



AEMO Consumer Forum

4 August 2020

*We acknowledge the Traditional Owners
of country throughout Australia and
recognise their continuing connection to
land, waters and culture.*

*We pay our respects to their Elders past,
present and emerging.*

AEMO Competition Law Meeting Protocol

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

Participants in AEMO discussions **must**:

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

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

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

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

Today's meeting

	Item	Duration	Time
1	Welcome and introductions	~10mins	9:30-9:45am
2	ISP (Integrated System Plan) publication and engagement (<i>Nicola Falcon and Craig Price</i>)	~45mins	9:45-10:30am
3	AEMO's external forum review engagement (<i>Alicia Webb</i>)	~15min	10:30-10:45am
4	Distributed Energy Resources (DER) program overview and update (<i>Tess Fitzgerald and Luke Barlow</i>)	~35min	10:45-11:20
	Virtual Power Plant project knowledge sharing (<i>Jacqui Mills</i>)	~10min	11:20 – 11:30
	<i>Short break for drink and stretch</i>	5 minutes	
5	Wholesale Demand Response project (<i>Emily Brodie & Ruth Guest</i>)	~15min	11:35- 11:50am
6	Knowledge sharing sessions- discussion on next steps (<i>Neale Scott</i>)	~15min	11:50-12:05pm
7	AEMO corporate plan	~10min	12:05-12:15pm
8	Other business	~15min	12:15-12:30pm
9	Close		

2020 ISP

Outcomes and insights

August 2020

An actionable roadmap for Australia's energy future

The 2020 ISP provides an actionable roadmap for eastern Australia's power system that:

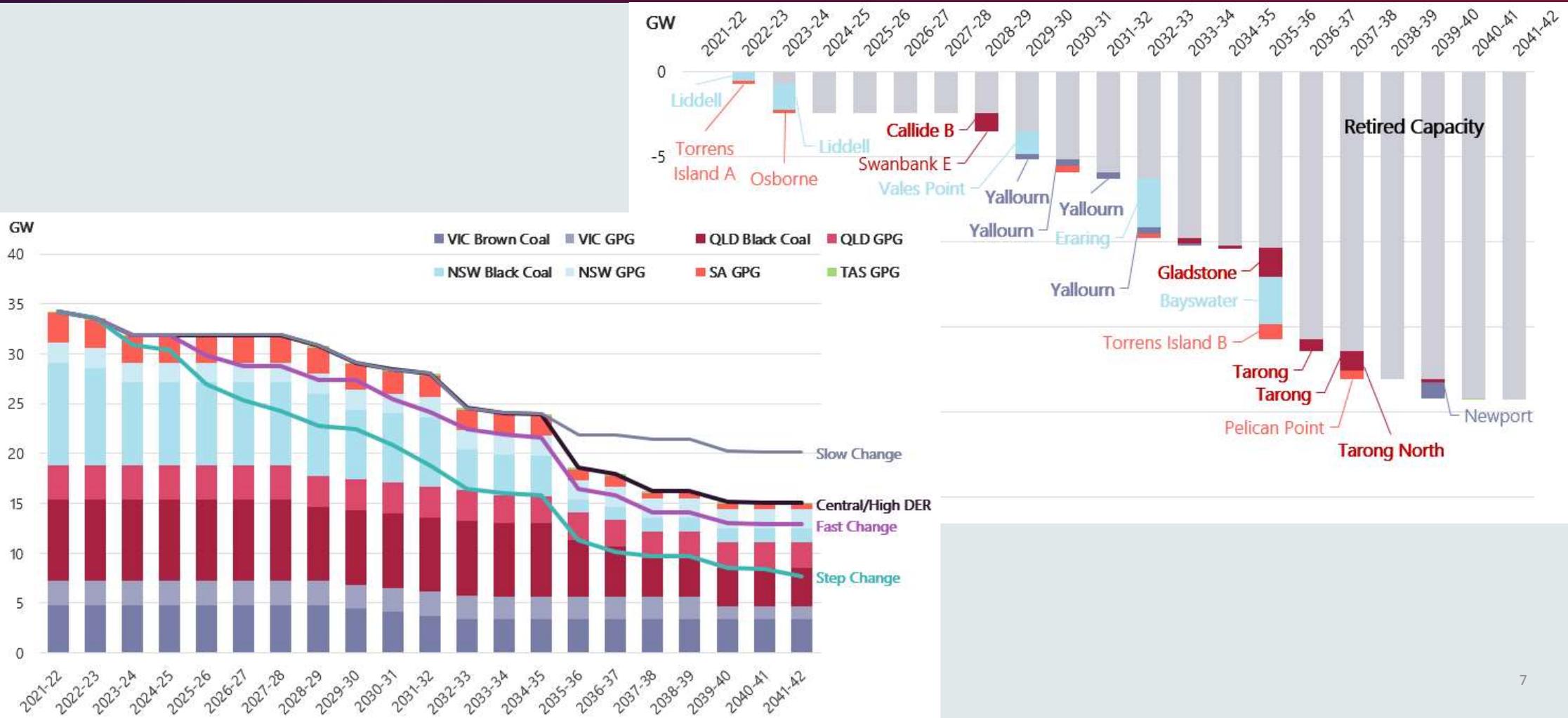
- Draws on extensive stakeholder engagement and internal and external industry and power system expertise
- Optimises consumer benefits through a transition period of great complexity and uncertainty.

In this presentation, we:

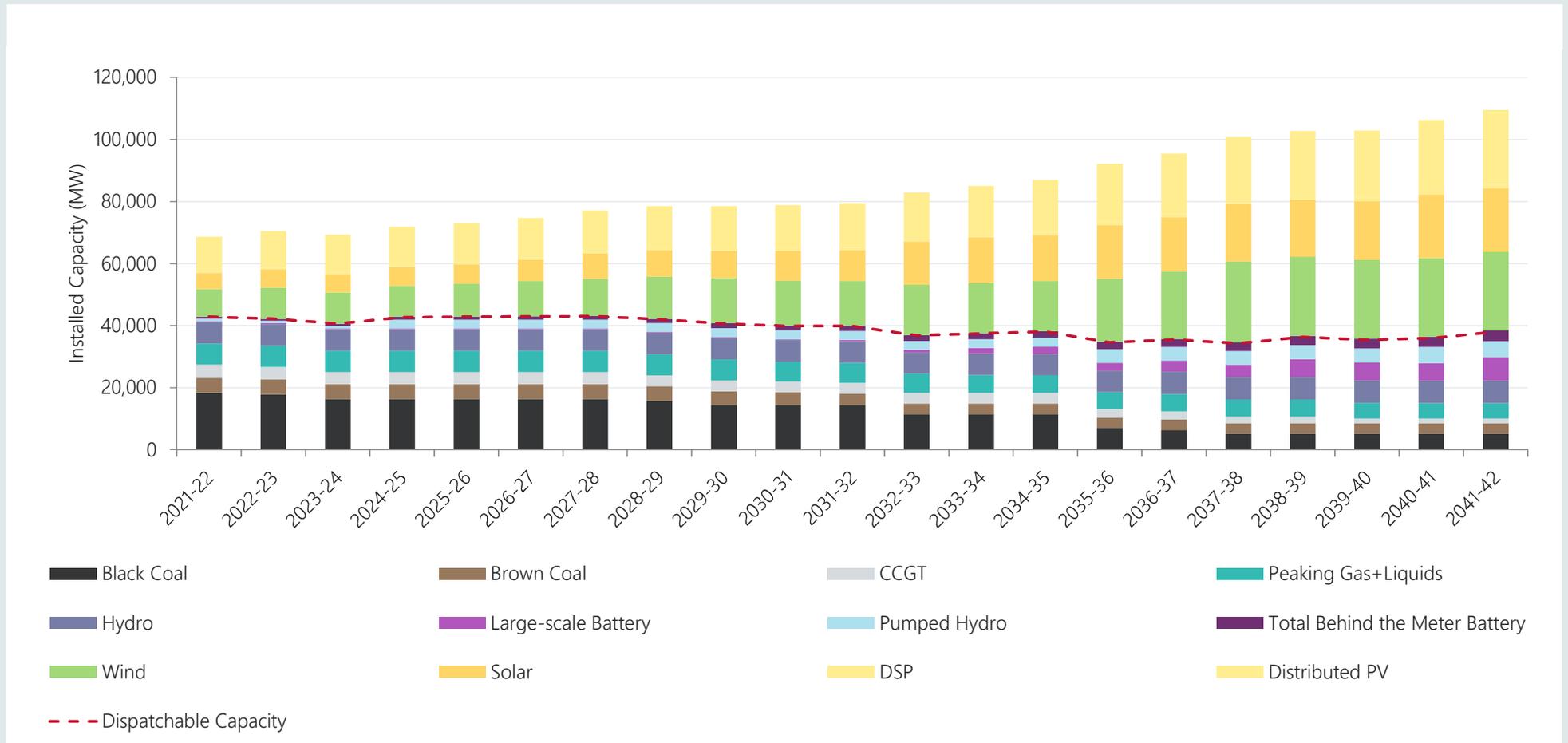
- Outline the national wide outlook
- Describe the optimal development path and key decision points

