AusNet

23 April 2024

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Stephanie Jolly
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Australian Energy Regulator
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Dear Stephanie

Submission re: AER Draft Determination – Values of Customer Reliability (VCR) Methodology

AusNet welcomes the opportunity to provide this submission to the AER's draft determination on the value of customer reliability (VCR) methodology.

AusNet is the largest diversified energy network business in Victoria with over $12 billion of regulated and contracted assets. It owns and operates three core regulated networks: electricity distribution, gas distribution and the state-wide electricity transmission network, as well as a significant portfolio of contracted energy infrastructure.

In this submission, AusNet:

1. Agrees that choice modelling remains an appropriate method for calculating most customers' willingness to pay (WTP) for avoiding power outages and encourages the AER to conduct a qualitative review to validate this.

2. Suggests there are more appropriate methods to calculate the volume of unserved energy during an outage and the probability of an outage occurring than the estimation methods used in 2019, and;

3. Welcomes the AER's concurrent work to quantify the value customers' place on avoiding long duration outages and offers some views on how this might be best achieved.

The above views are informed by learnings from our recent large-scale Quantifying Customer Value's (QCV) study, which involved 3,527 of our residential and business customers, and from our extensive Electricity Distribution Price Review (EDPR and BAU customer and research engagement programs.

AusNet supports the continued use of contingent valuation and choice modelling to determine VCRs for residential and small/medium business customers, and direct cost surveys for very large customers

When designing our recent QCV study, AusNet assessed numerous potential methods to quantify a $/kWh value which accurately captured our customers' preferences for avoiding/experiencing outages. Following engagement with our stakeholders, we chose to replicate the methodology used sby the AER in 2019, to obtain more granular values specific to our network and customers and to understand how the AER's VCRs might move following the 2024 review.

We supported the AER's approach at the last VCR review and remain of the view that this approach is broadly robust for the following reasons:

1. **It allows for a large and robust sample size**

   Conducting an online survey allows for greater participation than would be achieved through focus groups in isolation. Online surveys have a much lower barrier to participation than attending a focus group (no cost of travel, shorter duration) and therefore, can allow for a larger sample of customers to be represented.

2. **Encourages the respondents to consider their personal value of avoiding multiple outage scenarios, while minimising their cognitive load**

Choice modelling tests respondents' preferences by combining different outage characteristics (time of day, length of outage etc.), presenting respondents with three randomly combined scenarios simultaneously, and asking them to choose their preferred option. This exercise is repeated multiple times (usually eight) and allows for a value to be assigned to each outage characteristic.

This means that variations in willingness to pay to avoid different types of outages can be captured without the respondent having to consider all their potential utility functions, across all possible scenarios and mentally combine those utilities into one number. For example, the value a respondent places on avoiding a three-hour summer outage may be vastly different than the value they place on avoiding a one-hour winter outage, choice modelling allows us to capture all of these various preferences succinctly.

Notwithstanding the above, we acknowledge there are limitations to stated preference surveys, namely:

- Respondents not processing questions in the intended manner,
- Respondents not meaningfully engaging with the task
- Doesn't adequately capture non-standard needs

Consistent with the validation steps we conducted on our own QCV research, AusNet believes the AER took meaningful steps to address this by:

- Conducting qualitative interviews and a pilot program prior to the survey's launch in 2017-2018
- Conducting data validity checks (which allow for the removal of 'speeders', 'straight liners' and those who do not make internally consistent decisions)
- Engaging an external expert to review the survey and validate the results
- Assessing the needs of very large business customers, whose electricity needs vary dramatically, through a direct cost survey, rather than through choice modelling.

We support the AER's decision to undertake a pilot program as an added robustness measure to re-validate their proposed methodology, and suggest the AER also conducts qualitative research as part of the program.

We are confident in the AER's proposed survey methodology. This is based on both the significant stakeholder engagement and qualitative testing conducted as part of the 2019 review, and our own recent cognitive and qualitative testing to inform our QCV study. However, we suggest the AER conduct additional qualitative research as part of stress testing its proposed survey and methodology. This will re-validate customers can understand and meaningfully respond to the survey, and identify any metrics not currently included in the model which may influence a customer's decision. The rich qualitative data will give the AER and stakeholders insights on customers' reasoning, which we believe will increase stakeholder buy-in for the study.

