Real-Time Market Insights Forum

21 May 2024

Hosted by the WA Real-Time Market Monitoring Team

Please send questions, feedback and ideas to:
wa.rtm@aemo.com.au

Disclaimer

This material provides general information about the operation of the Western Australian Wholesale Electricity Market (WEM).

The information may be subject to specific exceptions or may not apply to particular circumstances.

To fully understand their obligations, participants should refer to the WEM Rules and WEM Procedures.

AEMO has taken all due care in preparing this material but accepts no liability for any errors it may contain.

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**:

- Ensure that discussions are limited to the matters contemplated by the agenda for the discussion
- Make independent and unilateral decisions about their commercial positions and approach in relation to the matters under discussion with AEMO
- 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:

- Which customers they will supply or market to
- The price or other terms at which Participants will supply
- Bids or tenders, including the nature of a bid that a Participant intends to make or whether the Participant will participate in the bid
- Which suppliers Participants will acquire from (or the price or other terms on which they acquire goods or services)
- 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.

Agenda

#	Item	Speaker
1	Investigation: Ongoing Available → In-Service Challenges	Adrian Pearce
2	Operational Update: WEMS User Role Caching	Douglas Birse
3	Investigation: SRC Overview	Lauren Ashby
4	Operational Update: Intervention Pricing	Douglas Birse
5	Operational Update: FCESS Clearing Price Ceiling + FCESS Cost Review Update.	EPWA

Investigation:

Ongoing Available → In-Service Challenges

Presenter	Adrian Pearce

Introduction

- **Issue:** The market has been experiencing periods of persistent high prices and ESS market shortfalls despite sufficient capacity to meet demand.
- **Root cause:** analysis has identified unit commitment, and a market reliance on Reference schedule forecasting as possible drivers of these market outcomes. *Note: this is not to say all periods of high prices and ESS market shortfalls are caused by these factors.*
- This section will dive into an example of one of these periods.

