Power of Choice 2.0: Analysis of Smart Meter Benefits

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The Australian Energy Market Commission (AEMC) consultation paper acknowledges its '*Power of Choice*' smart meter rollout is currently failing to deliver significant benefits. This submission discusses benefits the AEMC has identified as not being delivered, with changes intended to unlock the benefits at minimal incremental cost.

Introduction

The Australian Energy Market Commission (AEMC) is currently conducting a review of their Power of Choice meter rollout. At its core the Power of Choice mandates consumers install a smart meter. A key question the AEMC should be asking is:

"Does the meter rollout deliver
the benefits the AEMC promised?"

NO

Financial assessments of even the best smart meter rollouts show they only ever deliver a small societal benefit. This result is only possible when all (often small) benefits are delivered. Instead quoting the AEMC's Power of Choice consultation paper:

Smart meters are currently primarily being used to measure electricity consumption and generation for market settlement purposes.

Market settlements typically only provide a relatively small societal benefit. The AEMC discussion paper goes on to list multiple societal benefits ***not*** being delivered (some of which are discussed here).

The admission is deeply concerning. Retailers recover the high cost of the AEMC smart meters from consumers. That these meters then fail to provide societal benefits shows consumers ultimately pay more for no additional value. This is clearly not in the long term interests of Australian consumers.

Unavoidable inefficiencies in retailer led smart meter rollouts mean societal benefits are always less than alternative models. **That said the meter technology is the same and remains capable of delivering more benefits than are currently being realised.**

The following sections discuss a range of low cost enhancements the AEMC could consider with the potential to increase the delivery of societal benefits.

Summary of Submission

The AEMC consultation paper identifies multiple societal benefits not being realised by the Power of Choice smart meter rollout. At the top of that list is the lack of consumer benefits. Changes intended to allow consumers to access and use existing meter measurements should be given priority.

- Add support for local real time access to meter energy measurements
- Clarify the NERR gives consumers access to all meter measurements, both on and off market
- Make meter providers responsible for continuous installation safety checks
- Incorporate retailer switching into Energy Made Easy
- Allow consumers to appoint their meter provider
- Increase funding to consumer education programs

The AEMC consultation paper also identifies a lack of cost effective access is preventing local distribution network operators delivering typical smart meter benefits. This access can be added with minor changes to the minimum service specification. These changes are possible with virtually no impact on costs.

- Provide non-real time voltage measurements daily with NEM12/13 energy data
- Update clause (e) to support efficient power restoration (Note: to avoid cost impacts suggest limiting the allowable number of requests)
- Update clause (e) to ensure it returns all separate measurements of energy flows
- Instruct the AER approve expenditure on access to superior behind the meter inverter measurements

The following sections discuss how the minor enhancements deliver benefits and how they are possible at zero or minimal incremental cost to the current rollout.

What is a smart meter?

A smart meter supports the collection of data

The AEMC minimum service specification requires their smart meters make 288 measurements of electricity consumption per day. To put this into perspective this is 26,300 times more data than supported by the meter it replaces.

Collecting data is pointless unless the rules also ensure parties can cost effectively access this data. This involves considerations about who can access the data and the format of that data.

Identifying undelivered smart meter benefits

The AEMC consultation paper presents a list of benefits they feel are not being realised:

Smart meters are currently primarily being used to measure electricity consumption and generation for market settlement purposes. **However, they can also enable a range of other benefits** and services. **Some of these benefits relate to**:

- providing consumers with visibility and control of their electricity consumption and costs (for example, reduced estimated meter reads, better visibility of consumption and more product options)
- improving network operation, investment, security and reliability (for example, better outage management, better management of the low voltage (LV) network)
- improving safety outcomes (for example, detection of neutral integrity which can cause electrocution, and hot joints which can cause fires).
- Further, the data from meters should assist DNSPs more efficiently invest in and operate their LV network
- supporting and enabling better integration of distributed energy resources (DER) such as solar systems, batteries and electric vehicles.

Since the AEMC is concerned about the cost of any changes this submission chooses to discuss minor enhancements leading to the delivery of societal benefits. It is emphasised these enhancements incur almost zero additional cost.

The AEMC's list of undelivered benefits and services is used as the starting point for the discussion.

