

WA Electricity Consultative Forum

22 February 2023



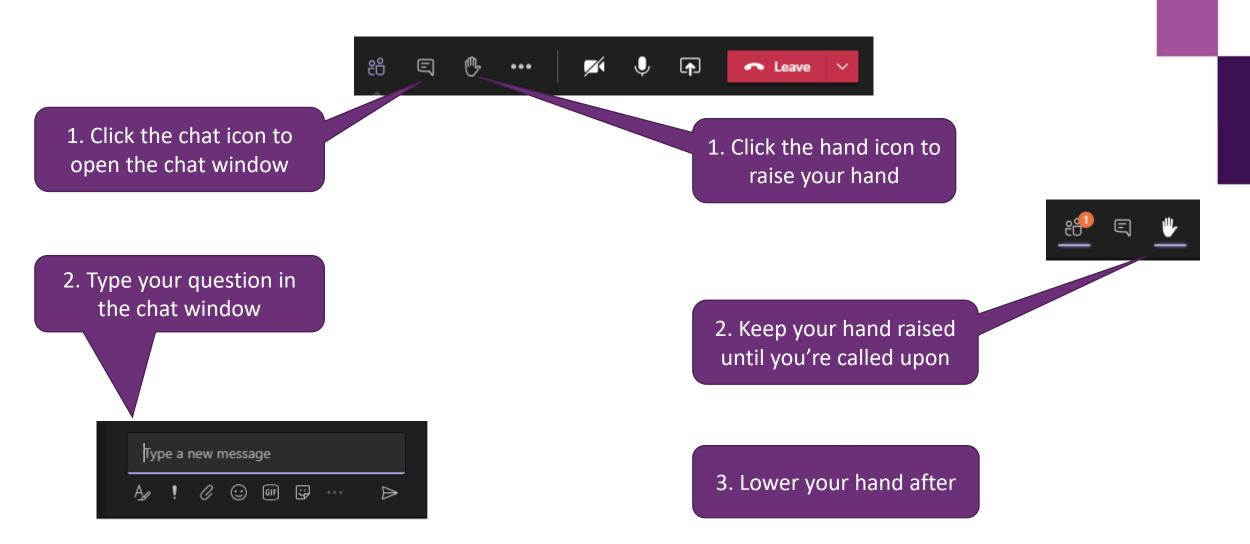


We acknowledge that this meeting is being held on Aboriginal land, the land of the Whadjuk people of the Noongar Nation.

We pay respect to their Elders past, present and emerging.



Join the Discussion and Teams





Agenda

Item	Time	Item	Speaker
1.	1.00pm – 1.05pm	Welcome and Minutes (7 December 2022)	Chair
2.	1:05pm – 2:15pm	AEMO Operational Updates	
		2.1. Power System update	David Lai (AEMO)
		2.2. Non-Co-optimised Essential System Services (NCESS) update	Toby Price (AEMO)
		2.3. Reserve Capacity update	Neetika Kapani (AEMO)
		2.4. Quarterly Energy Dynamic Report insights	Jennie Arts (AEMO)
3.	2:15pm – 2:30pm	AEMO Project Updates	
		3.1 WEM Reform Program update	Andrew Smith (AEMO)
		3.2 AEMO WA DER Roadmap update	Tom Butler (AEMO)
4.	2:30pm – 2:45pm	Allowable Revenue and Forecast Capital Expenditure (AR6) in-period submission update	Martin Maticka (AEMO)
6.	2:45pm – 2:50pm	Other Business	
7.	2:50pm	Next Meeting – 19 April 2023	Chair

^{*}Please note this meeting will be recorded for minute production



Power System Update

Presented to WA Electricity Consultative Forum

By David Lai, Planning Engineer - WA Operational Planning

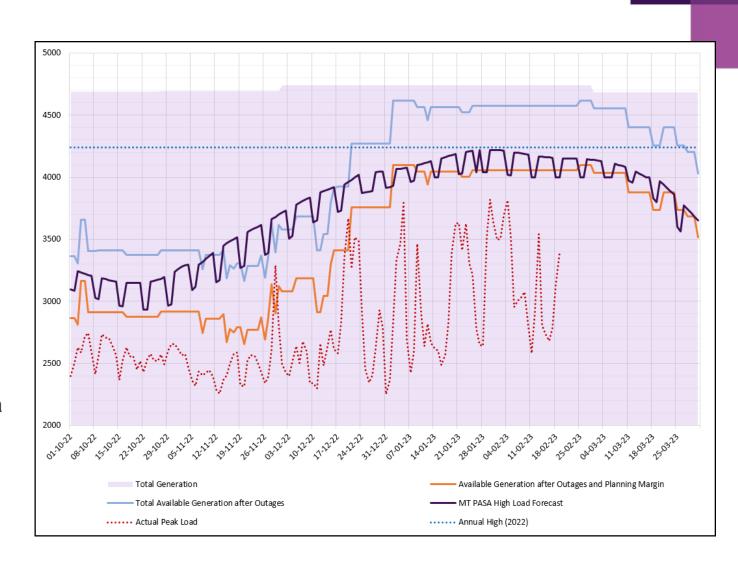
22 February 2023



Conditions improving in the SWIS



- Volume of outages has reduced and reserves are back to more balanced level when looking across the planning horizon.
- Relatively mild weather conditions
 throughout summer have resulted in loads
 that have not reached forecast 10% PoE
 loads, that typically occur during extreme
 weather events such as heatwaves.
- Coal preservation is a key focus of the industry, but pressure is easing on this front.
- Dispatch of the SWIS fleet has returned to a more normal profile, similar to that prior to tight supply vs demand issues.
- LOR factsheet published to the AEMO website.



