



Mr. Chris Pattas
General Manager
Australian Energy Regulator
GPO Box 520
Melbourne
Victoria 3001

Our Ref: JC 2017-002

24 February 2017

Dear Mr. Pattas,

S&C Electric Company submission to the Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guidelines

S&C Electric Company welcomes the opportunity to provide a response to the review of measures to the support the good performance of Australia's Electricity distribution network service providers.

S&C Electric Company has been supporting the operation of electricity utilities in Australia for over 60 years, while S&C Electric Company in the USA has been supporting the delivery of secure electricity systems for over 100 years. S&C Electric Company not only supports "wires and poles" activities but has delivered over 8 GW wind and over 1 GW of solar globally. S&C Electric Company has been actively engaged in deploying Battery Energy Storage Systems since 2006 providing a full range of services and using a range of battery technologies and currently has 45 MW/177 MWh in operation, including the UK Power Network's 6 MW battery that provides local peak load support and frequency services to National Grid the GB system operator and the Ergon Grid Utility Support System in Queensland, which reduces peak loads and provides voltage support on rural lines.

We are particularly interested in facilitating the development of markets and standards that deliver secure, low carbon and low cost networks and would be very happy to provide further support to the Australian Energy Regulator on the treatment and potential of these technologies, particularly energy storage.

Yours Sincerely

A handwritten signature in black ink, appearing to read 'Jill Cainey'.

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Introduction:

Australia's electricity system, in common with many other countries, is changing rapidly as intermittent generation connects at both the distribution and transmission level and as the fleet of large combustion plant reduces in response to both the need to mitigate climate change and changing market signals.

The operation of the distribution network is critical to delivering a secure supply of electricity to end consumers and the balance of delivering the innovation and replacement of network assets at lowest cost to these end consumers is a challenge. Network standards are a critical part of ensuring that consumers receive the best possible service and it is appropriate that there is a scheme that provides an incentive for good performance and a penalty for under-performance.

This response will address the 26 questions raised in the Issues paper "Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guidelines for Electricity distribution network service providers".

Additional Points:

Bushfire mitigation

Australia's networks start bushfires and while the total number of fires caused by networks is low at 1% of all fires, the impact of those few fires is significant, with network ignited fires burning the second largest area of land, after lightning strikes (14 % and 46 % respectively – data from Victoria). While it is relatively easy to assess the networks' impact in Victoria, it is less easy to find the data for non-Victorian networks. Bushfires are an issue in all of Australian Energy Regulator's jurisdiction and changing climate will only increase the potential for networks to be the source of a fire event and we would welcome other states following the example set by Victoria and would welcome the addition of the monitoring of fire starts and area burnt to the scheme, even if not incentivised/penalised (as is the case in Victoria).

Customer Engagement

Distributors are required to engage with their customers as part of their rate determination. If stakeholders are either (a) keen for increased expenditure or (b) not keen for increased expenditure, to address a particular local issue this may flow through into STPIS results, but there doesn't seem to be a ready mechanism to account for any impact on performance that may be the result of stakeholder desire.

State versus Federal

It should not be the case that different network operators under different state jurisdictions should be subject to different regimes. The STPIS scheme should be applied nationally and uniformly (where the Australian Energy Regulator has jurisdiction).



Responses to Consultation Questions

1. The AER would like views on the appropriateness of the current approach for setting the ratio of the relative reward/penalty rates between SAIDI and SAIFI, which is very close to the duration of a typical outage time, or CAIDI.

It is clear that the current ratio of the relative rewards and penalties for SAIFI and SAIDI has driven an improvement in SAIFI, but not SAIDI. By using a ratio it is very complex to ensure that both metrics can be addressed adequately and to ensure that the balance drives improvement. The current approach means that the balance has to be adjusted continuously to address the dominance of either SAIFI or SAIDI. If the spread is too narrow it risks becoming a binary scheme and if the spread is too wide, then the marginal incentives for changes in reliability may not be sufficient to affect a Distributor's decisions.

If Distributors are required to address both SAIFI and SAIDI then it would be less complex to provide an incentive for both separately, which would also empower individual networks with the opportunity to invest in the necessary equipment and approaches separately, depending on which metric needs more attention (currently SAIDI). Each metric is already monitored separately and so it is the calculation to determine the balance that needs to change or be removed.

As the current scheme has demonstrated, the calculation of the ratio is complex and leads to unintended consequences, where one metric is favoured over the other.

CAIDI, when presented as a graph of SAIDI over SAIFI provides a useful visual guide to performance, but the ratio is not helpful to achieve improvements in both SAIDI and SAIFI.

2. Would allocating a higher incentive rate to the SAIDI measure—by allocating a higher proportion of the energy value to this measure—provide a more balanced approach between incentives to improve reliability through capex and opex, and provide a more even improvement to all customers? If yes, what should be the relative weights between SAIDI and SAIFI incentives?

