

# Short Term PASA Procedures

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NOTE: National Electricity Amendment (Updating Short Term PASA) Rule 2022 No.4 requires AEMO to develop and publish ST PASA Procedure by 30 April 2025, and commence from 31 July 2025.

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## Current version release details

Version	Effective date	Summary of changes
1	31 July 2025	Updates as per National Electricity Amendment (Updating Short Term PASA) Rule 2022 No. 4 Changed title to ST PASA Procedure

**Note:** There is a version history at the end of this document.

# 1. Preliminary

## 1.1. Purpose

These are the short term (ST) projected assessment of system adequacy (PASA) procedures made under clause 3.7.3(c) of the National Electricity Rules (NER) (Procedures).

These Procedures have effect only for the purposes set out in the NER. The NER and the National Electricity Law prevail over these Procedures to the extent of any inconsistency.

## 1.2. Definitions and interpretation

### 1.2.1. Glossary

Terms defined in the National Electricity Law and the NER have the same meanings in these Procedures unless otherwise specified in this clause.

Terms defined in the NER are intended to be identified in these Procedures by italicising them, but failure to italicise a defined term does not affect its meaning.

In addition, the words, phrases and abbreviations in the table below have the meanings set out opposite them when used in these Procedures.

Term	Definition
<b>6-day PASA</b>	Short Term PASA as defined in NER 3.7.3, covers the period of six trading days starting from the end of the trading day covered by the most recently published pre-dispatch schedule.
<b>BDU</b>	Bidirectional unit
<b>CSV</b>	Comma-separated values; a file format for exchanging data using commas as delimiters.
<b>DB</b>	Database
<b>EMMS</b>	Electricity Market Management System; software, hardware, network and related processes to implement the NEM
<b>Goal programming</b>	An optimisation program that can be considered as an extension of LP algorithms to handle multiple objective measures.
<b>LHS</b>	Left hand side of a constraint equation
<b>LOR1 condition</b>	Refer to the Reserve Level Declaration Guidelines (RLDG) for the definition of LOR1 condition.
<b>LOR2 condition</b>	Refer to the Reserve Level Declaration Guidelines (RLDG) for the definition of LOR2 condition.
<b>LOR3 condition</b>	Refer to the Reserve Level Declaration Guidelines (RLDG) for the definition of LOR3 condition.
<b>LP</b>	Linear program
<b>MMS</b>	Market Management System (see EMMS)
<b>MNSP</b>	Market Network Service Provider (Network Service Provider in the National Electricity Rules)
<b>NEMDE</b>	NEM Dispatch Engine
<b>NER</b>	National Electricity Rules; a specified clause or paragraph from the NER

Term	Definition
<b>PD PASA</b>	Pre-dispatch PASA – Short Term PASA as defined in NER 3.7.3, covers the most recently published pre-dispatch period.
<b>POE</b>	Probability of exceedance
<b>Recall period</b>	Offered recall period of <i>scheduled resource</i> associated with its PASA Availability for each 30-minute interval.
<b>RHS</b>	Right hand side of a constraint equation
<b>ST PASA</b>	Short Term PASA as defined in NER 3.7.3. It consists of both PD PASA and 6-day PASA.
<b>UIGF</b>	Unconstrained Intermittent Generation Forecast of semi-scheduled generation

### 1.3. Related documents

Title	Location
Reliability standard implementation guidelines (RSIG).	<a href="https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-reliability/reliability-standard-implementation-guidelines">https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-reliability/reliability-standard-implementation-guidelines</a>
Reserve Level Declaration Guidelines (RLDG)	<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>
SO_OP_3703 - Short term reserve management	<a href="https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/power-system-operation/power-system-operating-procedures">https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/power-system-operation/power-system-operating-procedures</a>
Spot market operations timetable	<a href="https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/market-operations/dispatch-information">https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/market-operations/dispatch-information</a>
SO_OP_3707 Intervention, Direction and Clause 4.8.9 Instructions	<a href="https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/power-system-operation/power-system-operating-procedures">https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/power-system-operation/power-system-operating-procedures</a>
Demand Terms in EMMS Data Model	<a href="https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Dispatch/Policy_and_Process/Demand-terms-in-EMMS-Data-Model.pdf">https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Dispatch/Policy_and_Process/Demand-terms-in-EMMS-Data-Model.pdf</a>
AEMO Offers & Submissions	<a href="#">OffersSubmissions</a>

## 2. Introduction

The PASA has the following objective:

A comprehensive program of Information collection, analysis, and disclosure of medium term and short-term power system security and reliability of supply prospects so that Registered Participants are properly informed to enable them to make decisions about supply, demand and outages of transmission networks in respect of periods up to 2 years in advance (or up to 3 years in advance, where specified) (the *PASA objective*).