LOR Factsheet

FACTSHEET December 2022



Lack of Reserve (LOR) Dispatch Advisories

Globally, power systems are built and operated with an extra level of reserve energy a 'buffer' - available to assist with maintaining Power System Security and Reliability for energy consumers.

Pre-determined reserves in Western Australia's power systems refer to the spare capacity to provide this buffer, over and above the level of electricity demand that is forecast at any given time.

As the system operator, **AEMO** has several processes and arrangements in place to mitigate risks to energy supply when the system is affected by LOR conditions.



What causes LOR conditions?

A combination of planned and unplanned events can impact available resources, causing a depletion of electricity reserves:



Extreme weather events such as heatwaves, bushfires, floods, and storms



High demand



Generation and/or infrastructure outages, or critical infrastructure maintenance



Fuel shortages

LORs are categorised over three tiers

When there is a supply and demand imbalance, AEMO takes proactive steps to manage reserve shortfalls and communicates this by issuing LOR Dispatch Advisories.

LOR in Western Australia (WA)

AEMO has implemented the LOR notification framework in the WEM from December 2022 to improve communication related to tight operating conditions. Specific assumptions are used to forecast LOR conditions. Actual LOR outcomes may be different to what is predicted.

What is an LOR condition?

AEMO assesses the probability of a shortfall in available capacity to maintain the planning margin on a daily basis. If specific LOR conditions are identified, WA Market Participants may be notified accordingly by way of Dispatch Advisories to provide additional situational awareness and to support their preparations to respond to the tight period.

The planning margin is the buffer of reserves AEMO carries to operate the SWIS securely. It is forecast 24 hours in advance and monitored in real time to determine if an LOR condition exists or is likely to exist in the future.



LOR 1

This condition exists when reserve levels are lower than the amount required to cover the loss of the largest generation contingency and to maintain adequate reserves to respond to losing the second-largest generator on the South West Integrated System (SWIS). LOR 1 signals when there is a shortfall in meeting the planning margin and a contingency at this level may result in a shortfall of reserves.

At this level, AEMO will manage the power system as normal and no impact to Power System Security or Reliability is expected.

AEMO will continue to monitor reserve levels to maintain adequate supply. No Dispatch Advisory will be issued.



LOR 2

Signals a tightening of electricity supply reserves. This condition exists when reserve levels are lower than the amount required to cover the loss of the largest generation contingency on the SWIS. At this level a contingency over the evening peak may result in automatic under frequency load shedding.

At this stage, there is no impact to the power system, but supply could be disrupted if a large contingency occurred.

Under LOR2 conditions, AEMO would direct available capacity, including generators and demand side response, to improve the supplydemand balance.



LOR 3

Signals a deficit in the supply/demand balance. This condition exists when the available electricity supply is equal to or less than the operational demand. This means there are no reserves available.

Once all available capacity has been dispatched, manual load shedding may be required as a last resort to protect system security and prevent long-term damage to system infrastructure. If a contingency occurs, automatic under frequency load shedding may eventuate.

AEMO will take necessary actions to manage power system security under each of these conditions, taking into account the actual events on the system. Dispatch Advisories will be sent out accordingly.



SRC Activation



Supplementary Reserve Capacity has been activated twice over summer. LOR 2 notifications were sent out on both occasions:

30/01/2023:



- \$254,554.17



- 64.7 MW activated

20/02/2023:



- \$TBC



- 87.5 MW activated

Factors contributing to the decision to activate SRC:



Facility availability



High forecast demand



High Temperatures



Uncertainty in renewable output



Questions and Feedback

<u>wa.sm.operations@aemo.com.au</u>



Non-Co-optimised Essential System Services (NCESS)

Procurement of Reliability Services 2024/25 2023

Presented to WA Electricity Consultative Forum

By Toby Price, Manager - WA Future System & Design



NCESS for Reliability 2024/25



AEMO has identified risks which may prevent it operating the SWIS securely and reliably at both peak and minimum demand from October 2024 unless new services are procured.

- The services AEMO is procuring are:
 - Up to 830 MW of peak capacity; and
 - 269 MW of minimum demand service.
- Each service will carry availability obligations for the relevant Dispatch Intervals:
 - Peak demand intervals specified in the WEM Rules as Electric Storage Resource Obligation Intervals (16:30 to 20:30); and
 - Minimum demand intervals between 10:00 and 14:00 unless modified by AEMO.
- The contract for the proposed NCESS services would start from 1 October 2024 1 December 2024 with a 2-year duration:
 - Feedback from the Expressions of Interest process has helped AEMO to understand any
 economic or technical benefits associated with a longer contract duration or a change to the start
 date.





