WA Electricity Consultative Forum

8 December 2021

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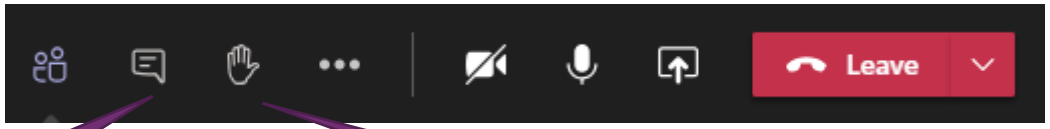
AUSTRALIAN ENERGY MARKET OPERATOR

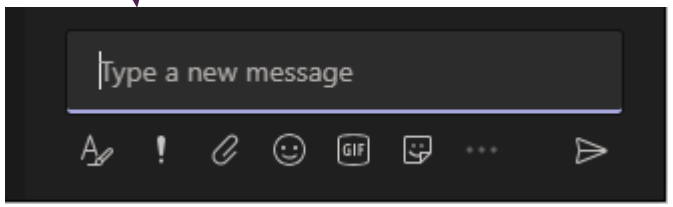
We acknowledge the Traditional Owners of country throughout Australia and recognise their continuing connection to land, waters and culture. We pay our respects to their Elders past, present and emerging.

Join the Discussion and Teams

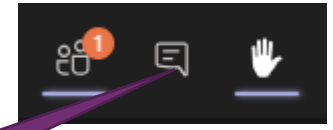


1. Click the chat icon to open the chat window

2. Type your question in the chat window



1. Click the hand icon to raise your hand



2. Keep your hand raised until you're called upon

3. Lower your hand after

Agenda

ITEM	TIME	TOPIC	PAPERS	RESPONSIBLE	ACTION
1.	1.00pm – 1.05pm	**Welcome and Minutes – WAECF (20 October 2021)**	Minutes	Chair (AEMO)	Endorsement
2.	1.05pm – 1.40pm	**2021 Year in review – Power System and Markets Operations**	Presentation	AEMO	Note / Discussion
3.	1.40pm – 2.25pm	**AEMO Operational Updates**			
		3.1 Managing DPV Tripping Impact	Presentation	Alireza Fereidouni (AEMO)	Note / Discussion
		3.2 Reserve Capacity Update	Verbal Update	Neetika Kapani (AEMO)	Note / Discussion
		3.3 Settlement Day Process for Non-STEM Adjustments	Presentation	Stuart McDougall (AEMO)	Note / Discussion
4.	2.25pm – 2.55pm	**AEMO's Allowable Revenue (AR6) Update**			
		4.1 Process and planning update	Verbal Update	Stuart Featham (AEMO)	Note / Discussion
		4.2 WEM Reform Program CAPEX Overview	Presentation	Stuart Featham (AEMO)	Note / Discussion
		4.3 OPEX Overview	Verbal Update	Dean Sharafi (AEMO)	Note / Discussion
5.	2.55pm – 3.10pm	**AEMO Project Updates**			
		5.1 WEM Reform Program 5.2 WA DER Program	Presentation Verbal Update	Stuart Featham (AEMO) Tom Butler (AEMO)	Note / Discussion
6.	3.10pm – 3.15pm	**Other Business**	Verbal Update		Note / Discussion
7.	3.15pm	**Next meeting 2 March 2022**	NA	(Chair)	Note

*Note: This WAECF meeting will be recorded to assist with minute production

2021 year in review

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Market Operations

Presented by David Dixon - Analyst, WA Market Operations

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WEM Registrations

Participant Registration

- **Power Research and Development (PRDSO)**
  Market Generator
  11 September 2021
- **Coordinator of Energy (COE)**
  17 May 2021

Participant Deregistration

- **East Metropolitan Regional Council (EMRC)**
  Market Generator
  17 September 2021
- **Amanda Australia Pty Ltd (AMAUST)**
  Market Customer
  14 October 2021

Facility Deregistration

- **Perth Power Partnership (PPP_KCP_IL1)**
  Intermittent Load
  1 December 2021
- **Kwinana Cogeneration Plant (PPP_KCP_EG1)**
  Scheduled Generator
  23 May 2022
- **Muja Stage C, Unit 5 (MUJA_G5)**
  Scheduled Generator
  1 October 2022

Note: There were no Facility Registrations in 2021.

WEM PaSS
Settlements Work Program

Settlements Enhancements was a key step in AEMO's Settlements work program.

In August 2021 the WEM Prudential and Settlement Service (PaSS) went live.

WEM PaSS is the biggest improvement to AEMO's settlement software since Market Start.

RoPE Phase 1 – RC_2017_06

Implementation of rule change RC_2017_06 which amends the Individual Reserve Capacity Requirement (IRCR) calculation, Capacity Credit Allocation and associated settlement and prudential processes.

July 2018 – May 2019

RoPE Phase 2 – Outstanding Amount Improvements

Implementation of market procedure changes that delivered more accurate OA based on daily estimated settlements and provided the foundation for settlement system replacement.

June 2019 – August 2020

Settlement Enhancements

Extend prudential calculation engine delivered under RoPE Phase 2 to decommission the POMAX Settlement application which is end of life and transition to an in-house support model.

Meter Data Warehouse Upgrade

As part of software asset lifecycle management upgrade product to ensure the currency of software.

2020 – 2021

WEM Reform

Improved settlement and prudential outcomes that will be delivered by ETIU and AEMO through the WEM Reform program.

2021 – 2023

WEM PaSS
Participant Impacts

Reduced Operational Risk

- IT support to AEMO's critical settlement functions will be provided by through existing in-house support model.
- AEMO will be able to more efficiently and effectively resolve technical issues with settlements.

More efficient system operability

- Automated jobs in a single system replaces several manual tasks across multiple systems.
- Single certified calculation engine that will replace two calculation systems.

Lower support and maintenance costs

- Moves AEMO from a third party owned and supported settlement system to a fully in-house settlement system.
- Allows AEMO to update settlement system (e.g. rule changes) at lower cost.

Improved system and clarity for Participants

- Publishes reports to Participants that allow them to reconcile calculations to a more detailed level than ever before.
- Aligns calculation formulation across prudentials and settlements.

Foundation reform work

- Consolidates AEMO's settlement capabilities to reduce risk for implementation of WEM Reform settlements.
- Provides framework for implementation of WEM Reform settlements.

WEM Procedures

Changes resulting from The Wholesale Electricity Market Amendment (Reserve Capacity Pricing Reforms) Rules 2019.

Minor changes, improvements and corrections.