Selected intervals morning peak of May 14th

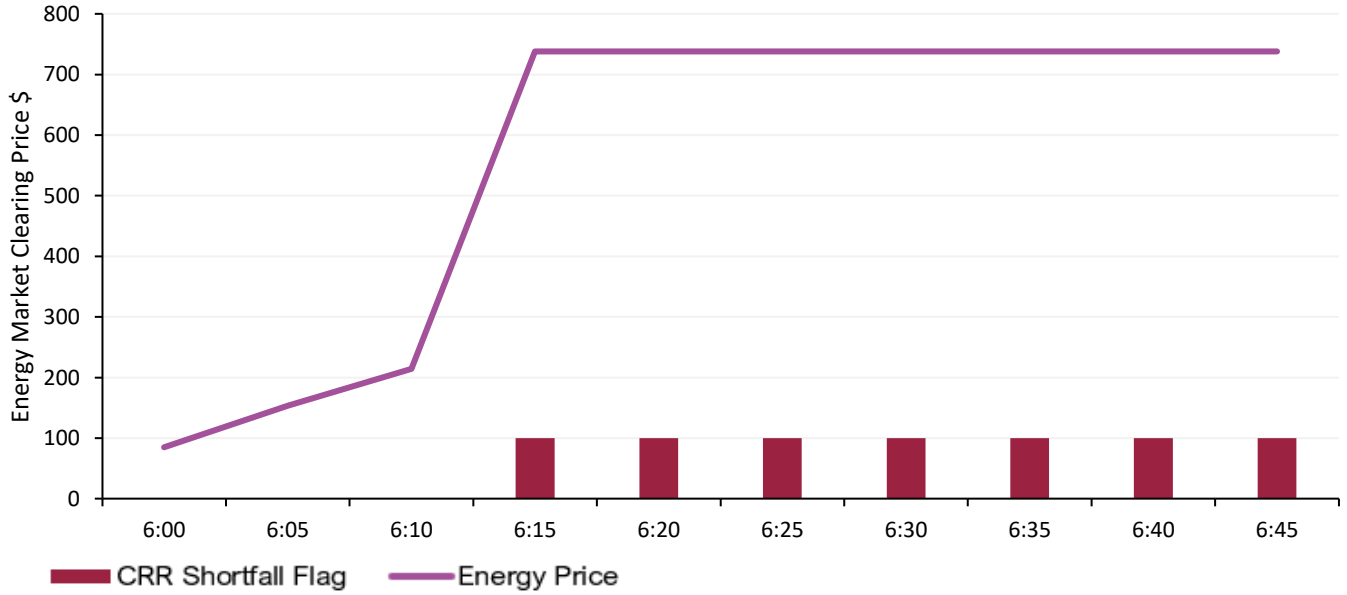
PDI

06:45 interval	6:00	6:05	6:10	6:15	6:20	6:25	6:30	6:35	6:40	6:45	6:50	6:55	7:00	7:05
Energy requirement	2025	2063	2076	2097	2115	2129	2167	2179	2180	2188	2223	2240	2258	2273
Energy Clearing Prices ($)	85	154	214	738	738	738	738	738	738	738	123	96	123	123
Market Shortfall	-	-	-	CRR	CRR	CRR	CRR	CRR	CRR	CRR	CRR	CRR	-	-

Actual

Forecast

Actual Market Outcomes



Selected intervals morning peak of May 14th

06:45 interval	6:45	6:50	6:55	7:00	7:05
Energy requirement	2188	2201	2217	2233	2248
Energy Clearing Prices ($)	738	738	738	206	123
Market Shortfall	CRR	CRR	CRR	-	-
NEWGEN_NEERABUP	-	-	-	50	81

Applicable RTMS example


```
{
  "dispatchIntervalFrom": 265,
  "dispatchIntervalTo": 265,
  "unconstrainedInjectionForecast": 0,
  "unconstrainedWithdrawalForecast": 0,
  "maxInjectionCapacity": 342,
  "maxWithdrawalCapacity": 0,
  "inflexibleFlag": "NO",
  "maxUpwardRampRate": 10,
  "maxDownwardRampRate": 10,
  "tranches": [
```

```
    "tranche": 7,
    "fuelType": "NON-LIQUID",
    "quantity": 171,
    "price": 123,
    "capacityType": "AVAILABLE",
    "noticeTime": 15
  },
  {
    "tranche": 8,
    "fuelType": "NON-LIQUID",
    "quantity": 159,
    "price": 126,
    "capacityType": "AVAILABLE",
    "noticeTime": 15
  },
  {
    "tranche": 9,
    "fuelType": "NON-LIQUID",
    "quantity": 12,
    "price": 660,
    "capacityType": "AVAILABLE",
    "noticeTime": 15
  },
```

