Turning smart meters into dumb meters

Submission by Dr Martin Gill

Should consumers be allowed to request retailers deactivate the remote communications to their smart meter? The answer is no because it fails to address consumer concerns while risking increasing electricity costs for all consumers.

Summary of Submission

The AEMC should not allow deactivation of smart meter communications because:

- Installing more expensive (smart) meters and then turning them into dumb meters (by deactivating the communications) ensures promised cost savings are not delivered
- The retailer suggestion they will charge consumers around $250[1] a year to support deactivation of communications may not be possible, because consumers will not pay this much and have no way to validate the communications have actually been deactivated
- If retailers do not charge consumers the full cost to support a smart meter with deactivated communications then all consumers end up paying more as retailers smear the $250 annual cost across all their customers
- The reason for asking for communications deactivation is consumer concerns about privacy and exposure to electro-magnetic radiation. Neither concern is considered in the NEO indicating the request falls outside the scope of the AEMC rule making test.

The AEMC has mandated the rollout of smart meters to all Australian consumers. A rule change proposal allowing retailers to deactivate the communications turns these expensive smart meters back into dumb meters. In addition to increasing meter costs by $200 a year, deactivation of the communications largely negates the promised benefits which have been conservatively estimated at $50 a year (giving the total annual cost of $250).

Alternative solutions are available addressing consumer concerns with how smart meters invade their privacy and increase the perceived risk of exposure to electro-magnetic radiation. These alternative solutions are much less expensive, give consumers greater control, while still delivering promised smart meter benefits. Permanently deactivating the communications should only be considered after these highly cost effective options have been fully explored.

Clarification: Giving consumers the right to choose deactivation of smart meter communications is not the same as giving consumers the right to choose a smart meter. Even with the communications deactivated the AEMC smart meter continues to raise consumer privacy concerns through the collection of 5 minute measurements of their electricity use. The only difference is it costs considerably more to collect these highly invasive measurements. Costs that will ultimately be passed onto consumers through higher energy bills.

Introduction

The Australian Energy Market Commission (AEMC) has mandated the rollout of smart meters to all Australian households. This decision was made on the promise the smart meters would lower electricity prices. The promise assumes smart meters allow retailers to lower their operating costs through efficiency improvements. Examples of efficiency improvements include avoiding the cost of manual meter reading and no longer having to send technicians to disconnect consumers, etc.

Meters without communications are called dumb meters.
All Smart Meters must have communications.

[1] The appendix discusses why this is the actual cost to support an AEMC smart meter with deactivated communications

In their submission retailers suggest they may charge consumers to recover the (significantly) higher costs to support meters without communications. This presents a major problem. Consumers have no way to verify the retailer has deactivated the remote communications. The Banking Royal Commission implied it is unfair to charge consumers for services they are unable to verify have actually been delivered.

Smart meters are more expensive than the dumb meters they are replacing. Retailers will recover the higher cost of the AEMC smart meters, either through higher electricity costs or (hopefully) through efficiency improvements. Deactivation of meter communications removes efficiency improvements and significantly increases meter operating costs. If retailers do not (or cannot) charge consumers the full cost of deactivating smart meter communications (and lost efficiency improvements) then these higher costs are ultimately passed to all electricity users.

The cost to deactivate communications (largely to pay for manual meter reading)

Smart meter rollouts promise to lower consumer electricity prices through efficiency improvements. The most readily identified efficiency is avoiding the cost of manual meter reading.

Before the retailer led AEMC smart meter rollout domestic meters belonged to the local distribution business. Meter reading was very efficient with a meter reader able to read all the meters by simply walking down the street. The cost of four meter reads a year was less than $4 ($1 per read).

