### Mandating the not smart demand response appliance interface

Submission by Dr Martin Gill

Australia has developed a unique appliance interface intended to provide demand response. Recent trials have shown the interface is ineffective, expensive and does not support options demanded by consumers. A range of smart appliances are already available costing significantly less than the Australian solution. The unique Australian interface should not be mandated.

#### **Summary of Submission**

The analysis of claimed financial benefits presented in the consultation paper is deeply flawed. The economic justification for mandating the interface is based on deferment of network augmentation. Evidence is presented to show the interface does not defer network augmentation. There is no economic justification for mandating this unique Australian appliance interface.

While the financial analysis grossly overestimates benefits it also underestimates costs. Recent ARENA trials attempting to utilise the interface have revealed numerous problems. These problems are caused by a failure to support cost effective installation. The result is installation can only be undertaken by licenced electricians, significantly increasing installation costs. For reference it is noted current smart appliances and smart appliance controllers focus on ease of installation, by consumers.

The mandate increases appliance costs. These higher appliance costs are borne exclusively by consumers. The mandate forces appliance manufacturers to develop a range of appliances which are only suitable for the Australian market. The immediate result of the mandate would be to deny Australian consumers access to both existing and future smart appliances offering far greater consumer benefits than the proposed interface.

Functionality supported by the unique Australian interface is significantly overstated. It is important to understand activating the interface does not turn dumb appliances into smart appliances. Smart appliances are already available in the Australian market place giving consumers total control, including turning the appliance on and off, monitoring its performance and adjusting settings. The unique Australian interface only supports turning an appliance off, provided it was first turned on. The unique Australian interface is not 'smart'.

Specifically

- AS4755 describes a uniquely Australian approach attempting to reduce the electricity demand of an extremely limited number of appliances
- Trials have shown AS4755 is difficult and expensive to use
- Testing shows the benefits of AS4755 are significantly less than claimed
- International demand response standards offer far more capability (at a fraction of the cost)

There is absolutely no need to mandate the inclusion of this unique Australian interface.

#### History

The development of the unique appliance interface described in the AS4755 series of documents was first proposed in the 1990's, however development of the AS4755 series only started in 2005. At that time network peak demand was still increasing. To meet increasing network demand utilities regularly undertook expensive network upgrades.

The proposal was to develop an interface giving utilities the ability to delay (defer) some of these network upgrades. Deferment was to be achieved by giving utilities the ability to restrict when consumers could run their appliances.

The development of AS4755 is based on the same principle as utility control of off-peak hot water heaters. The development missed a number of critical differences.

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- Firstly consumers receive lower electricity prices in exchange for giving utilities control of their hot water heater. The AS4755 series of documents does not support any features allowing consumers to be rewarded for surrendering control of their appliances.
- Secondly most utilities offered consumer a "boost button". The boost button ensured utility control did not impact their comfort and convenience by allowing them to override utility control of their hot water heater. Instead AS4755 forbids consumers overriding utility control of their appliances.
- Thirdly only heating storage hot water heaters overnight has very little impact on consumer comfort and convenience. Turning off consumer air-conditioners, pool pumps and when they can charge their Electric Vehicle does adversely impact consumers.

Of course the main problem for the AS4755 series of documents was by the time they were released peak network demand was no longer growing.

#### The changing Australian Energy Market

The economic benefits presented in the Consultation Paper assume mandating the AS4755 interface will allow utilities to defer expensive network augmentation. The analysis is deeply flawed. It is based on the incorrect assumption peak demand is continuing to grow. It is not.

At the time work on the AS 4755 series of documents commenced a number of Government energy efficiency initiatives were starting to deliver major benefits. The most significant is arguably the Minimum Energy Performance Standards (MEPS). MEPS has resulted in significant improvements to the energy efficiency of many appliances. For example a note on the Energy Rating website states modern split system air-conditioners are (at least) 50% more energy efficient than the units being contemplated when work on AS 4755 commenced.



The huge success of the MEPS scheme is shown by analysis of 20 years of data from the Australian Energy Market Operator (AEMO). The following figure plots Victorian monthly network peak demand from 1999 to 2019.



While the figure confirms in 2004 peak demand was indeed growing, it also shows peak demand is no longer growing. The figure clearly shows peak demand stopped growing in 2008. Despite record high temperatures and continued population growth, peak network demand in Victoria has been declining for over a decade.



Repeating the analysis for NSW reveals the same result. The above figure shows network peak demand growing steadily up to 2008. Since then NSW network peak demand growth has been flat.

This result is highly significant. With peak network demand no longer increasing, demand reductions <u>do not defer</u> <u>network augmentation</u>. This is because the existing networks are already able to meet peak demand requirements. Since claimed demand reductions would not defer investments, the financial benefits presented in the Consultation Paper do not exist!

Despite data clearly showing peak demand growth has stopped, the Australian Energy Market Operator (AEMO) continued to incorrectly forecast peak demand growth. Distribution utilities capitalised on AEMO's error using the incorrect forecasts to justify major network capacity upgrades. The consequence of these unnecessary network enhancements is large sections of the distribution network will *never* need to be upgraded. Claimed demand reduction across significant proportions of the distribution area do not deliver cost savings.

In summary the claimed saving of "\$300 per household" is based on the incorrect assumption **all** demand reductions defer network augmentation. This assumption is false. The evidence clearly shows peak demand is flat or even falling. Further existing overinvestment in unneeded network capacity means in many areas no network augmentation will ever be required. Generously assuming the AS4755 interface mandate delays augmentation in 10% of network areas suggests a total benefit less than \$30 per household. Even \$30 significantly overestimates benefits since higher appliance costs remain for 90% of consumers who never benefit.

This suggests a far more cost effective means of delivering benefits. Rather than forcing all Australian consumers to pay more for their appliances, when 90% will never deliver network savings, instead promote cost-effective approaches targeting those areas where demand reduction do deliver benefits. These solutions already exist and several can be easily retrofitted to existing appliances at a lower price point than supported by the AS4755 interface. There is no need to wait 10 to 15 years after any mandate comes into effect.

#### The future

It is important to understand mandating the AS4755 interface achieves nothing until a significant population of appliances fitted with the interface become available. This will not occur for at least another 10 to 15 years. So the interface does not provide utilities with any meaningful demand reduction until at least 2035. By 2035 Australia's electricity grid will be vastly different to the one we have today.

The data suggests network peak demand will have stopped growing across all areas (not just NSW, Victoria and South Australia). As such the capacity of existing distribution networks will be more than adequate to meet demand. The mandate will not defer network augmentation.

Falling prices for solar and battery storage systems mean Australia's energy market will increasingly rely on the effective management of Distributed Energy Resources (DER). One DER management technique creates local Virtual Power Plants (VPP) integrating solar and battery storage. Several Australian trials of VPP have already been undertaken revealing AS4755 does not support this energy future. Most VPP trials utilised the internationally recognised IEEE 2030.5 standard.

IEEE 2030.5 should be viewed as one of an emerging number of different solutions. This is hardly surprising as cost effective management of DER (including appliance demand response) is of global interest. For example another standard is OpenADR. OpenADR deserves special mention because it has been adopted as a European standard, which can be rapidly adopted for use in Australia. Additionally OpenADR is supported by several appliance manufacturers already offering products in the Australian market.

