

18 April 2013

Mr Matt Zema
Chief Executive Officer
Australian Energy Market Operator
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Melbourne VIC 3000
By email: reena.kwong@aemo.com.au

Dear Mr Zema

The NSW DNSP's Response to the *Value of Customer Reliability Issues Paper*.

The NSW Distribution Network Service Providers, Ausgrid, Endeavour Energy and Essential Energy (the NSW DNSPs) welcome the opportunity to provide this joint submission in response to the *Value of Customer Reliability Issues Paper (11 March 2013)*.

We note that the Value of Customer Reliability (VCR) Issues Paper is designed to canvass stakeholder views on how to best determine VCRs and under which NEM circumstances planners, system/network operators, regulators and policy makers should apply these values. In this respect, the Issues Paper presents three different uses for VCRs: as an input into network planning; as the incentive co-efficient for the Service Target Performance Incentive Scheme (STPIS); and as a method for informing the market price cap (MPC) to address market failure.

We would submit that the context of how it is to be applied will determine the effort appropriate to determining its "value". For example, in the context of a well designed incentive scheme, the accuracy of the VCR is less important than in a planning context where the consequences of underestimating the VCR might result in underinvestment, and over the longer-run, a greater frequency of outages. While it is appropriate that AEMO considers these issues as part of this review, we note that it is the AEMC that will determine the full scope and role of how the VCR should be used in the setting of reliability standards.

The NSW DNSP's response to the Issues Paper questions is attached. If you would like to discuss any aspects of this submission, please contact Mr Mike Martinson, Group Manager Regulation at Networks NSW on (02) 9853-4375 or via email at michael.martinson@endeavourenergy.com.au.

Yours sincerely,



Vince Graham
Chief Executive Officer
Ausgrid, Endeavour Energy and Essential Energy

Attachment A: NSW DNSP's Response to the Value of Customer Reliability Issues Paper Questions

Question 1: In what planning contexts should the VCR be applied?

We note that the Issues Paper posits VCRs primarily as an input parameter for use in network investment planning. In the future, it is likely that VCRs will become an important input into network investment planning for all DNSPs in the NEM, particularly as DNSPs increasingly move to an outputs based approach to planning. However, the current robustness of the VCR methodology and values derived to date would suggest that limited weight should be placed on VCR estimates for investment planning purposes. As the Productivity Commission notes:

“Current estimates of the value that customers place on reliability are based on inadequate sampling, data and methodology and need to be updated regularly.”¹

While an attempt will be made to refine the VCR methodology, the difficulty with the VCR measure is that it assumes a single value of reliability (per MWh) regardless of the nature of the outage being considered. Risk management practice tells us that the level of risk is determined by a non-linear function of the likelihood and consequence of an event. A very high consequence event, for example a city-wide or region outage, is generally assessed as embodying a greater relative risk than a small consequence event (like a single dwelling outage) even if the multiple of probability and MWh lost would be identical. However, to reflect this would require a VCR value that was indexed non-linearly to MWh lost. Two examples serve to reinforce this theoretical view with an intuitive logic.

In the case of a household level outage, there is not a linear relationship between duration and impact. The initial interruption has an initial impact as customers reset clocks and reprogram appliances. The impact is then likely proportional to time for a period, but there is a noticeable increase in impact beyond a certain point (i.e. food spoilage, significant lifestyle impacts etc.). Moreover, value will vary with household characteristics and usage, and even for an individual household, the VCR will vary based on day, time of year, and occupancy.

In the case of a wide-area outage, the impact from an outage that debilitates telecommunications, water supply and other utilities is substantially more costly than one which affects only one or two customers. However, the use of previous VCR estimates, would consider these as linearly proportional to the amount of MWh foregone. Our experience suggests the community values the impact of wide-area outages much more highly than a single dwelling outage, even allowing for the relative difference in MWh lost.

The NSW DNSPs maintain that estimating the VCR will always involve a level of subjective judgement and there remain challenges in quantifying the economic and value based VCR measures. This is because economically derived values generally do not adequately reflect the community's value of convenience and lifestyle impacts, while willingness to pay surveys have proven unable to adequately derive meaningful measures for the impact of events for which the respondents have no recent experience. It is for this reason that given a range of VCR values, a higher VCR value as a planning 'input' is likely to be a prudent risk management approach for investment planning.

¹ Productivity Commission 2012, *Electricity Network Regulatory Frameworks*, Draft Report, Canberra, P 51.

As the Productivity Commission notes:

“...the consequences of underestimating the VCR might include underinvestment, and over the longer-run, a greater frequency of outages. At the margin, the consequences of overestimating the VCR are likely to be less severe. Given the difficulties with estimating an accurate VCR and the fact that VCR is an aggregate of the differing preferences of many customers, adopting a VCR that is at the higher end of the reasonable range of possible values would be sensible”².