1 February 2022: Tranche 5 WEM Rules for the NCESS framework commenced

9 December 2022: AEMO submitted a Trigger request to the Coordinator of Energy to trigger NCESS for Reliability

16 December 2022: the Coordinator determined to trigger the NCESS procurement, with AEMO to undertake the procurement and contracting

20 December 2022: AEMO released the call for Expressions of Interest

20 January 2023: Expressions of Interest process closed

20 February 2023: Call for NCESS Submissions (Tender phase)

21 March 2023: Close of Call for NCESS Submissions

April 2023: Selection and Contracting

Further detail available here:

https://aemo.com.au/consultations/tenders/tenders-and-expressions-of-interest-for-ncess-reliability-services-wa





AEMO received a strong response with quantities of offers exceeding requirements for both the Peak Demand Service and Minimum Demand Service.

AEMO received offers from:

- DER Aggregators
- Demand Response
- New Scheduled and Semi-Scheduled Generation
- Scheduled Facility Upgrades

Following stakeholder feedback AEMO is making a range of changes to the NCESS Service Specification to reflect the capabilities of proponents.



Service Specification

Reliability Services

Peak Demand Service



The Peak Demand Service is an NCESS (measured in MW of response capability) to increase Injection or decrease Withdrawal.

The service may be provided by:

- New or Upgraded Scheduled or Semi-Scheduled Facilities, for Service Quantities not holding Capacity Credits in the 2022/23 or 2023/24 Capacity Years.
- Unregistered Equipment (which are not required to register under the WEM Rules).

Registered Facilities are paid for availability (analogous to Capacity Credits) to make themselves available in the Electric Storage Resource Obligation Intervals (currently set as 16:30 – 20:00).

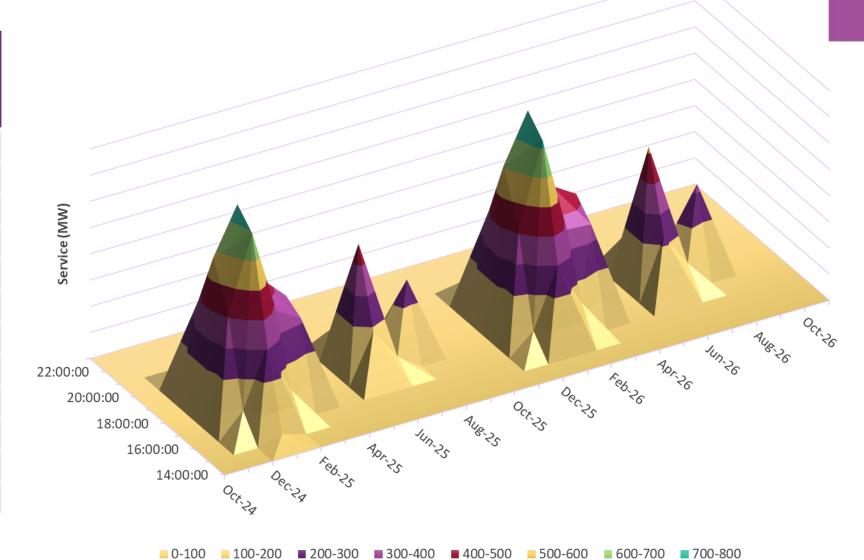
Registered Facilities do not receive activation payments.

Unregistered Equipment are paid for both availability in ESROI intervals and for activation by AEMO.



Peak Demand Service Requirement

Hour	2024 Capacity Year (Hours)	2025 Capacity Year (Hours)
12:00:00	0	0
13:00:00	0	0
14:00:00	0	0
15:00:00	1	0
16:00:00	7	7
17:00:00	23	24
18:00:00	28	30
19:00:00	12	15
20:00:00	2	2
21:00:00	0	0
22:00:00	0	0
23:00:00	0	0



Minimum Demand Service



The Minimum Demand Service is an NCESS (measured in MW of response capability) to decrease Injection or increase Withdrawal.

The service may be provided by:

- New or Upgraded Scheduled or Semi-Scheduled Facilities.
- Unregistered Equipment (which are not required to register under the WEM Rules).

The service must be made available between 10:00 – 14:00, unless the intervals are revised by AEMO (process will be specified contractually but will not exceed 4 hours).

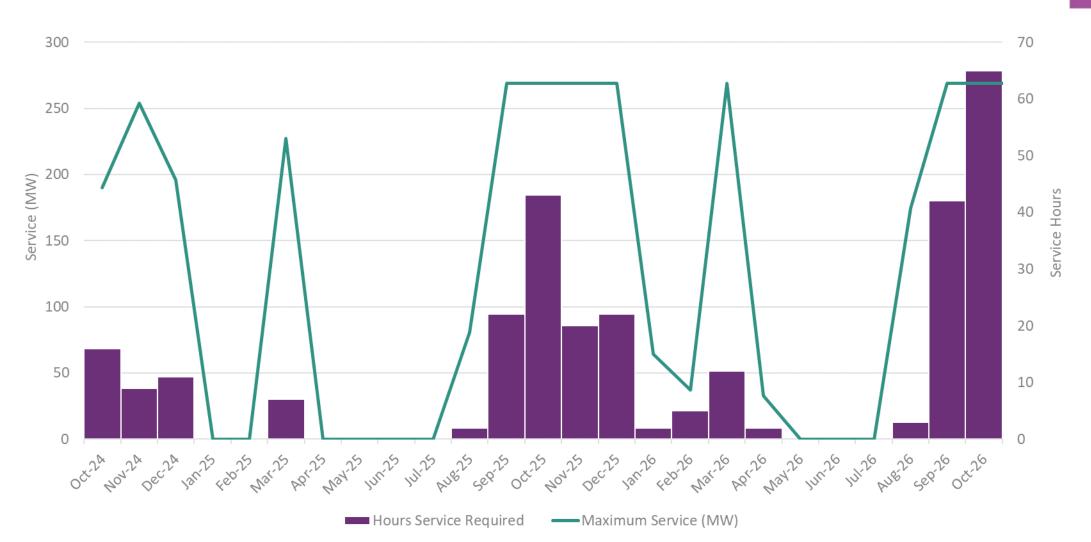
Registered Facilities are paid for availability to make themselves available to Withdraw.

