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# ST PASA Replacement Project- Industry Workshop (Feb 2020)

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**June 2020**

Summary of discussion

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# Important notice

## PURPOSE

AEMO has prepared this document to provide summary of the discussion at the ST PASA Replacement Project – Industry Workshop and any subsequent discussions, as at the date of publication.

## DISCLAIMER

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## VERSION CONTROL

Version	Release date	Changes
1	2 April 2020	Initial Document
2	4 June 2020	Update disclaimer and other minor changes

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# 1. Background

## 1.1 The ST PASA Replacement Project

The PD and ST PASA systems are the core systems used by AEMO and market participants to identify any system reliability issues in the pre-dispatch (PD) and short-term (ST) time frame.

The objective of the ST PASA Replacement Project is to undertake a holistic review of the PD/ST PASA methodology and develop a system that will serve the NEM now, and into the future.

The project will be done in two phases:

### Phase 1

Engage an external consultant to

- Consult with stakeholders to understand requirements for system redevelopment
- Investigate how the impact of the emerging technologies and processes like battery storage and demand response can be modelled to get a full picture of system reliability
- Investigate what is being done in this space internationally
- Identify potential solutions for implementation

This phase is expected to be completed by mid-2020.

### Phase 2:

- Develop a detailed design.
- Carry out Rules and/or RSIG change consultation process (if required).
- Build and implement the required system.

This phase is expected to be completed by mid-2022.

## 1.2 Why consider replacing ST PASA?

To enable AEMO to meet and maintain future regulatory obligations and industry needs, AEMO is commencing a project to potentially replace the current ST PASA system.

An internal review has found some issues with the current ST PASA system. The most notable being:

- The ST PASA system was designed when most of the generation was supplied from large thermal units connected to the transmission network. New technologies, such as battery storage, virtual power plants (VPPs), and distributed energy resources (DER), cannot be easily modelled in the current system.
- The current design uses study-region based modelling and needs improvement to cater for cross regional sharing of reserves.
- The current design needs improvement under some conditions to better represent/allocate energy limited plant.
- The system has become complex, making results harder to interpret and ongoing changes both costly to implement and support.
- Running ad-hoc offline PASA scenarios can be challenging.

### 1.3 Progress to date

AEMO has engaged Intelligent Energy Systems (IES) & Steve Wallace Advisory (SWA) to assist AEMO with Phase 1.

AEMO is consulting widely with industry to gain broad insights into how industry currently uses the PD/ST PASA information and understand proposed requirements from these systems going forward. IES & SWA held several one-on-one conversations with various stakeholders. AEMO then invited industry stakeholders to a workshop to get a wide variety of views on various issues identified during the stakeholder discussions and also identify any other issues that were not raised previously.

## 2. Industry Workshop

The industry workshop was held on 28<sup>th</sup> February 2020 and was attended by a variety of stakeholders. IES & SWA presented the common themes and issues identified during their previous stakeholder discussions and opened these up for feedback from the attendees. AEMO, IES & SWA also followed this up with further individual discussions where required.

This report summaries the topics that were discussed in the workshop, and the feedback received from the industry representatives at the workshop and subsequent to the workshop. This report should be read in conjunction with the slide pack that was used as a basis of discussion.

### 2.1 Approach & Workshop Focus

IES/SWA advised that an iterative approach was being used to determine the business requirements and potential solutions of the new PD/ST systems. This is illustrated in Figure 1.

