

WEM Reform Program

Communications and Control Requirements

WRIG – 29 October 2020

Agenda

1. Principles
2. Preliminary Analysis
3. Linear Ramping
4. Fast Start Facilities
5. Sent-Out to As-Generated Conversion
6. Invoking Network Constraints

Principles

- Require minimal changes to existing SCADA infrastructure.
- Re-use existing SCADA points for new market features where possible.
- Look to “ramp” planned outage constraints into/out of service over a period of time to minimise impact.

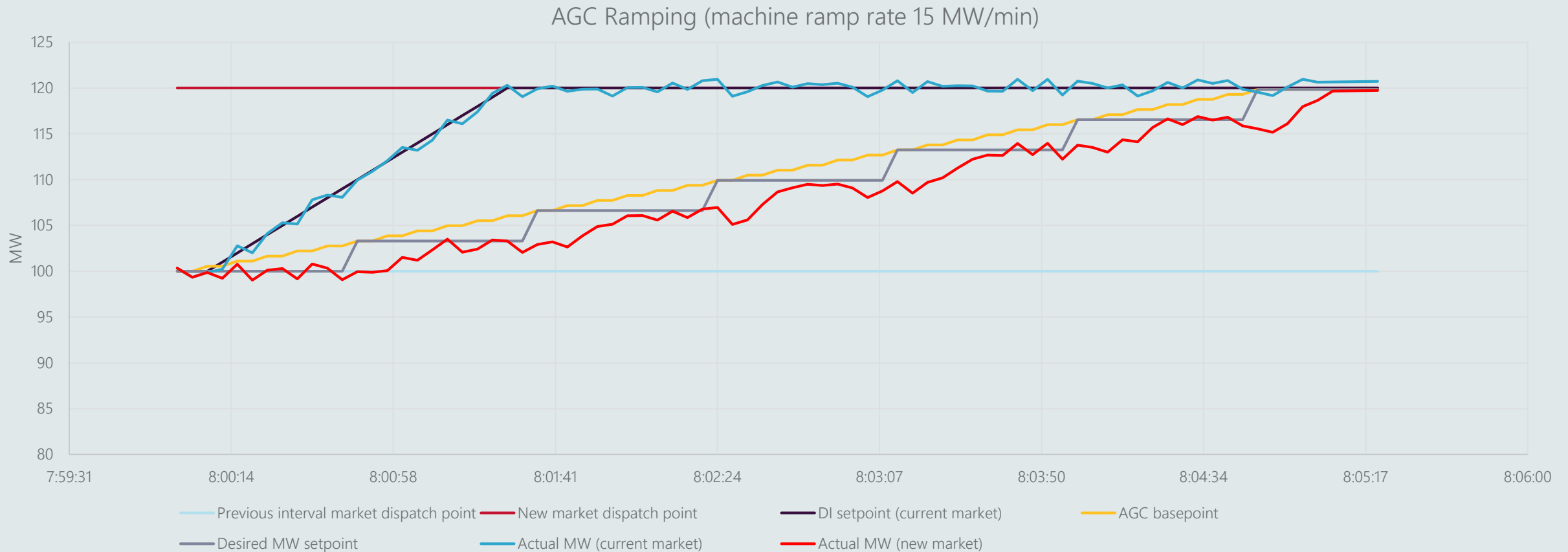
Preliminary Analysis

- Facilities that meet the existing Communication and Control Requirements will not require any new SCADA points.
 - Potential exception: Fast Start Facilities
- However, Facilities may need to undergo commissioning to tune linear ramping via AGC.
- Some existing SCADA points may be de-commissioned (no longer required)
 - e.g. ramp rate setpoints

Linear Ramping

- Achieve smooth, linear ramps between dispatch targets with minimal overshoot, or as close as possible.
- AGC system will combine linear basepoint ramping with any regulation signals if the facility is enabled for Regulation Raise or Lower.
- Dispatch Engine constraints will prevent a facility for being dispatched for a Regulation Raise/Lower quantity and new basepoint that is unachievable at the facility's ramp rate.
- Question for participants: are there any of your facilities that require an exemption from linear ramping? If so, please explain why.

