Integrating price-responsive resources

Draft determination public forum

27 August 2024

AEMC

ACKNOWLEDGEMENT OF COUNTRY

The AEMC acknowledges and shows respect for the traditional custodians of the many different lands across Australia on which we all live and work. We pay respect to all Elders past and present and the continuing connection of Aboriginal and Torres Strait Islander peoples to Country. The AEMC office is located on the land traditionally owned by the Gadigal people of the Eora nation.

Opening remarks

Tim Jordan | Commissioner

AEMC

27 August 2024

CER roadmap - AEMC CER rule changes and reviews

1 Accelerating smart meter deployment

Final Determination Nov 2024

2 Electricity pricing for a consumer-driven future

Commenced July 2024

3 Unlocking CER benefits through flexible trading

Final Determination Aug 2024

4 Integrating price-responsive resources into the NEM

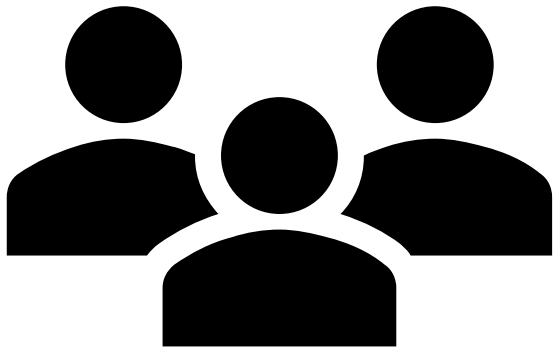
Draft Determination July 2024

5 Real-time data for consumers

Oct 2024

* ***New rule change request***

AEMC project team



EGM: Andrew Lewis
Project sponsor: Ben Davis
Project leader: Rachel Thomas
Project lawyers: Lily Mitchell and Ben Bronneberg

Lead areas
Dispatch lead: Harrison Gibbs

Incentives lead: Prabpreet Calais — Rachel Thomas

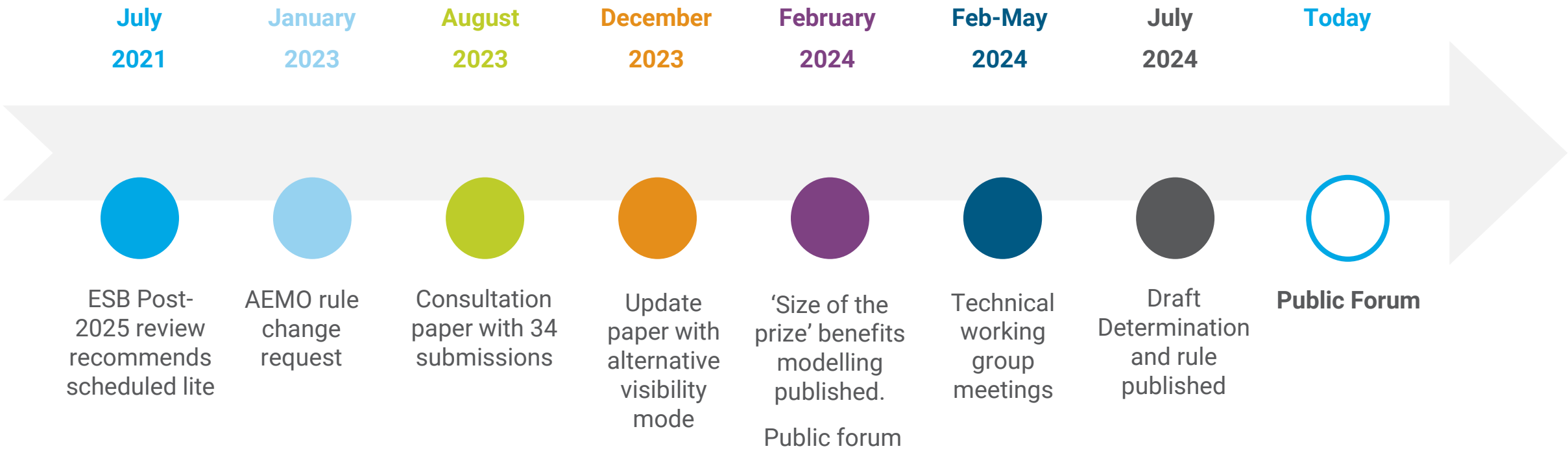
Visibility leads: Sam Markham — Max Bonic

Agenda

1. *Welcome by Tim Jordan*
2. *Introduction to today's forum by Andrew Lewis*
3. Background, context and overview of draft rule by Rachel Thomas
4. Dispatch mode by Ben Davis
5. Incentive mechanism by Prabpreet Calais
6. Visibility monitoring and reporting framework by Sam Markham
7. Next steps and implementation by Rachel Thomas
8. Wrap up

Background and context

Overview of the rule change process to date



Residential

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

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

Battery storage within a virtual power plant (VPP)

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

Controllable loads (e.g. vehicle to grid)

Predicatable and controllable spectrum

More controllable

Commercial + Industrial

Spot price pass-through

Demand response with retailer provided incentives

Customers with a battery / back-up generation on site

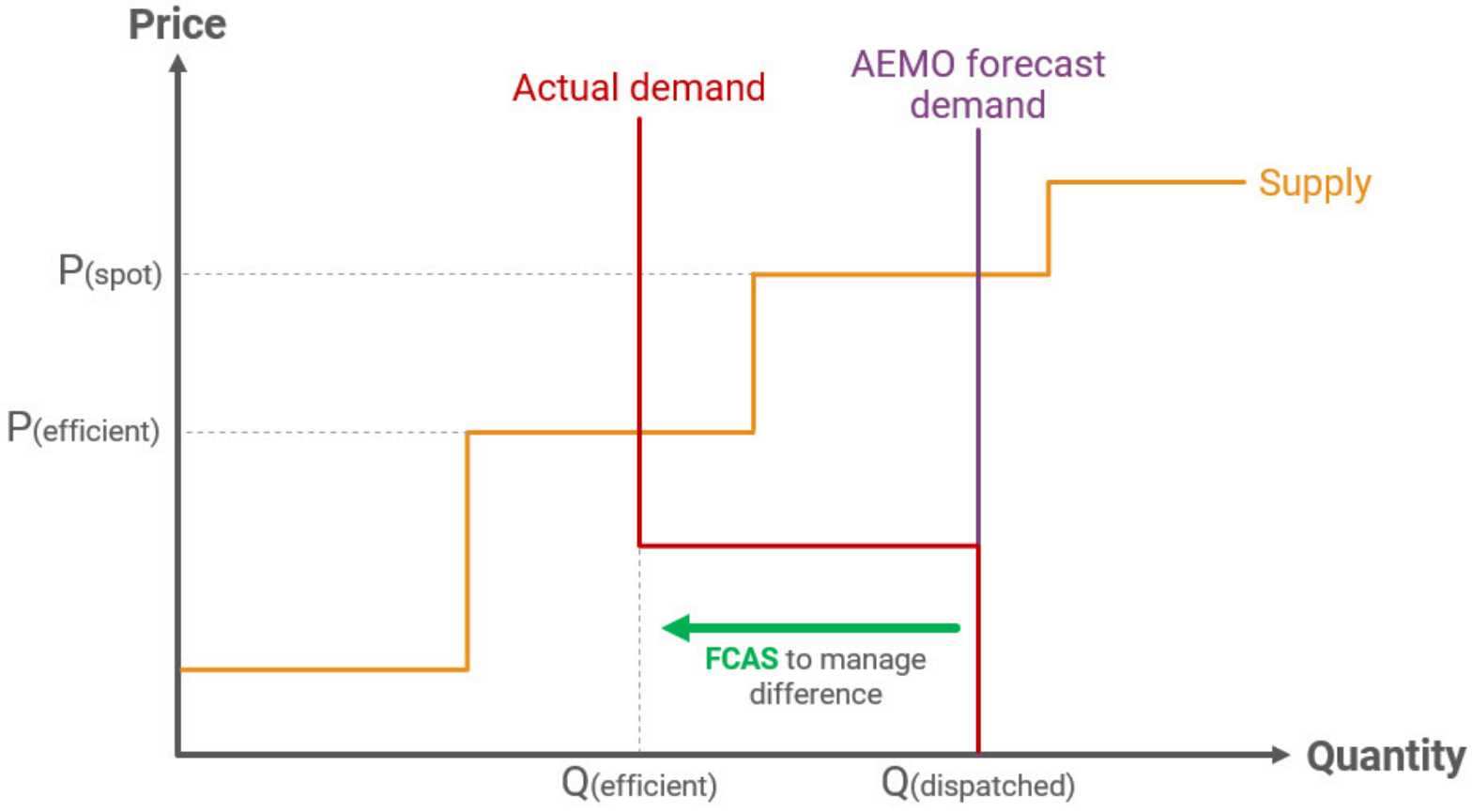
Partial spot price pass-through (e.g. with critical peak pricing)

