The Australian Industry Group

Submission on Smart Demand Response Capabilities for Selected Appliances

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About Australian Industry Group

Ai Group is a peak national employer organisation representing and connecting thousands of employers across Australia.

We are Australian Industry's strongest voice and most enduring partner, promoting industry development, jobs growth and stronger Australian communities. We provide advice, services, networks and advocacy to help members and industries thrive and the community to prosper.

Ai Group members are private sector employers large and small, with common interests in more competitive businesses and a stronger economic environment. Ai Group is genuinely representative of Australian industry. Together with partner organisations we represent the interests of more than 60,000 businesses employing more than 1 million staff.

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Executive Summary

Ai Group welcomes the opportunity to comment on the consultation paper: "*Smart" Demand Response Capabilities for Selected Appliances".* Our submission has been developed in consultation with our air-conditioning, hot water system and electric vehicle product members, and in light of the broad industry interest in an affordable, reliable and clean energy system.

Ai Group very strongly prefers approaches to technical regulation that are nationally consistent within Australia and avoid a fragmented market with increased compliance costs and confusion.

Australia also operates in global markets, and Ai Group generally prefers adoption of global standards where consistent with local needs and conditions. Imposition of unique Australian standards carries risks to the cost and range of products supplied in Australia. However, we also recognise that Australian electricity systems are currently at the leading edge of global trends – growth of variable renewable energy, closure of older dispatchable and synchronous generation capacity, increasing extreme weather and associated extreme peaks in energy demand. Efficiently managing and responding to those trends requires many kinds of flexible energy resource; demand response is one of them. We have a more urgent need than other economies to grow our demand response capability, but others will have the same needs in time. Australian policy and standards should be developed with an eye to this international context.

Realising Australia's demand response potential requires both technical capacity and motivation to use that capacity. There are many ways of motivating demand response – markets, tariff structures, community reward programs and more. Similarly, there are multiple options for ensuring relevant products are capable of demand response. Our members involved with the manufacture and supply of air-conditioning, hot water system and electric vehicle charging equipment raised concerns with some elements of the scope of the proposed mandate of AS/NZS 4755. The Committee should be open to a more cautious approach, excluding some product categories or subcategories for the time being until these concerns can be answered.

It is important that these concerns are answered and that technical capacity for demand response grows. Electricity distribution businesses are increasingly interested in accessing demand response to defer network investment. Cost-reflective network tariffs are becoming more common, and electricity retailers are offering more small customers exposure to the wholesale spot price of electricity. The wholesale demand response rule change proposed by the Australian Energy Market Commission for 2022 may well be extended to small customers following review of existing consumer protections. These different approaches can suit the needs of different customers, make it worth their while to agree to demand response, and so create value for all energy users. The increasing availability of major appliances with a standard set of demand response capabilities will greatly ease this value creation.

Our submission covers, and splits responses as appropriate between, the perspectives of:

1. air conditioning supplier perspectives;
2. electric hot water systems supplier perspectives from our Australian Water Heating Forum;
3. electric vehicle and related equipment suppliers from our EV Member Reference Group; and
4. the overall energy-using industry interest in development of demand response, informed by the members of our Leaders Group on Energy and Climate.

We have not provided specific comment on the "Swimming pool pump controllers" product category.

Overarching comments

ENERGY USERS

Demand response can greatly benefit industrial and other energy users by substituting for more expensive resources. Demand response by small customers is increasingly likely to be incentivised through tariffs, wholesale markets, emergency reserves and other programs. However these incentives will be much more effective with wider penetration of appliances with the controllable capabilities in AS4755. Mandating compliance, subject to addressing specific concerns for individual appliance categories about relevance, cost, clarity and international consistency, is in the broadest interest of energy users.

AIR-CONDITIONING

Air conditioning suppliers' greatest concern is the risk that regulatory approaches are fragmented across different jurisdictions; demand response requires a national approach. Subject to that overriding concern, suppliers prefer voluntary adherence to the 2012 version of the standard. They are worried that the compliance costs of a mandatory standard – especially the 2014 version – would limit the range of models in the market to the highest-selling and least energy-efficient.

ELECTRIC HOT WATER SYSTEMS

Hot water system suppliers have raised concerns about the mandatory application of AS/NZS 4755 to small electric water heaters with a storage capacity of 50L or less. When small electric water heaters are installed in homes, space and fuel sources are limited, so they tend to be the only water heating option for consumers in these circumstances. The highest volume line of small water heaters is the 50L size, and our members' experience is that these mainly service small one and two bedroom apartments or non-residential applications, like shops and offices.

Small water heaters are usually connected to continuous tariffs, to ensure they heat immediately after use, thus allowing a second or third person to access hot water over a relatively short time period. For example, the average shower (7 minutes, 40 degree hot water, 9L minute shower head), consumes more than 60% of a 50L tank's hot water, and it should take less than 30 minutes to reheat the tank to capacity.