NEM wide outlook

Power station closures



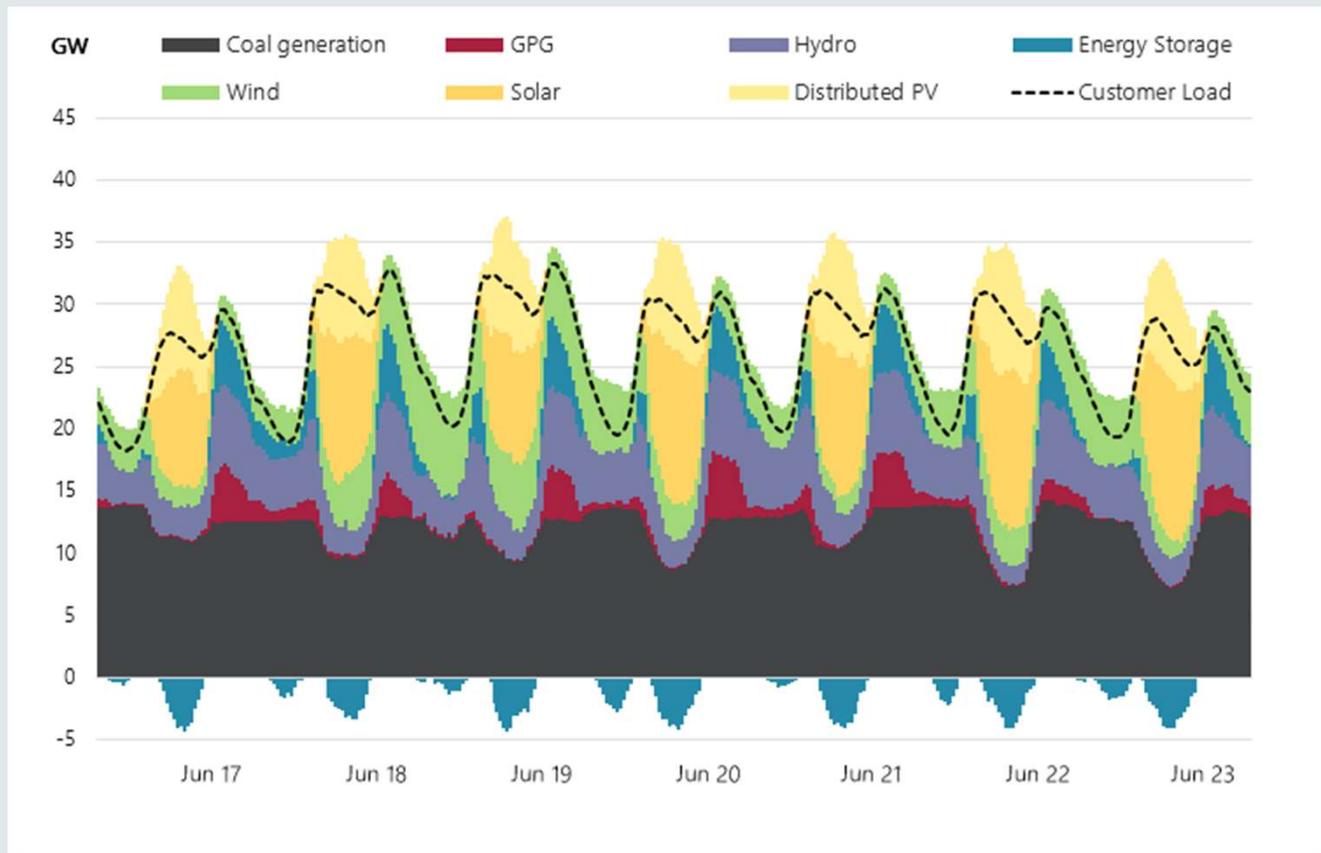
Across the NEM – Coal is replaced by VRE and DER...



...and gas has a role in helping to meet peak demand and firming of VRE...

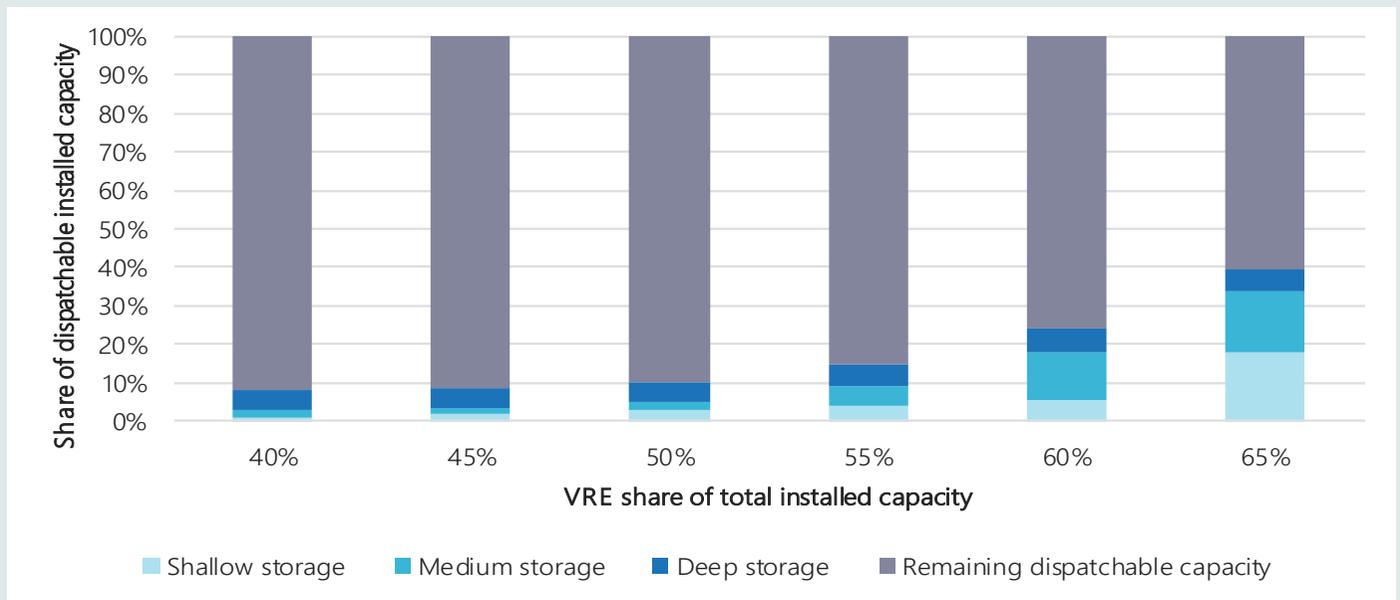
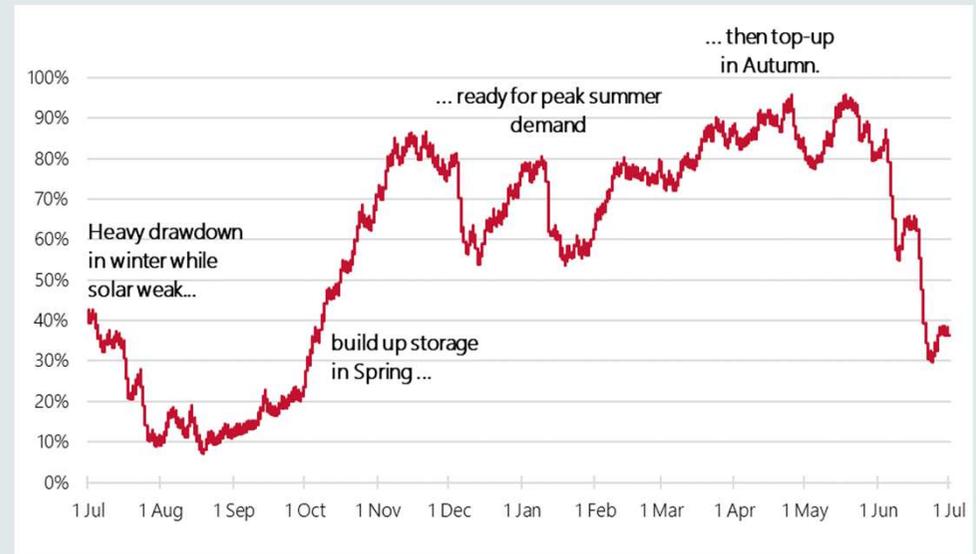
(but no new GPG developed in the central scenario)

Low VRE, high demand week in the NEM, 2035



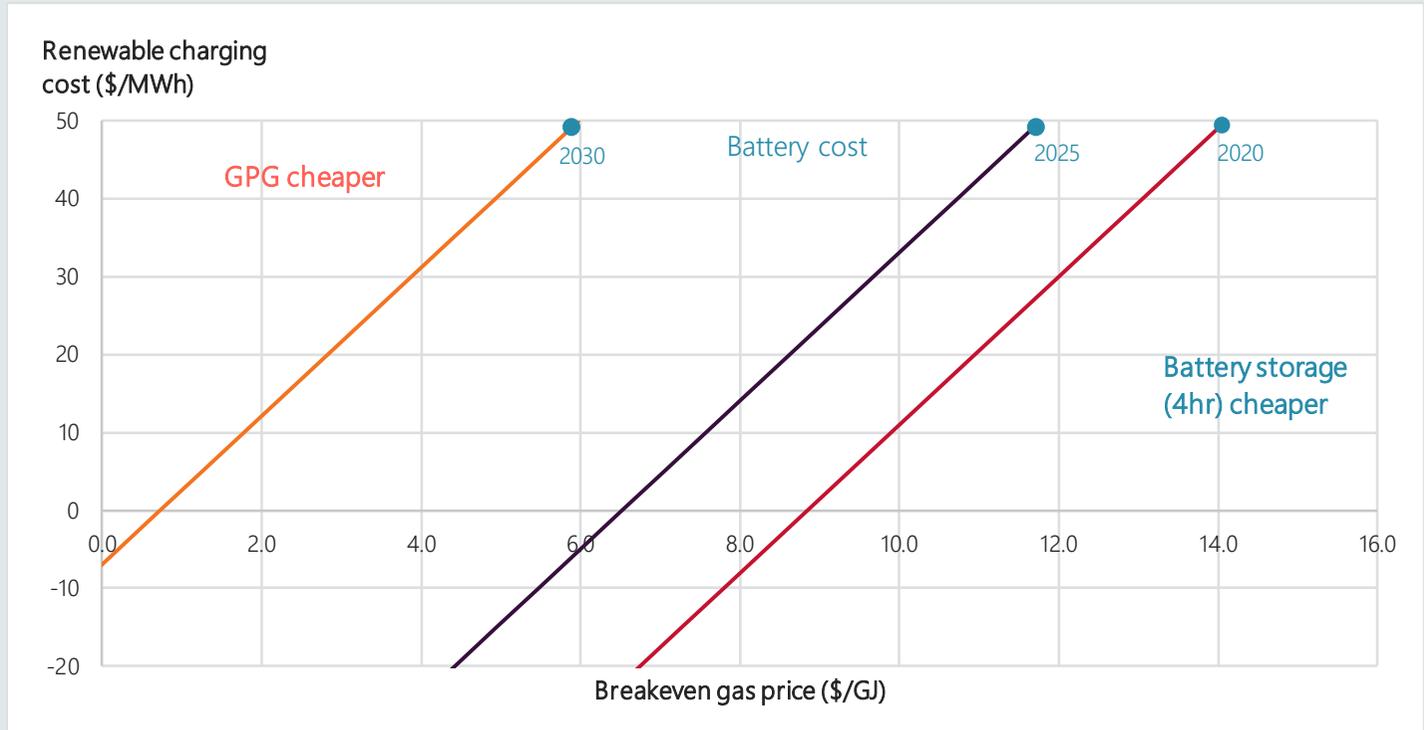
...complemented by a portfolio of storages of all depths

