DER Register and associated DER register information guidelines.

Note that the IPRR draft rule contains a similar provision for the AER in relation to its relevant guidelines and documents.

²⁶ IPRR draft rule, clause 11.[XXX].2(b)

Table 5 Current relevant AEMO procedures

TYPE OF PROCEDURE	EFFORT	CHANGE
Registration information resource & guidelines, including: <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Most registration/classification documents will require updates to accommodate VSR nominations by Market Participants. • New application forms and, guides <u>and factsheets</u> 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.
Portfolio management system user guide	High	<ul style="list-style-type: none"> • Amendments will be required to accommodate the PMS process changes described in section 3, including: <ul style="list-style-type: none"> – Establishing and maintaining VSR aggregations and portfolios, including nomination/de-nomination, addition/removal of NEMs, VSR configurations, updates to standing data, etc. – Implementing and managing new participation modes, including 'temporary deactivation' and 'hibernation'. – Portfolio management capabilities to manage declassification of NEMs and customer churn. – Updates to AEMO Validation processes to manage VSRs, for example VSR management within zones.
System Operation Procedures, including: <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Amendments will<u>may</u> be required due to the inclusion of: <ul style="list-style-type: none"> – 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. – Treatment of VSR load during conditions of supply scarcity.
Market ancillary services <ul style="list-style-type: none"> • Market ancillary services specification 	Low	<ul style="list-style-type: none"> • May need updating to incorporate requirements for VSRs to participate in regulation FCAS.
Non-market ancillary services <ul style="list-style-type: none"> • SO_OP_3717 - Procedure for the Exercise of the Reliability and Emergency Reserve Trader (RERT) 	Low	<ul style="list-style-type: none"> • Amendments to include: <ul style="list-style-type: none"> – New VSR unit type – Which modes of VSR operation are eligible to participation in RERT.
Directions <ul style="list-style-type: none"> • SO_OP_3707 - Procedures for Issue of Directions and Clause 4.8.9 Instructions 	Low	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • Forward-looking transmission loss factors • Treatment of loss factors in the NEM 	Low	<ul style="list-style-type: none"> • Procedures will need to describe the methodology for calculating loss factors for VSRs.
Constraints resources & guidelines, including: <ul style="list-style-type: none"> • Constraint Formulation Guidelines • Constraint implementation guidelines • Schedule of constraint violation penalty factors 	Low/ Medium	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • Demand Side Participation Forecast Methodology 	Low	<ul style="list-style-type: none"> • Updates to DSP methodology will be required to describe how VSRs are included in the Demand side participation forecasts.

TYPE OF PROCEDURE	EFFORT	CHANGE
<ul style="list-style-type: none"> • Demand Side Participation Information Guidelines • Medium Term PASA Process Description • Reliability Standard Implementation Guidelines 		<ul style="list-style-type: none"> • Updates to Reliability Standard Implementation Guidelines may be required to reflect treatment of VSR loads during conditions of supply scarcity.
Operational Forecasting <ul style="list-style-type: none"> • Load Forecasting Procedure 	Medium	<ul style="list-style-type: none"> • Amend procedures to include VSR unit type. • New procedures will need to be added to describe how demand forecast models are updated when VSRs switch between active/ temporarily deactivated/hibernate modes.
Settlements and prudentials <ul style="list-style-type: none"> • NEM Settlement Estimations Policy/Guide • Guide to NEM Prudential Forecast 	Medium	<ul style="list-style-type: none"> • SettlementSettlements and PrudentialPrudentials procedures may require updates to reflect approach to VSRs in settlements and non-energy cost recovery arrangements for VSRs.
DER register information guidelines	TBC	<ul style="list-style-type: none"> • Further assessment required as supporting IPRR will require DER data to be maintained.
Retail and metering procedures, including: <ul style="list-style-type: none"> • MSATS procedures 	Low	<ul style="list-style-type: none"> • Potential changes may be required to Market Settlement and Transfer Solutions (MSATS) procedures to manage churn. Note: This should not require system changes in MSATS.
B2B procedures (maintained by the Information Exchange Committee)	Low	<ul style="list-style-type: none"> • AEMO believes that there will be little or no impact to the B2B procedures from the IPRR draft rule. AEMO will refer AEMO referred the IPRR draft rule to the B2B Working Group to seek its view on any B2B impacts, particularly regarding whether there are any scenarios that would need a new transaction type. B2B WG members have not identified any B2B impacts from the IPRR draft rule.

For all new and existing procedures, AEMO will look for opportunities to prioritise and/or bundle procedure consultations, including discussion of critical path consultations that may have dependencies with AEMO’s and industry’s development and testing. Section 7 sets out AEMO’s initial view of the IPRR implementation, which indicates that some critical procedures will need to be consulted on and published in advance of the timeframes set in the IPRR draft rule to support AEMO’s and industry’s implementation.

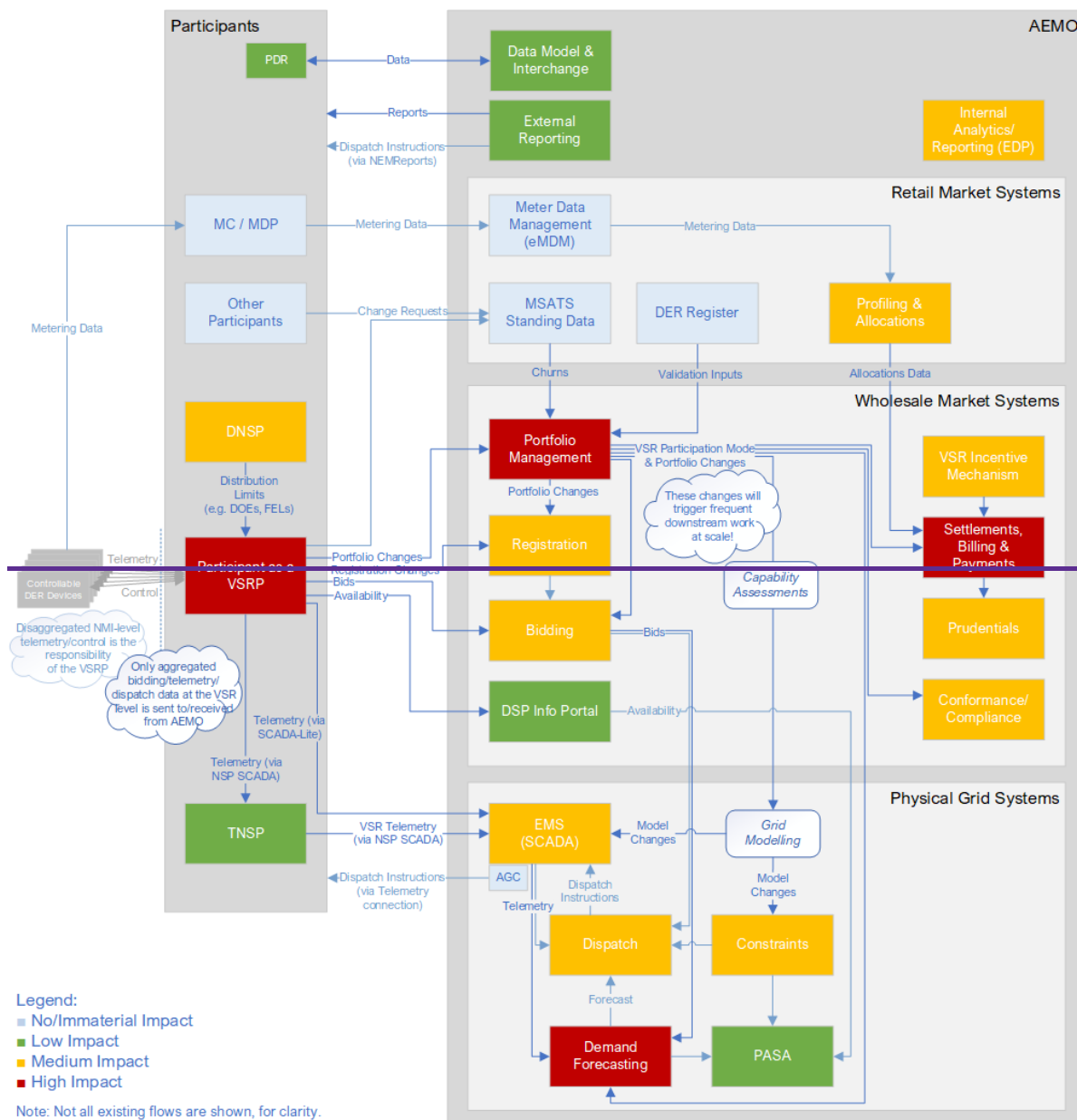
A further detailed review of IPRR procedure impacts will be required when the final rule is made to identify the complete set of procedure changes.