Deactivating the communications incurs manual reading costs of $200 a year

The AEMC smart meter rollout hands responsibility for the provision of domestic smart meters to the customer's retailer. With several dozen different retailers active in the Australian energy market the domestic meters in any one street could belong to multiple different retailers. For a number of reasons (including security) a meter reader for one retailer cannot read another retailer's meter. The result is each retailer must send their own meter reader to read their meters. With most smart meters retaining communications the retailer meter reader must travel large distances to read a handful of meters per day. The technical arguments of why deactivating the communications to an AEMC smart meter increases costs by $250 a year are presented in the Appendix to this submission.

When considering rule change requests the AEMC applies their rule making test to ensure the outcome of the requested rule change aligns with Australia's National Energy Objective (NEO).

> The NEO promotes efficient investment in, and efficient operation and use of, electricity services for the longer term interests of consumers of electricity with respect to:
>
> (a) price, quality, safety, reliability and security of supply of electricity; and
> (b) the reliability, safety and security of the national electricity system.

Note: The NEO does not consider consumer privacy or exposure to electro-magnetic radiation

The proposed rule change significantly increases costs which will be either directly or indirectly be passed onto consumers through higher electricity prices. This does not align with the principles of the NEO.

Higher electricity costs for the majority of Australian electricity consumers could be avoided if retailers charge individual consumers requesting deactivation of the communications the full cost $250 to support the smart meter. This seems highly unlikely. Charging these consumers an annual fee of $250 to replace their existing dumb meter with what is essentially another dumb meter would soon be picked up by the radio shock-jocks. The most likely outcome is therefore retailers will choose to smear the actual cost to deactivate the communications across all their customers, resulting in higher electricity costs for all consumers.

Why are consumers asking for deactivation of the communications?

In their submission retailers never discuss why consumers are asking for the remote communications to be deactivated. The great problem solver Edward de Bono indicates the only way to arrive at the best solution is to start with a clear statement of:

What is the problem?

Edward de Bono

The reason consumers are asking for deactivation of smart meter communications is easily found by searching different discussion forums. The main reasons can be summarised as.

- Concerns about long term exposure to electro-magnetic radiation
- Concerns about how smart meters invade consumer privacy

So despite failing to clearly define the problem retailers have chosen to present two solutions. Unfortunately starting from the view point of a solution eliminates all discussion of potentially equally viable, and often cheaper, alterative solutions. To demonstrate my point it is like being offered the choice of a Porsche or a Ferrari. Both are solutions to owning a sports car but there are many other (far cheaper and easier to live with) alternatives.

The retailer submission uses the same flawed logic by suggesting one solution (deactivating communications) is cheaper than an alternative solution (removing the meter). The issue is both solutions increase electricity prices so applying the AEMC rule making test shows neither solution is in the 'longer term interest of consumers' and therefore the rule change should be rejected.

Applying the AEMC rule making test to the identified consumer problems is also enlightening.

- The NEO does not mention consumer privacy. Indeed even if the communications is deactivated retailers must manually collect the intrusive interval data. So the NEO does not support deactivation on the basis of privacy.
- The NEO considers safety of supply of electricity and safety of the national electricity system. It does not cover perceived risks of exposure to electro-magnetic radiation. So the NEO does not support deactivation on the basis of consumer concerns about electro-magnetic radiation.

Neither problem is covered by the NEO. This suggests the AEMC must move outside the NEO's guiding principles to accept this, or similar, consumer focused rule changes. Even if retailers proposed a solution which do not increase the price of electricity (their solution does increase costs) the NEO does not give the AEMC the power to make the requested rule change. This situation will persist unless the NEO is updated to cover consumer concerns.

Low cost solutions addressing exposure to electro-magnetic radiation

What is the problem?

All the AEMC smart meters use cellular networks for the communications. To achieve this every smart meter is fitted with what is essentially a mobile phone. The smart meter, with mobile phone, is then installed inside a meter box located on an external wall of the consumer's house. The majority of meter boxes are made of metal. The solid metal door on the front of the meter box ensures virtually all the electro-magnetic radiation is directed to the back of the meter box, that is INTO the house.