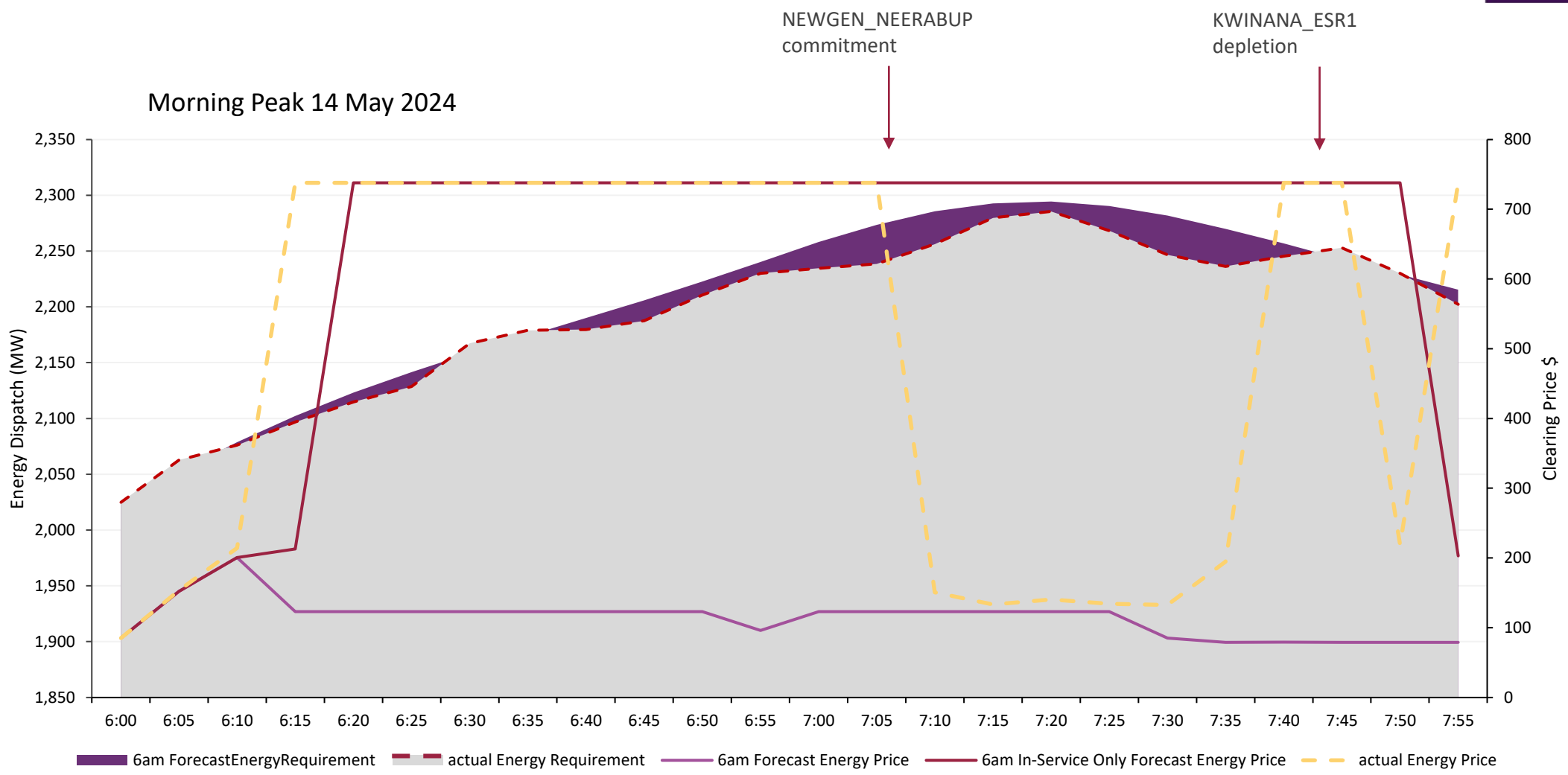
Reference scenario limitations

- The market signals provided by reviewing the Reference scenarios are not clear enough given the bidding and commitment behaviour that is often observed. This is due to inclusion of AVAILABLE quantities for dispatch.

- The In-Service Capacity Only Schedule **must** be reviewed by participants to provide a more realistic view of short-term forecasted market outcomes.

Key	Value
primaryDispatchIntervalFrom	2024-05-14T06:00:00.00%2b08:00
primaryDispatchIntervalTo	2024-05-14T06:00:00.00%2b08:00
categories	
dispatchScenario	InServiceCapacityOnly

Peak prices during Morning Peak 14 May 2024



Summary

Elevated market prices and regular shortfalls are being experienced due to Market Participants not responding based on the published market information.

Capacity Type bidding and notice times are resulting in a significant bias in the Reference scenario.

Review of the In-Service Only Dispatch Schedule should be undertaken to inform short-term commitment decisions.

Operational Update:

WEMS User Role Caching

Presenter	Douglas Birse

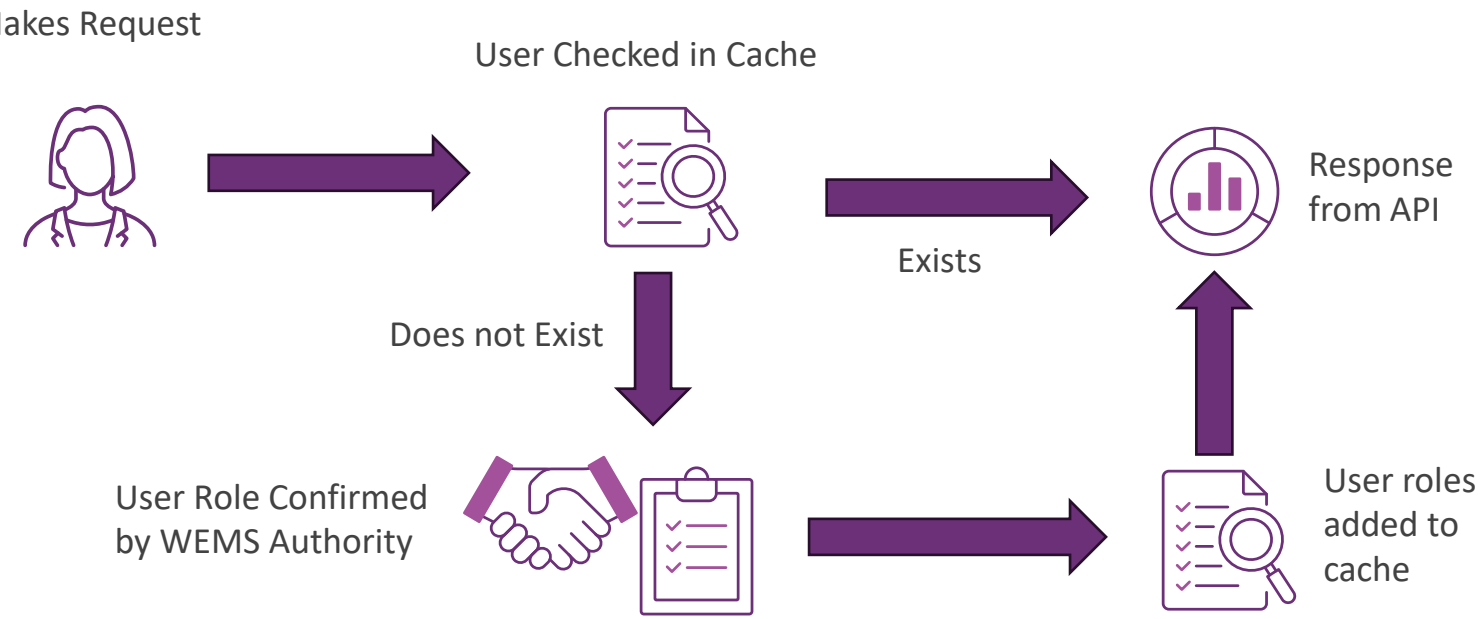
Background

- AEMO have implemented a change to their user authentication process
- This enables AEMO to carry out outages that include the WEMS Authority system
- A cache has been implemented that maintains user role privileges as returned by the WEMS Authority
  - Cached entries expire after 2 hours

IT System Change

Previous Process

New Process



User Role data stays in cache for 2 hours before expiring

Note: This example assumes the User has appropriate privileges assigned in WEMS User Roles

Market Participant Impacts

- User Roles may take **up to 2 hours** to become effective
  - This is for both additional roles and revoking roles
- During Production Deployments or Changes that require an outage to the WEMS Authority the following process will occur
  - Market Participants notified via Market Advisory
  - Cache cleared 30 minutes before outage
  - To maintain access, Market Participant **must** call a relevant API* between cache clearing and outage
  - Access to APIs will remain during outage to WEMS Authority

- The WEMS failover schedule for Wednesday 22nd May will allow Market Participants to observe this behaviour
- Questions on WEMS User Roles should be directed to WA Energy Market Management at wa.operations@aemo.com.au

**all APIs apart from STEM and Bilateral*

Investigation:

SRC Overview

Presenter	Lauren Ashby

Hot Season 2023-2024 SRC Quantities available

By mid 2023, AEMO had identified a potential shortfall of up to 326 MW for the 2023-24 Capacity Year. In accordance with Section 4.24 of the WEM Rules, AEMO may procure up to 326 MW of SRC to cover the shortfall.

The below table displays the Maximum Service Quantity (MSQ) procured by AEMO from SRC providers by Service Type.

Service Type	Hot Season 2023-2024 MSQ (MW)	Change from Hot Season 2022-2023 MSQ (MW)
Energy production (DER)	3.3	↓ -22.5 MW
Energy production (DSOC Uplift)	26.7	↓ -8.8 MW
Load reduction	120	↑ 110 MW
Total	**150 MW**	**↑ 78 MW**

SRC Historical

SRC was introduced in the WEM in 2008. It was not procured for in any of the Hot Seasons since then up until 2022.