Changes to reduce of the Credit Limit assessment period and correlate STEM and Non-STEM exposure.

System Releases

WEMS

WEMS 3.38

- 5-minute Balancing Load Forecast web service.
- Updated Balancing Submission validations, removing ability to submit 0 MW/min Ramp Rate.

WEMS 3.39

- Add DSP Transmission Node Identifier to DSP Association Form.

WEMS 3.42

- Updates for RCM Pricing amendments, including Capacity Credit Allocation changes and user interface improvements.

Prudential and Settlement Service

PaSS 1.5

- Management of Credit Support instruments and Credit Limit Letters in the new WEM "Credit Support Module".

PaSS 1.7

- Implementation of new user interface and calculations.
- Implementation of Coordinator Fee Rule Change.
- Automated certification of calculations.

PaSS 1.8 & 1.9

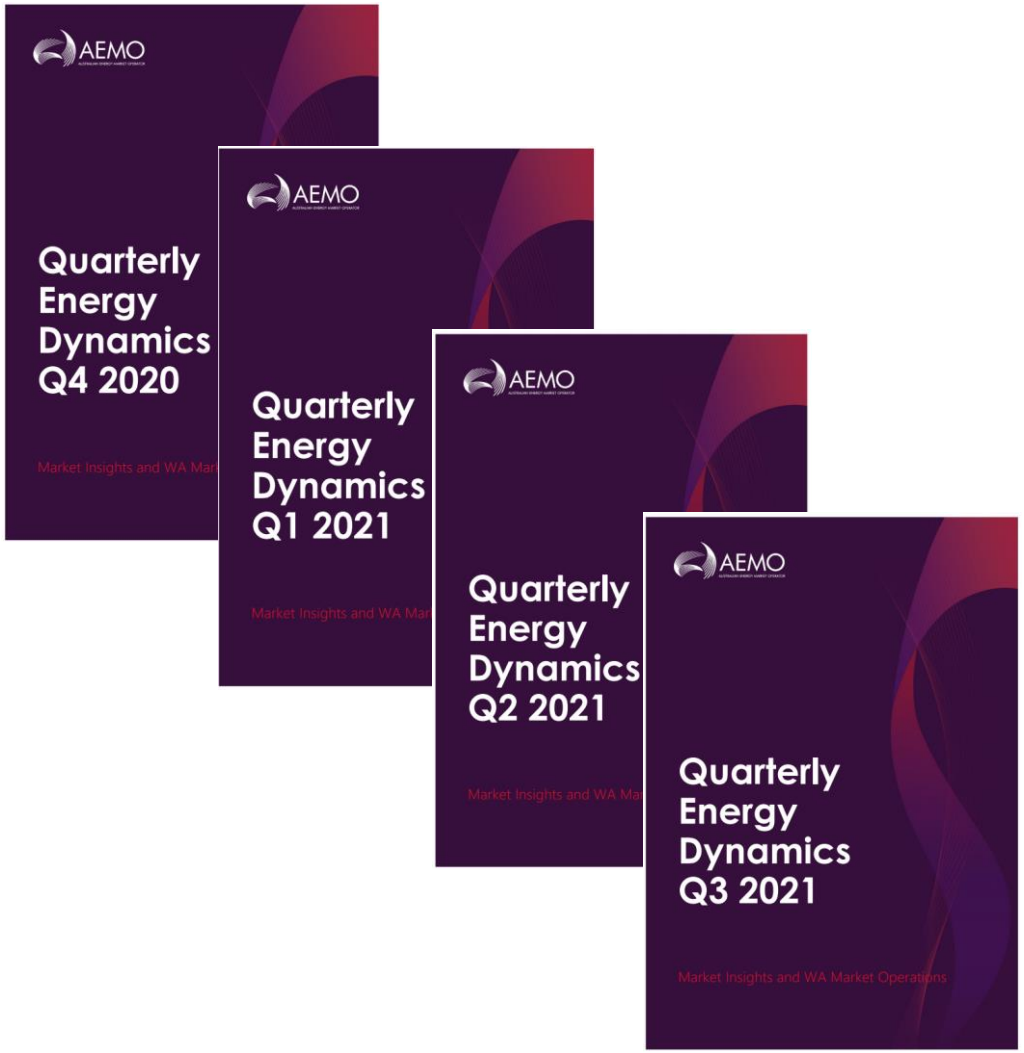
- Prepayment and Notice of Disagreement management through WEM PaSS.
- Calculations to support Short Payment and distribution of Civil Penalty amounts included in system.

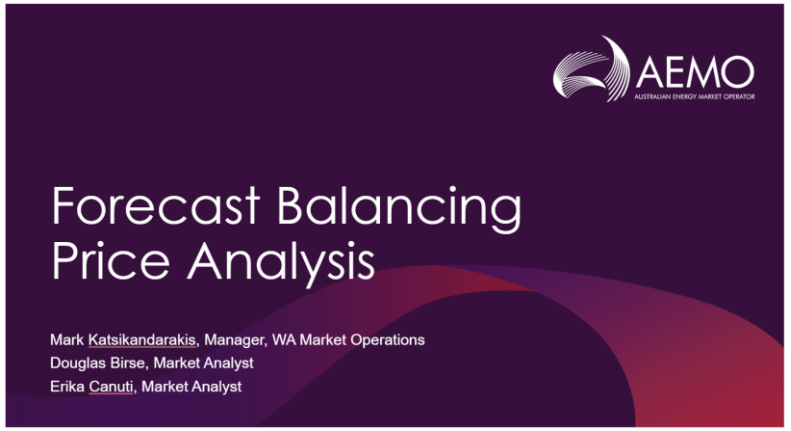
Other

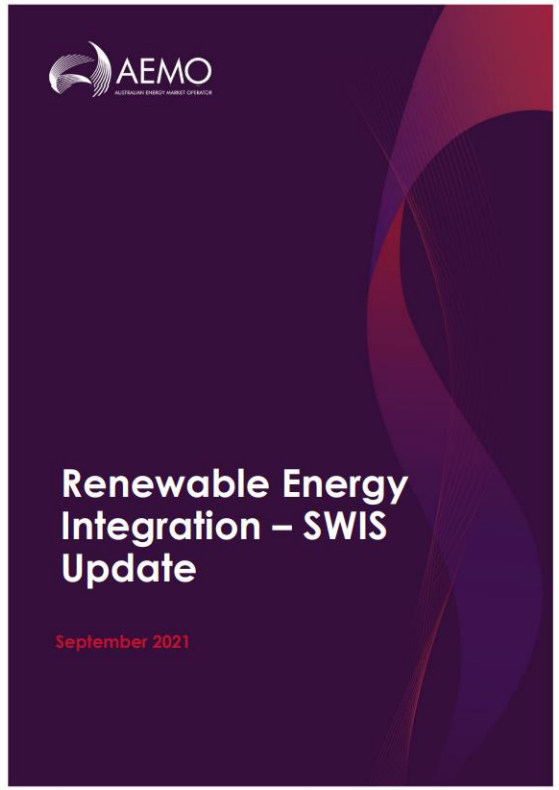
Market Data Website

- Automated Weekly Report - Now published automatically Tuesday 8:30AM.
- Automated Operational Demand – Now Published on the Market Data website.