Providing consumers visibility of costs

A contestable market only works when consumers have the knowledge to meaningfully compare available options. This is not currently occurring in Australia's complex energy market. The market is unbalanced, with retailers able to exploit largely uniformed consumers. Addressing this imbalance is in the long term interest of consumers (and the future energy market).

Significant steps have already been made to simplify consumer access to their smart meter data. In particular enhancements to the Government provided tariff comparison tool 'Energy Made Easy'. While these enhancements are acknowledged, they are insufficient to address the market imbalance and further enhancements are required.

Recent improvements mean consumers choosing to enter their National Meter Identifier (NMI) are able to use their smart meter data to perform the tariff comparison. This is a huge improvement over forcing them to dig through old bills trying to guess what values they have to manually enter.

Studies show around 10% of consumers have ever heard of Energy Made Easy and less admit to having used it. The main problem is Energy Made Easy remains too difficult to use. It has been "designed by tech-geeks" and fails to address the needs of the majority of consumers. For example in my case it lists the annual cost of 208 different offers. What consumers need to see is how much they could save by choosing a different tariff which is not provided.

Energy Made Easy also makes no attempt to simplify the process of switching to a different tariff. This is entirely possible as shown by the NSW Government's tariff comparison tool.

Inadequate consumer protections mean the switching process remains problematic. Consumers report during the switch process retailers subsequently put them on a more expensive tariff than the one they originally selected. The AEMC could address this poor behaviour in the National Energy Retailer Rules (NERR), something which is again possible at virtually zero cost.

Empowered consumers is one of the first requirements of a truly contestable market. Minor expenditure on further enhancements and promotion of the independent tariff comparison tool has the potential to deliver significant consumer benefits

One of the claimed benefits of smart meters is real time access to real time energy measurements. For example when the NSW energy minister announced "Power of Choice meters were available to NSW residents" he was pictured using an iPad showing the real time energy consumption of a range of appliances.

Trials show real time access to meter measurements can lower energy use by almost 10%! Historically this access was supported locally, however during the initial Power of Choice discussions retailers claimed they would provide *remote* real time access. Remote access allows consumers to view (and control) their energy use from anywhere. After installing 100,000's of Power of Choice meters not a single one supports remote access to real time energy measurements.

An excuse for not providing any real time access is 'its inclusion in the Victorian smart meter rollout failed to deliver benefits'. The Victorian cost benefit assessment assumed the availability of smart appliances, able to use the meter measurements to adjust local energy use. Unfortunately appliances compatible with Victoria's smart meters never arrived. The result was Victorian consumers could only install In Home Displays. In Home Displays only deliver a fraction of the originally forecast benefits.

An internationally recognised future requirement is consumer installed distributed energy resources must be able to access smart meter measurements. For example:

California Rule 21 requires Distributed Energy Resources within Investor Owned Utilities must utilise the IEEE 2030.5 standard.

Australia is currently adopting IEEE 2030.5 to support the intelligent control of (domestic) solar inverters. IEEE 2030.5 will be used to adjust the amount of power the inverter can send to the grid. The ability to share available network capacity while simultaneously avoiding expensive network augmentation delivers significant consumer benefits.

IEEE 2030.5 is capable of supporting more benefits for the smart home as suggested in the following figure:

IEEE 2030.5 supports any internet capable link. The above figure suggests the utility meter support the now universally supported Home Area Networking standard 'WiFi' (as described in the IEEE 802.11 series of standards).

The figure shows real time meter measurements being made available to a range of WiFi connected appliances, including solar inverters, battery storage systems and electric vehicle chargers. Importantly many of these appliances are readily available with WiFi. In the next couple of months appliances *directly* supporting IEEE 2030.5 will be offered in Australia.

The benefits to both networks and consumers from smart appliances able to directly access meter measurements are easily identified. For example smart appliances can autonomously decide to utilise excess solar generation, increasing its value from the wholesale price (2c/kWh) to the retail price (more than 25c/kWh). Consumers can enrol appliances in demand response programs autonomously maximising incentive payments.

So a standard able to deliver the benefits exists. Appliances supporting the standard already exist. The only remaining issue is the cost. The price of adding WiFi to the utility meter is similar to the earlier ZigBee radio. This suggests positive societal cost benefit from the inclusion in the minimum service specification.

