WEM RULES

PASA METHODOLOGIES

PREPARED BY: AEMO System Management (WA)
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1.0	10 July 2019	First issue, reflecting current state.
2.0	mm dddd yyyy	Reflects revised methodology in new PASA tool.

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1. INTRODUCTION

1.1. Purpose and scope

This Guideline documents the methodology followed by the Australian Energy Market Operator (AEMO) for the purpose of assessing Projected Assessment of System Adequacy (PASA) under:

(a) Step 4.1.4 of the Power System Operation Procedure: Short Term PASA; and

(b) Step 4.1.4 of the Power System Operation Procedure: Medium Term PASA.

This Guideline has effect only for the purposes set out in the Wholesale Electricity Market Rules (WEM Rules) and Procedures. The WEM Rules and Procedures prevail over this Guideline to the extent of any inconsistency.

This Guideline reflects the existing state of PASA as at the date of publication.

1.2. Power System Operation Procedure (PSOP) requirements

The PSOPs for Short Term and Medium Term PASA require at step:

4.1.1 AEMO must develop and publish methodologies detailing:

(a) Relevant assumptions related to the aggregation of data for the PASA study;

(b) The peak load forecast, where this must include:

(i) daily, weekly and monthly demand patterns;

(ii) seasonal variations;

(iii) weather conditions;

(iv) significant loads; and

(v) assumptions regarding block loads.

(c) The determination of transmission constraints between potentially constrained regions in accordance with clause 3.16.9(c) of the WEM Rules;

(d) The allowance for the Ancillary Service Requirements;

(e) The allowance for the Ready Reserve Standard in accordance with clause 3.18.11A of the WEM Rules;

(f) The allowance for the unavailability of Scheduled Generation;

(g) The allowance for the unavailability of Non-Scheduled Generation which must consider seasonal variation and fuel type; and

(h) The allowance for the unavailability of Demand Side Programmes.

4.1.5. Prior to publishing the methodologies in step 4.1.4, AEMO must engage with Market Participants and Network Operators in relation to the implementation of the methodologies.

1.3. Definitions and interpretation

1.3.1. Glossary

The words, phrases and abbreviations in the table below have the meanings set out opposite them when used in this Guideline.

Terms defined in the WEM Rules and the Procedures have the same meanings in this Guideline unless otherwise specified.

Table 1 Defined terms

Term	Definition
-	-

1.4. Related documents

Table 2 Related documents

Reference	Title	Location
PSOP	Short Term PASA	Market Web Site
PSOP	Medium Term PASA	Market Web Site

2. METHODOLOGY AND ASSUMPTIONS

2.1. Data usage and aggregation

2.1.1. Data usage

For the purposes of:

(i) conducting a PASA study, AEMO uses:

(i) generated values; or

(ii) converts Sent Out values to generated values.

(j) publishing the results of a PASA study (the PASA Report), AEMO converts generated values to Sent Out values.

As a result of this conversion, the Reserve Margin in the published PASA Report may not accurately reflect the Reserve Margin actually available. AEMO's existing PASA tools prevent the publication of the Reserve Margin on a generated basis.[1]

2.1.2. Data aggregation

Where data is not published on a Trading Interval basis AEMO aggregates values as indicated in the following table.

Value	Value over period of PASA Reference Point used
Generation and DSM capacity	Lowest
Outages	Highest
Demand forecast	Highest
Transmission constraints	Highest
Ancillary Service and Ready Reserve Requirements	Highest

2.2. Peak load forecasting

2.2.1. Trading Interval load forecasting model

This model includes historical and recent load and weather patterns, and recent load calculated using generated values.

Publication occurs daily and data is provided on a Sent-Out basis at a Trading Interval resolution over a seven- or eight-day horizon. The remainder of the Balancing Horizon is republished during each subsequent Trading Interval.