January 9, 2019 The OpenADR Alliance today announced that the International Electrotechnical Commission (IEC), the world's leading International Standards organization for all electrical, electronic and related technologies, has approved the OpenADR 2.0b Profile Specification as a full IEC standard, to be known as IEC 62746-10-1 ED1

More recently concerns have been raised about increased threat to our electricity networks posed by cyber security. Turning large numbers of appliances off could seriously impact grid security hence global demand management standards directly address cyber-security threats. AS4755 does not provide any cyber-security measures.

Finally the energy efficiency of appliances being sold in 15 years-time will be better than those being sold today. As discussed since development of AS4755 commenced the efficiency of air-conditioners has improved 50%. These improvements will see peak demand falling, without the need to mandate an ineffective and expensive unique Australian interface.

#### Claimed "Success" of trials of AS4755

The Consultation Paper states "ARENA has funded a number of trials of different DR technologies and approaches. None were more successful than those using AS/NZS 4755 products". Published reports from the ARENA trials suggest a rather different outcome. Referring to AGL's ARENA funded trial:

For those customers found to have an eligible air-conditioner make and model, site visits were arranged to install the equipment, however AGL encountered further complexities on site including:

- Compliance with AS4755 is not 'plug and play'. In many cases, an additional adapter from the OEM was required to interface between the DRED and the air-conditioner. There is no standardisation of adapter parts across brands, and many variants of adapters exist even across air-conditioners of the same brand.
- Many of the OEM parts did not have clear installation instructions.
- Some OEMs did not fully implement DRM as defined in AS4755 or the necessary translation of commands, requiring a bespoke approach to DRED installation.

In summary, the retro-fitting of DREDs to existing residential air conditioners uncovered many issues with compatibility, reliability, feasibility and cost. Due to the complexity of DRED installation, the time spent at customer sites was significantly more than planned, not only increasing costs but also proving an additional impost on customer's time.

The AGL result is far from the claimed "success". It also highlights attempting to activate the existing population of AS4755 air-conditioners would be far too expensive. The results show this benefit should not be included in the Consultation Paper.

#### Conclusion

The AS4755 interface was developed to address a historical concern network peak demand was growing. Two decades later evidence shows network peak demand is no longer growing. Without peak demand growth there is no financial justification for mandating appliances be fitted with the interface.

When AS4755 was first proposed global demand response standards were in their infancy. That is no longer the case. Several highly suitable open demand response standards are readily available. These standards have been developed by global associations with 100's of members. More importantly unlike AS4755 these standards address future demand response needs, including cyber-security, ease of installation, consumer options to retain control of their appliances and direct integration with the grid. That AS4755 does not address any of these issues provides further evidence there is no need to mandate the interface.

Of considerable concern is the AS4755 interface is unique to Australia. A mandate would force global appliance manufacturers to develop products meeting Australia's unique requirements, not only increasing appliance costs, but also reducing the range of products they can offer. The first casualties would be to deny Australian consumers access to the increasing number of smart appliances. These smart appliances offer to increase consumer comfort, convenience and to lower consumer electricity costs. That AS4755 does not offer any of these features is further indication the mandate is not in the interest of consumers.

So

- there is no economic justification for the mandate
- superior global standards are readily available
- mandating the interface is likely to deny consumers access to smart appliances of direct benefit to consumers

The AS4755 interface should not be mandated.

#### **Comments or Questions?**

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

#### Citation

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

#### References

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#### 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.

#### Answering questions from the Consultation Paper

The following section answers questions posed in the Consultation Paper

#### 1. Do you support the proposal to mandate compliance with AS/NZS 4755 for the nominated priority appliances?

No. The claimed financial benefits presented the Consultation Paper are grossly overstated. The Consultation Paper incorrectly assumes all demand reductions deliver savings. This is totally incorrect. Demand reductions only deliver savings where the demand reduction actually delays the need for network augmentation. Government energy efficiency initiatives have stopped the growth of network peak demand, so in the vast majority of areas demand reductions do not defer network augmentation. This significant error means the benefits presented in the Consultation Paper are grossly overstated.

The mandate attempts to solve a problem that no longer exists. The Consultation Paper states "unexpected surge in AC sales in the late 1990s [...] contributed to tens of billions of dollars in avoidable network costs". These network costs have already been incurred and cannot be recovered. If the AS4755 interface had been mandated in the late 1990's then investments might have been deferred. Now that air-conditioner ownership has reached saturation and their efficiency has been improved peak demand is no longer growing. Mandating the interface two decades too late does not result in savings.

There is another issue. In one state network demand growth is yet to peak and stabilise. This state already uses the proposed interface extensively to "reduce" demand growth. Analysis of peak demand in this state reveals the interface is ineffective at reducing network peak demand. So even if peak demand is growing, the proposed interface does not deliver promoted benefits.

Finally costs are significantly underestimated. Activation of the interfaced cannot be undertaken by consumers, instead requiring installation by licenced electricians. Recent trials found significant issues caused by unclear labelling, a poorly defined interface and ultimately interoperability issues. These trials show the interface is far more expensive to activate than included in the modelling.

### 2a. Is there any viable alternative options for meeting the objectives of the proposal, apart from the BAU case or mandating compliance with AS/NZS 4755?

This question incorrectly assumes AS4755 is a cost effective solution. Peak demand is no longer growing and without peak demand growth, the proposed mandate does not defer network augmentation. Since it does not defer network augmentation it does not deliver financial benefits. Mandating AS4755 only results in higher costs.

The Consultation Paper only presents two alternatives: Adoption of the unique Australian specific AS4755 solution or do nothing (BAU). The Consultation Paper chooses to ignore other viable solutions including adopting internationally developed demand response standards. This is particularly troubling because many of these solutions are able to deliver greater benefits (at lower cost) significantly sooner than either of the presented solutions.

For example the Consultation Paper claims benefits delivered by controlling Electric Vehicle (EV) Chargers when no such Australian standard exists. A suitable international standard already exists, Open Charge Point. This open standard provides all the functionality required to manage EV Chargers. More importantly EV Chargers supporting Open Charge Point already exist, along with the back office systems required to integrate and control the chargers.

Extending AS4755 to cover EV Chargers is both lengthy and costly, but is it justified? A mandate would force manufacturers of EV Chargers to incorporate a unique Australian interface. After forcing them to incorporate the unique Australian solution they must also incur additional costs to develop back office systems capable of controlling the chargers. All of these unnecessary costs can be avoided by simply adopting existing international standards. The proposed (non-existent) AS4755 solution is therefore far more expensive than adopting the international standard, but this alternative is not even presented.

Intriguingly the Consultation Paper does not include management of Energy Storage Systems in the benefit calculations despite this being supported. Multiple trials have found the unique Australian interface intended to support Energy Storage Systems does not provide the functionality required to manage their integration. Instead these trials have adopted the international IEEE 2030.5 standard. Equipment supporting this standard is already available.