The AEMC is encouraged to consider incorporating local real time access to their minimum service specification. Its inclusion is needed to support cost effective management of distributed energy resources

While remote real time access to meter measurements has the potential to provide similar benefits it is not recommended. The reason retailers have not followed through on their initial promise to

provide this is it is expensive. Support requires significant changes to how Meter Data Providers collect and process meter data. Currently meters are typically only read a couple of times a day with results made available the next day. Real time access requires the back office support continuous communications with meters and the ability to make the readings available immediately. Unavoidable delays will reduce the effectiveness of distributed energy resource management. It is therefore not recommended it be included in the minimum service specification.

Clarification: Some consumer representatives are incorrectly assuming the Energy Consumer Data Right (CDR) will offer consumers remote real time access to real time measurements. The CDR only gives consumers immediate access to their *historical* energy data (useful for tariff comparisons). This access does not support the management of distributed energy resources.

Outage Notification

One of the claimed benefits of smart meter outage notification is faster power restoration. It must be understood supporting outage notifications is potentially expensive. To demonstrate why: fully discharge your mobile phone battery and then try to call someone. You can't because you have no power. When there is an outage smart meters no longer have access to power. To report outages meters must contain a separate power source, in most cases a battery. Batteries are expensive and significantly shorten the useful life of the meter (e.g. mobile phone batteries only last a couple of years not the 15 to 20 years assumed life of a smart meter). There are more cost effective ways of delivering similar benefits however these do not rely on meters providing outage notification.

The ability for Power of Choice smart meters to support more efficient power restoration after an outage is detected *should* already be available. Table S7.5.1.1(e) of the National Electricity Rules (NER) describes the "metering installation inquiry service". This service provides "the remote retrieval of information from […] a specified metering installation". This *should* allow local network service providers to determine the extent of the outage and use that information to dispatch repair crews more efficiently, leading to faster restoration.

The existing minimum service specification is not delivering this benefit. The issue is local network service providers report they are unable to negotiate access to the service. This is further complicated by a failure to define a common format for the service. The result is local network service providers are forced to develop expensive proprietary interfaces for each of the few meter data providers choosing to provide access. The AEMC is encouraged to consider if the failure to provide cost effective access indicates non-compliance with the NER.

To explain the next issue it is necessary to understand how the meter installation service inquiry could support more efficient outage restoration. When the outage is detected the installation service inquiry is sent to other meters on the same feeder. This quickly determines if it is just one premise reporting an outage, a single phase fault or all premises on the feeder.

The delivery of this benefits requires the local distribution network provider to know exactly which feeder (and phase of that feeder) all meters are located on. Such accurate records do not exist.

Distributor led smart meter rollouts are using meter measurements to determine which feeder and phase of the feeder each meter is located on. This information can then be used to aid in the faster restoration of power.

So while the metering installation inquiry service *could* deliver societal benefits the lack of cost effective access to appropriate meter measurements is preventing its realisation.

The metering installation inquiry service must already have a fast response time. When a consumer calls to report an outage the call centre uses the installation inquiry service. If they get a response they can inform the consumer it is not an outage (avoiding unnecessary call out fees for consumers). To provide this service the installation inquiry service must take 10's seconds (much longer than 30 seconds and consumers will become impatient).

If distributors could access the metering installation inquiry service then the fast response time would allow them to determine the extent of any outage within a couple of minutes. Clearly a benefit.

Meter data providers raise concerns distributors might attempt to simultaneously communicate with thousands of meters. This may have cost implications. Avoiding these cost implications is straight-forward. Distributors should only be allowed to perform the installation inquiry service on a reasonable number of meters within certain time frames. This still supports the potential benefits since distributors only need to request the service on a small number of meters per feeder to determine the extent of the outage.

Separately there is an issue with how this service is described in the minimum service specification. A clause has been appended to the end of the voltage measurement meaning it may not support the intended outcome. The requirement is stated as "the voltage as measured by the metering installation, *with a date and time stamp for that reading*". A Meter Data Provider is fully compliant with that clause if they only ever make one voltage measurement, provided they report the date and time stamp of that single measurement! Correcting the clause so it delivers a current voltage reading should be given priority and incurs no additional costs.

Improving Safety Outcomes

The question of whether smart meters should be required to detect potential electrical safety issues at premises pre-dates the Power of Choice.