- Registered Facilities do not receive activation payments.
- Registered Facilities would not be eligible to reduce Injection.

Unregistered Equipment are paid for both availability and for activation by AEMO.



Minimum Demand Service Requirement





Service Specification Changes

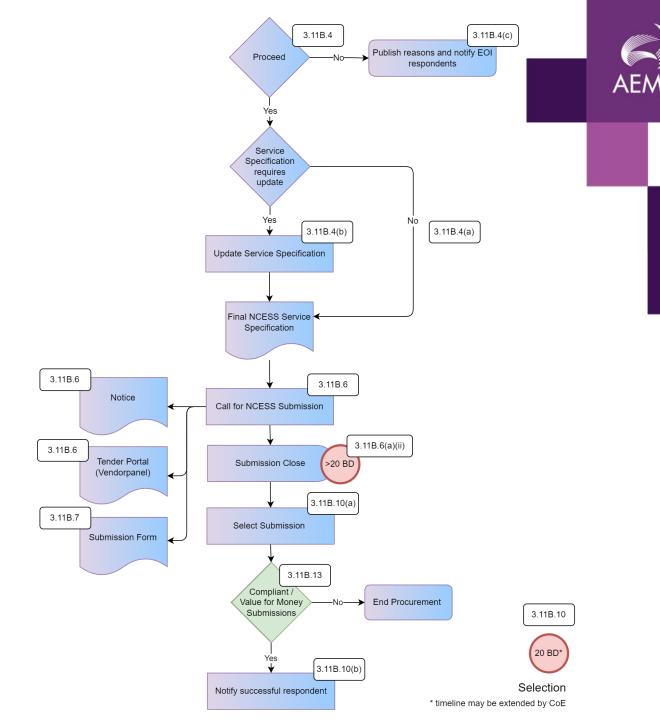
As a result of feedback and further analysis, AEMO has amended the Service Specification.

Key changes include:

- 1. Including Maximum Service Quantities.
- 2. Varying the Minimum Demand Service obligation hours to 10:00 14:00 hrs, but allowing AEMO to vary.
- 3. Amending security provisions.
- 4. Indicating preferred baselining methodology (based on CAISO 10 of 10).
- 5. Amending unavailability to exclude approved Outages.
- 6. Adding Progress Reporting obligations.

Next Steps

- Call for NCESS Submissions:
 - Notifying proponents in writing
 - Vendor Panel Tender release
- Opens 20 February 2023
 - 20 Business Days
- Close 21 March 2023
- Selection within 20 Business Days
- Notification to successful respondents in writing



Next Steps (cont'd)

- Critical elements of the Call for NCESS Submissions to inform AEMO's determination under 3.11B.9:
 - Offers must comply with the NCESS Service Specification (3.11B.10(a))
 - Proponents must provide evidence to support NCESS delivery dates (3.11B.10(b)(i))
 - Proponents must evidence sufficient Environmental Approvals have been granted (3.11B.10(b)(ii))



- 3.11B.8. An NCESS Submission must:
 - (a) be made in good faith;
 - (b) be made in accordance with the NCESS Submission form referred to in clause 3.11B.7 and contain any other information requested; and
 - (c) include the cost information and any assumptions used to calculate the proposed NCESS payment structure.

Selection process and signing of NCESS Contract

- 3.11B.9. Within 20 Business Days, or as reasonably agreed with the Coordinator, of the closing date for NCESS Submissions, AEMO or the Network Operator, as applicable, must:
 - in accordance with clause 3.11B.10, select one or more NCESS Submissions which:
 - comply with the requirements in clause 3.11B.7;
 - meet the NCESS Service Specification published in the request for NCESS Submissions; and
 - iii. in AEMO's or the Network Operator's reasonable opinion, as applicable, will result in the highest value for money for providing the NCESS; and
 - notify the relevant Market Participant or service provider that their NCESS Submission has been selected.
- 3.11B.10. Subject to clause 3.11B.12, when determining which NCESS Submissions to select under clause 3.11B.9, AEMO or the Network Operator, as applicable, must:
 - (a) exclude NCESS Submissions that do not comply with the NCESS Service Specification; and
 - (b) exclude NCESS Submissions for new facilities or equipment where:
 - i. insufficient evidence has been provided to support NCESS delivery dates; or
 - ii. sufficient Environmental Approvals have not been granted.