Major Reporting & Analysis

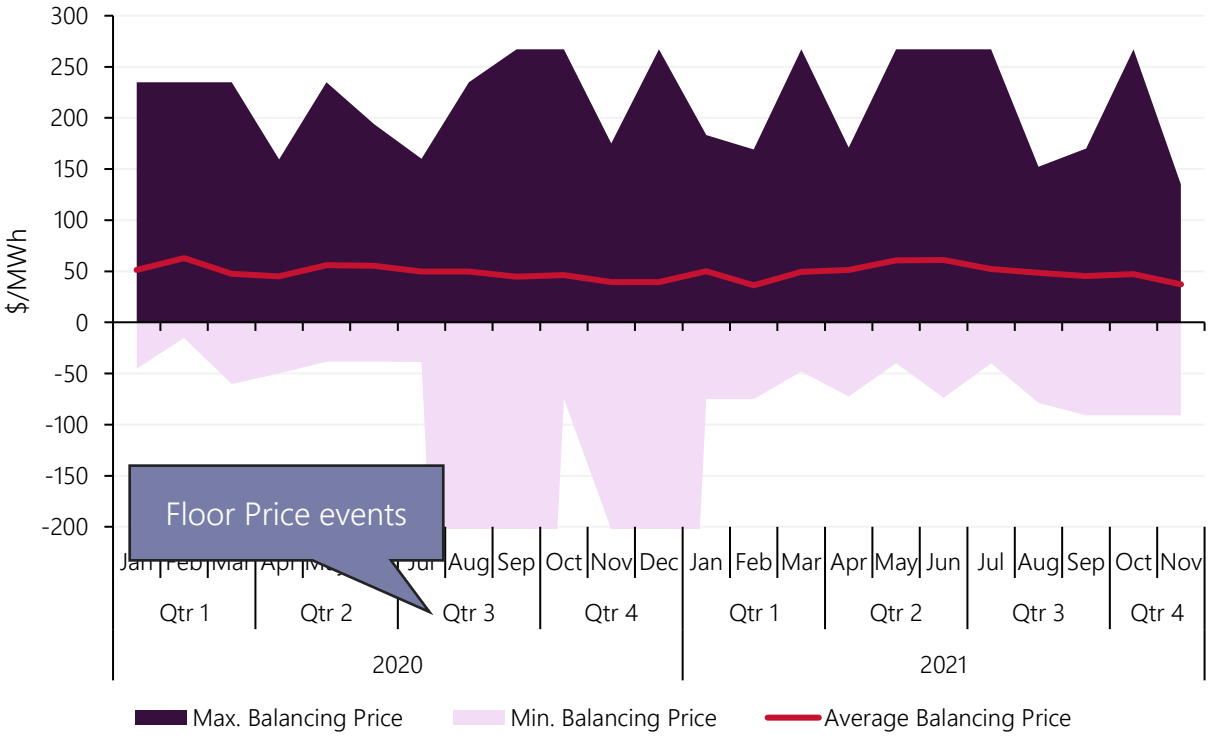




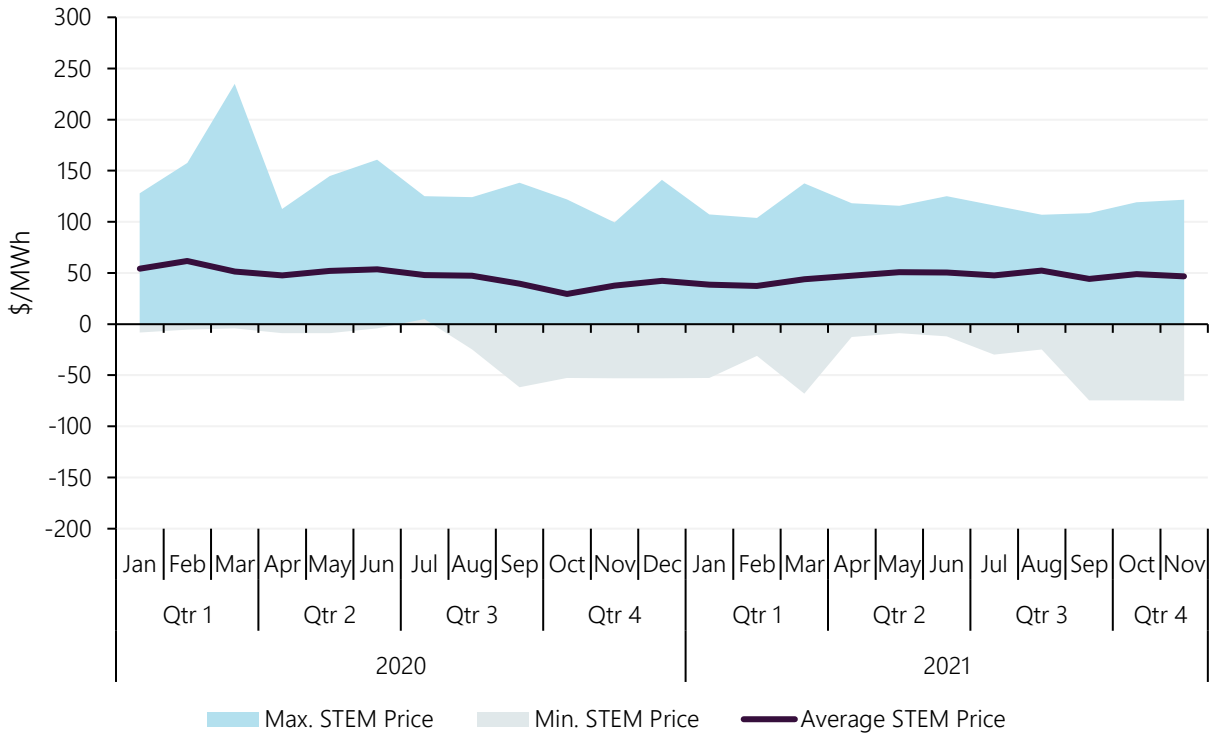


WEM Prices

Balancing Summary



STEM Summary



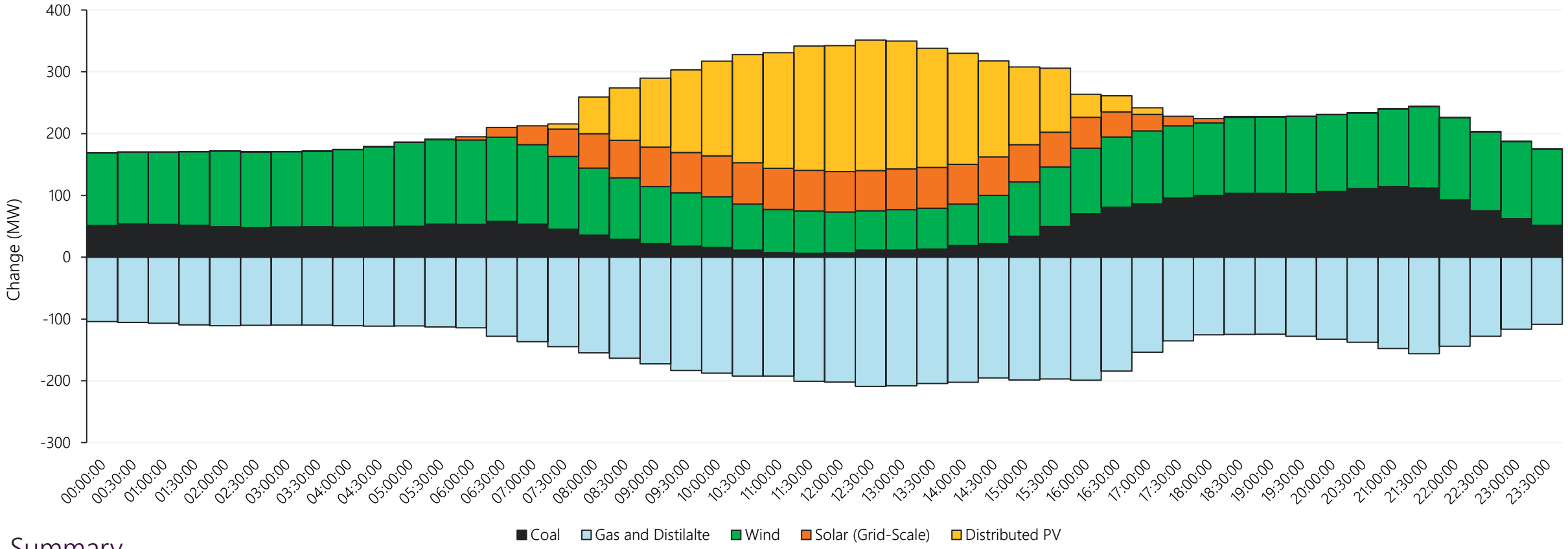
Summary

A Small increase in average Balancing Price (YTD) of $0.50/MWh to $49.40/MWh.

B Small decrease in STEM Price (YTD) of $0.76/MWh to $46.20/MWh.

C Fewer minimum price events in 2021 when compared to 2020; in 2021, 0 Trading Intervals cleared at the minimum price (-$1,000/MWh) compared to 6 in 2020.

