INTEGRATING ENERGY STORAGE SYSTEMS INTO THE NEM

DRAFT DETERMINATION STAKEHOLDER SESSION

2 AUGUST 2021

AEMC

Agenda

1. Context of today
2. Draft decisions
3. Next steps

CONTEXT FOR TODAY

Context

1. 69 submissions to date, on consultation paper and options paper

2. Two extensions of time due to size and complexity of the issues

3. Overlaps with the ESB's post-2025 workstream on DER integration

4. The objective of the draft rule is to make changes now to level the playing field for storage and hybrids, and provide a clearer framework for future investment

5. Submissions are due on 16 September

INTEGRATING ENERGY STORAGE

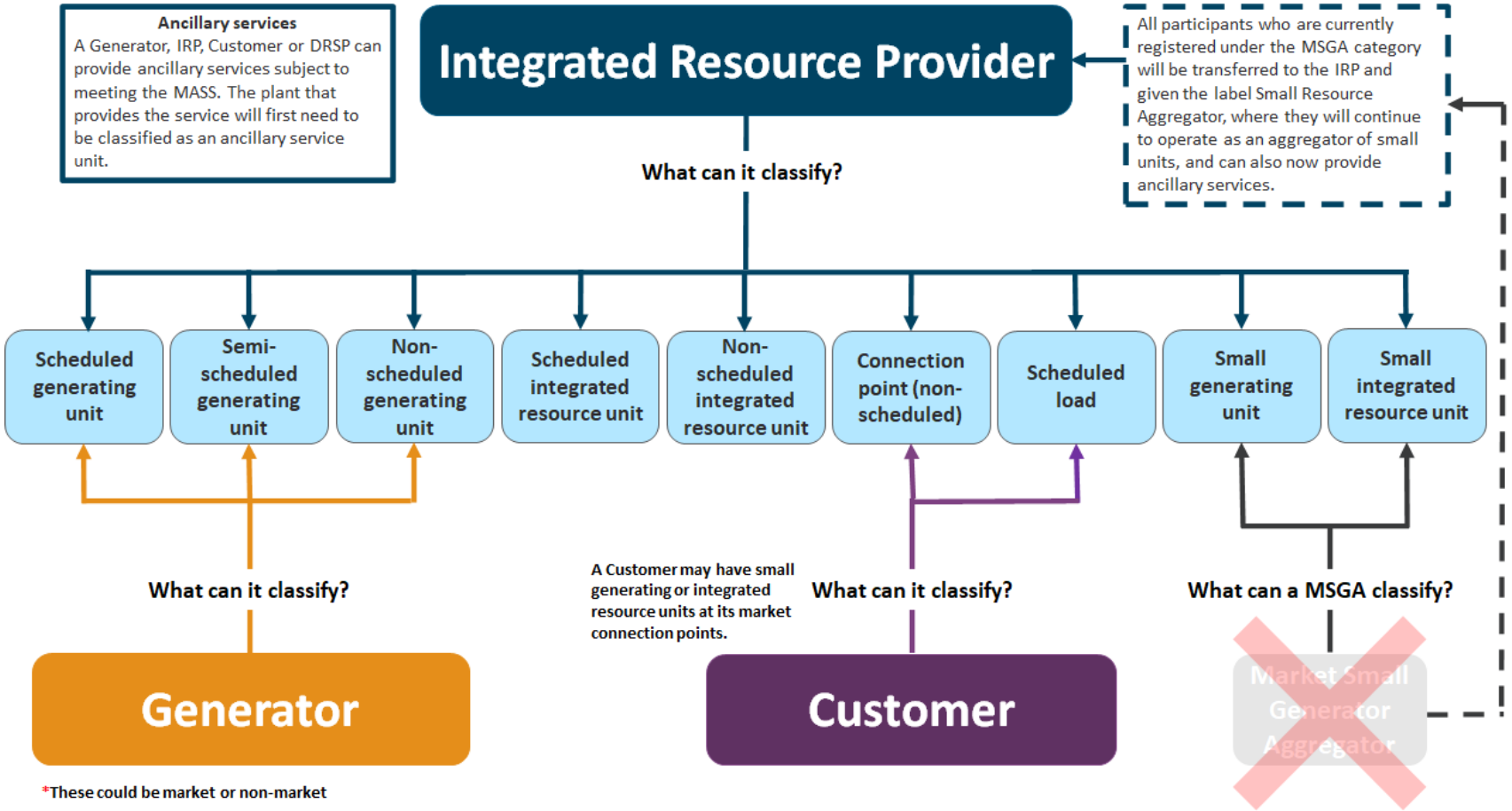
DRAFT DECISIONS

Registration and participation

A new registration category – Integrated Resource Provider

- A single registration category for standalone storage and hybrid systems to register in
- Moving MSGA participants into the IRP category (allowing small generating and storage units to provide ancillary services).
- For a hybrid system, dispatch conformance measured in aggregate (exceptions when a unit is providing FCAS or when AEMO identify a system security issue in that area).
- Grid-scale batteries would move from two DUIDs to a single, bi-directional DUID
  - Existing and new grid scale batteries.
