

# We have an opportunity – let's not waste it

Dr Martin Gill

It is essential we encourage solutions supporting our clean energy future. Proper smart meters are part of that energy future. The AEMC has acknowledged their current '*Power of Choice*' meters fail to deliver required services and therefore benefits. This presents the SA and NSW Governments with an opportunity. Rather than rush to install meters known *NOT* to support our clean energy future, they could instead promote the adoption of existing standards so future meters support the delivery of consumer and societal benefits. Such a program of work would only introduce minor delays and is possible at minimal incremental cost.

## Introduction

The SA and NSW Governments are examining ways to accelerate consumer uptake of the Australian Energy Market Commission's (AEMC's) Power of Choice meters. The AEMC promised the Power of Choice would deliver consumer benefits. Unfortunately even the AEMC now admits the meters are failing to deliver consumer, network and societal benefits. The situation can be fixed.

### Stating the challenges

- Unacceptably high consumer energy prices
- Maximise societal benefit from distributed energy solutions
- Reduce the need for costly network enhancements
- Reward consumers for offering control of behind the meter energy assets (generation and load)

Historically smart meters are viewed as meeting these challenges. Unfortunately the AEMC Power of Choice meters

- ✗ Do not give consumers access to the information required to manage energy costs
- ✗ Cannot be used to manage distributed energy solutions
- ✗ Fail to share data required to reduce the need for costly network enhancement
- ✗ Do not support the visibility required to reward consumers participating in two-sided energy markets

Solutions already exist and could easily be incorporated in the rules governing the AEMC Power of Choice meter rollout.

## Summary of Submission

Rather than accelerating the installation of meters acknowledged NOT to support our clean energy future a far better outcome would be achieved by working with the AEMC to address acknowledged deficiencies. The AEMC is already undertaking this work as part of the Power of Choice 2.0 metering rules.

At the core of the enhancements is ensuring Power of Choice 2.0 meters can

- Communicate with, and control, consumer installed distributed energy resources (DER)
- Make those measurements available to consumers and other relevant parties

Both of these aims can be achieved by

- Ensuring AEMC Power of Choice meters and consumer installed DER support a single certified interoperable standard

The adoption of a single interoperable standard provides a low cost and rapidly implementable means of supporting Australia's clean energy future.

This submission discusses the opportunity in more detail.

An important point of clarification.

Australia's clean energy future involves flexible control of multiple appliances and local access to real time energy measurements. These are not, and more fundamentally, cannot be, delivered by the majority of current AEMC Power of Choice meters. The reason is most meters do not support the necessary hardware. Hardware to support this option costs less than \$10.

## What is a smart meter?

Adding remote communications to a dumb meter does not make it smart. For example early mobile phones supported remote communications, but were not referred to as smart phones. Smart phones use both internal and external sensors to make measurements which consumer installed apps can access. Similarly a genuine smart meter would make all necessary measurements (both directly and indirectly) and allow consumers to access and share those measurements with other systems.

“Are AEMC Power of Choice Meters smart?”

**NO**

Factually AEMC Power of Choice meters do not make *any* measurements available to consumers.

Consumers:

- ✗ Can't view their current energy consumption
- ✗ Can't check if their solar system is working efficiently
- ✗ Can't work out the cost to charge their EV
- ✗ Can't use meter measurements to control smart appliances

AEMC Power of Choice meters are not required to provide *any* consumer benefits.

**Claims Power of Choice meters enable consumers to better manage their energy consumption are false**

While it is deeply concerning the AEMC failed to allow consumers to view their meter data (or even control who gets to see the vast amounts of data it collects). The situation gets worse.

The AEMC also failed to ensure distribution businesses can access measurements required to deliver societal benefits. This includes measurements required to support the efficient integration of consumer installed distributed energy resources (DER), including solar systems, batteries, Electric Vehicles (EV) and smart appliances.

Victoria's now two decade old advanced meters showed a better way. Victorian meters support an early version of the demand management standard IEEE 2030.5. This standard supports consumer access to local real time energy measurements and critically allows approved parties to control connected appliances. The AEMC Power of Choice meters are not required to support any similar capability. The AEMC

should be strongly encouraged to review this major oversight.

AEMC Power of Choice meters fail all reasonable tests for “smartness”. They should be recognised for what they are ‘remotely read dumb meters’. The AEMC is well aware of the issues and a review of their Power of Choice meter rollout intends to address (some of) the failings. The conclusion is

**Future Power of Choice meters will support greater consumer, network and societal benefits**

The AEMC has indicated Power of Choice 2.0 will be announced before the end of 2022. Until then installations of the current remotely read dumb meters should be discouraged.