AEMO is required to prepare PASA in two timeframes:

- ST PASA, as defined in NER 3.7.3, requires AEMO to cover each 30-minute period in the seven trading days from and including the day of publication. AEMO meets this requirement by determining and publishing pre-dispatch PASA (PD PASA) and 6-day PASA; and

- Medium Term PASA (MT PASA)<sup>1</sup> requires AEMO to cover the 24 months (or the longer period of 36 months<sup>2</sup>) from the Sunday after the day of publication with a daily resolution.

This document, ST PASA Procedure<sup>3</sup>, is developed by AEMO to describe the preparation of ST PASA for market participants and includes the processes and methodologies that AEMO applies to produce ST PASA information.

## 2.1. Scope

This Procedure provides the following information:

- How AEMO will prepare inputs for the short term PASA reflecting the factors outlined in NER 3.7.3(g).
- The detailed short term PASA information AEMO will publish to meet the requirements of NER 3.7.3(k).
- The processes or methodologies AEMO will apply to produce the short term PASA information.
- The period to be covered by the short term PASA in accordance with NER 3.7.3(b).
- Any other information that AEMO considers reasonably necessary to implement the *PASA objective*, having regard to the costs and benefits of collecting the relevant information.

The scope does not include processes that follow each ST PASA run (such as declaration of conditions, reserve trading and market intervention)<sup>4</sup>.

## 3. Short term PASA inputs

### 3.1. AEMO inputs

Under clause 3.7.3(g) of the NER, AEMO is required to prepare the following information for input to the ST PASA;

- Forecast load and unscheduled generation, taking into account forecasting uncertainties.
- Forecast availability of scheduled resources, including any applicable constraints.
- Forecast network constraints and notified network outages.
- Any other factors AEMO considers relevant having regard to the PASA objective. For completeness, AEMO also prepares the following information;

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<sup>1</sup> MT PASA Process Description is available at [https://aemo.com.au/-/media/files/stakeholder\\_consultation/consultations/nem-consultations/2023/reliability-forecasting-guidelines-and-methodology-consultation/final/mt-pasa-process-description.pdf?la=en](https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2023/reliability-forecasting-guidelines-and-methodology-consultation/final/mt-pasa-process-description.pdf?la=en).

<sup>2</sup> NER 3.7.3(d)(1)(i), (d1) and (f)(5)

<sup>3</sup> NER 3.7.3(k)

<sup>4</sup> Refer SO\_OP\_3703 Short term reserve management. Available at <https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/power-system-operation/power-system-operating-procedures>.

- 10% probability of exceedance (POE) and 50% POE demand forecasts for each region for each trading interval.
- Reserve requirements for each region, determined in accordance with the short term capacity reserve standards.
- Forecast network constraints.
- Unconstrained intermittent generation forecasts for each semi-scheduled generating unit for each trading interval.

## 3.2. Participant inputs

Under clause 3.7.3(h) of the NER, each Registered Participant is required to prepare the following information for input to the ST PASA:

- Available capacity<sup>5</sup> of each *scheduled resource* for each relevant 30-minute period.
- *PASA availability* of each *scheduled resource* for each relevant 30-minute period.
- *Energy constraints*<sup>6</sup> for *scheduled resources* or *wholesale demand response constraints* (as applicable) for *wholesale demand response units*.

## 3.3. PASA availability

*PASA availability* is for market participants (through PASA Outputs) to advise the market on their available physical plant capability and any additional physical plant capability that can be made available during that period. This information can be provided under AEMO direction or by the market participant.

## 3.4. Recall period

The value entered as a recall period is in hours and must be greater than or equal to zero. The maximum value AEMO systems will accept is 24,000 hours, which is equivalent to 1,000 days and consistent with the maximum value used in MT PASA. The maximum value is also the default value.

If left empty, then AEMO's system will default to 24,000 hours and the plant will not be considered available for recall. If 0 hours is entered, AEMO's systems consider the available physical plant is immediately recallable. Other non-numeric values such as NULL, TAB and SPACE will be bid rejected.

Recallable plant capability with recall periods greater than 168 hours (7 days) is beyond the ST PASA timeframe and is therefore not used for operational decision making in ST PASA.

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<sup>5</sup> Available capacity is the same as MAXAVAIL in the Electricity Data Model report.

<sup>6</sup> From 1 July 2025, bidding system changes to the validation of bid Daily Energy Constraint come into effect, so that an energy bid is rejected if the *Daily Energy Constraint*  $\geq$  registered Max Capacity x 24 hours, with an error message reported to the participant.

