

# MARKET PROCEDURE: DETERMINATION OF EXPECTED DSM DISPATCH QUANTITY AND DSM ACTIVATION PRICE

PREPARED BY: AEMO System Capacity (WA)  
DOCUMENT REF:  
VERSION: 1.0  
EFFECTIVE DATE:  
STATUS: FINAL

**Approved for distribution and use by:**

APPROVED BY: Peter Geers  
TITLE: Executive General Manager, Markets

DATE: 8 June 2017

## VERSION RELEASE HISTORY

Version	Effective Date	Summary of Changes
1.0		New Market Procedure as required by the Wholesale Electricity Market Rules as per PC_2017_01.

## CONTENTS

<b>1. PROCEDURE OVERVIEW</b>	<b>4</b>
1.1. Relationship with the Wholesale Electricity Market Rules	4
1.2. Interpretation	4
1.3. Purpose and application of this Procedure	4
1.4. Associated documents	5
<b>2. METHODOLOGY FOR DETERMINING EXPECTED DSM DISPATCH QUANTITY</b>	<b>5</b>
2.1. Rule requirement	5
2.2. Methodology	5
<b>3. METHODOLOGY FOR DETERMINING DSM ACTIVATION PRICE</b>	<b>7</b>
3.1. Rule requirement	7
3.2. Methodology	7

## TABLES

Table 1 Defined Terms .....	4
-----------------------------	---

## 1. PROCEDURE OVERVIEW

### 1.1. Relationship with the Wholesale Electricity Market Rules

- 1.1.1. This Market Procedure: Determination of Expected DSM Dispatch Quantity and DSM Activation Price (Procedure) is developed in accordance with clause 4.5.14B of the Wholesale Electricity Market Rules (**WEM Rules**).
- 1.1.2. Reference to particular WEM Rules within the Procedure, which are in bold and square brackets [**Clause XX**], are current as of 10 December 2016. These references are included for convenience only and are not part of this Procedure.

### 1.2. Interpretation

- 1.2.1. In this Procedure, unless the contrary intention is expressed:
- (a) Terms that are capitalised but not defined in this Procedure have the meaning given in the WEM Rules.
  - (b) To the extent that this Procedure is inconsistent with the WEM Rules, the WEM Rules prevail to the extent of the inconsistency.
  - (c) A reference to the WEM Rules or Market Procedures includes any associated forms required or contemplated by the WEM Rules or Market Procedures.
  - (d) Words expressed in the singular include the plural or vice versa.
- 1.2.2. In addition, the following defined terms have the meaning given.

**Table 1 Defined Terms**

Term	Definition
Contingent Valuation Methodology	Contingent Valuation Methodology refers to a method of valuation used in cost-benefit analysis and environmental accounting. It is conditional (contingent) on the construction of hypothetical scenarios, reflected in expressions of the willingness to pay for potential benefits or for the avoidance of loss.
Direct Measurement Approach	Direct Measurement Approach refers to directly measuring the Value of Customer Reliability by asking survey respondents to provide information on the costs of power outages and the cost of mitigation measures taken to avoid power outages.
DSM	Demand Side Management.
Expected Unserved Energy (EUE)	Expected Unserved Energy refers to a forecast by AEMO of the aggregate amount in MWh by which the demand for electricity exceeds the supply of electricity.
Value of Customer Reliability (VCR)	The VCR represents the estimate by AEMO of the aggregated value that customers place on the reliable supply of electricity.
VCR Study <sup>1</sup>	The VCR Study refers to the study undertaken by AEMO under Chapter 3 of this Market Procedure to estimate a baseline VCR.

### 1.3. Purpose and application of this Procedure

- 1.3.1. Chapter 11 (the Glossary) of the WEM Rules defines the DSM Reserve Capacity Price as the price that will be paid per DSM Capacity Credit for a Capacity Year, being the product of:
- (a) the Expected DSM Dispatch Quantity for that Capacity Year plus 0.5 MWh; and

<sup>1</sup> Further information regarding the VCR Study undertaken in the National Electricity Market during 2013-14 is available under: <http://wa.aemo.com.au/Electricity/National-Electricity-Market-NEM/Planning-and-forecasting/Value-of-Customer-Reliability-review>

- (b) the DSM Activation Price for that Capacity Year.