### Meters offer limited load control options

In the 1960's electricity distributors started controlling when hot water heaters ran. This remains the only load control benefit claimed by AEMC Power of Choice meters. Far more benefits are available.

*Flexible Load:* COAG and the SA Government have chosen to mandate the demand response standard AS4755.2<sup>1</sup> be included in all hot water heaters, air-conditioners, pool pump controllers and Electric Vehicle chargers sold in Australia. The problem is Power of Choice meters cannot interface to AS4755.2 appliances so can't access the promoted load control. Selecting a different standard suitable for both meters and appliances offers significant benefits.

*Flexible Generation:* Following advice from the Australian Energy Market Operator (AEMO) both SA and WA have introduced rules intended to provide control of ‘excess solar generation’. The industry has selected IEEE 2030.5 to intelligently manage solar generation. Significant benefits could be unlocked if AEMC Power of Choice meters also supported this standard.

So alignment of currently separate Government initiatives can benefit consumers, networks and society as a whole. Selecting a single standard which can be supported by both AEMC Power of Choice meters and consumer installed appliances is a first step to providing cost effective flexible load and generation control.

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<sup>1</sup> AS4755.2 is the “internet connected version” of AS4755 (still only available in draft)

## Measurements supporting our DER future

The efficient management of high penetrations of solar, batteries and flexible loads requires balancing both supply and demand. Network operators need the ability to:

- (i) adjust (solar and battery) generation and
- (ii) turn on/off loads to balance available generation

The current Power of Choice meters do not support either of these basic requirements. Perhaps more concerning is the meters do not even make the measurements necessary to support these requirements.

### Smart meters measure solar output - Right?

#### **WRONG**

The majority of Power of Choice meters do not measure the amount of solar generation. Instead they only measure the net flow of energy through the connection point (solar generation minus local use).

SA has attempted to address this deficiency by requiring consumers pay for more expensive metering. This solution is already proving unworkable as consumers install multiple distributed energy solutions. For example the additional measurements are unavailable at the increasing number of sites choosing to install larger three phase solar systems and/or those with a battery system.

Our clean energy future needs cost effective solutions capable of measuring all generation and major flexible loads installed behind the meter. Existing Power of Choice meters are incapable of meeting this requirement. Solutions are available.

Several states are introducing an intelligent management solution for 'excess solar generation'. Rather than shutting down consumer solar systems their output is adjusted. Dynamic Operating Envelopes (DOE) maximise the amount of renewable energy sent to the grid, far more than can be supported using hard shutdowns or fixed limits, all while avoiding costly network augmentation.

DOE does not rely on Power of Choice meters. In Australia DOE relies on interoperability provided by the IEEE 2030.5 standard. It also relies on the installation of separate communications to the inverter (it is not via the meter).

IEEE 2030.5 is not restricted to the control of solar systems. It is a fully interoperable demand management standard intended to support the flexible control of both generation and load. In addition to providing demand management the standard also supports individual appliance energy measurements. So the same standard can both control and provide the much needed visibility of behind the meter energy flows.

Internationally smart meter manufacturers are already moving towards true smart meters by adding standards based interoperability into their meters. The AEMC should be encouraged to consider including similar support to their Power of Choice 2.0 meters.

State energy ministers, and in particular SA, could help promote this desirable outcome by ensuring IEEE 2030.5 is adopted for all appliance demand management. The AEMC could then include the same interface in Power of Choice 2.0 meters confident the benefits are 'in the long term interest of consumers'.

### Other benefits of a short delay

After a burst of publicity the HUGE measurement errors made by electronic electricity meters has been forgotten. Laboratory testing confirms these measurement errors can exceed 500% when meters attempt to measure modern appliances!

The testing shows affected appliances includes energy efficient variable speed pool pumps, systems using excess solar generation to heat hot water, energy efficient lights and even solar inverters. The measurement errors result in consumers being incorrectly billed. The situation needs to be addressed.

*How did this unacceptable situation arise?* Australia's meter testing standards do not currently test the accuracy of meters in the presence of noise.

*How has the situation been addressed?* Several additional meter tests have been introduced. This testing checks the accuracy of energy use in the presence of noise.

Promoting the installation of meters known to make unacceptable measurement errors should not continue. Meters supporting accurate measurements could be available around the same time as revisions to the AEMC's Power of Choice.

## Conclusion

The current rush to install meters known NOT to support Australia's future energy needs is counter-productive. A short delay presents a genuine opportunity to deliver consumer, network and societal benefits. The key points are:

- ✓ Adoption of a single interoperable standard offering appliance control and visibility of energy use/generation
- ✓ Support consumer incentives for purchasing, and subsequently offering, remote control and access to appliances incorporating the standard
- ✓ AEMC incorporate the standard in their Power of Choice meters, along with multi-party access to both control and data.

