Edge Electrons ESB response

QUESTION 1: BENEFITS WHICH CAN BE ENABLED BY SMART METERS

(a) *Are there other benefits which can be enabled by smart meters that are important to include in developing policy under the Review?*

Smart meter benefits and alternative technologies

Universal installation of smart meters does not represent the most cost effective or efficient technology to manage a number of growing issues of power quality and the need for real time DER control on the LV network.

Smart meters retain an important role in measuring customer DER supply and usage as well as other benefits set out in the AEMC Directions Paper. However, the high annual cost of smart meters represents a significant cost burden on residential customers who choose not to participate or are unable (through lack of adequate space, rental accommodation, lack of available funding or other reasons) to participate in DER projects.

Live distribution transformer monitoring systems (DTMS) deliver more accurate and reliable, real time power quality data for networks which does not require universal smart meter coverage and can be delivered at a significantly lower cost per customer.

Areas which are important to include in the policy under Review:

Increasing DER penetration and increase in EV charging will place existing LV distribution assets under stress from reverse power flows, minimum demand and over capacity. Variability of weather, generation and customer usage will create greater power quality volatility. Current 15 and 30 minute smart meter reporting will be inadequate to monitor and manage real time variability in load and supply.

The rapid adoption of DER and EV The challenges of managing two way power flow on the LV network are well articulated in Energy Queensland's Future Grid road map:

[EQL Future Grid Roadmap - DRAFT]

It is therefore important that the Review looks at the most effective and least cost technologies available to monitor and manage DER in a "live" environment in order to avoid high costs and poorer reliability for LV customers.

In the context of these challenges, the following issues need to be addressed:

1) LV DTMS network monitoring provides live network data in response to live power quality issues from DER operation and customer usage. ***Smart meters do not provide this live data;***

2) Live DTMS network monitoring reports network capacity, asset operation fault detection and power quality issues at a transformer level. ***Smart meters do not provide this live data;***

3) Live data needs to be able to integrate into networks ADMS, OMS to enable live monitoring and management of the LV network.

4) The volume of live data delivery from universal smart meter coverage is huge. Smart meter programs needs to ensure this volume of data can be supported in secure, reliable and cost effective way through communications systems such as mesh network, LoRawan, 4G.

(b) What are stakeholders views on alternative devices enabling benefits? What are the pros and cons of these alternative devices?

The key alternative technology to smart meters is Distribution Transformer Monitoring Technology Systems (DTMS). There are approximately 650,000 LV distribution transformers across the NEM and SWIS networks, covering over 9 million end customers. Network-wide DTMS is commercially available and represents the least cost, highest resolution, most rapid deployment option to provide network power quality data to support Australia's future smart grid.

Background

There is currently minimal monitoring of distributed LV distribution transformers below the sub-station, as shown in the AEMC diagram below:

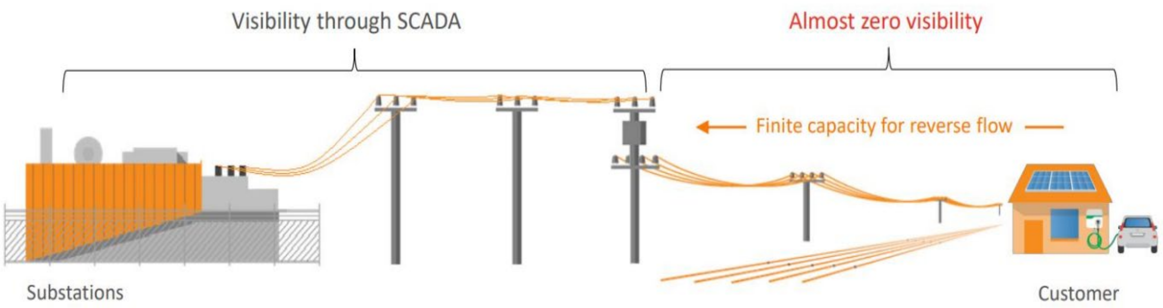


Figure 5: Limited LV Network Visibility for DNSPs (Source: AEMC, 2019)

The LV transformer is the closest constraining asset to the customer and is the most obvious asset to provide real time data for customer clusters on localised issues including power quality and network constraints. Live DTMS brings localised visibility and control to network areas with partial or no smart meter penetration.