5 AEMO system impacts

This section focusses on the system impacts associated with the IPRR draft rule. It provides:

- An overview of how VSRPs will participate in the market and highlights the scale of impact to different market systems which will be required to accommodate it:
- A summary of potential impacts to the participant data model and schemas:
- Some analysis into the potential scale of participation from VSRs and the impact it could have on system performance.

5.1 System and data exchange overview



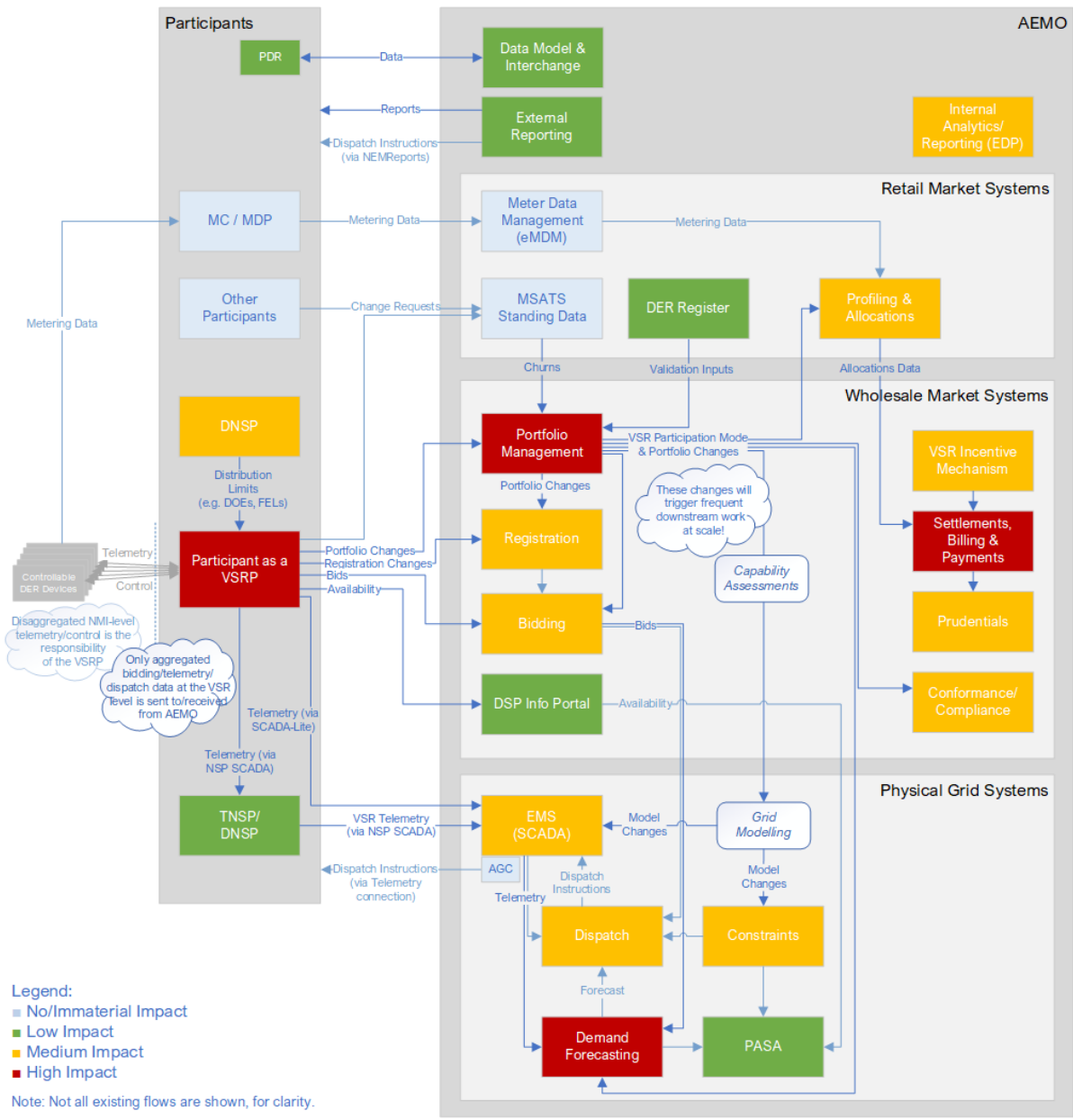


Table 6 Tabular view of system impacts from IPRR draft rule

AEMO System	Summary
■ High System Impact	
Portfolio Management (PMS)	<ul style="list-style-type: none"> • Management of 'Zones' for validation purposes • Manage the VSR Participation Status of Active/Deactivated/Hibernated for time periods, including approval workflows. • Significant uplift in system usability and capability is required to support these new use cases, including richer, more interactive forms. • 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/required 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. • Manage NMI de-nomination process from VSRs based on FRMP churn.
Settlements, Billing & Payments	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 from PMS. • Thresholds may be required to automatically re-trigger Capability Assessments if Capacity is changed above a material amount.
Bidding	<ul style="list-style-type: none"> • An optional attribute may be added into the existing BDU bidding structure for 'Temporarily Deactivated' VSR Participation Mode. This would be backwards-compatible for existing BDU participants. However, this would not be able to be incorporated into an approval workflow • New validation logic to cater for different VSR Participation modes (particularly Hibernated) • Cater for appropriate treatment of VSR load.
Dispatch	<ul style="list-style-type: none"> • Cater for different VSR participation modes. Detailed assessment is required to ensure the logic changes do not cause unintended consequences. • Include logic for not constraining-on VSRs • Dispatch Instructions will be exchanged over currently defined channels in existing formats (SCADA, SCADA-Lite, NEMReports/DI). • 'State of Charge' from ERI (Enhancing Reserve Information) will be used to constrain VSR assets from being dispatch when exhausted. • Cater for appropriate treatment of VSR load, including load bid in at the market price cap during conditions of supply scarcity.
VSR Incentive Mechanism	<ul style="list-style-type: none"> • A new system will be required to facilitate the VSR incentive mechanism: to uphold audit requirements, and feed data into Settlements, Billing and Payments for 'VSR participation payments'.

