

Reliability forecasting and calculating demand

Nick Culpitt
April FRG

What is a reliability forecast?

- The reliability forecast is a subset of the Electricity Statement of Opportunities (ESOO)
- It identifies any potential reliability gaps in the coming five years
- A reliability gap will be considered **material** if regional annual expected unserved energy (USE) is above the reliability standard.

What's not changing?

- The framework for producing the ESOO, and calculating USE to assess against the reliability standard remains unchanged.
- The **Reliability Standard Implementation Guidelines** continue to set out how AEMO implements the reliability standard, and the approach and assumptions AEMO uses in relation to:

Demand for electricity

Energy constraints

Treatment of extreme weather events

Reliability of generation

Intermittent generation

Network constraints

What's new?

- New **separate section** of the ESOO for the reliability forecast.
- New powers to source **additional information**.
 - Eg outage information and auxiliary supply information
- New oversight to improve **transparency** and **accuracy**
 - AER Best Practice Guidelines
 - Reliability Forecast Guidelines
 - Forecast Accuracy Report extended to include demand and supply, and key input drivers
 - Supplementary Materials (eg methodology reports, databases etc)
- New requirement to express the **reliability gap in MW**
 - only affects the POLR cost recovery mechanism.
- New requirement for a **one in two year demand forecast**.
- New metric of **actual demand** to determine trading intervals (TI's) subject to compliance
- New metric of **adjusted actual demand** for final compliance

What is included in the reliability forecast?

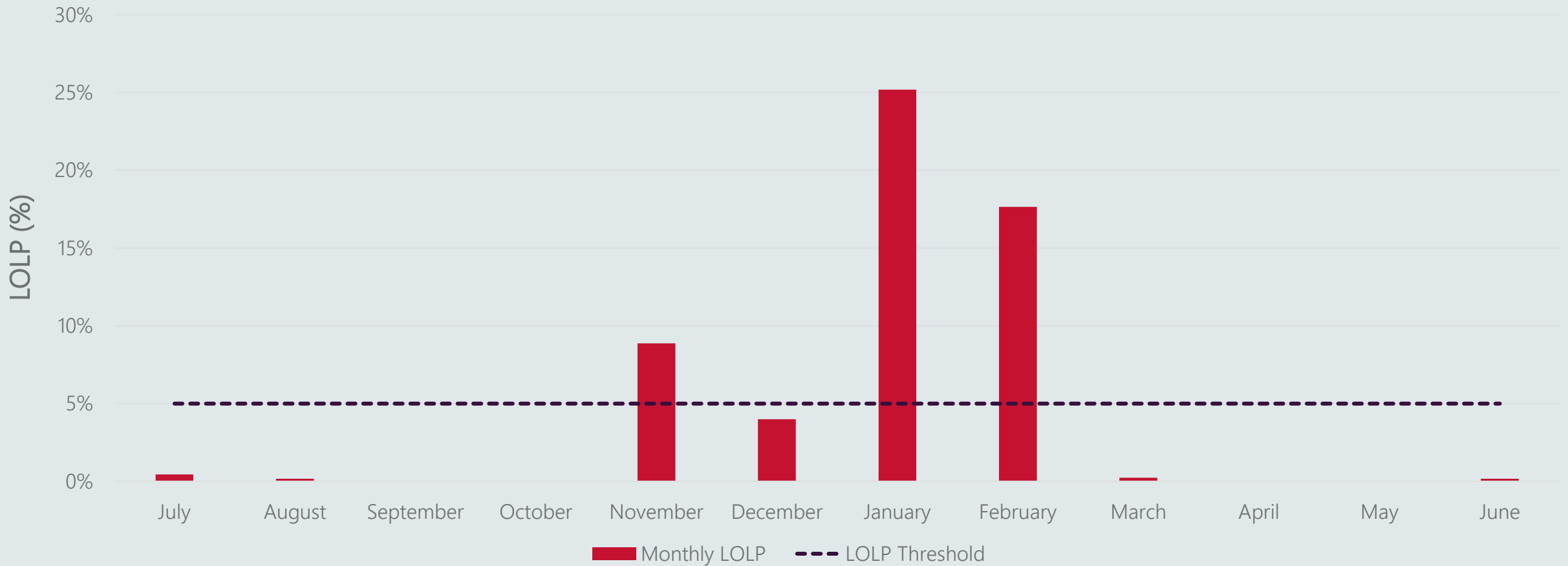
- AEMO's forecast of unserved energy (USE) for the reliability forecast gap period:
 - The forecast reliability gap period (start and end date)
 - The likely time of occurrence of the shortfall, specified as trading intervals
 - eg: The trading intervals between 13:05 – 22:00 (ending) each weekday during the forecast reliability gap period
 - The size of the gap, expressed in MW