Questions and Feedback

wa.marketdevelopment@aemo.com.au





Reserve Capacity Update

Presented to WA Electricity Consultative Forum

by Neetika Kapani, Manager, Reserve Capacity (WA) AEMO

22 February 2023



Announcements & reminders



2022 Reserve Capacity Cycle

14 February

• The 2022 Certified Reserve Capacity (CRC) window closed at 5:00 pm and AEMO is currently assessing applications received.

14 April

AEMO notifies CRC assignments for the 2022 RC cycle by 5:00 pm.

2023 Reserve Capacity Cycle

1 March

- The 2023 Expressions of Interest window closes.
- Proponents and Market Participants are required to submit an EOI for new capacity and upgrades. AEMO encourages an EOI submission as soon as possible to avoid missing out on participating in the 2023 CRC process. This includes Facilities that will have a NCESS contract.

14 April

- The 2023 CRC window opens at 9:00 am.
- Participants are encouraged to engage with the RC team for any CRC related queries in advance of this date.



Announcements & reminders cont.

The 2023 WEM Electricity Statement of Opportunities (ESOO) activities are progressing well with procurement activities completed.

Early April

- Forecasting Reference Group (FRG) session where AEMO will share:
 - the draft electricity consumption and demand forecasts, including the inputs, assumptions, and scenarios.
 - the reliability assessment inputs, assumptions, and methodology.

Late April

Presentation of draft reliability assessment results.

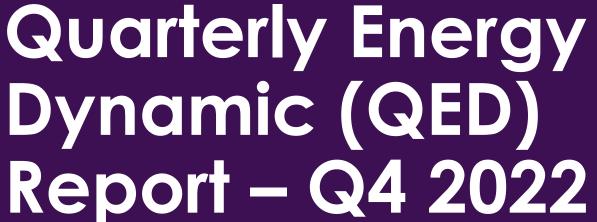
Other items to note for the 2022-23 Capacity Year

- Summer RC testing process is underway.
- Review of the Supplementary Reserve Capacity (SRC) process for the 2022-23 Capacity Year is underway by the Coordinator of Energy.

Questions and Feedback

wa.capacity@aemo.com.au







Presented to WA Electricity Consultative Forum

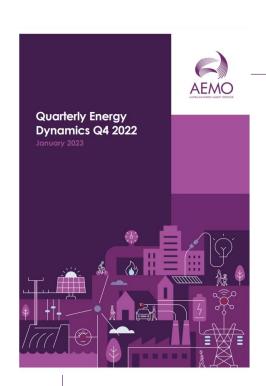
By Jennie Arts, Market Analyst, WA Market Operations & Support

22 February 2023



Overview





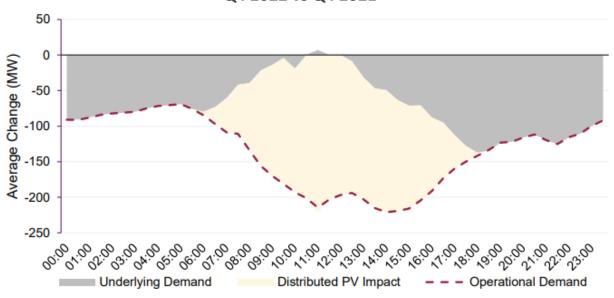
The Q4 2022 QED was published on 25 January 2023. Key insights include:

- A new minimum operational demand record and a new maximum DPV generation output record.
- Several renewables records.
- Weighted average Balancing Price at an all time quarterly high and new record for maximum Balancing Price.
- All-time lowest quarterly average coal-fired generation.
- Increase in gas production and gas demand for electricity generation.

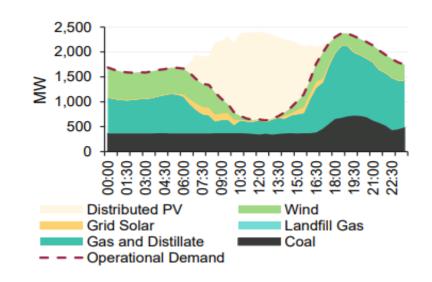




Change in average WEM demand components by time of day – Q4 2022 vs Q4 2021



Fuel mix by trading interval on the record minimum operational demand day



- A Increasing Distributed PV (DPV) output in the SWIS continues to reduce operational demand during the middle of the day.
- **B** Milder temperatures in November and December caused a decrease in cooling related demand which resulted in a lower underlying demand*.
- **C** A new minimum operational demand record of 626 MW was observed during the 1230-1300 hrs interval on 16 October 2022.

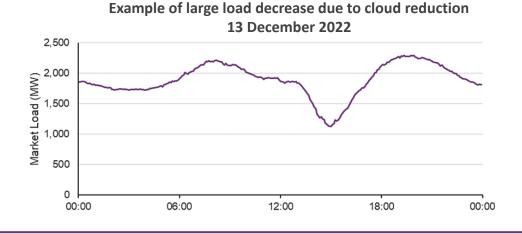


Challenges over the shoulder season

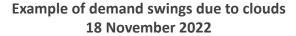
> Low load management

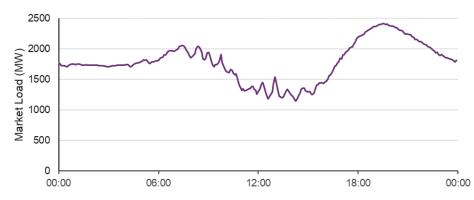
- AEMO implemented a Minimum Demand Threshold (MDT) for the first time to ensure the power system
 operates securely and the right level of Ancillary Services is maintained during low load periods.
- Generation dispatch profiles were reconfigured during low load days during Q4 2022, but no additional intervention (like ESM) was required.

