

# VALUE OF CUSTOMER RELIABILITY IN THE NEM

## A REVIEW BY THE AUSTRALIAN ENERGY MARKET OPERATOR

A submission from a small consumer perspective.

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28<sup>th</sup> February 2011

# BACKGROUND

## VCR

The Value of Customer Reliability (VCR) is a numerical parameter of significant potential use in the operation, planning and regulation of electricity systems. VCR represents the dollar value that customers place on the reliable supply of electricity – an indicator of customers’ willingness to pay for not having supply interrupted. It is not a parameter that can be measured and it is not a parameter that has a single value applicable to all customers across Australia’s National Electricity Market. It is a parameter that must be approximated or estimated and the methods by which this is done will impact on the uncertainty with which it can be determined. In turn, the uncertainty with which it can be determined should influence the way in which it is used.

The Australian Energy Market Operator (AEMO)<sup>1</sup> is seeking input from interested parties as part of its review of the most suitable approach to establishing and maintaining up-to-date Australian estimates of VCR. Specifically it is seeking submission on:

- The concept and purpose of VCR
- Current numerical estimates
- Methods and processes for future updates and extensions

This submission has been prepared by Andrew Nance as end-use customer representative on the Australian Energy Market Commission’s Reliability Panel. This submission has been prepared in consultation with members of the *National Consumer Roundtable on Energy* (particularly Mr Tony Westmore at the Australian Council of Social Service, **ACOSS**<sup>2</sup> and Mr Craig Memery at the Alternative Technology Association, **ATA**<sup>3</sup>) and aims to faithfully represent their views. Both ACOSS and the ATA have endorsed this submission; however responsibility for the content of this submission, particularly any errors or omissions, remains with the author, Andrew Nance.

It is understood that the release of the AEMO Background paper and the convening of the video-link forum in December 2010 represent the first steps in a process. It is understood that this submission will be considered by AEMO in the production of an Issues Paper in early 2011 and the establishment of a VCR Procedure by the middle of 2011.

## Introduction

Like any aspect of the regulatory framework, the consideration of VCR should be done on the basis of the National Electricity Objective (NEO), as stated in the National Electricity Law:

*... to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to –*

- *price, quality, safety, reliability, and security of supply of electricity; and*
- *the reliability, safety and security of the national electricity system.*

To the extent that ‘efficient investment’ is for the long term interests of consumers and efficiency needs to be assessed against a ‘willingness to pay’ it is apparent that VCR, a measure of ‘willingness to pay’, will be used either explicitly or implicitly in the market. Such a direct relationship to the NEO suggests that the reliable determination and appropriate use of VCR measures is a high order need of the market.

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<sup>1</sup> <http://www.aemo.com.au/planning/vcr.html>

<sup>2</sup> [www.acoss.org.au/about\\_us/what\\_we\\_do/](http://www.acoss.org.au/about_us/what_we_do/)

<sup>3</sup> [www.ata.org.au/projects-and-advocacy/](http://www.ata.org.au/projects-and-advocacy/)

## Principles

Discussions amongst consumer advocates informed by the AEMO Background Paper and briefing and the Oakley Greenwood (OGW) Report “Valuing Reliability in the National Electricity Market” (November 2010) have led us to establish some high level principles for consideration by AEMO. These principles are presented below. The “Desirable aspects of a VCR measure” presented at s5.3 of the OGW paper are also supported.

1. If VCR figures are made available, they will be used. Caveats around their applicability may or may not be acknowledged. Therefore VCR figures must be robust and have a high degree of segmentation.
2. Segmentation should reflect the disparate consumer circumstances in the NEM and reflect not only the different NEM regions but geographic sub-regions and circumstances where customer’s experience distinctly different reliability performance.
3. Sample sizes must be sufficiently large to ensure statistically significant results are obtained.
4. The VCR procedure must acknowledge all of the potential uses of VCR in the NEM regulatory framework and build up to a survey design from there.

For example, it is known that the AER has used the Victorian VCR figures discussed in the OGW Paper in the recent setting of incentive rates in the South Australian Distributor’s Service Target Performance Incentive Scheme (STPIS). The AEMC repeatedly refers to VCR (and the current Victorian values) in the Final Report of the Review of the Effectiveness of NEM Security and Reliability Arrangements in light of Extreme Weather Events (May 2010). The Reliability Panel discuss VCR and its relationship to the Market Price Cap (MPC) in the final report to its review of the Reliability Standard and Reliability Settings, April 2010. The AEMO objective of pursuing national VCR figures for Transmission Planning is noted as important but it is not the only use. All stakeholders that do or may use the VCR figures must be part of this current process.