Through our QCV study, which assessed reliability and resilience using the same methodology as the AER's 2019 VCR for residential and small business customers, we have identified several refinements the AER should consider

We are confident in contingent valuation and choice modelling as suitable methods of capturing customers' WTP to avoid an outage. However, we believe there are more robust methods to convert this value into final VCRs for customer subsections. Specifically, we consider:

- Residential customers should be segmented by on more granular basis than climate zone/remoteness level – such as network service area – and over a longer time series, to better reflect their outage probability profile, and;

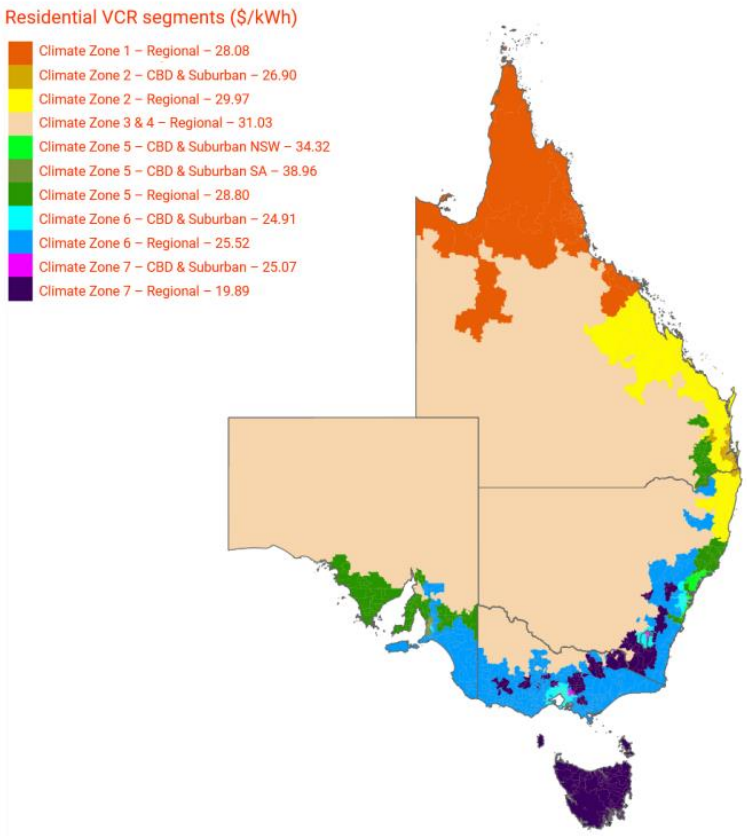
- A larger dataset – based preferably on NMI meter data - should be used to calculate the amount of unserved energy per outage.

Current VCR segmentation approach

In its current format, the VCR measures customers' WTP to avoid 32 different outage scenarios. The dollar amount the customer is WTP to avoid each scenario is then divided by the volume of energy they would typically consume during that outage type to calculate a $/kWh value. This is then multiplied by the weighted probability of each outage type occurring, these values are then added together to calculate a single value of customer

reliability or VCR, for than customer segment. Currently, residential customers are segmented by climate zone and remoteness while business customers are divided into three customer classes (agricultural, commercial, and industrial).

Figure 1: Current residential VCR segments



Source: *AER Update of VCR Values 2023, Appendix G*

Residential customer segmentation & outage probabilities

The AER's 2019 study segmented customers by climate zone and remoteness rather than by jurisdiction as per AEMO's 2014 VCR review[1]. While the AER's 2019 final decision states that when grouped together by climate zones, residential customers had very similar reliability preferences[2] However, AusNet notes that customers within these segments have very different reliability experiences. Collating outage probabilities at a climate/remoteness level may dillute some customers' experience of particular outage types and the value they place on avoiding them. Conversely, it may also increase the VCR paid by customers' who currently experience shorter outages to a level beyond what they would consider to be efficient.