Controllable loads (e.g. irrigation pumps)

Note that we are focused on the **financially responsible market participant** (FRMP).

In most cases, this is a retailer, but it can also be the owner/ operator of the resources, such as a Small Resource Aggregator (SRA).

Existing arrangements don't integrate these resources, resulting in inefficiencies and costs



For example:

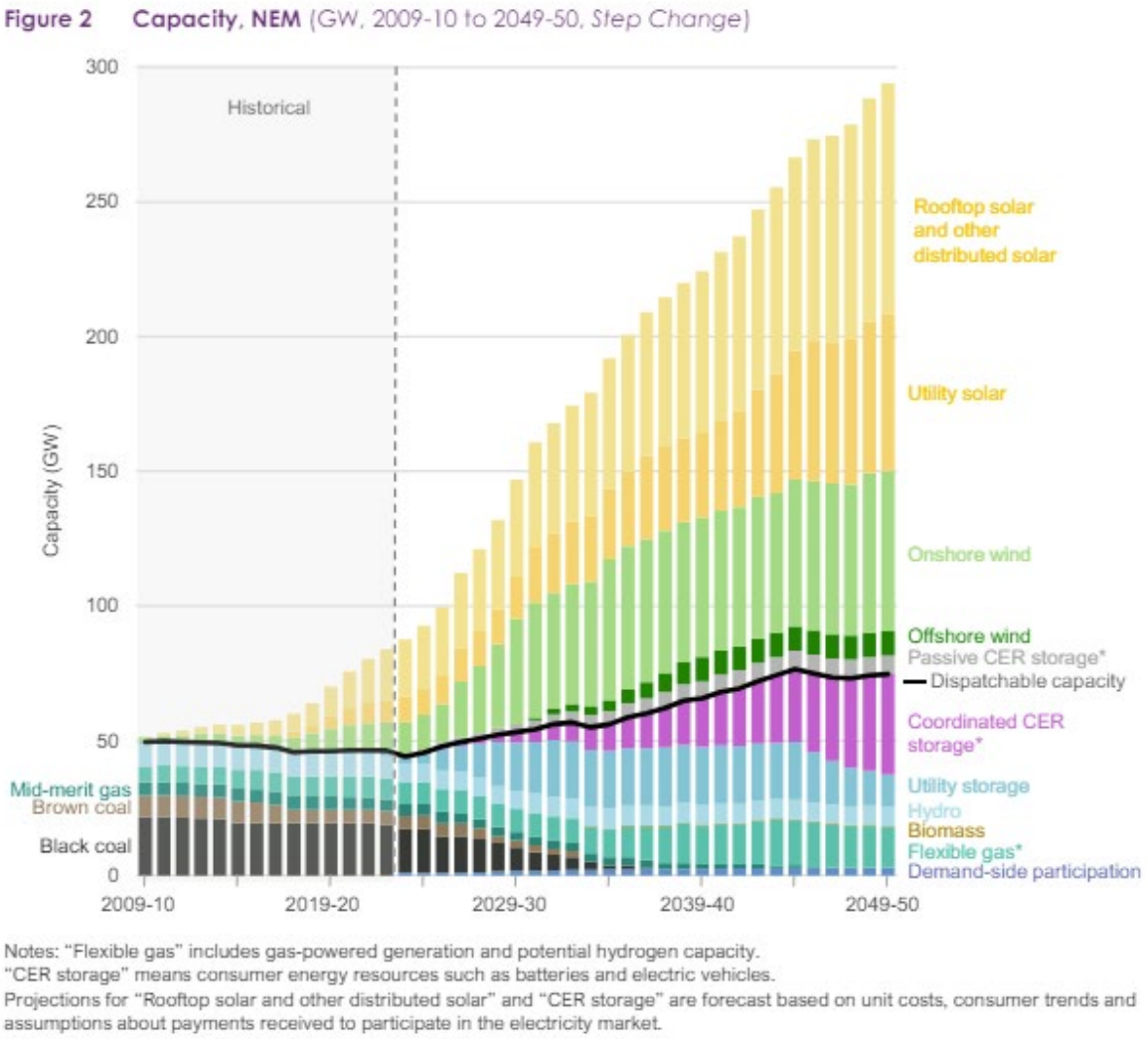
- Small distributed resources cannot participate in central dispatch easily (therefore can't access the full market, e.g. can't provide regulation FCAS)
- Price is not an input into demand forecasting

Resulting in:

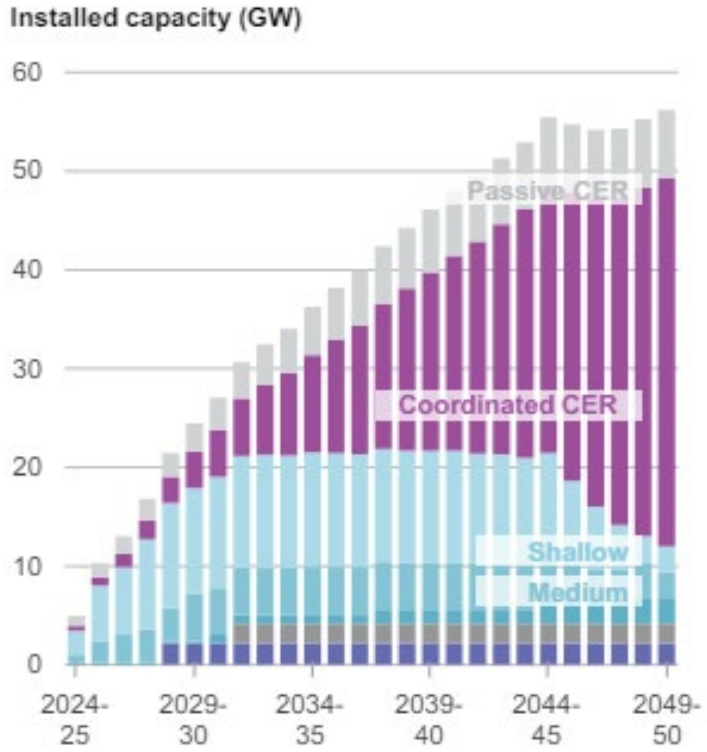
- Higher spot prices (P(s))
- Higher generation costs
- Potentially use of higher emitting generation
- To balance the system, increased use of FCAS and potentially emergency reliability measures

Over time these inefficiencies may lead to additional market entry, at a material cost.