The metal meter box causes another problem. Anyone who has tried to use their mobile phone inside an elevator (a metal box) can confirm lots of dropped calls. The smart meter is unable to move to a location with better signal coverage, so to overcome the poor signal strength the mobile phone transmits at the maximum allowable power level. Finally lots of dropped calls means the meter ultimately transmits more often and for longer.

$$Total\ Electro\text{-}Magnetic\ Exposure = \sum \boldsymbol{Power\ Level} \times \boldsymbol{Time}$$

The above (simplified) equation summarises the problem. The solution the retailers have presented (hopefully) sets the Power Level to zero, thereby reducing electro-magnetic exposure.

The equation suggests alternative solutions are available.

*Reduce the **Time** communications is active*

All AEMC smart meters must support six metering services. Cost effective delivery of these six services requires remote communications. When considering the time the communications is active and how this affects electro-magnetic exposure the service Read Meter Status deserves special attention.

The Read Meter Status allows retailers to 'instantly' obtain readings of the voltage and power use of their customers. Read Meter Status is supposed to result in more efficient call centre operation and faster power restoration. The important point is in order to support the AEMC mandated read meter status all AEMC smart meters must permanently enable the communications modem. As a consequence this service ensures consumers are *CONTINUOUSLY* exposed to electro-magnetic radiation.

The remaining five AEMC smart meter services can be supported even if the smart meter communications modem is turned off for most of the time. For example if the modem is only turned on once an hour to check if there are any requests to disconnect the consumer or reconfigure the meter, etc. Turning the communications modem off for most of the time would significantly reduce total exposure to electro-magnetic radiation, while still delivering all the benefits (the appendix presents a technical discussion of why removing the Read Meter Status service does not reduce smart meter benefits).

Rather than permanently deactivate communications should the AEMC consider allowing consumers to choose if their smart meter supports 'Read Meter Status'? Those consumers choosing to disable the service significantly lower their exposure to electro-magnetic radiation. Unlike the current proposal virtually all smart meter efficiency benefits are retained, including remote reading and maintenance.

Once the topic of consumer choice is raised the next question is should consumers be able to choose how often the smart meter communications are enabled? For example at the extreme this might be as infrequently as only once every 3 months. Even at once every 3 months this still avoids the high cost of manual meter reading and retains the smart meter benefits so could be offered to consumers at a significantly lower price than permanent deactivation of meter communications.

*Reduce the **Power Level** transmitted at consumers*

Reducing consumer exposure to electro-magnetic radiation is possible when the power transmitted into the premises is reduced. In fact there are several simple and cost effective steps retailers can take to reduce the amount of power transmitted into the house.

Most smart meters support the installation of an external antenna. These external antennas offer several benefits. Firstly the external antenna improves the signal strength allowing the communications modem to use lower transmit power. Secondly when the antenna is located outside the meter box the transmitted power is no longer directed into the house. Both effects reduce the level of consumer exposure to electro-magnetic radiation.

Photograph of the external antenna fitted to the author's smart meter

The above figure shows the external antenna fitted to the smart meter installed at Dr Gill's premises. Fitting an external antenna while installing the smart meter adds less than $20 to the cost (c.f. less than half the cost of the first manual read if the communications is deactivated).

Simplest solution: Avoid using smart meter communications when consumers are at home

The risk of electro-magnetic exposure can be reduced to zero if all communications occurs when consumers are not home. Unfortunately the AEMC's own rules suggest retailers should attempt to read the meter when most consumers are at home. Specifically retailers are encouraged to activate the communications shortly after midnight to collect the previous day's meter data. As a result the vast majority of smart meter communications occurs when consumers are at home.

The alternative would be to encourage retailers to only collect meter data when consumers are typically away from the house. For example mid-morning or early afternoon on workdays. Changing when the meter data is collected is virtually a zero cost option, while significantly lowering consumer exposure to electro-magnetic radiation.

