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Dear Dr. Kris Funston

Submission re: AER Issues Paper – Value of Network Resilience (VNR)

AusNet welcomes the opportunity to provide this submission to the AER's issues paper on the value of network resilience (VNR). In this submission AusNet:

- Welcomes the AER's decision to conduct additional, non-standard engagement during this review, particularly in light of its commitment to develop values by September, in time to be considered in Regulatory Proposals for the 2026-31 Victorian Electricity Distribution Price Review (EDPR) Process
- Suggests that in the long term, holistic network level VNRs should be developed using follow-up surveys, complemented by other data sources to capture indirect costs
- Acknowledges that while the above may be best practice, there are other useful alternatives such as utilising direct costs data provided by networks or applying a multiple to the VCR that may be used to value resilience in the short term.

The above views are informed by;

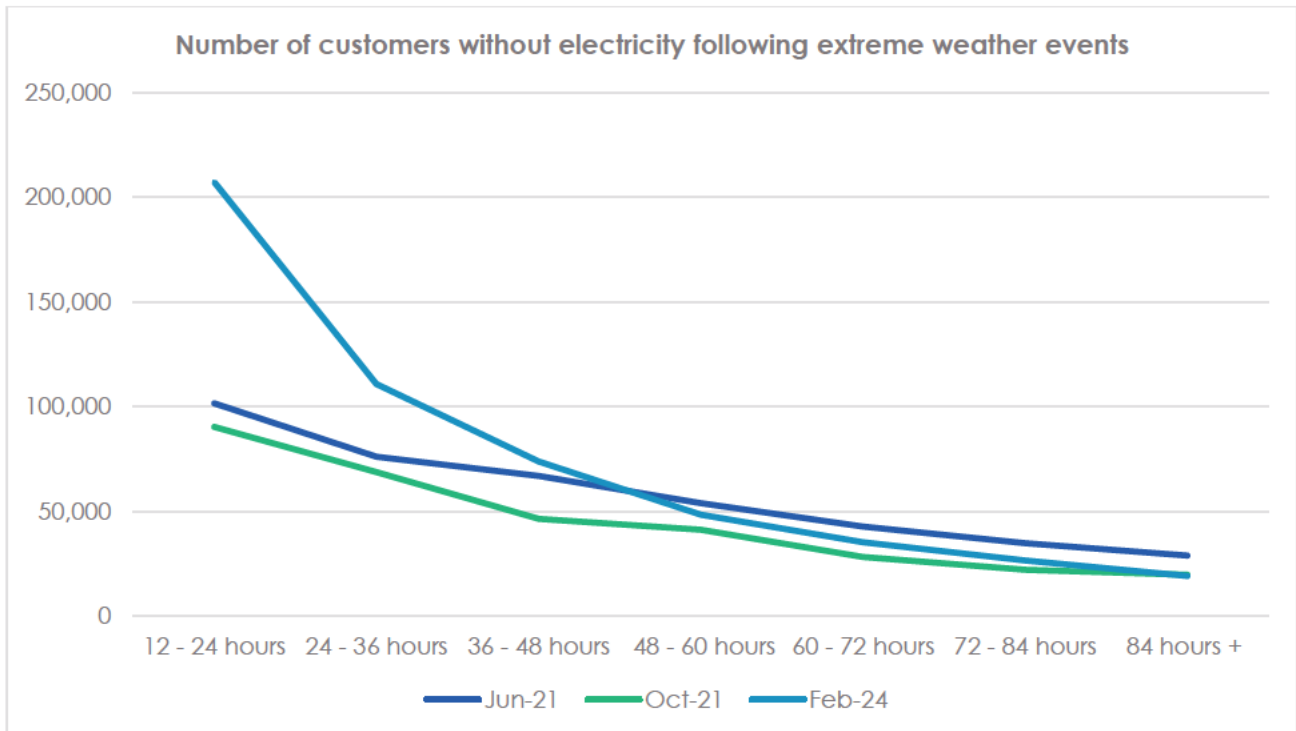
- AusNet's recent large-scale Quantifying Customer Value's (QCV) study, which involved 3,527 of our residential and small business customers;
- The results of a direct cost survey of 484 customers who experienced prolonged outages (>12 hours) during November and December 2023;
- Our extensive Electricity Distribution Price Review and BAU customer and research engagement programs, and;
- Input from AusNet's EDPR Availability Panel, set up to engage on our reliability and resilience plans for the next regulatory period. This comprises a mix of customer advocates and regional AusNet customers.

When considering the broader themes of network resilience, we have been cognisant of; the timeline of this review, the practical application of VNRs, and the unpredictable nature of long duration outages.