The Consultation Paper presents two alternatives when other cost effective solutions can be readily identified. A wide range of international standards are already available which the Government could choose to mandate. These international standards are more than capable of meeting all Australia's requirements, while largely avoiding the introduction of Australian specific requirements. The ideal leaves the market free to decide.

### 2b. Do you agree that including demand response capabilities on energy efficiency labelling and voluntary compliance with AS/NZS 4755 is not a viable alternative option?

Current cripplingly high electricity prices are encouraging consumers to use energy efficiency labels. The scheme is highly effective. More significantly many consumers are actively seeking solutions offering to lower their energy costs, for example by paying slightly more for appliances with higher star ratings or choosing smart appliances which allow them to manage their energy costs. The proposed interface is not designed to allow consumers to lower their energy costs and offers nothing to the successful labelling scheme.

More importantly existing energy efficiency schemes have already delivered the vast majority of (incorrectly) claimed benefits from the interface mandate. These energy efficiency initiatives have stopped network peak demand growth and without peak demand growth the claimed benefits of AS4755 will not be delivered.

As electricity prices continue to rise more consumers will choose solutions allowing them to lower their energy costs. These consumers generate their own electricity and monitor the electricity use of their appliances. Currently most are enthusiasts turn appliances on and off manually to maximise self-consumption of their solar system output. Appliances include washing machines, clothes dryers and dishwashers. Unfortunately none of these appliances are supported by the Australian interface. This limitation becomes problematic as the price of smart Home Energy Management Systems (HEMS), able to automatically lower their energy costs, continue to fall. In what will become a significant barrier to the adoption of these HEMS the Australian interface prevents the integration of air-conditioners and pool pumps, because it does not support required functionality (including no support for energy monitoring).

Digging deeper there are other issues with the mandate. Government initiatives to improving building standards have increased the thermal efficiency of many houses. For many households setting the air-conditioner to pre-cool, deliberately turning it on in the middle of the day when there is excess solar output is a viable means of increasing solar self-consumption and decreasing evening energy requirements (purchased from the grid or supplied by batteries). The AS4755 interface does not allow an air-conditioner to be turned on (it only supports turning off an air-conditioner which was previously turned on).

The idea of mandating a uniquely Australian appliance interface is at odds with existing Government policies encouraging alignment with international standards and leaving markets free to choose the most appropriate solutions. The most viable solution involves NOT mandating the interface.

#### 3a. Do you support permitting compliance with either AS/NZS 4755.3 or (DR) AS 4755.2?

This is a trick question. Neither interface should be specified. Recent ARENA trials show activation of AS/NZS 4755.3 is not cost effective. AS4755.2 is of even greater concern, since it significantly increases the cost of compliant appliances while failing to ensure they can ever be successfully activated.

To explain. Activation of appliances offering the AS4755.3.x interface requires the installation of an external Demand Response Enabling Device (DRED). The DRED implements Australian specific functionality described in AS4755.1. The

DRED also contains the communications chosen by the utility, for example proprietary ripple control systems or Zigbee Home Area Networks. Unique functionality assigned to the DRED ensures it is expensive.

The DRED requires power which is not provided by the appliance (this is only an option), so a licenced electrician must be employed to install a separate power point. Significant differences between where and how each appliance manufacturer chooses to implement the AS4755.3 interface mean the installer must tailor each individual installation. This tailoring significantly increases the cost of activation. The lack of interoperability means the cost to activate an AS4755.3.x appliance (including the DRED) is close to \$1000.

The draft of AS4755.2 reveals appliance manufacturers are required to implement the Australian specific DRED functionality *inside* the appliance. This specific functionality will increase the cost of all appliances. For example the DRED functionality requires every appliance to include a clock. This clock is used to ensure when utilities lose communications with the DRED then after some 24 hours consumer control of their appliance is restored. This is the reason it is so important to understand the mandate forces international appliance manufacturers to develop models which can only be sold in Australia. The additional hardware costs and limited Australian market ensure the mandate will significantly increase appliance costs.

While increasing the cost of all appliances, when they do not deliver benefits, is problematic it is not the major issue with AS4755.2. The main issue is the utility continues to choose which communications option is used to communicate with the DRED now inside the appliance. So a consumer walks into the store to buy an air-conditioner and must choose an appliance compatible with the communications option which may be selected by their utility or in the future a demand response service provider. This unnecessarily complex and totally unacceptable!

Demand Response Service Providers (DRSPs) must compete for consumer demand response, which they then bid into Australia's Energy Market. Under the draft of AS4755.2 a consumer must buy an appliance supporting one communications standard. They are then prevented from offering that appliance to some DRSPs because they do not support the "right" communications standard. Hence once the consumer chooses the appliance they are limited to whom they can offer control. The alternative is DRSP costs are increased as they are forced to implement multiple different communications options. It still leaves the major issue of obsolescence of the selected communications.

In fact the situation with the draft of AS4755.2 is far worse. The proposed labelling means it does not provide sufficient information to assure consumers they can even connect to the appliance. For example the same label lists multiple options including an RJ45 Local Area Network plug (requiring the consumer to connect an Ethernet cable to the appliance), or 3G/4G/5G modem (so the consumer has no control over who controls their appliance), or WiFi (so the consumer must give the utility access to their WiFi network even though doing so means the utility can turn off the appliance without any notice). Using the same label for incompatible options is unacceptable.

The correct answer to this question is neither interface should be mandated. If forced to choose then the AS4755.3 interface allows replacement of the DRED with a different communications option, thereby supporting the future energy market incorporating DRSPs. It also avoids obsolescence of the chosen communications solution.

#### 3b. Do you support requiring compliance with all Demand Response Modes (DRMs)?

What this question reveals is the significant failings requirements documented in AS4755. Virtually everything in the AS4755 documents is optional, from how the DRED is connected, where it is mounted, whether it supplies power to the required DRED or for (DR) AS4755.2 the communications method. Trials show all these options mean AS4755 is not a cost effective solution. Rather than address the optional features leading directly to high activation costs, the mandate proposes 'compliance with all DRM modes'.

The theory is some of the optional modes will have less impact on consumer comfort than turning the appliance on and off (the only mode required to comply with the AS4755 series of documents). There is no justification to this assumption. The problem is the documents leave manufacturers free to decide how they will implement the

optional modes. Specifically manufacturers can choose to simply turn the appliance on and off. The result is forcing manufacturers to implement all DRM modes, including those described as optional, is unlikely to address concerns about the adverse impacts on consumer comfort.

The Consultation Paper explains how adding the option to turn a hot water heater on can replace proprietary solar diverters. The discussion is incorrect. A solar diverter adjusts the electricity use of the hot water heater 50 times a second to ensure it only uses available solar generation. AS4755 does not adjust the electricity use of the hot water heater virtually ensures consumers end up buying electricity from the network. While utilities may be keen to be given the ability to (further) increase consumer electricity bills, from the consumers' perspective, there is no justification to mandating the additional modes.

Perhaps the greatest argument against mandating all modes is it invalidates claims compliant products already exist. The economic justification requiring appliance manufacturers develop products just for the Australian market is already questionable. Forcing manufacturers who have already developed compliant products to redevelop those products is even more questionable.

