ST PASA Replacement Project

Stakeholder Workshop #2 – Overview of the new process

May 2022

Agenda

- Background of ST PASA Replacement Project
- Key Themes
- Determination of Reliability – the new paradigm
- Uncertainty Margins and Confidence Levels
- Overall Design
- Next Steps
- Project timeline
- Glossary

Background

ST PASA Replacement Project

- **Objective**: To do a holistic review of the PD/ST PASA methodology and develop a system that would serve the NEM now, and into the future.
- Details and updates can be found on ST PASA Webpage

Progress to date

- Phase 1 completed
  - ✓Initiate industry consultation
  - ✓High level business requirements
  - ✓High level design (HLD)
  - ✓Proof of Concept (PoC)
- Phase 2A commenced
  - AEMC published the final rule change on 5th May
  - Tasks progressing in parallel:
    - Development of detailed business requirements including stakeholder consultations
    - Further development of uncertainty margins
    - Request For Proposal (RFP) for the SCED engine

Business requirements – Stakeholder Consultation

- Detailed business requirements are now being developed
- A series of stakeholder workshops to work through key technical concepts in detail
- Formal procedure consultation to commence once the key technical concepts have been addressed – most likely Q3/Q4 2022. The procedures will include:
  - ST PASA Process description (*the ST PASA procedure*)
  - Reserve Level Declaration Guidelines (RLDG)
  - Reliability Standard Implementation Guidelines (RSIG)
  - Spot Market Timetable (for frequency of PASA runs)

Key Themes

Key Themes of new system

Based on emerging challenges facing the power system, some key themes were identified as important for determining reliability

- Reliability is a physical system issue hence the model should reflect the physical reality instead of the market
  - Full network model
  - Forecast at nodal level (load on bus)
- Due to uncertainties in predicting certain inputs that are used to forecast reliability, it is important to account for these uncertainties in demand forecast, VRE forecasts and scheduled unit availability.

Benefits of the Proposed Approach

- A full network model provides
  - flexibility in modelling various/unforeseen network configurations e.g. separation not occurring at regional boundary
  - Information about network congestion at a nodal level hence provide information about impact of intra-regional contingencies

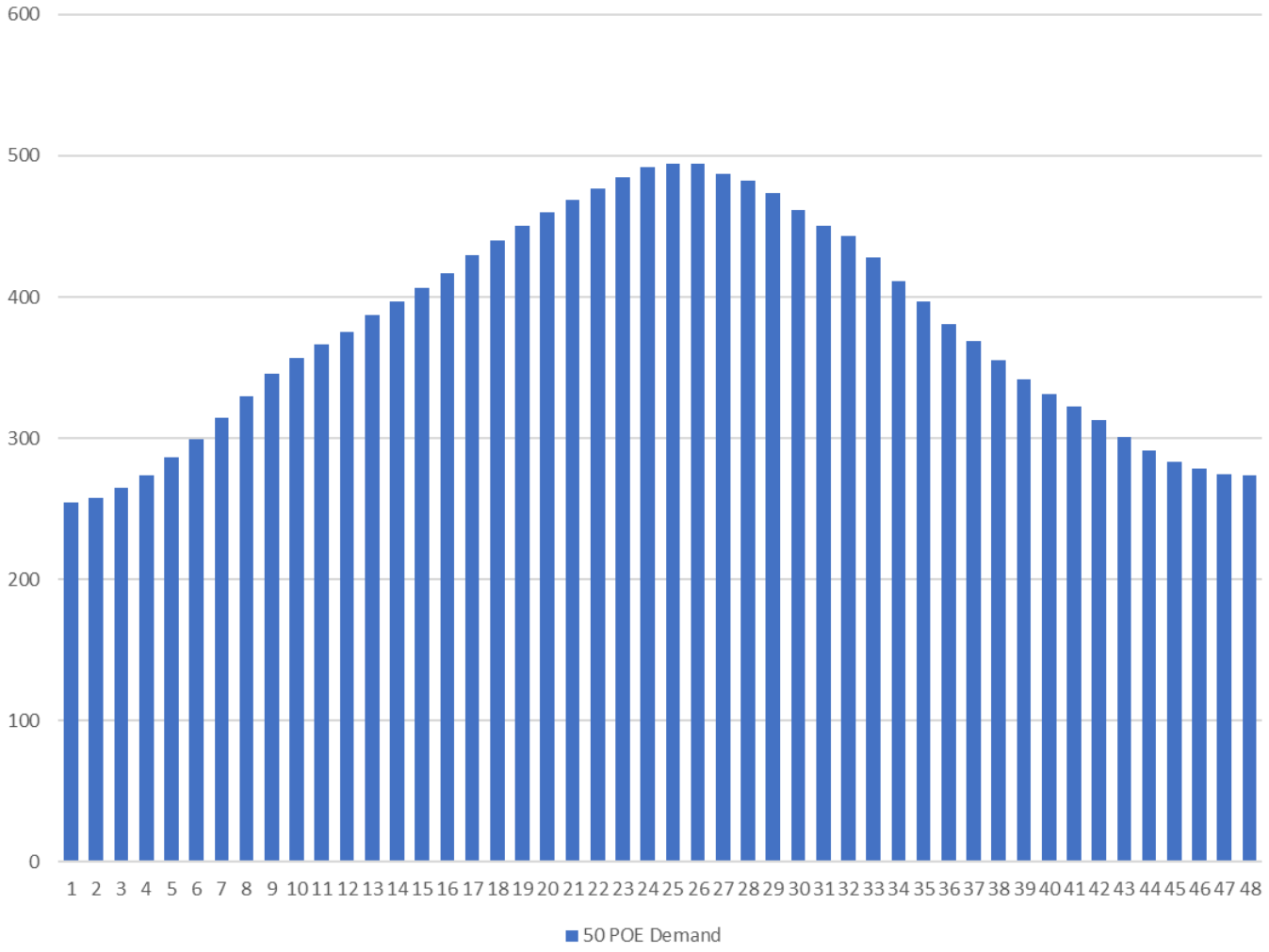
- There are two possible approaches to determining uncertainties:
  - Monte Carlo simulation – not feasible due to the massive number of simulations required that would be computationally impossible in an operational timeframe
  - Probabilistic approach i.e. Uncertainty Margins (UM) – viable option to determine uncertainties in an operational timeframe