AEMO System	Summary
Profiling & Allocations	<ul style="list-style-type: none"> To implement the exclusion of VRSPs from the RERT cost recovery calculation, it is prudent to move some NMI-level processing existing in Settlements into Allocations to avoid future performance issues as the scale of VSRs increases. It requires collation of a new set of data at the DUID level to represent energy from non-hibernated VSRs.
Prudentials	<ul style="list-style-type: none"> Potential adjustments to prudential estimation and prudential forecasting processes to accommodate VSRs, including for when VSRs are temporarily deactivated or hibernated.
EMS (SCADA)	<ul style="list-style-type: none"> Telemetry will be exchanged over currently defined channels in existing formats (SCADA, SCADA-Lite) Representing DUIDs without a single physical connection point located throughout the Distribution Network within the SCADA system will be challenging and requires further assessment. This will be required for all VSRs. Further assessment is required because frequent changes to the composition of VSRs may require labour-intensive changes to the configuration on an ongoing basis if they are of a material size (total MW capacity in the VSR).
Constraints	<ul style="list-style-type: none"> As per EMS, representing DUIDs without a single physical connection point will be challenging. Frequent changes to the composition of VSRs may require labour-intensive changes to the configuration on an ongoing basis. The stop/start nature of telemetry from VSRs during hibernation will require either manual work to keep constraint equations up-to-date, or complex logic to deal with the conditional treatment of these variables.
Internal Analytics/Reporting (EDP)	<ul style="list-style-type: none"> Incorporation of new data elements/entities (such as VSR Participation Mode) that are required to implement the IPRR monitoring and reporting framework
■ Low System Impact	
Data Model & Interchange	<ul style="list-style-type: none"> Minor changes to incorporate VSR Participation Status
PASA	<ul style="list-style-type: none"> Upstream systems will abstract differences to ensure that data flows related to VSRs conform with other DUIDs, resulting in minimal change. Further assessment will need to be conducted for ST-PASA to ensure that changes currently being implemented will cater for VSRs. If the changes implemented to accommodate Wholesale Demand Response (WDR) cannot be leveraged then the impact will be higher.
External Reporting	<ul style="list-style-type: none"> Changes in Settlements reports Potential new reports required. Other impacts require further assessment
DSP Info Portal	<ul style="list-style-type: none"> Consider adding a flag to differentiate VSRs from existing unit types captured in the system.
DER Register	<ul style="list-style-type: none"> Allow data integration to PMS to provide new data for validations. AEMO believes there is an opportunity to improve the DER Register information based on asset details provided in the VSR nomination process. Further consultation will be required with NSPs on whether this information could be automatically populated into the DER Register.
■ No or Immaterial System Impact	
Meter Data Management (eMDM)	<ul style="list-style-type: none"> No identified impacts. Meter data will be received for each NMI without change.
MSATS	<ul style="list-style-type: none"> No identified impacts, assuming that there is no new role for a NMI with respect to VSR nomination. The ramification of this is that this information will not be able to be queried in NMI Discovery, other than via the existing Agg Flag.
DER Register	<ul style="list-style-type: none"> Allow data integration to PMS to provide new data for validations.
B2B e-Hub	<ul style="list-style-type: none"> AEMO believes that there will be little or no impact to the B2B e-hub from the IPRR draft rule. AEMO will refer AEMO referred the IPRR draft rule to the B2B Working Group to seek its view on any B2B impacts, particularly regarding whether there are any scenarios that would need a new transaction type. B2B WG members have not identified any B2B impacts from IPRR draft rule.

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5.2 Data model, schemas, and technical specification impacts

Potential impacts to the participant data model, schemas, and technical specifications are described in the tables below.

Table 7 Potential changes to MMS Data Model

PACKAGE NAME	PROPOSED CHANGES
BIDS	<ul style="list-style-type: none"> New field for VSR participation status if this becomes an attribute in bidding, otherwise no identified impact.
DISPATCH, PRE_DISPATCH, STPASA_SOLUTION, PD7DAY	<ul style="list-style-type: none"> New field for VSR participation status Potentially include new fields for regional aggregation of VSR energy storage
PARTICIPANT_REGISTRATION	<ul style="list-style-type: none"> VSR Participation Mode – new table to track modes for time periods. Potential changes to cater for Zones. New table to define Zones, with new field in PMS_GROUPSERVICE to link to a Zone.
SETTLEMENT_DATA	<ul style="list-style-type: none"> Potential new table to cater for new VSR incentive mechanism participation payments. Cost recovery for these payments will be included in existing tables. To be able to fully reconcile the cost recovery of VSR participation payments, CRMPs would need to update to the new model. However existing use of the model would not be impacted.

Table 8 Potential impacts to technical specifications from the IPRR draft rule

TECHNICAL SPECIFICATION NAME	POTENTIAL IMPACTS FROM IPRR DRAFT RULE
EMMS Technical Specification	<ul style="list-style-type: none"> IPRR updates required to accommodate settlement changes such as any new reporting of VSR aggregations and the exclusion of VSRs from RERT cost recovery.
EMMS Data Model technical specification	<ul style="list-style-type: none"> Changes will be required to reflect updates to packages in the data model as specified in Table 7.
MSATS technical specification	<ul style="list-style-type: none"> No changes expected to metering installations or metering data management. Further assessment required should there be changes to customer churn processes.

Table 9 Schema Impacts from the IPRR draft rule

SCHEMA	PROPOSED CHANGES
aseXML (B2M)	<ul style="list-style-type: none"> AEMO believes that there will be no impact to B2M schema.
aseXML (B2B)	<ul style="list-style-type: none"> AEMO will referreferred the IPRR draft rule to the B2B Working Group to seek its view on any B2B impacts, particularly regarding whether there are any scenarios that would need a new transaction type. B2B WG members have not identified any B2B impacts from the IPRR draft rule.
Bidding JSON Schema	<ul style="list-style-type: none"> New field for VSR participation status if this becomes an attribute in bidding, otherwise no identified impact.
CDR/CDP JSON Schema	<ul style="list-style-type: none"> No identified impact

5.3 Data growth impacts on system capacity

In the early stages post IPRR implementation, VSRs are expected to be comprised mainly of aggregations of stand-alone exempt generation/storage and larger commercial and industrial (C&I) resources, as these are expected to have more advanced capabilities for participation. Over the medium-to-long term, participation is expected to evolve to include larger volumes of residential NMIs as capability develops. These considerations are based on initial stakeholder engagement and the additional challenges associated with managing household-level aggregations and customers. Therefore, a non-linear volume increase is anticipated through market systems.

The increase in the number of DUIDs, whilst not an orders-of-magnitude increase, may also have an effect through time-sensitive scheduling and reporting systems.

The increase in the number of NMIs represents an increase of several orders of magnitude over the volumes handled by the portfolio management system today, which may lead to performance issues.

Approximations have been made in Table 10 and Table 11 for potential volume numbers of VSRs. These have been estimated using aggregated embedded energy storage numbers forecasted in the 2024 ISP [from both the Progressive Change and Step Change scenarios which each have different assumptions around CER uptake and integration into VPPs](#).²⁷

[Some of these numbers have been revised following feedback on the first draft HLIA. The main changes are that the modelling has now been done on a zonal basis, with some limits placed on the number of participants per zone.](#)

Table 10 Assumed Volume Cumulative Growth Projections (Progressive Change)

System	Entity	Now	2027	2028	2029	2030	Scalability Limitation
Wholesale market systems/PMS	DUID	100s	+2211	+2513	+3417	+3622	No impact.
PMS	NMI Enrolments	1,000s	+8904,200	+3,90010,800	+10,00020,400	+15,00025,600	May require changes by 2029/2028
	Total MWs		+86 MW	+119 MW	+167 MW	+193 MW	

Table 11 Assumed Volume Cumulative Growth Projections (Step Change)

System	Entity	Now	2027	2028	2029	2030	Scalability Limitation
Wholesale market systems/PMS	DUID	100s	+6636	+43062	+24077	+25087	Needs further investigation of impact.
PMS	NMI Enrolments	1,000s	+60,000	+180,000	+370,000	+540,000	May/Would require changes by 2027 for initial release.
	Total MWs		+300 MW	+890 MW	+1800 MW	+2600 MW	

Further systems will be assessed for scalability limitations in subsequent versions of this document.

²⁷ See forecasts for aggregated energy storage systems in the 2023 IASR Assumptions Workbook: <https://aemo.com.au/en/energy-systems/major-publications/integrated-system-plan-isp/2024-integrated-system-plan-isp/current-inputs-assumptions-and-scenarios>

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6 Participant impact assessment

This section provides AEMO’s high-level view of the IPRR draft rule’s potential impact on different participant types and outlines an early view of industry readiness for the IPRR reform. However, **AEMO recommends that each participant perform their own detailed impact analysis of the IPRR draft rule** because AEMO cannot predict the exact scale or nature of impacts for individual participants.