> Rapid demand swings



A Market load decreased by 390MW (21%) from 1300hrs to 1400hrs due to sudden cloud reduction (increase in DPV output)



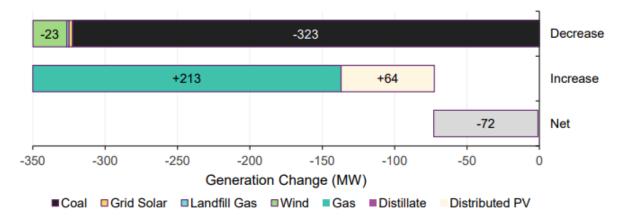


- A Multiple rapid demand swings caused by sudden changes in cloud coverage.
- **B** Instantaneous market load decreased by 320MW from 1230hrs to 1300hrs and then increased again by 330MW from 1300hrs to 1330hrs.

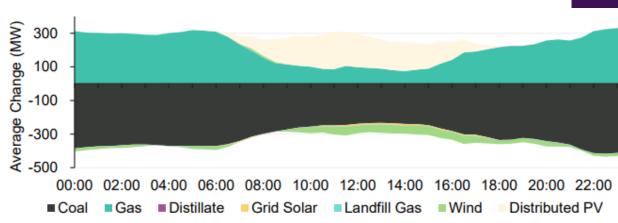








Average WEM change in fuel mix by time of day – Q4 2022 vs Q4 2021

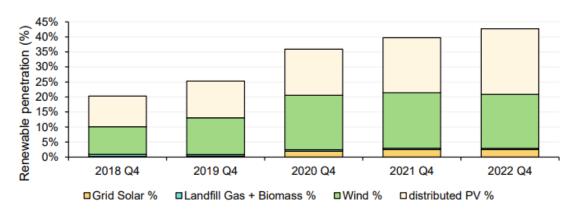


- A Coal-fired generation reached an all-time low quarterly average, decreasing by 42% from Q4 2022. The reduction was observed across all times of the day and was driven by reduced facility availability.
- B Gas generation increased by 35% on average, with increases across all times of the day, resulting in gas generation being the primary fuel of Q4 2022.
- **C** Estimated DPV reached an all-time high quarterly average, increasing by 15% from Q4 2022. The increase was observed in the middle of the day and it is linked to the increase of PV installed capacity in the SWIS.

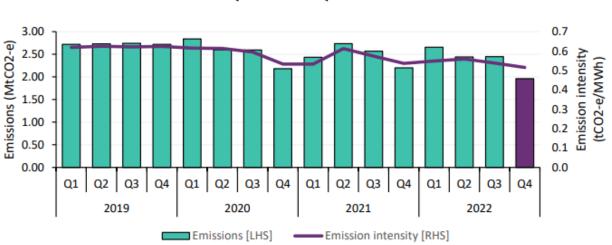


Renewable penetration & emissions





Quarterly WEM emissions and emission intensity - Q1 2019 to Q4 2022

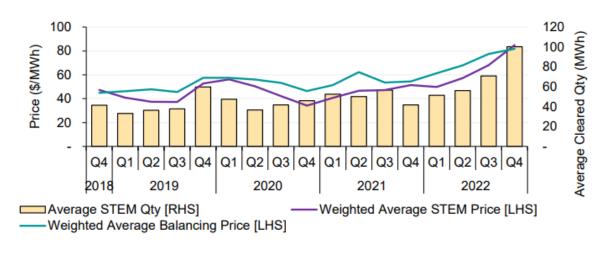


- A Renewable penetration in Q4 reached an all-time record quarterly value of 42.7%.
- B Several instantaneous records occurred during the quarter with the latest one of 84.3% on Monday, 12 December 2022 across the 1100 11:30 hrs trading interval.
- C Increasing renewable penetration and change in fuel mix resulted in a decrease in SWIS carbon emissions, reaching 1.94 MtCO2-e in Q4 2022.

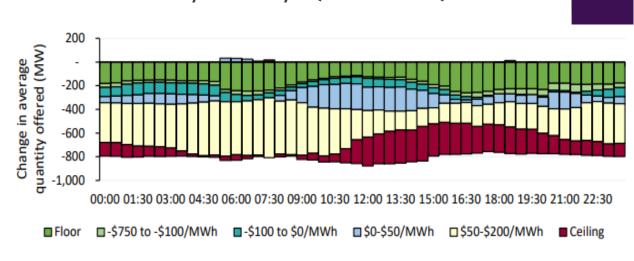




WEM weighted average Balancing Price, STEM Price and quantity cleared in STEM – Q4 2018 to Q4 2022



Change in average Balancing Merit Order structure by time of day – Q4 2022 versus Q4 2021