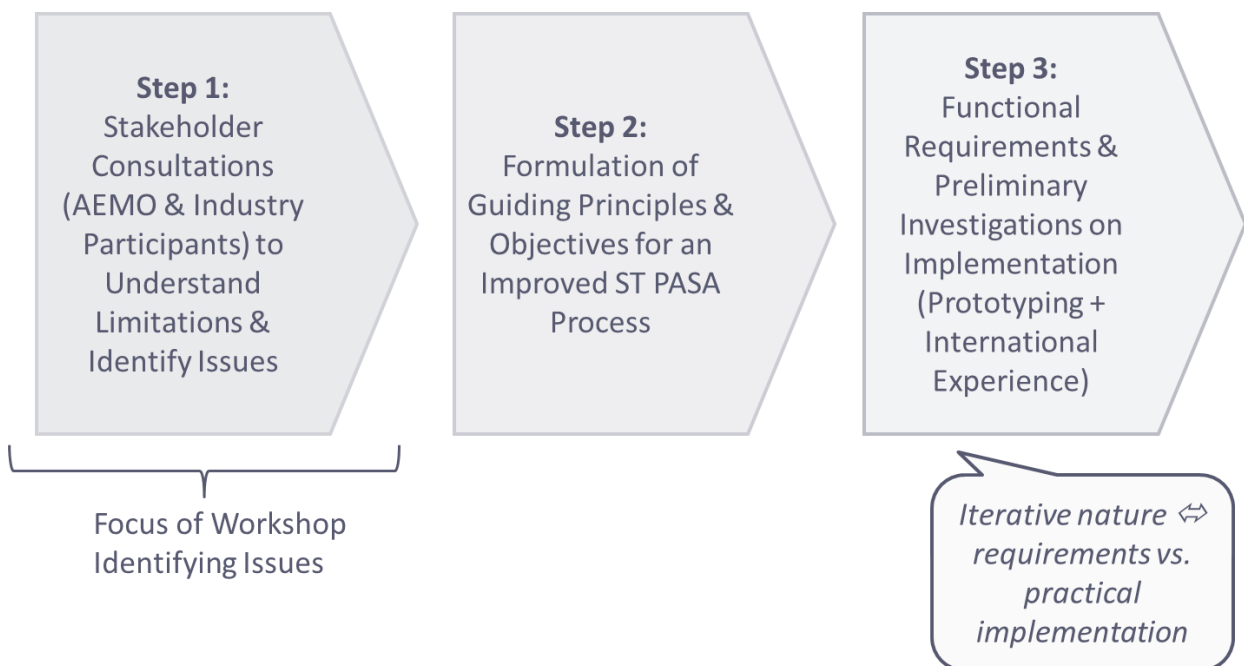


Figure 1, Iterative Approach for Determining ST PASA Requirements

## 2.2 ST PASA Objectives

The PD & ST PASA have a dual role of providing information for market participants to respond to power system needs and, if there is not an adequate response from participants, for AEMO to intervene in the market to manage system security and system reliability. AEMO may use different operational levers such as rescheduling a network outage, or activating RERT, to maintain system security and reliability.

AEMO would also like the new ST PASA system to provide a mechanism to assist AEMO, when required, to develop a RERT schedule at least expected cost.

## 2.3 Future Proof Design Principles

It was widely agreed that the ST PASA process needs to be matched to the future requirements of Australia's power system, where practical. This could include:

- Technology mix characterised by high levels of Variable Renewable Energy (VRE)
- High levels of penetration of battery energy storage systems (BESS)
- Increased levels of distributed energy resources (DER)
- Higher penetration of end use appliances that are responsive to prices and demand (DR)
- Be designed to accommodate a wider range of credible threats to power system operations

As the business requirements are being developed, the associated proposed modelling solutions will also be considered. It is understood that when some of the detailed modelling is eventually undertaken there may be difficulties in satisfying all the business requirements, and thus the business requirements may need to be modified or prioritised.

## 2.4 Common Themes

The following themes and issues were raised during individual discussions with stakeholders and discussed at the workshop.

### 2.4.1 Critical Decisions over 7-day period

The decisions made by AEMO and the industry (including market and non-market organisations) over the 7-day horizon are shown in the Figure 2. The text in blue was added as per the discussion at the workshop.