6.1 IPRR high-level participant impact assessment

Table 12 considers the direct IPRR impacts to participants of the IPRR draft rule, as well as the flow-on impacts to participants associated with IPRR changes that AEMO would be required make to its processes, procedures, and systems.

Table 12 Indicative IPRR high-level participant impact

STAKEHOLDER TYPE	INDICATIVE HIGH-LEVEL IMPACT	COMMENT
Integrated resource provider	Opting to participate in IPRR: High	<p>See Table 13 for more detail on indicative IPRR impacts to those market participants that choose to participate as VSRPs.</p> <ul style="list-style-type: none"> To be able Existing CRMPs choosing not to operate VSRs could continue using the pre-IPRR data model. They would only need to adopt the data model updated for IPRR if they wished 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.
Market generator	Not participating in IPRR: Low	
Market customer		
Transmission Network Service Providers	Low impact expected	<p>TNSPs may need visibility of VSR operation:</p> <ul style="list-style-type: none"> For incorporation into constraint equations For future non-market services To manage the interface between transmission and distribution systems.
Distribution/Transmission Network Service Providers	Low/medium impact	<ul style="list-style-type: none"> VSRPs would be responsible for ensuring that their bids and any subsequent dispatch complies with applicable distribution/transmission connection agreements. <ul style="list-style-type: none"> Any requirements for VSRPs to receive information regarding limits applicable to the NMLs that comprise their VSRs is out of scope for this rule change. Receive any new VSR-related reports or data feeds: <ul style="list-style-type: none"> Visibility of NMLs 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. Receive any new VSR-related reports or data feeds via MMS data model: <ul style="list-style-type: none"> Visibility of NMLs that are part of a VSR Aggregated scheduling information (pre-dispatch/dispatch timeframes)
Metering providers	No impact expected	<ul style="list-style-type: none"> As part of the VSR guidelines development, AEMO must consult on and determine acceptable types of metering installations for participating connection points.

STAKEHOLDER TYPE	INDICATIVE HIGH-LEVEL IMPACT	COMMENT
		<ul style="list-style-type: none"> • AEMO expects that the revenue meterRevenue meters at the participating site would need to connection point must adhere to the requirements in NER Chapter 7: of the NER and to AEMO's procedures. For small customers, this would typically mean a type 4 meter that is capable of recording data in five-minute intervals, <u>which is remotely read</u>. • For secondary settlement points participating in VSR, the metering installation must meet the requirements in Chapter 7 of the NER and <u>AEMO's procedures that set out the services for type 8A, type 8B and type 9 metering installations</u>.
Metering data providers	No impact expected	<ul style="list-style-type: none"> • No change to current metering data processes for VSRs.
Embedded network managers	No impact expected	<ul style="list-style-type: none"> • VSRPs could nominate resources at embedded network child connection points, if they are an on-market connection point.
Market SAPs resource providers	No impact.	<ul style="list-style-type: none"> • MSRPs would not be able to nominate VSRs.

Table 13 provides a heat map view of indicative IPRR impacts to those market participants that choose to participate as VSRPs and to DNSPs.

Table 13 IPRR impacts to eligible market participants acting as VSRPs and to DNSPs

INDICATIVE FUNCTION OR CAPABILITY	RELATED AEMO FOCUS AREA	IMPACT	
		Eligible market participant acting as a VSRP/VSRP	DNSP
Register as Generator, Market Customer or IRP	Registration	✓	
Nominate qualifying resources into a VSR	Portfolio management	✓	
Apply to aggregate two or more qualifying resources into a VSR <ul style="list-style-type: none"> • Includes initial VSR capability assessment • Potentially includes periodic VSR capability assessment (to be confirmed through VSR guideline development) 	Portfolio management	✓	
Self-manage VSR connection points, including to: <ul style="list-style-type: none"> • Manage customer churn • Add, remove and update NMIs within a VSR • Apply to 'temporarily deactivate' VSRs • Apply to 'hibernate' VSRs 	Portfolio management	✓	
Submit bids for VSRs, including when temporarily deactivated, <u>ensuring that their bids and any subsequent dispatch complies with applicable distribution/transmission connection agreements</u> .	Bidding	✓	
Receive dispatch instructions	Pre-dispatch and dispatch	✓	
Disaggregate dispatch instructions to individual VSR NMIs within the VSR	n/a	✓	
Conform with dispatch instructions <u>and applicable distribution/transmission connection agreements</u> .	Pre-dispatch and dispatch	✓	
Comply with applicable distribution connection agreements	n/a	✓	✓
Provide aggregated telemetry for VSRs in accordance with 'Power System Data Communications Standard'. It is expected this could include telemetry via: <ul style="list-style-type: none"> • SCADA through NSP 	Telemetry	✓	✓

INDICATIVE FUNCTION OR CAPABILITY	RELATED AEMO FOCUS AREA	IMPACT	
		Eligible market participant acting as a VSR/VSRP	DNNSP
<ul style="list-style-type: none"> Direct 'SCADA-Lite' connection once available²⁸ 			
Receive any new VSR-related reports or data feeds: <ul style="list-style-type: none"> Visibility of NMs that are part of a VSR Aggregated scheduling information (pre-dispatch/dispatch timeframes) 	Data exchange	✓	✓
Updated settlement reconciliation processes to reflect that VSRs are not subject to RERT cost recovery	Settlements, billing and invoices	✓	
Updated settlement reconciliation processes to account for any 'VSR participation payments'	Settlements, billing and invoices	✓	
VSR activity will be incorporated into prudential estimation for VSRPs (including consideration of when VSRs are temporarily deactivated or hibernated)	Prudential assessment	✓	
Provide Demand Side Participation Information via the DSP Information Portal to support long term planning processes.		✓	
Optional participation in VSR incentive mechanism (tender) from Jan 2027 – Dec 2031.	VSR incentive mechanism	✓	