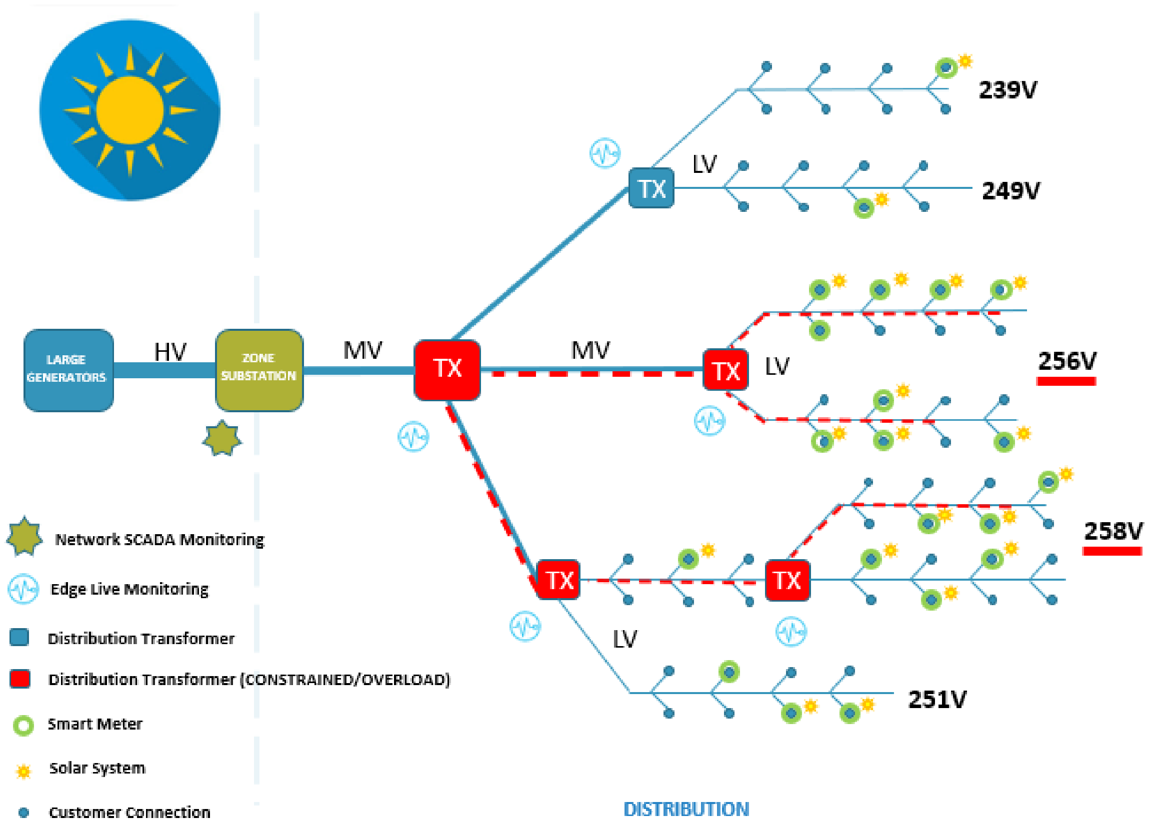
Diagram 1 below shows the capability of DTMS to provide live, localised data across feeder and LV circuit level

Diagram 2 illustrates Adelaide reference case where LV transformer level data sets dynamic operating envelopes for control of DER solar inverter assets based on real time LV data.

Diagram 3 illustrates reference case where LV transformer level data sets dynamic operating envelopes for control of EV chargers based on real time LV data.

Diagram 1:

Below diagram illustrates capability of DTMS monitoring to deliver live power quality and voltage data across feeder and LV circuit level WITHOUT the requirement for universal smart meter installation.



Key:

LV network monitoring is currently available at zone sub-station only. Sub-station level monitoring does not report differing power quality and feeder/ LV circuit level constraints across LV network

Voltage control at sub-station level does not address real time variations in PQ and voltage across different feeders/LV circuits

Edge DTMS reports live PQ and constraint analysis at closest LV network asset to customer

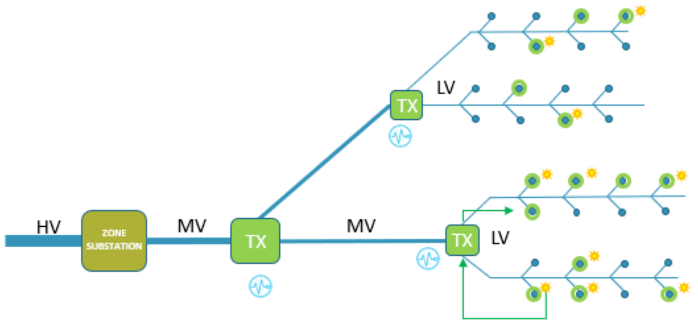
DTMS complements existing smart meter data where available, with higher level PQ resolution and real time data availability

DTMS replaces need for universal smart meter coverage to provide LV network data

Feeder/LV circuit level DTMS enables dynamic, targeted solutions to PQ and voltage control problems

Diagram 2:

Below diagram illustrates live DTMS monitoring links to DER assets through API and enables dynamic operating envelopes to be set for solar export. This enables active management of minimum demand issues at localised LV circuit level and maximisation of customer solar generation as opposed to less targeted sub-station level approach.



- Edge Live Monitoring
- Distribution Transformer
- Smart Meter
- Solar System
- Customer Connection