WEM Fuel Mix – Change between 2020 and 2021



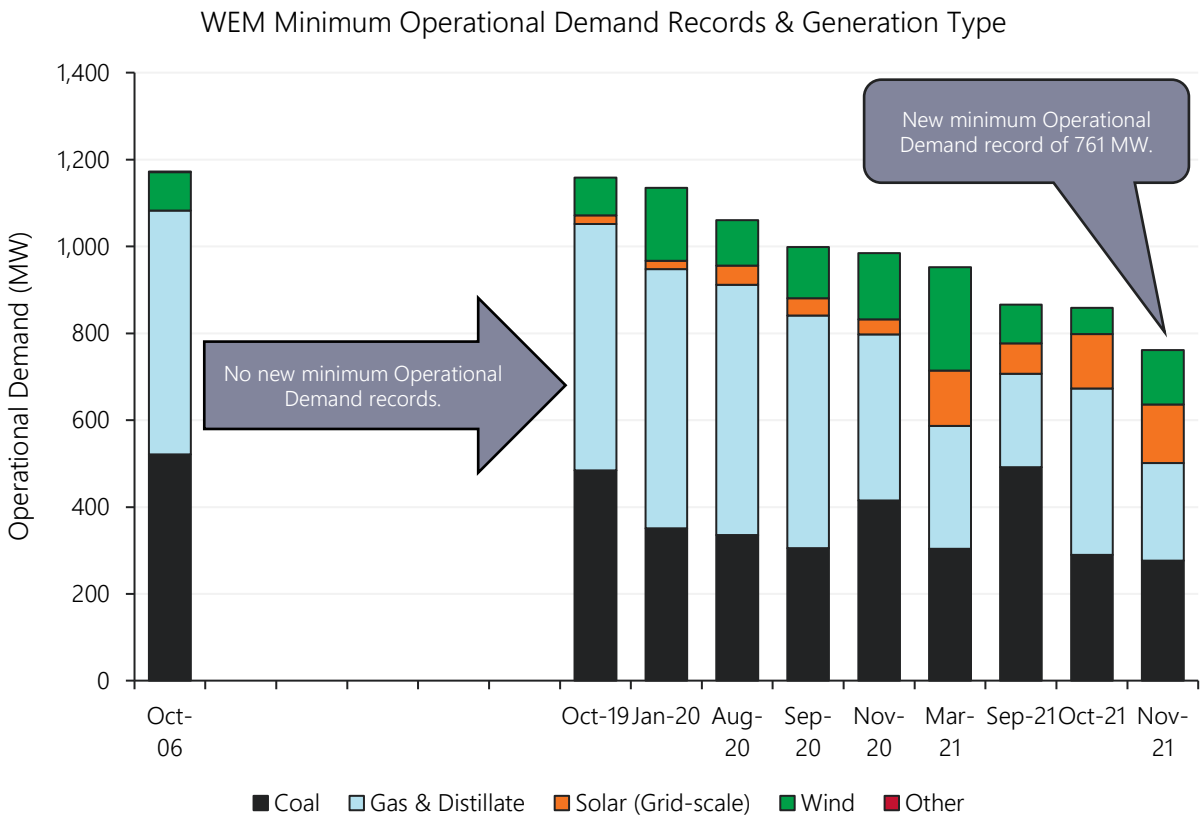
Summary

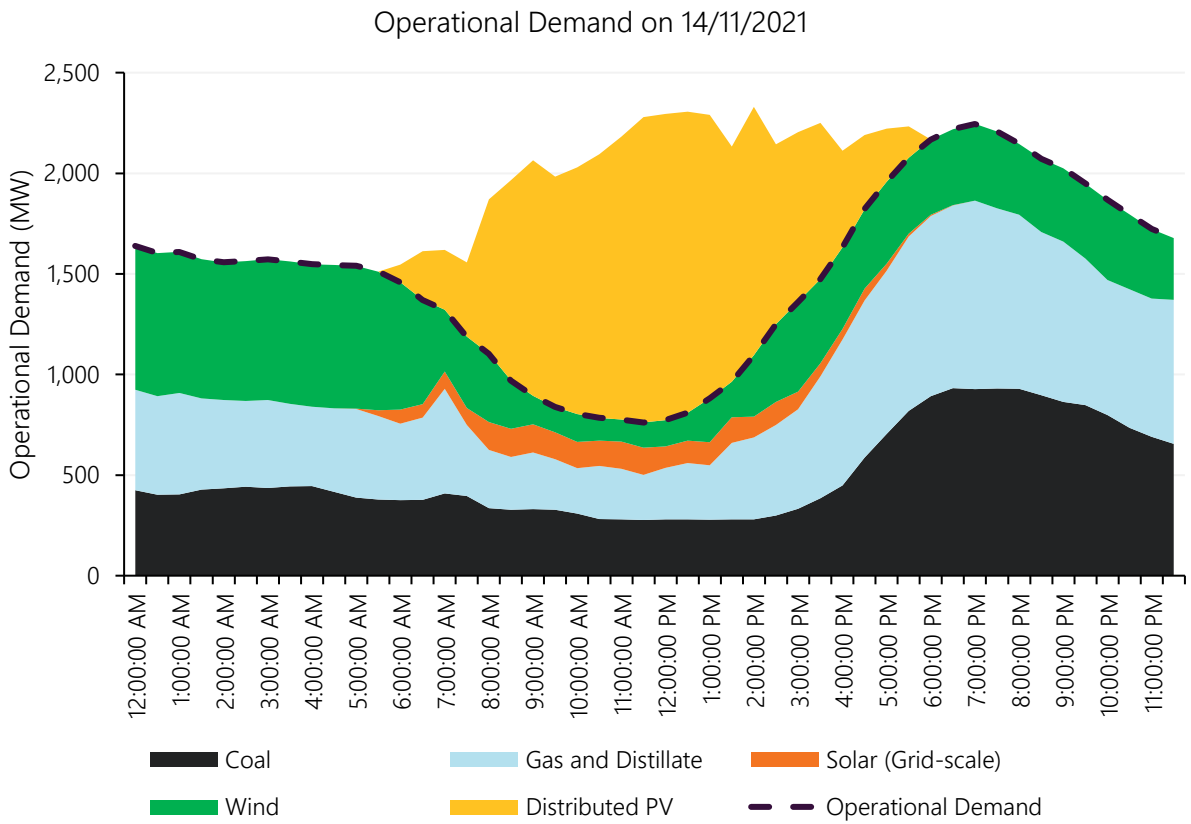
A Overall reduction in average gas and distillate generation across every interval as newly registered renewables displaced higher merit-order generation.

B Greater average wind and grid-scale solar generation due to the registration of three new Facilities since 2020: MERSOLAR_PV1, YANDIN_WF1, and WARRADARGE_WF1 (+492 MW Capacity)

C Increase in average coal generation across every interval.

Ongoing Minimum Demand Records





Summary