Assumed impact level:  High  Medium  Low

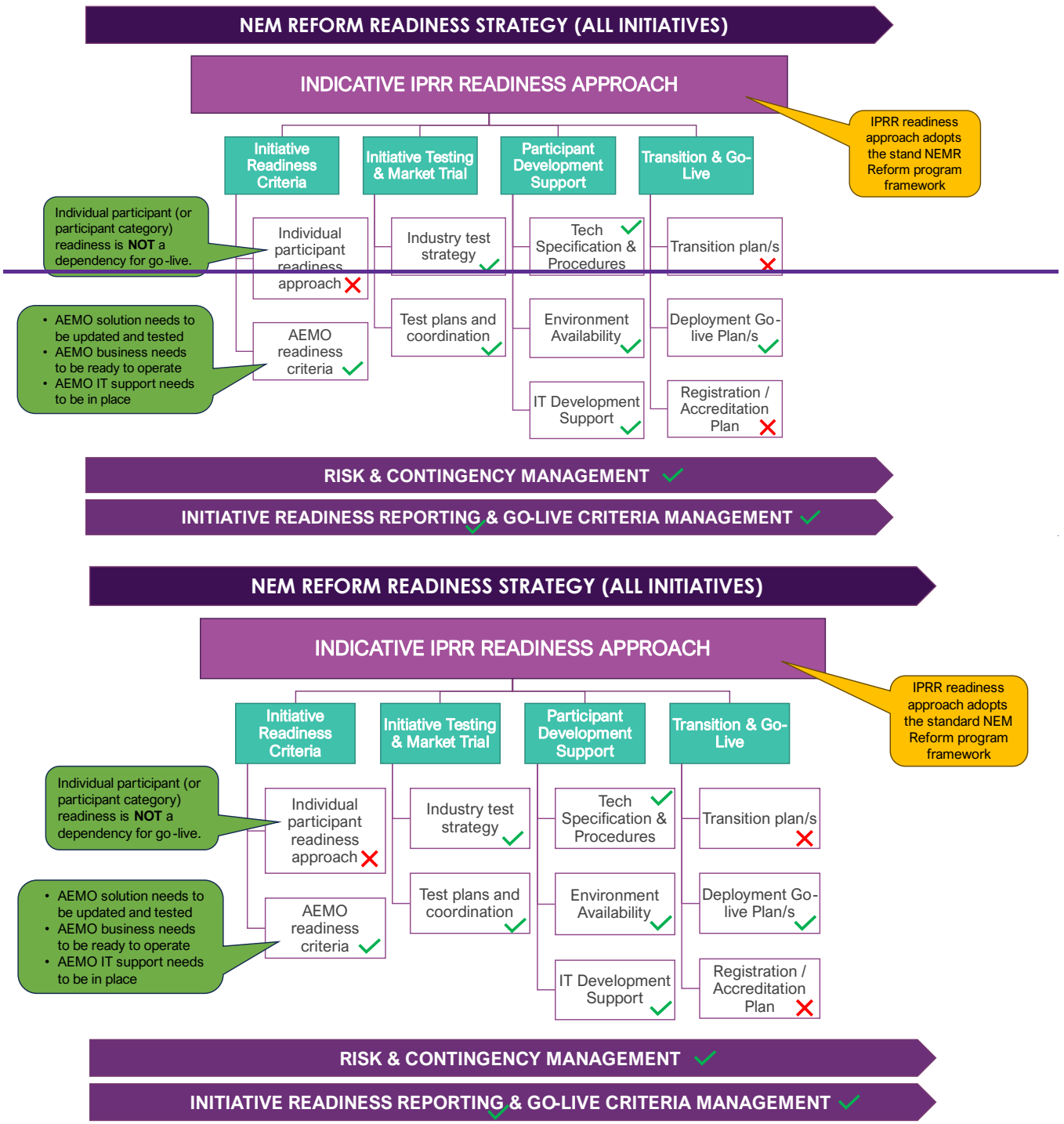
6.2 Indicative industry readiness approach

This section shows AEMO's early view of the IPRR readiness approach based on the IPRR draft rule. The readiness approach and milestone dates will be confirmed in consultation with participants based on the final rule. Figure 5 provides the indicative view of the IPRR readiness approach, consistent with the NEM reform readiness strategy. 0 provides commentary on each of the readiness elements.

The indicative readiness approach assumes that AEMO and industry will prepare for IPRR based on the expected early volumes of coordinated CER. As described in section 5.3, AEMO will eventually need to adapt its systems for increased data growth as more VSRs look to participate in the NEM.

Figure 5 Indicative IPRR industry readiness approach

²⁸ SCADA Lite will enable NEM non-NSP participants to establish a bi-directional connection to exchange operational information (telemetry and control) with AEMO. See SCADA Lite project page for more information: <https://aemo.com.au/initiatives/trials-and-initiatives/scada-lite>



Section 7 discusses how the indicative IPRR industry readiness approach is incorporated into AEMO’s implementation approach.

Table 14 AEMO’s initial view of industry readiness for the draft IPRR rule

READINESS AREA		INITIAL VIEW OF INDUSTRY READINESS
Initiative readiness criteria	Individual participant readiness approach	Individual participant (or participant category) readiness is not a dependency for go-live because IPRR participation is voluntary.
	AEMO readiness criteria	<p>By the IPRR commencement date, AEMO’s:</p> <ul style="list-style-type: none"> • solution needs to be updated and tested • business needs to be ready to operate • IT support needs to be in place.
Industry testing and market trial	Industry test strategy	<ul style="list-style-type: none"> • Industry test strategy will be developed in collaboration with industry. • Based on its current understanding of likely IPRR uptake <u>at the commencement date</u>, AEMO is planning for <u>a 1-month</u> industry test period to conduct either a market trial or industry testing prior to the IPRR commencement date. <u>A November 2026 rule commencement date would limit industry testing to a one-month window, whereas a May 2027 commencement date would see a three-month period for industry testing allowing for a broader range of trial scenarios.</u> • AEMO will engage with participants to establish whether a market trial (end-to-end testing) will be required. • At this early stage, AEMO expects it more likely that it would run ‘industry testing’ i.e. coordinated testing of business process scenarios with a select number of participants who have their systems ready for testing. • <u>If a November 2026 commencement date is maintained in the IPRR final rule</u>, AEMO will engage with intending VRSPs on any need for extended testing support beyond the IPRR commencement date. • During this industry test period, pre-production would be available for self-testing of IPRR functionality. • HLIA indicates that industry testing: <ul style="list-style-type: none"> – Will be needed for VSRPs to test new functionality (likely including VSR portfolio management, telemetry, bidding, dispatch, data exchange, and settlement) – May be needed for NSPs to test any new VSR-related reports or data feeds – May be needed for changes to settlement processes and customer churn processes.
	Test plans and coordination	<ul style="list-style-type: none"> • Will be developed in consultation with industry and in alignment with the industry test strategy. • AEMO will develop test plans that support: <ul style="list-style-type: none"> – Coordinated test scenarios and timings – Identification of required test data e.g. pre-production refreshes etc.
Participant development support	Procedures	<ul style="list-style-type: none"> • IPRR draft rule indicates that new procedures and guidelines will need to be developed, consulted on and published by the timeframes set in the IPRR draft rule. • Where relevant, existing procedures will need to be updated by the IPRR draft rule required date of 1 June 2026. • For all new and existing procedures, AEMO will look for opportunities to prioritise and/or bundle procedure consultations, including discussion of critical path consultations that may have dependencies with AEMO’s and industry’s development and testing. • Section 7 sets out AEMO’s initial view of the IPRR implementation, which indicates that some critical procedures will need to be consulted on and published in advance of the timeframes set in the IPRR draft rule to support AEMO’s and industry’s implementation.
	Technical specifications	<ul style="list-style-type: none"> • AEMO will plan to publish draft technical specifications and the EMMS Data Model, with sufficient time before the commencement of Industry testing to support participant development. <u>A May 2027 commencement date would provide an additional 3-4 months of development time for participants compared to a November 2026 start.</u>
	Environment availability	<ul style="list-style-type: none"> • AEMO’s pre-production will be available to support industry testing (and potentially a market trial) <u>for 1-month</u> prior to the IPRR rule commencement. • Initial assessment is that a Participant development support environment would not be needed as changes to participant interfaces are not expected to be significant. However, AEMO will engage on the need for development support for new/intending participants who seek to become VSRPs, ahead of their registration.

READINESS AREA	INITIAL VIEW OF INDUSTRY READINESS	
		<ul style="list-style-type: none"> Existing IRPs, generators and market customers who become VSRPs will already have access to pre-production for testing.
	IT development support	<ul style="list-style-type: none"> As required, AEMO will provide industry support via NEM Reform forums, information sessions, focus groups and daily stand-ups for affected participants. These engagements would be scheduled as the IT design and approach is formalised to support participants' development.
Transition and go-live	Transition plans	<ul style="list-style-type: none"> No transitional requirement for industry are indicated in the IPRR draft rule IPRR draft rule transitional requirements relate to AEMO and AER developing or updating guidelines and procedures (see above)
	Go-live plan	<ul style="list-style-type: none"> Will be developed in consultation with industry to confirm detailed deployment and capability availability timeframes in the lead up to rule commencement.
	Registration or accreditation plans	<ul style="list-style-type: none"> IPRR draft rule does not indicate changes to registration or accreditation frameworks
Risk & contingency management	<ul style="list-style-type: none"> Will be developed in consultation with industry. 	
Initiative readiness reporting & go-live criteria management	<ul style="list-style-type: none"> Will be developed in consultation with industry. Readiness reporting will be consistent with the go-live criteria. Readiness checkpoints will be scheduled for 6, 3 and 1-month prior to rule commencement. Progress reporting against established milestones will be provided on a regular basis though NEM Reform forums. 	