For example, analysis has been undertaken by NSW DNSPs in examining implied VCR values from recently completed projects. From our analysis we found that whilst some projects (simple minor augmentation projects) could be readily evaluated in these terms and had costs that are similar to or below current VCR estimates, complex projects, with multiple drivers and constraints, involve significant assumptions that greatly impacts the estimated cost of avoiding the risk of unserved energy. A simple VCR measure struggles to capture the complexity of these decisions, however on any reasonable engineering assessment these projects were needed to ensure long term security of supply in accordance with the National Electricity Objective (NEO).

We therefore consider that in developing a VCR methodology, AEMO could use the implied VCRs derived from a sample of recent projects that are considered to have been justified on the basis of good industry practice (and engineering standards) as the upper bounds and the current economically derived VCRs as the lower bounds for a reference point.

Question 2: In what network regulation contexts should the VCR be applied?

The principal way VCR has been used in network regulation is to set the incentive coefficient applicable under the Service Target Performance Incentive Scheme (STPIS). However, it is important to recognise that STPIS is not an investment management mechanism but is designed to incentivise DNSPs to improve service standards for reliability performance at the margins. As a result, there is low risk if the STPIS coefficient is not a highly accurate measure of actual VCR.

The extent of investment driven by STPIS will depend on the interplay of the incentive coefficient, the value at risk and the cost of reliability improvement projects. For example, an aggregate (flat) VCR-based STPIS coefficient will direct investment in areas where reliability can be improved cost effectively. However, it may not necessarily direct investment in areas where customers (at a disaggregated level) have different reliability requirements.

Question 3: If the VCR was to be used for informing the MPC, should it be calculated differently from how it would be calculated for planning and revenue-setting purposes?

We would submit that the VCR should not be used for informing the market price cap (MPC). The MPC is a mechanism designed to manage financial risk and market failure in the NEM and should be calculated based on efficiently achieving this objective. Its relationship to customers (and the VCR as a proxy for them) is tenuous at best.

² Productivity Commission 2012, *Electricity Network Regulatory Frameworks*, Draft Report, Canberra. P 52.

Question 4: To what extent should the methodology for setting VCRs be similar to or different from that used to determine procurement prices for NEMAS (such as SRAS)?
Question 5: Are there other NEM contexts where the VCR should be applied?

It is not appropriate or necessary to align the methodology for setting VCRs to the NEMAS. This is because systems restart ancillary services (SRAS), also known as 'black start' services are not something that can easily be "valued" by customers much in the same way as customers have difficulty valuing other high consequence low probability events, because they are outside their recent experience. Furthermore, if competition in NEMAS service is limited, setting these to VCR is liable to deliver excessive producer surpluses to suppliers and excess costs to consumers.

In terms of other NEM contexts where the VCR should be applied, we would submit that this question is best addressed by the AEMC in its national reliability review.

Question 6: For AEMO's 2013 review, should VCRs be calculated on a regional or sector-specific basis? Why?

Question 7: How could sector-specific VCRs be re-weighted to reflect geographical considerations?

In general terms, we would submit that sector-specific data is preferable to regional values. For example, the Sydney CBD would have different reliability needs from many rural areas which would only be reflected in a sectoral split. In terms of pursuing additional levels of granularity, this will depend on the cost and complexities of extracting the data against the expected benefits of its use. As noted by the Productivity Commission in the context of planning:

"The VCR is one of the most critical parameters of probabilistic planning. For reliability outcomes to be efficient, VCRs must be identified in as disaggregated way as possible, including by:

- geographical location
- customer type
- interruption duration."

Question 8: How should AEMO assess which approach (or combination of approaches) is the most appropriate to deriving VCR while considering the contexts of its application?

Question 9: Which approach (or combination of approaches) to deriving VCR should AEMO consider employing? Are there any other possible approaches not listed?

Of the two options presented in the paper, we would submit that survey based techniques may be the most appropriate method of calculating the VCR since they rely less on assumptions and the skill of the analyst than model based approaches. However, we would submit that current survey methodologies have generally failed to adequately capture the indirect costs on customers and society or the temporal nature of responses.

For example, as changing reliability standards can be long in execution and effect, surveys need to consider to what extent is a given sampled appetite for cost savings a function of current economic conditions rather than longer term economic conditions.

Question 10: Are there any other international VCR studies worth examining to inform the current process?

The paucity of international VCR studies, combined with the disparate results from Australian and international studies suggests that there is no definitive methodology or consensus on how it should be used. We would submit that it would therefore be a courageous investor to consider the cost/benefit of a project based on a high level VCR estimate alone.

The use of international studies is complicated by the fact that avoiding an outage has a value this is unlikely to be fixed across countries, time and circumstance. In July 2012 India suffered the world's largest ever blackout affecting over 620 million people, half of India's population or about 9% of the world's population. However, due to local circumstances, a history of poor reliability, adoption and habituation, the cost of the outage was substantially less than if it had occurred in the USA or Australia. This can be attributed to a level of habituation and accommodation amongst customers, where the current reliability level is a benchmark for performance and their mitigation requirements.

Question 11: Should specific indexing of VCR measures be applied? If so, what types of indexing would be appropriate and how often should the index be applied?