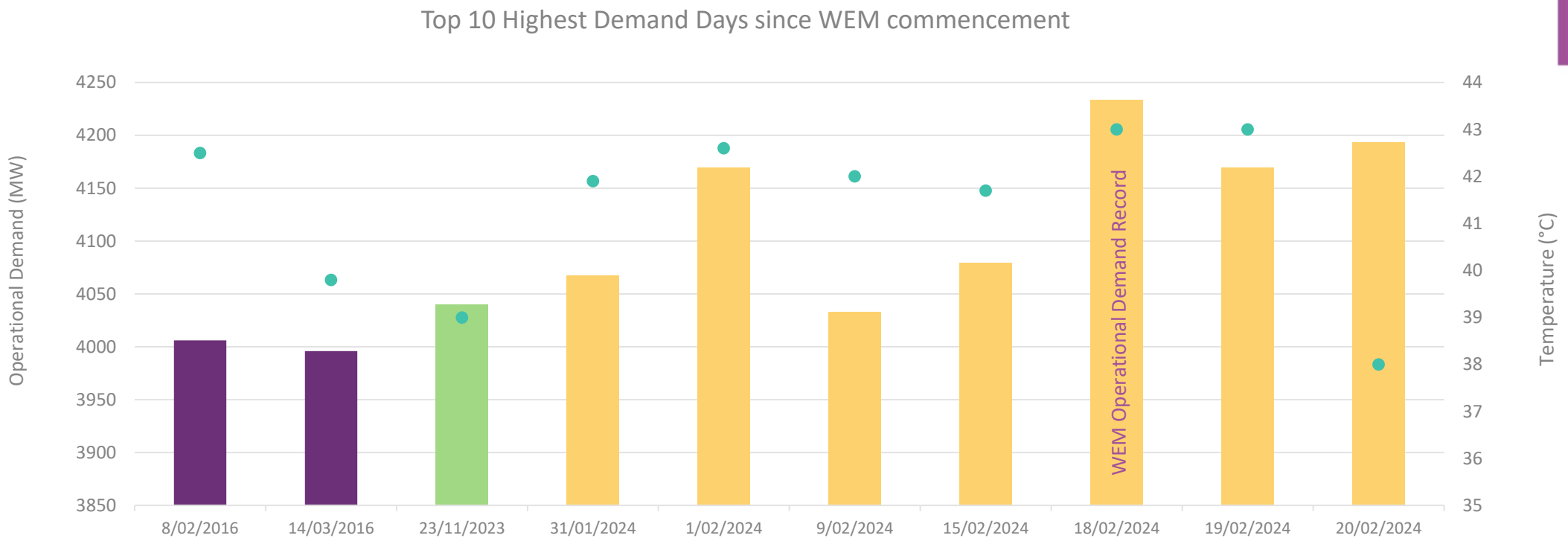
2 Activations in **2022-2023 Hot Season**

Driven by Facility unavailability

14 Activations in **2023-2024 Hot Season**

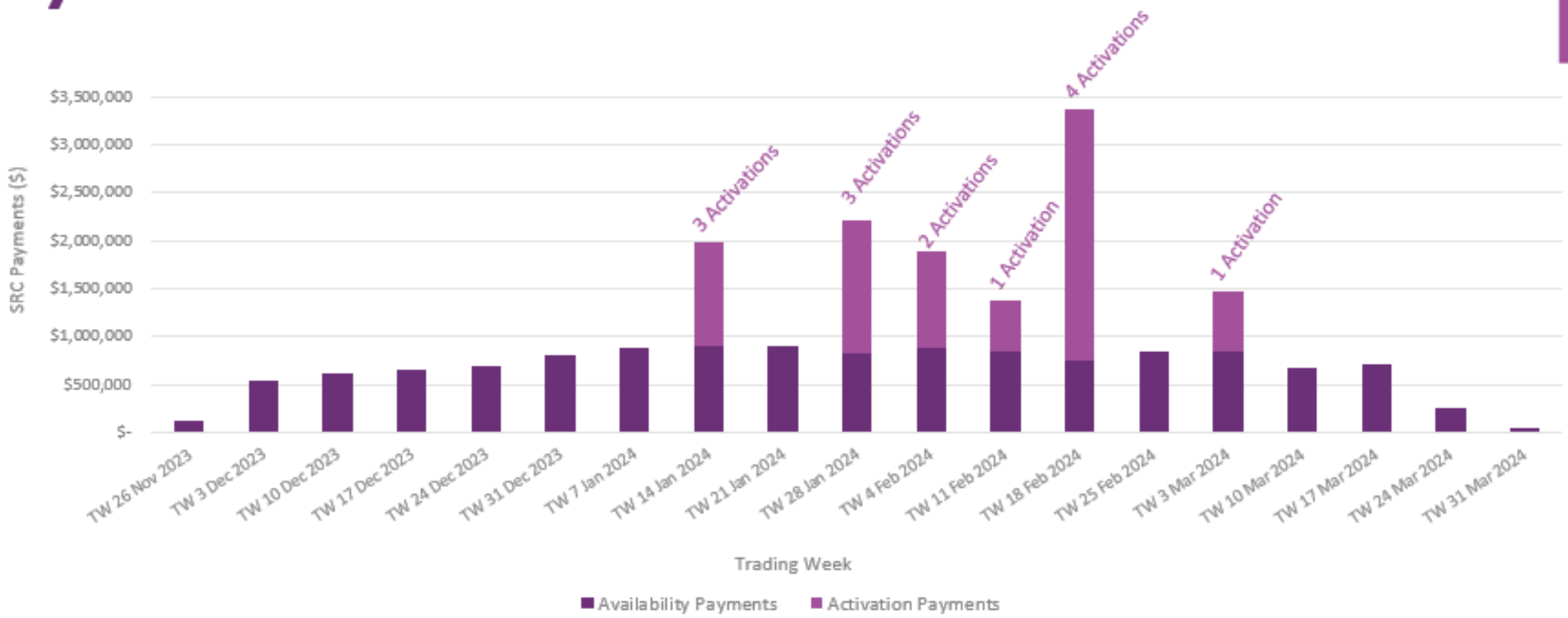
Driven by high demand over the very hot summer

