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Values of Customer Reliability

PIAC submission to AER Consultation Paper

21 December 2018

About the Public Interest Advocacy Centre

The Public Interest Advocacy Centre (PIAC) is an independent, non-profit legal centre based in Sydney.

Established in 1982, PIAC tackles barriers to justice and fairness experienced by people who are vulnerable or facing disadvantage. We ensure basic rights are enjoyed across the community through legal assistance and strategic litigation, public policy development, communication and training.

Energy and Water Consumers' Advocacy Program

The Energy and Water Consumers' Advocacy Program (EWCAP) represents the interests of low-income and other residential consumers of electricity, gas and water in New South Wales. The program develops policy and advocates in the interests of low-income and other residential consumers in the NSW energy and water markets. PIAC receives input from a community-based reference group whose members include:

- NSW Council of Social Service;
- Combined Pensioners and Superannuants Association of NSW;
- Ethnic Communities Council NSW;
- Salvation Army;
- Physical Disability Council NSW;
- Anglicare;
- Good Shepherd Microfinance;
- Affiliated Residential Park Residents Association NSW;
- Tenants Union; and
- The Sydney Alliance.

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Overview

The Values of Customer Reliability (VCR) has long been a key element of NEM energy market frameworks, and how it is determined and applied is of increasing importance if efficiency is to be achieved, both throughout a number of transitions in the energy systems and markets and after commensurate changes to energy market design and regulatory frameworks are made.

AER's VCR values should be default

PIAC supports the AER having responsibility for developing VCR values.

PIAC is concerned about the high cost, inconsistency, lack of rigour and lack of transparency of VCR values¹ proposed by network businesses in particular. In PIAC's view stronger guidance, and a degree of prescription, is needed regarding the appropriate approach to determining and applying VCR in a given setting, and the AER's VCR values should be the default.

Accordingly, the AER's VCR values will need to be comprehensive enough for only very limited and infrequent use of alternate values to be justified. The VCR values produced by the AER, along with associated rules and regulations, will need to ensure that VCR arrangements are fit for any anticipated application of VCR, and remain so into the future. These outcomes are essential to provide long-term certainty for industry and confidence for all stakeholders.

AEMO's VCR guidelines is a useful reference point, but further work is required

AEMO's approach to developing the previous VCR values has been pioneering at the time it was undertaken. PIAC is of the view that AEMO's VCR process, values and Application Guide offer a sound reference point for future work on VCR. Nonetheless, the interaction between consumers and the energy system is undergoing massive changes that alter consumers' expectations for the relationship between price and reliability in fundamental and complicated ways. The AER will need to employ different, and necessarily more complex, approaches to understand contemporary Values of Customer Reliability.

Applications of VCR

In recent years, VCR has been applied in circumstances, and at a level of granularity, which were not anticipated, and for which it was not designed. This highlights the need for a detailed and adaptable set of VCR values that are designed to be applied in a variety of circumstances. Any future work on VCR will need to respond to these developments and be done with cognizance of the applications of VCR.

It will not be practical (or, in some cases, possible) to produce VCR values to cater to all conceivable future applications; yet, in PIAC's view, it is in the long-term interests of consumers to make every reasonable effort to do so.

¹ And other information that is purported to reflect consumer preference with respect to price and reliability trade-offs.

AER's VCR guideline

PIAC recommends that, as AEMO did, the AER should develop a guideline for the application of VCR which provides guidance on matters including (but not limited to):

- the interpretation and application of AER's VCR values;
- the limited circumstances in which the use of alternate VCRs may be appropriate; and
- what are acceptance approaches in the development of alternate VCRs.

PIAC recommends that the AER considers seeking changes to the National Energy Rules that:

- make the AER's VCR guideline binding; and/or
- prescribe elements of the AER's approach to VCR.

These changes above will help support the NEO, insofar as having stronger guidance for industry, along with appropriate prescription, that supports the AER's approach to determining VCR, affords businesses less discretion in the matters to which they must have regard. This will:

- support the consistent application of AER's VCR values as the 'default';
- provide certainty over the longer term for businesses, consumers, energy market institutions, governments and other stakeholders;
- minimise regulatory compliance burden on network businesses; and
- limit - and ideally eliminate - grounds on which businesses may seek judicial review of AER decisions regarding VCR.

Where any regulated business chooses to undertake its own VCR study, the AER should only consider it for the purposes of regulatory determinations if it complies with the guideline.