As these resources grow, so too will the issues



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



Estimated benefits – IES size of the prize modelling

- IES estimates cost savings of between $1.4 and $1.8b net present value (NPV, 2023) to 2050. These efficiency gains are made up of:
  - lower FCAS requirements (between $831m and $1,053m NPV);
  - lower use of scheduled generation, resulting in:
    - lower emissions (between $325m and $423m NPV), and
    - lower generation costs (between $189m and $234m NPV), and
  - lower requirements for emergency reliability measures ($122m NPV).
- In addition, reform is expected to lower spot prices (between $12b and $13b NPV) and FCAS prices (between $678m and $814m NPV). IES's modelling held market entry constant between the scenarios. Given the magnitude of higher revenues they would likely result in additional market entry and this entry would come with a material cost. We therefore note that the above efficiency gains are likely understated.

Overview of our draft rule

Three areas in the draft rule

1

Small distributed resources cannot participate in central dispatch easily

- New voluntary framework to allow resources to participate – known as 'dispatch mode' – voluntarily scheduled resource (VSR)
- The draft rule has been designed so that participation's practical requirements will be less onerous and more flexible than those of a fully scheduled resource.

2

Being scheduled does not provide the scheduled participant with benefits

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

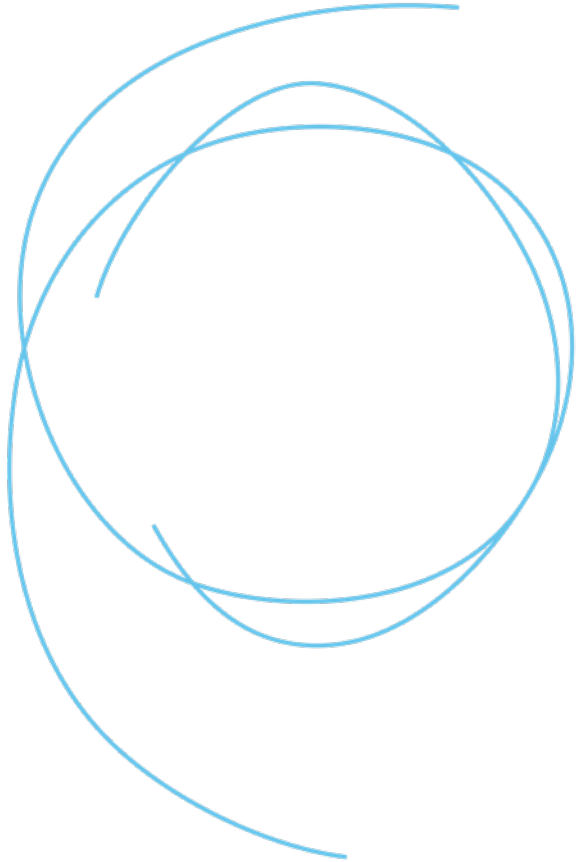
3

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

- Monitoring and reporting by the AER and AEMO to:
  - understand the impact of unscheduled price-responsive resources on demand forecasting
  - increase transparency on the actions AEMO takes to improve forecasting.

Please place your questions in the Q&A

Questions?



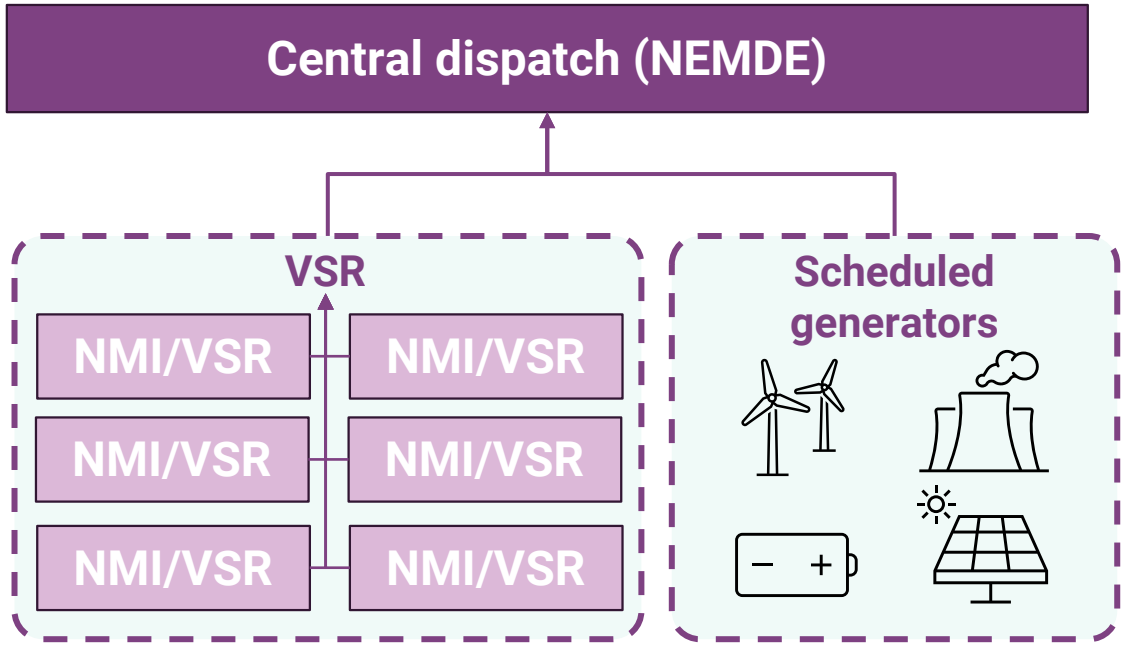
Dispatch mode

Dispatch mode - overview

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

The key features of dispatch mode are that it:

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

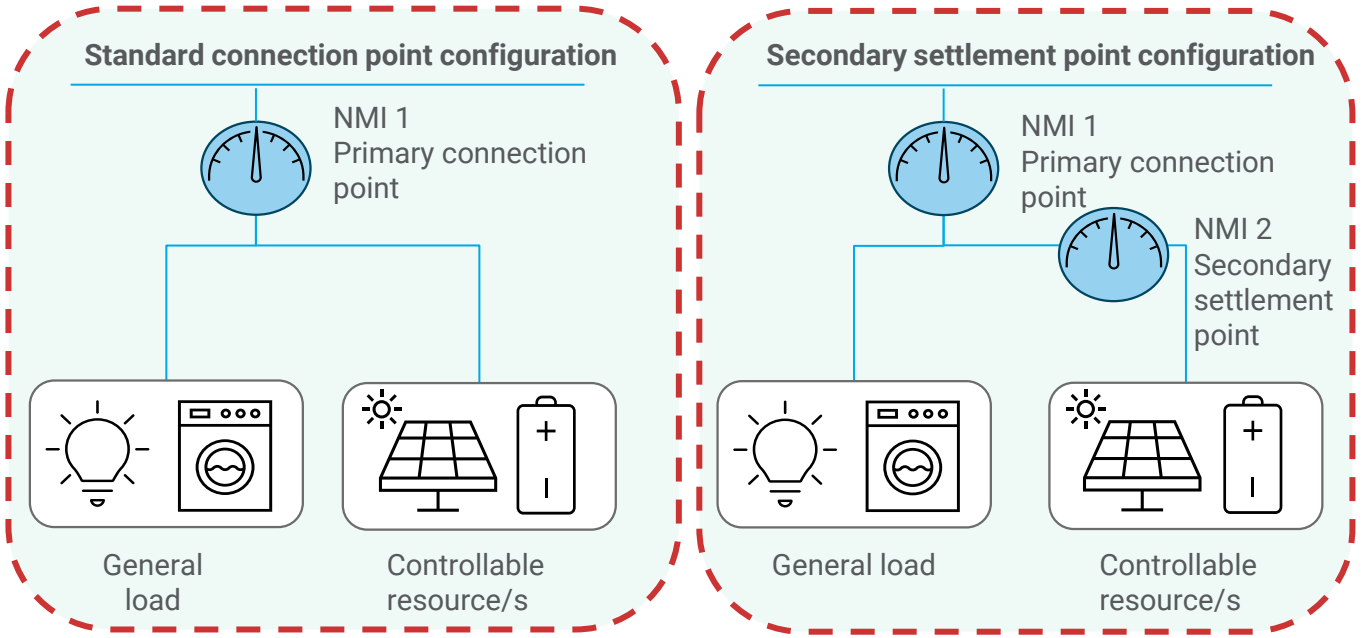


Dispatch mode – Illustrative example

To assist with explaining our draft rule we will go through how the arrangements would work for a fictional retailer "Ralph Energy".

Ralph Energy has signed up 1000 customers with solar panels and batteries for its VPP program. Ralph Energy optimizes the solar and battery output to minimize the customers' imports from the grid and has a level of discretionary control over using the battery in response to spot prices.

Each customer has one NMI at their primary connection point.



Dispatch mode – Qualifying resources

To participate in dispatch mode, qualifying resources are nominated as a voluntarily scheduled resource (VSR). Resources classified under Chapter 2 that are not automatically required to be scheduled are eligible to participate. Examples of these are outlined below.

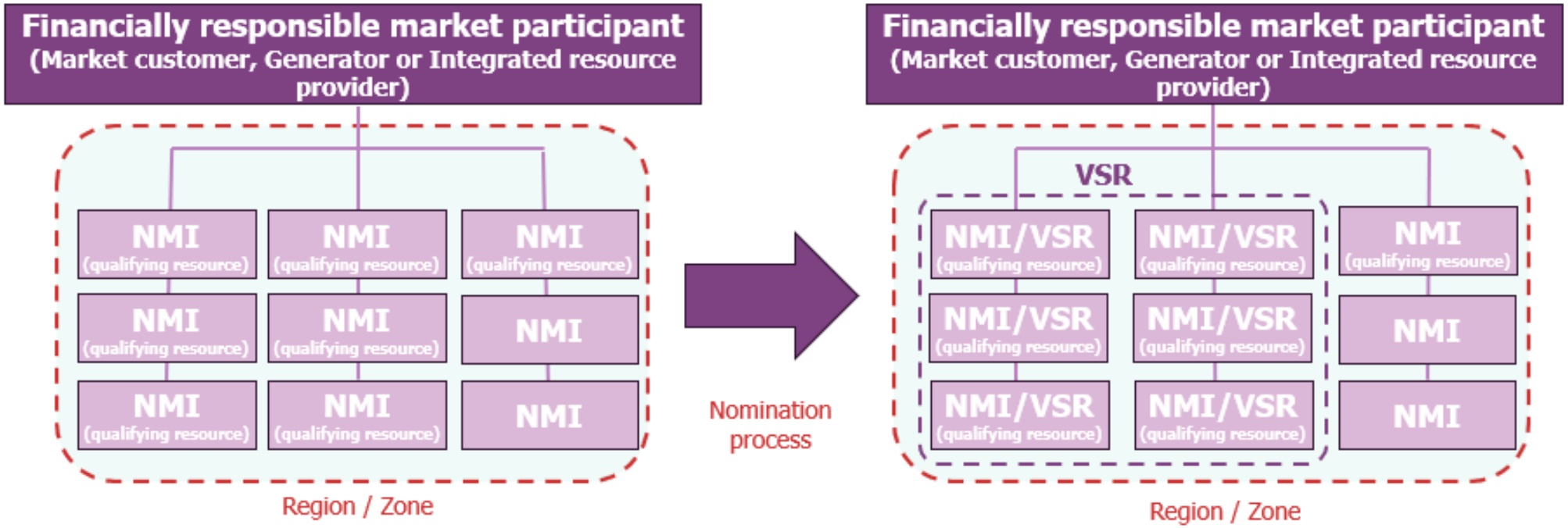
Using a nomination approach rather than a new registration category allows for greater flexibility in participation. Although nominated resources can participate in dispatch as a VSR, they retain their underlying classification and operate as such when not participating as a VSR.

Participant registration	Resource / classification	Example of resource
Generator IRP	Non-scheduled generating unit	20 MW diesel generator, not exempt
IRP	Non-scheduled bi-directional unit	3 MW battery in a registered hybrid system
IRP	Small generating unit or small bi-directional unit. (Small resource aggregator classifications)	Exempt 1 MW battery on its own connection point
IRP Customer	Connection point (non-scheduled)	Large users, VPPs, aggregated demand response portfolio

Dispatch mode – Nomination and aggregation

VSRs will be able to participate in the market either individually if they are large enough, or as part of an aggregation. The FRMP will apply to AEMO to nominate a qualifying resource as a VSR and can also apply to nominate two or more qualifying resources to be aggregated into a single VSR. To be aggregated, the resources need to be within the same region.

While each eligible resource is nominated as a VSR, when they are aggregated together, the term VSR applies to the aggregation as a whole and not the individual resources within it.



Dispatch mode – Operation

The requirements for how VSRs operate in central dispatch broadly follow a similar process for scheduled BDUs. The high-level obligations are described below.

These obligations are the responsibility of the financially responsible market participant to follow, not the individual customer or resource that has been nominated as a VSR.