Highest Demand Days



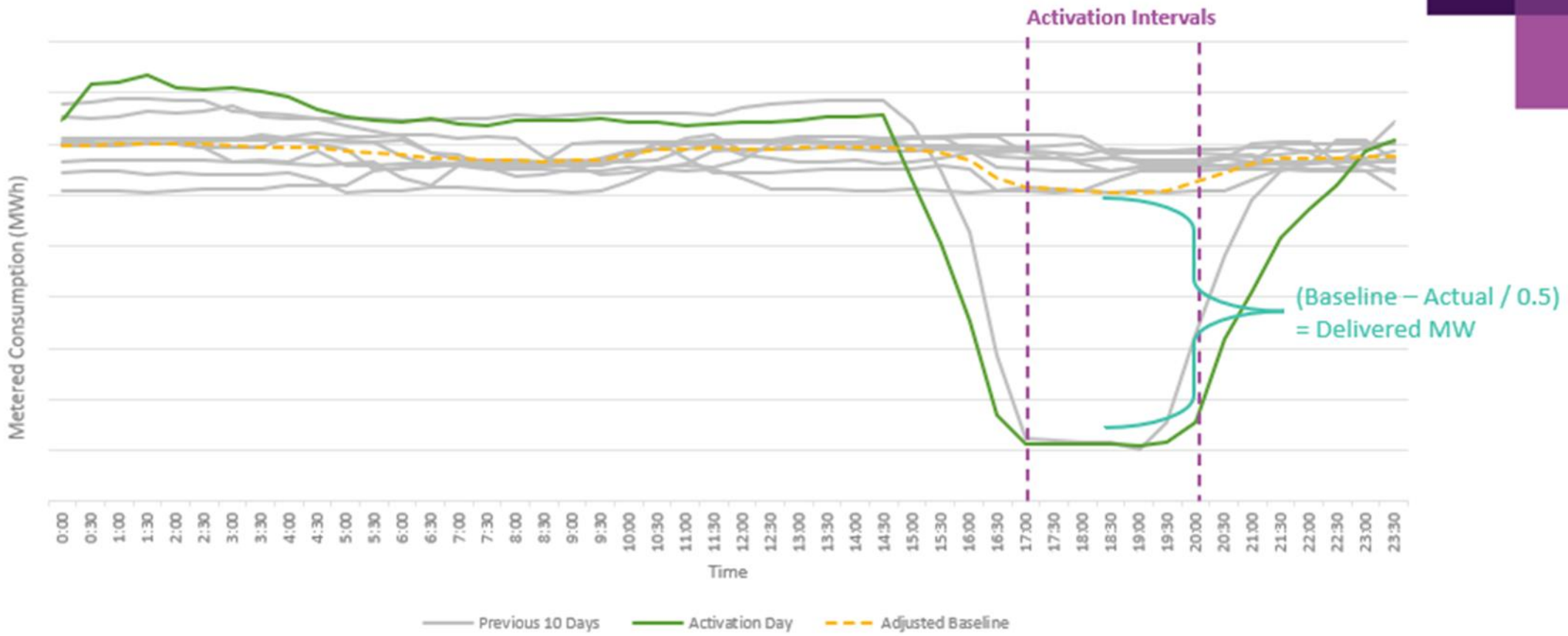
- 2023-2024 was a very hot summer
  - Perth Metro recorded 9 days in total with maximum temperatures at or above 40 °C
- New WEM Maximum Operational Demand Record: 4,233 MW on 18 Feb 2024
- Out of the Top 10 Highest Demand Days since the commencement of the WEM, 7 have been recorded in Hot Season 2023 – 2024 (yellow column in graph)
  - An additional Highest Demand Day was on 23 November 2023, which technically falls outside of the Hot Season (green column in graph)