  - Increase bid-bands to 20 (maximum of 10 in each direction).
- Clarifying that the current approach to performance standards that are set and measured at the connection point will apply for grid-scale storage units, including where part of a hybrid.
- Transitional rule provisions would apply to SGAs and grid-scale batteries.

Classifications and services that can be provided by Market Participants

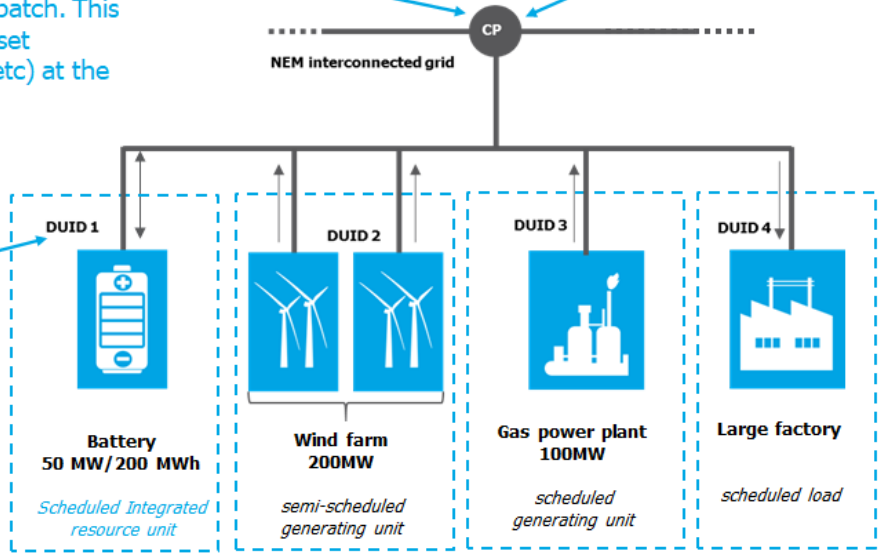


How a hybrid facility would register and participate under the draft decision

We are proposing that the AER measure **compliance with dispatch** at the connection point or at unit level, as determined by an AEMO power system operating procedure. This will allow hybrid systems to benefit from self managing energy flows behind the connection point and choosing how to meet dispatch. This will not limit AEMO's ability to set constraints (or instruct/direct etc) at the unit level where appropriate.

A participant seeking to set up a hybrid facility would **register** as an Integrated Resource Provider (IRP)

Performance standards would be set at the unit level but would be measured at the connection point. As now, each grid-scale unit would connect through Chapter 5 of the NER, which requires information on the technical characteristics of the unit that impact the power system.