Expression of consumers preferences

In producing the VCR, the AER should seek to understand:

- in depth, consumers' willingness to pay to maintain or improve on extant reliability levels;
- in depth, consumers' willingness to accept current or lower reliability levels in return for lower bills;
- consumers' willingness to
 - Participate in demand response. This could be understood as a VCR for 'partial' supply for some consumers. For example, pool pumps will have a lower VCR than indoor lights, which is particularly of note when planning or operating parts of the energy system for controlled outages that result from constraints in network or generation capacity. In these cases, a transfer of wealth from consumers with higher VCR to those with lower VCR (and who can forgo some loads) will often be a more efficient way to maintain supply in a manner that reflect people's willingness to pay, compared with building more network or generation infrastructure.
 - Reduce their demand voluntarily and without payment, particularly during events nearing Maximum Demand. A recent Energy Consumers Australia "Consumer Sentiment Survey" found that 50% of households would reduce their load without payment to relieve pressure on the grid on a high demand day.

- cognitive biases that may influence consumers' responses to questions about willingness to pay or accept, and adjust results according to these. For example, the bias of 'Uncertainty aversion' has been shown to affect the consumer response to surveys on VCR. Uncertainty aversion can be minimised by using face-to-face deliberative engagement with people (rather than relying on phone and online surveys) and adjusted for weighting analysis of responses (for example, according to respondents' actual experience of outages), and ensuring minimum quotas of respondents with exposure to outages.
- the impact on VCR values of ways other than making price/reliability trade-offs for managing reliability. For example, people are demonstrably more accepting of outages, and better able to manage the impact, if they have better information about
 - when (if known) the outage will occur;
 - the cause of the outage; and/or
 - an estimate of when supply is expected to be restored.
- which substitution is appropriate and acceptable for different types of consumers and in different locations. This includes consideration of the nature, impact and preferences for potential forms of substitution, such as:
 - backup generation, which may be
 - temporary/relocatable (petrol or diesel powered), for hire or provided by an energy network, or
 - permanent/onsite (diesel or gas), which are common for critical loads and in remote areas.
 - batteries and an inverters that can supply some or all of the onsite load, with or without
 - Uninterruptable Power Supply functionality to ride through any faults and
 - solar panels or a backup generator for longer term outages
 - fuel substitution options that are incremental in nature and cost. For example, where a customer would purchase an \$8k domestic solar and battery system for purposes other than reliability, and an upgrade to \$10k system will also provide islanded onsite backup supply, the substitution cost is arguably the difference between the two options, or \$2K.
- attributes of the current energy system and expected attributes of the future energy system. For example, the future energy system would be expected to have a more productive demand response market, and more accessible fuel substitution in the form of batteries.

In PIAC's view, in order to understand the value placed on reliability by any given consumer, the AER should use the **lower** value of:

- the maximum value a consumer is willing to pay for reliability;
- the minimum cost associated with of the options a consumer is willing to accept; and
- the lowest cost substitution options (where these are appropriate and preferred for a given consumer).

Responses to consultation questions

Question 1: How might the wholesale market price cap be informed by VCR?

VCR should be used to inform the setting of the Reliability Standard, which is a fundamental metric in modelling for wholesale market price settings.

It is reasonable to assume the Market Price Caps (MPC) should be well below VCR. The MPC, however, is only one factor in achieving the Reliability Standard. While some stakeholders believe that the MPC should be more directly linked to - or even equal to - VCR, PIAC does not support this view. Elements common to both MPC and VCR are outnumbered by those that aren't, such that they could not be intrinsically linked; it even may be appropriate to raise one and lower the other at the same time.

Question 2: What customers and outage scenarios should be considered when deriving applicable VCR values to inform the wholesale market price cap?

As noted above, PIAC is of the view that VCR should be used to inform the setting of the Reliability Standard, and this should be the extent of its direct use in setting the MPC.

In setting the Reliability Standard, the outage scenarios considered should reflect the nature of outages relevant to involuntary curtailment due to insufficient generation, such as controlled rolling blackouts of residential areas that are initiated at a transmission or sub-transmission level, and brief curtailment of large loads such as smelters. Importantly, it should be assumed that outages at smelters are of a length that carries no risk of irreversible damage to potlines.

Question 3: Should VCR inform load-shedding priorities for services other than essential service, and if so, how?