A Increased distributed PV capacity installed throughout 2020 and 2021 has contributed to ongoing minimum operational demand records.

B A new minimum operational demand record of 761 MW occurred during the 11:30-12:00 interval on Sunday, 14 November 2021, this was due to a combination of mild, sunny conditions and industrial load outages.

System Management

Presented by Nicole Markham- Manager, Power System Operations

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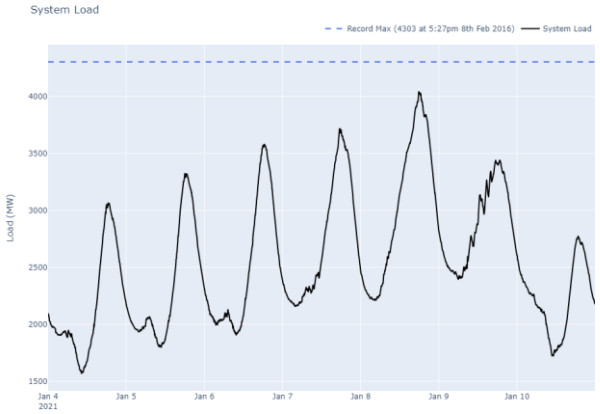
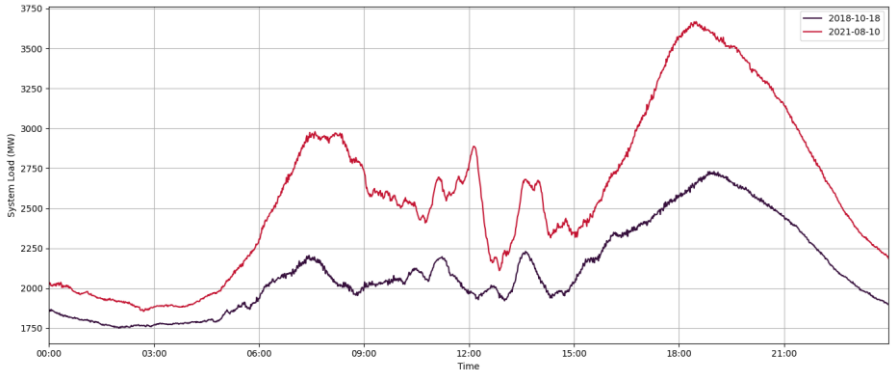
What we saw