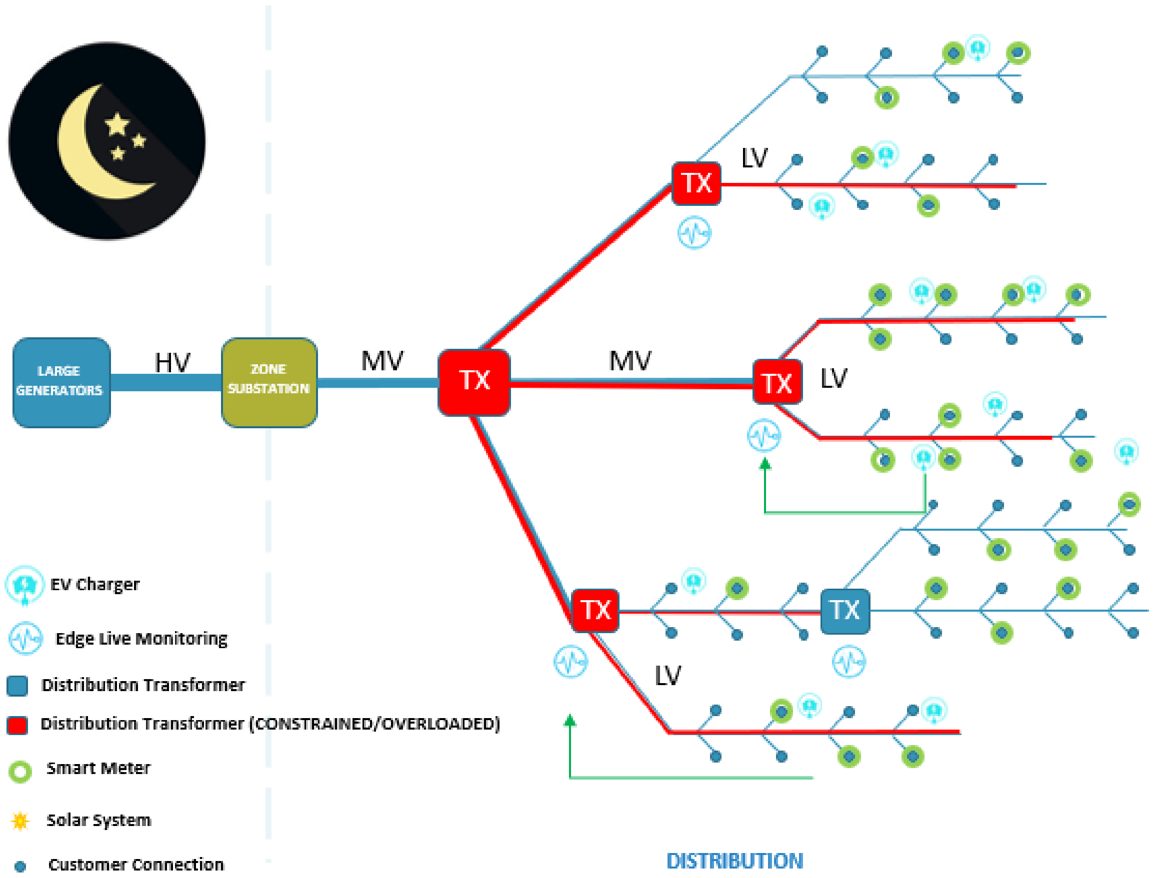
DTMS reports live LV circuit level PQ and voltage, identifies dynamic constraint issues

API link to smart inverters enables dynamic operating envelopes based on live data

Real time smart inverter control enables improved power quality and voltage management

Diagram 3

Below diagram illustrates live DTMS monitoring links to EV charging assets through API and enables dynamic operating envelopes to be set for EV charging. This enables active management of capacity constraints and maximisation of EV charging rates at localised LV circuit level as opposed to less targeted sub-station level approach.



DNSPs require low cost, live transformer monitoring meters which supply data in 1-5 minute packets which reflect changing DER operation and customer usage. These data packets must be capable of integration into DNSP ADMS, OMS and GIS operating systems. *Smart meter data can supplement this live transformer and feeder level data, but does not provide real time asset and power quality performance.*

This level of live data reporting is available from DTMS technology at a significantly lower cost per customer than current smart meter costs. This relative cost is set out in the Reference Case Analysis below:

Reference Case analysis: Cost comparison of smart meters and DTMS:

- The annualised cost of smart meters to residential customers is approximately $120 per annum for single phase customers and $150 per annum for 3 phase customers based on 10 year+ metering contracts *(Source: Energy Locals electricity retailer).*
- In contrast, commercially installed live DTMS monitoring can be installed and operated at a cost of less than $10 per customer per year.

Example: Evo Energy, ACT (source: RIN data analysis; Edge Electrons DTMS costs)

Total customers:	200,000
Distribution transformers:	5,200
Avg customer per transformer:	38.4
Edge eSensor DTMS:	$3,000 per transformer (fully installed) $5 per month data costs
10 yr annualisedDTMS costs:	$360 per transformer
Annualised cost per customer	**<$10**

DTMS programs are currently being rolled out by major DNSPs in the NEM at per customer costs significantly below the per customer cost of smart meters. While smart meters provide valuable monitoring and metering of DER asset performance, there is no evidence that their high operating costs result in positive NPV benefit to retail customers.

In contrast, the implementation cost of the Edge live LV monitoring platform represents costs saving of 80- 90% relative to the 10 years cost of universal smart meter rollout.

Edge Electrons distributed transformer monitoring system (DTMS) records live transformer level data from our eSensor transformer monitors. A detailed datasheet on the technical performance of Edge DTMS is attached:

EE-402-series
eSensor Datasheet F

Alternative device benefits analysis: Distributed Transformer Monitoring Systems

Pros:

1) Full, live power quality data is delivered from an average 1:30 monitoring devices to customer ratio as opposed to full AMI penetration
2) The Edge LV monitoring devices are applicable for single, 2 and 3 phase installation
3) Under current power of choice regulation, AMI installation requires customer consent. Edge's LV monitoring platform can be installed and full network benefits achieved without customer consent
4) Installation is done without powering down, so there is no customer power interruption
5) Monitors are IP68 rated. Small form (4kg), simple installation. Installation of each device is approximately 1 hour and can be completed by a team of 2 linesman
6) Devices provide real time network power quality data and transformer load data at local LV feeder level, with reporting in 1 minute data packets
7) Provides full, live alarms including power outages and recovery, asset overloading, over voltage, under voltage, voltage sag, voltage flicker, frequency, power factor, harmonic distortion and reverse current flow
8) Military level encryption and data security
9) Provides last gasp power backup in the event of power outage
10) Monitors run at a minimal 14 watt power, which is drawn directly from the power line via IPC (insulation piercing connectors) clamps, so there is no requirement for battery replacement
11) Adaptable communications protocol over 4G/CAT-M1 modem
12) Monitors are supported by Telstra CatM1 network which has 2.5 times the coverage range of the standard network and is part of Telstra's long term data strategy with 5G compatibility. Telstra has guaranteed support for CatM1 to beyond 2035
13) For regional and rural installations the CatM1 communications solution is a more effective and lower cost solution than a mesh network, which requires greater density of users/nodes in order to transmit data reliability.
14) The CatM1 network has faster real time data transmission capability than mesh networks which are susceptible to performance issues and bottlenecks in data delivery at high data volumes
15) Provides real time operating envelopes for DER management control based on live power quality and LV capacity data
16) Provides real time voltage data for improved voltage management
17) Detects power theft based on comparison of transformer power analysis and aggregate customer meter analysis (based on either analogue or smart customer meter data)
18) Enables more accurate forecasting of network development based on actual transformer level data
19) 15 year asset life
20) Per customer cost: $10 per annum compared to $120-150 cost per customer of smart meters
21) Lower overall network costs than universal smart meter adoption

Live DTMS platform provides superior network asset management and power quality management benefits to those described in table 2.2 (Directions Paper, page 18).

DTMS does not provide the following:

1) Remote customer meter reading (Note: Evo Energy meter reading cost is <$10 per customer as per RIN analysis)
2) Remote customer connection/disconnection (Note: Energy Queensland regulation requires onsite safety checking for ALL connecting customers, including smart meters)
3) Neutral fault detection
4) Measurement of DER output

Edge considers that the benefits of remote customer meter reading and remote customer connection capability do not justify the additional $110 to 140 per annum cost of smart meters for those customers who do not have DER

Customer energy monitoring and low cost neutral fault detection technologies are available for residential customers at significantly lower cost than annualised smart meter costs.

Edge considers that smart meters will continue to be required for DER and VPP monitoring. The costs of smart meters for these customers should be borne by the relevant customers and not shared across non-participating customers.

QUESTION 2: PENETRATION OF SMART METERS REQUIRED TO REALISE BENEFITS

(a) ***Do stakeholders agree that a higher penetration of smart meters is likely required to more fully realise the benefits of smart meters? If so, why? If no, why not***

Edge does not believe that universal smart meter penetration is required to deliver the network operations benefits set out in the AEMC Directions Paper. These benefits can be delivered through a combination of smart meters and live DTMS network monitoring technology at a significantly lower overall cost.

Residential and SME customers adopting smart meters fall into the following 3 categories:

1) For customers who choose to install DER assets (solar, battery and future EV charging) smart meters provide the necessary technology to report time of day electricity consumption and export. This has been the biggest driver of smart meter adoption by customers outside Victoria.
2) For customers who choose to participate in time of use tariff plans smart meters provide the necessary technology to validate the financial benefits IF customers wish to participate. To date, there has been minimal customer adoption of TOU tariff structures.

For customers who neither adopt DER or choose to participate in TOU tariffs, smart meters are a significant annual cost burden with minimal financial benefit.

A large portion of the non-DER customers will be strata residents or vulnerable, low income customers who rent, do not have roof space for solar, do not have the means or lifestyle to benefit from time of use tariffs. Smart meters bring no direct benefit to these customers (we do not consider automated disconnection to be a customer benefit).

We do not believe the Victorian smart meter rollout has delivered an equitable level of economic benefits to all customers. As one of the respondents to the Newgate research comments, the Vic smart meter has been a 15 year program, "*Has there been a reduction in usage? Have people saved money?*". The evidence is is not clear.

The failure of retailers to persuade non-DER customers to adopt smart meters outside Victoria under the Power of Choice legislation is, however, clear evidence that retailers and DNSPs are unable to articulate a compelling case for smart meters with all customer segments, especially the lower income, vulnerable customers.

Requiring regulatory intervention to support the universal adoption of high-cost smart meters will benefit meter data management companies. We would refer the AEMC to the current sale process for IntelliHUB (which purchased the previous Origin meter company Acumen in 2018) as indicative of the extremely high value ascribed to long term smart meter management rents. It is not clear that universal smart meter rollout will benefit end customers as much as shareholders of metering companies.

Table 2.2 sets out a number of general benefits which we believe can be delivered by lower cost grid monitoring technology combined with selective smart metering technology:

1) *Real time LV network visibility* – current smart meter technology does not deliver real time data on the status of LV transformers. These represent the point of constraint on the network as it responds to changing customer DER technology and usage patterns.
2) This is a calculated analysis as opposed to actual data. The actual data analysis this can be delivered through LV transformer monitoring at significantly lower cost
3) *Dynamic operating envelopes* – to provide optimal efficiency for customers, setting dynamic operating envelopes should be based on live, local, feeder based data.
4) *Transformer load management* – smart meters cannot record the real time power quality and capacity constraints at each transformer.
5) *Better identification of outages* – this is more efficiently and accurately delivered through real time transformer monitoring
6) In addition, smart metering does not report transformer health or phase imbalance across the transformer as accurately as actual transformer monitoring
7) *LV network optimisation* – this is more efficiently achieved through a combination of smart meter data and live transformer monitoring
8) Automated transformer load management – more effectively achieved through *actual and live* transformer load data

Edge proposes that the least cost, fastest approach to achieving the network benefits stated is through a national program of LV transformer monitoring. This will provide a platform of usable LV network data which can be supplemented by additional smart meter data.