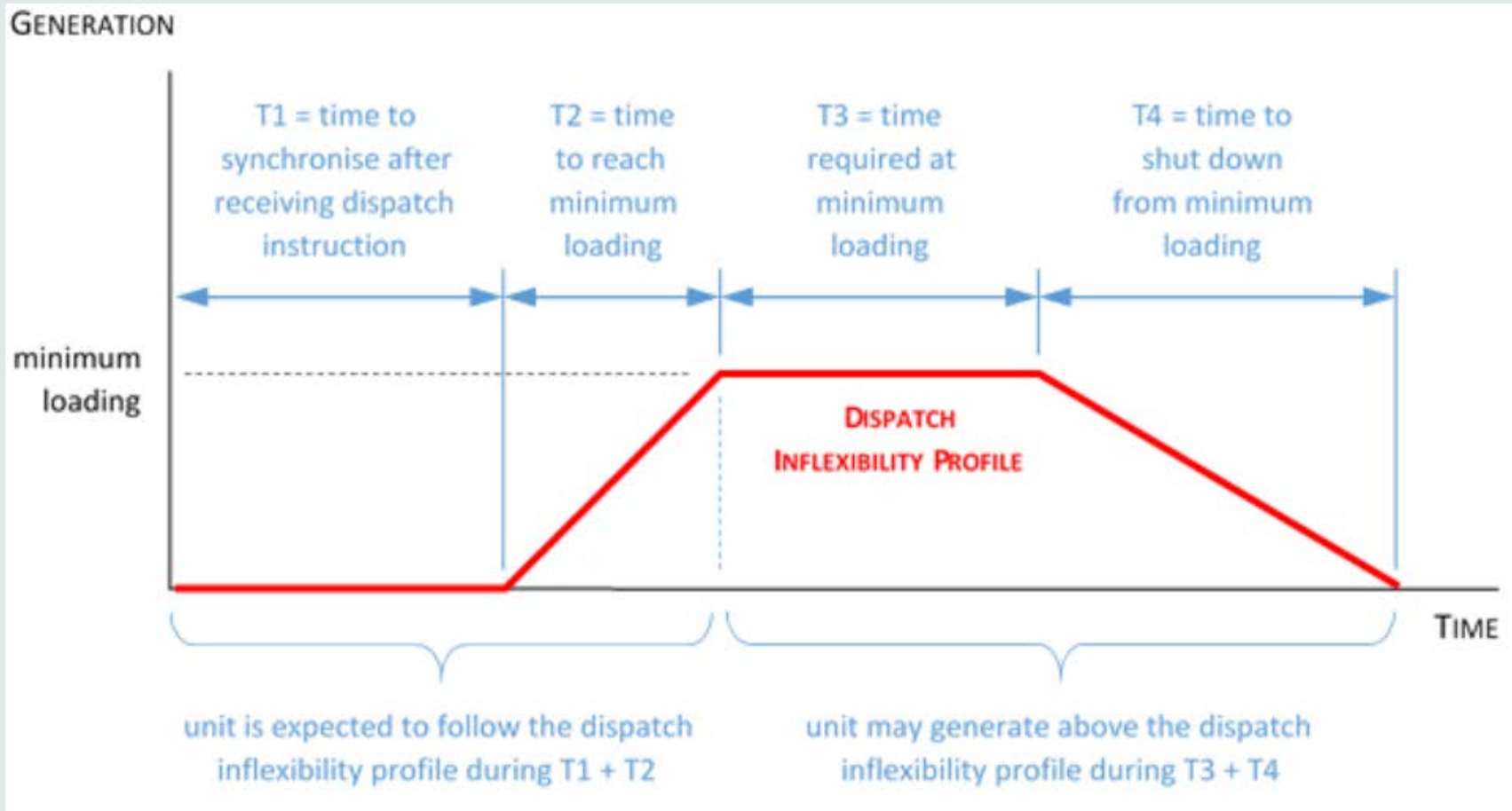
Linear Ramping Example



Fast Start

- Quick overview of principles
- Explain NEM process
- WEM options
 - Re-use forward looking dispatch instruction points
 - Require new Fast Start SCADA point

Fast Start Inflexibility Profile



Where:

$$T1, T2, T3, T4 \geq 0$$

$$T1 + T2 \leq 30 \text{ mins}$$

$$T1, T2, T3, T4 \leq 60 \text{ mins}$$

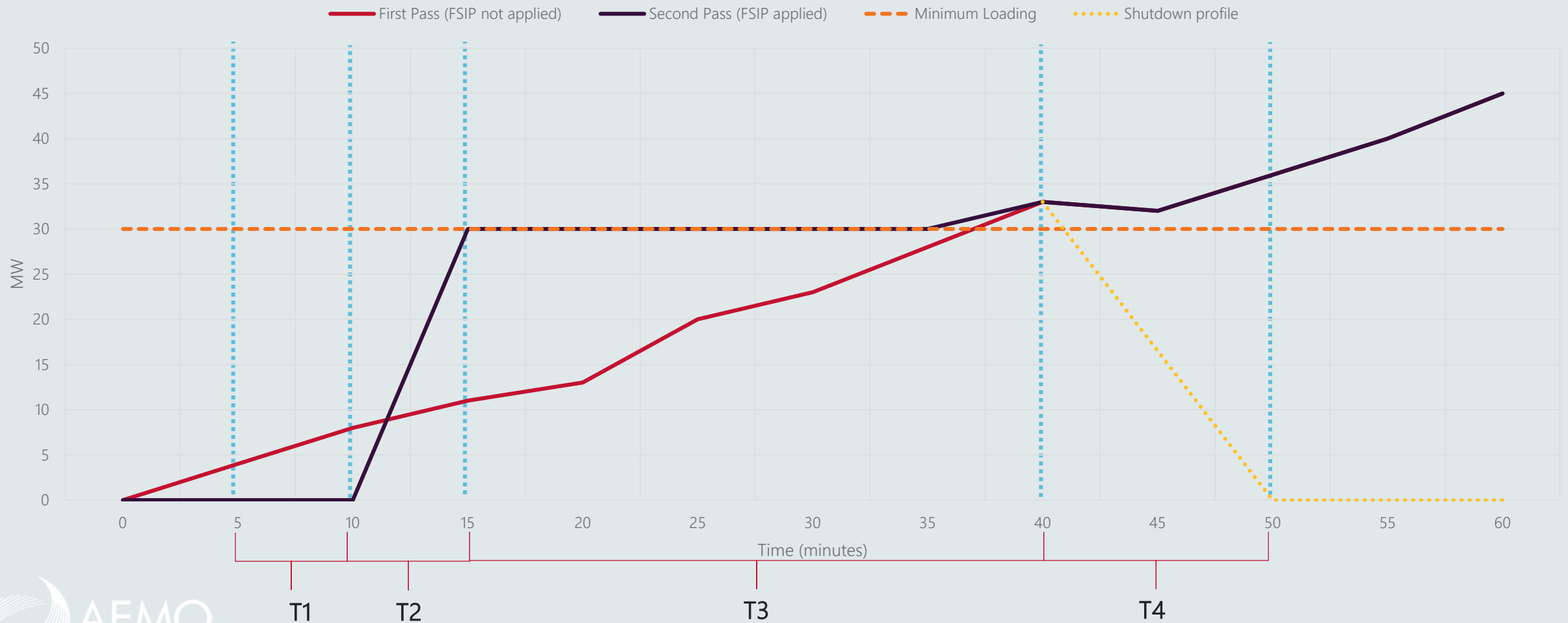
MR 7.4.38

MR 7.4.40

NEM Process

- Two-step process to determine Fast Start Facility dispatch
 - Step one run ignores FSIP
 - Step two applies FSIP based on results of first run, and re-runs
- Fast Start is not an “ahead” commitment process.
 - If pre-dispatch indicates a Facility will likely receive a dispatch in 10 minutes time, it will not receive the start signal until the interval itself.
 - Fast Start Facilities can opt to commit earlier as per any other facility, and rebid to ensure appropriate quantities clear for ramp and minimum running period.

Fast Start Facility Dispatch Example



Fast Start SCADA Requirements

- Existing NEM approach uses the analogue MW setpoint at a high value to indicate start/stop (4001 for start, 4004 for stop).
 - Does not require any additional SCADA points, but would require reconfiguration of facility control systems.
- Alternative approach could use existing/new points to indicate starts and stops (e.g. re-purposing existing lookahead setpoints).
- Different approaches may work for different facilities.
- AEMO seeks feedback from participants on the following items:
 - Are you considering registering any of your facilities as Fast Start Facilities? If so, which ones?
 - For these facilities, do you have a preference in which point is used by AEMO to signal a fast-start dispatch?

Sent-out to As-Generated Dispatch Target Conversions

- Clause 7.6.17(b) requires AEMO to document this process.
- Alternatively, participant can do the conversion at their end.
- In either case, compliance is to the sent-out target (clause 7.10.1).
- For participants who currently receive as-generated Dispatch Targets, we can work with either approach.

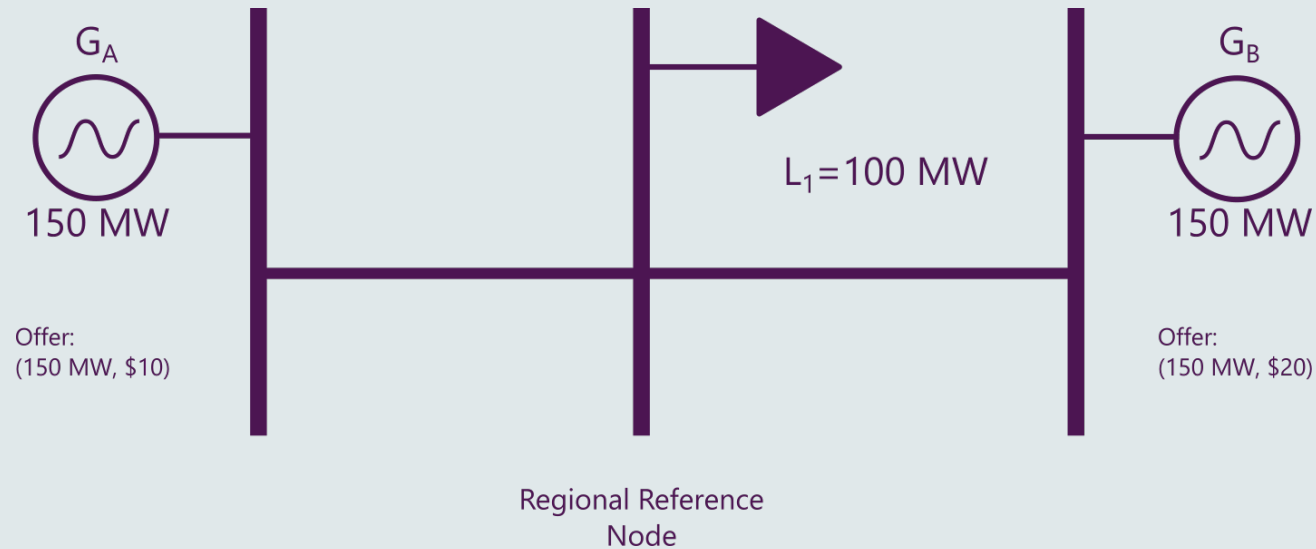
Sent-out to As-Generated Dispatch Target Conversions