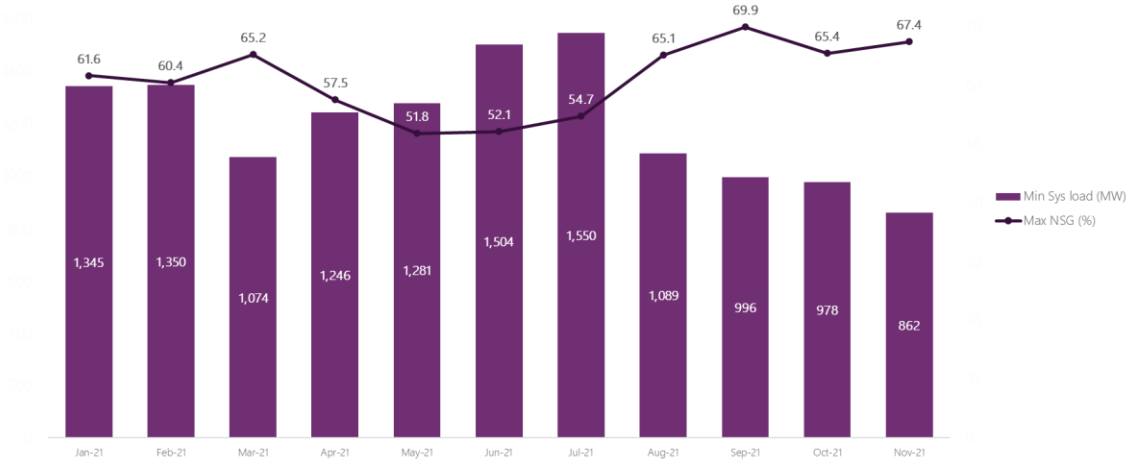
1 High summer loads in January



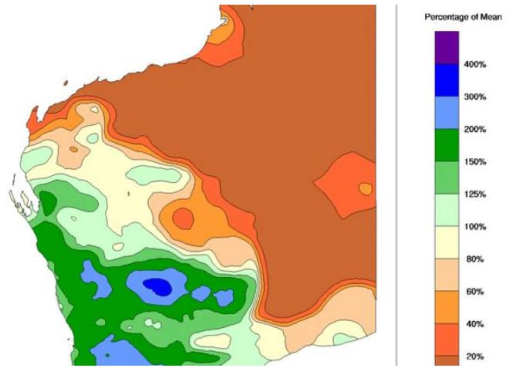
2 Increasing volatility



3 Reducing minimum loads and increasing PV penetration



4 Wettest July in 26 years with consistently strong winds



4 Backup LFAS events in one month occurred

Keeping the lights on

Keeping the power system secure through a range of unprecedented challenges, such as:

- 750 MW load swing in 30 minutes
- Significantly different dispatch outcomes to manage changing power system conditions

660	Generation outages assessed
2,430	Transmission outages assessed
142	Commissioning Test Plans reviewed
87	Synergy Operational Requests accommodated

Forecasting

- Improved forecasting models to consider additional providers of irradiance forecasts.
- Additional forecasts introduced to enhance situational awareness.

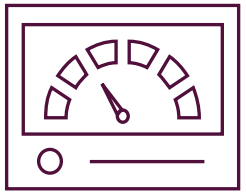
System Restart

- For the first time one of the system restart facilities was tested right through to energising a small section of the network and picking up 7 MW of generator auxiliary load.
- 2 years of planning to coordinate outages and plans across AEMO, Western Power and generators

Responding to new challenges

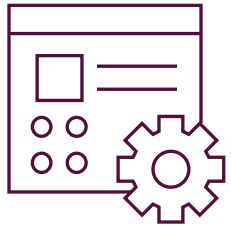
Poor DPV tolerance of voltage and frequency disturbances

January 2021 - Additional spinning reserve requirements introduced to compensate for the DPV loss coinciding with the loss of a 330 kV line and connected generators. Additional actions taken as this risk better understood and quantified.



Reducing load quantities on the UFLS scheme

Reducing UFLS quantities resulted in a change to how this risk is assessed. Western Power has connected a number of larger customers onto the UFLS scheme.



Undifferentiated dispatch at the WEM floor price

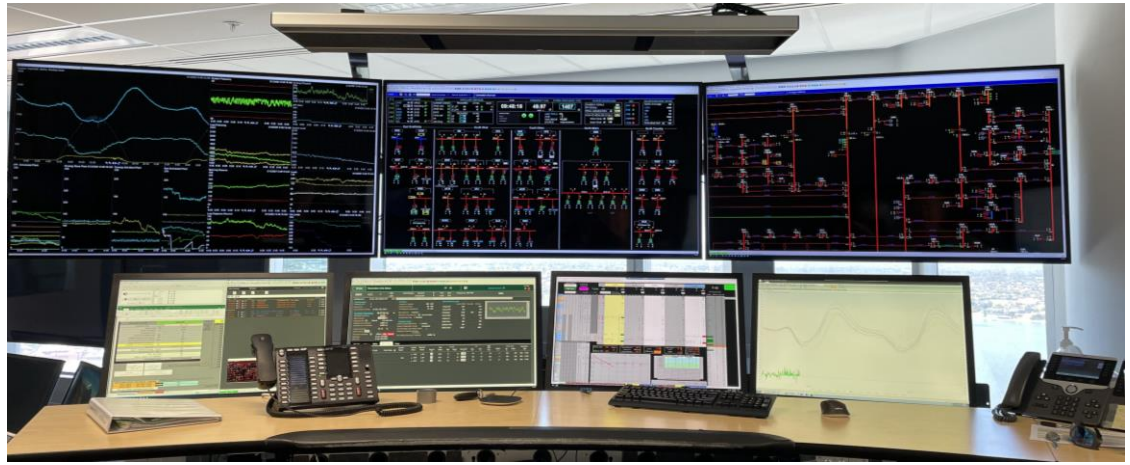
November 2021 – Updated Balancing Merit Order (BMO) tie-break methodology to differentiate between energy and minimum generation at the WEM floor price.

Commissioning AEMO Energy Management System

After several years of complex work, AEMO successfully transferred to the new EMS on 6 October 2021. This ends the reliance on Western Power for the provision of systems, EMS and historical PI historian.