Area	Description
Bidding	For each VSR, the VSRP would bid in its willingness to generate or consume energy in 20 price quantity pairs, 10 each for generation and load.
Dispatch	VSRs would be incorporated into the existing NEM dispatch process, receiving a single bi-directional dispatch instruction every five minutes, representing the net flow to be achieved by the VSR.
ST PASA	VSRPs would be subject to the same ST PASA requirements for VSRs as other scheduled resources.
Conformance	VSR conformance would be assessed in real-time against criteria developed by AEMO through its guideline. Conformance is an operational assessment as it is separate from compliance with the rules, which is assessed by the AER.

Dispatch mode – deactivation and hibernation

Our draft rule recognises that aggregated resources may not be able to address technical issues as easily as existing scheduled resources. Large standalone resources are designed for constant operation in central dispatch and can disconnect from the grid when they encounter an issue. VSRs, by contrast, may be comprised of aggregated resources that continue consuming or producing power where there is an issue.

To address this, we have included two options for VSRPs to remove a VSR from dispatch obligations over different timeframes:

Temporary deactivation – allows a VSRP to remove a VSR from dispatch obligations up to seven days.

Hibernation – allows a VSRP to remove a VSR from dispatch obligations for longer timeframes, up to 18 months.

These options provide a necessary safety net for VSRs with technical issues in operational time frames and recognise that some resources may only be able to participate over specific periods.

Dispatch mode — guidelines

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

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

Contents of AEMO guidelines	Principles

• The requirements for nominating an NMI as a voluntary scheduled resource
• The requirements and processes for aggregating voluntary scheduled resources
• Operational requirements for participating:
  • the types of data to be provided to and from AEMO
  • information about the requirements for telemetry and communications equipment
  • the minimum threshold for participation
  • dispatch conformance criteria
  • acceptable types of metering installation for participating connection points
  • requirements for sharing data with Distribution Network Service Provider
• Guidance on aggregating voluntary scheduled resources, including:
  • a methodology for determining zones in which voluntarily scheduled resources participate in central dispatch;
  • guidance for Voluntary Scheduled Resource Providers on processes for automated aggregation of zones for voluntarily scheduled resources; and
  • validation processes for AEMO.
	The draft rule requires that in developing these guidelines AEMO must:
	a) seek to minimise total cost of facilitating the rule change, and in doing so balance the cost to participants in operating a VSR as well as AEMO's costs of facilitating VSRs
	b) balance the technical requirements for VSRs with the expected level of participation from these requirements
	c) consider any other matter determined by AEMO.

Estimated dispatch mode benefits

There is material uncertainty regarding the uptake of dispatch mode.

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

Modelled participation sensitivities

	2027	2030	2035	2040	2045	2050
High	15%	35%	50%	60%	60%	60%
Medium	10%	25%	30%	35%	35%	35%
Low	5%	10%	15%	15%	15%	15%

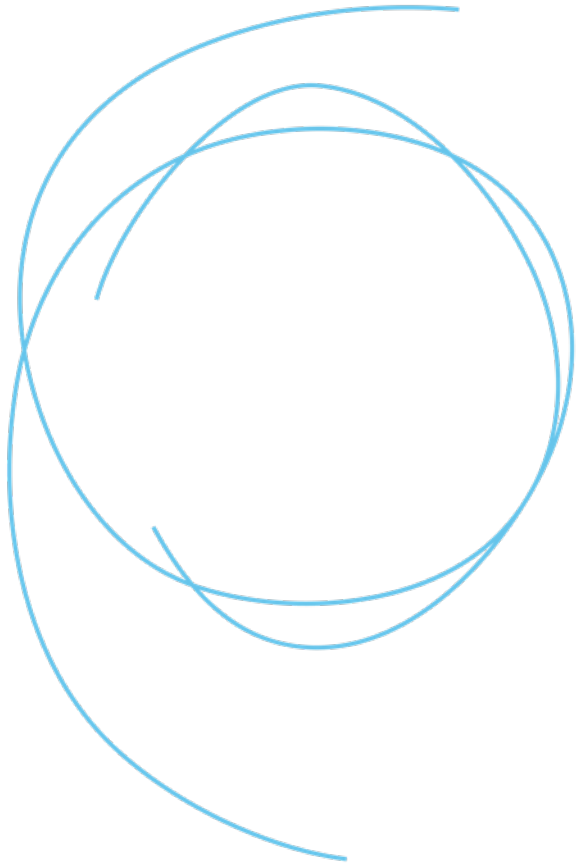
Modelled benefits by category for participation sensitivities

($m)	Low	Medium	High	Weighted
FCAS	220	403	617	411
RERT	100	100	100	100
Generation benefits	63	120	180	121
Emissions	140	199	274	203
Total	**523**	**821**	**1,170**	**834**

Please place your questions in the Q&A

Feedback sought on:

- Nomination and aggregation
- Operation
- Hibernation
- Whether we have an appropriate balance between rules requirements and guideline



Questions?

Incentives

In-market incentives

Existing incentives will become available to participants:

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

Exclusion from RERT cost recovery:

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

Additional incentives may be warranted to increase participation

- Given the significant benefits to the market from price-responsive resources participating in dispatch, and recognising there are several costs and risks to participate, an additional explicit incentive could be warranted
- Our initial investigation of barriers to participation revealed there could be substantial initial establishment costs related to IT system build and proof of concept.
- A short-term incentive is proposed to help alleviate some of these costs and help build capacity in the market.
- In the longer term, more enduring incentives are expected to develop, including access to additional security and reliability markets and network access.

Costs and risks

- Forecasting costs
- IT integration and system costs
- Opportunity costs and conformance requirements
- SCADA-lite and AGC costs

Possible incentives in the longer-term

- Access to new reliability and security markets
- Priority network access

An AEMO operated tender mechanism is proposed

- Incentives of this nature are generally not ideal for the rules, so **our first preference is for a party such as ARENA or the CIS to create an incentive mechanism.**
- However, failing this, we created a design for a tender mechanism that would make AEMO provide incentives to the lowest cost participants.
- Tenders would be for a lump-sum payment for participating in dispatch
- A price cap for tenders would be introduced based on the benefit that generation would provide to consumers.
- A variety of resource types are to be procured through the tender process.

How will the tender mechanism work?

1. AEMO would undertake an exercise each tender process to determine the **price cap for the tender**. The price cap would be half of the $/MW of the market benefit an additional MW is expected to generate.

2. The tender process is run and successful tenders announced a few months prior to the contract beginning, with the **lowest cost resources being procured first**, where bids are below the price cap.