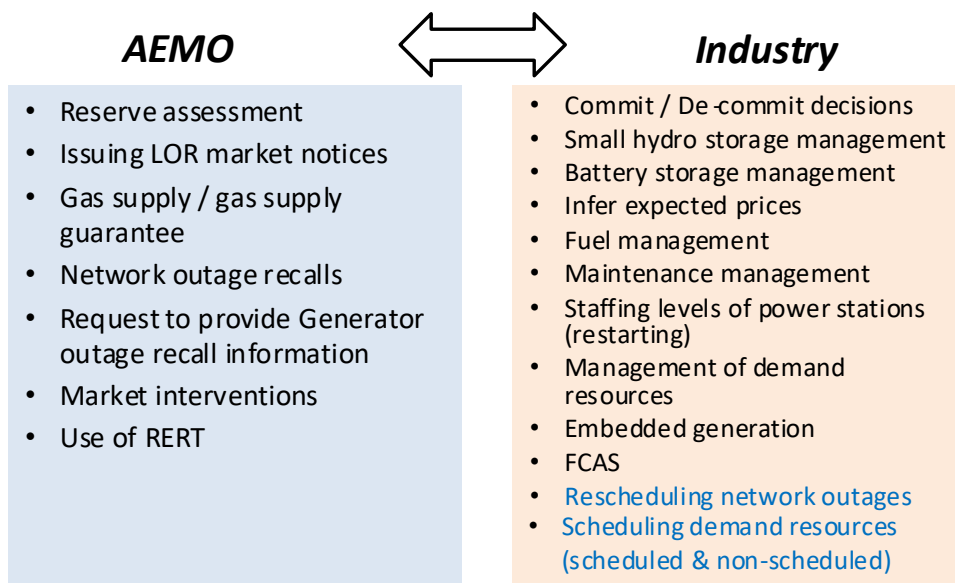


Figure 2, Critical Decisions over ST PASA Timeframe

## 2.4.2 Issues identified with current ST PASA

There were several issues identified with the current ST PASA. They were listed in the slide pack presented at the workshop. The key ones were:

- ST PASA regional model does not adequately reflect physical reality:
  - Loss of network elements not intersecting with regional boundary
  - Does not adequately model intra-regional constraints nor system post network contingencies
  - Network and load shedding not consistent with physical reality
  - Can make it difficult to interpret what the results mean
- Energy limited resources are not modelled adequately, and the optimisation of battery storages is problematic – e.g. not reflecting cycles within a day
- Power system security issues not modelled under all conditions – e.g. minimum demands
- Power system services like FCAS, Inertia, System strength etc are not modelled

Other topics that were raised at the workshop were:

- Network constraints do not reflect sub-regional load: AEMO does forecast some zonal loads that are used in network constraints, but there could be further improvements made in that area. AEMO will also consider the possibility of publishing these zonal forecasts
- A participant raised concerns that it appears that ST PASA is still allocating all the energy to 4am rather than allocating it to the higher demand periods. On follow-up it was discovered that the participant was looking at the wrong field and that the energy was being allocated proportionally over the day.

Notwithstanding that, AEMO agrees that there can be improvements made to modelling of energy limited plant and will investigate the most effective (and practical) method of modelling it.

- There is no documentation on the Lack of Reserve (LOR) run. AEMO will be updating the ST PASA Process description document to include this information, as part of the improvements it is doing to the current ST PASA system.
- There is not enough data available to non-market participants and there could be improvements made to the data dashboard. AEMO is working with organisations that raised this concern to understand their requirements and update the data dashboard, as appropriate. AEMO will also consider the appropriate means to provide the new ST PASA related data to both market and non-market participants.
- Whether ST PASA should model FCAS explicitly. One participant thought that it wasn't necessary as ST PASA was about reliability not security. However, it was pointed out that AEMO must run the power system securely first and thus reliability can only be assessed after security has been satisfied. The current reliability criterion of the largest two units is in effect one unit as a proxy for FCAS requirements and the other unit as a proxy for reliability.

Overall the workshop participants were supportive of AEMO's objective to replace the current PD/ST PASA systems to provide a more effective system reliability tool.

### 2.4.3 Time Horizon & Update Periodicity

Stakeholders were split between those that were happy with 7 days ahead and those that would like a longer period of say 10-14 days ahead. It was agreed that uncertainty of input data (e.g. weather forecast) out more than 7 days would be a lot higher and thus may not provide a lot of value.

It was suggested that AEMO may need to look at managing the boundary between ST and medium term (MT) PASA better. Even though both processes are different, there is sometimes a step jump in the reliability information that is being provided by the two systems around the boundary.

There was no strong opinion raised around increasing the update periodicity of PD or ST PASA. There was a suggestion made to increase the periodicity of ST PASA during periods of tight reserves, at AEMO's discretion.

### 2.4.4 Merging 7 Day Pre-Dispatch with ST PASA

Several stakeholders monitor both PD/ST PASA and 7-Day Ahead pre-dispatch and use results from both processes to inform their decisions.

There were mixed views about merging the two processes. Some stakeholders could see the benefits in having price signals which would assist them in making unit commitment decisions. However, some did not see a benefit in that approach and some also raised concerns about 'good faith' rebidding Rules being applied that far into the future. AER has advised that 'good faith' is not in the Rules and participants must be referring to 'false and misleading' rebidding rules.

AEMO will investigate this topic further and determine the merits (or lack thereof) of this approach.

## 2.5 ST PASA Model Details

IES/SWA put forward some thoughts on what areas should be considered while designing the new PD/ST PASA model. They were listed in the slide pack presented at the workshop.

