AER Statement of Methodology for determining Values of Customer Reliability

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Contents

Shortened form	Extended form
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
CPI	Consumer Price Index
GWh	gigawatt hour
kVA	kilovolt ampere
kWh	kilowatt hour
MVA	megavolt ampere
VCR	values of customer reliability
WTP	willingness to pay
$/kWh	dollars per kilowatt hour

1 Methodology

This document sets out our methodology to calculate values of customer reliability (VCR) for unplanned outages for standard outages with a typical duration equal to or less than 12 hours.

From March to June 2020, we consulted on a draft model for estimating widespread and long duration outages. Although stakeholders provided in-principle support for a macro-economic approach for estimating the costs of WALDOs and deriving WALDO VCRs, they did not support the draft WALDO model in its current form, mainly due to concerns with how the draft WALDO model estimates social costs. There were also differing views among stakeholders on the extent to which social costs should be included in the draft WALDO model, and whether including these costs is consistent with the National Electricity Objective.

We have considered the issues raised in the submissions responding to the consultation paper in our Final Conclusions document[1] and have updated the VCR methodology to discontinue the WALDO methodology and modelling approach.

We believe there is merit in further work being undertaken on WALDO, and we are considering ways future primary research could be carried out via partnerships with universities or other similar academic institutions.

The VCR methodology is set out in Tables 1.1 to 1.3 below. It is also published on the AER website in chapter 4 of our *Final decision on methodology for determining VCR values.* This document serves as a standalone statement of the final methodology.

Table 1.1: Methodology for standard outages

Standard outages	
Residential and business customers with a peak demand of less than 10 MVA	Stated preference surveys using combined contingent valuation and choice experiment techniques. *Contingent valuation* The contingent valuation technique asks a respondent two closed questions followed by one open-ended question about their willingness to pay (WTP) to avoid two unexpected power outages a year (the baseline scenario) affecting either the home of a residential customer or the specified place of business of a business customer. Each unexpected outage in the baseline scenario occurs on a different random weekday in winter and lasts for one hour during off-peak times. Each outage only affects the local area. The closed questions present a respondent with a bill increase of $x and ask the respondent to indicate (YES or NO) as to whether they

1 AER, *Widespread and Long Duration Outages Final Conclusions*, September 2020.

would be willing to pay the $x bill increase to fund network investment and avoid the baseline scenario.

The bill increase of $x for the first closed question is randomly selected. The second closed question is double the first cost prompt if the respondent answers YES to the first question and is half the first cost prompt if the respondent answers NO to the first question.

The initial cost prompts for residential customers are the following monthly bill increase amounts: $2, $3, $4, $5, $6, $7, $8 and $9.

The initial cost prompts for business customers are the following bill increase percentage amounts: 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9% and 10%.

The open-ended question following the closed questions asks respondents to indicate the maximum bill increase they would be willing to pay to avoid the baseline scenario.

Responses to the open-ended question are capped. For residential customers the cap is $22 per month, which is the approximate cost of a backup power system which can supply a household for the duration of the baseline scenario.[2] Where a respondent enters a value more than the cap, they will be asked a follow up question as to whether they would be willing to pay $22 per month to install the described backup power system. If the respondent answers NO, they will then be presented with an open-ended question asking them how much they would be willing to pay to install the described backup power system.

For business customers the cap is equal to 100 percent of their indicated electricity bill.

Choice experiment

The choice experiment technique asks respondents to identify their most preferred option out of a series of choices with different outage characteristics such as duration, severity (widespread / localised), time of day, time of week and time of year they occur in. The trade-offs customers make in choosing between options with different characteristics are used to determine the relative value respondents place on each of these attributes.

The choice experiment technique presents respondents with eight different sets of three hypothetical outage scenarios that ask respondents to select their preferred outage scenario in each set. Each outage scenario includes a specified bill discount which a customer would receive if they choose to accept the outage scenario.

Each set of outage scenarios contain the baseline scenario with no bill discount. The other two scenarios in each set are variations of the baseline scenario with changes to the severity (level) of one or more attributes (characteristics) of the outage. The attributes and levels tested in the choice experiment are:

2 Appendix 4 of our *Draft decision* discusses how we set the cap of $22 per month.

	• Outage duration: 1 hour, 3 hours, 6 hours and 12 hours • Geographic impact: 'localised' and 'widespread' • Time of day: Peak time and Off-peak time • Season: Summer or Winter • Day of the week: Weekday or Weekend • Bill discount (residential): no change, $3 per month, $7 per month and $15 per month • Bill discount (business), no change, 1%, 2% and 3%.
Business customers with peak demand of equal or greater than 10 MVA	*Direct cost survey* The direct cost survey asks respondents to outline and quantify the actual costs they expect to incur as a result of an unplanned outage affecting their identified business site. There are two versions of the survey - one for business sites with continuous 24/7 operations and one for business sites with non-continuous operations. For customers with continuous 24/7 operations, respondents are asked to outline and quantify the costs they would expect to incur in an unplanned outage of the following durations: 10 minutes, 1 hour, 3 hours, 6 hours, 12 hours, 24 hours and 48 hours. For customers with non-continuous operations, respondents are asked to outline and quantify the costs they would expect to incur for: • unplanned outages that start at peak times (between 7am and 10am, or 5pm and 8pm on a weekday) for the following durations: 10 minutes, 1 hour, 3 hours and 6 hours • unplanned outages that occur at off-peak times (anytime except between either 7am and 10am or 5pm and 8pm), on a weekday for the following durations: 10 minutes, 1 hour, 3 hours and 6 hours • unplanned outages that start at any time and have the following durations: 12 hours, 24 hours and 48 hours.