5. The uncertainty inherent in the derived VCR values must be determined and stated explicitly. The precision with which data is presented and used should correspond to this uncertainty. The Application of VCR values should also include a sensitivity test of the impact of considering the limits of a reasonable confidence interval.

For example, the OGW Paper cites the New Zealand Grid Investment Test as using a value of unserved energy (USE) of NZ\$20 per kWh with sensitivity of the result being tested at values + and – NZ\$10 from that figure. This seems intuitively more reasonable than the examples contained in the OGW spreadsheets of, for instance, \$133.49/kWh or the Urban and Rural Feeder value used by the AER of \$47.85/kWh.

6. The cost of expansive surveys is acknowledged but should be evaluated in comparison to the dollar value of the investment decisions that rely on reliable VCR figures.

## Specifically in relation to the Consultation Points of AEMO’s Background Paper

- a. The concept and purpose of the VCR

From an end-use customer perspective, the economic concept of ‘willingness to pay’ is an accepted part of infrastructure provision. However, it is also understood that the economic literature contains a diversity of views of the merits of various techniques and precautions regarding the use of results out of context.

The willingness to pay concept and its explicit or implicit application is a key part of the service/price balance that underpins the market.

At a more detailed level though it is clear that this optimal service/price mix is very different for different customers. At best, the market can distinguish only an ‘average’ for the consumers that are supplied directly from a given investment. Commercial and residential customers jointly fed from an element of the transmission network will be equally impacted by the reliability of that element and so, while they may exhibit a diversity of VCR measures, only a single value can be used to assess the ‘value’ of any investment in that element. Conversely, agricultural customers and CBD commercial customers have exhibited quite different VCR measures and share little common infrastructure. The use of VCR in the regulatory framework should therefore be capable of discerning these different expectations.

From the perspective of low-income and vulnerable consumers, the concept is however somewhat counter to the notion that everyone has a right to some level of access to electricity: An ‘unwillingness’ to pay should not be interpreted as a lack of need or desire for the service - it could just as well represent an incapacity to pay. However, in relation to temporary outages and for customers at large, it is acknowledged that there is merit in reliable and appropriately applied VCR measures.

To aid the engagement of consumers on this issue, it is recommended that AEMO construct some meaningful case studies on the application of VCR for use in the upcoming issues paper.

## b. Current numerical estimates

The current numerical estimates presented in the OGW spreadsheet have been analysed briefly. It is noted that each of the state based estimates use, for illustrative purposes, the un-weighted sector values of Unserved Energy (USE in \$/kWh) derived from analysis of past Victorian surveys.

It is apparent that the results are highly sensitive to the ‘outage profile’ provided by the various distribution businesses – with the shorter the median outage duration the higher the VCR that results. It is not clear if this is an appropriate correlation – especially if the ‘outage profile’ is driven by distribution network events and the end result is higher likelihood of transmission investment or by the AEMC and the Reliability panel to consider changes to the MPC.

As an illustration, Figure 1, below, shows the significantly different Victorian outage profile (the dark blue line with diamond markers) to those of the other regions used in the OGW examples.

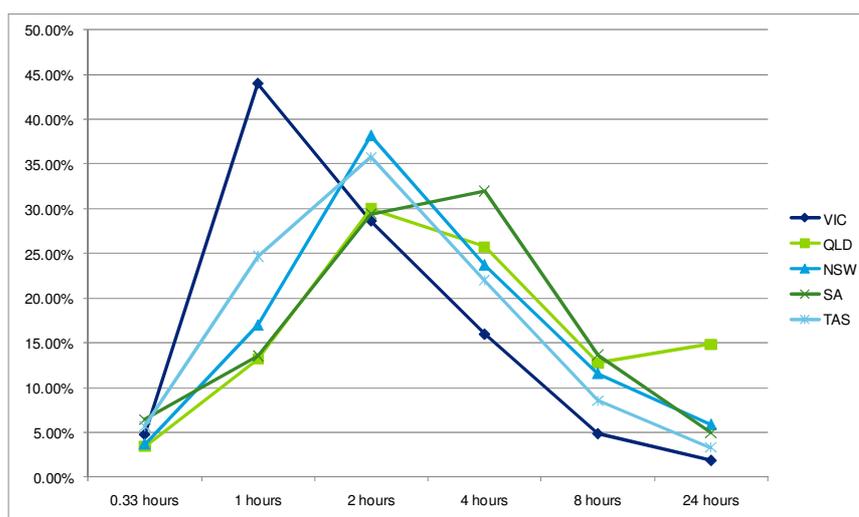


Figure 1 – Region Outage Profiles (source: OGW)

This result suggests that the issues paper needs to test any methodology for sensitivity to its various inputs and against a logic of what VCR should reflect.