See the above response regarding the use of a ratio. Rather than provide the incentives through a ratio and since both SAIFI and SAIDI are already monitored separately, it would be more appropriate to incentivise each separately to avoid the demonstrated unintentional consequences of getting the balance in the ratio wrong.

The AER contends that investing in reclosers, a CAPEX cost, has improved SAIFI results and this is likely to be true. In the case of a persistent fault reclosers will lock out and have a negative impact on SAIDI. The more traditional approach to reducing outages, such as managing vegetation and maintenance would be an OPEX cost.

However, not all reclosers operate in the same way and an automated pulse closer (reclosers), linked to a remote management software tool, would result in improvements in SAIFI and SAIDI, since the software allows each pulse closer to communicate with the control room or other assets in the network to more accurately identify the location of a persistent fault. Using an automated network of pulse closers would be a CAPEX cost, but reduce OPEX costs, since the fault is more accurately located, allowing for a targeted and rapid response by crews.



3. Currently there is a slight difference between the ratios for SAIDI and SAIFI incentive weights across the CBD, urban and rural networks (the W_n factor of equations (1) and (2) of STPIS, see appendix C). Should a uniform ratio be applied to all network types?

All network types have their own challenges and while we feel the “ W_n ” factors are representative, the over-arching driver should be, that regardless of network type, a reliable supply needs to be delivered to customers.

4. Should MAIFle be implemented as the standardised measure for momentary interruptions?

MAIFle should be implemented as the standard measure for momentary interruptions. This is particularly the case with regards to reclosers. If networks have invested in reclosers to deliver improvements in SAIFI, then it would be more appropriate to ensure that each reclose attempt for a given single fault event, is *not* counted as a separate momentary interruption (as is the case with MAIFI). Automated restoration of supply will not only improve SAIFI, but improve MAIFI.

Momentary faults impact both residential as well as industrial customers and should therefore be included in the STIPIS, as the scheme is used for both funding improved performance as well as penalising deteriorating performance. The removal of MAIFI or MAIFle from the STPIS will likely result in a deterioration in the number of momentary outages.

All networks have data from routine monitoring equipment on momentary outages and, given the impact momentary outages have on customers it would be appropriate to ensure MAIFle is part the standard suite of reliability measurements that is used to incentivise performance.

5. Even if the definition for performance comparisons was set at 3 minutes, should the STPIS provide flexibility to change the MAIFI threshold to a value other than 3 minutes to balance the cost of the technologies available to the distributors, the forgone unmeasured unserved energy and customers’ preferences?

We would not support an increase in the definition of a momentary outage to an outage lasting 3 minutes or less. The argument that for most customers and outage of 3 minutes is no more annoying than an outage of 1 minutes, ignores the impact that momentary outages have on industrial processes and electronic equipment.

While the cost to the average domestic customer of moving from 1 to 3 minutes appears to justify this decision, the cost of managing momentary interruptions (including those that result from poor power quality) will move from the network, who levies to cost on the customer, direct to the customer who will then have to make their own arrangements for ensuring a secure supply. This is particularly the case for industrial and commercial customers. So the cost is still borne by the customer, but removed from the network and becomes another hidden cost, like the cost of all outages of any definition, that is borne by the end user.



Any outage of any duration is likely to drive customers towards a solution that is less network reliant and more self-determined and independent. This may reduce the size of the cost base and is not helpful to the continued operation of our networks.

There are automated pulse closers (reclosers) that are fully configurable via management software that would complete a full reclosing sequence in less than 20 seconds (although this could be set for much longer periods, if desired by the network, to address bushfire mitigation for instance) and certainly in less than a minute.

It is particularly troubling that by moving from a 1 to 3 minutes definition for a momentary interruption, the SAIFI performance of all networks is immediately improved. This implies that the bulk of current non-momentary interruptions fall between 1 and 3 minutes and it would be a concern if a change in definition and mathematics resulted in a reduction in investment in measures to improve network reliability.

Any definition should have the ability to be modified quickly in response to changing network circumstances, however given the impact of momentary interruptions and consumer sentiment, the definition should remain at 1 minute or less.

6. What method should be applied to identify catastrophic days so that it is able to consistently, reasonably and universally operate across all distributors?

It appears that distributors struggle to meet and improve reliability on a routine “good” day and this should surely be the minimum outcome from any STPIS scheme.

We would agree that Major Event Days and Catastrophic days should be removed from the routine STPIS, but not *ignored*. Maintaining supply is becoming increasingly challenging in Australia and will only become more so as Climate Change continues to impact on weather and bushfires.