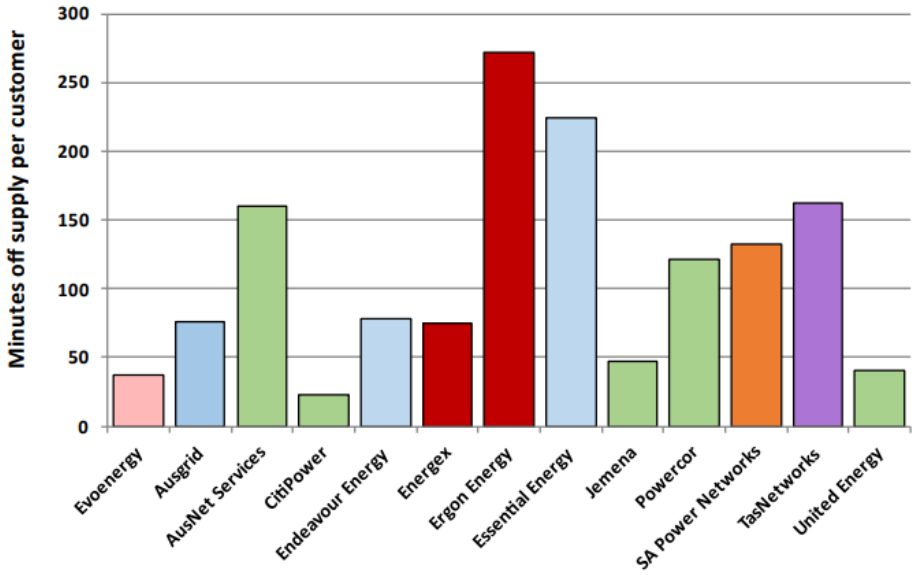
[1] State values were calculated by weighting the proportion of climate/remoteness zones in each state
[2] [Document title] (aer.gov.au)

As network reliability is heavily influenced by intrinsic network characteristics such as the age and condition of the network's asset base, legacy network configuration and design, average line and feeder length, vegetation and terrains AusNet suggests the AER should consider calculating VCR's on a per network basis.

As an example, AusNet's network covers five climate/remoteness zones. In some instances, one feeder which covers multiple postcodes is included in calculations for all five climate zones. This means that these customers, although facing a very similar outage pattern, are assigned dramatically different outage probability profiles because their outage experiences are calculated using customer data from across the NEM.

The majority of our network falls within Climate Zone 6 – Regional (CZ6 Regional) segment. This segment also covers parts of the Ausgrid, Essential Energy, Endeavour Energy and Powercor networks, among others. Based on the AER's 2023 benchmarking report[3], customers connected to each of these networks experience a significantly different frequency and/or length of outage.

Figure 2: Average annual minutes off-supply per customer (2018-22)



Source: Economic Benchmarking RIN.

Source: AER's 2023 Annual Benchmarking Report – Distribution Network Service Providers

This leads to the current VCR segmentation approach applying a dramatically different outage profile than customers' actual experience. This can result in VCRs, to be used for network investment planning, that do not reflect the experience of the customer base that will ultimately finance these investments.

AusNet's QCV study used five years of our network's RIN outage data, segmented by feeder type to calculate outage probabilities, while the 2019 VCR study is based on nationwide 2018 RIN data. This means the AER's CZ6 Regional outage probabilities and the 'Rural' profile[4] established for our study are not directly comparable. However, the divergence shown below further illustrates the inaccuracies that may result from using highly generalised data. Network specific data would better ensure customers' preferences are weighted in accordance with their experience.

[3] Report template (aer.gov.au)

[4] AusNet's sample was segmented based on feeder type, all AusNet postcodes included in the AER's CZ6 profile were served by either a rural long or rural short feeder.

Table 1: Outage probabilities – AER 2019 VCR Review vs AusNet QCV study

Outage duration (hours)	Offpeak Weekday Winter		Peak Weekday Winter		Offpeak Weekend Winter		Peak Weekend Winter		Offpeak Weekday Summer		Peak Weekday Summer		Offpeak Weekend Summer		Peak Weekend Summer	
	AER	QCV	AER	QCV	AER	QCV	AER	QCV	AER	QCV	AER	QCV	AER	QCV	AER	QCV
0 - 1	2.6%	2.7%	1.0%	1.4%	0.5%	0.7%	0.5%	0.2%	3.8%	2.7%	1.1%	1.0%	2.0%	0.9%	0.8%	0.4%
1 - 3	9.0%	7.6%	2.8%	2.8%	2.5%	1.9%	0.6%	0.8%	11.3%	10.3%	5.3%	5.0%	5.8%	3.7%	4.8%	1.7%
3 - 6	3.9%	7.0%	1.4%	2.9%	2.2%	1.9%	0.6%	0.4%	7.3%	9.7%	2.8%	4.0%	6.6%	3.0%	3.2%	1.1%
6 - 12	2.9%	10.9%	1.2%	2.5%	0.6%	0.9%	0.2%	0.3%	5.8%	6.1%	2.0%	1.9%	3.7%	2.5%	1.4%	1.2%