7 Implementation pathway

This section outlines the indicative implementation pathway and risks for the IPRR reform, for discussion with industry and the AEMC. The ~~pathways consider~~pathway considers the implementation impacts to participants and AEMO described in earlier sections, and key milestones proposed in the IPRR draft rule.

Figure 6 shows an indicative implementation pathway for all three elements of the IPRR draft rule:

- Mechanism to enable VSR participation in the NEM
- Price Responsive Reporting Guidelines
- VSR Incentive Mechanism (VIM)-, noting that the AEMC is assessing alternative options to having the incentive scheme as an AEMO obligation in the NER.

There are two main suggested changes to the implementation timeframes outlined in the IPRR draft rule:

- ~~An~~A recommended implementation date of ~~22 November 2026~~in May 2027 rather than Thursday, 5 November 2026. This is because:
 - ~~AEMO needs to align go-live with the beginning of the billing week (a Sunday) to support settlement changes.~~
 - ~~AEMO considers a slightly later 22 November commencement would provide additional development time, and is likely to work better with the timing of the Unlocking CER benefits deployment for both AEMO and industry.~~
 - Based on stakeholder feedback and its own analysis, AEMO's strong preference is for a May 2027 IPRR commencement date to allow sufficient time for design, development and testing, and allow AEMO to have sufficient contingency in its schedule. AEMO considers November 2026 as the earliest feasible implementation date that could be achieved but this would be dependent on:
 - o The VIM or other incentive mechanism being delivered much earlier to support and provide certainty to early adopters, and
 - o There being a strong indication that prospective VSRPs will be ready for the short, one-month industry testing window that would be available if IPRR commenced in November 2026. This is so that AEMO's and participants' technical solutions would have undergone sufficient industry testing prior to rule commencement.
 - A May 2027 commencement would provide more time for VSRPs' customer acquisition, technical development and testing.

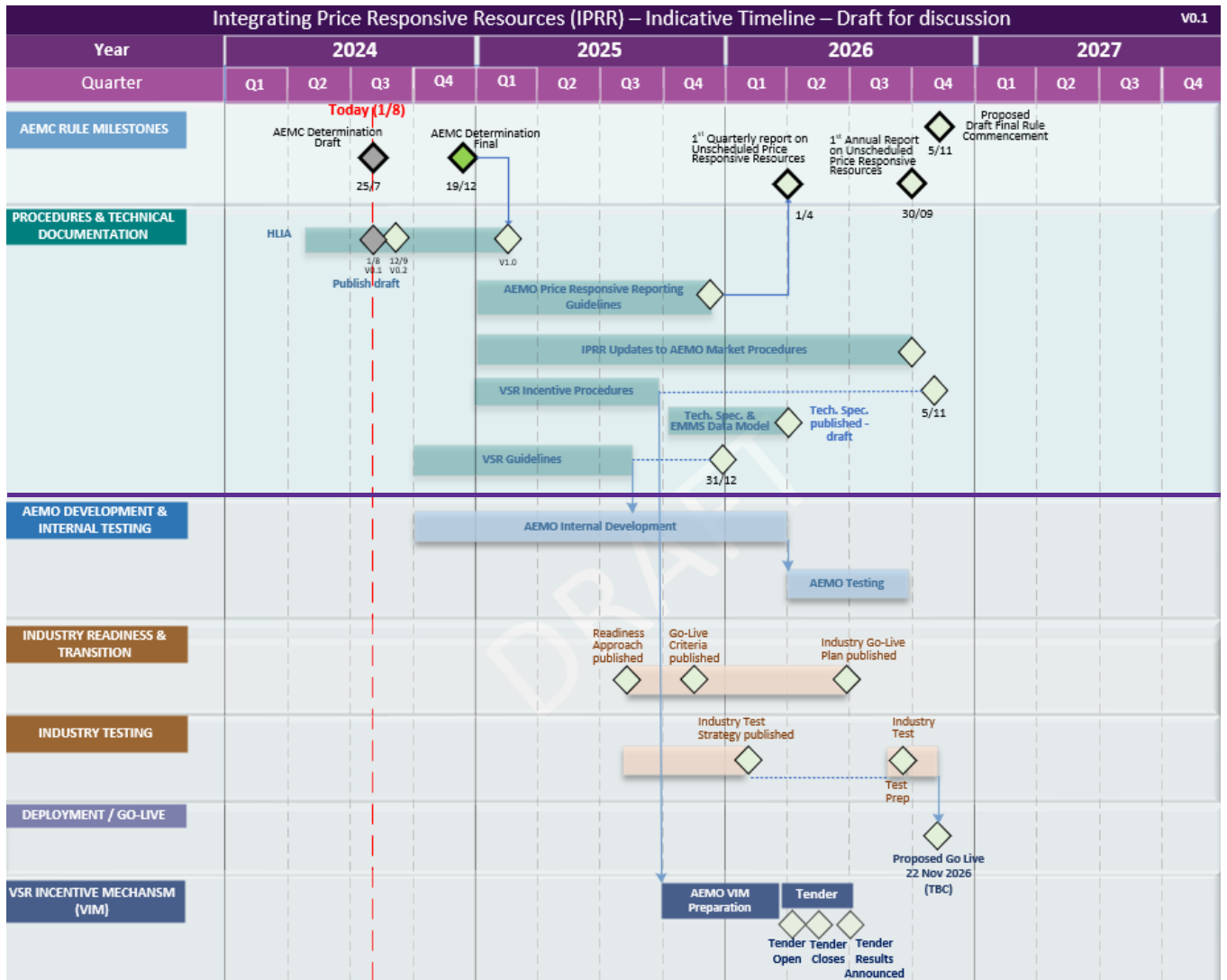
Note that the IPRR commencement **day** should be a Sunday to align with the start of the NEM settlement billing week. Commencing IPRR on any other day of the week would increase design and development complexity, leading to increased implementation costs. This is because there would need to be a 'settlement transition week' to accommodate the first part of that week being based on pre-IPRR settlement processes and the later part of that week being based on IPRR settlement processes.

- Earlier commencement of the VSR incentive mechanism activities:

- AEMO proposes ~~bringing~~aligning the development of the VSR incentive procedures ~~in-line~~ with that of the VSR guidelines, given expected impacts on settlements applications ~~to implement~~of both the IPRR mechanism and the VSR incentive mechanism.
- AEMO proposes that the first VSR tender process would be brought forward to commence in Q2 2026, ~~enabling~~ successful participants ~~to access payments~~with certainty earlier. This would help to mitigate the risk of lower-than-expected participation rates in early stages of IPRR as participants wait for the VSR incentive mechanism to be available. ~~This~~it strengthens the requirement for sufficient detail to be resolved in the IPRR final rule and determination for the VSR incentive mechanism, to minimise complexity in implementation.
- The assumption in this alternative timeline is that AEMO would be able to finalise the VSR incentive procedures and immediately act on them, with a tender able to be run in Q2 2026, in parallel with AEMO development and testing and industry readiness for the IPRR mechanism.

There are a range of risks associated with the proposed IPRR implementation timeframes, given the extensive impacts for AEMO systems and procedures, as well as industry impacts. These are considered in section 0.

Figure 6 Indicative IPRR implementation timeline



7.1 Key delivery considerations

Given the breadth and complexity of IPRR, AEMO has considered the key delivery areas in 0 in its development of the indicative IPRR implementation pathway.