Low cost solutions addressing concerns about consumer privacy

What is the problem?

All AEMC smart meters are required to collect 5 minute interval data measurements. These measurements reveal exactly how and when consumers use their electricity. Interestingly most contributors do not raise issues about the privacy breach, instead they express concerns about how the information will be used. These contributors claim the interval data will ultimately be used to force consumers to pay more for electricity when they need it most (time of use pricing).

What consumers are failing to understand?

Even if the communications is deactivated the AEMC still requires the retailer collect the 5 minute interval data measurements. Once collected the interval data can be used to support a wide range of different consumer tariffs, from the current flat tariff structures, through time of use all the way through to demand tariffs. Hence deactivation of the communications does not avoid different tariffs.

Simplest solution: Provide tools allowing consumers to access the benefits of smart meters

Despite more than 500,000 AEMC smart meters having been installed none of these consumers can access the benefits of their smart meter. The lack clear benefits stimulates consumer concern and discontent, leaving them vulnerable to exploitation. For example retailers are telling consumers they must install a smart meter (even though this is fundamentally incorrect)

Australia already has an example of what is possible: Victoria. Victorian consumers are provided with an easy to use website allowing them to download their smart meter data and then use it to accurately compare all available electricity tariffs. Using the website consumers can quickly find how much they could save on tariffs offered by different retailers and even different tariff structures (flat, time of use, etc). The Victorian tariff comparison website even includes accurate solar calculations to avoid the highly misleading retail practice of offering high feed in credits.

All consumers affected by the AEMC smart meter rollout are forced to use the largely useless Energy Made Easy tariff comparison site. The Energy Made Easy website does not allow consumers to use their actual meter data. It does not allow them to compare fixed to time of use tariffs (it does not even support demand tariffs). It also ignores the Australian 2.5 million households with a solar system by not including solar credits in its results. Given all these failings it is unsurprising a little over 10% of consumers report they are aware of the Government offered (independent) tariff comparison website.

The cost to maintain the Energy Made Easy website is already being collected from consumers with promised upgrades now running several years behind schedule. Upgrading the site would be a huge step towards allowing consumers to access the benefits of their smart meter. This is only fair since they are paying for the website.

The practicalities of deactivating communications

Most smart meters are designed to allow the communications module to be easily exchanged without removing the meter. Module exchange is required when smart meters use commercially provided cellular networks. For example Australian commercial cellular operators will phase out support for 3G technology around 2021. A significant number of AEMC smart meters currently use the 3G network, all of these modules must be replaced before the 2021 deadline.

While most smart meters allow the communications module to be removed this cannot be done by consumers. The module is fitted inside the meter to avoid tamper. Further in most smart meters the communications module is not visible. So removing the communications module still suffers the same problem as communications 'deactivation' with consumers unable to verify the service they requested has actually been delivered.

More importantly this is not what the retailers are requesting, they only want to remotely deactivate the communications module. Remote deactivation avoids the cost of sending a technician to the consumer premises to physically remove the module. More importantly retailers do not want to pay to send a technician back to the premises to reinstall the communications module. This should be viewed as a huge WARNING SIGN, and to explain why the following considers a simple experiment.

> Ask a friend to send you an SMS asking you to turn off your mobile phone.
> Ask them to send a second SMS sometime later telling you it is OK to turn the phone back on.
>
> When you receive the first SMS you turn off your phone.
> As a result you NEVER receive the second SMS!

It is expensive for retailers to deactivate the communications. As the experiment shows, once the phone has been turned off (deactivating communications) the only way it can be turned back on is to send a technician to the customer premises to physically reactivate the communications. Sending technicians to consumer premises is expensive and retailers are going to try to avoid these costs.

Justification for the above statement: Retailers do not actually install smart meters. Under the AEMC smart meter rollout the retailer appoints a Metering Coordinator to organise meter installation. Retailers sign performance agreements with these Metering Coordinators detailing the service levels and performance targets they require. There are rumours some of these retailer defined performance targets do not allow the Metering Coordinator to deactivate the communications! Specifically the specified performance target for reactivation can only be met using remote communications!