The selection of a suitable standard is already well advanced. IEEE 2030.5 has been selected to implement intelligent control of, and communications with, solar systems. (Note: a wide range of other priority appliances already support this standard)

The decision to mandate AS4755 should be reviewed. Critically it fails to support both interoperability and consumer benefits. It makes no attempt to support the provision of energy use/generation data. It is also concerning that three years after this standard was selected it remains only available in draft.

The AEMC is keen to address acknowledged deficiencies with their Power of Choice meters. Showing the addition of a standard interface can deliver significant long term consumer benefits would be viewed positively.

The final argument is cost. Adding a single relay to a meter costs around \$10. This is a similar cost to support IEEE 2030.5. IEEE 2030.5 can then control multiple appliances, obtain individual energy measurements and give consumers access to local real time energy measurements.

This is a genuine opportunity. The question is whether energy ministers are prepared to accept a minor delay which then delivers major benefits, rather than promote a disjointed program which has already been shown not to support Australia's clean energy future.

## Comments or Questions?

The author is happy to receive comments or questions about this submission. He can be contacted at [martin@drmartingill.com.au](mailto:martin@drmartingill.com.au)

## 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.

## Citation

It would be appreciated if all quotes from and references to this submission include the author's name and the submission title "We have an opportunity – let's not waste it".

## **Points of Clarification**

### *Consumer access to meter data*

A relatively recent upgrade to the Government's independent tariff comparison website Energy Made Easy allows consumers to use meter data to compare tariffs. Disappointingly the site is so poorly advertised only 10% of consumers are aware it exists. More concerning is the output is so confusing polite consumers report the site as 'unhelpful'.

### *Other Benefits of access to real time measurements*

Multiple groups, including Energy Consumers Australia, are encouraging the AEMC to include local real time access to meter measurements in their Power of Choice 2.0. One benefit is to lower the cost of systems increasing the local use of solar generation.

Instead of sending excess solar generation to the network (where it can cause network issues) it is instead used locally to heat hot water or pre-cool air-conditioning (reducing consumer energy costs). Currently this requires the installation of additional metering to measure the flow of excess solar generation to the network. This additional metering makes exactly the same measurements as Power of Choice meters. This additional cost could easily be avoided if consumers could access real time measurements made by the AEMC Power of Choice meter.

### *AS4755 does not support interoperability*

The COAG and SA Government mandate of AS4755 does not allow smart meters to control connected appliances. The issue is AS4755 does not support interoperability because it fails to define any standard protocol. For comparison IEEE 2030.5 offers third party independent testing and certification of this interoperability.

Other advantages of IEEE 2030.5 include efficient management of distributed energy resources (AS4755 only really supports turn off and on) and supporting energy measurements (not considered in AS4755). COAG and the SA Governments should expand the adoption of IEEE 2030.5 from solar systems to include priority appliances. The alternative is continuing to wait for the still unpublished and vastly inferior AS4755.2 standard.

### *Support for two sided energy markets*

Accurate estimates of baseline energy consumption are required to appropriately reward consumers for participating in desirable two-sided energy markets. The AEMO/ARENA baselining study revealed yet another failure of Power of Choice meters.

The study attempted to use meter measurements to estimate baseline energy consumption. It found estimates were too inaccurate when solar was involved and where loads were temperature dependant (which includes air-conditioning, pool filtering and hot water use).

The result highlights the importance future meters can access additional measurements and data to support accurate baseline estimates. As noted above IEEE 2030.5 already supports this access and interoperability.

### *Forcing consumer participation in demand response*

The COAG and SA Government AS4755 mandate forces consumers to purchase appliances fitted with an out-dated demand response interface. Option 4 in the SA discussion paper then suggests all consumers purchasing ANY air-conditioner, pool pump controller, hot water heater or EV charger will then be forced to install a Power of Choice meter.

The problem is like AEMC Power of Choice meters AS4755 offers absolutely no consumer benefits. Despite the lack of benefits the (deeply flawed) financial analysis incorrectly assumes a majority of consumers will still register appliances in demand management programs. This assumption is highly questionable given the only "benefit" of registration will be to allow AEMO to turn off their air-conditioner, pool pump and hot water heater while preventing their Electric Vehicles from charging (just like is currently required for solar systems).

The alternative is to encourage the AEMC include the IEEE 2030.5 demand management interface in Power of Choice 2.0 meters. This standard is designed to deliver consumer benefits and to lower total system costs. Importantly it supports visibility of energy use/generation as required for the efficient management of our clean energy future.