(b) ***Do stakeholders have any feedback on the level of smart meter penetration required for specific benefits? Or to optimise all benefits?***

Live transformer monitoring which integrates into DNSP operating systems will provide a low-cost alternative to universal smart meter rollout. Customers wishing to participate in DER programs will require smart meters to validate the economic benefits of their participation. Customers who do not participate in DER programs should not be obliged to pay for smart meters.

Importantly, this would remove the burden of smart meter cost on smaller, low-income households with low loads and no participation in DER.

QUESTION 3: TO REACH A CRITICAL MASS IN A TIMELY MANNER, OPTIONS TO ACCELERATE THE ROLL OUT SHOULD BE CONSIDERED

(a) ***Do you consider that the roll out of smart meters should be accelerated? Please provide***

details of why or why not.

The accelerated rollout of live LV transformer monitoring will achieve a number of the benefits under a smart meter program at significantly lower cost.

This can be done in parallel with a smart meter rollout to those customers who have stated desire to participate in DER program. This is already the case with battery and solar installation.

It is uneconomic, inequitable and unnecessary to accelerate installation of smart meters across consumers who do not wish to participate in DER or time of use tariff programs

An accelerated LV transformer monitoring program will be faster to deploy than a universal smart meter program. This is due to the fact that the ratio of deployed devices is closer to 1 device per 40 connected customers. In addition, DTMS can be rolled out without customer power outage and there is minimal risk of site specific installation factors (such as asbestos, poor customer connection wiring etc)

DTMS rollout will provide faster edge of grid network visibility and better understanding of power quality issues, capacity constraints and direction to smarter network augmentation programs.

QUESTION 4: OPTIONS TO ASSIST IN ALIGNING INCENTIVES

(a) ***What are the costs and benefits of each option? Is there a particular option which would best align incentives for stakeholders?***

LV transformer monitoring will address a number of the network benefits proposed to be provided by smart metering. This is achievable at significantly lower cost per customer than smart meters.

The cost of smart meters required to support individual customer decision to purchase solar, battery or EV and to participate in DER programs should be a cost to those individual consumers and should not be apportioned to non-participants.

Below comparison of smart meter costs and DTMS costs (plus analogue meter reading costs) per customer based on Edge Electrons' eSensor LV monitoring device and data platform:

Example: Evo Energy, ACT (source: RIN data analysis; Edge Electrons DTMS costs)

Total customers:	200,000
Distribution transformers:	5,200
Avg customer per transformer:	38.4
Edge eSensor DTMS cost:	$3,000 per transformer (fully installed) $5 per month data costs
10 yr annualised costs:	$360 per transformer
Annualised cost per customer	**<$10**
Analogue meter reading:	**$10 per customer per year**

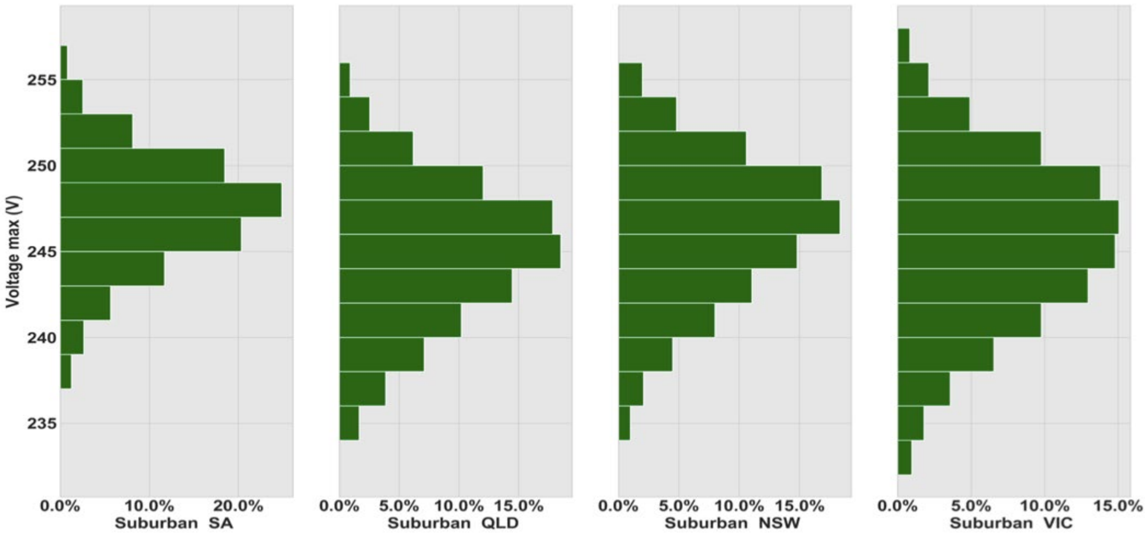
Smart meter costs (source: Energy Locals retailer)

Single phase:	$120 per customer per year
Three Phase:	$150 per customer per year
Net benefit of DTMS:	**$100-130 per customer per year**

(b) ***Are there other options that you consider would better align incentives?***

Voltage management incentives:

The ESB has found a that "*95% of [voltage] readings*" are higher than the 230V nominal voltage on the grid. This represents a "*material level of technical non compliance*" by the networks. The following chart from the ESB Report shows that the issue of high voltages and technical non compliance is equally as high in Victoria, where there are 100% smart meters, as in other NEM states and WA.