Climate change has resulted in more energetic storms, stronger winds, high intensity rain events that lead to flash flooding and more persistent floods, increases in storms involving hail and increases lightning strikes. A drier environment has led to higher bushfire risk. These types of event will become more frequent and our networks need to be able to develop to withstand such events. If significant events are excluded, more and more events that damage networks will be excluded from the STPIS. So performance on major event days and catastrophic days needs to be monitored and understood, since the ultimate goal should be resilient and robust networks for the future and the new climate.

There appears to be no mechanism to incentivise distributors to create the resilient and robust networks we need now and in the future (apart from some State-led bushfire mitigation programmes) and while it is appropriate to exclude major events days and catastrophic days from STPIS to ensure data isn't skewed by a single event, there does need to be an incentive approach to ensure that networks aren't just addressing reliability today, but in the future.

The Major Event Day Beta method seems appropriate and it should apply to all networks, regardless of type.



An additional approach would be use the readily available data from national agencies, such as the Bureau of Meteorology, to determine if an event, typically weather related, was statistically “unusual”. The Bureau of Meteorology could also be asked to provide an <http://www.blackout-simulator.com/> assessment of whether a particular event was statistically outside normal conditions. In some circumstances, such as a cyclone, it is obvious through warnings from the Bureau of Meteorology that weather conditions were far from normal.

For instance in the analysis of the winter storms of 2013 in the UK, the UK Meteorological Office was able to confirm that the 2 months of December 2013 and January 2014 were the wettest since 1915 and December was the windiest month since 1993. Meteorological data would be helpful in confirming that a particular event was outside the statistical norms.

It should be noted that the UK equivalent of the Guaranteed Service Level scheme was updated following storms in 2002 to provide a range of categories of event and was again update in 2015 following the 2013 storms. This resulted in increased payments to customers based on the event category.

7. Given catastrophic days are already excluded under the MED framework, should such events be treated differently from the "major event days" concept under STPIS?

See response above. Catastrophic days need to monitored and recorded and should feed into an incentive scheme (separate from the “routine” operation covered by STPIS) that ensures Australia’s networks are developing to be resilient and robust to impacts of Climate Change.

8. Should distributors be permitted to exclude a transmission outage event if the event is caused by the action, or inaction, of that distributor?

If an event that occurs on the distribution network is the result of a transmission outage and the distributor had no control, then it should be excluded. However, if the distributor took an action, or took no action which either caused the outage on the transmission system or exacerbated the outage on the transmission system or the distributors own network, then that event should be counted.

9. The AER would like views on the current definitions of the feeder classifications.

We feel the current feeder classifications are appropriate.

10. Historically, only feeders supplying the central business districts of the capital cities of each jurisdiction have been classified as CBD feeders for STPIS purpose. Should this practice be maintained?

Rather than change the definitions, they perhaps need to be applied differently, particularly for CBDs, since some Australian cities, other than capitals, may have “CBD-like” networks.

11. Should planned outages be included in the STPIS? What is the value/cost of a planned outage?

Since planned outages do impact on the customer they should be monitored and reported, but it is not straightforward to determine if they should count in the STPIS. It is easy to recognise that unplanned outages indicate deficiencies in network management. High levels of planned outages may mean that the distributor has embarked on a major improvement exercise, but equally networks with a well-designed



N-1 redundancy would have fewer planned outages. If the major improvements that lead to increased planned outages are in response to customer needs, then good stakeholder engagement (which is monitored) should minimise impact and manage customer satisfaction.

12. What considerations should we take to address the potential safety related issues in order to enable the introduction of incentives to reduce planned outages?

“Live line” work should be avoided for safety reasons and if a planned outage is needed, then good engagement with affected customers and an undertaking to support those customers who dependent on a secure supply, perhaps financially or through the provision of temporary back up supply would mitigate the impact.

13. The AER would like views on what level of supply interruptions is considered worst served?

No Comment

14. Do you consider that improved standardisation would increase the effectiveness of STPIS?

It is not clear what impact standardisation would have on the operation of the STPIS. Simplification is definitely needed as it is clear that the complexity of the SAIDI to SAIFI ratio, plus the way STPIS currently determines the weighting of each, has led to unintentional consequences, with the result that SAIFI has improved at the expense of SAIDI.

15. Should unmetered supplies be included in the performance measure?

No Comment

16. What is the appropriate method to adjust the target when the performance improvement or deterioration results in the financial reward/penalty that exceeds that cap level?

No comment

17. Do you consider that allowing distributors to retain the same proportion of the value of reliability improvements as they do capital and operating expenditure reductions will promote economic efficiency?

Distributors should retain the 30 % of value derived from improvements. In an improved network spending CAPEX on new technologies, such reclosers and automated intelligent pulse closers, will lead to a reduction in OPEX also.

18. We would like views on whether the scheme should continue to operate in a symmetrical way, i.e. penalties are incurred at the same rate as rewards.