While we agree the relationship between outage length and customer costs are unlikely to be linear, the review should develop values that can be applied to prolonged outages of varying duration

AusNet's research on the customer cost of long duration outages supports the AER's hypothesis that there is a non-linear relationship between outage length and the value a customer would place on avoiding the outage. Our November 2023 direct cost survey highlighted that instead of incurring costs proportionally during the whole duration of the outage, there were significant 'tipping points' in customer costs including, the loss of perishable foods/medicine, purchase of a generator and a loss of income. These 'tipping point' costs resulted in a convex curve when costs are examined on per hour or per kWh basis. For example, customers who experienced a 12 – 18 hour outage lost \$43/hr on average, while this fell to \$38/hr for customers who were without electricity for 18 – 24 hours, before jumping again to \$58/hr to customers who experienced a 24+ hour outage. This cost profile suggests the need to establish multiple values of resilience to reflect the non-linear relationship between outage length and costs incurred by customers.

Furthermore, when a long duration outage occurs, customer restoration times depend on a number of factors including, the nature and severity of damage done to the network, the number of impacted customers, and when it becomes safe for our staff to gain access and begin repairing the damage. For example, an analysis of three recent major storm events on AusNet’s network shows that in February 2024, 46% of customers who experienced a long duration outage had their electricity restored within 24 hours while in June 2021, only 25% of customers had their electricity restored in the same time frame. This highlights the unpredictable nature and variation between long duration outages, and the need to establish values of resilience that can be applied to prolonged outages of varying duration (rather than focussing on a single outage duration).



While there are characteristics which are likely to affect the value of resilience for specific customer types within network areas, we support the development of network-specific VNRs as part of this review

While we believe that feeder level values would be best theoretically, given the time constraints for this review, the trade-off between simplicity and accuracy, and the purpose of VNRs (to inform network-wide investment planning) in this instance network specific values would be most suitable. This would simplify the calculation approach and ensure that resilience investments, which will be paid for by all customers proportionally reflect the tolerance for risk and appetite for investment of all customers on the network

However, direct cost research conducted after our November 2023 storms highlighted that customer without gas incurred significantly higher direct costs compared to dual fuel customers (\$63/hr vs. \$30/hr, on average) who remained able to access alternative energy sources during prolonged electricity outages (e.g., gas cooktop for cooking). This highlights that differences do exist between VNRs for gas vs non-gas customers that should be considered in this review. This may be further compounded as the energy transition progresses and customers further electrify their transport. These factors (access to gas, EV ownership etc.) which influence the value of resilience will not be uniform within the NEM, within states, or even within distribution networks. This suggests there would be value in developing more granular VNRs. AusNet would encourage the AER to consider developing VNRs for single and dual fuel customers within networks reflecting these differences between customer types.

For robustness, the AER's chosen methodology should be capable of valuing the total unserved energy that would go unserved during a long duration outage.

When conducting our Quantifying Customer Values Study, we adapted the AER's VCR method for calculating a contingent valuation cap and choice value dollar intervals. Dividing the resulting dollar amounts by the total quantity of unserved energy during a long outage led to \$/KWh amounts which did not reflect the high value of resilience customers expressed elsewhere in the study¹ and ran counter to insights on customer preferences obtained through other engagement activities (e.g., EDPR customer workshops exploring willingness to pay for different service levels). To avoid this risk, we can see merit in quantifying resilience based on non-deferable load (e.g. the essential electricity the customer cannot consume during the outage) rather than the total amount of unserved energy

However, segmenting unserved energy into deferable/non-deferable load adds a layer of complexity to development of VNRs and business case development, and is a less meaningful concept when considering power outages over long periods of time – ie multiple days. It would also mean the AER must make value judgements around what load can and cannot be deferred (which will likely vary significantly between customers). It is also possible that as the outage becomes longer the proportion of deferred load would fluctuate (e.g. a customer may be able to put off doing a load of laundry for a day or two, but following day seven without power it may become imperative to have clean clothes).

Segmenting unserved energy to derive customers' 'true' demand during a prolonged outage introduces other complexities – for example, should cafes/restaurants' assumed unserved energy be inflated to reflect the presumed additional unserved energy they would consume to meet the extra demand driven by the outage?

To avoid introducing undue complexity, we consider the risk of an unrealistically low per kWh value should instead be managed by ensuring the chosen methodology, or combination of methodologies is capable of reflecting all the activities customers may wish to do over the outage period whilst also producing robust and intuitive VNRs

Given the work the AER and their stakeholder reference group is doing to engage with customers who have experienced long duration outages, and capture their experiences qualitatively, the chosen assessment approach, or combination of approaches should also allow for a nuanced and complete quantification.