3. A **total payment cap** of the amount that could be paid out over the 5-year program is legislated at **$50m**.

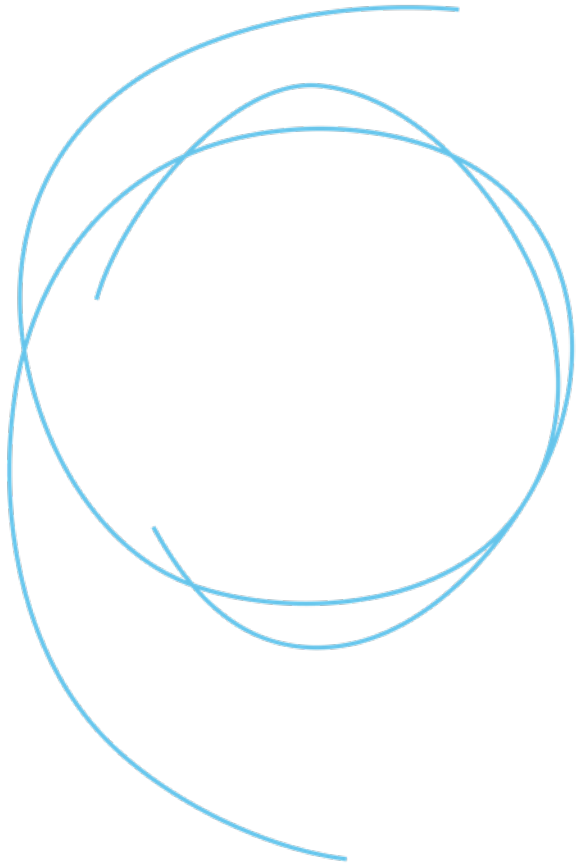
4. Costs of payments under successful contracts would be recovered via **market customer charges**, in a similar way to RERT activation fees. Costs of running the auction would be recovered via participant fees.

5. The tenders would end after **5 years, with at least 2 tender processes run during this period.**

Please place your questions in the Q&A

Feedback sought on:

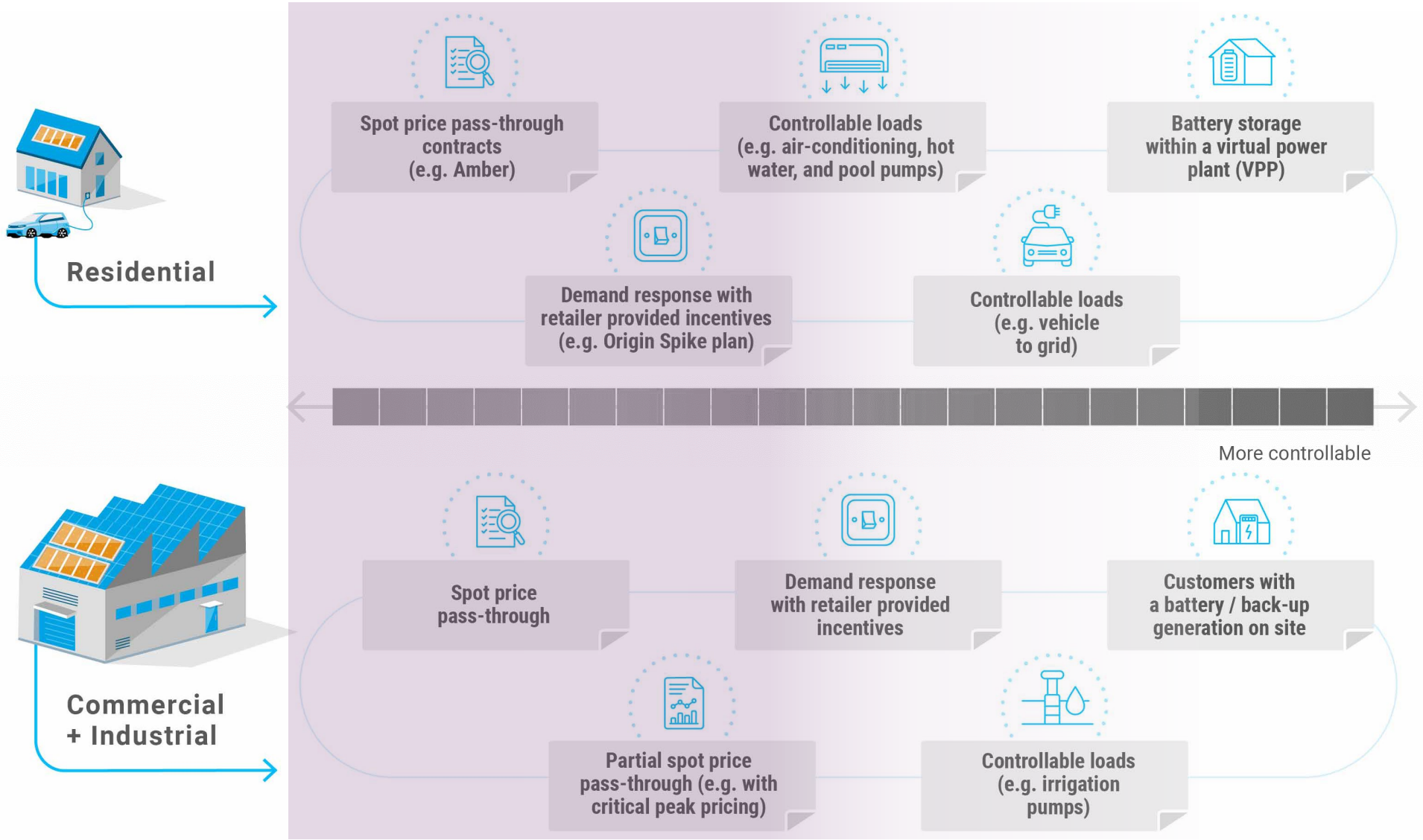
- Expected magnitude of in-market incentives (e.g. Reg FCAS)
- Costs for individuals to participate
- Suitability of ARENA funding
- Applicability of tender mechanism



Questions?

Visibility monitoring and reporting

There are likely to be a range of unscheduled price-responsive resources who will not participate in dispatch mode



We consider that the **purple** types of unscheduled price-responsive resources are less likely to participate in dispatch mode.

We considered a range of options account for unscheduled price-responsive resources who would not participate in dispatch

AEMO rule change request

- We assessed AEMO's proposed 'visibility mode' which was a light-handed version of dispatch mode.
- We ruled this solution out because we considered that without incorporating the bids directly into dispatch, visibility mode would not result in substantial benefits and still come at material cost.

Alternative visibility market model

- We then assessed a visibility market model prepared by Creative Energy Consulting. The expected benefits include:
  - incorporating unscheduled price-response 'quasi bids' directly into dispatch would drive more efficient dispatch and pricing.
  - efficiently allocating risk by transferring responsibility to market participants (e.g. retailers) for forecasting the price-responsiveness of their customers.
  - financially rewarding (or penalising) accurate quasi-bids through frequency performance payments.
- The Commission considers this model has considerable merit but would currently be unlikely to meet the NEO:
  - While the volume of unscheduled price-responsive resources is growing, it has not yet reached a point where it is materially challenging AEMO's demand forecasting.
  - The visibility market model would come with material costs to produce the necessary retailer-level forecasts regardless of participation in the model.