No Comment

19. Should consumers' preferences be reflected through the capital and operating expenditure funding level, or through the STPIS incentives, or a combination of both measures?



Both. If customers want a more secure network, for instance, and are prepared to pay for it via CAPEX and OPEX support, then this spending would result in improvements in SAIDI and SAIFI. It could be argued that CAPEX and OPEX spending that won't result in an improvement in performance is spending that shouldn't occur.

20. Which input factors of the STPIS should be, or could be, made flexible to reflect consumers' preference on reliability level, for example the VCR rate, level of revenue at risk and the major event day exclusion criterion (which determines the coverage of the reliability measures).

No comment

21. We would like views on the current approach for s-factor calculations. Specifically, should and how the calculation of s-factor be simplified?

No Comment

22. We would like views from stakeholders on what other clarification is needed for the GSL section of the current STPIS scheme.

See response to Question 6, with regard to the changes in the UK equivalent scheme following major storms (more granularity added)

23. In what way could the STPIS be changed to reflect the needs of consumers with storage or other similar technologies?

New technologies, such as storage or electric vehicles, may have positive or negative impacts on the operation of the network. The nature of the impact will largely depend on how that new technology is operated and whether it is operated to *support* the wider network/system or whether it operates in a way that *increases* the cost of operating the network.

A small-scale domestic customer with behind-the-meter storage and roof-top solar PV, are likely to have a negative impact on network operation. Significant investment has been made to develop tools to predict solar PV export on the Australian system and this is largely based on weather forecasts and satellite data. However, a battery behind-the-meter makes predicting solar generation export much more complex, since export is no longer dependent on the weather and clouds, but on the state of charge of the batter. Batteries behind-the-meter reshape the "Duck Curve" so that the ramping down of demand becomes an issue in the morning as well as the afternoon ramp up. If the battery is charging/discharging to the network (as opposed to operating entirely behind-the-meter) this further complicates network management. Therefore the "need" of a customer with storage implies that behind-the-meter storage is a good thing for the network, when international evidence shows otherwise.

New technologies deployed domestically have been purchased by the network customer for the benefit of that customer and not the network, therefore managing the impact of that asset is difficult, particularly if there is no price signal that the customer can see to drive "appropriate" behaviour.



Distributors and transmission system operators internationally are grappling with the treatment (connections) and management of new technologies. Electric vehicles, heat pumps and batteries are notifiable technologies in the UK, when connecting to the distribution network. Connection requirements and assessment approaches have been developed in the UK for such technologies.

Larger-scale industrial or commercial customers may be able to genuinely provide network support, either by managing their own peak load or actively providing services to the network. This is the case in the UK, where Distribution Use of System charging provides a signal to half-hourly metered customers, typically larger-scale, to manage their energy demand to minimise their impact on network operation. Additionally assets can either contract to provide ancillary services to the transmission system operator, directly or through an aggregator (to meet minimum capacity requirements). Distributors are also beginning to develop system services requirements to help manage network operation and these services could be provided by third parties, such as industrial and commercial customers.

STPIS needs to reflect whether storage or any other new technology or approach will have a positive or negative impact on the performance of the network. How that is achieved is difficult to define, since it is dependent on how each asset is used.

24. The existing STPIS is not based directly on the energy-not-supplied. Do you think it would be preferable to base the financial reward or penalty directly on the energy not supplied? How shall we measure the social harm associated with network outages?

The customer is increasingly placed at the heart of all approaches and so an assessment of the social impact, positive and negative, rather than just “harm” as indicated here, is required. It would be much easier to assess the *financial* cost of energy-not-supplied and there are a variety of calculators internationally that have been developed e.g. <http://www.icecalculator.com/> and <http://www.blackout-simulator.com/>. It would be useful for networks in Australia to have access to a similar tool to better understand the true cost of outages for their customers.

25. The existing STPIS is estimated as the product of the outage duration (and frequency) of an average customer and the incentive rates for the SAIDI (and SAIFI). Do you think it would be preferable to base the average outage duration and frequency on energy not supplied (KWH) or load (KVA)?

STPIS is estimated using SAIDI and SAIFI and it is a complex calculation. It would be preferable if the incentives for frequency and duration were separately assessed to ensure that each receives the appropriate attention.

Energy-not-supplied is an interesting metric to monitor and would be useful tool for comparing networks nationally and internationally (and kWh seems to be the standard unit) and it would certainly be useful when combined with the financial cost (e.g. Question 24).

26. Should the AER move away from service quality measures mainly based on SAIDI and SAIFI measures? If not, how do we know when we have reached that point? What other measures should be considered?



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SAIDI and SAIFI are extremely well-established metrics in the industry and internationally. They have been used for a long time and it's not clear that there a better approach. Any introduction of a new approach would need to be handled with care to ensure that the ability to perform historic comparisons is not lost.