The AEMO guidelines on Offers and Submissions are available at: [OffersSubmissions](#)

There is a data integrity requirement for 2 decimal places with anything greater than 2 decimal places will be bid rejected.

The following Table 1<sup>7</sup> summarises AEMO's interpretation of recallable capacities (PASA Availability minus Available Capacity) and recall periods.

**Table 1 AEMO interpretation of recallable capacities and recall periods**

Availability (MW)	Recall period (hours)	AEMO interpretation	Published recall period (hours)
PASAAvailability > Available Capacity	0	Bid accepted. Recallable capacity is immediately available.	0
PASAAvailability = Available Capacity	30,000	Bid rejected. An error message will be issued, as recall period exceeds the maximum limit of 24000 hours.	Participant needs to re-submit the bid.
PASAAvailability > Available Capacity	0.5	Bid accepted. Recallable capacity is available in 0.5 hours. Up to 2 decimal places will be accepted, bid will be rejected for 3 or more decimal places.	0.5
PASAAvailability > Available Capacity	168	Bid accepted. Recallable capacity is available within ST PASA period, which is 7 days (168 hours).	168
PASAAvailability > Available Capacity	48	Bid accepted. Recallable capacity is available with 2 days (48 hours) notice.	48

**Table 2 Further details on submissions of recall period (via API Submission)**

Recall period (hours) entered by participant (hours) via API Submission	AEMO interpretation	Published recall period (hours)
Recall Period attribute is defined, but its value is left blank, e.g. -"recallPeriod": Recall Period attribute is defined, but its value is non-numeric, or a string enclosed in quotes, e.g. -"recallPeriod": <tab key>, -"recallPeriod": "<space key>", Recall Period attribute is defined, but its value is a null character (ascii CHR(0) )	Bid rejected. An error message will be issued, Recall Period must be an integer or a decimal number with no more than two decimal places, between 0 and the pre-defined Max Limit of 24000.	Participant needs to re-submit the bid.
no value defined / removed for an interval	Bid accepted. Recall Period value will default to 24000 hours (maximum value). There is no recallable capacity.	24,000

<sup>7</sup> These examples are not exhaustive, refer to AEMO guidelines on Offers and Submissions available at: [OffersSubmissions](#)



**Table 3 Further details on submissions of recall period (via Web portal)**

Recall period (hours) entered by participant (hours) via Web Portal	AEMO interpretation	Published recall period (hours)
<blank>	Bid accepted. Recall Period value will default to 24000 hours (maximum value). There is no recallable capacity.	24,000
<space> 'non-numerical value'	Bid rejected. An error message will be issued, Recall Period must be an integer or a decimal number with no more than two decimal places, between 0 and the pre-defined Max Limit of 24000.	Participant needs to re-submit the bid.

## 4. Modelling assumptions

The ST PASA has specific modelling assumptions that are used as part of the inputs into the ST PASA process. This section explains the modelling assumptions for *scheduled resources*.

### 4.1. Scheduled and semi-scheduled generating units

Forecast availability of *scheduled* resources, including any applicable constraints, are assumed as follows:

- The lowest bid available capacities over the six trading intervals for each 30-minute period is used<sup>8</sup>.
- For *semi-scheduled generating units*: the minimum (lowest bid available capacities over the six trading intervals for each 30-minute period, UIGF) is used.

### 4.2. Scheduled loads

If present, *scheduled loads* that are normally-on dispatchable loads are dispatched off for Lack of Reserve (LOR) reserve assessment. Normally-off *scheduled loads* are assumed to be fully off.

### 4.3. Scheduled bidirectional units (BDUs)

ST PASA does not currently support charging/discharging cycles of BDUs. It only supports Daily Energy Constraints. Hence only the generation side of BDUs is modelled in ST PASA.

#### PD PASA:

A basic workaround to model charging/discharging capability of BDU used in PD PASA is as follows:

Available Capacity =

<sup>8</sup> AEMO has the functionality to use only one of average, minimum or the last trading interval available capacity from the six trading intervals for each 30-minute period for ST PASA. The current selection is the minimum.

Daily Energy Constrained Availability from the corresponding pre-dispatch run and 30-minute period, where

Daily Energy Constrained Availability =

min (bid Available Capacity from last trading interval of HH, pre-dispatch Initial Energy Storage for 30-minute period \* 2)<sup>9</sup>.