Reliability gap period and trading intervals

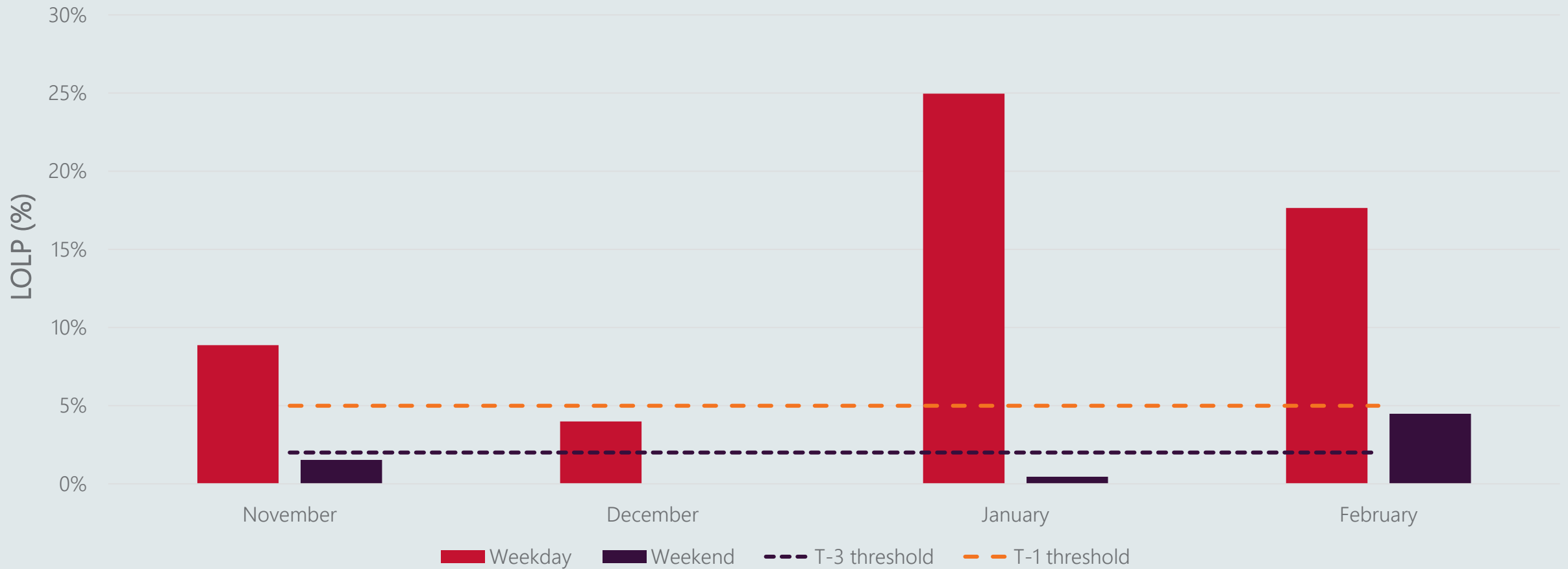
A method for determining the start and end date of the Reliability gap period, and relevant trading intervals, will be consulted on, and may take into account. The current proposal is as follows:

- For T – 3 instrument request:
 - Start date and End date: Months with LOLP > 5% (including any single month where LOLP is < 5%)
 - Likely trading intervals:
 - For each month, include weekends if LOLP in that month > 2%
 - Time-of-day: between the first and last trading interval times where LOLP exceeds 2%
- For T – 1 instrument request:
 - Start date and End date: Months with LOLP > 5% (including any single month where LOLP is < 5%)
 - Likely trading intervals:
 - For each month, include weekends if LOLP in that month > 5%
 - Time-of-day: between the first and last trading interval times where LOLP exceeds 5%

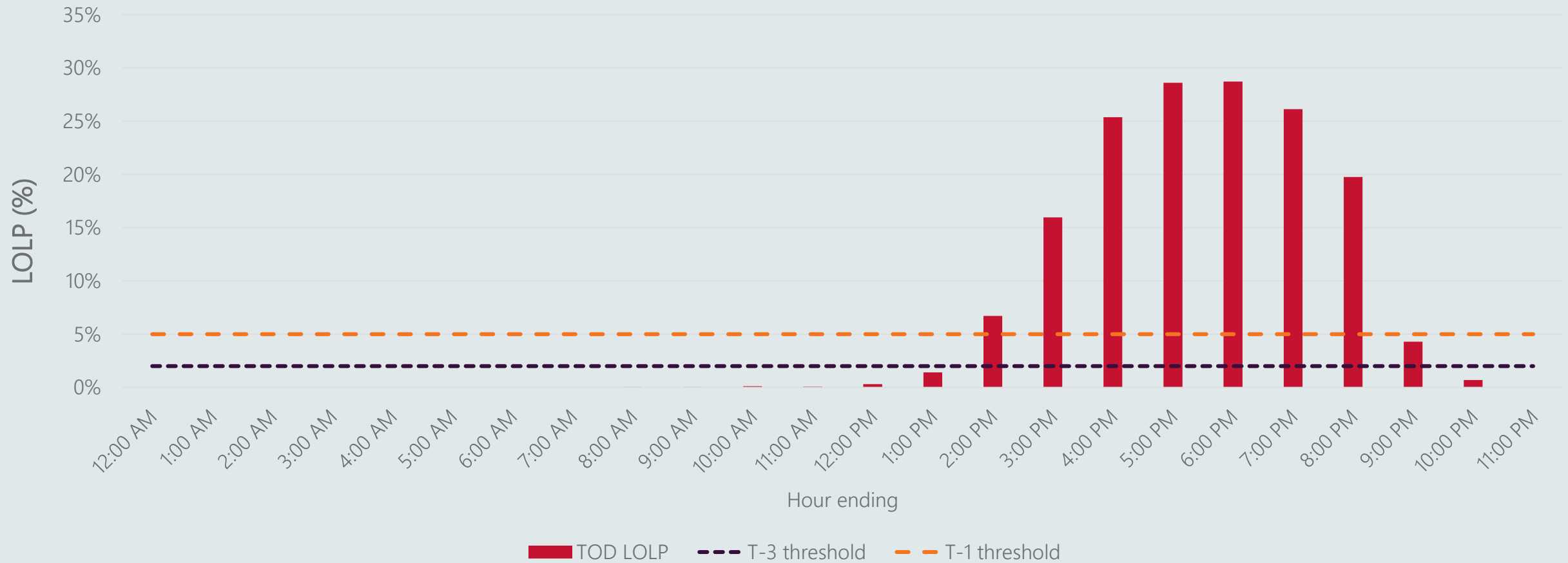
Example – start/end date



Example – start/end date