Yes. Load shedding should, to the extent practicable, be based on a merit order of lowest VCR to highest. Outage scenarios considered should reflect the nature of outages relevant to curtailment due to insufficient generation, such as controlled rolling blackouts of residential areas that are initiated at a transmission or sub-transmission level, and brief curtailment of large loads such as smelters. Importantly, it should be assumed that load shedding periods at smelters are of a length that carries no risk of irreversible damage to potlines.

As noted herein, the development of VCR values should have regard to people's willingness to:

- Participate in demand response. This could be understood as a VCR for 'partial' supply for some consumers; for example, pool pumps will have a lower VCR than indoor lights, when planning or operating parts of the energy system for controlled outages that result from constraints in network or generation capacity. In these cases, a transfer of wealth from consumers with higher VCR to those with lower VCR (and who can forgo some loads) will often be a more efficient way to maintain supply in a manner that reflect people's willingness to pay, compared with building more network or generation infrastructure.
- Reduce their demand voluntarily and without payment, particularly during events nearing Maximum Demand. A recent Energy Consumers Australia "Consumer Sentiment Survey" found that 50% of households would reduce their load without payment to relieve pressure on the grid on a high demand day.

Question 5: Should VCR inform a price cap for ancillary services such as NSCAS and FCAS, and if so, how? Question 7: Should VCR inform a price cap for RERT, and if so, how?

Yes. Average VCR values should be considered an absolute cap on the value of services procured under RERT or any other mechanism for the reliability and/or security of the energy system.

Question 4: What customers and outage scenarios should be considered when deriving the VCR values considered when establishing load-shedding priorities? Question 6: What customers and outage scenarios should be considered when deriving applicable VCR values? Question 8: What customers and outage scenarios should be considered when deriving applicable VCR values? Question 14: If so, what customer and outage scenarios should be considered when deriving applicable VCR values? Question 26: What outage scenarios should be included when surveying customers to establish a CDF? Question 27: Are there particular outage characteristics that are critical to focus on in this review and any surveys we conduct? Question 28: What outage characteristics do you consider necessary to include as being likely to drive variation in values of customer reliability?

In producing the VCR, the AER should have regard to the consumer experience of outages from a whole-of-system perspective, with weighting made according to where in the system where most outages experienced occur.

- Transmission- and sub-transmission-connected consumers experience relatively fewer outages compared to distribution connected customers
- Distribution-connected electricity consumers experience the most outages.
 - The majority of these outages occur in the distribution network (95.6% of outages according to the AEMC's Reliability Frameworks Review)
 - Outages from generation shortfalls, usually experienced as periods of load shedding, are relatively insignificant (0.23% of outages).