Similarly, AusNet believes network service level data would be better placed to calculate unserved energy

In order to translate residential WTP responses to a $/kWh value, the current VCR approach relies on constructed unserved energy profiles of a 2.6 person household for each climate zone[5]. The base annual energy consumption for these profiles was formed using the 2 and 3 person household annual consumptions reported in the 2017 Energy Consumption Benchmarks Report[6]. These annual consumption amounts were then adjusted by calculating a 'solar factor' for each state and adjusting the relevant segment for the proportion of households in the climate zone that have gas, swimming pools, and slab heating. These proportions were also estimated using the same Energy Consumption Benchmarks Report. These annual profiles were then adjusted based on a sample of 30-minute interval data, previously collected by the AER[7]

AusNet notes the relatively small sample size of households used to calculate these unserved energy profiles.

TABLE 3.3 BREAKDOWN OF SAMPLE BY CLIMATE ZONE AND HOUSEHOLD SIZE

Household size	Climate zone one	Climate zone two	Climate zone three	Climate zone four	Climate zone five	Climate zone six	Climate zone seven and eight	Total
Electricity sample (excl SA)								
Number of respondents								
1 Person Household	40	275	6	73	266	513	194	1367
2 Person Household	79	579	14	141	522	1136	411	2882
3 Person Household	44	299	9	56	221	594	165	1388
4 Person Household	28	212	5	37	198	473	128	1081
5+ Person Household	30	157	1	32	122	328	89	759
Total (excl. SA)	221	1522	35	339	1329	3044	987	7477
Gas sample (excl SA)								

Source: *Acil Allen 2017 Energy Consumptions Benchmark Report*

Again, based on the annual consumption data gathered for our QCV study, the resulting values are not reflective of our customers and their consumption. This may be due to a non-homogenous distribution of household size throughout the country, non-homogenous solar penetration through the state or a non-homogenous distribution of gas, swimming pools and slab heating throughout the relevant climate zone.

[5] One energy profile was used for all remoteness segments within each climate zone.
[6] Acil Allen Report (aer.gov.au)
[7] Sample size was not provided

We suggest the AER use a larger dataset to develop the value of unserved energy for residential customers. The use of actual consumption data (e.g., NMI meter data) would allow for the development of network specific usage profiles and remove the need to derive consumption profiles from other data sources (e.g., other survey data).

Our QCV study demonstrated a significant increase in residential VCRs compared to current AER VCR values, from $25/kWh to $52/kWh, which we consider reflects a range of customer and network specific factors

While the contingent valuation value for the three residential cohorts in our QCV work was broadly in line with the AER's 2019 study, values placed on the choice model metrics differed dramatically between the two studies. We believe this is driven by the specific characteristics of our network, and the attributes and preferences of our customers, including their electricity consumption patterns, attitudes to affordability and potentially, their increasing reliance on a reliable electricity supply as they electrify their transport and gas appliances.

Quantifying AusNet's residential customers' reliability preferences using their actual consumption and reliability experiences lead to a final VCR value that is almost double the AER's Victorian VCR. The use of a larger, network specific dataset to establish WTP, unserved energy, outage probability and ultimately a VCR, avoids smoothing customers' preferences and experiences. Ultimately, this promotes a more efficient level of network investment as the benefits of reliability investments are quantified based solely on the views and experiences of those who are paying for them.

Accordingly, AusNet encourages the AER to calculate VCRs on a more granular basis than climate and remoteness zones (such as network service areas). This ensures differences in the reliability customers currently experience and key demographics (e.g., proportions of solar PV and gas use, socioeconomic factors) are adequately accounted for.