#### 6-day PASA:

A basic workaround to model charging/discharging capability of BDU used in 6-day PASA is as follows:

Available Capacity =

Lowest bid Available Capacity over the six trading intervals for each 30-minute period

Daily Energy Constraint =

Registered MaxOperationalStateOfCharge (if opted in) else MaxStorageCapacity

## 4.4. Wholesale demand response

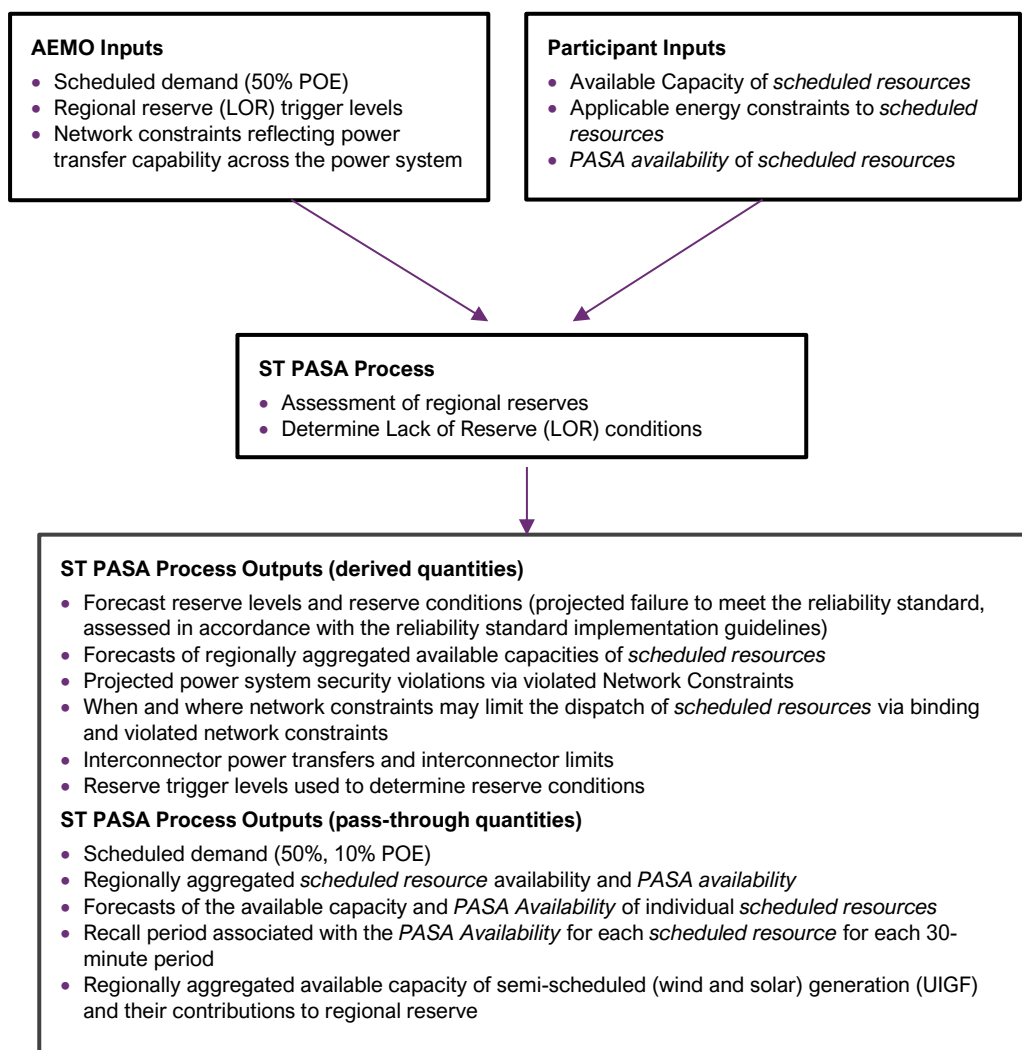
*Wholesale demand response* (WDR) scheduled entities are treated like normally on *scheduled loads* in ST PASA, and are dispatched off for LOR reserve assessment.

## 5. Short term PASA process

ST PASA collects information from a variety of sources to provide a forecast of the adequacy of the supply/demand balance. They are calculated on a half-hourly basis for both PD PASA and 6-day PASA periods incorporating the modelling assumptions as outlined in section 4 above.

Figure 1 summarises the ST PASA process.

<sup>9</sup> PD PASA does not apply a separate intertemporal maximum energy limit for BDUs. Hence if there is no BDU energy storage drawdown in pre-dispatch, the Daily Energy Constrained Availability = bid Available Capacity, and PDPASA will continually use this value for subsequent 30-minute periods, potentially exceeding the BDU's maximum energy limit. This results in overstating BDU contribution to reserves. AEMO is implementing a daily maximum energy limit for BDUs to minimise the inaccuracy introduced due to this. This procedure will be updated to reflect this change after implementing the change.