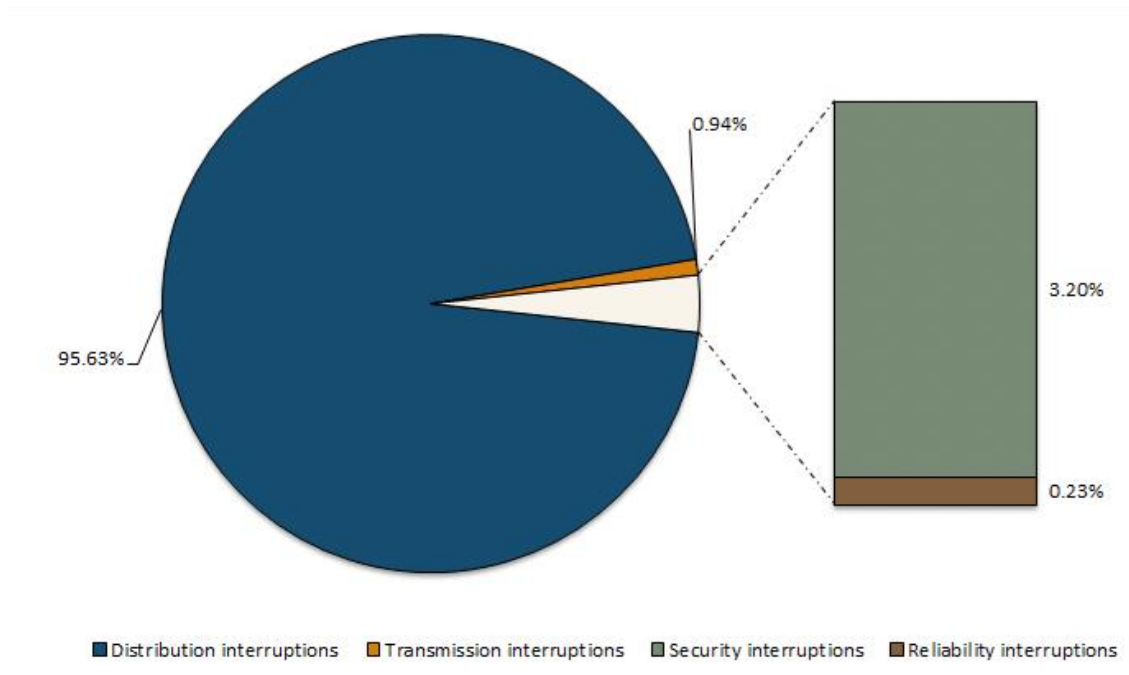


Figure 1 Sources of supply interruptions in the NEM: 2007-08 to 2016-17. Taken from the AEMC's Reliability Frameworks Review final report

These relativities should be reflected in how VCRs and related metrics are determined and expressed, considering that the consumer impact of, and sentiment towards, outages originating in different parts of the system will not be the same.

Some stakeholders may hold the view that the consumers experience of an outage is mostly dependent on the duration of the outage alone. In PIAC's view, that is a questionable and over simplistic view. Consider the experiences of a household of a relatively common local residential street level outage with a less common, wider-scale outage. While the durations of both outages may be the same, the consumer impact of a local outage is in many ways more manageable that a wider-scale outage is not.

Concern	Distribution-level outage	Transmission- or sub-transmission-level outage
Likely causes	A fault in the distribution network – probably at the feeder or lower level. E.g.: tree falling on a power line in the street	A fault in the transmission or sub-transmission network. Due to the meshed nature of the transmission network, it is possible that a number of separate faults occurred leading to the outage.
Likely impact	Outage localised to one or two streets	Outage spread over several suburbs. Some or all supply may be returned relatively quickly through rerouting power

	Outage may last several hours while crews work to address the network fault	through other parts of the transmission and distribution network. Addressing the root cause(s) of the outage may or may not take longer than for a distribution-level outage
Can't cook at home – are there take away/eat out/home delivered food options?	Most likely unaffected by the outage	Unlikely to be available. Demand may be much higher if available.
Is street and security lighting still working?	Typically	No, except for some security lighting with backup power
Is there access to emergency services?	Delays possible if outage caused by extreme event, otherwise yes.	More likely to be limited by lack of communications systems and extreme demands on emergency services.
Is electrified public transport (trains and trams) available	Yes	Less likely
Are mobile communications working?	Yes (as long as consumer has charged mobile device or can charge locally)	If so, heavily constrained by limitations of system backup power and heavy demand of system.
Are there options for preserving refrigerated food storage?	Options such as purchasing ice or transferring items elsewhere may be available.	Less likely.
Is there access to outage information?	Likely access to DNSP notifications, online information and call centres	Potentially only access to public media, likely limited by mobile communications system constraints.
Emotional impact on consumer	Likely lower degree of emotional impact than a sub-transmission outage of the same length.	Likely higher degree of uncertainty and emotional impact, particularly if the outage has occurred during a catastrophic event or extreme weather event.

Question 9: Should the AER determine a VCR for prolonged and extensive outages envisaged by System Black and HILP events? Question 29: What outage characteristics do you consider unnecessary as being unlikely to drive variation in values of customer reliability?

Is PIAC's experience, seeking people's views on rare and unlikely events, such as once-in-ten-year major outages, does not yield reliable and informed results, as people have little experience with such events and hence the cognitive bias of uncertainty aversion is difficult to overcome.

The benefits of determining a specific VCR for High Impact Low Probability (HILP) events are further limited by the fact that these events are infrequent, hard to predict and typically not cost effective to avoid.

Nonetheless, the impacts of outages in the table above (see previous question) could be extrapolated to develop VCR estimates for HILP events.

Question 12: Should VCR values for different customer types also inform the allocation of distribution and transmission shared costs among consumers?

Yes. Where customers of different types (and/or who are connected at different voltages within the same distribution network) have materially different VCRs, investments made in network reliability may not be valued equally by these classes. It may be appropriate to allocate some cost recovery for reliability-driven investment according to VCR in the calculation of DUoS charges. Though more complicated to achieve, TUoS charges could be treated similarly.