- Proposed approach would be for participants to provide an equation which can be encoded within AEMO's Energy Management System (EMS).
- This equation could be piece-wise to account for multiple operating modes if required.
- The equation can consist of fixed parameters, or data available to AEMO via the SCADA system, including:
 - Operating mode (if relevant)
 - Mills in service
 - Local ambient temperature (if available)
 - MW measurement of auxiliary load(s)
- AEMO would document the process for altering and updating this equation in the relevant procedure, and how the logic will work where SCADA is bad/unavailable.
- AEMO seeks feedback on the following questions:
 - Are you considering applying for AEMO to perform an sent-out to as-generated conversion of Dispatch Instructions for any of your facilities? If so, which ones?
 - For these facilities, do you believe existing telemetry is sufficient to perform this calculation?

Network Outage Constraints in Dispatch

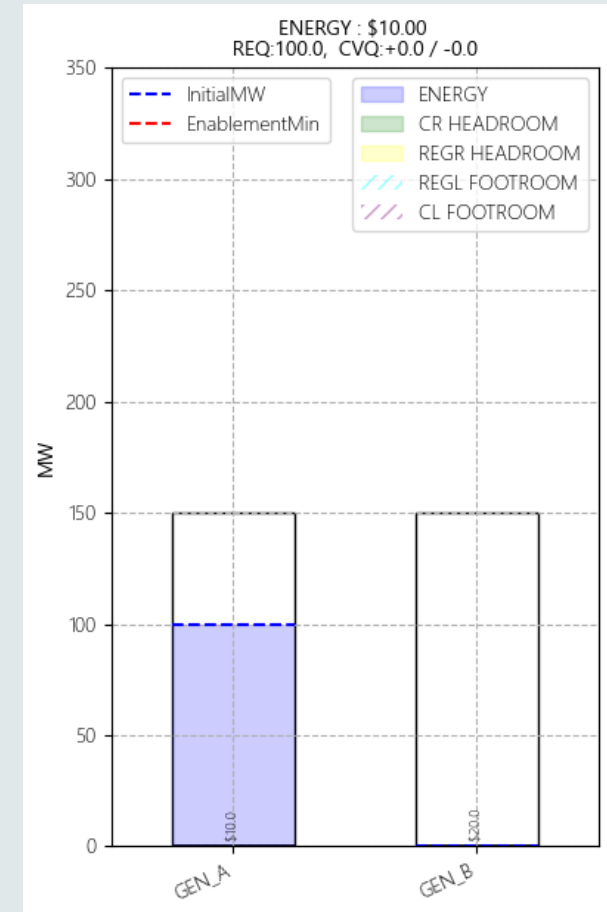
Realtime Constraints

Example 1 – Basic dispatch



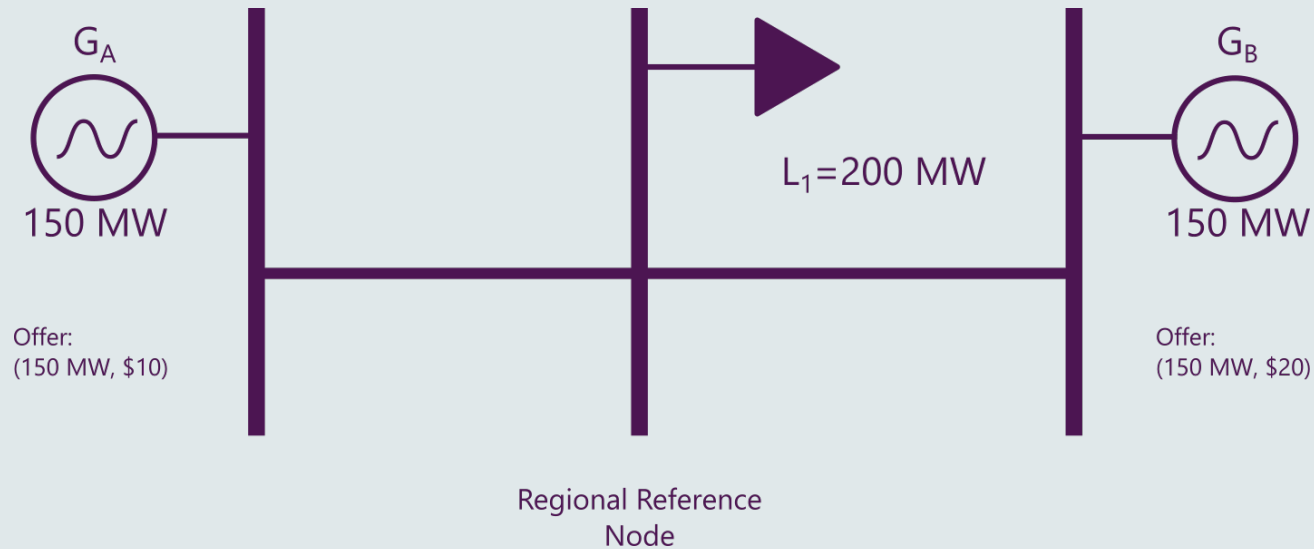