Figure 1 ST PASA process<sup>10</sup>

As outlined in Figure 1, the two parts of the ST PASA (PD PASA and 6-day PASA) use the same optimisation model.

- Market Participants prepare their bids and send this information to AEMO. The File Loader Bids application loads valid Energy (resource and Market Network Service Provider (MNSP)) from the Participant File Server into the Market Management System (MMS) Database. Bid Acknowledgment files are returned to Participants.
- The PD PASA process is initiated by MMS Timer on a cyclic basis every half-hour.
- The 6-day PASA process is initiated by MMS Timer on a cyclic basis every hour.
- The PASA Case Loader is used in PD PASA and ST PASA processes to create the input files for the ST PASA Solver.

<sup>10</sup> Refer AEMO Demand Terms in EMMS Data Model document available at: [https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security\\_and\\_Reliability/Dispatch/Policy\\_and\\_Process/Demand-terms-in-EMMS-Data-Model.pdf](https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Dispatch/Policy_and_Process/Demand-terms-in-EMMS-Data-Model.pdf).

- (For PD PASA only) The PASA Case Loader obtains SCADA snapshots from the MMS EMS Server.
- The PASA Solver—a goal programming solver—takes these input files and solves the case according to this procedure.
- The PASA process writes its solution to an output file (PASA Solver Solution file). The PASA output file triggers the PASA Solution Loader to load a PASA Solution into the NEM Database. A CSV Report each for PD PASA and 6-day PASA are generated and published to Market Participants.
- Another automatic process replicates ST PASA solution data to the Participant File Share. AEMO publishes ST PASA outputs via:
  - PD PASA and ST PASA NEM Reports if subscribed.
  - Participant Data Model tables<sup>11</sup>.
  - AEMO Market Data NEMWeb<sup>12</sup>.
  - AEMO Markets Portal (Web Portal)<sup>13</sup>.

## 6. Concepts and definitions

A number of concepts and definitions are used by PASA and these are discussed below, before commencing a detailed explanation of the PASA processes.

### 6.1. “Probability of exceedance” demand forecasts

Refer SO\_OP\_3710 – Load Forecasting<sup>14</sup> for the AEMO method of determining 50% and 10% POE Regional demand forecasts.

### 6.2. LOR trigger levels and Forecast Uncertainty Measure (FUM)

LOR1 and LOR2 trigger levels are determined using the following PASA information.

LOR: Largest Credible Risk.

LOR2: Sum of the largest and the second large credible risks

<sup>11</sup> Market participants load these NEM Reports into the Participant Data Model tables using the Data Interchange. The following link provides information on the Data Interchange: <https://visualisations.aemo.com.au/aemo/di-help/Content/Common/Glossary.htm>

<sup>12</sup> AEMO Market Data NEMWeb can be accessed using: <https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/data-nem/market-data-nemweb>.

<sup>13</sup> AEMO Markets Portal can be access using the following link. Participants must communicate with AEMO Support Hub obtain access to AEMO Market Portal. <https://portal.prod.nemnet.net.au/#/>

<sup>14</sup> AEMO operating procedure SO\_OP\_3710 – Load Forecasting is available at: [https://aemo.com.au/-/media/files/electricity/nem/security\\_and\\_reliability/power\\_system\\_ops/procedures/so\\_op\\_3710-load-forecasting.pdf?la=en](https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/power_system_ops/procedures/so_op_3710-load-forecasting.pdf?la=en).

LCR and LCR2 are determined by the ST PASA calculation dynamically. AEMO has the functionality to provide following manual inputs to correctly determine half hourly LCR and LCR2:

- Select loss of an element of an interconnector as a credible contingency.
- Select one physical generating unit of an aggregated generating unit as a credible contingency. This functionality is used to model loss of a gas turbine or combine cycle power station as a credible contingency.
- Select a group of generating units or power stations that are connected to the power system via a radial transmission line as a credible contingency.

AEMO also determines half-hourly Forecast Uncertainty Measure (FUM)<sup>15</sup> for the proceeding 72 hours. FUM is the measure of uncertainty in determining 50% POE regional demand, interconnector transfers determined by ST PASA as well as the supply side variables such as semi-scheduled wind and solar generation.

LOR2 trigger level = MAX (LCR, FUM)

LOR1 trigger level = MAX (LCR2, FUM)

Refer RLDG for details on the FUM methodology as well as its incorporation into LOR trigger levels.