#### 4. Do you agree with the scope of the proposal?

It is impossible to agree with the scope of the proposal since AS4755 does not deliver financial benefits. Adding or subtracting appliances does not change the fact network peak demand is no longer growing so promised demand reductions do not defer network augmentation and therefore do not deliver savings.

Mandating the interface for Electric Vehicle (EV) Chargers is of particular concern. There is no AS4755 document describing the control of EV Chargers. Despite the AS4755 interface not supporting EV Chargers the Consultation Paper claims. Such claims should be considered fraudulent. International interfaces supporting the control of EV Chargers should be removed from the scope of the document.

A majority of resistance storage hot water heaters are already controlled. This control ensures they do not contribute to network peak demand. Mandating the AS4755 interface for storage hot water heaters therefore does not deliver network benefits. The hot water interface should be removed from the scope of the document.

A labelling scheme for energy efficient pool pumps already exists. This labelling scheme reveals energy efficient pool pumps are not significantly more expensive than inefficient pumps. The price difference moving from an inefficient pump to an efficient pump is much less than adding the unique Australian interface to the inefficient pump. More importantly the energy efficient pump typically reduces annual electricity bills by more than \$400. Fitting the more expensive AS4755 interface does not reduce energy bills. The conclusion is rather than mandate an expensive interface delivering minimal benefits far greater societal benefits are delivered by using the MEPS scheme to improve pump energy efficiency. Poop pumps should be removed from the scope.

The only remaining appliance is therefore air-conditioners. As already discussed should the mandate proceed it will apply to air-conditioners which are at least 50% more energy efficient than those available when AS4755 was proposed. Indeed by the time a significant population of air-conditioners is available, the efficiency of these air-conditioners, and subsequently their impact on networks will be even lower. This suggests greater societal benefits are delivered by accelerating the uptake of energy efficiency improvements rather than adding an expensive unique Australian interface. There appears to be little justification for including air-conditioners in the scope.

### 5a. Do you have information that demonstrates the ability of so-called "smart home" devices and systems to achieve automated demand response for the appliances within the scope of this proposal?

The first assumption made in this question is AS4755 reduces demand, it does not. Despite over 108,000 airconditioners using this interface Queensland peak demand continues to grow. Trials of the off-the-shelf Sensibo product showed it was able to deliver demand reductions similar to those offered by AS4755. The Sensibo result is of particular concern for the AS4755 mandate, because Sensibo is interoperable with virtually all existing air-conditioners *ALREADY INSTALLED* in Australia. It highlights there is no need to mandate an expensive unique Australian interface, which does not deliver benefits until a significant percentage of units are installed which is anticipated to take at least another decade (by which time the peak demand growth currently shown in Queensland will likely to have peaked as has already occurred in Victoria and NSW). Hence benefits can be delivered far faster, and at a significantly lower cost, by choosing to deploy off-the-shelf solutions rather than the expensive bespoke solution being proposed.

An AGL trial utilised off the shelf smart air-conditioners to demonstrate demand reductions. This trial made minor adjustments to the set point temperature. The results are also very worrying for AS4755. The reason is trial participants did not notice the minor adjustments. This contrasts with use of AS4755, where any search of online discussion forums will quickly reveal consumers who are very upset activation of AS4755 has impacted their comfort.

Consumer comfort concerns aside there is another reason to promote off-the-shelf smart appliances. The minor temperature adjustments these appliances support have been proven to lower consumer energy bills. Apps are readily available to automate these adjustments so in addition to short term demand response benefits, these solutions offer the long term benefit of lower electricity bills. AS4755 does not support minor thermostat adjustments so does not support lower electricity bills.

#### Is [sic] so, please provide this information and specify which particular "smart" devices?

AS4755 is a dinosaur fighting for relevance in a world vastly changed from when it was proposed in the late 1990's. The AS4755 interface is designed to allow expensive specialised hardware to be used to control a limited range of appliances (this expensive hardware is the Demand Response Enabling Device (DRED)). By contrast smart appliances and smart appliance controllers (including Sensibo) remove the need for this expensive hardware by connecting to the internet. The manufacturers provide an Application Programming Interface (API) allowing a wide range of developers to provide solutions. For example a quick Google search of the If This Then That website (IFTTT.com) suggests they have 197 different recipes allowing Sensibo to control an air-conditioner.



The IFTTT Sensibo recipes increase consumer comfort and convenience, while lowering consumer energy costs. For example Sensibo can be programmed to automatically make minor adjustments to air-conditioner temperature in response to outdoor temperature. These minor adjustments lead directly to lower energy and more importantly can be easily overridden by the consumer (unlike AS4755 control of the air-conditioner).

The unique Australian solution makes it highly unlikely anyone will develop an API to interface with an airconditioner using AS4755. The main reason is because in the case of an air-conditioner the AS4755 API would be limited to turning the air-conditioner off (and only if it was on). Unlike a smart appliance the API cannot be used to monitor the performance of the air-conditioner, adjust settings or turn the air-conditioner on.

### 5b. Would adoption of proprietary "smart home" systems undermine the benefits of peak demand reduction into the future?

The first point is AS4755 is effectively a proprietary solution. It is unique to Australia and continues to ignore global demand response standards. This submission explains why the unique Australian solution does not deliver benefits.

Consumers choose smart home solutions because they offer to increase consumer comfort and convenience while also lowering their energy costs. AS4755 does not support any of these smart features. As an example one smart home device lowers hot water heating costs by managing the temperature of the storage hot water heater. Lower temperatures reduce heat loss and therefore lower costs. To address concerns about the health of the tank, once a week the tank temperature is raised to ensure bacteria growth does not occur. The important point is proprietary solutions still offer consumer benefits which AS4755 does not.

The question also shows a lack of understanding of the benefits of Application Programming Interfaces (APIs). The API shifts the focus away from the physical appliance interface. The main advantage is to make smart home devices easy to install and widely supported. For example the Sensibo air-conditioner controller is a proprietary solution. Despite being a proprietary solution their decision to provide an API means there are now close to 200 If This Then That recipes allowing Sensibo devices to be cost effectively integrated into smart homes. AS4755 does not support APIs nor is it cost effective.

### 5c. How many products currently on the market have the ability to connect to demand response programs? If so, which or what type of programs?

Almost every air-conditioner already installed in Australia is compatible with the Sensibo smart controller. The ARENA trial shows utilising Sensibo results in demand reductions. Significantly Sensibo allows virtually all existing air-conditioners to be immediately enrolled in a demand response program at a tiny fraction of the cost of the proposed mandate of AS4755. ARENA trials of AS4755 control of air-conditioners found it was problematic and expensive.

The long delay between any mandate and potential benefit realisation is significant. Analysis shows as airconditioner ownership reaches saturation and the efficiency of those air-conditioners increases, network peak demand is no longer growing. This suggests the proposed benefits of the mandate actually decrease overtime. Hence delays to the start of the rollouts results in less benefits.

Almost every storage hot water heater installed in Australia is already connected to a dedicated electrical circuit. Increasing the cost of these storage electrical hot water heaters by mandating the AS4755 interface, when they are already controlled, does not reduce peak demand beyond what is already available.