Question 13: Are there any other regulatory investment assessments and/or NEM planning contexts that could be informed by the application of VCR values? Question 15: For what purposes do you currently use VCR? Question 16: For what future purposes could you use VCR? What level of VCR segmentation would you require?

In recent years, VCR has been applied in circumstances, and at a level of granularity, which was not anticipated, and for which it was not designed. This highlights the need for a detailed and adaptable set of VCR values that are designed to be applied in a variety of circumstances. Any future work on VCR will need to respond to these developments and be done with cognizance of the applications of VCR.

It will not be practical (or, in some cases, possible) to produce VCR values to cater to every conceivable future applications; yet, in PIAC's view, it is in the long-term interests of consumers to make every reasonable effort to do so.

Applications of for which VCR are, could and/or should be applied include:

- Transmission planning;
- Transmission investment tests;
- Transmission reliability settings;
- Distribution planning,
- Distribution investment tests;
- Distribution reliability settings, such as targets for SAIDI and SAIFI in a given network and STIPS;
- DMIS;
- Arrangements for worst served consumers, including Guaranteed Service Limits;

- The Reliability Standard and Market Price settings;
- The development of the System Restart Standard
- The procurement of System Restart Ancillary Services
- Policy development, such as the National Energy Guarantee
- Implementation of the National Energy Guarantee Reliability Obligation
- Special cases (such as was used for the Victorian Bushfire Powerline Safety Taskforce)
- Determining the upper bound of payments made to providers of emergency mechanisms such as RERT;
- Determining thresholds and arrangements for emergency load shedding.
- Allocation of DUOS and TUOS charges between customer types

Question 18: If not, what other method or methods would be most appropriate to engage with customers and derive VCR values? Question 19: Should different methods be used for different customer types? Question 20: Should multiple methods be used to cross check derived VCR values?

In PIAC’s view, the AER should use the same stakeholder engagement guidelines that it requires energy network businesses to follow in the development of VCR values. PIAC’s own good engagement framework affirms the importance these guidelines, particularly as they relate to deliberative engagement.

“PIAC’s good engagement framework reflects a preference for a particular approach to consumer engagement. As noted in section 3, PIAC assessed ‘Approach to engagement’ by evaluating the DNSPs’ commitment to:

- Deliberative engagement;
- Ongoing engagement; and
- Strategy-driven processes.

For true deliberative engagement, NSPs should treat representative groups of consumers as a ‘mini public’, to talk through issues from start to finish and work towards a consensus outcome.² This form of engagement requires NSPs to host the same group of participants over a number of sessions in order to properly explore complex issues and facilitate high quality feedback from, and negotiate outcomes with, deliberative forum participants.

Deliberative processes relate directly to the IAP2 Public Participation Spectrum.³ ...the spectrum measures public participation in decision-making from ‘Inform’ to ‘Empower’. PIAC contends that any truly deliberative consumer engagement process could be considered to be at the ‘Collaborate’ level of this spectrum.”⁴

Deliberative processes are a minimum requirement to accurately understand and overcome cognitive biases in the expression of consumer preferences on complicated issues such as price and reliability trade-offs. Data obtained from phone and online surveys on the other hand, is generally unreliable.

² Lucy Cole-Edelstein, [Random Selection Does Not Equal Deliberative](#), 2016.

³ International Association for Public Participation, [IAP2 Public Participation Spectrum](#), 2014.

⁴ PIAC Evaluation of Consumer Engagement by NSW DNSPs 2017-18

This distinction was born out in consumer and community engagement processes by Essential Energy in 2017. Essential ran in-depth deliberative forums with local communities throughout regional NSW, in addition to phone surveys, to understand consumer preferences. In each case, participants were asked the same questions about the value they place on reliability relative to their recent experience of bills and outages.

“When faced with the concept of a trade off on length and frequency of outages against cost, findings varied between the forums and the online surveys.

Due to the current satisfaction with reliability, a consistent finding was that the vast majority were not willing to pay more to reduce their outage duration. **In fact, in the forums two thirds (66%) wished to pay \$40 less a quarter to have 1-2 more outages a year showing that they were willing to accept slightly lower levels of ‘reliability’ for a slightly lower ‘cost’.**

The online participants did not have the prior knowledge that this question was framed with in the forums and without this knowledge there was slightly less willingness to trade off reliability. Over half of [online] respondents (53% residents and 55% businesses) chose the status quo.”⁵

More telling still is that in the **online surveys, slightly less than one-third** of participants preferred to accept lower reliability levels for lower bills, compared to the **deliberative forums where two-thirds** of participants preferred to accept lower reliability levels for lower bills.