2.2.2. PASA forecasting model

This model is used for both Short Term and Medium Term PASA and is calculated using generated values at a six-hour resolution over a three-year horizon[2]. It does not include recent weather or usage, but only historical load patterns. Results are sense-checked with the forecasts provided in the latest WEM Electricity Statement of Opportunities (ESOO) report.

Publication occurs as part of the PASA Report on a Sent-Out basis.

2.2.3. Approach to forecasting

[1] AEMO intends to redevelop these tools.

[2] In the published Short Term PASA forecast, the forecast corresponding to the to the first week uses the 'high case' of the Trading Interval Load Forecast.

AEMO forecasts the peak load by calculating:

(a) the total SWIS demand from temperature-dependent loads using forecast and historical weather information, plus

(b) the total SWIS demand from non-temperature dependent loads.

2.2.4. Variations in forecast

Forecasts can vary depending on:

(a) Daily, weekly and monthly demand patterns, which are included:

(i) in the Trading Interval Load Forecast model based on recent conditions; and

(ii) in the PASA forecast model based on medium term historical data.

(b) Seasonal variations, which are included in the PASA forecast model based on historical data.

(c) Weather conditions, which are included in Trading Interval Load Forecast model based on recent conditions and Bureau of Meteorology (BOM) forecasts.

(d) Significant loads, which are included in the forecast models as non-temperature dependent loads, including assumptions regarding their demand which is based on historical data, except where the relevant Market Participant informs AEMO otherwise.

2.3. Determination of transmission constraints between potentially constrained regions

~~No~~ Limited transmission constraint~~ted regions~~ exist in the SWIS except under specific Outage conditions.

Where Outage conditions create a constrained region, AEMO identifies transmission constraints on Market Generators in each region by conducting power system studies.

2.4. Allowance for the Ancillary Service Requirements

AEMO makes the following allowances for Ancillary Services in the SWIS:

(a) Load Following Ancillary Service (LFAS), which is included in the Spinning Reserve requirement;

(b) Spinning Reserve Ancillary Service (SRAS): requirement of 70% of the largest generator not on outage, or the largest identified contingency, of which a portion is provided by Interruptible Loads with Spinning Reserve Ancillary Service Contracts as published in the annual Ancillary Services Plan.

(c) Load Rejection Reserve Ancillary Service (LRRAS): not relevant to PASA studies.

2.5. Allowance for the Ready Reserve Standard

All Ready Reserve Requirements are included which is calculated as:

(a) 30% of the largest Market Generator not on outage, plus the Minimum Frequency Keeping Capacity as defined in clause 3.10.1(a), available within 15 minutes.

(b) 70% of the second largest Market Generator not on outage, less the Minimum Frequency Keeping Capacity as defined in clause 3.10.1(a), available within 4 hours.

2.6. Allowance for the unavailability of Scheduled Generation

AEMO excludes the following Sheduled Generation:

(a) generation in the Balancing Portfolio that is not available to be dispatched for security reasons; and

(b) generation related to Intermittent Loads.

AEMO extends all outges to include the start-up time of Scheduled Generators, and includes any generation capacity in excess of the Capacity Credits assigned to the Facility.

2.7. Allowance for the unavailability of Non-Scheduled Generation (NSG)

AEMO includes ~~8 to 16% of NSG nameplate capacity~~the following allowances as a proportion of NSG nameplate capacity for Facilities >10MW[3], and 50% of NSG nameplate capacity for Facilities <=10MW.

Season	Wind (%)	Solar	Biogas
Summer	8	0	59
Spring	3	0	65
Autumn	2	0	59
Winter	5	0	64

~~These inclusions vary by season, but do not consider fuel types.~~

2.8. Allowance for the unavailability of Demand Side Programmes (DSP)

AEMO~~'s~~ includes an allowance for ~~existing PASA tools prevent the inclusion of capacity related to Demand Side Programmes in the Reserve Margin~~[4]~~. However,~~ DSP availability ~~is included in PASA Report~~.

[4] ~~AEMO is redeveloping these tools.~~