A significant percentage of pool pump controllers are already connected to simple (read cheap) timer switches. This ensures the pool is regularly filtered (healthy) however it also means a significant percentage of pool are not operating during peak times. For example running the pump in the middle of the day to circulate heat collected under the solar blanket, but turning it off once the sun leaves the pool. Note even customers who are not on Time of Use tariffs typically avoid peak times. A mandate of AS4755 would not provide anywhere near the claimed benefit.

### 5d. Is there a risk that a mandatory AS/NZS 4755 standard may become obsolete as new technologies/innovative products achieve the same objectives without using AS/NZS 4755?

AS4755 is already obsolete. There is absolutely no justification for proposing this mandate!

The problem of obsolescence is virtually guaranteed. AS4755 control is based on the mindset of utilities telling consumers when they can use their appliances, this will always restrict its acceptance (and the percentage of appliances fitted with the interface which are activated).

Fitting a dumb appliance with AS4755 does not deliver energy savings. Specifically AS4755 does not allow consumers to monitor the energy consumption of their appliances or to make adjustments leading to lower energy costs. This is in stark contrast to smart appliances where an App loaded on the consumer's smart phone allows them to estimate running costs and make adjustments to lower these costs. The AS4755 interface is already obsolete.

#### 6. What is your estimate of how much complying with the requirement will increase the price of each product?

This is a unique Australian solution. It is not utilised globally (and given severe limitations it will never be adopted internationally). Mandating the interface forces manufacturer to develop products only for the Australian market. The cost of providing the interface, and of developing products only for the Australian market, will result in higher costs.

Discussions with manufacturers during the original 2013 Regulatory Impact Statement indicated they anticipated adding the simple AS4755.3 hardware interface would increase appliance costs by at least \$100. That only considered implementing one mode. This proposal requires all modes be implemented suggesting additional hardware will be required further increasing the cost to fit the interface.

The Consultation Paper suggests adding WiFi to air-conditioners costs \$30. In fact the published figures were US\$30 or approaching \$50 more. It is emphasised this is NOT the additional price for the interface outlined in (DR) AS4755.2. The draft of AS4755.2 requires all the functionality of the unique Australian Demand Response Enabling Device (DRED) be included inside the appliance. This includes unique requirements for battery backed up clocks and additional memory to store events. It is conservatively estimated incorporating DRED functionality able to satisfy Australia's unique DRED requirements will add at least a further \$100. This is still not the final cost! Unlike AS4755.2 requires the consumer pay for the communications option, even if the appliance is never activated. Some of the communications options proposed in (DR) AS4755.2 are expensive, for example the suggested 4G/5G modem would yet another \$100. The Consultation Paper significantly (and consistently) underestimates all these costs.

### 6b. If a product complies with DRM 1, are there any additional costs incurred for a product to comply with the other DRM modes?

Yes mandating the additional modes will increase costs. The cost increases occur because the additional control modes require more interface hardware, probably additional internal control hardware (including timers), along with additional development time and testing to confirm the additional modes function as described. All of these additional costs will be recovered from Australian consumers.

#### 7. Are the data and assumptions used in the cost-benefit estimates reasonable?

No! The justification for the mandate is based on deeply flawed financial analysis. It incorrectly assumes peak demand is continuing to grow (it is not), that reducing demand defers investments (in many areas overinvestment in capacity mean demand reduction will never defer investment) and AS4755 is able to reduce network peak demand (Queensland proves it does not). Hence the presented cost-benefit assessment is a long way from reasonable.

The Consultation Paper does not present anywhere near enough information to allow validation of the figures. There are instead sufficient hints the calculations exaggerate benefits. For example Table 15 shows the benefit of controlling air-conditioners claiming "80% of air-conditioners will be participating by 2035". Immediately under the table it provides actual results gathered from the PeakSmart program showing only 45% of air-conditioners were running. Hence without justification the Consultation Paper has doubled the participation rate while claiming the

assumptions in the table "are conservative". The figures in the table are not conservative. They are not even reasonable.

The assumption the number of air-conditioners operating at peak times will increase does not align with current ownership figures. Figures show the increasing number of air-conditioners arises because consumers now have more than one air-conditioner. It is totally invalid to assume every air-conditioner a consumer owns will be in use during peak times. For example many of these additional units are installed in bedrooms and are only turned on after the evening peak. Since the bedroom air-conditioners do not contribute to peak demand, AS4755 control of these air-conditioners will never deliver any benefits. The percentages of appliances running during peak times are therefore completely unreasonable.

The cost-benefit assessment is unreasonable because it has chosen to ignore the benefits of energy efficiency initiatives. Falling peak demand has been delivered by including air-conditioners in the MEPS program. Moves to improve the energy efficiency of hot water heaters and pool pumps will greatly reduce any benefits of mandating the AS4755 interface. Further claiming benefits from controlling EV Chargers when this is not supported by the AS4755 documents is far from reasonable.

#### 8. Do you think the estimates of activation rates and costs are reasonable?

The financial analysis suggests an activation cost of \$140. This figure significantly underestimates actual costs.

Activation of the Australian interface requires the installation of a Demand Response Enabling Device (DRED). The DRED is a unique Australian product supporting utility required functionality along with utility specified communications. As such DREDs are specialised pieces of equipment developed individually for each utility. This ensures they are produced in small volumes with development costs recovered through high prices. While never openly published the price of DREDs is considered to exceed \$200.

The AS4755 interface does not allow plug and play DRED installation. Instead every DRED must be installed by a licenced electrician. This is time consuming because the AS4755 documents do not indicate where the interface is located meaning for each appliance the installer must try to locate the interface (e.g. it could be in the head unit inside the house or the compressor unit outside the house). Recent trials found many units then require the installation of manufacturer supplied interface boards. Without plug and play functionality these boards vary from manufacturer to manufacturer and even across models offered by the same manufacturer. These additional costs were not included in the financial assessment.

AS4755 describes the optional provision of power for the DRED. With virtually no products offering this option the licenced electrician is instead forced to install an external power point to supply power to the DRED. In most cases this is an outdoor power point adding at least \$100 to every 'activation'.

While international demand response standards allow automated device registration this is not supported by the unique Australian interface. Instead registration of every AS4755 appliance must be performed manually, including entering the type of appliance, its size, which modes it supports, which DRED has been installed, which modes the DRED supports (this may be different to the appliance), how to communicate with the DRED, etc. Manual device registration adds at least another \$100 per activated appliance.

The only reason the PeakSmart program has encouraged 108,000 consumers to activate their AS4755 appliances is by offering them an upfront payment of \$400. The cost of these incentive payments should be included in activation costs, since they are ultimately passed on to consumers through higher network charges.

Finally not all air-conditioners complying with AS4755.3.1 are eligible for the incentive payments. To avoid unnecessary installation costs air-conditioners are tested to ensure they work correctly with the PeakSmart DRED. This additional testing is required to avoid the interoperability issues revealed by the ARENA AGL trial. While the cost

of testing and managing the list of approved air-conditioners is relatively minor, it is a cost which could have been avoided if AS4755 supported interoperability.

So the cost to activate the AS4755 interface is at least \$800, not the claimed \$140. For comparison the retail cost of a smart air-conditioner is US\$30 and a Sensibo is \$140. The unique Australian interface is genuinely expensive.