There are added complexities when calculating the indirect and wider socio-economic costs of long duration outages which may be difficult to overcome given the time frame of the review. However, AusNet's qualitative research on customers' experience during long duration outages shows customers experience a mental and physical health burden during these outages. Customers have also told us losing power at their residence impedes them from engaging in the wider economy (for example, a flat phone means they are unable to set an alarm for work or communicate with their workplace or school). While we understand the difficulties with estimating the socio-economic costs of a long duration outage, this is an important element of a VNR and should be explored further using the various methodologies identified in the issues paper.

AusNet welcomes the non-standard engagement process the AER is proposing and its commitment to developing VNRs in time to be considered for the Victorian Distributors 2026 – 2031 Price Reset Proposals.

As climate change accelerates the frequency of severe weather events, long duration unplanned outages are becoming more common. AusNet's network was impacted by very severe storms in June 2021 and October 2021, and again in February 2024. Previously these events would have been referred to as 1-in-100-year events but are clearly becoming far more frequent. This has brought the issue of resilience into sharp focus in Victoria where, following the long duration outages in 2021, the State Government convened an Expert Panel to undertake an Electricity Distribution Network Resilience Review². The importance of network resilience was highlighted again in November 2023 and February 2024 when severe weather events again led to Victorian electricity customers losing supply for 12+ hours.

¹ [AusNet Presentation \(hdp-au-prod-app-ausnet-communityhub-files.s3.ap-southeast-2.amazonaws.com\)](https://hdp-au-prod-app-ausnet-communityhub-files.s3.ap-southeast-2.amazonaws.com)

² [Electricity Distribution Network Resilience Review \(energy.vic.gov.au\)](https://energy.vic.gov.au)

Network resilience is increasing in importance as customers electrify their homes and transport, to meet net zero targets, and are therefore more reliant on electricity as a single energy source.

Given the above, we support the AER's commitment to valuing network resilience in time for the results to be considered in Regulatory Proposals for the upcoming Victorian EDPR.

We are supportive of the AER's decision to conduct additional, non-standard engagement activities, including conducting deliberative forums (or similar consultation activities). The valuable insights into customers' experiences and priorities collected through these activities ensure stakeholders can be confident that the resulting VNRs reflect customer's complete preferences.

We are undertaking engagement on resilience with our customers and stakeholders, including through a Post Incident Review of the February 2024 storms, as well as research and engagement to inform our EDPR proposal, much of which has been shared with the AER. We would welcome the opportunity to share suitable locations with the AER to inform their VNR deliberative forum program

AusNet believes there are merits to the approaches identified in the issue paper and have considered each in light of the immediate need to develop VNRs, and how suitable they may be as a more holistic long term approach.

As noted previously, our QCV study highlighted the consequences of an inadequate cap given the substantial quantity of unserved energy during a prolonged outage.

We agree with the AER that procuring back up generation may be the most suitable economic substitute for network electricity. However, there are several considerations we believe the AER should be cognisant of if this approach is taken to setting a cap.

For residential customers:

1. Will the cap be considered nationally (like VCR) or on a more granular basis? This comes into play when averaging the cost of back-up generation for apartments and standalone dwellings (as is done for VCR) as different networks will have very different housing compositions.
2. Purchasing and installing a generator is a closer substitute for network electricity supply than renting a generator. However, this requires the customer to have anticipated the outage in advance and introduces the risk of paying twice if the outage doesn't occur.
3. If the customer is using a diesel generator, is it reasonable to assume the customer will store 24, 48 or more hours' worth of diesel on their property? If not, will the cap also include time/fuel to travel to buy more? Given that it's likely that many of their local petrol stations will also be without power, this may be a considerable journey.
4. When calculating a cap in its 2019 and 2024 VCR reviews the AER assumes that people living in apartments will use a UPS unit powered by a battery as back up generation. The limited KVA of these devices may mean they are not a suitable substitute for long duration outages.

For business customers:

Given the unique electricity needs of business customers, we believe that in the absence of additional engagement, the VCR approach of using a month's electricity bill is the most appropriate cap.

Using the VCR as a basis for establishing a VNR may be an appropriate method given the tight timeframe for this review, however we encourage the AER to consider whether alternative, more robust approaches can be applied (in this review and longer-term)

Of the two proposed VCR based approaches, AusNet favours the idea of using a multiple of the VCR as our QCV work corroborates AEMO's assumption that customers value avoiding a long duration outage about twice as much as they value avoiding a standard outage³. However, in the long term, we believe a more robust methodology should be developed.