Single DUID for integrated resource units. This is a change from the two DUIDs that currently exist for grid-scale batteries. The participant would have 20 price bid bands (10 for load and 10 for generation).

Classifications and scheduling would be at the unit level (for both the energy and ancillary service markets). AEMO would send dispatch instructions to each unit.

* This diagram is an example of a potential hybrid facility. A hybrid facility could vary in the number and type of units behind its connection point.

DC coupled systems

Participants can choose from four options:

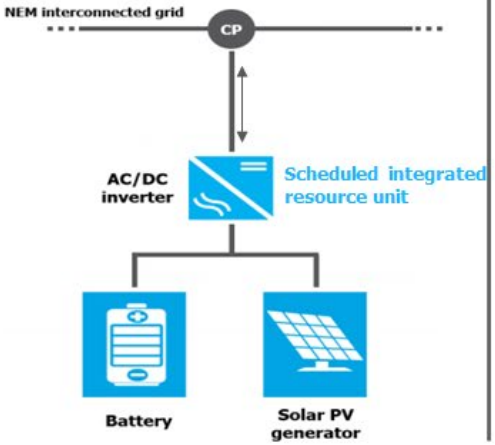
1. a non-scheduled IRU (only for systems under 5 MW)
2. a scheduled IRU (can't operate without the battery)
3. a semi-scheduled generating unit (can't operate the battery independent of wind/solar forecast)
4. separately as a scheduled IRU and a semi-scheduled generating unit, which would be treated as two separate units in dispatch (but conformance as a whole, subject to AEMO’s Power system operating procedure).

How a DC coupled facility would register and participate under the draft decision*

DC coupled system proponents (above 5MW) would register as an IRP and would then have the option to classify the units in their system in one of the following ways:

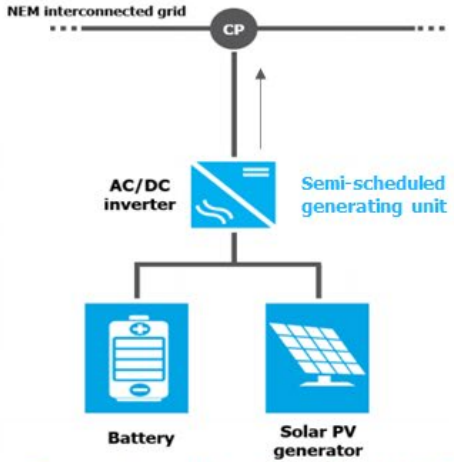
Scheduled integrated resource unit (IRU):

- Participate in the same way a grid-scale battery (over 5MW) would, as a scheduled IRU.
- Single DUID with 20 price bid bands (10 for load and 10 for generation).



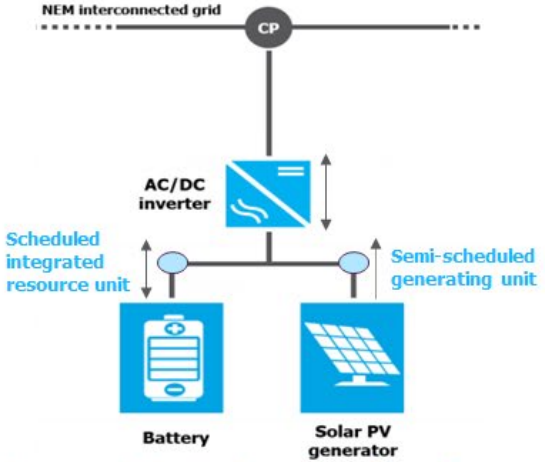
Semi-scheduled generating unit:

- Participate in the same manner as an existing stand alone grid scale intermittent generator (over 30MW) as a semi-scheduled generating unit.
- Dispatch limited by AEMO's unconstrained intermittent generation forecast (UGIF) as well as the level specified by AEMO during 'semi-dispatch' intervals (as per existing requirements).
- Consumption from the grid limited to auxiliary load; battery cannot be charged from the grid.