The evidence from the Victorian experience therefore does not support that universal smart meters will address the issue of high voltage, which costs Australian customers $1.9 billion a year in over consumption, appliance damage and reduced solar production (under AS4777 regulations and volt-var controls).

Attached *White Paper: Overvoltage – The Hidden Electricity Thief* by Ty Christopher, Director Energy Futures Network at University of Wollongong proposes the issue of high voltages be addressed through incentivising the DNSPs to achieve a lower voltage by including voltage improvement targets in the AER – Service Targets Performance Incentive Scheme.

Overvoltage White Paper final.pdf

Edge proposes that the fastest and least cost way to monitor DNSP voltage performance against the STPIS is through live transformer level monitoring at a feeder level rather than higher cost, universal smart meter coverage.

Edge considers the White Paper proposal regarding STPIS incentives to be the optimal way to align network monitoring requirements with long term customer benefits from better voltage and power quality management

QUESTION 5: THE CURRENT MINIMUM SERVICE SPECIFICATIONS ENABLE THE REQUIRED SERVICES TO BE PROVIDED

(a) ***Do you agree with the Commission's preliminary position that the minimum service specification and physical requirements of the meter are sufficient? If not, what are the specific changes required?***

No comments

Technical specifications and performance levels of Edge eSensor transformer monitoring technology is attached for comparison

EE-402-series
eSensor Datasheet F

(b) ***Are there changes to the minimum service specifications, or elsewhere in Chapter 7 of the NER, required to enable new services and innovation?***

Note incentive proposal for improved voltage management through STPIS adjustment in Question 4(b) response

(c) ***What is the most cost-effective way to support electrical safety outcomes, like neutral integrity? Would enabling data access for DNSPs or requiring smart meters to physically provide the service, such as via an alarm within the meter, achieve this?***

Edge considers that there are commercially available technologies which address neutral integrity checking at significantly lower cost to smart meters

(d) ***Do you agree smart meters provide the most efficient means for DNSPs to improve the visibility of their low voltage networks? Why, or why not? What would alternatives for network monitoring be, and would any of these alternatives be more efficient?***

Smart meters are not the most effective or least cost means for networks to improve visibility of their LV networks. They do not provide live data from the transformer, which is the critical point of constraint on the LV circuit.

Distributed transformer monitoring technology provides superior, real time visibility at significantly lower per customer cost.

Please see responses to previous Questions, including Question 4.

(e) Can smart meters be used to provide an effective solution to emerging system issues

Smart meters play an important role in monitoring customer participation of DER operation and validating commercial performance.

Setting DERMs operating envelops and control conditions is more effectively provided through live transformer and LV feeder monitoring as the reference asset being monitored is upstream of the impacts of neighbouring homes and businesses.

Enacting direct data connection between DERMs assets (solar, battery, EV, controllable loads) and their closest point of network constraint (distribution transformer) improves the management and accommodation of smart distributed assets. This active data model supports new TOU tariff models and brings power quality improvements to active network participants while protecting neighbouring passive connections.

The provision of DERMs management operating envelopes can be extended to control of any DRED enabled device including HVAC, pool pumps, etc

QUESTION 6: ENABLING APPROPRIATE ACCESS TO DATA FROM METERS IS KEY TO UNLOCKING BENEFITS FOR CONSUMERS AND END USERS

(a) Do you agree there is a need to develop a framework for power quality data access and exchange? Why or why not?

Power quality data is a critical feature in the supply of safe, reliable, low-cost electricity. It is generally accepted that increasing DER penetration is affecting power quality levels, specifically voltages, on the LV distribution system. This is leading to higher cost, increased emissions, higher peak demand requirements and lower network reliability.

Edge believes that the broad availability of network power quality data will enable customers to adopt technology which improves the safety and reliability of electricity supply and reduces their electricity consumption. The public availability of power quality data will also enable the regulator to more effectively manage power quality performance the networks.

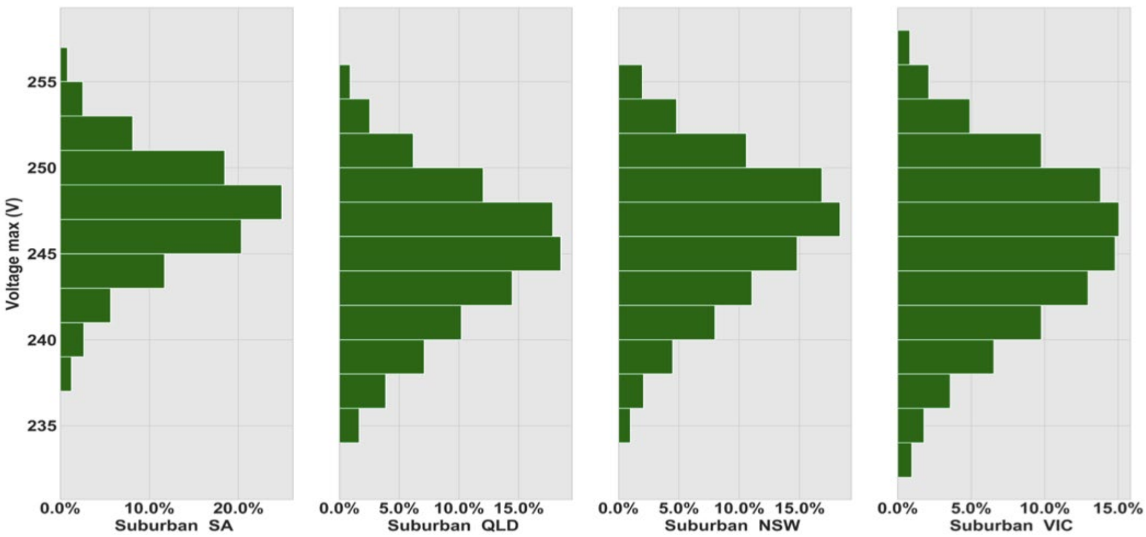
The understanding of and access to power quality data is an essential component in operating a smart grid environment. Power quality data sets the operating thresholds in which smart connected DERMs devices interact with the grid to ensure maximum customer performance and benefit while working to support grid stability.