Question 21: What levels and categories of segmentation in VCR values are useful to you, taking into account the trade-off between accuracy and required survey respondents and resources? Question 22: Are there particular customer types, categories, sectors etc. that are critical to focus on in this review and any surveys we conduct? Question 23: What categories of segmentation do you consider necessary as being likely to drive variation in values of customer reliability? Question 24: What categories of segmentation do you consider unnecessary as being unlikely to drive variation in values of customer reliability? Question 25: What level and categories of segmentation in VCR values can be utilised, given the level of detail and segmentation present in customer data and data sets to which you have access? Question 30: What outage characteristics can be utilised, given the level of detail and segmentation present in customer data and data sets to which have access? Question 31: What method should be used to representationally weight affected segmented customer classes at the point of proposed investment? Question 32: Should different consumption information be used to weight VCR values depending on the nature of the outages being considered? For example, should average annual consumption information be used to weight VCR values when considering prolonged outages, and average peak consumption values be used to weight VCR values when considering short outages during peak periods?

PIAC is continuing to develop its position on these questions and looks forward to assisting the AER through this process.

Question 34: How often should the AER undertake reviews of VCR?

PIAC recommends that the VCR is reviewed every four years, and ideally no more than a year before each determination of the wholesale market reliability standard and market price settings.⁶

⁵ Woolcott Research and Engagement, [Engagement Programme Summary Report – Phase 1, Prepared for Essential Energy](#), June 2017, 8.

⁶ This would entail the first review to be done earlier than four years before the AER's first VCR review.

The benefit of this approach over five-yearly assessments include:

- The wholesale market reliability standard and market price settings can be informed by up-to-date values. These settings are determined two years in advance for periods of four years. Under five-yearly VCR the settings, and resultant investment decision, towards the end of the market price settings period could be informed by VCR values determined a decade or more earlier, which is beyond the timeframe of reliable prediction given the rapid changes anticipated in the energy market. Under PIAC's recommended approach, settings and investment decisions would be informed by VCR values and methodology never more than seven years old;
- Similarly, given the five-year reset period typically used for network revenue determinations, a four-yearly update of VCR would avoid protracted use of potentially out-of-date values for a given network. Under a five-yearly VCR review cycle, some networks could consistently be using values determined five years before the start of the reset period (and 10 years before the end);
- Values used will be more up to date, providing more certainty to market institutions, investors, consumers and other stakeholders; and
- There may be resource allocation benefit for the AER in coordinating the interval with other four yearly processes, such as Rate of Return.

Question 35: What mechanism(s) should be applied to adjust the VCR on an annual basis?

PIAC recommends that:

- Elements for annual adjustments should be limited, to provide certainty; and
- Indexation to account for inflation should not be automatically applied as a default. Indexation for CPI should only be applied if a case can be made for it. In PIAC's view, the default approach of applying CPI to the Market Price Caps, for example, has proven problematic in restricting them from being lowered over time.

Question 36: Should smoothing techniques be applied when transitioning to newly derived VCRs?

Only where the magnitude of the difference between the old and new values is so great that the impact on the market of an immediate full transition is clearly higher than the impact of any inefficiency in the transition. Smoothing for its own sake is of questionable value.

Other Questions

VCR values for DER customers

PIAC understands that the use of VCR to estimate the impact on consumers with DER could be problematic. This is because such consumers – be they residential, business or industrial – are likely to meet a portion of their total electricity demand through their DER assets rather than through the network. However, in the event of a network outage, the consumer will lose all of their energy supply – not just the portion which is supplied through the network (noting that many consumers would not have set up their DER system to provide backup supply).

Simply multiplying the demand supplied by the network by a VCR will underestimate the impact of an outage on such as consumer. Therefore, rather than developing a separate VCR estimate for customers with DER, the native demand (i.e.: total electricity demand from both grid-supplied plus onsite-generation) should be used in calculating the impact of a network outage. This method is favourable as it:

- Maintains the same VCR estimates for the same category of customer, rather than, for instance, separating residential customers into those with and without DER;
- Can be scaled to account for the portion of final demand which is met by the network as the portion supplied by DER changes depending on the penetration of DER as well as the time and duration of the outage; and
- Is broadly consistent with the load forecasting methods used for network planning.