### 6.3. Network constraints

Power transfer capability of the power system is modelled using network constraints. For example, flow on an interconnector can be expressed as a linear combination of various quantities such as regional demand, generation configuration and network outages. This flow can be constrained to be less than, equal to or greater than a certain limit.

A network constraint will take the form that consists of the following three terms:

- A left-hand side (LHS) variable that represents the calculated value of the quantity being constrained.
- An operator term that defines inequality ( $\geq$  or  $\leq$ ) or equality.
- A right-hand side (RHS) that represents the limit being applied.

AEMO will invoke a set of constraints depending on the particular system conditions (such as prior line outages). When the limit applied by a network constraint has been reached, the constraint is known as a binding constraint.

Each network constraint also has an associated violation penalty. These allow the bounds defined by the constraint to be violated at a cost. The “cost” is not an actual dollar value as ST PASA does not comprise pricing data, but rather a penalty associated with the violation of the constraint that indicates its relative importance. Provided the violation penalties are set at a level whereby they are only used as a last resort, constraints will only be violated when it would otherwise be impossible to determine a feasible solution. The assigning of different penalties

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<sup>15</sup> Refer Reserve Level Declaration Guidelines document for details on FUM and its application: [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).

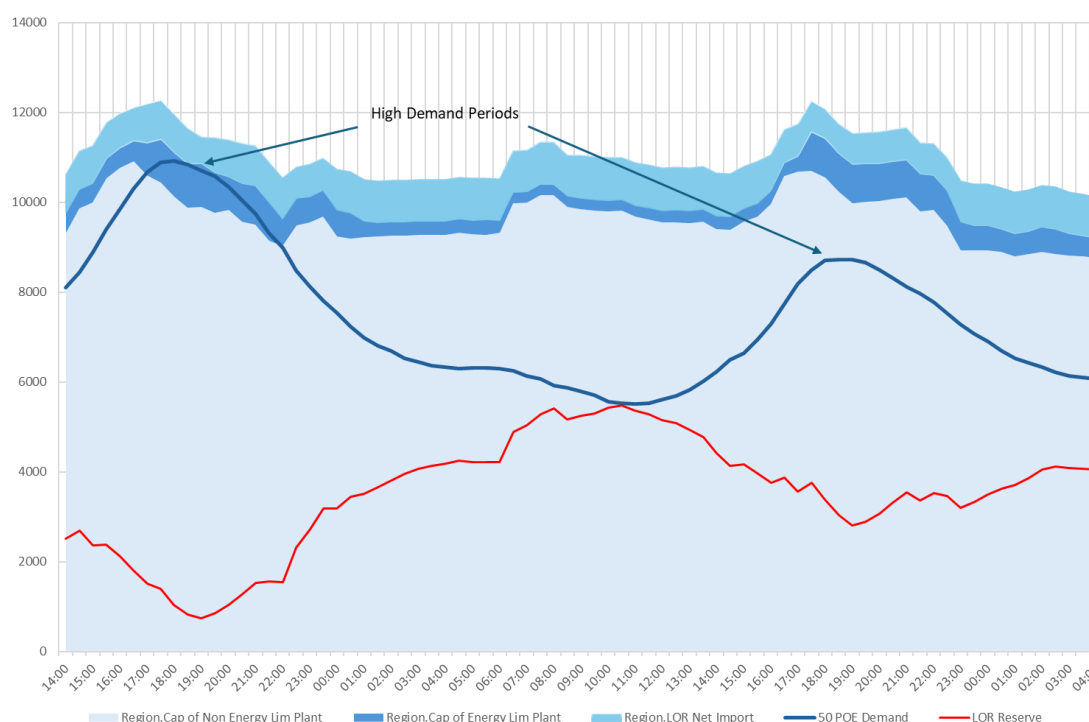
can prioritize constraints, i.e. a constraint with a low penalty would be violated before a constraint with a higher penalty.

## 6.4. Energy constrained plant

Generating plant such as hydroelectric and gas/diesel power stations cannot generally operate at maximum capacity indefinitely otherwise their energy source will be used up. Such plant is known as energy limited plant.

The ST PASA includes a process for allocating the contribution of energy limited plant to particular times of each day so that it maximises reserves throughout each day of the PASA period. This is done by allocating energy limited plant at times when regional demand is proportionally high, refer to Figure 2.

**Figure 2 Energy limited plant contribution to regional reserve**



BDUs are generally energy limited. The load side of BDUs are not modelled on ST PASA. Refer section 4.3 above for further details.