"Trust me I am your electricity retailer"

Recent consumer sentiment surveys show a steady decline in consumer confidence with electricity retailers. Of relevance to this discussion is consumers no longer believe electricity retailers act in the interest of consumers.

How do consumers validate the retailer has deactivated the communications?

If retailers apply cost reflective pricing they must charge consumers $250 a year to deactivate the communications. Given consumers no longer trust electricity retailers they are going to want to verify the communications have indeed been deactivated. Unfortunately there is no way a consumer can validate the communications have been deactivated. Most consumers are (justifiably) not going to pay. As a result the $250 cost will be smeared across all consumers leading to higher electricity prices.

Another issue is deactivating communications "to avoid breaching consumer privacy" is potentially ambiguous. While a retailer may agree not to collect the on-market interval data what about continuing to maintain the meter, for example checking and adjusting the meter's real time clock to ensure it meets regulatory accuracy requirements?

What about proposals to continue supporting the local distributor smart meter benefits such as reporting network voltage fluctuations (remember distributors pay retailers for this data)? Dr Gill's smart meter collects off-market gross solar data which is very useful to the Australian Energy Market Operator (AEMO) as they struggle to manage increasing uptake of domestic solar systems. This is a slippery slope because where do you draw the line when considering this off-market smart meter data?

Conclusion

There are fundamental issues with this rule change request. Retailers have presented two alternative solutions claiming one solution is cheaper than the other. They then request the AEMC amend the rules to support the cheaper alternative. The problem is the rules do not currently support the more expensive solution, or the cheaper solution.

The rule change request also fails to discuss the problem the two presented solutions are trying to solve. Analysis of consumer discussion forums shows these problems fall outside the terms of the NEO. The AEMC uses the NEO in its rule making test suggesting no solution can pass the AEMC's rule making test.

It will be a significant achievement if retailers can convince the AEMC to allow them to deactivate smart meter communications. Such a decision negates the benefits of the AEMC smart meter rollout leading directly to higher prices. This does not align with the NEO.

The bright side for consumers is this rule change request stimulates another discussion. The failure of the NEO to consider consumer concerns is a major shortcoming. As consumers become more involved in the operation of electricity networks there is an urgent need to update the NEO to include consumer concerns. Such a review might even finally give consumers the Power of Choice, the power to choose not to have an AEMC smart meter fitted in the first place.

Appendix

How much extra does it cost to manually read an AEMC smart meter?

It is estimated deactivation of the communications will increase the annual cost to read the AEMC smart meter from $20 to $250. The following explains how this figure is derived.

AEMC smart meters cost at least $100 more than the dumb meters they replace. Additionally an annual fee is required for the Telstra/Optus/Vodafone data services required to read the meter, adding a further $10 per year. Remote smart meter reading requires an expensive head end system, however it is assumed this replaces the manual meter readers and route planning software so is cost neutral. Thus ignoring the cost of capital and assuming the meter lasts 10 years suggests remote reading of the AEMC smart meters costs $20. This $20 will still be incurred even if the communications is deactivated.

It is a fact remote reading of smart meters is more expensive than the $4 per year required to manually read dumb meters. The AEMC hope other efficiencies enabled by the smart meters, e.g. avoiding the high cost of special reads and costs to disconnect consumers for non-payment, will recover the higher smart meter reading costs.

Deactivating the communications means the AEMC smart meter must be manually read. This will be ***much*** more expensive than the $4 required to manually read the dumb meters they are replacing. This is due to the fundamental difference between distributor provided dumb meters and the retailer provided AEMC smart meter.

When the meter reader is sent to collect dumb meter data they read every meter in the street. When they are sent to manually read an AEMC smart meter they will only be reading one or perhaps two meters per street. All the rest of the meters in the street belong to different retailers or continue to have the communications enabled (allowing remote reading). The result is the cost per meter is significantly higher.