Table 15 Key delivery considerations

AREA	KEY DELIVERY CONSIDERATIONS
<p>Procedure consultation considerations</p>	<ul style="list-style-type: none"> • Allowing sufficient time for consultation with participants. • Prioritising critical path consultations that may have dependencies with AEMO’s and industry’s development and testing. Publishing critical path procedures sooner means that data model and technical specifications can be released to participants sooner. • Looking for opportunities to prioritise and/or bundle procedure consultations, likely via the Electricity Wholesale Consultative Forum or the Electricity Retail Consultative Forum as appropriate, including discussion of ‘critical path’ consultations noted above.
<p>VSR Incentive Mechanism</p>	<p>As described above, AEMO is proposing the incentive mechanism procedure development and first tender process be brought forward because of:</p> <ul style="list-style-type: none"> • Dependency on Settlements build. • Benefits from running the auction earlier to provide more certainty for participants, earlier access to payments, and earlier participation in the IPRR mechanism.
<p>Industry support and test considerations</p>	<ul style="list-style-type: none"> • AEMO would make the 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. However, AEMO will engage on the need for development support for new/intending participants who seek to become VSRPs, ahead of their registration. • <u>Providing 1 month of industry testing based on the assumption that a market trial is not required. Note that Based on its current understanding of likely IPRR uptake, AEMO is planning for an industry test period to conduct either a market trial or industry testing prior to the IPRR commencement date. A November 2026 rule commencement date would limit industry testing to a one-month window, whereas a May 2027 commencement date would see a three-month period for industry testing allowing for a broader range of trial scenarios.</u> • <u>AEMO’s initial assessment does not identify the need for coordinated market trials.</u> • <u>If a November 2026 commencement date is maintained in the IPRR final rule, AEMO will engage with intending VRSPs on any need for extended testing support beyond the IPRR commencement date.</u> • AEMO will plan to publish AEMO’s initial assessment does not identify the need for coordinated market trials. • <u>Publishing draft technical specifications and the EMMS Data Model, with sufficient time before the commencement of Industry testing to support participant development. <u>A May 2027 commencement date would provide an additional 3-4 months of development time for participants compared to a November 2026 start.</u></u>

7.2 Risks

Table 16 considers the risks associated with the proposed IPRR implementation approach discussed above.

Table 16 Initial assessment of the IPRR implementation risks

IDENTIFIED RISK	CURRENT RATING	MITIGATION STRATEGIES	RESIDUAL RATING (AFTER MITIGATION)
Scope, complexity and timing of IPRR final rule could affect AEMO's and industry's ability to meet the rule commencement date.	Medium	<ul style="list-style-type: none"> Continued engagement between AEMC, AEMO and industry. 	Low
Contention and priority of IPRR amongst other reform initiatives affecting common capability areas	Medium	<ul style="list-style-type: none"> NEM Reform program governance to manage priority and contention. 	Low
Any change and potential instability (particularly across summer periods) requires focus on operations rather than reform change.	Medium	<ul style="list-style-type: none"> Timeframes consider summer operations to support successful delivery. 	Low
AEMO support for participant development timeframes.	Medium	<ul style="list-style-type: none"> AEMO to publish comprehensive specifications in a timeframe that supports participant development being ready for industry testing. 	Low
Insufficient participant involvement during industry testing	Medium	<ul style="list-style-type: none"> Engagement with intending and existing Participants to understand test requirements, support, and impact. 	Low
Project activities affecting stakeholder resourcing over Christmas owing to organisational shutdown periods.	Low	<ul style="list-style-type: none"> Timeframes consider holiday closure periods to support successful delivery. 	No impact

8 Related reforms

Table 17 sets out the interrelationship between the IPRR reform and key, select NEM reform initiatives.²⁹

Table 17 IPRR project's relationship with other key initiatives

NEM REFORMS	RELATIONSHIP TO IPRR
SCADA Lite	<p>The SCADA Lite reform will enable NEM non-NSP participants (such as VSRPs) to establish a bi-directional connection to exchange operational information (telemetry and control) with AEMO.</p> <p>SCADA Lite is a pre-requisite for IPRR and is expected to be available to participants from late January 2025.</p>
Unlocking benefits of CER through flexible trading	<p>The draftfinal rule creates a mechanism that facilitates consumers and their agents (i.e. retailers, FRMPs and aggregators) to identify and manage flexible CER separately from inflexible or passive energy use and for that flexible CER to be better recognised in the energy market and used in the power system.</p> <p>'Flexible trading' is not a dependency for the IPRR reform. However the 'flexible trading' reform is complementary to IPRR as it enables end users to establish a secondary settlement point(s) for controllable resource(s) within their electrical installation. The reform allows large customers the ability to choose different market participants for the connection point and secondary settlement point. Whilst small customers can participate in the reform, it requires the same FRMP for the connection point and secondary settlement point. The reform provides a framework for new products and services to be available for CER assets.</p> <p>The draftfinal rule for the unlockingUnlocking CER benefits through flexible trading has an indicative commencement date of 02-Februarystaggeres the implementation into two key dates:</p> <ul style="list-style-type: none"> • Arrangements related to Type 9 metering installations at primary connection points beginning 31 May 2026; however AEMO and • Arrangements related to the Reform Delivery Committee have recommended a later commencement date of 2 remaining substantive matter of the rule beginning 1 November 2026.
Frequency performance payments	<p>The FPP reform is intended to promote the provision of good frequency control in the NEM at the lowest cost to consumers. This is achieved by more clearly pricing the impact of helpful and unhelpful behaviour by facilities and providing information about performance in a timeframe that allows for plant operators to respond to these price signals.</p> <p>The new FPP allocation method will also be used to apportion the recovery of regulation FCAS, replacing the current 'causer pays' framework.</p> <p>All generators and loads, including households, are captured by FPP, and VSRPs would be eligible for frequency performance payments. Facilities capable of providing four-second performance data (SCADA) will receive individual contribution factors calculated accordingly, while those without SCADA are part of the 'residual' and receive and allocation of incentives/penalties based on their metered energy.</p> <p>FPP will go live on 8 June 2025 after a period of 'non-financial operation' of the new FPP systems.</p>
Enhancing Reserve Information	<p>The ERI reform aims to improve the transparency of the available energy from scheduled generators and grid-scale batteries across the NEM. The additional information will enable market participants to make more informed decisions about their own behaviour, including when periods of tighter supply-demand balance in the wholesale electricity market are anticipated. Three new measures will be introduced:</p> <ul style="list-style-type: none"> • Publication of previous day's 5-min data for batteries • Publication of daily energy limits (total availability) of scheduled generators • Publication of aggregated state of charge of batteries in near-real time by region <p>Scheduled BDUs will also need to provide Maximum Storage Capacity (MWh) to AEMO in their annual Schedule 3.1 data confirmation process.</p> <p>Information relating to a battery's aggregated state of charge (SOC) will need to be provided for VSR assets to help signal to the market the aggregated levels of storage available in operational time frames, and to constrain VSR assets in pre-dispatch forecasts when their batteries are exhausted.</p> <p>Go live for the ERI reforms is 1 July 2025 (except for near real-time SOC in Tasmania, which will commence as soon as sufficient diversity in battery operators exists in that region, or no later than 1 July 2027).</p>

²⁹ The [NEM reform implementation roadmap](#) provides stakeholders with the complete list of reform initiatives.

9 Seeking feedback

AEMO welcomes feedback on this HLIA by Monday, 19 August 2024 via email to NEMReform@aemo.com.au

AEMO is particularly seeking feedback on matters set out in Table 18 to:

- Help shape its IPRR implementation approach
- Inform its submission to the AEMC in relation to the IPRR draft determination and rule.

A response template is available for stakeholders to use if preferred.