Consumers would benefit from a more in depth analysis of the implications of the Victorian results under the existing segmentations. It implies that the statewide average (from either of the Monash, CRA or AEMO studies) is several multiples (at least triple) the residential sector VCR results and around half the Agricultural and Commercial customer values. For transmission level investment this use of an average to represent such a diversity of views might be acceptable but at lower levels of the network this inability to discriminate might compromise the notion of economic efficiency.

The OGW paper repeatedly uses the term ‘granularity’ and it is agreed that this is a vitally important aspect of an effective suite of VCR measures.

## c. Methods and processes for future updates and extensions

Expanding on the notion of granularity, we believe that it is important to understand how VCR measures may be used in the NEM and work back to a survey design from there. This would entail agreeing on appropriate

geographical, network and customer segmentation then determining sample sizes to ensure sufficient statistical power to resolve the necessary matrix of VCR measures.

An example of what may be necessary for each of the 5 NEM regions is a matrix of values for the 4 network types (CBD, Urban, Rural Short, Rural Long) and 4 Customer categories (Residential, Agricultural, Commercial and Industrial). Populating this matrix would require the determination of  $4 \times 4 = 16$  separate VCR values per region. This would appear to be the minimum 'granularity'. Each of these values would necessarily be made up of sub-measures determined for a range of interruption durations and, possibly, seasonal and time of day dimensions.

Further, in light of the load control and supply capacity limiting potential of smart meters, direct load control (DLC) and other, future 'smart' grid developments, determination of VCR should consider the value of partial supply (for residences this is, for example, the difference between the kWh to keep the fridge going and the kWh for the TV), particularly to better quantify the comparative value of non-network-based solutions to network constraints.

The Victorian data presented and analysed in the OGW paper and the South Australian and New Zealand examples discussed all provide useful insights. An obvious feature is the 'spread' of results between customer classes. Of particular interest from a small consumer perspective, is the relatively low VCR values determined for residential customers. It is not clear if this is due to the difficulty of monetising losses or a general satisfaction with current levels of reliability (although the South Australian survey seems to support the latter) but it does suggest that, on average, residential consumers are not willing to pay up to the level that the statewide VCR values imply.

Also of interest was the relatively high VCR determined for the agriculture sector. As discussed at the forum this is likely to have a significant seasonal component. In promoting "efficient investment", it would be important to apply seasonally appropriate VCR measures based on the seasonal understanding of the probability of unserved energy (USE) – particularly given the summer biased nature of capacity / reliability issues in most NEM regions.

Based on the Monash/CRA method (as used in the OGW spreadsheet), the 'outage profile' information is obviously very important and this implies that a 'granularity' below the state-wide level is probably necessary. Wherever possible, the actual outage profile of a customer group should be used to 'weight' the corresponding VCR measure. Urban residential and agriculture sector customers will no doubt experience very different outage profiles yet the current method appears to use the same profile.

It is understood that the cost of large sample size surveys and the subsequent analysis of data is a resource intensive and expensive exercise. On initial consideration though, spending several hundred thousand dollars in each region every few years would appear to be proportionate expenditure if the results better inform investment decisions likely to total several hundred million dollars.

## Summary

It is apparent that various regulatory processes have extrapolated and inferred from the Victorian VCR figures and it is a concern that this has perpetuated without a significant testing of the validity of such an approach. It is also apparent that estimating 'willingness to pay' is a complex undertaking but relevant to a very wide range of stakeholders. From an electricity consumer perspective, the application of VCR estimates is clearly pervasive and, for that reason, greater effort in providing a more sophisticated approach to its determination and application is well overdue.

We trust that this brief submission is of use to AEMO and I am available to discuss these issues further. We look forward to considering the upcoming issues paper.

Sincerely,



Andrew Nance