## 6.5. Lack of Reserve assessment

Regional Lack of Reserve modelling has the following attributes:

- Physical power system is modelled hence use 50% POE demand with planned network outages included.
- Since LOR assessment is required for each region in the NEM, ST PASA runs a separate reserve assessment for each region.


- The region for which the LOR reserve is assessed is taken as the study region. Supply demand balance is met in other regions and the surplus/deficit supply in other regions is transferred to the study region, subjected to network constraints. Then the reserves are assessed for the study region to determine reserves and LOR conditions. Each region is taken as study region in-turn and the reserve assessment is conducted.

See Figure 3 for a simple example of assessing LOR reserves and LOR Reserve conditions.

**Figure 3 A simple example of LOR reserve assessment**

Interconnector Limit 300 MW  
in either direction with both ccts in service,  
150 MW with only one cct in service

Interconnector Limit 300 MW  
in either direction with both ccts in service,  
150 MW with only one cct in service



Regional Demand (MW)	1200					2000				3000
Regional Generation (MW)	1000					2500				4000
Largest contingency	200					500				500
Largest + Second large contingency	400					1000				1000
<b>LOR Run for StudyRegion = Region A</b>										
Net Interconnector flow	300		From B to A					300	From C to B	
LOR2 trigger level	200									
LOR1 trigger level	400									
Total Supply	1300									
Reserve	100									
Reserve condition	LOR2									
<b>LOR Run for StudyRegion = Region B</b>										
Net Interconnector flow	200		From B to A			100		300	From C to B	
LOR2 trigger level						500				
LOR1 trigger level						1000				
Total Supply						2600				
Reserve						600				
Reserve condition						LOR1				

## 6.6. Assessment of LOR Reserve and LOR condition

The objective of the assessment of LOR reserves is to avoid the LOR3, LOR2 and LOR1 condition in that priority order.

The assessment utilises the security constrained Goal Programming model that evaluates LOR reserves, published as regional MaxSpareCapacity (MSC). The goals of the model are:

Find the maximum spare capacity available in each study region subjected to:

- (i) Must obey the network and resource level constraints.
- (ii) Avoid lack of capacity in the study region under several possible contingency conditions.
- (iii) Avoid deficit capacity in non-study regions.

- (iv) Any deficit capacity must be encouraged to appear in the study region rather than other regions.
- (v) LOR1, LOR2 and LOR3 deficit capacity must be shared across as many time periods as possible.
- (vi) Any degenerate solutions must be avoided.

The MSC for any region of the NEM in a given period is used to determine LOR Conditions as follows:

If  $MSC < 0$  level, then the LOR condition is LOR 3

Else

If  $MSC < \text{LOR 2 trigger level}$ , then the LOR condition is LOR 2

Else

If  $MSC < \text{LOR 1 level}$ , then the LOR condition is LOR 1

Else

No LOR Condition

## 7. Short term PASA outputs

ST PASA outputs are required under the NER to be published daily but AEMO publishes the ST PASA every hour to accommodate frequent changes in the market.

The published outputs of the LOR reserve assessment are as follows.

- Demand forecasts for each region with 10%, 50% and 90% probability of being exceeded.
- Short Term Capacity Reserve requirement (LOR trigger levels) for each region.
- Regional LOR reserves (MaxSpareCapacity in ST PASA outputs).
- Net Interchange for each region over interconnectors with other regions to achieve reserve sharing.
- LOR Condition – LOR 0, 1, 2 or 3.

For specific details of the data contained in the ST PASA Public .csv file, please refer to the MMS data model document<sup>16</sup> published on the AEMO website.

Refer Appendix A for a complete list of other ST PASA outputs.

### Features of ST PASA outputs

Each ST PASA LOR runs determine optimum levels of LOR reserve for each study region. Hence the ST PASA model does not use supply demand balance equation. Pre-dispatch includes supply demand balance equation because its objective is to determine the most cost-effective (i.e. based on the offers and bids) secure dispatch of energy and frequency

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<sup>16</sup> EMMS data model document is available at:

[https://visualisations.aemo.com.au/aemo/web-techspecportal/Content/TSP\\_TechnicalSpecificationPortal/EMMSDM.htm](https://visualisations.aemo.com.au/aemo/web-techspecportal/Content/TSP_TechnicalSpecificationPortal/EMMSDM.htm).



control ancillary services (FCAS) to meet demand. Because of this reason, outputs of ST PASA are different to pre-dispatch outputs.