Currently there are no quality of supply parameters under the AER – Service Target Performance Incentive Scheme *Section 4 Quality of supply component 4.1 Performance incentive scheme parameters*. A clear framework for power quality data access together with live LV transformer monitoring will enable the necessary improvements in power quality performance

Edge calculates that the cost to NEM consumers of high voltage is $1.9BN every year. An effective framework for power quality data access, together with financial incentive to improve voltage management under the STPIS, will enable DNSPs to target effective voltage management responses

The ESB has identified oversupply of voltage as an ongoing key issue in terms of customer costs. ESB has gathered data from University of New South Wales and from industry participants to illustrate the high average voltages across the NEM (see below extract from ESB report). The ESB has calculated that the additional cost to consumers of voltages running above the optimal 230V level is over $1.0Bn per annum.

Source : Energy Security Board



In addition:

- high voltages cause significant cost to all consumers from the effect of shortened appliance and equipment life (Source: UNSW Voltage Report);
- under current AS4777 and various volt-var and volt-watt network controls, high voltages reduce output from over 20% of residential solar households;

(b) Besides DNSPs, which other market participants or third parties may reasonably require access to power quality data under an exchange framework? What are the use cases and benefits that access to this data can offer?

Given the significant cost and emissions reduction benefits from improved voltage management, ALL NEM customers will potentially benefit from the availability of power quality data which will allow them to calculate the cost-benefits of commercially available voltage management technologies.

Solar retailers will benefit from the availability of power quality data which will explain the underperformance of solar installations. This will reduce unnecessary servicing costs and warranty claims.

DER participants will benefit from power quality data. Under DER and VPP schemes, the ability to dispatch DER assets when needed is critical. High network voltages can affect the dispatch level of solar systems as well as the charge rates of distributed battery assets (which may be curtailed due to high voltages operating under AS4777 guidelines)

AER and AEMO should have access to power quality data at LV transformer level to validate network performance standards and for system security reasons.

(c) Do you have any views on whether the provision of power quality data should be standardised? If so, what should the Commission take into consideration?

Live voltage data should be made available at an individual feeder level. This can be implemented using freely available, low-cost transformer monitoring technology.

DNSPs should be required to provide feeder level voltage data to inform potential solar and DER customers of the likelihood of voltage constraints on the operation of their assets. Feeder level data will also inform existing customers as to one of the key reasons installed DER assets are not performing.

Feeder and LV circuit level voltage data can also be used to identify potential capacity constraint issues which will affect EV charging capability.

Localised, feeder and LV circuit level power quality and voltage data will enable DNSPs to identify least cost infrastructure and technology investments to improve voltage control to enable improved reliability and safety as well as reduce electricity costs and CO_2 emissions

Localised data sets that could be produced from transformer monitoring to bring value to downstream connected customers and DERMs agents by informing when are highest points of constraint and when are best opportunities to leverage time of use tariff incentives and other supportive network conditions.

Key data sets would include:

- Daily period of peak demand:
- Daily period of minimum demand:
- 5 min reporting of available capacity:
- Periods of high voltage conditions:

(d) Do you consider the current framework is meeting consumers' demand for energy data (billing and non-billing data), and if not, what changes would be required? Is there data that consumers would benefit from accessing that CDR will not enable?

The current framework does not provide customers with easy to access and simple to understand billing data.

There is no access to non-billing power quality data, specifically voltage data at a local feeder and LV circuit level, which would inform DER investment and operational decisions.

Live power quality monitoring requires transformer monitoring at the LV circuit. The number of monitors will depend on feeder length and customer concentration. Our experience is that a ratio of one monitor per 40 end customers provides effective live network coverage. Rollout of DTMS can be made available at significantly lower costs than full AMI rollout, which requires each premise to install an AMI meter. Rollout of DTMS monitoring can be installed without power outages and enables all customers (and regulators) to access and benefit from localised power quality data.

QUESTION 7: FEEDBACK ON THE INITIAL OPTIONS FOR DATA ACCESS THAT THE COMMISSION HAS PRESENTED

(a) What are the costs and benefits of a centralised organisation providing all metering data? Is there value in exploring this option further? (e.g. high prescription of data management).

Metering data falls into 2 categories:

1) Network power quality data (including certain power quality data from network transformer monitors)
    - this should be made available to AEMO and AER to monitoring network power quality performance
    - this data can be made commercially available in order to drive the least cost commercial solutions for improved reliability and operations
    - by not providing network power quality data, DNSPs are able to retain the commercial benefits from implementing new technology solutions (such as battery storage) which would have lower cost and broader commercial benefit if provided to the market
2) Customer metering data
    - This should be available to the customer's retailer, but should not be made available to the commercial market without consent of the customer

Note: Edge accepts that certain power quality data may have security considerations. However, at an LV level this is unlikely to be significant

(b) What are the costs and benefits of minimum content requirements for contracts and agreements for data access to provide standardisation? Would such an approach address issues of negotiation, consistency, and price of data?