SRC Availability and Activations Payments



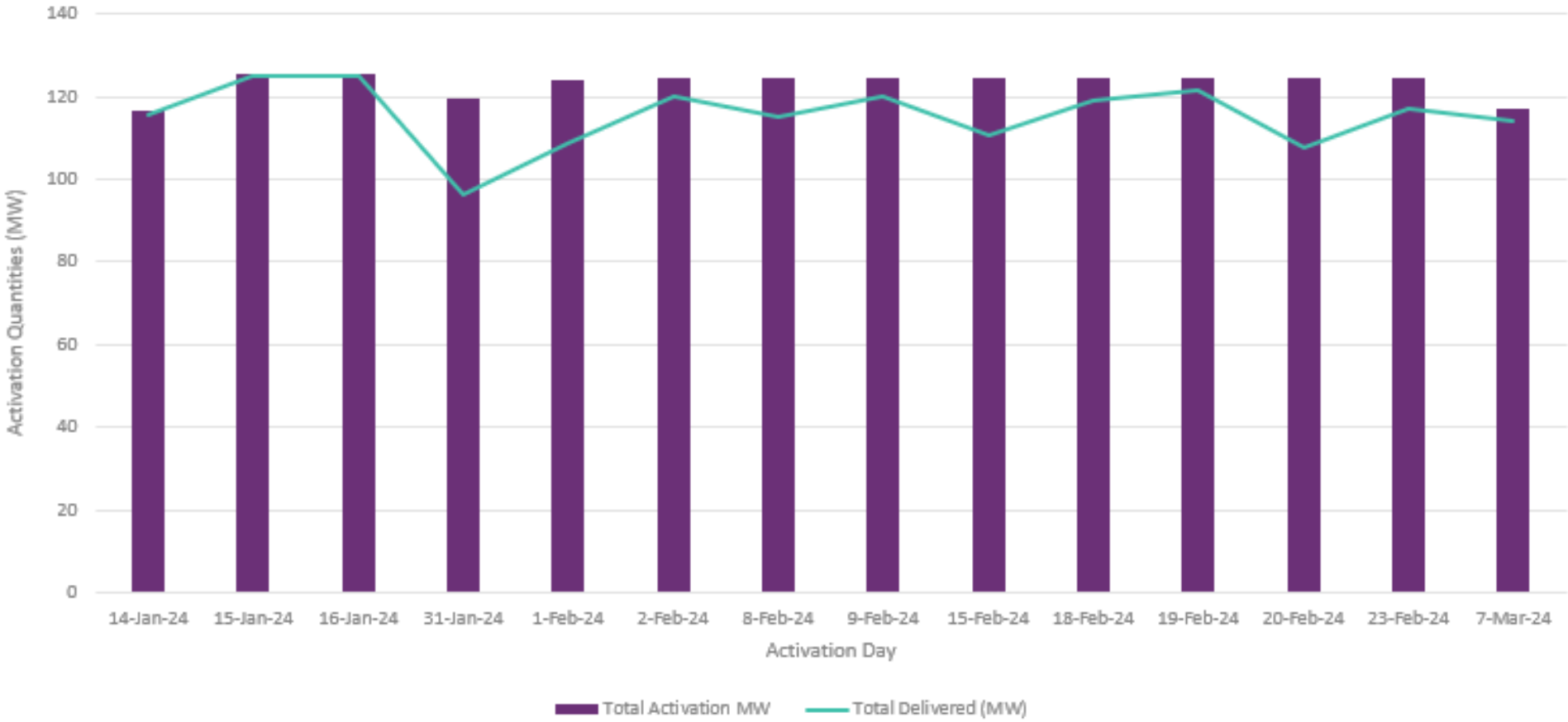
- SRC Availability Payments were lower in TW 26 Nov 2023 and TW 31 Mar 2024 due to only some of the Trading Days within the week falling into the Hot Season 2023-2024
- SRC Availability Payments in TW 24 Mar 2024 reduced from prior week as some contracts came to an end.
- Other changes to Availability Payments are driven by changes to MSQ or unavailability 'refunds'
- Activation Payments are based on the performance of the provider during the Activation Period