System Cost: \$1,000

Generator	Payment
G_A	\$1,000
G_B	\$0



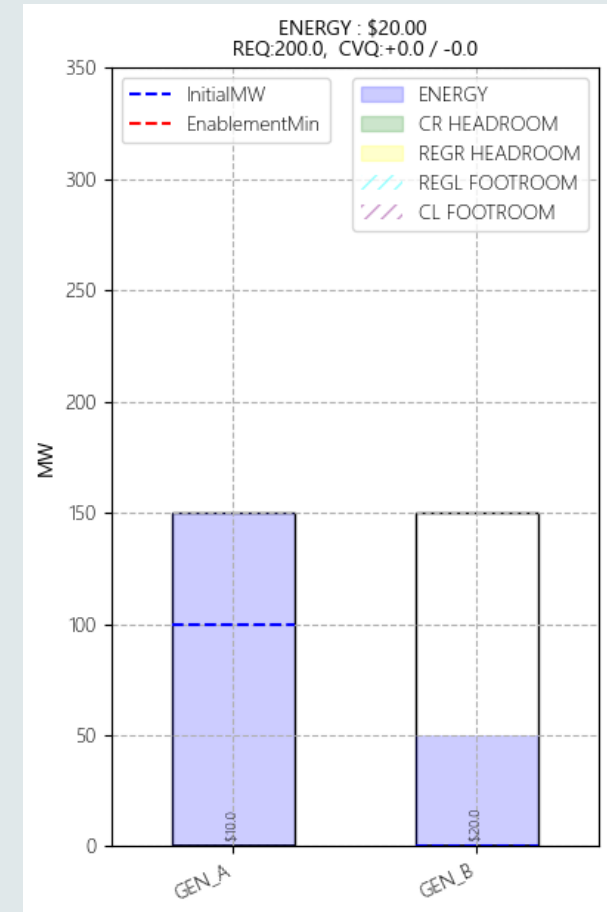
Realtime Constraints

Example 2 – Peak dispatch



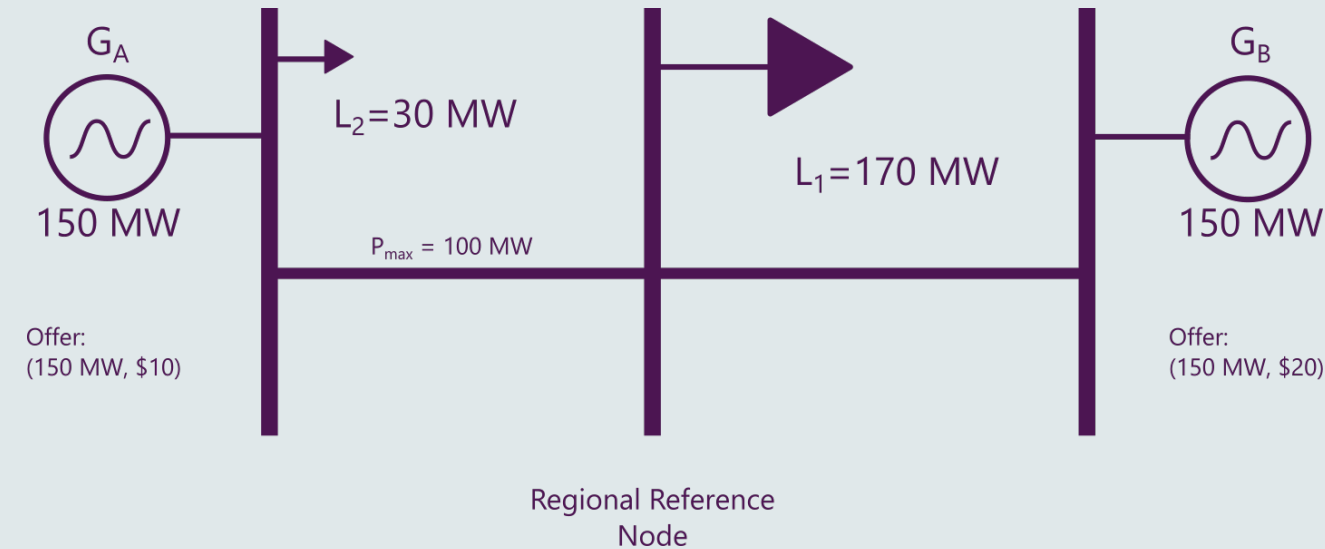
System Cost: \$2,500

Generator	Payment
G_A	\$3,000
G_B	\$1,000



Realtime Constraints

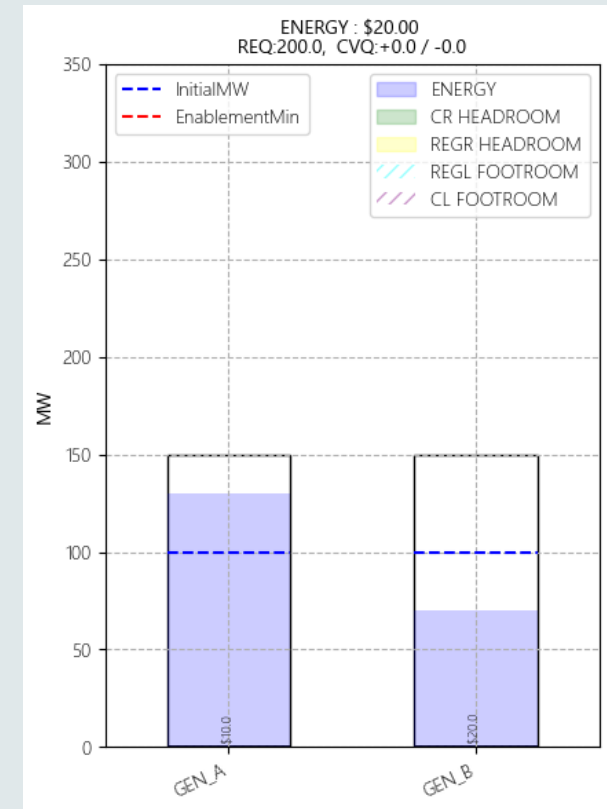
Example 3 – Network constraint



$$1 \times G_A < 100 + 1 \times L_2$$

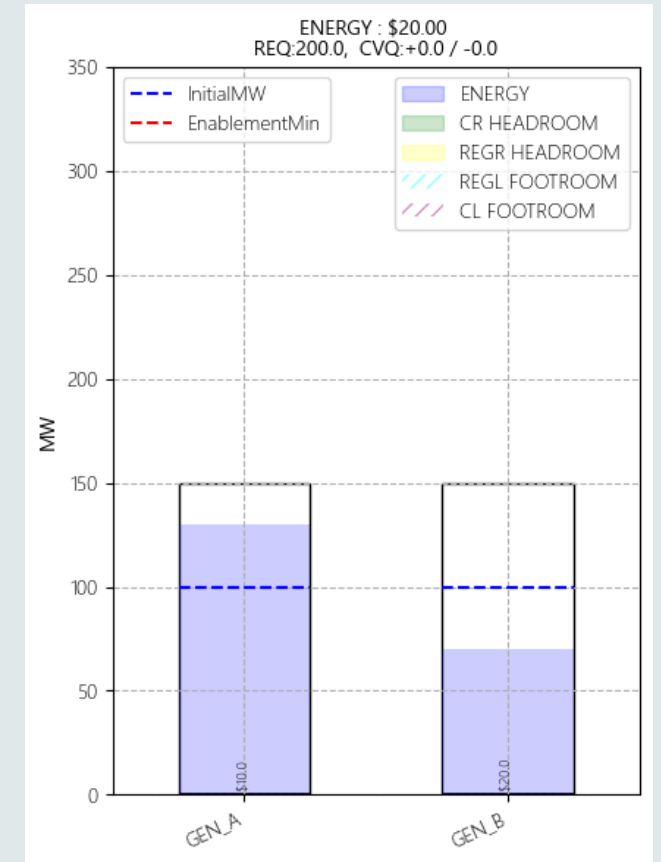
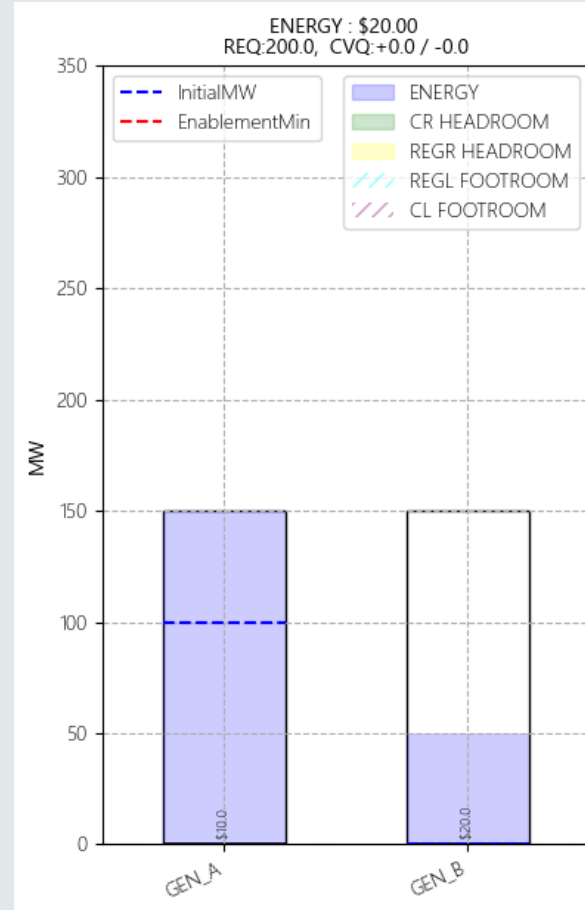
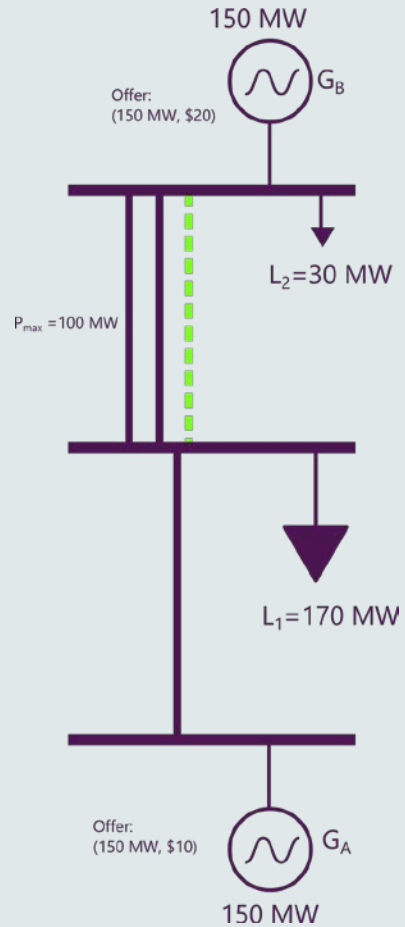
System Cost: \$2,700