1.3.2. The purpose of this Procedure is to describe how:

- (a) AEMO calculates:
  - (i) the Expected DSM Dispatch Quantity under clause 4.5.14C of the WEM Rules;
  - (ii) the DSM Activation Price under clause 4.5.14D of the WEM Rules; and
  - (iii) the DSM Reserve Capacity Price (as defined and calculated in Chapter 11 (the Glossary)); and
- (b) Rule Participants, and other parties, must provide information to AEMO to assist in calculating the Expected DSM Dispatch Quantity and DSM Activation Price **[Clause 4.5.14B]**.

## 1.4. Associated documents

1.4.1. The following Market Procedures (available on the Market Web Site<sup>2</sup>) provide background information to this Procedure:

- (a) Undertaking the Long Term Projected Assessment of System Adequacy (Long Term PASA) and Conducting a Review of the Planning Criterion.

## 2. METHODOLOGY FOR DETERMINING EXPECTED DSM DISPATCH QUANTITY

### 2.1. Rule requirement

2.1.1. AEMO must calculate the Expected DSM Dispatch Quantity by **[Clause 4.5.14C]**:

- (a) estimating the amount of Unserved Energy in a Capacity Year if no Demand Side Programmes (**DSP**) were dispatched;
- (b) estimating the amount of Unserved Energy in a Capacity Year if each DSP to which Capacity Credits are (or are forecast to be) assigned is dispatched for 200 hours;
- (c) calculating the difference between the estimates in step (a) and step (b); and
- (d) dividing the difference in step (c) by the total of all DSM Capacity Credits assigned to all DSPs as at 1 October of Year 3 of the relevant Reserve Capacity Cycle.

2.1.2. AEMO must publish the Expected DSM Dispatch Quantity for each Capacity Year in the Long Term PASA Study Horizon in the Statement of Opportunities (**SOO**) Report (other than the 2016 Capacity Year) **[Clause 4.5.13(h)]**.

### 2.2. Methodology

2.2.1. The Expected DSM Dispatch Quantity is the EUE avoided in a given Capacity Year as a result of each DSP with Capacity Credits being dispatched for 200 hours in that Capacity Year.

2.2.2. The Expected DSM Dispatch Quantity in MWh per DSM Capacity Credit assigned in year  $t$  of the Long Term PASA Study Horizon can be represented as:

$$EDDQ_t = \frac{EUE_{t,0} - EUE_{t,200}}{CC_t}, \text{ with } EUE_{t,0} \geq EUE_{t,200} \text{ and } CC_t \neq 0$$

<sup>2</sup> <http://aemo.com.au/Electricity/Wholesale-Electricity-Market-WEM/Procedures>.

Where

- (a)  $t = 1, 2, \dots, 10$  denotes the  $t^{\text{th}}$  Capacity Year (commencing at the start of the Trading Day which commences on 1 October, year  $t$  and ending at the end of the Trading Day ending on 1 October, year  $t + 1$ ) in a given Long Term PASA Study Horizon.
- (b)  $EDDQ_t$  denotes the Expected DSM Dispatch Quantity in MWh per DSM Capacity Credit assigned or expected to be assigned<sup>3</sup> in year  $t$ .
- (c)  $EUE_{t,0}$  denotes the EUE in MWh in year  $t$  if no DSPs with DSM Capacity Credits assigned or expected to be assigned<sup>3</sup> are dispatched.
- (d)  $EUE_{t,200}$  denotes the EUE in MWh in year  $t$  if each DSP with DSM Capacity Credits assigned or expected to be assigned<sup>3</sup> is dispatched for a total of 200 hours.
- (e)  $CC_t$  denotes the sum of all DSM Capacity Credits assigned or expected to be assigned<sup>3</sup> to DSPs as at 1 October of Capacity Year  $t$ . Where Capacity Credits have been assigned as at 1 October of Capacity Year  $t$ , but no Capacity Credits were assigned to DSPs, the values for  $EUE_{t,0}$ ,  $EUE_{t,200}$  and  $CC_t$  of the most recent Capacity Year will be used to determine  $EDDQ_t$ .