SRC Activation Qty for Load Reduction



- SRC Activation payments are based on the MW quantity 'delivered' multiplied by the contracted activation price.
- To obtain the MW qty delivered by a load reducing SRC provider, AEMO uses meter data to calculate a baseline for each provider. The baseline is used to measure against metered consumption during the activation intervals and converted from MWh to MW.
- Activation quantity delivered is capped at MSQ value in the SRC contract
- SRC Providers must meet 90% of their MSQ during activations, otherwise are considered unavailable for the Trading Day and ineligible for availability payments

SRC Manual Activations Summary



- The above values represent the manual activations of unregistered equipment (SRC Service Type includes DER and Load Reduction)
- This excludes the SRC provided by Registered Facilities through DSOC Uplift (26.7 MW), as this is captured in energy dispatch via WEMDE
- Over the 2023-2024 Hot Season, SRC providers delivered on 94% of quantities in the Activation Notices.

Operational Update:
Intervention Pricing

Presenter	Douglas Birse

Background

- Due to a system performance limitation AEMO have been unable to implement the Intervention Pricing logic under AEMO Intervention Events
- In WEMDE 3.0.0 a change to WEMDE simplified the solution to the calculation of Intervention Pricing to improve performance
- AEMO are updating internal processes to ensure consistent application and messaging associated with AEMO Intervention Events

Performance Solution

- Prior to WEMDE 3.0.0 WEME would carry out a complete solve for all Inertia and Contingency Size DFCM variables
- WEMDE 3.0.0 introduced a solution where the Inertia solution in the initial solve is used as a fixed value for the Inertia
- This effectively reduces the search range required for WEMDE
- WEMDE performance is incredibly sensitive to the number of integer variables within the search domain

AEMO Intervention Events

- As defined in the rules: **AEMO Intervention Event**: An event where AEMO intervenes in the Real-Time Market by issuing a direction in accordance with clause 3.4.4(c), clause 3.4.4(d), clause 3.4.5, clause 7.7.4(b), or clause 7.7.5.

- In practice this is via a Discretionary Constraint in the Dispatch Engine in the format below:


```
{
    "id": "#S 1*BW1_BLUEWATERS_G2 >= 200 id-264",
    "constraintEquations": [
        "#E 1*BW1_BLUEWATERS_G2 >= 200 id-265"
    ],
    "version": 1,
    "description": "Discretionary constraint created by the AEMO Control Room in real time.\r\n1*BW1_BLUEWATERS_G2 >= 200\r\nNetwork type",
    "comments": "Discretionary constraint created by the AEMO Control Room in real time.\r\n1*BW1_BLUEWATERS_G2 >= 200\r\nNetwork type"
}
```



```
{
    "id": "#E 1*BW1_BLUEWATERS_G2 >= 200 id-265",
    "description": "Discretionary constraint created by the AEMO Control Room in real time.\r\n1*BW1_BLUEWATERS_G2 >= 200\r\nNetwork type",
    "comments": "",
    "leftHandSide": [
        {
            "term": "BW1_BLUEWATERS_G2.energy.setpoint",
            "coefficient": 1.0,
            "termType": "SOLVER",
            "index": 1
        }
    ],
    "operator": "GreaterThanOrEqualTo",
    "rightHandSide": [],
    "rightHandSideScript": "def RHS(terms):\n\treturn (200)",
    "required": true,
    "limitType": "",
    "limitAdviceId": "",
    "isInterventionEvent": true,
    "constraintType": "Network",
    "defaultRHS": 200.0,
    "violationPenalty": 5000.0,
    "contingency": "",
    "monitoredElement": "",
    "version": 0,
    "systemConfiguration": "Discretionary"
}
```

Intervention Pricing Approach

- The WEM Procedure: Dispatch Algorithm Formulation outlines the Intervention Pricing approach in Appendix D
- The process is to:
  - Remove Intervention Constraint
    - Outcome if AEMO Intervention Event had not occurred
  - Remove ramp rate constraints
    - Remove any persistent bias from application of AEMO intervention constraint
- This only applies in instances where the Dispatch Engine has a binding intervention constraint in place

Operational Update:

FCESS Clearing Price Ceiling + FCESS Cost Review Update.

Presenter	EPWA

Questions, Feedback, Ideas

wa.rtm@aemo.com.au

For more information visit

aemo.com.au