#### 9. Do you think the estimates of annual participant costs are reasonable?

This question misses the point. It does not matter what costs are assumed, the mandate does not deliver benefits. Without benefits this mandate just leads to higher prices for all Australian consumers.

The participation costs are driven by the cost to provide communications to every activated appliance. The costs presented in the Consultation Paper are far too low. Proposed communications solutions are already at end of life and will need to be replaced. The cost to install, maintain and operate new communications systems has not been adequately captured in the financial assessment.

This question misses another major point. The unique Australian interface does not support verification. It does not allow the utility using the interface to determine if the appliance is even connected. For example online discussion groups advise Queensland consumers to unplug the DRED so the utility can no longer limit when they use their air-conditioner. The lack of validation means the utility is completely unaware the appliance has been disconnected. This major oversight ensures consumers can continue to claim on-going incentives for participation, even though their appliance is no longer being controlled.

### 10. Is lack of demand response capable products a barrier to the introduction of demand response programs for small consumers?

No. A number of retailers have been running successful voluntary demand response trials. These trials do not require specific products. The trials give *consumers* the freedom to choose which appliances they wish to control and the flexibility to choose how they wish to control individual appliances.

For example consumers could install the Sensibo smart air-conditioner controller allowing them to reduce their demand. They can further reduce their demand by turning off unused appliances. This is easily achieved using a range of highly cost effective appliance plugs. For example the AU\$13 smart plug available from Amazon Australia.



It is relevant to note unlike AS4755 consumers choosing to install a Sensibo or smart switch receive benefits beyond lowering peak demand. Both can be used to lower consumer electricity costs, for the Sensibo by automating thermostat adjustments and for both smart controllers by setting up Geo-fencing so the appliance(s) are automatically turned off when the consumer leaves the premises. Perhaps importantly the smart controllers can be integrated into smart home control offered by Voice Assistants including Google Assistant and Amazon Alexa. This highlights how these far more cost effective solutions deliver more benefits than AS4755.

### 10b. Do you think that mandating demand response capability for these products will lead to their activation and to consumer enrolment in DR programs?

No. Only by providing consumer incentives will consumers choose to enrol products in Demand response programs. If there is any doubt consider consumers only allow utilities to control their off-peak hot water heater in exchange for lower (off peak) electricity prices. Similarly PeakSmart only achieved significant uptake by offering consumers \$400 incentive payments.

Cripplingly high electricity prices are encouraging consumers to investigate how to lower their electricity costs. AS4755 does not provide any services to allow consumers to lower their energy costs. For example a consumer choosing a WiFi connected smart air-conditioner can use an App to monitor its energy use. This direct feedback has been proven to be extremely valuable when educating consumers about the cost to run various appliances. The AS4755 interface does not support energy monitoring or reporting. Instead it limits how consumers can use their appliances leading directly to reservations about activating the interface (c.f. findings from the Jemena ARENA trial).

# 11. It is assumed that the cost of communications platforms to support demand response and direct load control services will be low (e.g. through the use of existing electricity supply infrastructure such as ripple controls or smart meters, or general infrastructure such as WiFi or 3G/4G/5G). Do you agree?

This assumptions are completely invalid.

- The only Australian state to have an existing ripple control system is Queensland. The antiquated technology is increasingly difficult and expensive to maintain with virtually no companies offering the transmission equipment. More significantly ripple control systems are increasingly unreliable (even the Consultation Paper noted 10% of commands are missed). It is highly unlikely the ripple control system will still be operating in 2035.
- The only meters able to control an AS4755 appliance are the Advanced Meters installed under the Victorian Government mandate. Appliance control is via the Zigbee Home Area Network and requires the installation of specialist, proprietary and expensive Zigbee compatible DREDs. The Victorian Advanced Meters are approaching end-of-life and will soon be replaced. The replacement meters will not be required to support the superseded Zigbee Home Area Network so this is not a viable solution.
- All commercial cellular operators have indicated shutdown of 3G services will commence in 2021, so this is not a viable solution.
- The unique AS4755 appliance interface describes an option to supply power to the DRED. If power was readily available then it would have allowed different communications options to be fitted to appliances. The cost to install any communications is significantly underestimated in the Consultation Paper.
- Utilities have already dismissed WiFi. Maintaining connectivity as consumers change internet service provider, upgrade WiFi routers, move in/out result in significantly higher costs to renew WiFi connectivity. If utilities do not consider it to be a viable solution and they are the ones to use AS4755 then why is it included here?
- The new AS4755.2 does not specify the use of cost effective communications. The same label is fitted to incompatible communications solutions which will be highly confusing for both consumers and installers hoping to activate the products.

### 12. What implications (positive or negative) would the proposals have for your industry, in terms of activity, profitability and employment?

Mandating this standard will have a huge negative impact on consumers. Consumers ultimately bear the higher cost of fitting this interface to the appliances they purchase. The uniqueness of the Australian interface also means the range of models appliances manufacturers will be able to offer to Australian consumers will be reduced. The proposed appliance interface then replaces existing smart appliances already offering far more consumer-centric benefits than the purely utility-centric AS4755 interface.

### 13. What can appliance suppliers, installers and energy utilities do to facilitate customer enrolment in direct load control or demand response programs?

This question incorrectly assumes mandating the unique Australian interface facilitates more offers of, and participation in, demand response programs. This is not the case.

For appliance suppliers the business case for promoting smart appliances already exists. Smart appliances offer increased consumer comfort, convenience and lower energy costs. Consumers can easily install and configure the appliance and then monitor and control its operation. Unfortunately the AS4755 interface does not support monitoring or control of appliances. More concerning unlike existing smart appliances and controllers it does not offer features allowing consumers to lower their energy costs.

The business model for installers promoting smart appliances already exists. Most smart appliances monitor their performance and report when issues are detected, for example gas levels in the compressor are low leading to lower efficiency or the pool pump is reaching end of life. Performance monitoring allows installers to become involved in appliance maintenance programs, supporting an on-going revenue stream, a vast improvement over the current business case relying on 'appliance replacement once every 15 years'. Unfortunately the AS4755 interface does not support appliance monitoring.

Australia's electricity market already provides financial incentives for the provision of demand response. Recent rule changes create the role of the Demand Response Service Provider (DRSP). In the contestable Australian energy market DRSPs will compete to sign up consumers and then offer to sell the resulting demand response to the market. The AS4755 interface does not support this new service. Firstly DRSPs must deliver promised demand reductions, and AS4755 cannot be used to confirm or validate the demand reduction. Secondly the AS4755 interface does not support allow consumers to specify the DRSP controlling their appliances. Hence it fundamentally does not support Australia's future contestable demand response market.

### 14. Do you think the proposal would reduce competition among product suppliers, reduce consumer choice or lead to an increase in product prices (beyond what is expected to occur)?

The mandate will increase product prices and reduce consumer choice.

Of great concern is the proposed time frame for the mandate to come into effect. The reality is the vast majority of Australian appliances are now designed and produced overseas. A mandate would require manufactures to develop new products fitted with the unique Australian interface. While many will simply choose to leave the Australian market those choosing to offer products must recover the considerable new product development costs, leading to higher prices.