There was general agreement to those suggestions, and it was emphasised that a more locational network model would provide a better outcome. It was also agreed that modelling of intra-regional network contingencies would be an important feature of the new model.



There was some discussion on how the Forecast Uncertainty Measure (FUM) is determined currently. AEMO is considering various options of modelling forecasting uncertainty in the new model, including the possibility of moving the probability distributions from the output via the FUM to clearly defined inputs.

There was discussion regarding the current LOR definitions. AEMO will examine if a fixed measure of reserve level will still be appropriate going forward.

## 2.6 Information Provision

Some of the data that stakeholders would like published are listed in the slide pack. There were some further suggestions including:

- Reserve levels in real time
- Traffic light signals (or similar) to show how far the power system is away from the required levels
- Informing when system is approaching low inertia levels
- Information about marginal values and violation degree of network constraints

It was commented that a traffic light system to indicate whether reliability is at risk was a good idea but may not be as useful for more than 24 hours ahead.

## 2.7 Credible contingencies

The Rules currently have definitions for credible and non-credible contingencies. Some participants expressed the view that they may not fully address all situations. AEMO will work through any gaps there may be regarding this issue.

### 3. Next Steps

Taking into account the discussions and feedback, AEMO, along with IES/SWA, will finalise the business requirements and consider potential modelling/software solutions.

Table 1 sets out the next steps of the ST PASA Replacement Project. The dates are indicative only and may be subject to change, including due to issues related to COVID-19.

Table 1, Next Steps

Deliverable/Milestone	Detail	Due Date
Feedback	Stakeholders to provide any further feedback	13 March 2020
Follow up	Individual follow-ups to address comments raised in workshop	March 2020
Summary Report	Summary of key themes raised at the workshop (this report)	March 2020
Final Report	Consultant Report to AEMO including requirements and potential solutions	May 2020
Finalise Phase 1 / Plan for next Phase	<ul style="list-style-type: none"> <li>• Develop Stakeholder consultation plan               <ul style="list-style-type: none"> <li>○ Develop webpage on AEMO Website to provide updates</li> </ul> </li> <li>• Develop resource requirements &amp; cost estimates</li> <li>• Seek approval from AEMO senior management to commence the next Phase</li> </ul>	Q3 2020
Commence next Phase	Pending approval commence designing and implementation (including Rule Change process)	Q3 2020

# A1. Key AEMO Contacts

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## A2. Key documents

Further information about the ST PASA process and design can be found on AEMO website.

Title	Location
SO_OP_3703 - Short Term Reserve Management	<a href="https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Power_System_Ops/Procedures/SO_OP_3703---Short-Term-Reserve-Management.pdf">https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Power_System_Ops/Procedures/SO_OP_3703---Short-Term-Reserve-Management.pdf</a>
ST PASA Process Description	<a href="https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Security-and-reliability/Dispatch-information/Policy-and-process-documentation">https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Security-and-reliability/Dispatch-information/Policy-and-process-documentation</a>
Reliability Standard Implementation Guidelines (RSIG)	<a href="https://www.aemo.com.au/Stakeholder-Consultation/Consultations/Reliability-Standard-Implementation-Guidelines-Consultation">https://www.aemo.com.au/Stakeholder-Consultation/Consultations/Reliability-Standard-Implementation-Guidelines-Consultation</a>
Lack of reserve - Credible Contingency List	<a href="https://www.aemo.com.au/-/media/Files/Stakeholder_Consultation/Consultations/Electricity_Consultations/2017/Reserve-Level/LOR-Contingency-List---Final---For-publication-20-Dec-2017.docx">https://www.aemo.com.au/-/media/Files/Stakeholder_Consultation/Consultations/Electricity_Consultations/2017/Reserve-Level/LOR-Contingency-List---Final---For-publication-20-Dec-2017.docx</a>
Reserve Level Declaration Guidelines	<a href="https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Power_System_Ops/Reserve-Level-Declaration-Guidelines.pdf">https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Power_System_Ops/Reserve-Level-Declaration-Guidelines.pdf</a>

# Abbreviations

<b>Term</b>	<b>Definition</b>
FCAS	Frequency Control Ancillary Services
FUM	Forecast Uncertainty Measure
LCR	Largest Credible Risk
LOR	Lack of Reserve
MT	Medium Term
PASA	Projected Assessment of System Adequacy
PD	Pre-dispatch
RERT	Reliability and Emergency Reserve Trader
RSIG	Reliability Standard Implementation Guidelines
ST	Short Term