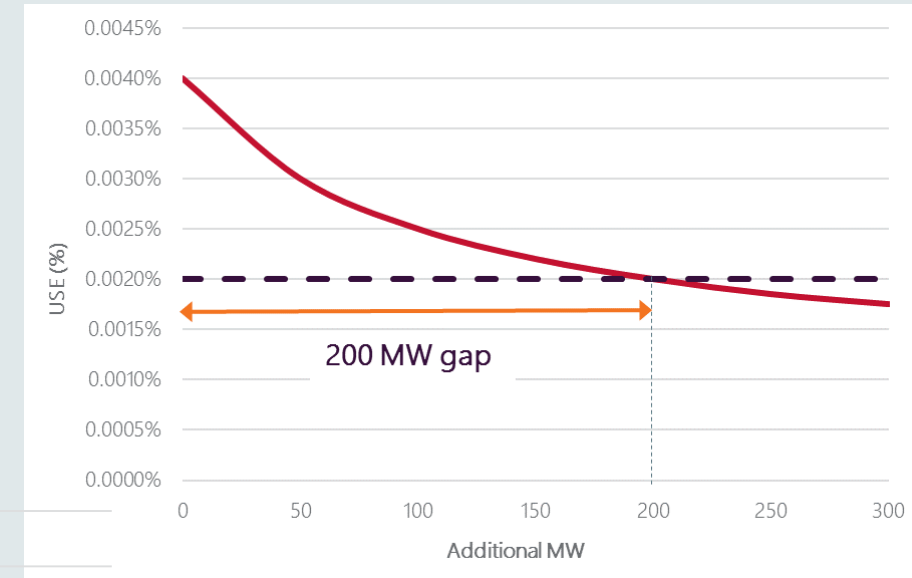
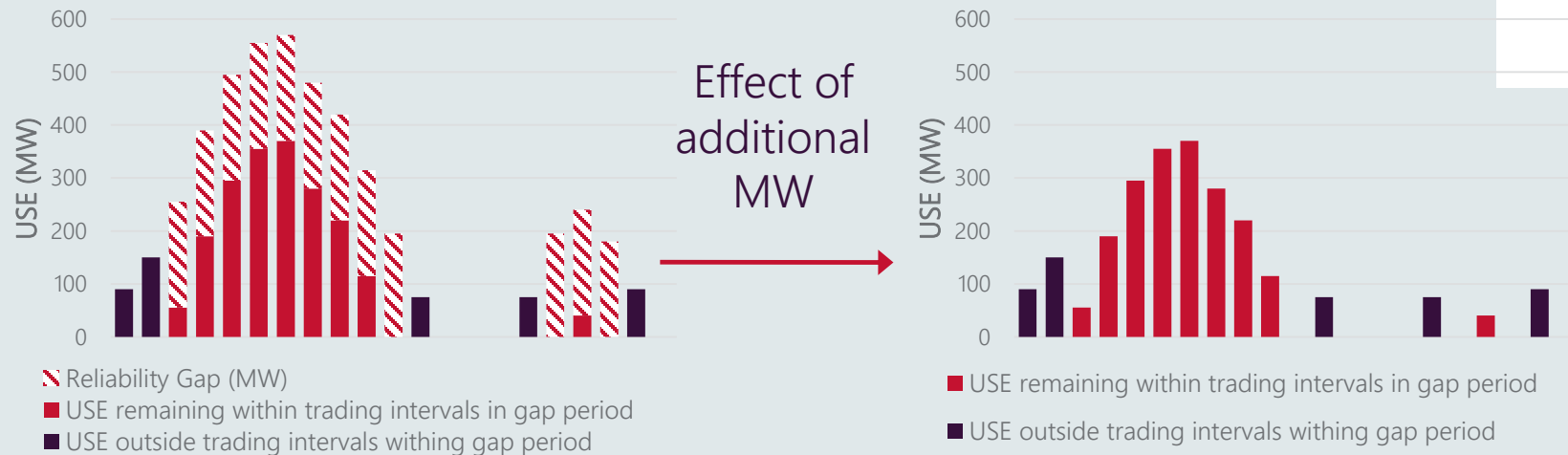


Example – trading intervals



Calculating the size of the gap (in MW)

- Based on additional firm capacity required to reduce USE to the level of the reliability standard..
- Will be determined for each region separately, based on effect of additional capacity in reliability gap period on USE in each interval in each Monte Carlo iteration:



Instrument request

- In addition to the above, AEMO will publish a number of accompanying visualisations to assist participants in understanding the timing of any reliability shortfalls.
- AEMO will also submit the sensitivity of the USE estimates to additional capacity.