Table 1.2: Methodology for annual adjustment mechanism

Annual adjustment mechanism

Published values will be adjusted on an annual basis using a CPI-X approach, where X is set to zero. This ensures that in economic terms, real values of VCR are maintained between VCR reviews.

Due to the lack of available information on what the key drivers of changes in customer reliability preferences are and how they affect VCR, X is set to zero. We consider these difficulties are likely to remain an impediment to calculating a non-zero X in the near future. The AER welcomes further discussions with stakeholders on how real changes in VCR could be monitored annually, prior to the next review.

To measure CPI changes we will apply the annual percentage change in the Australian Bureau of Statistics' (ABS) consumer price index (CPI) all groups, weighted average of eight capital cities, for the four quarters preceding the most recently reported figure.[3] For example, to publish annual adjustments in December, we will use the reported CPI figures for the four quarters preceding September, which are the most recently reported figures available.

ΔCPI_t is the annual percentage change in the ABS CPI All Groups, Weighted Average of Eight Capital Cities[4] from the September quarter in regulatory year t–2 to the September quarter in regulatory year t–1, calculated using the following method:

The ABS CPI All Groups, Weighted Average of Eight Capital Cities for the September quarter in regulatory year t–1

divided by

The ABS CPI All Groups, Weighted Average of Eight Capital Cities for the September quarter in regulatory year t–2

minus one.

For example, for the 2021 regulatory year, t–2 is September quarter 2019 and t–1 is September quarter 2020; and for the 2022 regulatory year, t–2 is September quarter 2019 and t–1 is September quarter 2020 and so on.

3 ABS, Catalogue number 6401.0, Consumer price index, Australia. We note this measure is consistent with our approach to indexation employed elsewhere by the AER, for example to index network business' regulatory asset bases.

4 If the ABS does not or ceases to publish the index, then CPI will mean an index which the AER considers is the best available alternative index.

Table 1.3: Methodology for converting VCR survey results into dollars per kilowatt hour ($/kWh) VCR values and aggregating values

Converting survey results into dollars per kilowatt hour ($/kWh) and aggregating values	
Deriving $/kWh standard outage VCR for each residential segment	For each residential customer segment, the contingent valuation and choice experiment results are combined to produce a dollar value for a range of outage scenarios relevant for customers in that segment. To convert into $/kWh values, the dollar value are divided by an estimate of the consumption which a residential customer would have consumed over the period had the outage not occurred. This estimate is based on residential consumption data obtained from one or more of the following sources: • the residential survey • network business data, or • other available sources (actual or estimated) of residential consumption data. An aggregate $/kWh for each residential cohort is derived by summing the probability-weighted $/kWh VCR of each outage scenario. The probability for each outage scenario is based on estimates derived from historical network outage data.

Deriving $/kWh standard outage VCR for each business segment with a peak demand of less than 10 MVA	The contingent valuation and choice experiment results for each business segment are in % of bill terms. These results are converted to dollar terms using estimates of business customer bills. Different bill assumptions may be used to account for consumption size and/or business sector. The dollar contingent valuation and choice experiment results are combined to produce a dollar value for a range of outage scenarios relevant for customers in that segment. To convert into $/kWh values, the dollar value is divided by an estimate of the consumption which a business customer would have consumed over the period had the outage not occurred. This estimate is based on business consumption data obtained from: • the business survey • network business data, or • other sources (actual or estimated) of business consumption data. An aggregate $/kWh for each business cohort is derived by summing the probability-weighted $/kWh VCR of each outage scenario. The probability for each outage is based on estimates derived from historical network outage data.
Deriving $/kWh standard outage VCR for business customers with peak demand greater than or equal to 10 MVA	The responses from the direct cost survey produce a dollar value for the outage scenarios asked in the survey. To convert into $/kWh vales, the dollar value for each outage is converted using energy consumption data obtained from the direct cost survey. An aggregate $/kWh for each business customer is obtained by summing the probability-weighted $/kWh VCR of each outage scenario. The probability for each outage is based on estimates derived from historical network outage data. The aggregate $/kWh for each response is load-weighted with other direct cost survey response, on the basis of industry or sector groupings, to produce a combined industry or sector $/kWh VCR.
Aggregating VCRs	Aggregate VCRs for a particular area or region are derived by load-weighting the relevant aggregate residential and business cohort VCRs (including combined aggregate industry or sector $/kWh VCRs for business customers with peak demand of greater than or equal to 10 MVA).