Perhaps the most revealing statement here is "beyond what is expected to occur". This acknowledges that the mandate will force all consumers to pay more for their appliances. In economic terms this presents a split benefits problem. While consumers incur the costs, there is no mechanism ensuring they benefit from (theoretical) savings. Worse correcting numerous errors in the Consultation Paper's deeply flawed financial analysis reveals there are no savings.

### 15. If the measure is implemented, what is the earliest feasible date by which products could comply? How much lead time should there be after publication of the final requirements?

Firstly the measure should not be implemented. Question 14 highlights consumers will pay more and deeply flawed financial analysis is used to claim savings (with no assurances savings will be returned to consumers).

The world is increasingly relying on Global Standards. Global Standards enable economies of scale, with efficient volume production at one site leading to lower costs in all markets where the product is sold. Product costs are further reduced by sharing product development costs across all markets. Australia has declared it does not want to

accept any of the existing Global demand response standards and is instead looking to mandating its own unique interface.

## 16. Do you consider that there are any major technical or functional issues related to the proposal? If so, how should these be addressed?

There are major functional deficiencies with the proposal. It fails to consider the interests of consumers, it fails to adopt international demand response standards, it fails to support functionality required by Demand Response Service Providers and it is expensive to activate.

The most cost effective means of addressing the numerous issues is to not progress with the mandate. Without a mandate the Australian market is free to choose from multiple international demand response standards. These solutions offer far more cost effective means of providing Australia with a demand response capability.

Giving a specific example: The Consultation Paper claims financial benefits from controlling EV Chargers, however no member of the AS4755 series of documents describes control of EV Chargers. Developing a suitable AS4755 EV Charger interface presents serious challenges, since consumer use of their Electric Vehicles requires consumers to be able to control when, if and how fast the vehicle is to be charged. These features are a major departure from all the existing Australian appliances interfaces (which largely deny consumers any control). All these features are included in the Open Charge Point protocol and EV Chargers compatible with this global standard are already available. It is a major waste of time and resources to propose the development of yet another unique Australian solution when solutions complying with global standards are already available.

17. How should the changes in demand or energy during DR events involving AS/NZS 4755-compliant products be measured? What would should be the notional "baselines?" Is the estimation of baselines more or less reliable than for other DR approaches?

Behind the above question is a flawed assumption it is possible to create "baselines" for individual appliances. The smart meters currently being installed on Australian households do not support the creation of individual appliance baselines.

Multiple Trading Relationships already allow consumers to buy electricity from one retailer while selling the electricity generated by their solar system to a different retailer. In the future contestable demand response market consumers will be able to sell demand response from their kitchen air-conditioner to one Demand Response Service Provider (DRSP) and from their bedroom air-conditioner to another. The electricity use of both these air-conditioners is measured by the same meter making it impossible to determine which appliance delivered the demand reduction. It is therefore impossible to correctly reward the appropriate DRSP.

The situation is further complicated by retailer offered demand response programs which have seen consumers adjust their use of all appliances installed in their homes. The major failing of the unique Australian interface does not support any measurement or validation of appliance demand response. The interface cannot even determine if a controlled appliance is turned on or even connected.

The discussion highlights the creation of baselines requires the interface to provide additional information, including the appliance is connected, details of how it is currently being operated (the settings) and ideally an estimate of its energy use. While international standards support the collection of this information the unique Australian interfaces does not. Hence it does not support validation of demand response benefits. It certainly does not support baselines.

#### 18. How will the proposal impact on electricity prices and energy network costs and investment requirements?

Mandating the interface will lead directly to higher prices. Consumers will be forced to pay more for appliances developed specifically for the Australian market. Costs to activate the ineffective utility managed demand response schemes are then recovered directly from consumers through higher electricity charges.

Savings are not delivered to consumers because the mandate does not defer the cost of network augmentation. Deferment of network augmentation first requires peak demand growth and analysis shows other Government energy efficiency initiatives have stopped peak demand growth. Significant overinvestment in (unnecessary) network augmentation has already been undertaken in response to AEMO's incorrect forecasts so there is already plenty of spare capacity. Finally AS4755 does not reduce demand. There are no savings, there are only higher costs.

### 19. Do you think that the effectiveness of the proposal depends on the implementation of more cost-reflective pricing, e.g. time-of-use (TOU) tariffs?

Earlier analysis shows even without changing consumption habits as many as 80% of Australian households could reduce their electricity costs by moving from a traditional fixed tariff to a Time of Use (ToU) tariff. The impediment to wide spread adoption of ToU tariffs is a lack of information.

Only Victorian consumers have the ability to compare traditional flat tariffs to ToU tariffs. Unfortunately this relies on their poorly implemented advanced meter mandate. The Victorian Government mandate lead directly to higher electricity costs (much like the mandate of AS4755 will lead to higher costs) and many consumers remain frustrated they their electricity bill increased \$130 a year to pay for something delivering no benefits.

Nationally this should change in the near future. The Australian Government's Consumer Data Right will give Australian consumers access to their meter data and the full range tariffs available to them. The Australian Energy Regulator who maintains the EnergyMadeEasy tariff comparison site has committed to a major upgrade so consumers can use their data to compare all available tariffs.

There are other initiatives leading to anticipated greater uptake of ToU tariffs. In Victoria consumers can choose a flat solar feed in tariff or a ToU feed in tariff offering a significantly higher rate in the afternoon. These tariffs increase consumer awareness of the benefits of ToU tariffs.

Then there are sites offering to continuously undertake tariff comparisons for consumers to ensure they remain on the cheapest electricity tariff. Choice offers one, but a better example is provided by the UK site Flipper. When combined with the Consumer Data Right a greater percentage of the 80% of consumers benefitting from selecting a ToU tariff can be expected to move.

Finally one of the impediments to acceptance of ToU tariffs is the need to manually reduce the use of certain appliances during peak times. From the consumer perspective AS4755 only really offers to turn off air-conditioners (hot water heaters and pool pumps are invisible). Hence AS4755 does not offer the benefits of slight delays to the start time of dishwashers and clothes dryers, both offering significant savings on a ToU tariff while having minimal impact on consumer comfort and convenience.

# 20. In regard to the regional aspects of the proposal do you consider that it would provide significantly more benefits in certain regions? If so which ones? Will any regions be largely unaffected? If so which ones? What causes these differences in impacts between regions?

Correction - The interface only supports potential benefits in few areas where it might defer network augmentation. With falling peak demand and existing overinvestment in network infrastructure this is a very small percentage of regions.

Providing cost effective communication with appliances in some areas will be expensive making it uneconomic to attempt activation. For example forcing consumers in remote areas to pay more for all their appliances will never deliver benefits.

The shift to distributed energy resources is also significant. Rather than continue to connect remote regions to the main grid it is more cost effective to install Standalone Power Systems incorporating solar, battery storage and back-

up generators. Trials do not show AS4755 delivering any benefits (proving too slow and too expensive), instead international standards are being used.

22. In your opinion, what proportion of householders with AS/NZS 4755-compliant appliances will have the demand response capabilities activated and will participate in demand response programs? Do you have survey or other evidence to support your view?