The value of deep pumped hydro storages (such as Snowy 2.0) becomes more obvious when utilisation is looked at seasonally.



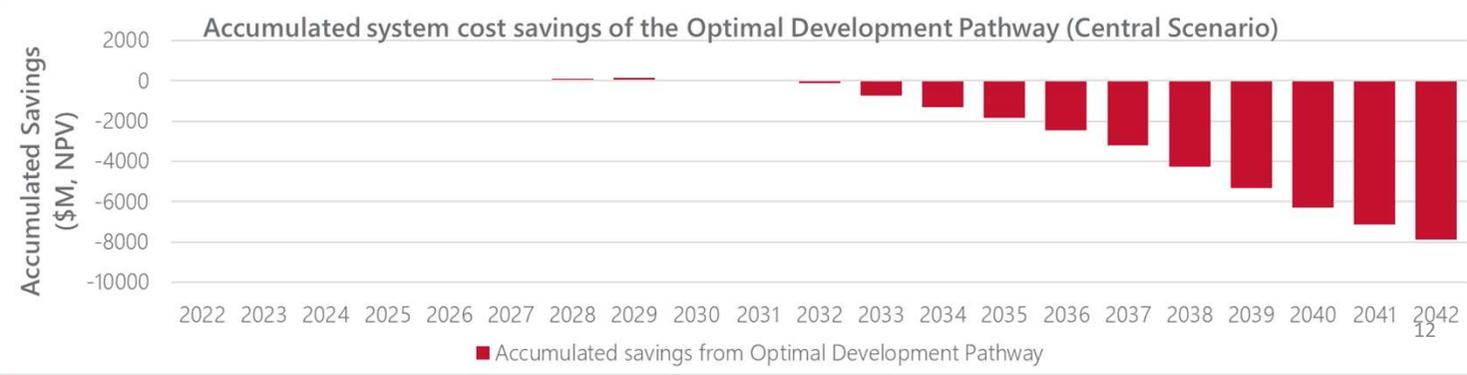
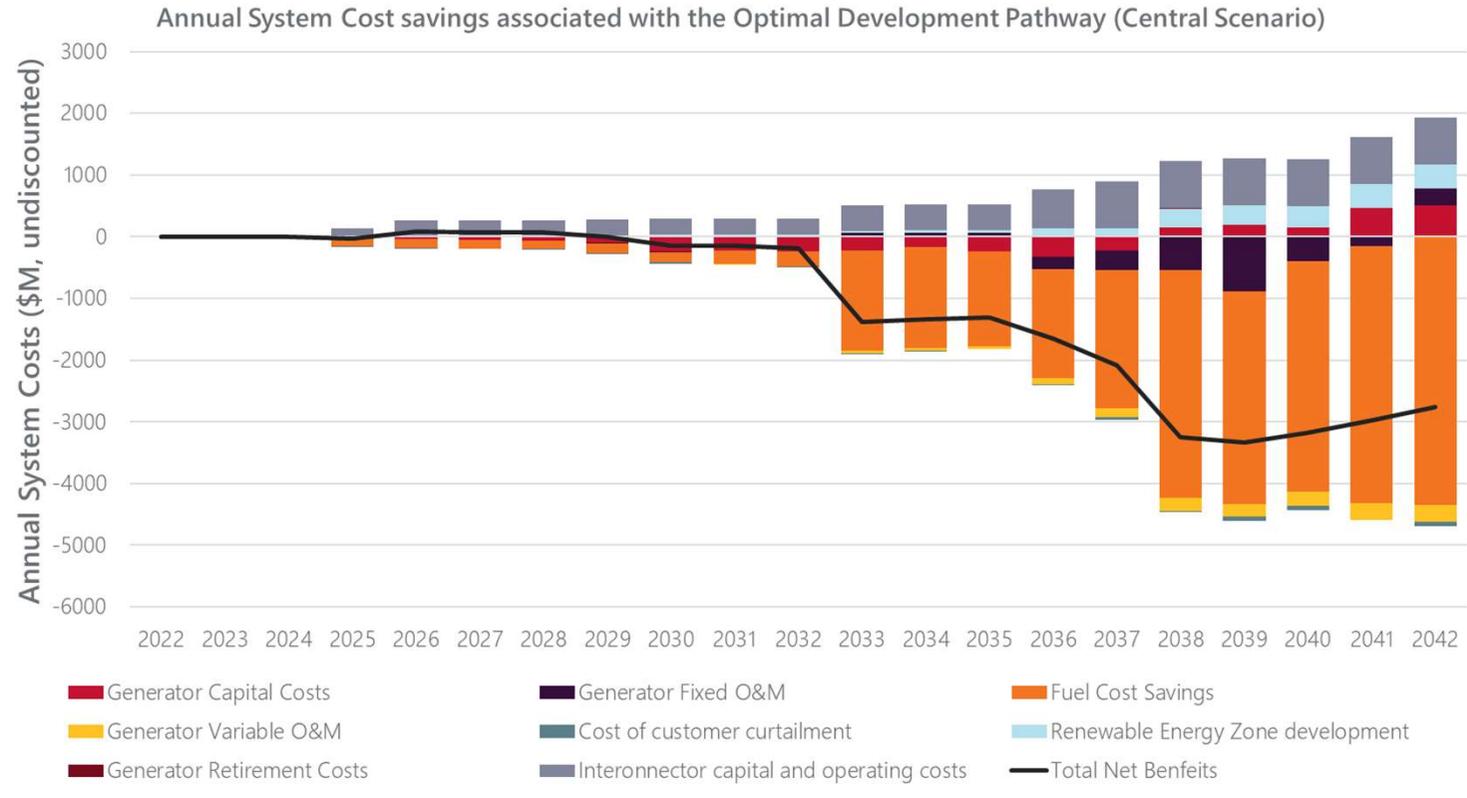
Why do we not see more new GPG?

4 hour batteries are cheaper than gas to complement solar on a daily basis



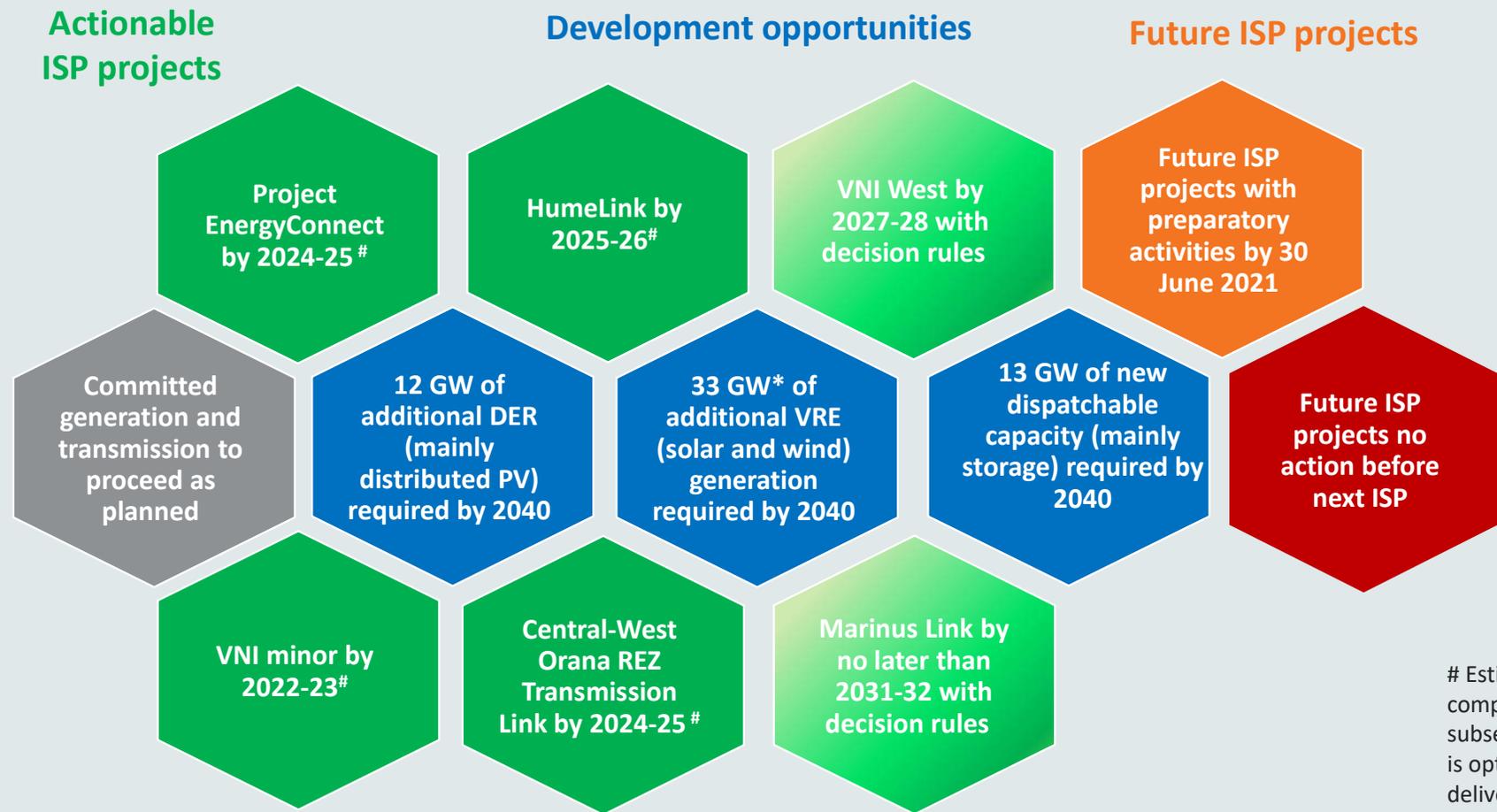
Where do the benefits come from?