Table 18 — Key areas for feedback on this HLIA

HLIA SECTION	KEY FEEDBACK AREAS
2. Market design CER data exchange	<ul style="list-style-type: none"> • To what extent has AEMO appropriately captured the IPRR market design based on the AEMC's draft IPRR rule? What changes do you propose and why? • AEMO considers that the system changes to implement a 'hibernation' mode (i.e. in addition to enabling temporary deactivation) are likely to be complex. This is because hibernation will require processes to manage the treatment of VSR NMs 'shifting' between demand-side and supply-side treatment in the market. AEMO is thus interested to understand from participants: <ul style="list-style-type: none"> — Under what circumstances is a hibernation feature likely to be used and 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? <p>Identifies use cases and data exchange model to support CER coordination.</p>
3. Key AEMO impacts MITE	<ul style="list-style-type: none"> • To what extent have the key impacts to AEMO's processes from the IPRR draft rule been appropriately captured? What changes do you propose and why? <p>What are your views on how the information in the existing DER Register could be used for establishment of VSRs? AEMO considers that there are a range of ways to incorporate information from the existing DER Register to support and verify the process of nominating NMs into VSRs; however, the DER Register does not currently capture information on all relevant resources and access to the information in the Register is restricted. AEMO's current view is that the DER Register could be used for high-level verification of the capacity of different types of resources within VSR portfolios and as a supplementary source of information, but would not be relied upon to approve nomination of NMs into VSRs.</p> <p>Market interface technology enhancements:</p> <ul style="list-style-type: none"> • Enhanced identity and data exchange capabilities to support service providers & new CER use cases.
4. AEMO procedure impacts	<ul style="list-style-type: none"> • To what extent have the impacts to new and existing market procedures from the IPRR draft rule been appropriately captured? What changes do you propose and why?
5. AEMO system impacts	<ul style="list-style-type: none"> • 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?
6. Participant impact assessment and readiness Accelerating smart meter deployment	<ul style="list-style-type: none"> • 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? More 5-min capable meters available as a pre-requisite for a VSR.
7. Implementation pathway ARENA capacity building	<ul style="list-style-type: none"> • To what extent have the key IPRR implementation considerations been appropriately described? • In Section 7, AEMO has proposed alternative timing for two implementation components, including: <ul style="list-style-type: none"> — a slightly later 22 November 2026 commencement date

HLIA SECTION	KEY FEEDBACK AREAS
	<p>— earlier development of VSR incentive mechanism procedures and earlier commencement of the first tender process.</p> <p>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? <u>Community battery investments are good VSR candidates.</u></p>
8. Related reforms	<ul style="list-style-type: none"> • To what extent have the related reforms and their interaction with IPRR been appropriately identified? What changes do you propose and why?
General	<ul style="list-style-type: none"> • AEMO would appreciate feedback on the structure and content of this HLIA, to help inform the next version:

A1. Impact ratings

Description of AEMO's reform impact ratings for industry systems, processes and documentation

Impact rating	Description	Comments
No impact	<ul style="list-style-type: none"> No change's to AEMO or industry systems, processes, guidelines, or procedures. Stakeholder consultation not required. 	<ul style="list-style-type: none"> No changes
Immaterial	<ul style="list-style-type: none"> Immaterial impact to AEMO or industry systems, process, guidelines, or procedures Stakeholder feedback sought 	<ul style="list-style-type: none"> Immaterial administrative changes to AEMO procedures and/or guidelines, purposes of consistency Immaterial changes or additions to existing business processes and/or technology systems Stakeholder consultation not required.
Low	<ul style="list-style-type: none"> Low impact to AEMO or industry systems, processes, guidelines, or procedures Stakeholder consultation may be required, or feedback sought. 	<ul style="list-style-type: none"> Minor changes, additions, or updates to AEMO procedures and/or guidelines, purposes of consistency Minor changes, additions, or updates to existing business processes and/or technology systems Stakeholder consultation not anticipated but may be required.
Medium	<ul style="list-style-type: none"> Medium impact to AEMO or industry systems, processes, guidelines, or procedures Stakeholder consultation required. 	<ul style="list-style-type: none"> Material changes or additions to AEMO procedures and/or guidelines Significant changes or additions to existing business processes and/or technology systems Stakeholder consultation required.
High	<ul style="list-style-type: none"> High impact to AEMO or industry systems, processes, guidelines, or procedures Stakeholder consultation required. 	<ul style="list-style-type: none"> Significant changes, additions, or creation of new AEMO procedures, and/or guidelines Significant changes, additions, or the creation of new business processes and/or technology systems Stakeholder consultation required.
Very High	<ul style="list-style-type: none"> Large impacts to AEMO or industry systems, processes, guidelines or procedures Stakeholder consultation required 	<ul style="list-style-type: none"> Large changes, additions or creation of new AEMO procedures and/pr guidelines Major changes, additions or creation of new business processes and/or technology systems Stakeholder consultation required

A2. Glossary

This document uses many terms that have meanings defined in the National Electricity Rules (NER). The NER meanings are adopted unless otherwise specified.

Please also see AEMO's [industry terminology web page](#) to complement the table below.

TERM	DEFINITION
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
API	Application programming interface
ARENA	Australian Renewable Energy Agency
ASEFS	Australian Solar Energy Forecasting System
B2B	Business-to-business
B2M	Business-to-market
BDU	Bidirectional Unit
CER	Consumer Energy Resources
COAG	Council of Australian Governments
CP	Connection point
CRMP	Cost recovery market participant
DER	Distributed Energy Resources
DNBP	Distribution Network Service Provider
DRSP	Demand Response Service Provider
DSP	Demand side participant
DUID	Dispatchable unit identifier
EDP	Enterprise Data Platform (interchangeable with EDW)
EDW	Enterprise Data Warehouse (interchangeable with EDP)
ESB	Energy Security Board
EMS	Energy Management System
EMMS	Electricity Market Management System
EV	Electric Vehicle
FCAS	Frequency control ancillary services
FEL	Flexible Export Limit
FPP	Frequency Performance Payments
FRMP	Financially Responsible Market Participant
GW	Gigawatt
HLIA	High-level Implementation Assessment
IDAM	Identity Access and Management
IDX	Industry Data eXchange
IPRR	Integrating price responsive resources into the NEM – rule change
IRP	Integrated Resource Provider

TERM	DEFINITION
LNSP	Local network service provider
LSU	Light Scheduling Unit (now termed as Voluntarily Scheduled Resource)
MSATS	Market settlement and transfer solutions
MT PASA	Medium term projected assessment of system adequacy
MW	Megawatt
MWh	Megawatt hour
NECR	Non-Energy Cost Recovery
NEM	National Electricity Market
NEMDE	National Electricity Market Dispatch Engine
NER	National Electricity Rules
NMI	National Metering Identifier
NSP	Network service provider
PD / Pre-Processing	Pre-dispatch or other known as 'Pre-Processing' feeds into 'NEMDE'
PMS	Portfolio Management System
PoL	Predictability of load
Post Processing	Process after 'NEMDE'
Price-Responsive resources	Price-responsive resources refer to the wide range of residential, community, commercial and industrial energy resources and load that are not currently scheduled through the market dispatch process and do, or could, respond (individually or as part of aggregation) to market price signals. It includes but not limited to household CER such as solar PV, batteries, EVs, flexible hot water systems, pool pumps and industrial loads with components of controllable demand (for example smelters, foundries and manufacturing facilities).
PV	Photovoltaic
RERT	Reliability and Emergency Reserve Trader
RMC	Registration Manager Client
SCADA	Supervisory Control and Data Acquisition
SOC	State of charge
ST PASA	Short Term Projected Assessment of System Adequacy
TI	Trading Interval
Trading Interval (TI)	A period for which AEMO settles trading amounts in the NEM. A trading interval is defined in the Rules as a 5-minute period.
V2G	Vehicle to Grid
VIM	VSR incentive mechanism
VPP	Virtual Power Plants
VSR	Voluntarily Scheduled Resource
VSRP	Voluntarily Scheduled Resource Provider
WDR	Wholesale Demand Response Mechanism