Without significant financial incentives the answer is none. Recent ARENA trials highlight compliant air-conditioners are available, but without incentive payments the expensive interfaces remain unused. The cost of these financial incentives has not been included in the presented economic analysis. Alarmingly current incentive payments exceed the benefit claimed in the economic analysis. The conclusion is mandating the interface does not support the societal benefits presented in the Consultation Paper.

23. (To consumer and welfare organisations). In your opinion, what measures should be taken to ensure that consumers are adequately informed of the potential costs, as well as the benefits, of entering contracts that enable the demand response capabilities on their appliances to be activated?

The unique Australian interface has already been widely adopted in Queensland. After accepting a huge attractive sign on bonus (incentive) they fail to explain consumers will be unable to fully benefit from their new air-conditioner on hot days. Unsurprisingly these details are glossed over, with provided documentation failing to mention it renders the air-conditioner largely unusable on hot days.

Various online discussion forums highlight the alarming lack of information provided about AS4755. These forums describe numerous DRED failures (with multiple site revisits from installers to replace failed DRED) and even provide instructions on how to disconnect the DRED to avoid utility control.

In stark contrast selling smart appliances is all about informing consumers. Smart appliances come with an App allowing consumers to fully control its operation. Consumers are shown how it can be used to lower their energy costs by monitoring energy use and allowing the app to make minor adjustments to the thermostat setting. The App even allows them to set up a geofence so the air-conditioner automatically turns off when they leave the home and turns on when they approach. Consumers buy smart appliances because the benefits are explained to them. AS4755 does not support these benefits which is why the only program using it fails to inform consumers.

This brings us back to Jemena's unsuccessful ARENA trial of AS4755. Jemena explained what activation of the airconditioner would achieve and reported

"It should be noted that a customer survey data on attitudes towards direct load control indicated that many households were wary of allowing a network business to control their usage"

The complete lack of consumer benefits offered by AS4755 ensures the only way to encourage consumers to all the interface to be activated is to gloss over its actual purpose.

24. (To electricity market regulators). Do you consider that the regulatory arrangements provide utilities and potential DR aggregators with sufficient incentive to offer (or commission) small-consumer demand response as a means of reducing investment in supply-side infrastructure?

The Australian Energy Market Commission (AEMC) promotes competition. For example despite there only being two international metering standards the AEMC left it to the market to choose the metering standard. The decision avoided limiting which meters Metering Coordinators could install. Mandating a unique Australian interface therefore goes against everything the AEMC has set out to achieve.

The AEMC will not risk hindering the emerging demand response market by forcing a particular solution. Instead they will leave it to the market to choose from the widest range of possible solutions, from simple plug switches, all the way through to smart homes offering full monitoring and control of multiple appliances.

Standardisation is a double edged sword. Giving a historical example the American analogue TV standard was NTSC. Technically this was an inferior standard to PAL used by the rest of the world. During lengthy and often heated arguments over the cost and limited benefits of the USA adopting PAL, digital TV standards arrived. If the USA had mandated PAL it would have reduced their ability to adopt the far superior digital TV standards. Similarly mandating the inferior AS4755 interface will compromise Australia's long term ability to adopt superior existing and emerging demand response standards.

### 25. How do existing electricity market rules which enable and encourage DNSPs and TNSPs to invest in demand response programs impact on, or interact with the proposal?

The only reason Australian distributors promote the interface is because it is so expensive. The high cost of activating appliances is recovered directly from consumers. All the costs of installing the expensive equipment is added to their regulatory asset base which then earns a guaranteed rate of return. The rate of return is higher than the actual cost of capital so turns into a revenue stream. The more expensive the hardware the greater the guaranteed returns. Significantly the interface does not even have to deliver network benefits, because they continue to receive compensation for all costs independent of benefits.

The situation for retailers, and in the near future Demand Response Service Providers, is totally different. They must fund the installation of the equipment and hope they retain the customer long enough to recover costs. This leads to significant differences. Firstly the equipment must be easy and cheap to install. Secondly the equipment must deliver validated benefits and cost savings.

This explains why only distributors have promoted the AS4755 interface.

# 26a. How would changes to electricity market rules (the Retailer Reliability Obligation and the wholesale market demand response mechanism draft determination announced by the AEMC) impact on or interact with the proposal?

There is a huge assumption in this statement. The proposed interface does not provide guaranteed demand response, it therefore fails to meet the requirements of the Retailer Reliability Obligation. This obligation can only be met with validated demand reduction and the proposed interface does not support validation.

Perhaps of even greater concern when considering Reliability is the proposed interface does not provide ANY cybersecurity. Without this protection a cyber-attack could easily compromise the grid. For reference existing international demand management standards do consider cyber security (e.g. OpenADR).

#### 26b. Would a new class of DR aggregators make use of AS/NZS 4755 DR platform? If so, why. If not, why not?

No. One of the most significant differences between the unique Australian interface and global standards is recognition consumers must be given the right to Opt -In or Opt-Out of events. AS4755 does not support consumer choice. The interface relies on consumers accepting they will lose control of their appliances.

There is another more fundamental failing. Demand Response Aggregators agree to deliver a certain amount of demand reduction. Using the AS4755 interface they cannot determine if the appliance is turned on (so will not deliver demand reduction) or the mode in which it is operating (e.g. it is already at set point so the demand reduction is much less than predicted). The lack of these basic features highlights AS4755 cannot be used by the new demand response aggregators.

Then there is the cost. The failure to consider installation means the interface is very expensive to install. Given competition between different aggregators most will chose solutions which are easily installed and configured. Currently consumers are given total freedom to choose which appliances they will utilise to lower their consumption in exchange for financial incentives.

26c. Would the potential AEMC wholesale demand response mechanism be material to the benefits of mandating AS/NZS 4755 for the four selected appliances? Why or why not? d. Would the benefits of deferring investment in network capacity from the wholesale demand response mechanism changes announced by AEMC also reduce the network investment benefits attributable to mandating AS/NZS 4755?

A perfect example is the Demand Management Incentive Scheme (DMIS). The DMIS rewards distributors for choosing demand management solutions over network augmentation. The important point is network augmentation is only ever undertaken in limited areas (especially now peak demand is no longer growing and earlier overinvestment in unnecessary capacity). The Australian Energy Regulator then compares the cost of this limited augmentation to the cost of demand management solutions. So what is being suggested is all Australian consumers should pay more for appliances just so in a few limited areas distributors can choose to activate the installed appliances. Then rather than resulting in cost savings, the regulator will instead reward the distributor for choosing demand management. So the mandate ensures all consumers pay more for appliances, while giving savings which might have occurred in extremely limited areas back to distributors.

27. Could an option for Government to require utilities or independent DR service providers to offer incentives, or have the Government fund these incentives, achieve the same benefits as the mandatory standard but at a lower overall cost to the community?

The issue of incentives deserves special attention. The PeakSmart program offers consumers \$400 for agreeing to allow the utility to control when their new air-conditioner runs. Evidence suggests customers are using the bonus payment to purchase larger air-conditioners. These larger air-conditioners place greater demand on the network than the air-conditioner they would have bought without the incentive. So up front incentives actually reduce the benefits of activating the interface!