In Central scenario, majority of benefits are from fuel cost savings



The Optimal Development Path

The optimal development path (ODP) under Central scenario

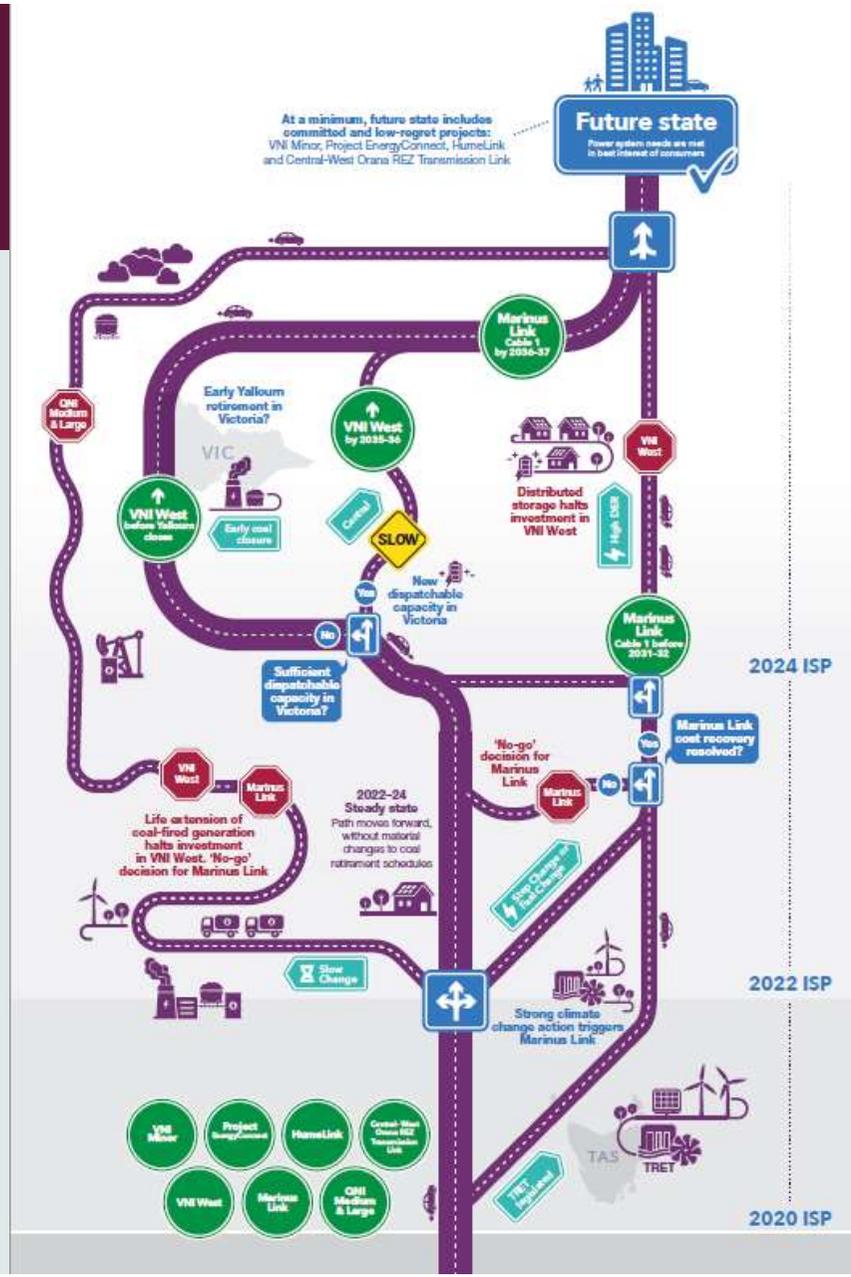


- *Regional VRE split:
- 11 GW QLD
 - 12 GW NSW
 - 6 GW VIC
 - 3 GW SA
 - 1 GW TAS

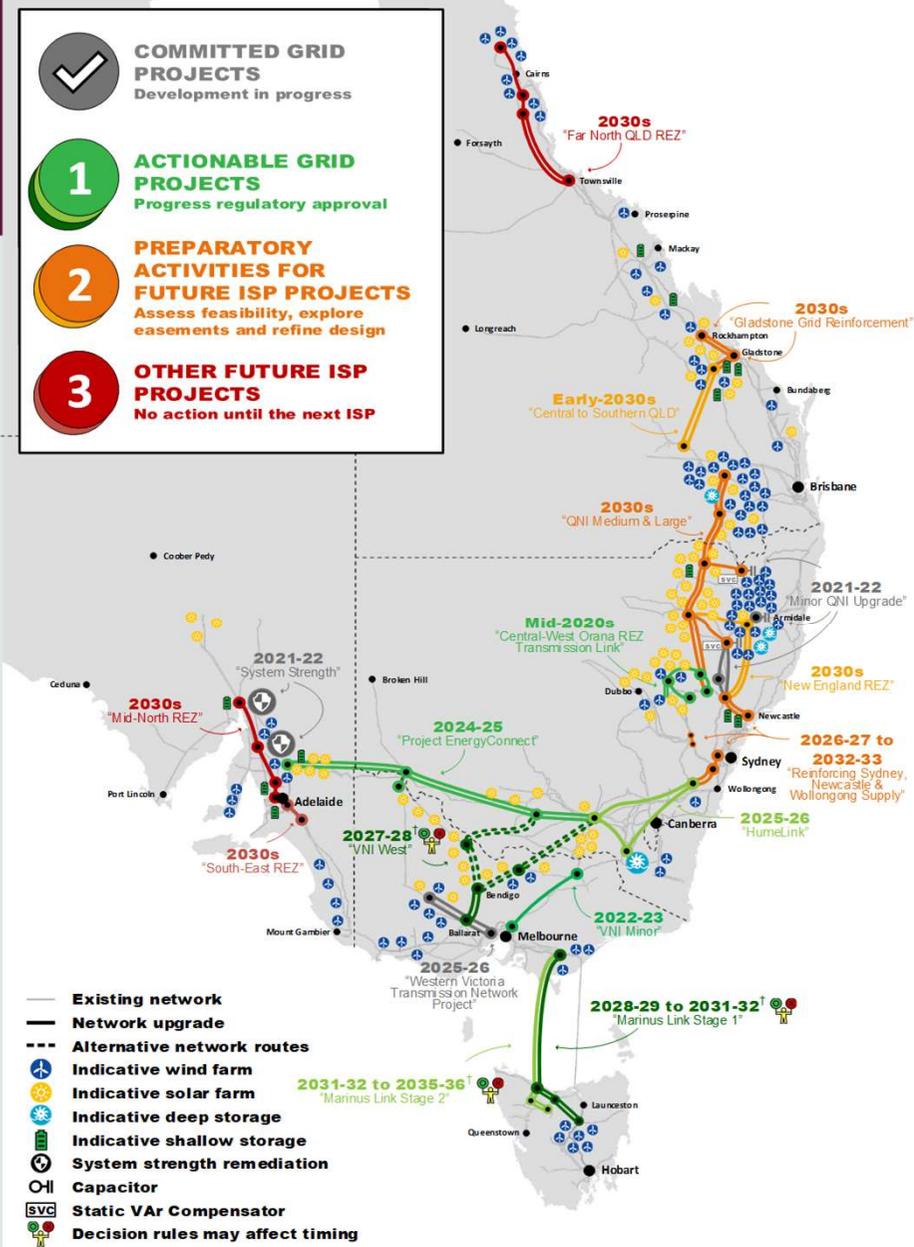
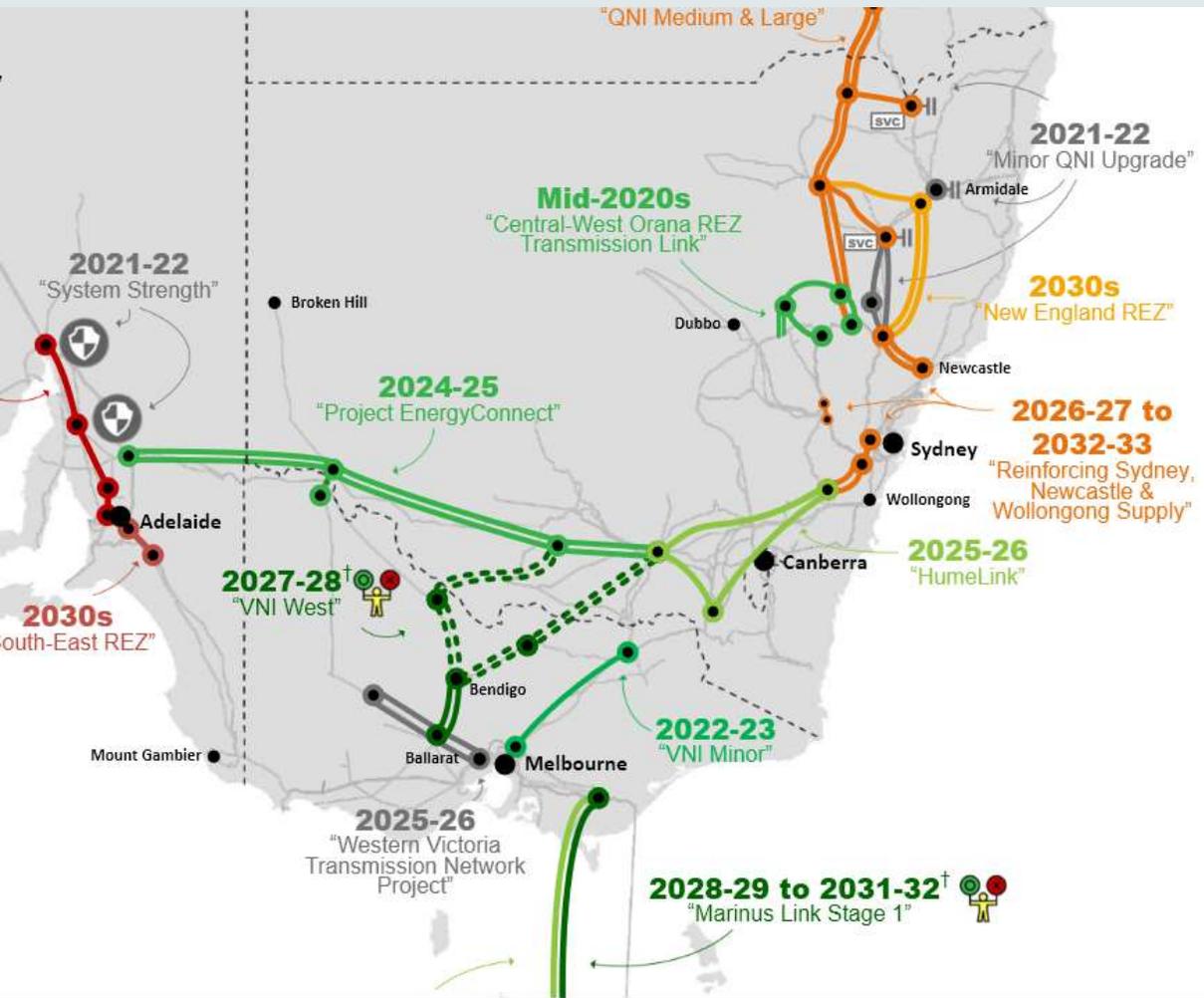
Estimated practical completion including any subsequent testing, project is optimal if can be delivered earlier