The project involved:

- Building a **database** with over **18,000 telemetered points** from Western Power to AEMO via ICCP link
- **Integration** with the WEM dispatching and forecasting applications (RTDE, SOCC_UI, Metrix forecast, BOM data)
- Creating **200+** displays
- Creating **AEMO PI Historian** for WEM
- Establishing **cross functional teams** to support all new systems



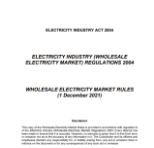
AEMO Control Room

Operationalising new obligations

Generator Performance Standards (GPS)

- Working with Western Power to finalise the GPS of all existing Transmission Connected Generating Systems.
- Processed 49 extensions for the provision of Generator Monitoring Plans (GMP) to date as AEMO is required to approve the GMP.
- Working with Market Participants to enhance the understanding of what should be provided for existing and new generators
- Working with Western Power to develop the GPS Technical Requirement guidelines to clarify any ambiguities and provide consistent interpretation of the Technical Requirement

Internal processes and systems updated in line with the **Credible Contingency Framework** to enable reclassification of non-credible contingencies (where relevant)



Updated monitoring and reporting against the new **Frequency Operating Standards** in the WEM Rules

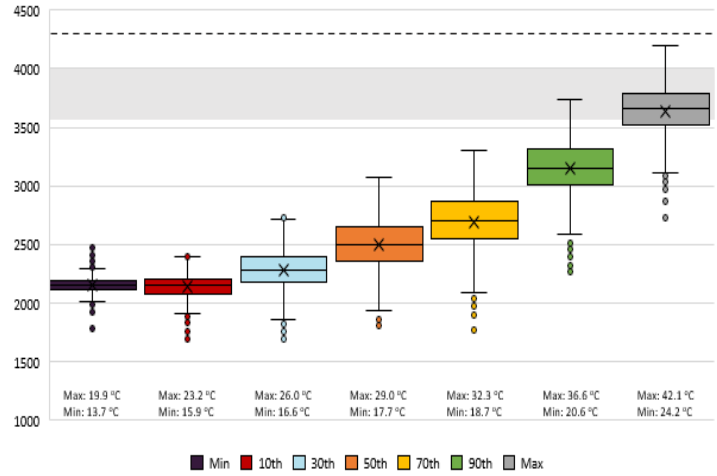
Release of WEM Procedures

- **Frequency Co-optimised ESS Accreditation**
- **Credible Contingency Events**
- **Generator Monitoring Plans**
- **Communication and Control Systems**

Summer preparedness

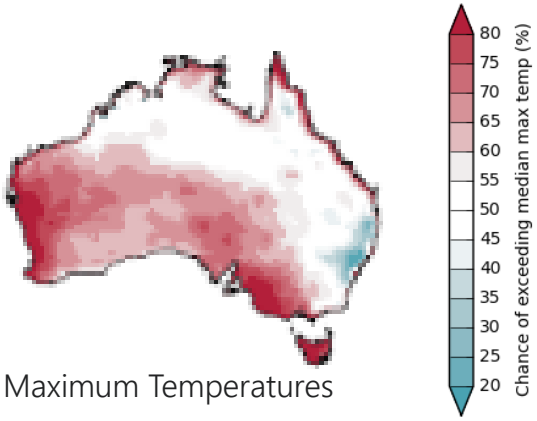
- There are no significant transmission or generation outages that increase the risk of not being able to meet demand during summer.
- Minimum load over Christmas and New Year holiday periods could be as low as 900 MW
  - perfect weather
  - block loads are on

Summer daily maximum system load (MW) on weekdays, for average maximum and minimum temperature forecasts.

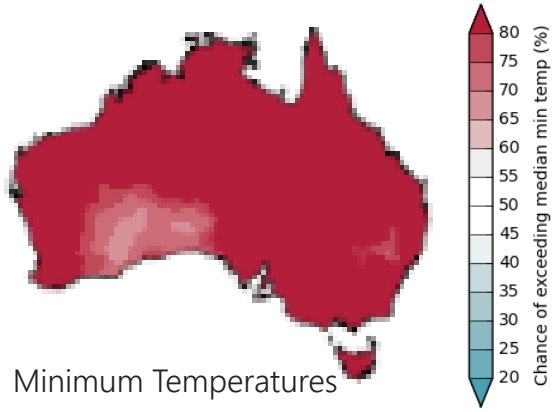


Climate outlook (Jan – March 2022)

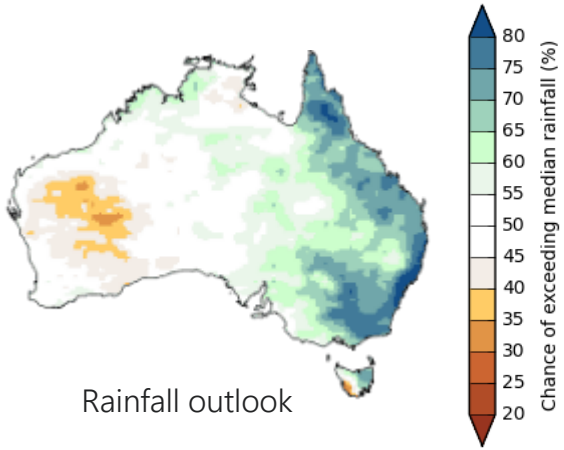
Source: BOM



Maximum Temperatures



Minimum Temperatures



Rainfall outlook

Reserve Capacity

Presented by Manus Higgins – Senior Analyst, Reserve Capacity

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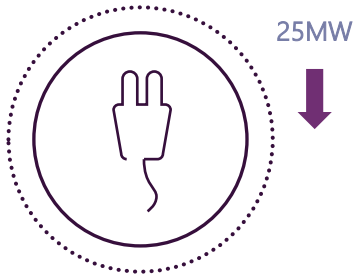
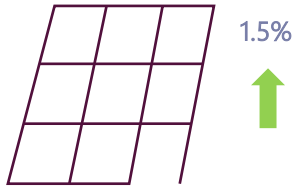
2021 WEM ESOO (2023-24 Capacity Year)



4,396 MW

Reserve Capacity Requirement

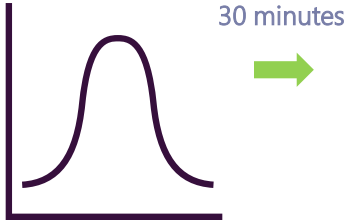


8% growth rate

Behind-the-meter PV Capacity

0.2% growth rate

10% POE peak demand

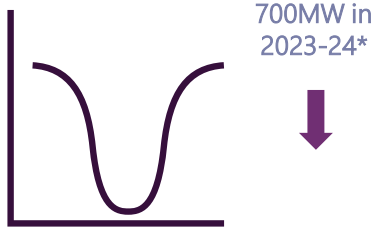


18:00 to 19:00

Peak Demand

0.8% growth rate

Operational Consumption



232 MW by 2025-26

Minimum Demand

$151,700/ MW

Benchmark Reserve Capacity Price

Key highlights:

- Methodology changes and improvements (reliability assessment, DER forecasts etc
- WEM ESOO Survey
- Developed peak demand and operational consumption forecasts using in-house forecasting models

Changes to the RC Processes

Benchmark Reserve Capacity Price function transferred to ERA from 1 July 2021.