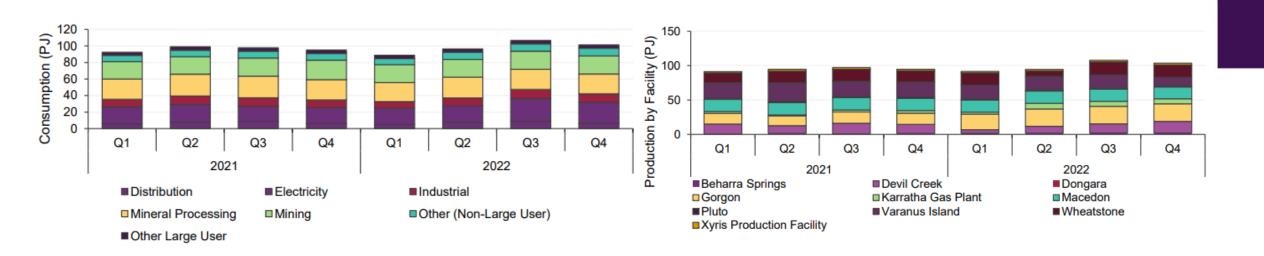
- A The weighted average Balancing Price in the WEM for Q4 2022 was \$81.80/MWh, the highest quarterly average of all time.
- **B** Decrease in the average quantities offered in all price bands in the Balancing Market.
- C The weighted average STEM Price was \$84.87/MWh. The quarterly average quantity of energy cleared in STEM in Q4 2022 was the largest of all time. This was mainly driven by increased participation in STEM during the quarter.







WA quarterly gas production by facility – Q1 2021 to Q4 2022



- A Gas consumption in the WA domestic gas market increased by 7% from Q4 2021.
- B Gas production increased by 9% from Q4 2021.

Questions and Feedback

wa.operations@aemo.com.au





WEM Reform Program Update

Presented to WA Electricity Consultative Forum

By Andrew Smith, Program Director, WEM Reform, WA

22 February 2023



WEM Reform Program Status Update | February 2023



Overall Status

Following a full program review, AEMO has increased confidence in achieving the 1 October 2023 go live date. Whilst scope and schedule have been resolved, additional funding is expected to be required and the Program status will remain as **red** until budget is resolved.

Key Activities This Period

- Procedures: Presented on Verification of Dispatch Inflexibility WEMP (9 Feb) and Outage Management WEM Procedure No.2 of 3 (24 Jan); consulted on WEM Submissions (RTMS) and Real-Time Market Timetable WEMPs
- System Development: Highlights include:
 - RCM: Testing in progress for RCM NAQ (RCM Phase 2) on track for 5 April release.
 - STEM: Completed development of STEM Auction.
 - API Management: Commenced internal testing of code changes to integrate new certificate type with legacy systems for external APIM – on track to support March MPT releases.
 - System integration: Commenced internal testing of Release 2 incorporating functionality required for Phase 2 of Market Trial.
- Market Trial & Transition:
 - Commenced drafting Cutover Plan
 - Republished Industry Testing and Transition Strategy
 - Briefed WRIG on additional details of Market Trial management approach
 - Completed Market Readiness Survey No.7
- Financial
 - Commence preparation of 'in-period' submission to ERA to seek additional funding

Focus For Next Period

- Procedures: Present on MT PASA; Individual Reserve Capacity Requirements (IRCR); Monitoring and Reporting Dispatch Compliance; Network Modelling; Outages and Transitional Registration. Consult on Dispatch Algorithm; Adjustment of Real-Time Inputs; ESS Quantity Determination Methodology; and Power System Security.
- System Development: Progress work including:
 - RCM: Place RCM NAQ release into pre-production.
 - RTMS: Complete final release to MPT (est. 6 March).
 - WEMDE UI: Complete a release to MPT (est. 15 March).
 - Outage Management: Complete final release to MPT (est. 5 April).
 - Forecast Integration: Complete deployment pending review of outstanding item with vendor (April).
 - STEM: Complete development of Bilateral Submission & Report functionality and STEM Submission & Report functionality (est. end March)
 - System integration: Complete internal testing of Release 1 ready to commence Market Trial Phase 1.
- Market Readiness Reporting: Complete Report No.7 (late Feb / early March).
- Market Trial & Transition:
 - Finalise and publish Test Packs for Market Trial Phase 1
 - Progress cutover planning and draft Go-Live Decision Framework.

Stakeholder Engagement

WRIG 23 Feb Market Readiness Survey Report early March

WRIG 9 March WRIG 16 March Industry Testing
Forum
Mid March (TBC)

WRIG 23 March

Questions and Feedback

wa.ets@aemo.com.au





WA DER Program Update

Presented to WA Electricity Consultative Forum

Tom Butler, Manager WA Distributed Markets

22 February 2023



WA Distributed Markets February 2023



Our vision: Enabling distributed energy resources and new technologies to be an integral part of the SWIS through the WEM by supporting security and reliability, as we move towards a 100% instantaneous renewable energy power system.

Project Symphony

For controlled energy and network services to be provided from the aggregation. Focus over Q1 will be on enhancing capability and refining control and optimisation.

DER Participation

VPP Visibility Guideline publication.

Technology Integration

AEMO focus has been on inverter standards and compliance from a national perspective, with ongoing effort and engagement via Energy Policy WA. DER compliance arrangements will be a focus for the DER Orchestration Roles and Responsibilities project, led by EPWA.

DER Register

- ➤ DER Register procedure consultation completed. Three submissions were received, and the final procedure is planned for March release. System changes are presently being reviewed, and development of technical specifications for Network Operators is underway.
- > AEMO proposes to retain the targeted commencement date of 2 October 2023.