Uncertainty around financial benefit estimates has typically been used as an excuse for not including what is now a proven capability. The following presents a simple cost benefit assessment:

Assuming the service saves 1 life per year for the 20 year life of the meters and each life is valued at $5million (the value of a statistical life as used by the Australian Office of Best Practice Regulation) then the benefit is $100 million. To deliver a societal benefit across 10 million meters implies the cost to support the service must be less than $10 per meter.

The simple calculation shown above does not include the value of detecting and avoiding domestic fires caused by switchboard faults or injuries arising from electrical shock. This suggests a cost exceeding $10 per meter will still deliver societal benefits.

When the Victorian Advanced Meters were installed they did not include safety monitoring. It has been added by monitoring existing voltage and current measurements which are already supported by Power of Choice meters. This suggests the target cost of less than $10 per meter necessary to deliver societal benefits is readily achievable.

The simple financial calculation suggests the AEMC should consider including electrical safety monitoring in the minimum service specification.

The question is then who should be assigned responsibility for providing this service? The on-going refusal of meter data providers to offer local distribution network service providers cost effective access to necessary measurements leads to a suggestion the AEMC consider assigning responsibility to the meter data provider.

Should a meter data provider detect an issue then they can notify the retailer who can immediately inform the consumer using the contact details they hold. The meter data provider also works closely with the meter provider, who has field crews who can be dispatched to perform a physical examination of the installation.

Shifting responsibility for electrical safety monitoring to the Meter Data Provider should be considered

Arguments safety checks will incur significantly higher costs due to the need for immediate identification and reporting are difficult to justify. In most cases the installation will gradually degrade so tracking changes over a period of time allows the Meter Data Provider to schedule a site inspection while avoiding the high cost of emergency site visits.

Improving Network Operation

The AEMC consultation paper notes significant network operational benefits are not being delivered.

- improving network operation, investment, security and reliability (for example, ~~better outage management~~, better management of the low voltage (LV) network)

Interval data collected by AEMC smart meters is provided to local network service providers. Importantly these measurements are provided in a standard format. Both requirements ensure local distribution network service providers can cost effectively utilise the meter energy measurements. This access and standard data format should be retained.

The assumption is access to this data allows local network service providers to lower costs by identifying which and when various network assets require (expensive) augmentation. These lofty ambitions are to be commended, however the benefits are not being delivered.

These network load calculations rely on accurate knowledge of which feeder meters are located on. That information is currently unreliable. This information could be determined (as will be discussed below).

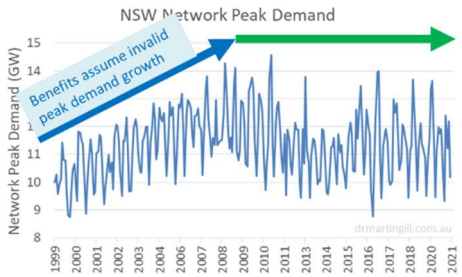
A more fundamental problem for network load calculations is only 20% of meters are currently AEMC smart meters. So even if the local distribution network provider knew which feeder the meters were on, they are only getting to see a small fraction of network load (yes this is better than nothing, but not enough to support the claimed benefit).

The AEMC hopes in 10 to 20 years all the meters will be smart. Unfortunately this still does not deliver the claimed benefits. To explain why it is necessary to understand the assumptions underlying the societal benefit calculation.

Historically cost benefit assessments assume smart meter consumption data can be used to support efficient network planning. Accurate models then allow expensive network augmentation to be deferred delivering significant savings. This benefit *ASSUMES* peak demand is continuing to grow at historical rates, forcing regular (expensive) network augmentation.

This assumption is no longer valid with analysis showing peak demand stopped growing in 2008.

Since 2008 Network Peak Demand has been flat



Without peak demand growth the benefit of improved network planning is small.

In an attempt to re-establish the benefit some are presenting arguments the uptake of domestic solar generation is causing reverse energy flows approaching network capacity limits. While true the long term benefit of this benefit is questionable. As discussed above the introduction of IEEE 2030.5 along with Dynamic Operating Envelopes is already being used to address this problem.

Further the value of excess solar generation is falling rapidly. This provides a strong financial signal encouraging consumers to self-consume their solar output. This will also occur as domestic battery storage prices fall, anticipated uptake of EV ownership and finally the installation of smart home energy management systems. These changes will increase self-consumption, decreasing reverse energy flows. Hence while the benefit may currently exist (but is not being delivered), its future value is also likely to be small.