2.2.3. In accordance with step 2.1.2, AEMO must publish for each Capacity Year  $t$  in the Long Term PASA Study Horizon values for:

- $EDDQ_t$ ;
- $EUE_{t,0}$ ;
- $EUE_{t,200}$ ; and
- $CC_t$

in the SOO Report (other than the 2016 Capacity Year) **[Clause 4.5.13(h)]**.

2.2.4. The approach used to calculate  $EUE_{t,0}$  and  $EUE_{t,200}$  must be consistent with the approach used for the reliability assessment of the Long Term PASA study<sup>4</sup>.

2.2.5. The input data and modelling assumptions used to calculate  $EDDQ_t$ ,  $EUE_{t,0}$  and  $EUE_{t,200}$  must be consistent with the input data used for the Long Term PASA reliability assessment and Availability Curve development. Input data and assumptions may include (but are not limited to):

- (a) allocation of Capacity Credits to generation and DSM resources;
- (b) demand forecasts (including peak demand, energy consumption, and load duration curve forecasts);
- (c) Planned Outages and Forced Outages of generation;
- (d) Intermittent Generator production profiles;
- (e) DSP availability information including any constraints;
- (f) relevant network constraint data that may affect any Facility's ability to provide energy; and
- (g) other relevant demand, generation or DSP data (e.g. ability to provide Ancillary Services, Heat Rates, regional Load participation factors, etc).

<sup>3</sup> For Capacity Years where DSM Capacity Credits have not been assigned, AEMO may roll forward DSM Capacity Credits assigned in the most recent year while taking into consideration any advice provided by Market Participants regarding their respective Facility. Such advice may include (but is not limited to) likely reductions, upgrades or retirements in capacity.

<sup>4</sup> The reliability assessment component of the Long Term PASA study assesses whether the forecast Reserve Capacity Targets applicable for the Long Term PASA study horizon meets the reliability aspect of the Planning Criterion set out in clause 4.5.9(b) of the Market Rules (i.e. expected energy shortfalls (or EUE) must be less than 0.002% of expected annual demand).

- 2.2.6. The approach used to model the dispatch of DSM capacity must be consistent with the approach taken to modelling DSM dispatch for the Availability Curve component of the Long Term PASA study<sup>5</sup>, including:
  - (a) dispatching DSM capacity in a given year so as to minimise peak demand; and
  - (b) taking into account DSP availability constraints.
- 2.2.7. In determining  $EUE_{t,0}$ , AEMO must assume that DSPs are not dispatched in year  $t$ , while meeting the requirements in step 2.2.6.
- 2.2.8. In determining  $EUE_{t,200}$ , AEMO must assume that all DSPs are dispatched for exactly 200 hours in year  $t$ , while meeting the requirements in step 2.2.6.
- 2.2.9. AEMO may request information that can be used to inform the process outlined in step 2.2.2 for each year of the Long Term PASA Study Horizon, no later than 1 April of Year 1 of the relevant Reserve Capacity Cycle **[Clause 4.5.3]**. Rule Participants must provide the information requested under this step within 15 Business Days from the date of the request **[Clause 4.5.4]**.

### 3. METHODOLOGY FOR DETERMINING DSM ACTIVATION PRICE

#### 3.1. Rule requirement

- 3.1.1. The DSM Activation Price must be calculated in accordance with clause 4.5.14D of the WEM Rules.
- 3.1.2. AEMO must publish the DSM Reserve Capacity Price in the SOO Report for the Capacity Year commencing on the next 1 October after the SOO Report is published **[Clause 4.5.13(i)]**.