Depending on how the VCR is to be applied, will determine how often it should be updated. Intuitively however it is assumed that customers' value of reliability preferences would remain relatively stable over time, in the absence of major external events. It is also likely that, in the expected period of relatively low inflation and income growth, errors in the estimation of VCR will outweigh any precision in the application of indexing. Indexing for inflation by a simple annual CPI measure between survey periods should be adequate.

Question 12: What strategies or approaches should be used to overcome apparent anomalies and biases in previous VCR surveys?

Question 13: Should contingent valuation or other survey methodologies be used to allow higher values to be placed on residential customer inconvenience from interruptions?

No survey methodology is likely to be without some degree of bias and anomaly but as stated above, the nature of how the VCR is to be applied will depend on the degree of accuracy and effort required to capture its value. We would submit that the methodology should attempt to estimate as far as practicable the full economic cost to customers of interruptions.

Question 14: Is survey data on the cost of momentary interruptions likely to be useful to the transmission planning process? What applications of VCRs are likely to benefit most from more information about momentary interruption costs?

In a distribution context, measuring the cost of momentary interruptions may be appropriate as part of the design for future incentive regulatory schemes. However, it is unlikely to be relevant in a transmission planning context.

Question 15: Is greater customer-type disaggregation necessary or preferable for setting VCRs?

Question 16: To what extent is the disaggregated customer information that network businesses and retailers currently have able to support the calculation of VCRs based on assessing the specific VCRs for more customer sectors?

Customer type disaggregation would be preferable in most situations. However, to be useful it must reflect the availability of data required for decision making.

In terms of disaggregated customer information, it is important to recognise that NSW DNSPs' customer information, for all but the largest customers, is largely restricted to current tariff class and geographic regional information. Current customer information held by NSW DNSPs does not support disaggregation to support the calculation of VCRs.

Question 17: For businesses and retailers that currently have this type of information, what additional information (and how much) would be required to accurately calculate such granular VCRs?

Please refer to questions 15 & 16 above.

Question 18: Should VCRs be set in the same way for transmission and distribution networks? If not, what features warrant different consideration and how should these differences be incorporated?

As noted above, it is more important to consider how the VCR is to be applied more generally rather than whether it should be applied in the same way for transmission and distribution networks. Our previous comments about the non-linearity of the risk coefficient would imply that transmission values, being applied to higher consequence events, might reasonably be higher.

Question 19: Can VCR surveys effectively estimate the cost of HILPs or should HILP events be captured separately within the reliability framework?

Question 20: Based on the response to Question 19, how would HILP costs be reflected in the metric development or reliability framework?

The NSW DNSPs are concerned that current VCR surveys are not able to effectively capture investments driven by high impact, low probability events (HILP). This is especially of concern with respect to the subtransmission part of the network where the feedback loop between investment in the network backbone and reliability outcomes seen by customers can be lengthy.

Aside from the previously mentioned structural concern regarding the linear nature of the VCR methodology, there are further concerns that the methodology relies on customers being able to value different levels of reliability in a survey. Implicit in this is that customers would be able to provide useful valuations of alternate network performance levels provided they were within a reasonable range of customers' past experience. However, the current VCR methodology has demonstrated that without appropriate metrics, customers have significant difficulty in valuing service levels which they have had no experience of and could not reasonably be considered likely by customers, particularly if consumers consider the service level to be a minimum standard which they would normally expect from a DNSP.

One alternative may be to survey people involved in the escalation caused by high consequence, low probability events such (for example, wide area outages) rather than

customers themselves. For example, surveys could be conducted of communications and executive personnel within distributors/transmission companies combined with surveys of government officials who are responsible for the protection of critical infrastructure of national importance.

Question 21: What improvements should AEMO consider to the conduct and administration of surveys?

Survey-based techniques would appear to be the most appropriate method of approximating VCR since they rely less on assumptions and the skill of the analyst than model based approaches. Ideally, a survey of customer preferences would need to sample responses from customers other than average levels of desired reliability and avoid the use of averages as a means of characterising the needs of various segments.

The current VCR customer types (residential, industrial, commercial and agricultural) only represent their electricity service use characteristics. Surveying customer types such as “Urban-Residential”, “Rural Industrial/Commercial” and the like combined with information about those customers’ performance history would result in more appropriate acceptable performance values than an energy-based survey profile. For this to be achieved, the Steering Committee for National Regulatory Reporting Requirements (SCNRRR) customer categories would need to be re-defined. This is because the current customer categories incorporate a mix of different types of customers in the one category. It is more appropriate however to have customer types defined by use and location characteristics.

More generally, it is important to recognise that the VCR is a survey of the economic cost of outages not the level of acceptable reliability performance valued by customers (i.e. by reference to minimum service standards). It is a proxy for the value customers place on reliability in the absence of something more robust. While there is still merit in measuring the cost of outages, it could be combined with a minimum service standard (MSS) approach where customers’ preferences for reliability standards are determined. Any reliability improvements that exceed the MSS would be considered effective reliability investment which could then be tested for its efficiency using a VCR approach. The VCR approach could have a role in determining that the investment is efficient if the cost of the improvement does not exceed the cost of the benefit.