The above analysis is intended to highlight the importance of understanding how societal benefits are delivered. Another assumption underlying the above analysis is local distribution network service providers must be able to accurately determine the location of meters on the network. This is possible using voltage measurements.

The minimum service specification assumes local network service providers can access voltage.

> the average voltage and current over a nominated trading interval for one or more nominated trading intervals

As already discussed the problem is the specification is insufficient to provide cost effective access.

Access to voltage measurements has been included in (e) metering installation inquiry service. The problem is (e) is primarily intended to provide real time access. The vast majority of benefits can be delivered from daily (non-real time) access which is possible at minimal incremental cost.

The minimum service specification should be updated to ensure voltage measurements are included along with the daily provision of energy data. This is possible at minimal incremental cost.

One benefit of access to non-real time voltage measurements is it allows local distribution network service providers to validate the location of meters on their network. Earlier analysis by Dr Gill showed access to 5 minute voltage measurement data can reveal meters located on the same phase of a local distribution transformer. Similarities between the measurements also suggest meters connected to the same local distribution transformer. It is emphasised this analysis does not require real time access which is why it is fully supported by adding voltage measurements to the daily provision of consumption data.

When Dr Gill tried to obtain more voltage data it was provided in a totally different format. This forced a rewrite of the analysis software before he could even attempt to repeat the earlier analysis.

This highlights why the minimum service specification should ensure all Meter Data Providers use a defined format when providing voltage measurements to local distribution network service providers. Since the existing minimum service specification requires meters support a voltage measurement "per trading interval", it suggests a minor modification would allow their inclusion in the standard NEM12/13 formatted files already used to provide consumption data.

Providing the voltage measurements in a single data format is important. Since the measurements are made every trading interval one possible solution is they be included in the NEM12/13 data files

The availability of (non-real time) voltage measurements made over a lengthy time period allows local distribution network service providers to validate where meters are located on the network. It also supports the identification of voltage issues on the Low Voltage network, e.g. consistently high/low voltage measurements. Once identified steps can be taken to address those issues.

To be clear there are also benefits for supporting real time access to meter measurements, for example as discussed earlier they can be used to determine the extent of a reported outage leading to more efficient use of limited field repair crews. Access to real-time voltage measurements should continue to be provided as documented in the existing clause (e).

Access to real-time voltage measurements already supported in the minimum service specification should be retained. This access would benefit from the definition of a common data format

In Victoria timely access to voltage measurements made by their Advanced Meters are being used to deliver additional societal benefits. This includes successful trials of Conservation Voltage Reduction as part of a demand management strategy avoiding expensive network augmentation. They have also been used to actively manage voltage issues arising in areas in areas with high penetration of domestic solar.

As strange as it may seem the benefits may not be applicable to AEMC meters. To explain it is necessary to understand there is no requirement the voltage measurements made by electricity meters are tested. Several Victorian distributors ensured their selected vendor did test the voltage measurements made by the meters they purchased. Even if not tested the benefit was still available because each distributor installed meters from the same vendor ensuring voltage measurements made by different meters could still be meaningfully compared.

The AEMC contestable rollout model results in a range of meters being installed on each feeder. Since each meter manufacturer uses a different voltage measurement algorithm (reminder there is no requirement it be tested) it may compromise the ability to use these untested voltage measurements to deliver additional benefits.

Issues could be addressed by specifying a suitable test standard for meter voltage measurements. Dr Gill asserts these requirements would have minimal impact on meter prices, however such changes are likely to encounter a different response from meter vendors. Feedback provided to the AEMC during the MASS review suggested (ridiculously high) price impacts from standardising the voltage

measurements. For this reason is it not suggested the AEMC address the deficiency. Especially when lower cost alternatives now exist.

Better DER integration

- supporting and enabling better integration of distributed energy resources (DER) such as solar systems, batteries and electric vehicles.

The assumption underlying this assertion is a single measurement of the net flow of electricity to and from the network is sufficient. **It isn't**.

As high levels of domestic solar in South Australia have demonstrated, the efficient management of distributed energy resources requires more measurements than just the net flow of electricity through a single metering point. South Australia has introduced requirements the output of distributed energy resources be measured separately. The separate measurements are then used to better manage the distributed energy resources (DER).