Multiple classifications:

- Plant behind the inverter classified as separate units with individual DUIDs allowing independent operation.
- Plant that satisfies existing criteria to be classified as a semi-scheduled generating unit.
- Plant that satisfies the draft rule's new criteria can be classified as an integrated resource unit.
- Specific requirements (telemetry/metering etc) to be set out in an AEMO guide to registration.



* This diagram is an example of a stand alone DC coupled system. These options could also be used in a hybrid facility. A DC coupled system could vary in the number and type of plant behind the inverter.

Recovery of non-energy costs

Recovery of non-energy costs – an example of the proposed change

Current framework

Costs are recovered based on the participant category you are registered in:

- only Market Customers pay costs recovered from load, and
- only Market Generators and MSGAs pay costs recovered from generation.

Netting is allowed at the connection point, and between multiple connection points.

Draft decision

All costs would be recovered based on consumed and sent out energy metered at the connection point. That is, for example, all participants would pay for costs recovered from load based on their proportional share of metered load.

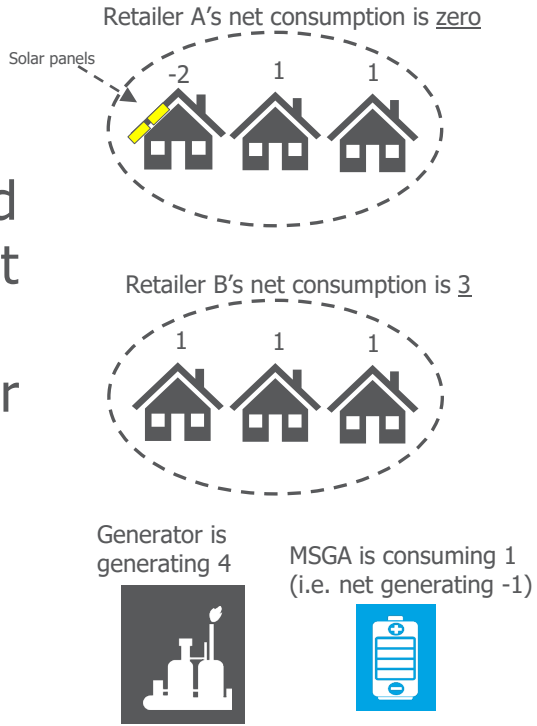
There would no longer be any netting between multiple connection points.

Recovery of non-energy costs – an example of the proposed change

This example uses a settlement interval during the day when it is sunny, and a non-energy service that is recovered based on consumption (e.g. FCAS lower event).

Current framework

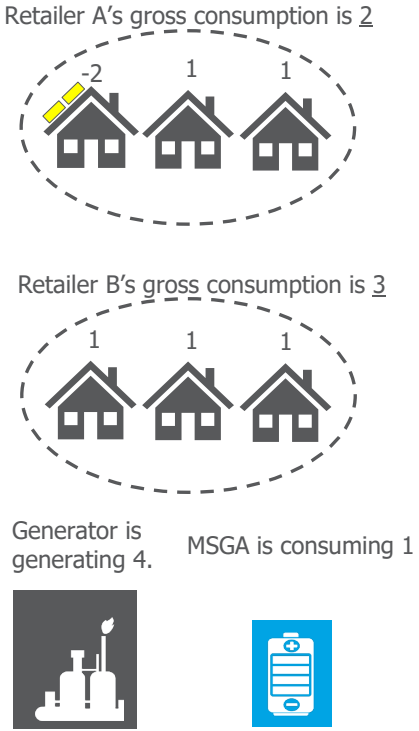
All costs are paid by retailer B as it is the only Market Customer with a positive net consumption.



Total net consumption from Market Customers = 3.
Retailer B pays all of the cost.

Proposed approach

All costs would be recovered based on consumed energy that would be spread proportionally across participants' gross energy consumption.