WA DER Market Participation Forum:

- 14 March 2023

Register your interest:

WADERProgram@aemo.com.au

View previous presentations on our forum webpage:

WA DER Market Participation Forum

Questions and Feedback

WADERProgram@aemo.com.au





AEMO's in-period capex submission

Presented to WA Electricity Consultative Forum

By Martin Maticka, Group Manager, WA Market Development

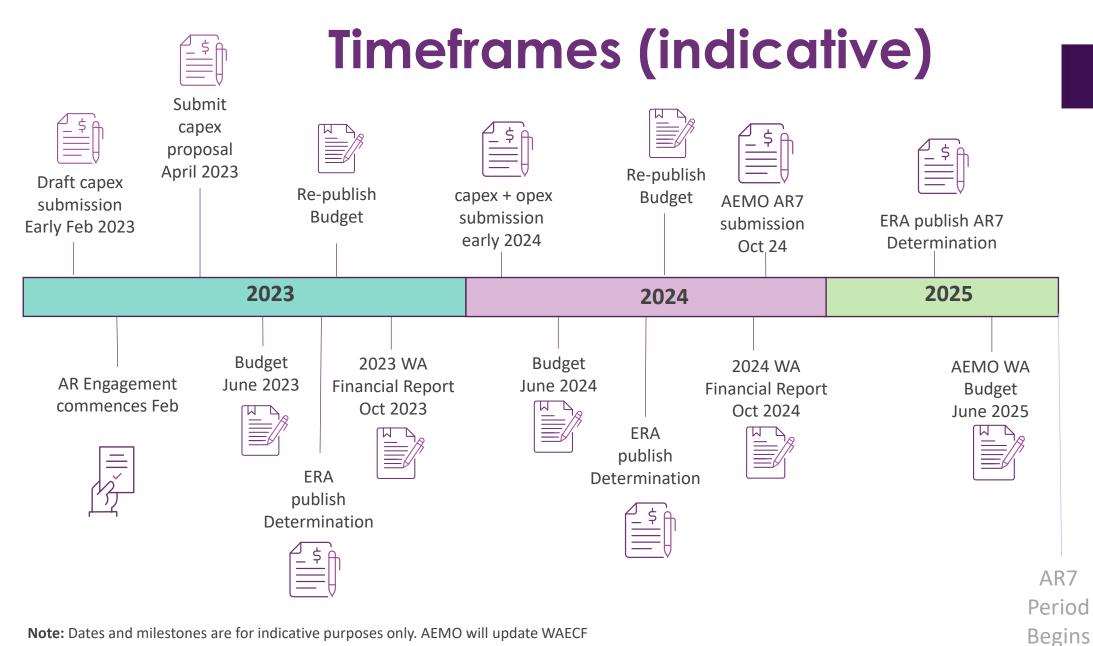
22 February 2023



Agenda

AEMO

- 1. Timing
- 2. High-level scope
- 3. Drivers of AEMO's in-period capex submission
- 4. WEM reform implementation
- 5. WEM and GSI sustaining capex
- 6. Market participant and consumer impacts











- This submission
 - WEM Reform Implementation 1 October 2023 + delayed projects
 - WEM & GSI sustaining capex projects
- Longer-term possible scope for next capex/opex submission
 - Ministerial Principles
 - Project Eagle
 - RCM Reform
 - Cost Allocation Review
 - 5-minute settlement
 - DER implementation
 - Cyber



Drivers of our in-period capex submission

- We forecast capex funding will be exhausted as early as end 2023, leaving insufficient capital to support existing and new projects.
- Drivers of higher than expected capex include:
 - WEM Reform implementation will exceed contingency
 - Higher inflation than forecast
 - Higher labour costs than forecast
 - Further developed & new WEM & GSI sustaining capex projects





- An extensive review was undertaken of the WEM Reform implementation program to ensure the MVP can be delivered by 1 October and identify potential cost savings.
- Changes were made to project scheduling, including projects:
 - to be delivered in full by 1 Oct '23
 - delayed implementation post 1 Oct '23
 - aspects delivered pre/post 1 Oct '23
- Restructured existing scope to reflect timing changes, but there are no new initiatives.



WEM & GSI sustaining capex

- Predominately new projects implemented at a national level with a WA cost share.
- Some projects were still in their infancy during AR6 process, others are new since AR6.
- Project examples include end of life IT assets, finance system replacement, HR system replacement.
- Cost allocation to electricity and gas.
- Trucked LNG Rule change Small GSI implementation project.



Market Participant and Consumer impacts

- AEMO expects that in-period submissions will occur more frequently, due to the pace of change in the sector, coupled with the requirements for a high degree of funding certainty under the AR process.
- Market Fees are adjusted post determination and are based on metered generation / consumption.
- Capex is recovered based on depreciation schedules for relevant assets, commencing from when each asset enters service (e.g. October 2023 for new WEM systems).
- AEMO's submission is undergoing internal verification and approval, with values to be provided shortly.

Questions and Feedback

waelectricityforum@aemo.com.au





Upcoming Forums and Working Groups

WEM Reform Implementation Group (WRIG) 23 February 2023

WA DER Market Participation Forum 14 March 2023

WA Electricity Consultative Forum (WAECF) 19 April 2023



For more information visit

aemo.com.au