Aside: In South Australia consumers are paying more for meters supporting better management of DER. The AEMC may wish to clarify consumers access to these measurements. Consumer access to meter measurements is documented in the National Energy Retailer Rules (NERR). While the NERR ensures consumers can access energy measurements, this access is apparently limited to ON MARKET measurements. The On-Market measurements are only the Net Flow of energy through the meter, not the separate measurements. There are consumer benefits from accessing the separate measurements so the AEMC may wish to review if it is necessary to clarify consumers can access all measurements made by their meter. It is not suggested these additional measurements be added to the Consumer Data Right, accessing the data on request probably remains acceptable.

The AEMC should ensure the NERR allows consumers to request all energy measurements made by their smart meter, not just the On Market measurements

South Australia (SA) shows the installation of a smart meter is insufficient to manage high levels of DER. Network management will get even more challenging as solar installations continue and battery storage and electric vehicle ownership takes off. It is also relevant to note the additional challenge of centralised control of domestic appliances using the interface mandated by the COAG Energy Council and SA Government. That is why AEMC smart meters are unable to support the efficient management of our future energy market.

Should the AEMC modify the minimum service specification to support the management of distributed energy resources? **No**

SA shows the management of high levels of variable supply and load requires individual measurements. Modification of the minimum service specification to support these additional individual measurements risks significantly increasing metering costs. Not only for more expensive meters and more expensive back office systems, but also household wiring modifications required to support the additional measurements.

While the SA Government requires ALL consumers installing domestic solar pay for more expensive metering this is actually unnecessary. Efficient management could have been delivered by installing additional metering at a relatively small number of sites. The data obtained from these sites is then used to validate and maintain forecast models. As noted above it also relies on cost effective access to both the On and Off Market measurements.

Further benefits may be available if it is possible to access the additional measurements in real time. Clause (e) of the minimum service specification allows on demand reading of the "power (watts) as measured by the metering installation". To deliver the additional benefit the minimum service specification should probably be updated to ensure it returns all separate power measurements, not just a single net power measurement. For example for a three phase meter the power flow through each measurement element should be accessible.

It is recommended the AEMC consider updating clause (e) of the minimum service specification to clarify the installation inquiry service is required to return the power measured by each measurement element, not just total power

Supporting future energy markets

Meters installed today should still be (attempting to) support the energy market in 25 years-time. Predicting metering requirements for that future market is challenging. As a starting point we quote the

first guiding principle used in the development of the Common Smart Inverter Protocol[1]:

All smart distributed energy resources require communications to achieve their full value as distributed energy resources

The AEMC's consultation paper reveals on its own communications does not unlock the full value of meters. Specifically while existing Power of Choice meters support communications, insufficient access and interoperability is preventing the delivery of societal benefits.

Equally concerning is findings from South Australia (SA). A single measurement of the flow of energy through a connection point is insufficient to support the efficient management of domestic solar. SA suggests efficient management requires measurement of all energy flows. Looking 25 years into the future this is likely to include:

- More solar generation (with variable export limits)
- Variable load (including demand response)
- Dispatchable on site storage (batteries and EV)

The future market is also likely to see consumers forming multiple trading relationships (MTR). For example payments for enrolling their battery storage system in a Virtual Power Plant (VPP), retailers offering special tariffs in exchange for controlling certain appliances and EV leasing arrangements including free charging.

A previous determination by the AEMC ruled MTR required each provider install a separate smart meter. This is prohibitively expensive, because space at existing domestic metering installations does not allow the installation of multiple meters. Hence the AEMC is encouraged to consider allowing the installation of a single meter, making separate measurements. The appointed Meter Data Provider then manages secure separate access to measurements.

Power of Choice 1.0 originally proposed allowing *CONSUMERS* to appoint the meter provider. The final rules only allowed retailers to appoint meter providers. The AEMC is encouraged to consider if this restriction should be reassessed in light of multiple trading relationships. Lifting the restriction allows consumers to choose a suitable meter and give each of their chosen service providers access to necessary measurements.

The AEMC may want to consider allowing consumers to appoint their Metering Provider to support future multiple trading relationships

Electricity meters are covered under Australia's National Measurement Act. In simplistic terms the act states measurements for trade (bills) must use approved instruments (meters). The problem is the future demand response market pays consumers for *NOT USING* energy. Meters cannot measure the amount of energy not used, instead payments must be based on energy estimates.