We acknowledge that differences *within* network service areas (and over time, as the degree of electrification increases) can also be significant and may result in network specific VCRs also suffering from loss of granularity. For example, our urban and regional customers often experience considerably different levels of reliability, for a variety of reasons. The averaging of reliability outcomes – a feature of the VCR and STPIS performance measures – masks these differences and has repeatedly been raised as a concern by our customers and stakeholders, including through our recent EDPR engagement program.

While our network investment planning approach takes account of locational differences in customer mix by applying weightings (e.g., for residential, commercial, agricultural and industrial customers) tailored to the individual project/location being assessed, network specific VCRs by customer type (e.g., rural and urban) would be a refinement to this approach and enable more efficient network investment planning. The AER should consider the benefits of establishing this level of granularity in VCRs as part of assessing development of network specific measures, as proposed in this submission.

These changes would go some way to address the significant limitations of the use of highly averaged measures currently to plan and incentivise network reliability measures. Addressing these limitations requires careful consideration to improve equity through the transition and ensure all customers can benefit from electrification.

We support the work underway by the AER to value prolonged outages and other high impact low probability events

Given the increasing frequency and severity of major weather events due to climate change – including the largest storm event ever on our network in February 2024, which disrupted approximately 360,000 households and businesses – and the Victorian Government's Network Outage Review,[8] there is a strong appetite from our customers for us to make efficient investments in mitigating prolonged power outages. It is critical that this work is completed in a robust manner within the same timeframes as the AER's VCR Review process, so it can be applied to the next round of AER determinations. We look forward to engaging further with the AER further on this work.

[8] https://www.energy.vic.gov.au/about-energy/news/news-stories/putting-consumers-first-through-network-outage-review#:~:text=A%20Network%20Outage%20Review%20is,panel%20meetings%20or%20written%20submissions

While we believe this work should be completed in parallel with the AER's VCR review, other quantification methods may be more appropriate

The very low VCRs for long duration outages (12-72 hours) determined through our QCV study – approximately ¼ the residential VCR we derived for standard outages - run counter to other evidence – both qualitative and quantitative – that we are collecting on the value our customers place on avoiding these outages.[9]

While the value placed on avoiding prolonged outages is high, this is diluted through the large volumes of unserved energy which are used to derive a VCR if the current VCR approach is applied. From a network resilience planning perspective, determining whether an investment will avoid a 24 hour or one week outage – and therefore the extent to which this value should be scaled up – is an additional practical challenge when applying a value of resilience to business cases.

The above findings from our study indicate that while respondents can conceptualise their personal value of resilience, revisions to the VCR calculation may be necessary to derive more meaningful values for long duration outages. For example, instead of capping the contingent valuation input at the cost of running a back-up generator for the duration of the outage, it may be more appropriate to include spoilt groceries along with restaurant meals in the cap amount as our resilience research has identified this as a key cost to customers during these outages.

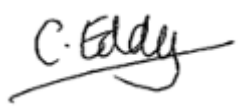
We also encourage the AER to consider alternative approaches to contingent valuation and choice modelling to valuing long duration outages. Direct cost surveys used in previous VCR reviews undertaken by AEMO in 2007 (and by the AER to develop VCRs for very large business customer at the 2019 review) may be more appropriate in this instance.

While we believe that through qualitative testing and stakeholder engagement, the AER can develop a choice model or direct cost survey capable of accurately capturing customers' personal value of resilience, AusNet believes that additional work may be needed to capture the broader socio-economic impact of long duration outages. As an example, a dentist's office could reasonably quantify their lost earnings due to cancelled appointments during long duration outages. However, the answer they supply in a direct cost survey or choice model may not capture the cost of their patients remaining in pain until their appointment can be rescheduled.

Additionally, long duration outages, particularly repeated long duration outages, may dissuade customers from electrifying and moving to a single source of energy. The environmental impacts of this could also be seen as a cost of poor resilience and would not be adequately captured through traditional survey methods.

If you have any questions regarding this submission, please feel free to contact Chloe Finn, Regulatory Economist (chloe.finn@ausnetservices.com.au).

Sincerely,



Charlotte Eddy
GM Regulation & Policy (Distribution)
AusNet Services

[9] For example, following the recent storm events in February 2024, AusNet has received $4.3M worth of claims for spoilt food across 2,929 customers ($1,468 per customer). These are actual costs incurred and therefore do not account for broader economic and social costs of a prolonged outages, including emotional distress and lost productivity.