Determination of Reliability

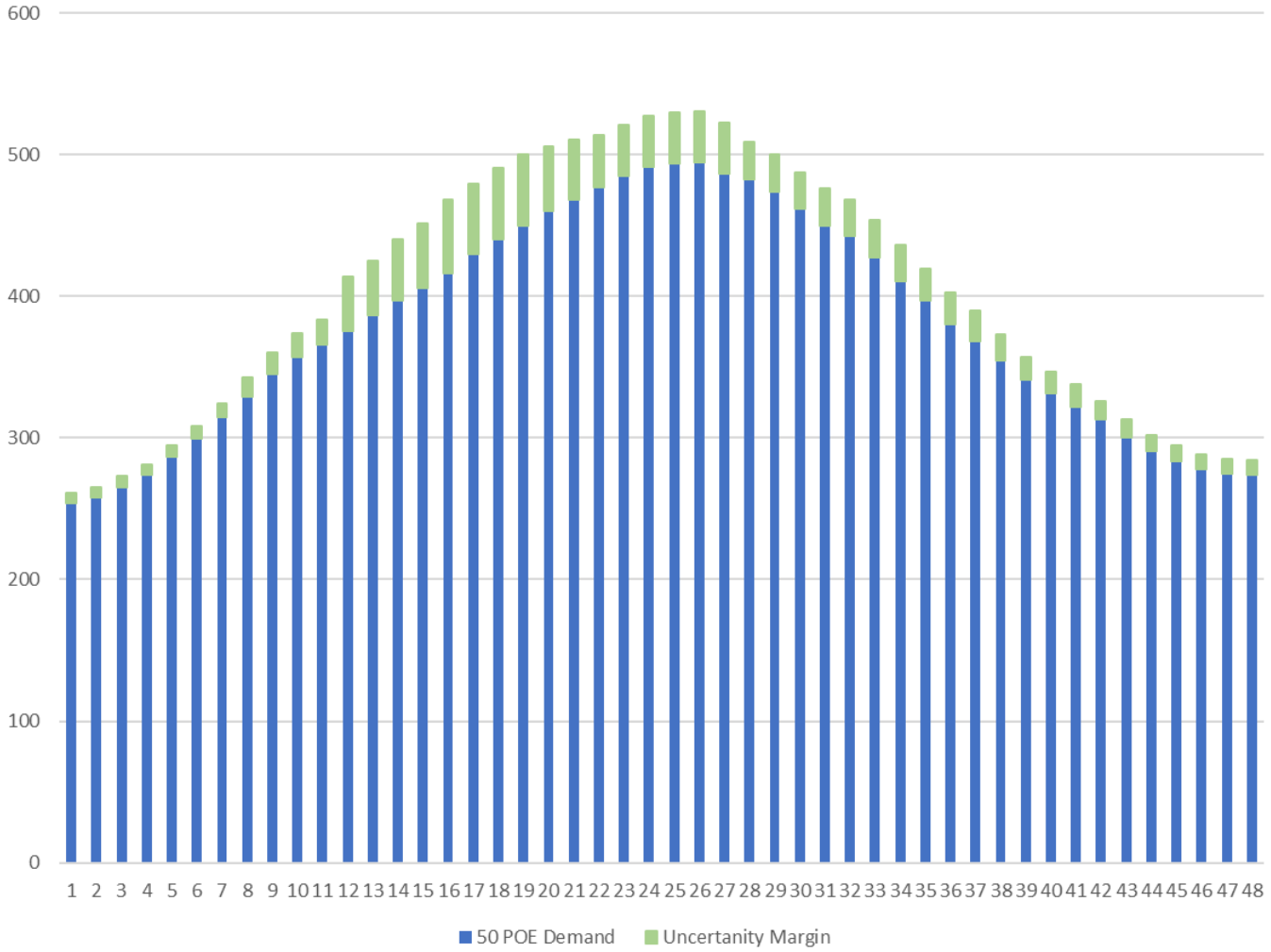
Determination of Reliability – the new paradigm