**Regional LOR reserve, net interchange, interconnector flows/limits and binding/violated constraints:**

- Given that there are five sets of ST PASA outputs, AEMO selects regional LOR reserve, interconnector limits and binding/violated constraints for publication as follows:
  - Regional reserve and Net Interchange for study regions only.
  - Interconnector flows, interconnector limits, binding constraints and violated constraints from all ST PASA runs. Users must select RunType = LOR and then the StudyRegionId = RegionX to access these ST PASA outputs.

**Contributions from scheduled resources to regional LOR reserve:**

- Contributions from scheduled generation with daily energy constraints and from BDUs for regional LOR reserve are reported under the 'Constrained Capacity' for the region.
- Contributions from scheduled generation with no daily energy constraints and from semi-scheduled generating units for regional LOR reserve are reported under the 'Unconstrained Capacity' for the region.

## Appendix A. ST PASA outputs

Refer MMS Data Model Reports<sup>17</sup> for explanations of the listed data items below.

REGIONSOLUTION		
RUN_DATETIME	MAXSURPLUSRESERVE	UIGF
INTERVAL_DATETIME	MAXSPARECAPACITY	SEMISCHEDULEDCAPACITY
REGIONID	LORCONDITION	LOR_SEMISCHEDULEDCAPACITY
DEMAND10	AGGREGATECAPACITYAVAILABLE	LCR
DEMAND50	AGGREGATESCHEDULEDLOAD	LCR2
DEMAND90	AGGREGATEPASAAVAILABLE	FUM
RESERVEREQ	LASTCHANGED	SS_SOLAR_UIGF
CAPACITYREQ	RUNTYPE	SS_WIND_UIGF
ENERGYREQDEMAND50	ENERGYREQDEMAND10	SS_SOLAR_CAPACITY
UNCONSTRAINEDCAPACITY	CALCULATEDLOR1LEVEL	SS_WIND_CAPACITY
CONSTRAINEDCAPACITY	CALCULATEDLOR2LEVEL	SS_SOLAR_CLEARED
NETINTERCHANGEUNDERSCARCITY	MSRNETINTERCHANGEUNDERSCARCITY	SS_WIND_CLEARED
SURPLUSCAPACITY	LORNETINTERCHANGEUNDERSCARCITY	WDR_AVAILABLE
SURPLUSRESERVE	TOTALINTERMITTENTGENERATION	WDR_PASAAVAILABLE
RESERVECONDITION	DEMAND_AND_NONSCHEDGEN	

INTERCONNECTORSOLN	CONSTRAINTSOLUTION
STUDYREGIONID	STUDYREGIONID
RUN_DATETIME	RUN_DATETIME
INTERVAL_DATETIME	INTERVAL_DATETIME
INTERCONNECTORID	CONSTRAINTID
CAPACITYMWFLOW	CAPACITYRHS
CAPACITYMARGINALVALUE	CAPACITYMARGINALVALUE
CAPACITYVIOLATIONDEGREE	CAPACITYVIOLATIONDEGREE
CALCULATEDEXPORTLIMIT	LASTCHANGED
CALCULATEDIMPORTLIMIT	RUNTYPE
LASTCHANGED	
RUNTYPE	
EXPORTLIMITCONSTRAINTID	
IMPORTLIMITCONSTRAINTID	

<sup>17</sup> Available at: [https://visualisations.aemo.com.au/aemo/di-help/Content/Data\\_Model/MMS\\_Data\\_Model.htm](https://visualisations.aemo.com.au/aemo/di-help/Content/Data_Model/MMS_Data_Model.htm).

**Publication of the Available Capacity, PASA Availability and Recall Period**

For all *scheduled resources* and *MNSPs*, following information will be published starting from the current 30-minute period to the end of the ST PASA period. If an energy bid does not exist for a trading day, the latest valid energy bid received for the prior trading day is brought forward.

Run_DateTime
For PPDASA: current half hour ended interval For STPASAs: nominal STPASAs run time
Interval_DateTime (half-hour ended).
DUID for a <i>Scheduled Resource</i> , LINKID for MNSPs
<i>Scheduled Resource</i> /MNSP Maximum Availability (MW).
<i>Scheduled Resource</i> /MNSP PASA Availability (MW).
<i>Scheduled Resource</i> /MNSP Recall Period (hours).

## Version release history

Version	Effective date	Summary of changes
006	15/03/2012	ST PASA Process Description updated to reflect changed process (removal of the System (NEM) LRC run
005	25/05/2011	ST PASA Process Description updated: <ul style="list-style-type: none"><li>• Included semi-dispatch.</li><li>• Updated section 3.</li><li>• Updated section 5.</li><li>• Deleted old references.</li><li>• Corrected typos.</li></ul>
004	01/07/2010	Change to AEMO document