Frist mandatory EOI process for new Facilities and Facility Upgrades

- Volume of EOIs increased (~10-fold from previous RC Cycles).
- Increased complexity to process EOI's

The RCM portal was re-built to incorporate the changes to RCM pricing and accommodate DSM Reserve Capacity Security.

Introduction of Indicative Facility Class and Indicative Technology Type Assessments including Energy Storage Resources.

2021 RC Cycle timeline modified.

Electric Storage Reserve Obligation Intervals published

Expression of Interest (EOI) process

Technology Type [A]	2022-23 Capacity Year	2023-24 Capacity Year
Total No. of Submissions	3	29
Intermittent Generating Systems (MW)	165	84
Non-Intermittent Generating Systems (MW)	29	15
Electric Storage Resources (MW)	-	196
Non-Dispatchable Load (MW)	-	5
Potential capacity provided by EOIs [B]	62	301

A. The 2022-23 Capacity Year only had Facility Types which included Intermittent Generators, Non-Intermittent Generators, and DSM. The 2023-24 Capacity Year onwards has a Facility Class, and Technology Type.

B. The figures have been adjusted from the nameplate capacity figures provided by the project proponents to account for an estimate of the Relevant Level for Intermittent Generating Systems.

Reserve Capacity Year key updates

Reduction of Capacity Credits

- Alcoa_WGP

Notice of Closure

- Kwinana Cogeneration Plant (PPP_KCP_EG1) 1 Dec 2021
- PPP_KCP_IL1 1 Dec 2021

Return of Reserve Capacity Security

- YANDIN_WF1
- BADGINGARRA_WF1_UPG_1
- GREENOUGH RIVER_PV1_UPG_1

RCM WEMs Releases (RCM 1.20-1.24)

RCM 1.20 and WEMS 3.39

Release of the new Reserve Capacity Testing tool

RCM 1.21 – 1.23

Updates for the Settlement Enhancements project

RCM 1.24

RCM Portal updates for the opening of the 2021 Reserve Capacity Cycle CRC window

Updates to Wholesale Electricity Market Procedures (WEMP) - RCM

Electric Storage Resource Obligation Intervals

Indicative Facility Class and RCM Facility Class Assessment

Reserve Capacity Testing

Certification of Reserve Capacity for the 2021 Reserve Capacity Cycle

Facility Sub-Metering

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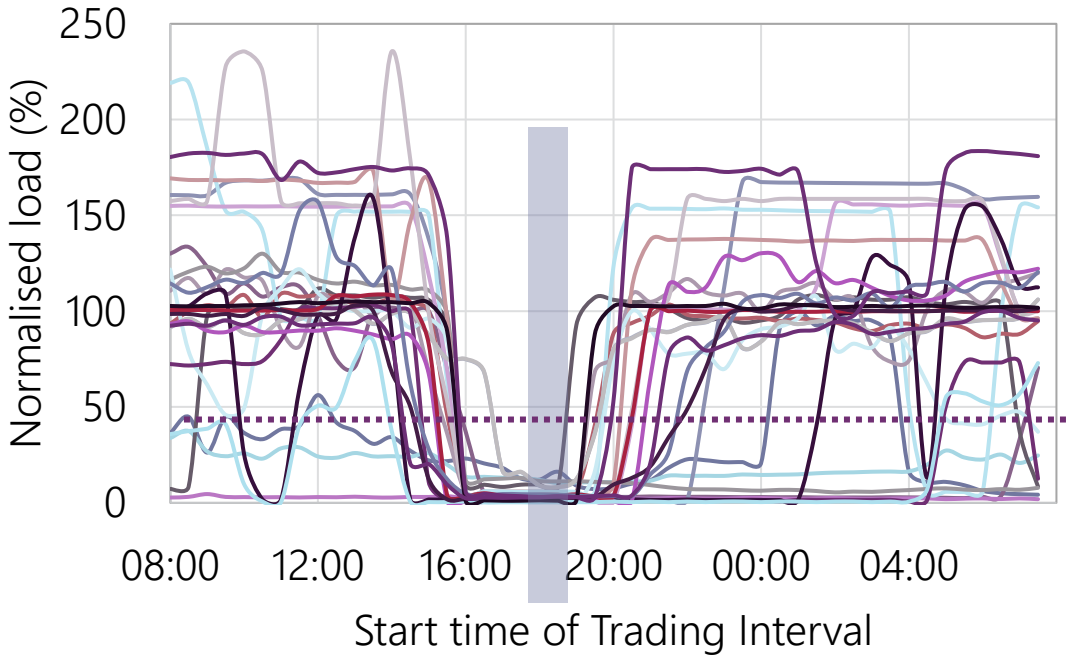
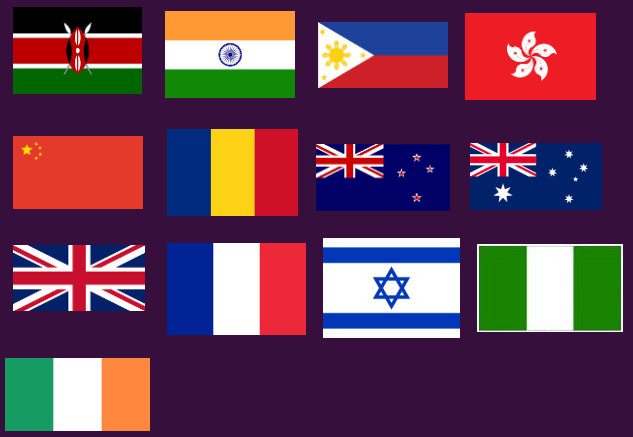
IRCR incentivising reduction during peak intervals

Date	8 Jan 2021
Peak demand (MW)	3,789
Trading Interval of peak demand	18:00-18:30
IRCR reduction (MW)	146
Estimated number of NMIs responded out of the sample	42 (8%)

Intraday normalised load[1] for NMIs that responded at least 9 of 12 Trading Intervals on 8 Jan 2021



1. Normalised load is calculated as the ratio of the consumption to baseline consumption



Statistician, Clean Energy Scientist, Environmental Scientist, Data Scientist, Environmental, Fluid/Mechanical/Industrial Engineers, Chemist, Nursing/Haul Truck Operator, Oceanographer, Economists, Health, Organisational Development/Strategy, Banking and Finance.

Questions and Feedback

Reserve Capacity

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For more information

please visit www.aemo.com.au

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