	Current ST PASA	Proposed System
Objective	Create generation profile that maximises reserve by maximising supply to RRN	Create generation profile that meets the demand at each node
Subject to	n-1 security constraints for predefined network configurations (Transmission contingencies only)	n-1 security constraints for any network configuration and set of contingencies (Transmission and generator contingencies)
Demand Used	50% POE demand	50% POE demand + Uncertainty Margin
Supply Side (Generation)	Max Availability or UIGF	(Max Avail or UIGF) – UM – Aux Load
Reliability Measure	Reserve = Generation – Demand	Deficit = Demand - Generation
LOR Declared	LOR 3 if Reserve < 0 LOR 2 if Reserve <= LOR 2 level LOR 1 if Reserve <= LOR 1 level LOR2/1 level = Max (LCR/LCR2, FUM) where LCR represents either a generator or interconnector contingency	Deficit > 0 The determination of the three LOR levels will be discussed in detail in the next workshop

Determination of Reliability



Determination of Reliability



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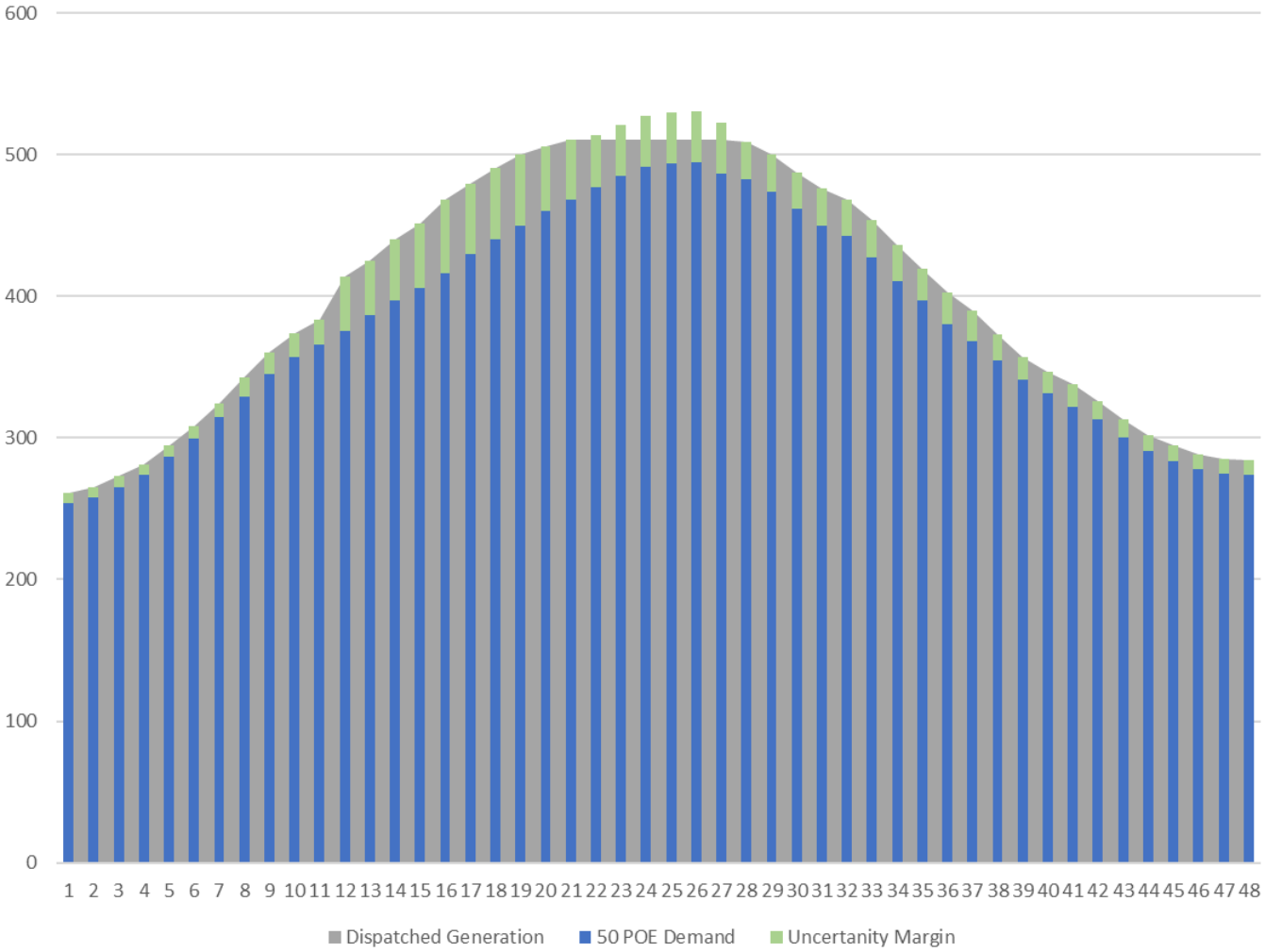

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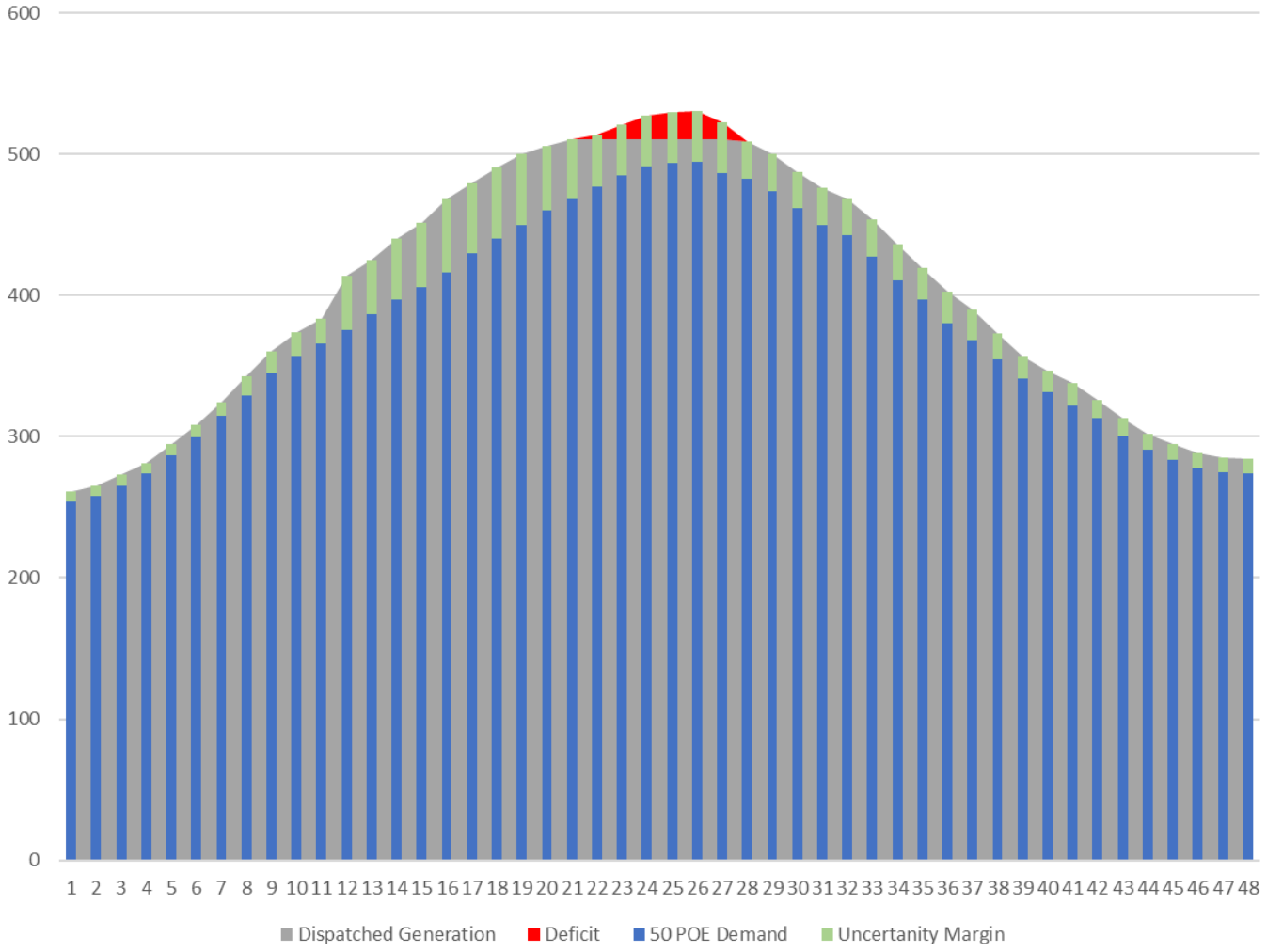