Detailed, live power quality data from DTMS at a feeder level is adequate for DNSP network operation.

Aggregation of similar levels of live data from each smart meter will result in significant volumes of live data which are impractical and highly costly to manage.

(c) What are the costs and benefits of developing an exchange architecture to minimise one to-many interfaces and negotiations? Could B2B be utilised to serve this function? Is there value in exploring a new architecture such as an API-based hub and spoke model?

Maintaining power quality requires live feeder level data taken at the transformer level (which is the nearest point of constraint to the customer).

Edge recommends full integration of DTMS with existing network operating systems including ADMS, GIS, SCADA. This is managed through direct API linkages.

Using smart meters to aggregate feeder level power quality data requires unsustainable and expensive data connections. The incremental costs and huge volumes of data resulting from live power quality analysis at individual customer level is overly expensive with limited cost benefit.

(d) What are the costs and benefits of a negotiate-arbitrate structure to enable data access for metering? Is there value in exploring this option further? (e.g. coverage tests or nonprescriptive pricing principles).

DTMS provides necessary network power quality at significantly lower costs. This reduces the importance for power quality data from smart meters and reduces the dependence of DNSPs to negotiate high cost data supply arrangements with smart meter managers.

(e) Are there any other specific options or components the Commission should consider?

There are a number of household energy monitors commercially available which are not dependent on smart meter installation, and which have significantly lower installation and data support costs. These range from specialist solar monitors (such as supplied by Solar Analytics), to behind the meter, circuit level monitoring in the home (supplied by EdgeConX and WattWatchers), to basic premise level energy monitors (supplied by PowerPal).

The Commission should review the energy monitoring technology market as a number of these devices combine meter level energy consumption accuracy with a significantly higher level of customer engagement, including sub-circuit level monitoring, tariff switching advice, solar and battery sizing based on individual customer consumption patterns.

In addition, monitors such as our own edgeConX energy monitor will detect damaged neutral connections.

The customer engagement benefits of smart meters as outlined in the Newgate Research can all be delivered by customer energy monitors at significantly lower cost and higher specification than is available through smart meters.

QUESTION 8: A HIGHER PENETRATION OF SMART METERS WILL ENABLE MORE SERVICES TO BE PROVIDED MORE EFFICIENTLY

(a) Are there other potential use cases that third parties can offer at different penetrations of smart meters? What else is required to enable these use cases?

(b) ***Noting recommendations in incentives and the roll out, are there other considerations for economies of scale in current and emerging service models?***

Please note previous responses on relative cost-benefit of LV DTMS network monitoring program over universal smart meter approach

QUESTION 9: IMPROVING CUSTOMERS' EXPERIENCE

(a) ***Do you have any feedback on the proposal to require retailers to provide information to their customers when a smart meter is being installed? Is the proposed information adequate, or should any changes be made?***

No comments

(b) Should an independent party provide information on smart meters for customers? If so, how should this be implemented?

The average annual costs of residential smart meters range from $115 to 150 per household. This is a significant cost impost on low income households. The Victorian experience does not provide evidence that smart meters deliver this level of economic benefit to individual customers.

The Commission should undertake an independent review of the relative cost and benefits of live LV transformer monitoring relative to universal smart meter implementation.

(c) ***Should retailers be required to install a smart meter when requested by a customer, for any reason? Are there any unintended consequences which may arise from such an approach?***

If a customer requests a smart meter, they should cover the costs of the installation.

QUESTION 11: MEASURES THAT COULD SUPPORT MORE EFFICIENT DEPLOYMENT OF SMART METERS

(a) Do you have any feedback on the proposal to reduce the number of notices for retailer-led roll outs to one?

No comments

(b) What are your views on the opt-out provision for retailer-led roll outs? Should the opt-out provision be removed or retained, and why?

Current Power of Choice regulation requires retailers to persuade customers to "opt in" to smart meters. Very few customers have chosen to do so. That is telling and suggest the cost-benefit of smart meters under the current high-cost model is not commercially attractive to customers.

Changing the model to "opt out" will not change the cost-benefit analysis of smart meters. It may mean that more customers forget or overlook the ability to opt out of the process, but it will still not justify a program which is extremely high cost, has few perceived customer benefits and can be superseded by improved, lower cost alternative technology.

In effect, the AEMC is proposing to support regulatory change that gives retailers a better chance of railroading customers into a high cost smart meter program which they have been unable to implement to date. Smart meters represent a major financial cost to customers who have low income, no solar or DER participation and whose bills will not change significantly with TOU tariffs.

The AEMC should be supporting least cost solutions for customers, not highest cost solutions for the benefit of metering companies and network shareholders

(c) ***Are there solutions which you consider will help to simplify and improve meter replacement in multi-occupancy premises? Should a one-in-all-in approach be considered further?***

No comments

QUESTION 12: FEEDBACK ON OTHER INSTALLATION ISSUES

(a*) Do you have feedback on any of the other installation issues raised by stakeholders? Are there any other installation issues the Commission should also consider?*

QUESTION 13: IMPROVEMENTS TO ROLES AND RESPONSIBILITIES

(a) ***Are there any changes to roles and responsibilities that the Commission should consider under this review? If so, what are those changes, and what would be the benefit of those changes?***

See comments under Question 6 regarding change to STPIS to provide incentive for networks to improve voltage management.

Commission should review AER responsibilities for setting and managing technical performance under the AER STPIS