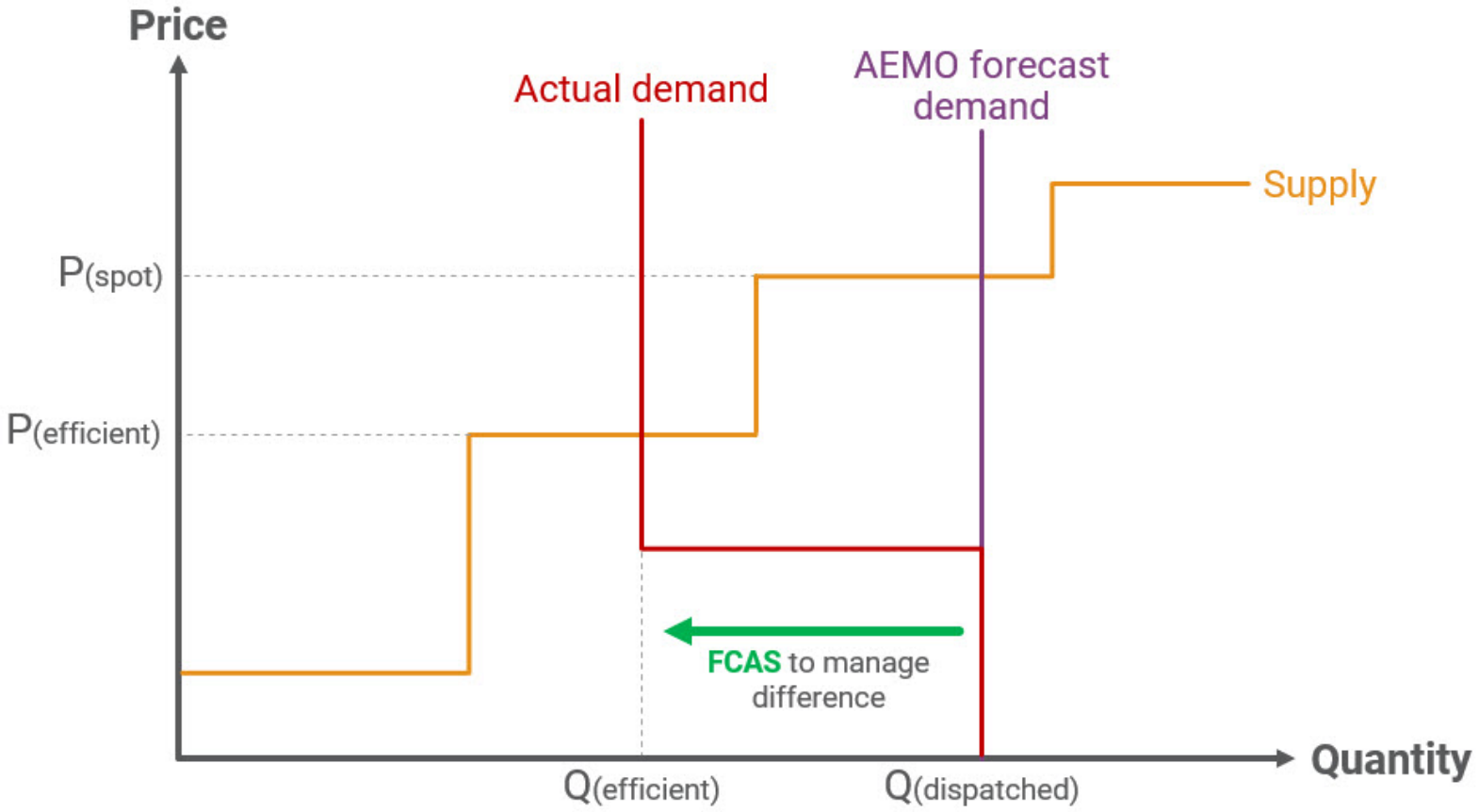
Draft Rule

- The draft rule introduces new monitoring and reporting obligations for AEMO and the AER to transparently evaluate the effect of price-responsive resources on the accuracy of AEMO's short-term demand forecasts, and the subsequent efficiency consequences.
- The Commission considers the draft rule is likely to meet the NEO:
  - It is a lower-cost proportionate response to better understand the impacts of unscheduled price-responsive resources before considering a larger reform.
  - The costs are only expected to be on AEMO and the AER to fulfill the new reporting requirements.

New reporting by AEMO and the AER to transparently evaluate the effects of unscheduled price-responsive resources

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

Reporting will increase transparency and help us understand whether market changes are required



Unscheduled price-responsive resources can result in inaccurate demand forecasts. The monitoring and reporting framework will reveal the extent to which 'actual demand' differs from 'AEMO forecast demand'.

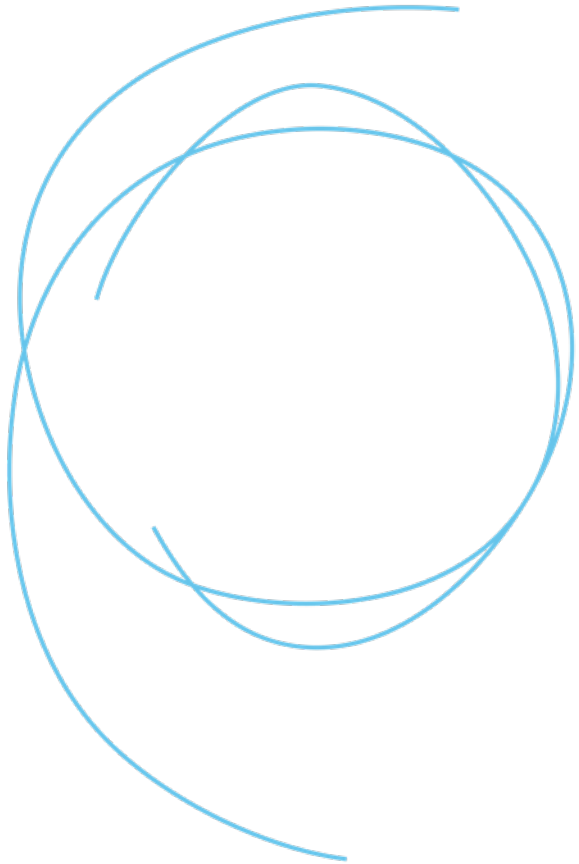
It will place us in a good position to determine:

- when AEMO's demand forecasts are being materially challenged
- if challenges can be addressed by AEMO changing its demand forecasting methods
- whether a move to retailer-led forecasting of price-responsiveness is warranted.

Please place your questions in the Q&A

We are particularly interested in feedback on:

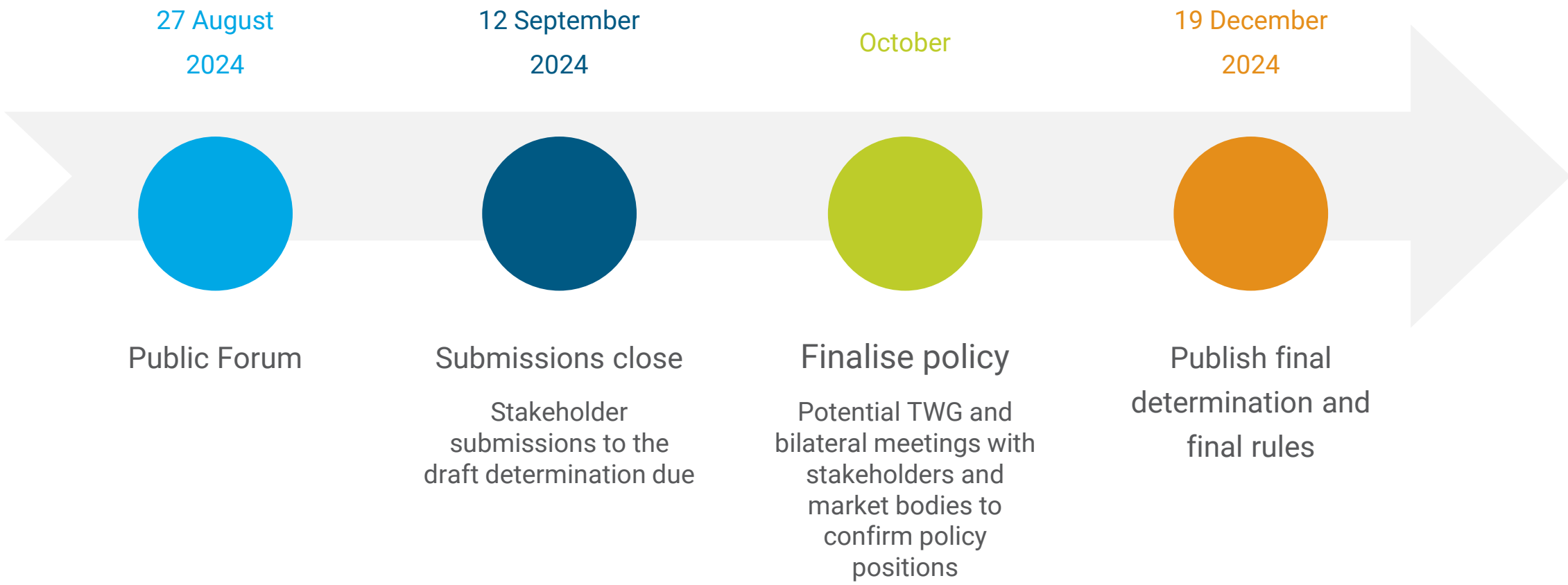
- Do participants want a regular feed of data via quarterly reporting from AEMO?
- Is annual reporting the right timeframe?



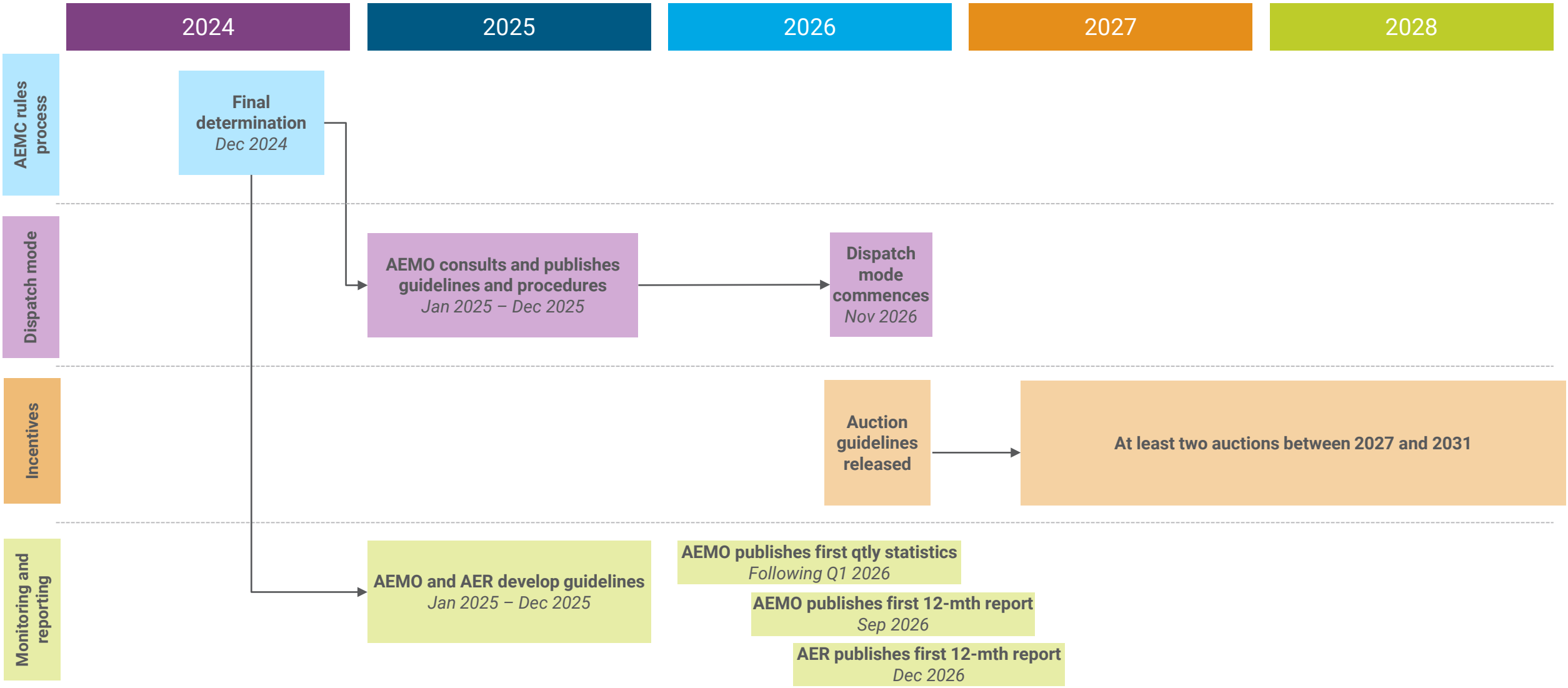
Questions?

Next steps and implementation

Indicative timeline for the final rule



Proposed implementation timelines



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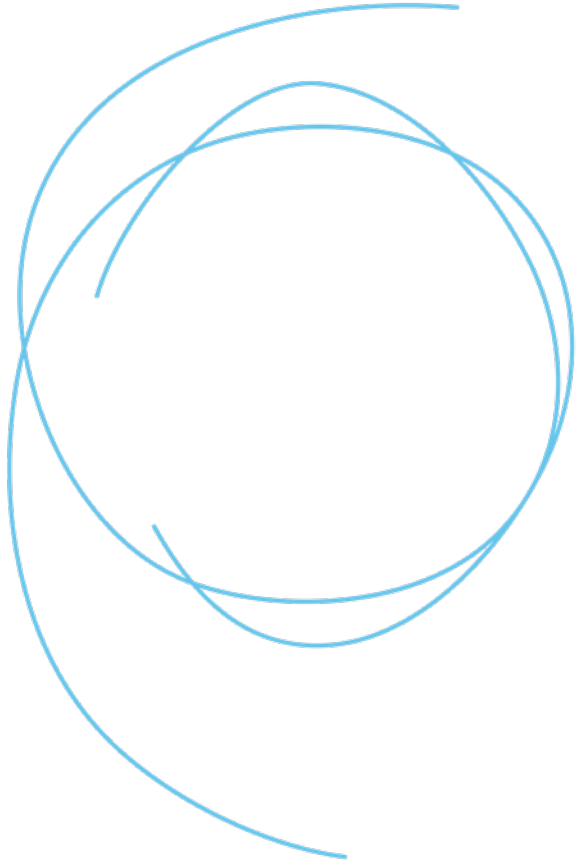
Feedback sought on:

- implementation timeframes for the three areas



Questions?

Additional information

Project page

For more information and links to any documents mentioned:

https://www.aemc.gov.au/rule-changes/integrating-price-responsive-resources-nem

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