Generator	Payment
G_A	\$2,600
G_B	\$1,400



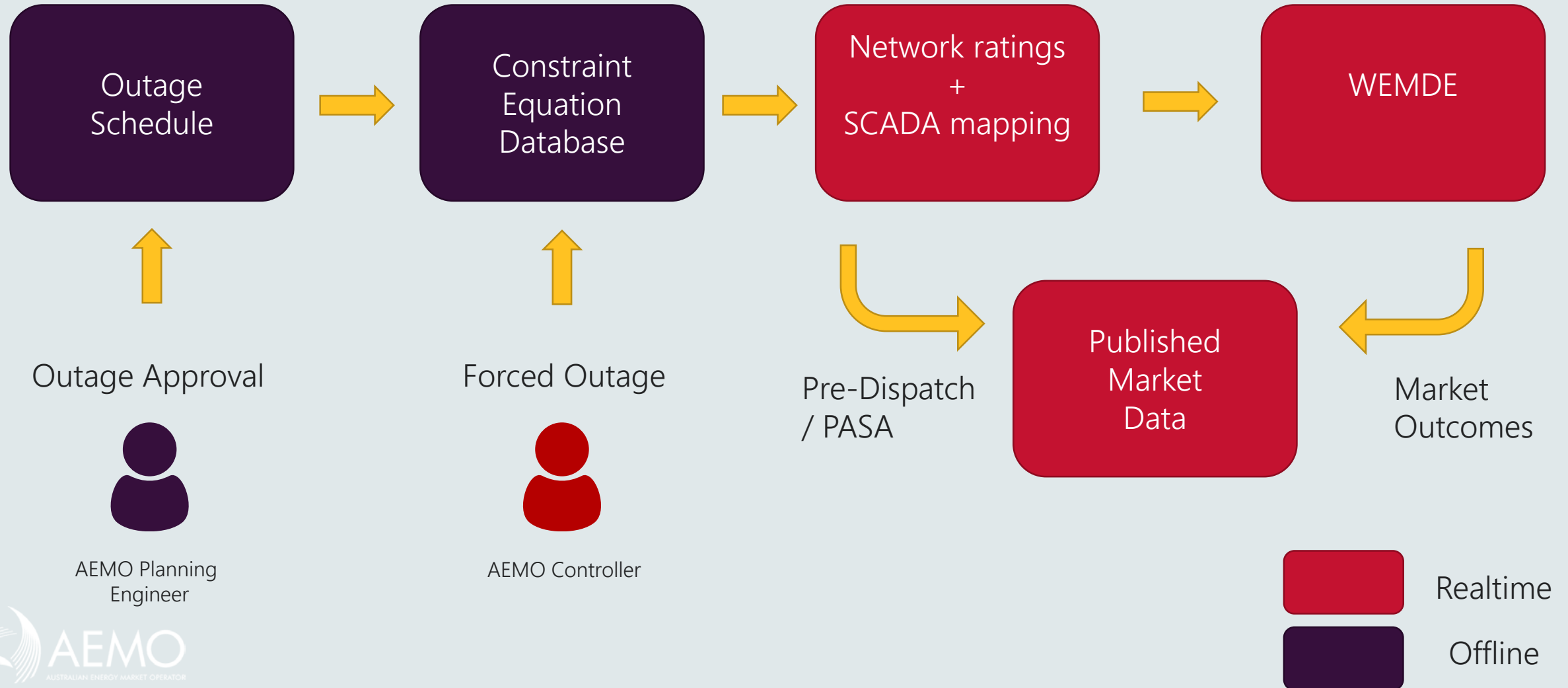
Realtime Constraints

Example 4 – Network outage constraint

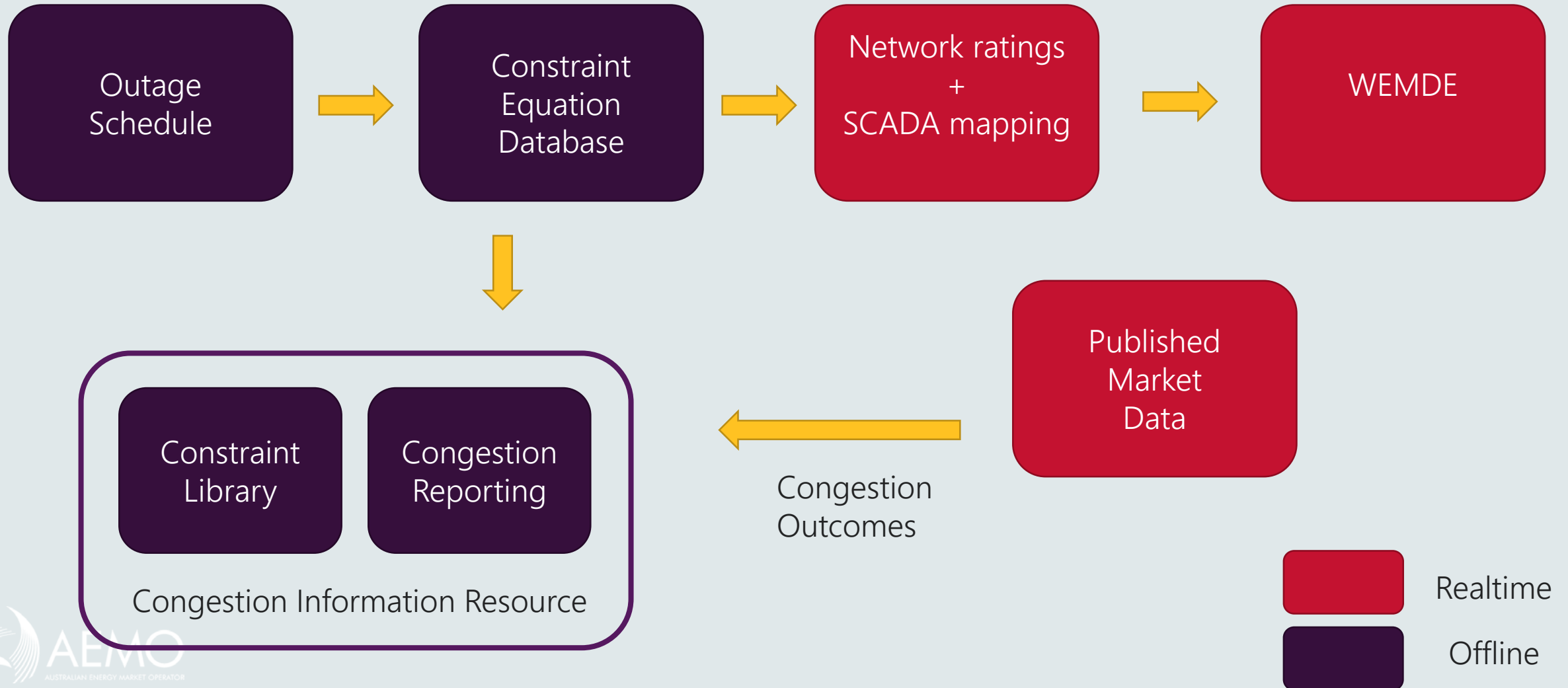


Network Outage Constraints

Pre-dispatch / PASA



Network Outage Constraints Congestion Information Resource



Feedback Requested

- Are there any of your facilities that you believe require an exemption from linear ramping? If so, please provide details.
- Are you considering registering any of your facilities as Fast Start Facilities? If so, which ones?
 - For these facilities, do you have a preference as to which point is used by AEMO to signal a fast-start dispatch?
- Are you considering applying for AEMO to perform a sent-out to as-generated conversion of Dispatch Instructions for any of your facilities? If so, which ones?
 - For these facilities, do you believe existing telemetry is sufficient to perform this calculation?

Please send any responses to wrig@energy.wa.gov.au with the subject: "20201029 WRIG Responses".