A dynamic roadmap with decision rules

- **Progress VNI West by 2027-28 with early works as soon as possible; and defer to 2035-36 or pause if:**
 - *transmission costs, including any third-party contribution, are expected to exceed \$2.6 billion, or*
 - *sufficient new market-based dispatchable capacity is expected to be in place in Victoria ahead of the next brown coal closure in Victoria, or*
 - *the Slow Change scenario eventuates, which includes life extensions of existing coal-fired generation.*
- **Progress Marinus Link, with early works as soon as possible, as follows:**
- **Stage 1 from 2028-29 should the Step Change scenario eventuate, and by no later than 2031-32, provided:**
 - *there is successful resolution as to how the costs of the project will be recovered (from consumers or other sources), and*
 - *either TRET is legislated, or, either the Step Change or Fast Change scenario unfolds.*
- **Stage 2 between 2031-32 and 2035-36, provided additional decision rules are satisfied (these decision rules to be decided in the 2022 ISP)**



Optimal development path





**AEMO's external forum review
engagement:
Alicia Webb**



DER Program Status update

AEMO Consumer Forum | 4 August 2020
Luke Barlow, Chris Cormack and Jacqui Mills

AEMO's DER Program is designed to:

- explore emerging markets,
- maintain network stability with high levels of DER, and
- pioneer best-in-class new products and services

for all Australian consumers.



Consumer investment in DER is driving the need for two-way electricity flows, allowing households to be rewarded for participating in the energy market

AEMO's DER Vision addresses Australia's expected DER generation contribution to 2040 (slow to step change)

DER Vision: To effectively integrate DER into Australia's energy system to facilitate greater choice and affordability for consumers, maximise DER investments for whole-of-community benefit, and ensure a reliable, secure and least-cost energy system.

Distributed PV



10.8 GW to **24.4 GW** (NEM)
1.9 GW to **3.7 GW** (WEM)

Embedded battery storage capacity



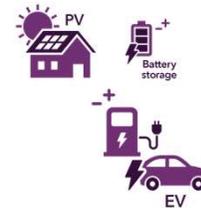
2.1 GWh to **18.6 GWh** (NEM)
0.4 GWh to **2.6 GWh** (WEM)

Electric vehicle consumption



<1 TWh to **7.7 TWh** (NEM)
0.05 TWh to **2.2 TWh** (WEM)

Virtual Power Plant aggregate storage capacity



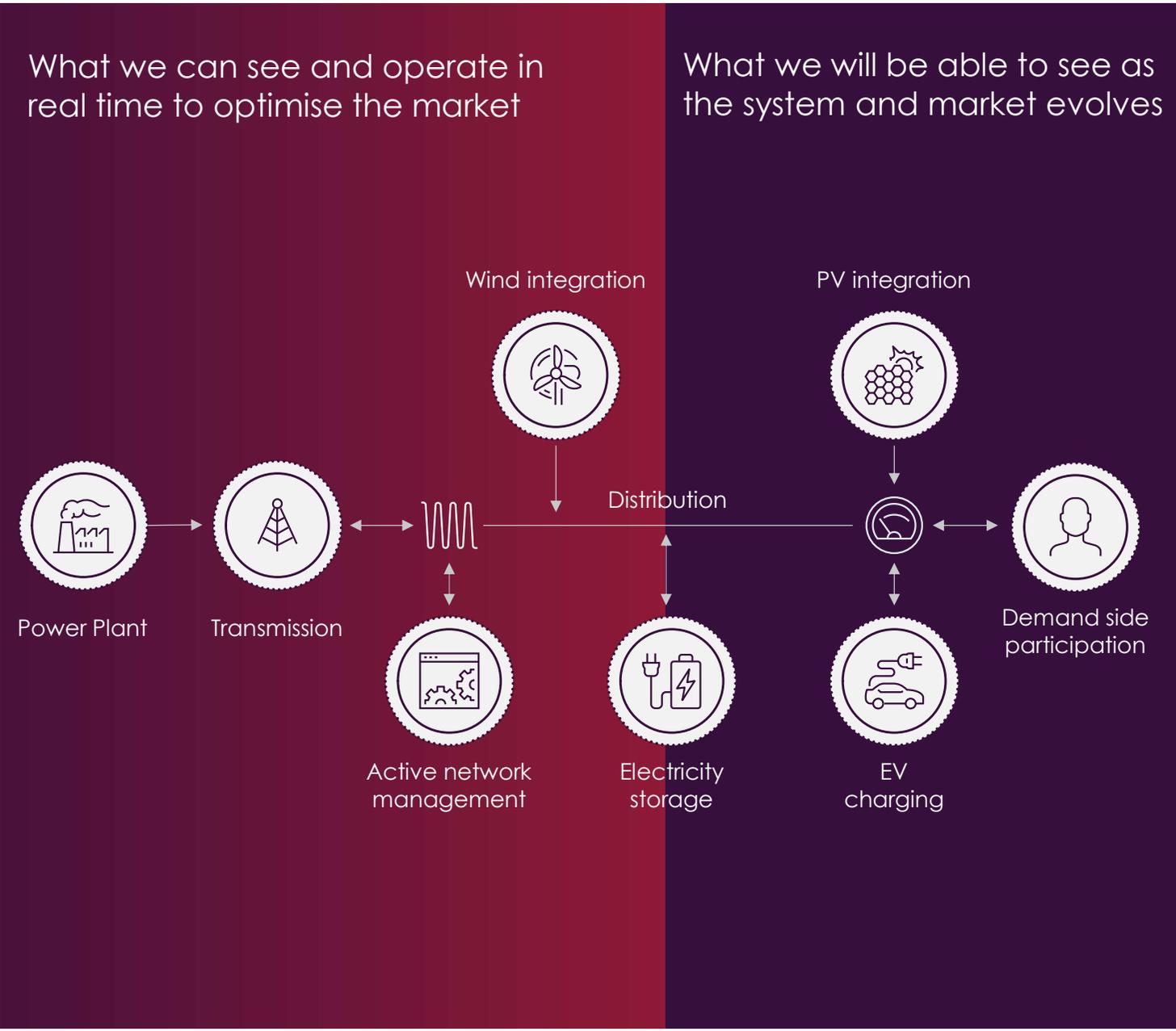
Up to **10.7 GWh**

Six core DER workstreams are underway to realise the **DER Vision**:

1. **Demonstrations** – trialling DER services and markets to assess technical, business model and consumer outcomes.
2. **DER Register** – database of DER devices, specifications, locations to provide shared visibility of DER to networks and AEMO.
3. **Markets and frameworks** – market reforms to bring the supply-side into wholesale energy markets.
4. **Operations** – engineering studies and modelling of effective DER integration
5. **Standards and connections** – uplifting existing and developing new inverter standards.
6. **The WA DER Roadmap** - AEMO's WA DER Program leverages the NEM DER Program insights and learnings to design WEM-specific solutions for DER integration in line with the WA DER Roadmap.