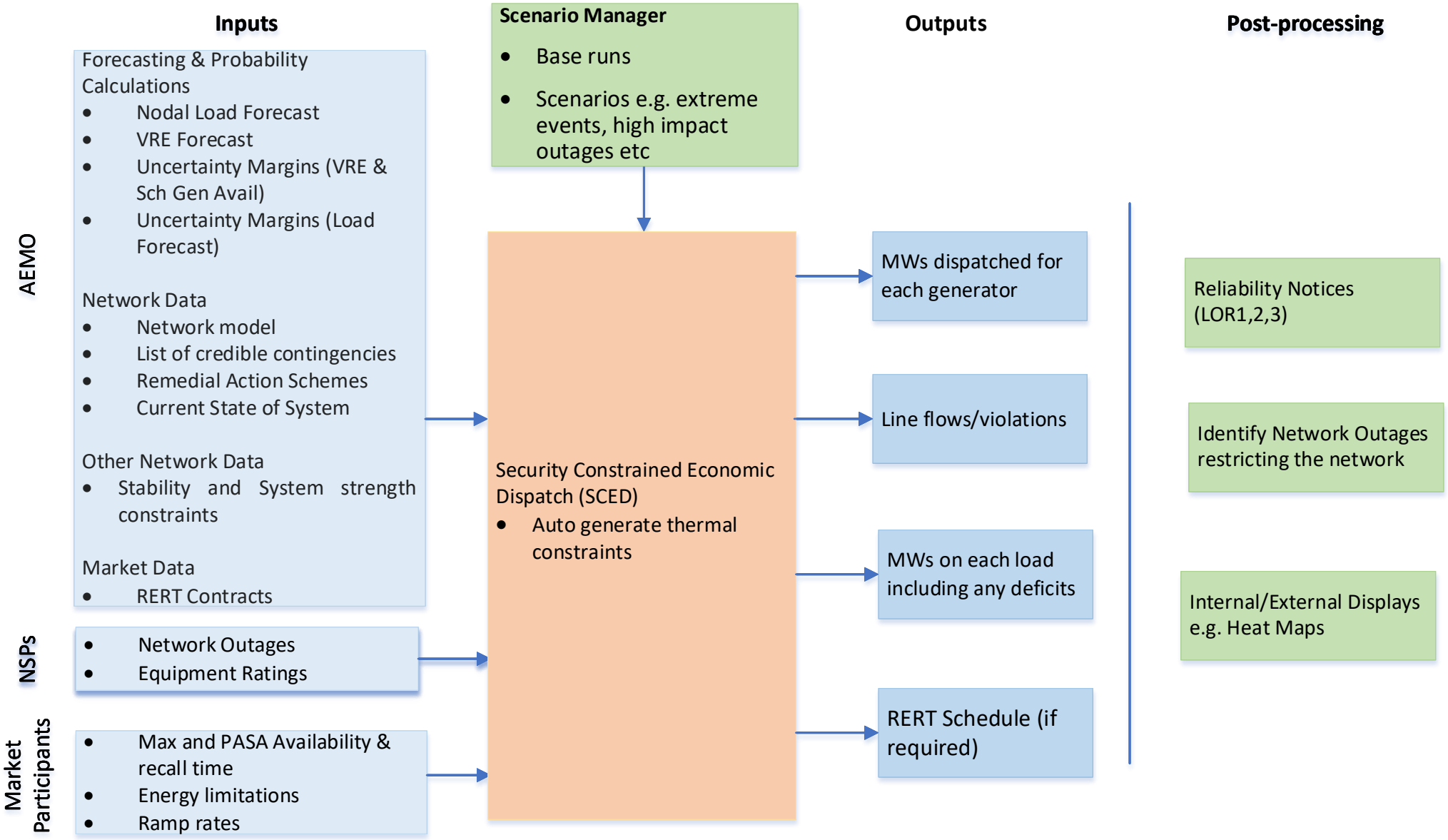
Uncertainty Margins and Confidence Levels