Demand forecasting

One in two year demand definition

One in two year demand is the peak demand forecast in accordance with the Rules:

- to occur for a region during the period; and
- where the likelihood is that the forecast amount will be exceeded in any two-year period.

(Section 14C of the *National Electricity Law*)

Draft Rules: the one in two year demand forecast for a region is:

- the forecast made in accordance with the Reliability Forecast Guidelines; and
- specified in a reliability forecast to be that forecast for that region for that financial year

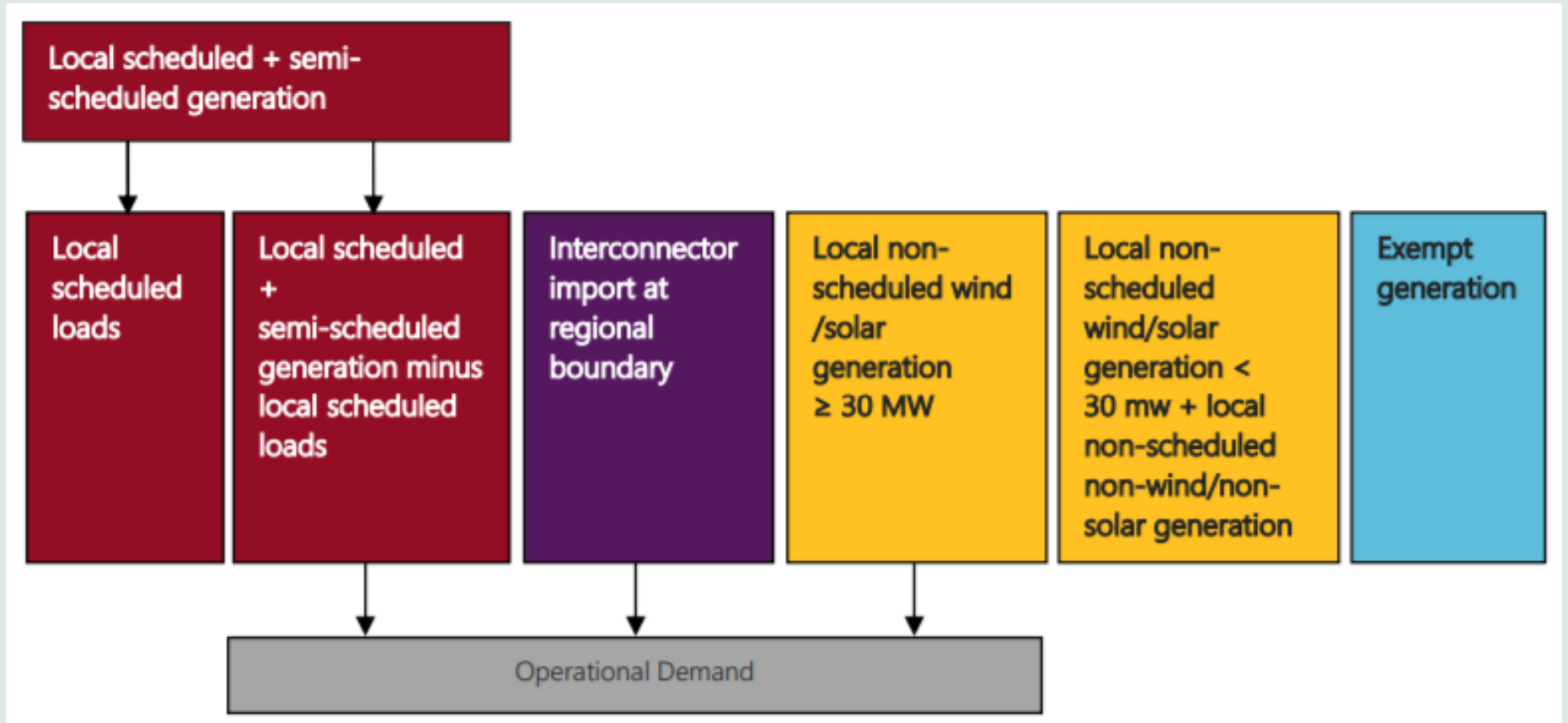
AEMO proposal (to be consulted on in developing *Reliability Forecast Guidelines*) is:

- to use 50% probability of exceedance (POE) operational maximum demand forecast (as generated) reported in the Electricity Statement of Opportunities.

Operational demand definition

Operational demand:

"the electricity used by residential, commercial and large industrial consumers, as supplied by scheduled, semi-scheduled, and significant non-scheduled generating units with aggregate capacity ≥ 30 MW"



Exception: some local non-scheduled wind/solar generation < 30 MW is included if, due to power system security reasons, AEMO is required to model in network constraints.

Actual demand(for assessing if Obligation applies)

Actual demand:

"what demand would have been if not for AEMO intervention"

Operational
As generated

Operational
Sent-out

Customer load
AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Actual and forecast
published by AEMO
near real-time

50% POE forecast

Aux load

50% POE forecast

Losses

50% POE forecast

Check if actual
demand in TI is
higher than
forecast

Balances accuracy
and timeliness

Actual demand
is NOT adjusted
due to these
factors

Metered actual

- Directed load shedding

- RERT

- Directed non-sch. generation

- Demand response

- Voluntary reduction

- Mandatory restrictions

- USE from Network outages

Adjusted actual demand (for assessing liability)

In determining “liable load”, a further adjustment is required for qualifying demand response (DR) contracts that are activated by liable entities:

Liable entity’s trading interval liable load:

- Settled demand is adjusted to reflect the actual volume of activated DR qualifying contracts

Highest adjusted peak demand for the region:

- Where actual regional demand exceeded one-in-two year forecast:
 - Adjust actual demand to reflect the sum of actual DR for all liable entities under qualifying contracts
 - Highest adjusted peak demand = highest demand calculated over these TI’s

Next steps

Questions for consultation

1. Transparency

- 1.1 Is the level of detail provided in this issues paper and referred methodology papers sufficient to allow you to constructively critique and provide feedback on the appropriateness of the methodology? If not, what additional information/explanations are required?

2. Open processes

- 2.1 In addition to this consultation and associated workshop, what other means of engagement could be considered for this year's ESOO, taking into account the time available and balancing timeliness and relevancy of information with need for consultation?

3. Accuracy and lack of bias

- 3.1 Are the proposed assumptions and methodologies for calculating supply and transmission inputs to the Reliability Forecast (e.g. forced outage rates and auxiliary loads) reasonable for the purpose of assessing unserved energy? If not, what refinements should be considered?

4. Reliability Forecast and reliability instrument methodologies

- 4.1 Are the outlined assumptions and approaches to calculate the reliability gap size, reliability gap period and likely trading intervals reasonable?
- 4.2 Is the proposed demand definition to be used for the 1-in-2 year peak demand forecast reasonable? If not, what alternative definition should be considered and why?
- 4.3 Does the set of result visualisations provided in the conceptual example provide information that assists participants in responding to any reliability instrument? What additional information would support decision-making in response to any reliability instrument?

Reliability Forecasting consultation

Transparent information flows & process ensures credible results.

- 2019 reliability forecast prepared before Guidelines in place
- Robust, inclusive consultation process proposed
- 2019 Forecasting and Planning Inputs and Assumptions consultation already commenced

Reliability Forecast

2019 ES00 timeline