Provides DER insights into key AEMO reports including:

- Renewable Integration Study (RIS)
- ISP



DER Demonstrations

- **Victorian DER Marketplace** – commencing Q1 FY21 (with Ausnet Services, Mondo, ARENA)
- **Virtual Power Plant (VPP)** – 2nd report (knowledge-sharing) published, and Consumer Insights report slated for July 2021.

DER Register

- **NEM DER Register** now in place
- **DER Register data reporting** – quarterly reporting on no. of DER installations (NEM)
- **WA DER Register** - project underway (refer WA DER Program)

Markets and frameworks

- **Post 2025 NEM market redesign – 2SM and DER integration stream** (ensuring DER is featured in other Market Design Initiatives)
- **WDR implementation** in 2021

Operations

- Published the **SA Minimum operational demand threshold report** informing SA govt DER roadmap
- Consulted on the **Draft Power System Frequency Risk Review** in July
- Considering options for appropriate **emergency responses in high DER contexts**

Standards and Connections

- **Fast-track of updated AS/NZS 4777.2** – now out for public comment
- **Initial Standard consultation** commenced
- **Test procedure for inverters** published on AEMO's website.
- **DEIP Standards, Data and Interoperability Working Group** established (and associated taskforces commence soon)

WA DER Program

- **WA Government DER Roadmap**
- Project Symphony' DER Marketplace **Demonstration**
- Leverage national experience to inform **Market design**
- Updates to **standards** and improved **operational tools**
- **DER Register** extends NEM DER Register

Spotlight on: Electric Vehicles

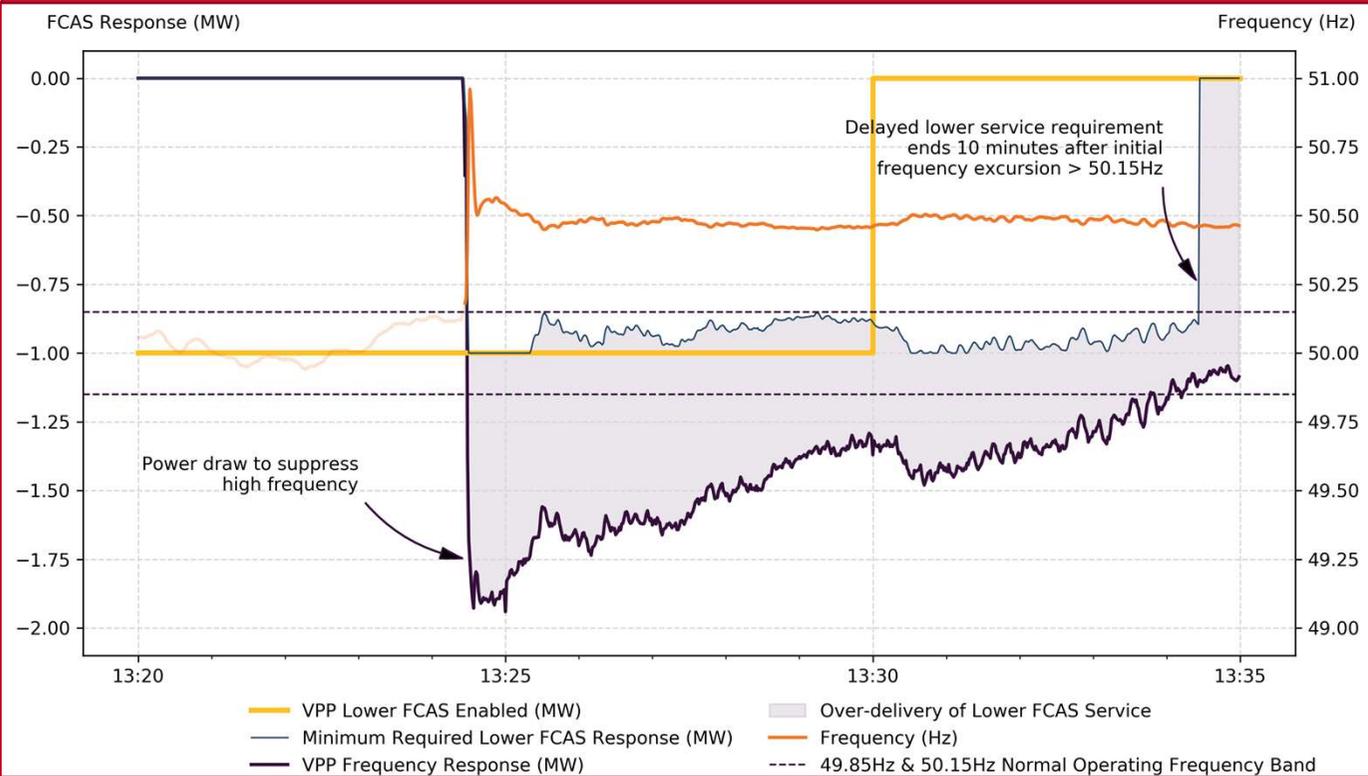
EVs from AEMO's perspective are a form of DER. We have a work program assessing EV impact on grid, including **DEIP Electric Vehicles Grid Integration Working Groups** –AEMO leads two DEIP EV Taskforces under this Working Group: EV Data Availability and EV Standards.

Spotlight on Virtual Power Plant Demonstration

Knowledge sharing highlights

- VPP Demonstration is a **foundational building block** to enable AEMO to operate with high levels of DER
- VPP industry remains small, and in the early stages of capability development
- VPPs are highly capable of responding to FCAS event and energy price signals
- Forecasting will be a key focus for VPPs to ensure they can accurately forecast their performance.
- VPPs could alleviate some operational challenges such as low generation reserves and low minimum demands as they grow in scale.

Figure 1. Response of Energy Locals VPP to South Australian islanding event, 31 Jan 2020



Spotlight on Virtual Power Plant Demonstration

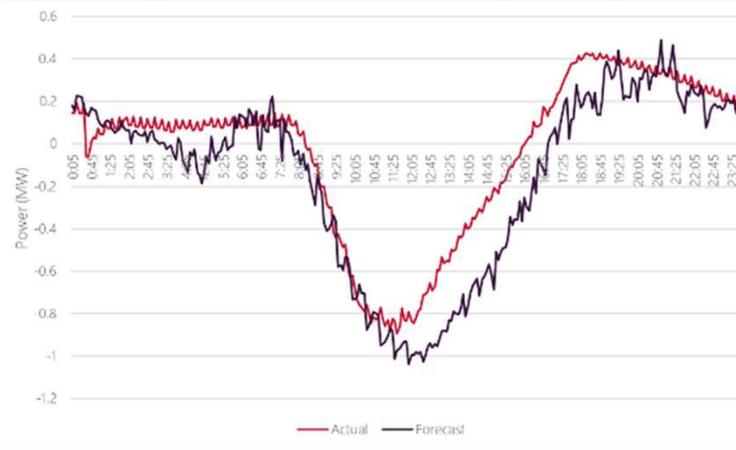
Knowledge sharing highlights

Forecasting Accuracy

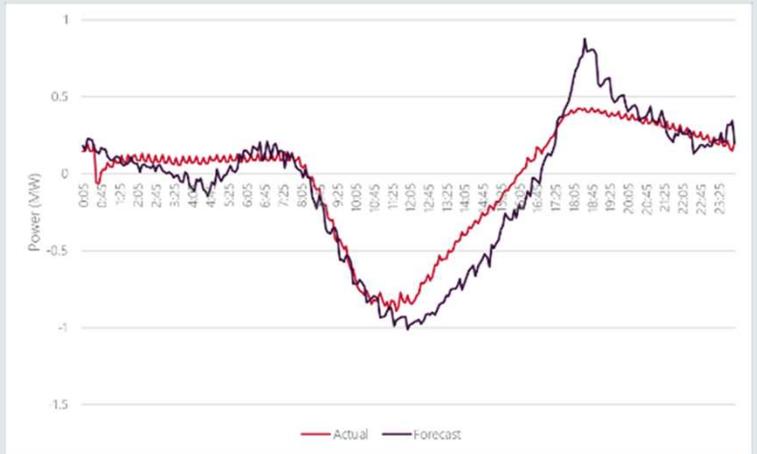
Average South Australian Virtual Power Plant Forecast vs Actual (1-7 May 2020)

- Afternoon & evening peak most difficult times to forecast
- 1-hour-ahead forecasts are most accurate
- Day ahead forecast promising (small sample size)

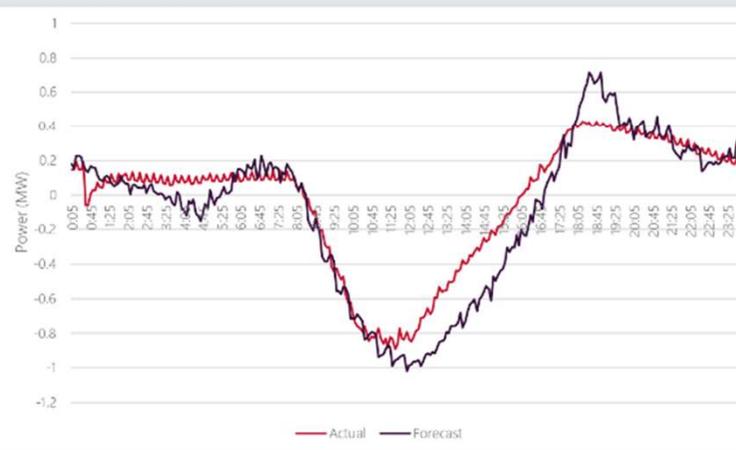
Day-Ahead (Forecast as at 1230 hrs day-ahead)