There is already a published figure for the cost when a meter reader is sent to one or two geographically dispersed meters, this is the cost of a special read. The published cost is $40 per read. With four special reads required per year the cost to manually read a smart meter with the communications disabled exceeds $160.

There is another problem. Reading the dumb meters took less than 30 seconds. The meter reader opened the meter box and noted the total. The AEMC smart meters measure consumer electricity use every 5 minutes resulting in 288 interval measurements every day. The meter reader must uses a handheld device to download the data through the meter's optical ports. This is very slow, in fact it will take roughly 10 minutes to read each meter. This adds another $5 per read or $180 every year.

The AEMC justified the mandated rollout of their smart meters after considering the longer term benefits to consumers. Ultimately the benefits of the smart meters result in lower electricity prices. Unfortunately with the communications deactivated most of these benefits are no longer available. The AEMC has introduced the principle of cost reflective pricing, where consumers pay for their effect on electricity prices. Under these principles consumers requesting deactivation of their smart meter communications should pay all the higher costs and lost benefits.

The AEMC never published their cost benefit assessment supporting the rollout of smart meters. Certainly the benefits would have recovered the extra $20 to support remote reading. For the purpose of this discussion the lost benefits are estimated to be $50 a year.

Item	Annual cost
Higher cost of Smart Meter	$10
Cellular communications	$10
Four manual reads	$180
Lost benefits (estimated)	$50
TOTAL	**$250**

It seems unlikely retailers will be prepared to follow the AEMC cost reflective pricing principles and pass the full $250 cost to consumers requesting deactivation of the communications. This causes another problem. If the consumer incurring the additional costs does not pay the full amount then the cost must be recovered from other electricity consumers, including those who choose not to request deactivation of their smart meter communications. This is not in line with the National Energy Objective.

Smart Meter Outage Notification v Read Meter Status

Most smart meter rollouts require the meter notify the local distributor when it detects a power outage. These notifications immediately alert the local distributor of potential problems and critically exactly where the problem has occurred. The notifications allow distributors to efficiently dispatch their field service crew to affected areas leading to faster power restoration. The distributor can also add an automated message to their call centre line indicating 'they are working to repair an outage in area XXXX' thereby reducing consumer waiting times into the call centre. Finally unexpected single premise outages can be associated with meter tamper, so outage notification can reduce energy theft. Cost benefit assessments therefore assign significant benefits to outage notifications, these benefits are not supported by the AEMC smart meters.

Rather than implement outage notifications the AEMC included Read Meter Status assuming it provided a cheap method of supporting outage notifications. Their thinking was when a consumer rang to report an outage the call centre could perform a Read Meter Status to confirm there was an outage. The outage could then be reported to the distributor.

While it probably looked good on paper the problem is it is not possible to call the meter during a power outage. The power outage disables the smart meter communications so the Read Meter Status fails. When it does the retailer tells the consumer to call the distributor to report the problem. Hence an AEMC smart meter does not make the process of power restoration faster or more efficient.

Having determined Read Meter Status does not deliver significant cost savings indicates it could be removed from the AEMC's minimum list of services. If it is removed from the list then the smart meter communications no longer needs to operate continuously. Specifically it can be turned off reducing electro-magnetic exposure. Further Read Meter Status can be used to significantly breach consumer privacy, by revealing which appliances are being used, most consumers would be more comfortable with its removal.

About Dr Martin Gill

Dr Martin Gill is an independent consultant specialising in the provision of consumer advice 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.

He currently represents the interests of consumers on a range of Standards Australia committees including metering, renewable power systems, battery storage, electric vehicles and demand management.

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.

Citation

Please accurately attribute all quotes and references to this submission. It would be appreciated if references also included the author's website drmartingill.com.au.

Comments or Questions?

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