#### 3.2. Methodology

- 3.2.1. The DSM Activation Price represents the VCR for a Capacity Year in dollars per MWh and is used to determine the DSM Reserve Capacity Price as stated in step 1.3.1. The VCR reflects the value derived through reduction of unserved energy by DSPs.
- 3.2.2. AEMO will undertake an annual assessment to determine the need to conduct a VCR Study and will publish the outcome of this assessment in the Request for Expressions of Interest by 5:00 PM on or before 31 January of Year 1 of a Reserve Capacity Cycle in accordance with clause 4.1.4. The assessment will consider costs and the expected duration of the study. AEMO will take the following factors into account in making the assessment:
  - (a) whether an allowance for a study has been made in AEMO's Allowable Revenue determination;
  - (b) any relevant studies brought to the attention of AEMO; and
  - (c) the views of the MAC and other stakeholders.
- 3.2.3. In the absence of a VCR Study, AEMO will determine the VCR price to be \$33,460/MWh, which is the value provided in clause 4.5.14F of the WEM Rules.
- 3.2.4. A VCR Study will include the estimation of the VCR across different customer groups, where this grouping will include, as a minimum, the following:
  - (a) residential customers; and

<sup>5</sup> The Availability Curve component of the Long-term PASA study estimates (amongst other quantities) the minimum amount of generation required to meet the Planning Criterion (Clause 4.5.9) and the Outage Planning criteria (Clause 3.18.11), if all DSPs were dispatched to their maximum (excluding Interruptible Load) so as to minimise peak demand.

- (b) non-residential customers.
- 3.2.5. Subject to step 3.2.6, AEMO may apply a Contingent Valuation Methodology to estimate the VCR for each customer group selected for a VCR Study. Alternatively, AEMO may apply a Direct Measurement Approach in estimating VCR for customer groups where AEMO deems the cost of an outage can be measured directly.
- 3.2.6. Where a VCR Study is conducted, AEMO will define a range of outage scenarios based on historical outage data from the South West Interconnected System (SWIS) to facilitate the application of the Contingent Valuation Methodology and the Direct Measurement Approach in step 3.2.5.
- 3.2.7. AEMO may use the following set of outage attributes in defining outage scenarios:
- (a) severity (localised versus widespread);
  - (b) duration;
  - (c) frequency;
  - (d) season (e.g. summer versus winter);
  - (e) day of the week (e.g. weekday versus weekend); and
  - (f) timing (e.g. peak or off-peak).
- 3.2.8. AEMO will ensure the outage scenarios defined in step 3.2.6 include, at a minimum:
- (a) an “expected” or “average” outage scenario;
  - (b) power outages during an extreme heatwave; and
  - (c) rare but long duration power outages.
- 3.2.9. Where a VCR Study is conducted, AEMO will calculate the DSM Activation Price for a given year  $t$  by using a load-weighted average of the customer group VCR estimates derived in the VCR Study, based on each customer group’s share of consumption in the 12 peak SWIS Trading Intervals as defined in Appendix 5 of the WEM Rules during the most recently determined Hot Season.
- 3.2.10. A VCR Study is valid until a more current VCR Study is completed, at which time the new VCR Study will validly replace the previous VCR Study.
- 3.2.11. AEMO may request information from Market Participants to determine the DSM Activation Price, and Market Participants must provide the requested information within 15 Business Days. AEMO may extend the time for Market Participants to respond to a request made under this step [**Clause 4.5.3**].
- 3.2.12. As part of the VCR Study, AEMO will publish an issues paper that explains the proposed methodology, inputs and assumptions for the study, and must invite stakeholder submissions.
- 3.2.13. Once a revised VCR has been determined, AEMO must publish a draft report describing the process used to arrive at the proposed value and undertake consultation.
- 3.2.14. At the conclusion of the VCR Study, AEMO will publish a final report which includes:
- (a) inputs, assumptions and results of the VCR Study; and
  - (b) submissions made by stakeholders during the consultation process and any responses to issues raised in those submissions.