In addition to the concerns around the VCR aggregation level and foundational data sources which we expressed in our recent submission on the AER's draft determination⁴, we believe this approach may not be theoretically sound as the VCR is calculated based on customer's WTP to avoid various outage situations. This value is then divided by the energy typically consumed during the outage and then weighted by how likely these outages are to occur. This leads to some methodological concerns as this weighting of outage types doesn't relate to the frequency or pattern of long duration outages. However, in the short term there are merits to this approach given its relative ease of calculation. If feasible we would suggest the AER validate the values resulting from this approach with further qualitative engagement and/or comparing the values with direct cost data collected from customers.

While we can see the merits of using a modeling based approach to establish a value for a country wide value of climate resilience, we do not consider this approach is fit for purpose to calculate a more granular value of network resilience for the following reasons:

1. Identifying appropriate data sources to feed into the modelling
2. Disaggregating the costs incurred by energy users and costs incurred by taxpayers, wider society etc.
3. Disaggregating the costs driven by the power outage and the weather event which caused it.

These disadvantages are further exacerbated by the tight timeframe of the review.

Using follow up surveys to prolonged outages is the most robust method of calculating direct costs, however this is likely the lower bound of VNRs

Conducting follow up surveys to capture data on customers actual incurred expenses to value the outage avoids networks and the AER developing assumptions for customer costs or relying on other survey-based approaches involving customers who may not have experienced prolonged outages recently, or at all.

The direct cost surveys which AusNet conducted following our November 2023 outages show customers experienced varied costs during long duration outages. These included the loss of perishables, the cost of alternative accommodation, generator purchase and loss of income etc. Customers who have not experienced a long duration outage may not consider all of these costs when assigning a value to VNRs.

AusNet would be happy to share these anonymized survey responses with the AER, which could be used as an interim data source to calculate the VNR given the limited time frame to conduct surveys and calculate a value in time for the targeted September deadline.

In the long term, AusNet would suggest that if the AER chose this approach, survey responses could be anonymized and shared on the AER's website. Stakeholders could then inspect the costs incurred by customers allaying historic fears around the data quality used to develop WALDOs which may linger into this review.

However, while we do believe this is the most robust approach, it only captures the lower bound of customers' value of resilience. It will not include the wider socio-economic costs and emotional cost of an outage which 86%

³ As per our QCV study residential WTP is \$73.44 per annum and \$31.68 per annum for resilience and reliability respectively, small business WTP for resilience is \$293.16 and \$118.56 for reliability per annum.

⁴ [2024-04-23 AusNet - submission on draft determination - VCR | Australian Energy Regulator \(AER\)](#)

of customers experienced, as per our November 2023 research. We would encourage AER to give further consideration as to how these indirect costs may be quantified.

We recognise that given the time frame of this review, conducting follow up surveys may not be possible. In the short term this issue could be overcome using alternative data sources. In the long term, the AER could explore alternative data sources to capture the indirect costs not reflected in direct cost surveys.

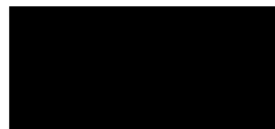
As mentioned previously, given the short deadline the AER is working to, conducting follow up surveys may not be a practical approach. While AusNet is happy to share research we have conducted, the AER could also consider using network claims data and/or insurance claims data to establish customers' direct costs. For example, in the wake of the February storms AusNet received 2,949 customer compensation claims for spoiled food and would be happy to share the anonymized details with the AER.

The Insurance Council of Australia tracks and publishes insurance claims relating to Natural Hazard Catastrophe Events at an aggregate level on their website⁵. We would encourage the AER to contact the Insurance Council to seek a more granular break down of this data, which may allow them to isolate costs due to the electricity outage, rather than the impact of the natural hazard itself.

Again, the methods mentioned above would only reflect the lower bound of a customers' VNR. They do not take into account for example, the potential long-term costs of higher insurance premiums paid by customers if they do choose to seek compensation from their provider or broader socio-economic costs of long duration outages. Other cost data may be used to establish these long term or indirect customer costs of long duration outages. As an illustrative example, the AER could seek to gather data on the number of medical appointments that had to be deferred due to the outage, these could be valued at the medicare reimbursement rate and considered when valuing the broader socio-economic cost of long durations without power this could be combined with the direct costs, established through post incident surveys to develop a holistic view of the value of network resilience.

If you have any questions regarding this submission, please feel free to contact Chloe Finn, Regulatory Economist

Sincerely,



Charlotte Eddy
GM Regulation & Policy (Distribution)
AusNet Services

⁵ [Data hub - Insurance Council of Australia](#)