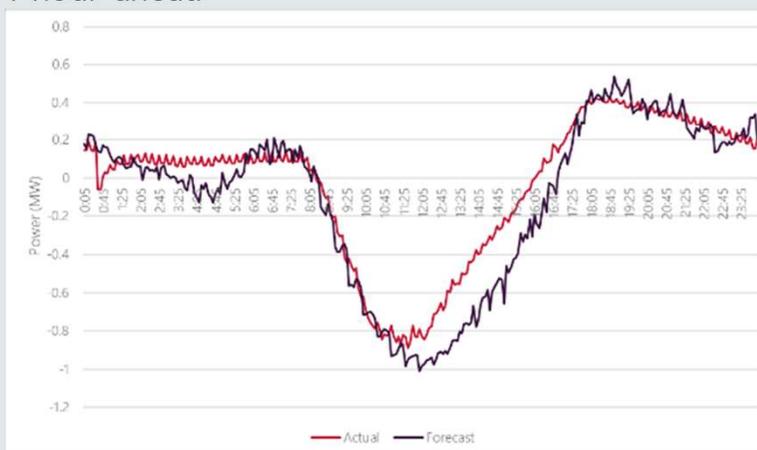
12-hours-ahead



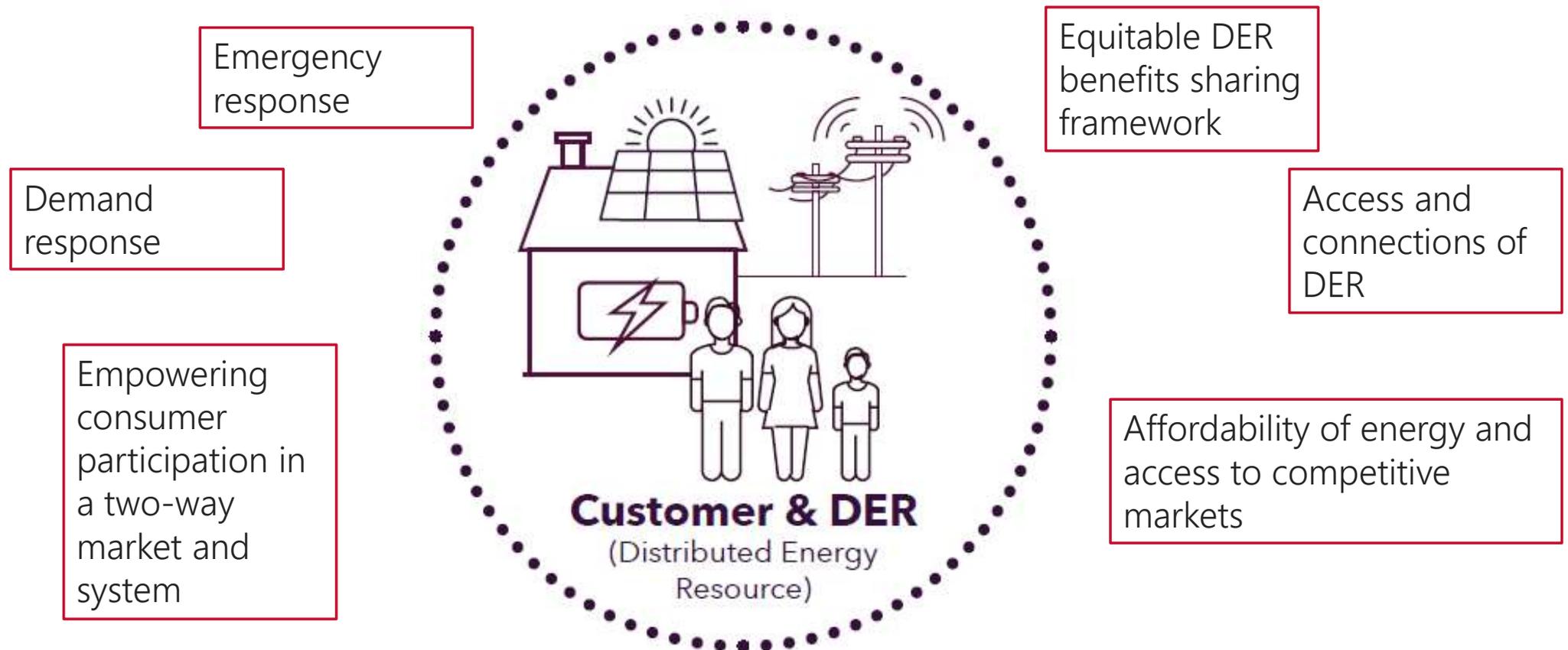
4-hours-ahead



1-hour-ahead



Consumers and DER: Policy considerations



Question: What other consumer-related factors should we consider?

Upcoming opportunities for consumer engagement with AEMO's DER Program

DER Demonstrations

- **Victorian DER Marketplace** – stakeholder working groups are in design/development phase. More info on AEMO's website, once confirmed.

Standards and Connections

- **DEIP Standards, Data and Interoperability working group** – expression of interest to get involved.
- **DER Initial Standard Consultation** – Refer: <https://aemo.com.au/consultations/current-and-closed-consultations>.

Markets and frameworks

- Refer COAG Energy Council for **post-2025 NEM market design working groups** - <http://www.coagenergycouncil.gov.au/energy-security-board/post-2025>

DER-aligned work: Electric Vehicles

- **10 August and 7 September** – DEIP EV Standards Taskforce Working Group
- **10 August and 7 September** - DEIP EV Data Availability Taskforce Working Group

WA DER Program

- Refer **WA Government DER Roadmap** for consumer engagement opportunities - https://www.wa.gov.au/sites/default/files/2020-04/DER_Roadmap.pdf
- WA Advocates for Consumers of Energy forum ([Office of Energy website](#))

For AEMO's stakeholder engagement calendar, visit:

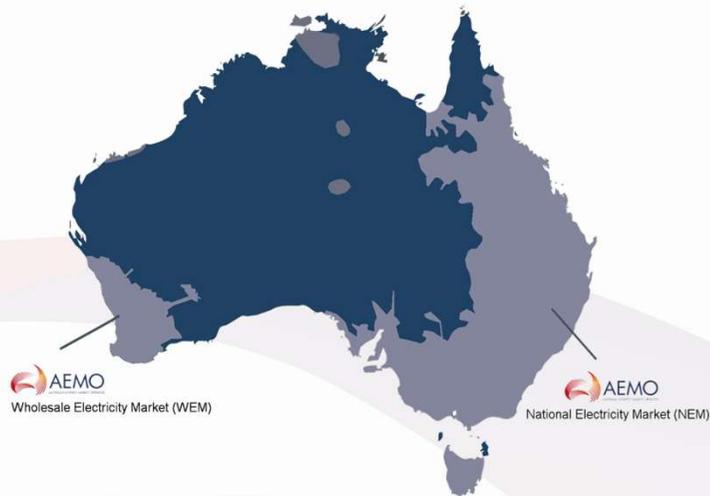
<https://www.aemo.com.au/consultations/industry-forums-and-working-groups/calendar>

Share feedback with DER Program team: DERProgram@aemo.com.au

Electric Vehicle team: electricvehicles@aemo.com.au



About AEMO



We operate Australia's National Electricity Market and power grid in Australia's eastern and south-eastern seaboard, and the Wholesale Electricity Market and power grid in south-west WA.



Both markets supply more than 220 terawatt hours of electricity each year.



We also operate retail and wholesale gas markets across south-eastern Australia and Victoria's gas pipeline grid.



Collectively traded more than A\$20 billion in the last financial year.



Ownership

40%

Market participants

60%

Governments of Australia

Short break



Wholesale Demand Response project

(Emily Brodie & Ruth Guest)



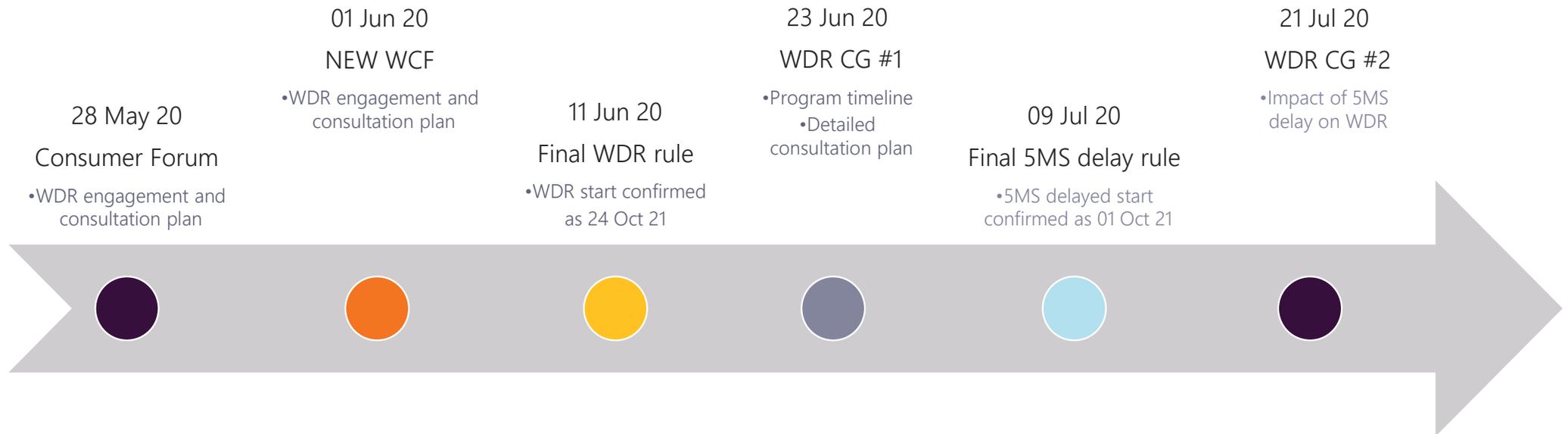
Wholesale Demand Response program update

Ruth Guest, AEMO WDR Business Lead

Emily Brodie, AEMO WDR Stakeholder Engagement Lead

AEMO Consumer Forum, 4 August 2020

Previously on WDR...