Uncertainty Margins and Confidence Levels

- *Uncertainty Margin: An amount of MWs that represents expected conditional forecast error given a confidence level, used to adjust the load, VRE forecasts and scheduled generation max availability and ensure sufficient supply to meet demand.*
- A methodology to produce Uncertainty Margins is being developed.
- A separate workshop to be held to discuss this further.
- x% confidence level means that we are x% confident that the forecast error will not exceed this value
  - Work to be done to determine which confidence level to be used

Overall Design

Overall Design



Inputs by NSPs

- Network Outages
  - The Network Outage Scheduler (NOS) will be treated as the single source of truth for ST PASA
  - Any NOS updates including extension of outage timing to be reflected as soon as practical to ensure that the changes are reflected accurately in the next ST PASA run
- Equipment Rating
  - No changes to current process envisaged as this stage

Inputs by Market Participants

For Generators, MNSPs, Loads, BDUs* and WDR* units, continue with current process for bidding:

- Max Availability
- PASA Availability
- Energy Limitations
- Ramp Rates

Additional process

- Enter the recall time associated with the PASA Availability

Inputs by Semi-Scheduled units

- The new STPASA rule requires all scheduled resources, including scheduled and semi-scheduled (SS) units to provide the Max Avail, PASA Avail and recall time in the ST time frame.
- At this stage, AEMO does not expect to use the PASA availability/recall time for SS units in the new STPASA. However, this may become important over time with the growing proportion of VRE resources in the generation mix.

Modelling of WDR & BDUs

- WDR units
  - Treated like a generator
  - Need to disaggregate dispatch across nodes pro-rata to registered Maximum Responsive Component (MRC) for each NMI in that unit
  - Bid Max Availability will be used
- Bi-directional units (batteries)
  - Bidirectional model to be introduced in June 2024
  - Will account for state of charge