Total gross consumption from all participants = 6.
Retailer A pays 2/6, Retailer B pays 3/6, MSGA pays 1/6.

Costs and benefits

Costs and benefits

AEMO's cost estimate to implement the draft determination is $19-28.7 million. The main changes and costs are presented below.

Topic	AEMO's Cost estimate	Benefit
A new participant category	$8-10m	Simplest way to accommodate bi-directional participants, and to create the foundation of a future universal category.
Increasing number of price bid bands to 20 for storage units	$1.5-2m	Maintains a level bidding playing field for storage in a move to a single DUID
Allowing flexibility for DC coupled systems	$1-2.5m	Better integrate storage through providing a variety of options for DC coupled systems.
Moving SGAs into the IRP, and allow them to provide ancillary services	$1-2m	Allows greater flexibility in how small units can be used in the market
Changes to recovery of non-energy costs framework	$5-7m	Provides a forward-looking cost recovery framework that is more reflective of who benefits from non-energy services. Removes existing unintended outcomes.

TOUS and DUOS charges

Changes to the rules to clarify how network charges are set

The draft rule makes minor amendments in relation to grid-scale storage and hybrids and to accommodate the new IRP participant category within the framework:

- non-retail distribution customers' tariffs should be cost reflective
- TNSPs must provide shared transmission services as prescribed transmission services if requested
- the IRP will pay TUOS for prescribed transmission services i.e., in relation to electricity taken from the grid.

Reasons why storage were not exempt from network charges in the rules

As our draft decision is not to define storage, our draft determination clarifies how storage fits into the current framework. The Commission considers that the rules currently contain appropriate provisions on the treatment of TUOS/DUOS for load and generation.

- **For generation**: generators do not incur TUOS or DUOS charges.
- **For load**: the rules are designed to provide flexibility to account for network and jurisdictional arrangements.

However, we agree that it is important to continue to move to more cost reflective pricing. Broader network charging arrangements are being considered through other processes:

- *Access, pricing and incentive arrangements for DER* rule change
- the ESB's medium term access reforms
- the AER's transmission ringfencing guidelines review.