- Both WDR program and stakeholder engagement are established and ramping up
- AEMO is cognisant of proximity of 5MS and WDR go-lives and implications for readiness, testing and cutover.
- AEMO has a broader program of work underway in conjunction with the industry to manage multiple NEM reforms in 2021 (“Regulatory roadmap”)

Where to find WDR program information

Website was refreshed in July:

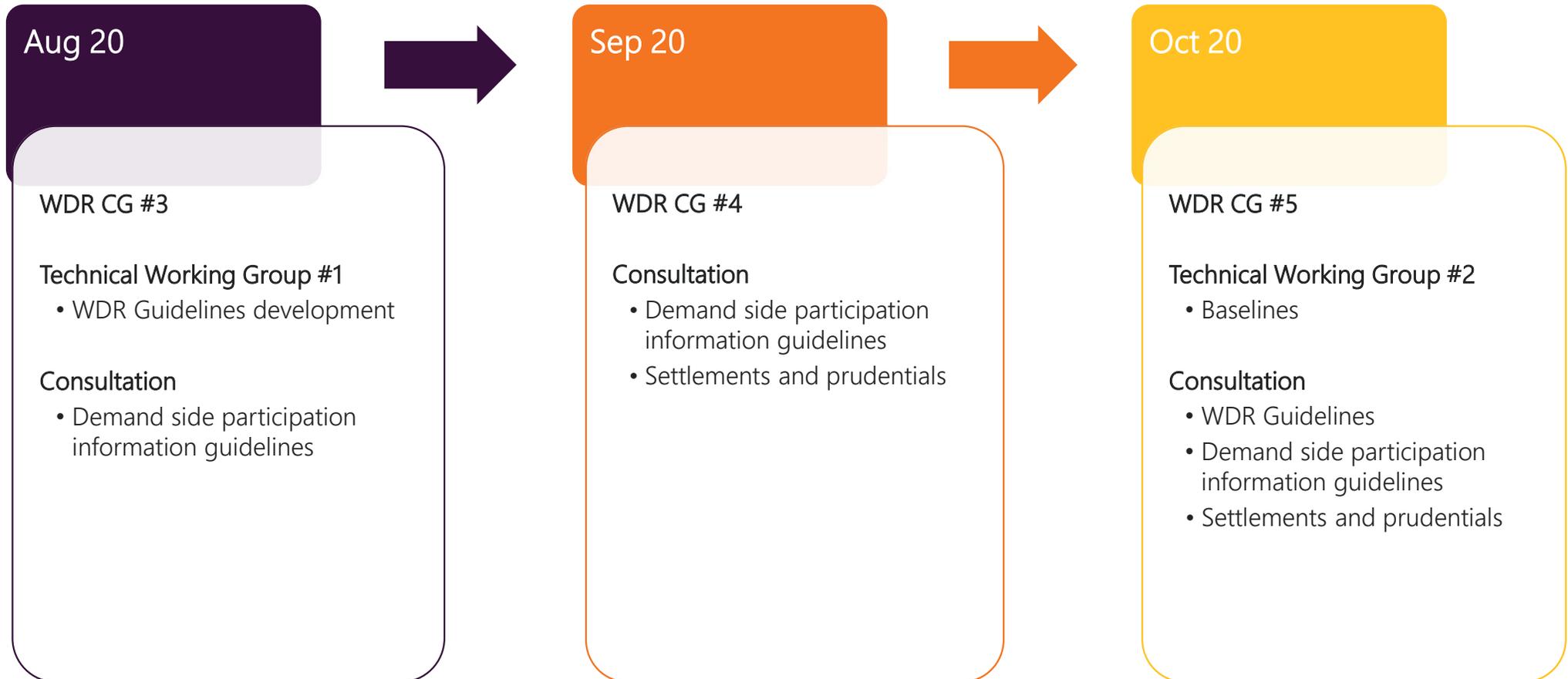
WDR mechanism

- Background
- AEMO's program and industry engagement
- How to get involved
- Reference information

WDR Consultative Group

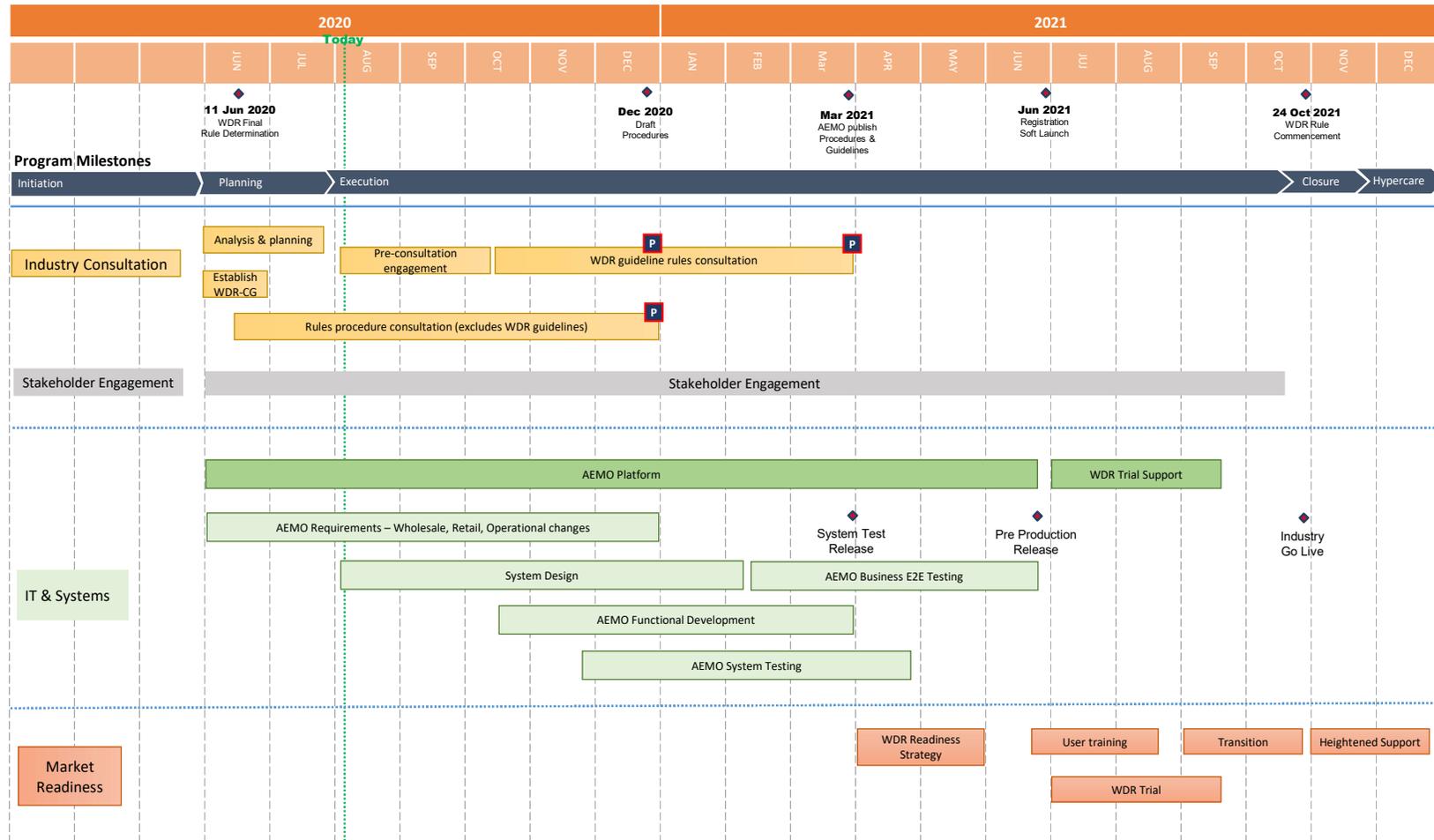
- Context
- Terms of reference
- Meeting calendar
- Meeting information (packs, notes etc)

Coming up on WDR...



Wholesale Demand Response – Project Timeline

High Level Program Overview - Tuesday, 4 August 2020



For Information: WDR = Wholesale Demand Response

P Publish ◆ Milestone
 ◆ Working group meeting

For detailed meeting schedule and agendas, see AEMO's Stakeholder Relations Website

WDR program contact



Please contact the WDR program at any time via WDR@aemo.com.au

Questions?

WDR@aemo.com.au

Knowledge Sharing Sessions- Neale Scott

- AEMO committed to running 3 knowledge sharing sessions in 2020 as voted for by Consumer Forum members
 - VPPs and Inverters
 - Forecasting - Modelling uncertainty in customer demand, minimising market costs and risks through system development & reliability
 - NEM Wholesale Market Dynamics
- Inverter session held on 25 June 20
 - Feedback?
 - Traditional AEMO driven presentation VS Q&A with AEMO SME/Panel
 - More shorter targeted sessions instead of the three formal sessions
 - Which session next?
 - Inverter/metering session 2.0?

AEMO corporate plan – update

Other business & close

- Thank you!
- Next Consumer Forum to be held around November 2020