Details to be explored in subsequent workshops

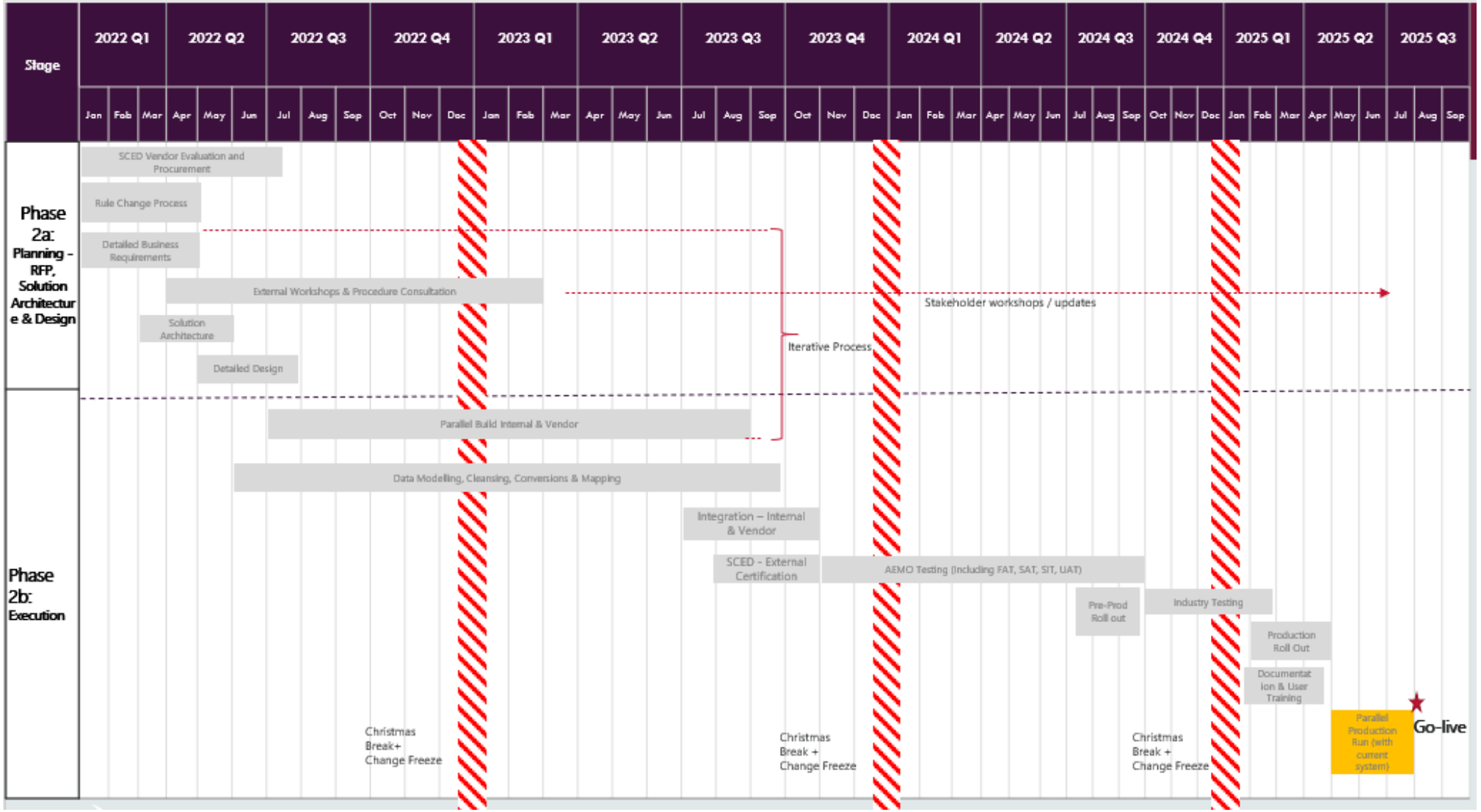
- Types of Runs - *Workshop #3*
  - used to determine the three LOR levels
  - Other runs to provide further information to market
- Different inputs used in each run- *Workshop #3*
  - System intact vs unplanned credible contingencies
  - Max Avail vs PASA Avail
  - Continuous vs Short-term ratings
  - What confidence level to use for Uncertainty Margins - *Workshop #4*
- Frequency of runs - *Workshop #3*
- Information to be published - *Workshop #5*

Next Steps

Workshop timetable

Workshop	Topic	Proposed Date
1	Generator Recall Process – current and future	Thursday 7 April 2022
2	Overview of the new process	Thursday 19 May 2022
3	PASA Run types	Thursday 23 June 2022
4	Demand Forecast, Uncertainty Margin and Confidence Levels	Thursday 21 July 2022
5	Information to be made publicly available	Thursday 11 August 2022

High level project time line



Glossary

Term	Definition
BDU	Bi-directional unit
FUM	Forecast Uncertainty Measure
LCR	Largest Credible Risk
LOR	Lack of reserve
MRC	Maximum Responsive Component
NMI	National Metering Identifier
NOS	Network Outage Scheduler
NSP	Network Service Provider
PASA	Projected assessment of system adequacy
PD	Pre-dispatch time frame
POE	Probability of exceedance. A 50% PoE load forecast is one which will be exceeded 50% of the time
ST	Short term time frame
WDR	Wholesale Demand Response