Other issues

Other changes where minor draft amendments have been made to integrate storage

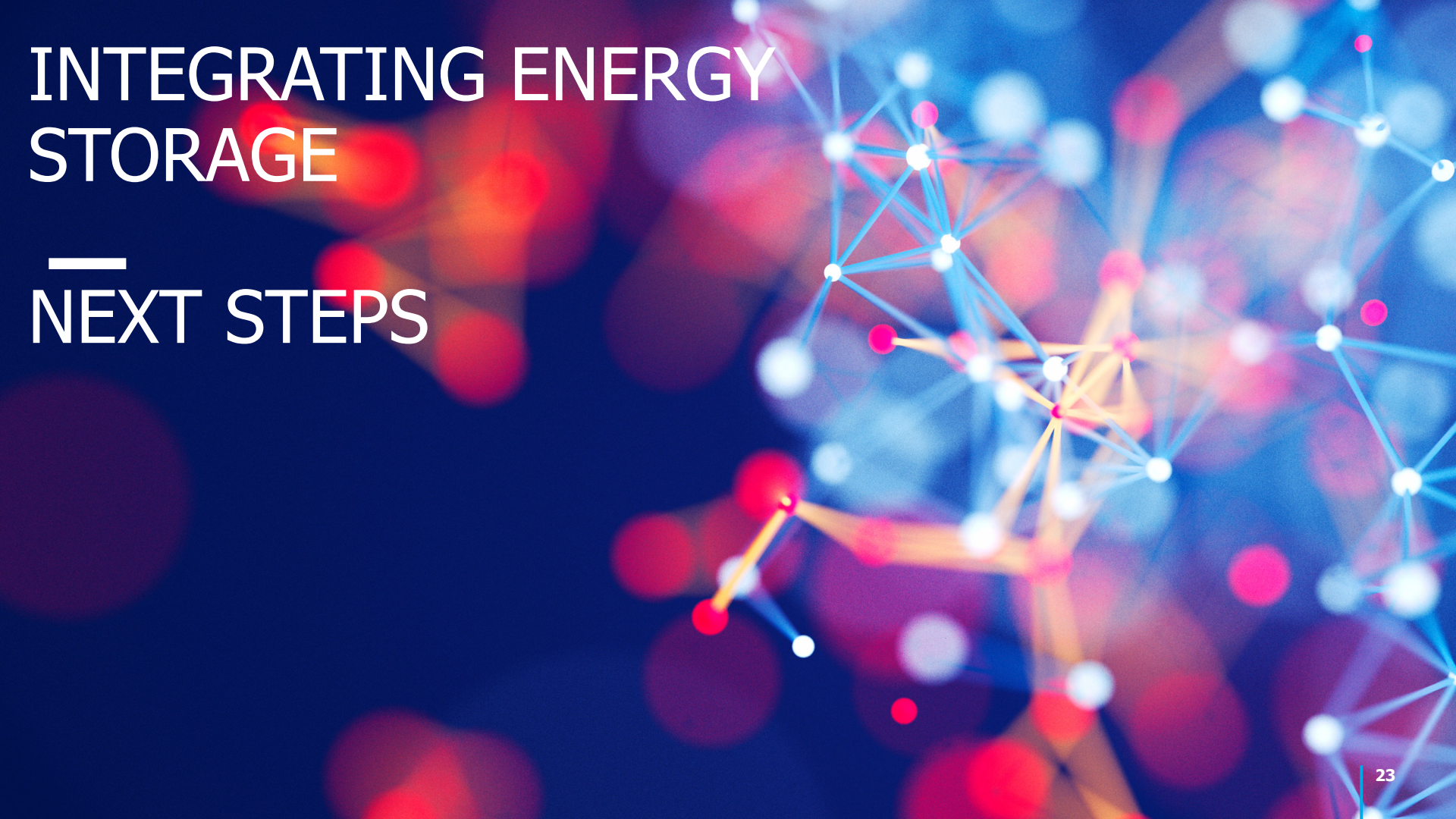
- **Retailer Reliability Obligation** – IRPs have been included as liable entities under the RRO if their annual aggregate load in a region exceeds 10GWh
- **Updating language in the rules** – The terms load and generation have been amended to make it clear when these terms apply under different contexts. All mentions of 'offer' have been replaced with 'bid', and generic references to scheduled plants and market participants have been made where practicable.
- **Ancillary services clauses in Rules** – A new umbrella term for the provision of ancillary services has been introduced to replace the separate clauses, which relate to ancillary service generating units and ancillary services loads. Additional changes have also been made to properly integrate the IRP into this new umbrella term.
- **Intervention compensation framework** – No unique arrangements for storage and hybrids have been developed in the intervention compensation frameworks. However, the IRP has been integrated into these frameworks.

Other issues where no changes were made

- **Network service provider connection points** – No unique connection pathway for NSP owned energy storage systems has been developed. The current arrangements will be maintained whereby an NSP owned battery must make use of a separate operator for contestable market services to file a connection agreement.
- **Network losses and marginal loss factors** – No changes to the MLF framework have been made because this framework already considers bi-directional energy flows.
- **Reliability Panel representation** – No changes to the Reliability Panel's representation provisions have been made to specifically require IRPs be represented on the Panel, as a storage representative can be appointed as one of the three discretionary members.

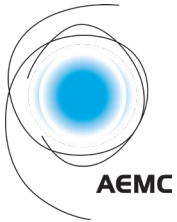
INTEGRATING ENERGY STORAGE

NEXT STEPS



Next steps

- Submissions are due 16 September 2021
- Final determination expected to be published by 28 October 2021
- Expected 18-month implementation (the final rule would take effect from 28 April 2023)



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