Should the AEMC make greater use of estimated values?

Before answering that question we return to the untested voltage measurements made by meters. Voltage measurements made by (solar) inverters are subjected to laboratory testing. The Australian Inverter Standard AS4777.2 requires inverters respond appropriately and (unlike meters) extremely quickly to applied voltages. Hence while inverter voltage measurements are not formally tested, they are subject to more testing than utility meters.

If meter data providers (falsely) claim the provision of non-real time voltage measurements alongside daily consumption data incurs high costs then the AEMC should consider instructing the AER to allow cost recovery for systems obtaining voltage data directly from inverters. The incremental cost to collect voltage data from IEEE 2030.5 inverters will be small. An added bonus is inverter voltage measurements are likely to be available every 5 minutes, supporting the additional real time network benefits discussed above.

The availability of almost real time verified voltage measurements by IEEE 2030.5 compliant inverters raises another possibility. Similar laboratory testing is also used to confirm inverters accurately measure imported and exported power. It is therefore a minor step to suggest the use of energy measurements made by inverters (note: IEEE 2030.5 also describes energy measurements). Inverter energy measurements will certainly be far more accurate than the estimated demand response benefits (refer ARENA/AEMO research).

[1] Available from arena.gov.au/assets/2021/09/common-smart-inverter-profile-australia.pdf

So bringing all the pieces together. Australia is introducing a standard to realise the full potential of distributed energy resources. This standard supports access to almost real time laboratory tested voltage measurements (unlike smart meters). It supports access to multiple behind the meter sources of generation (unlike smart meters). The standard covers solar, battery storage and EVs with Vehicle to Grid since all use inverters (cost effectively providing necessary separate measurements).

Rather than try to modify the minimum service specification to compete with these superior solutions perhaps a better solution is to ensure smart meters can be seamlessly integrated into this environment. This requires the AEMC determine how best to support local access and interoperability. The inclusion of an IEEE 2030.5 Home Area Network (using WiFi) is one possibility.

Aside: In passing it is noted metering standards are slowly adapting to allow a single meter to make multiple separate measurements. While already supported the solutions remain too inflexible to be cost effective. Further updates are required to allow measurement elements to be supplied separately, so they can be added only when required.

Conclusion

Rules requiring the installation of meters making 288 separate measurements every day, but which then fail to provide cost effective access to those measurements, will never realise societal benefits.

For consumers to benefit from their smart meter they must be able to access the meter data. Currently consumers are only allowed to access their historical data. There is an urgent requirement meters provide cost effective access to real time meter measurements. Such access is needed to support the efficient operation of consumer owned and operated distributed energy resources.

Local distribution network operators also need to be able to cost effectively access meter measurements. This includes guaranteed daily access to network voltage and current readings. More benefits can be delivered with real time access, however this must be managed carefully to avoid cost implications.

As consumers engage with multiple new service providers it suggests consumers should be allowed to appoint their meter provider. They can then give multiple parties access to required measurements. This is a far more cost effective solution than requiring each install their own meter, or force them to negotiate access via the incumbent retailer (who to date even refuse to provide cost effective access to businesses not competing against them).

Comments or Questions?

The author is happy to receive comments or questions about this submission. He can be contacted at martin@drmartingill.com.au

Citation

It would be appreciated if all quotes from and references to this submission include the author's name and the submission title "Power of Choice 2.0: Analysis of Smart Meter Benefits".

About Dr Martin Gill

Dr Martin Gill is an independent consultant specialising in the provision of consumer advice. This advice is based on a deep understanding of the Australian energy industry and strong analytical skills. As a consultant he has prepared advice for consumer advocates, government regulators, electricity distributors, electricity retailers, asset operators and equipment vendors.

Dr Gill is a metering expert. During the National Smart Metering Program he facilitated the development of a specification for Australian smart meters. Innovative metering products developed by his teams have been externally recognised with the Green Globe Award, NSW Government's Premier's Award and Best New Product by the Australian Electrical and Electronics Manufacturers Association.

He currently represents the interests of consumers on a range of Standards Australia working groups including metering, renewable power systems, battery storage, demand management and Electric Vehicles.