These heaters appear less relevant to relevant to demand response than larger-capacity units. With less storage their ability to time-shift energy use is lower. The most obvious current use case for demand response is minimising the wholesale and network costs of extremely hot summer afternoons and evenings; small residential water heaters' most intensive energy use is typically during and immediately after hot showers, and households may be less likely to have hot showers under those conditions.

Furthermore small water heaters sell at a much lower price point than large ones; since, as the paper acknowledges, the absolute incremental cost of adding electronic controls will be similar across all sizes of water heater, the proportionate impact on the price of small systems will be higher and the relativities to larger systems will shift.

On the other hand, exclusion of smaller water heaters from a mandate could also alter their attractiveness relative to large ones, though this may be subsidiary to the space, family size and fuel availability drivers of water heater selection.

The Committee should therefore re-examine the specific costs and benefits of applying a mandate to small water heaters, and exclude these devices unless the concerns above are resolved.

ELECTRIC VEHICLES

Electric vehicle uptake is embryonic in Australia and our ability to drive compliance with unique standards is very limited given this tiny market; Australia already has access to fewer models of EV than other economies with more developed EV infrastructure and supporting policies, and a unique standard could further restrict this range. Members have raised concerns that the costs of compliance may be much higher than currently estimated. The EV component of AS/NZS 4755 is much less advanced than other components and relevant international standards are developing (including Open Charge Point Protocol (OCPP), IEC 15118 and IEC 61850-90-8). We therefore recommend that the initial mandate not extend to EV chargers, but that the questions of whether to mandate a standard and which standard to choose should be revisited in two years in light of further local and international standards development work.

Maintenance of sustainable public finances should remain a key fiscal strategy of the next State Government. The key to managing this task is responsible and prudent management of the State's finances. This requires ensuring that recurrent spending is covered by recurrent revenue. It equally requires paying close attention to the level and balance of the State's assets and liabilities.

A failure to do so will increase pressure on the Government to find additional sources of revenue through taxes and charges. This would limit the ability of the Government to undertake critical investments and have a considerable adverse effect on business growth and employment and impose an increased cost burden on the NSW community.

We would urge the next Government to continue to progress the recommendations of the final NSW Commission of Audit Report (Schott Report). This is necessary to increase productivity, improve the cost competitiveness of the NSW economy and generate stronger long term economic growth, thereby easing fiscal pressures over time.

Responses to questions

1. DO YOU SUPPORT THE PROPOSAL TO MANDATE COMPLIANCE WITH AS/NZS 4755 FOR THE NOMINATED PRIORITY APPLIANCES?

Energy users

Demand response can greatly benefit industrial and other energy users by substituting for more expensive resources. Demand response by small customers is increasingly likely to be incentivised through tariffs, wholesale markets, emergency reserves and other programs. However these incentives will be much more effective with wider penetration of appliances with the controllable capabilities in AS4755. Mandating compliance, subject to addressing specific concerns about cost, clarity and international consistency for individual appliance categories, is in the broadest interest of energy users.

Air-conditioning

Suppliers and manufacturers of air-conditioning do not support mandating AS/NZS 4755 but rather prefer a BAU or voluntary compliance model. Consideration should also be given to the version of the standard applicable in any scheme as it may impact the availability of product in Australia.

Electric vehicles

We note that AS 4755 Part 3.4 currently does not exist and would need to be developed, confirmed to be consistent with the requirements of automotive manufacturers, and ratified. Then, subject to the standard being technically viable, it would need to be implemented by manufacturers. Prior to these steps, compliance will not be possible.

While the consultation paper assumes compliance would increase the unit cost of EV chargers by $50 initially, declining over time, our members have raised concerns that actual compliance costs would be much higher: $500 or more, taking account of the costs of adding cellular communications capability, and more again if Australia-specific development costs are recovered on a small volume of local sales. Based on these estimates the mandate would significantly restrict choice and drive up cost to consumers, and make it perversely more likely that drivers charge using cheaper but uncontrollable wall outlets.

Further considerations that distinguish EV controllers are:

a) EV controllers are part of a technology ecosystem and are inherently linked to the EV itself. The EV Battery Management System is responsible for management of the charging. The EV and EV controller use standard global communication protocols based on IEC, OCPP. Introducing a requirement for external control of the EV controller has a potential flow on impact to design of the EV which may further impact the cost of EVs and availability in Australia.

b) With the introduction of V2G/H, EVs will not be just a load but also potentially a storage resource - an EV could power the pool pump when demand is constrained. These capabilities are highly unlikely to be enabled by an Australian specific standard hence we will be better served adopting international standards in order to take advantage of these capabilities.

We therefore recommend that the initial mandate not extend to EV chargers, but that the questions of

whether to mandate a standard and which standard to choose should be revisited in two years in light of further local and international standards development work. This would provide time to clarify and minimise the costs of compliance with any standard.

2A. ARE THERE ANY VIABLE ALTERNATIVE OPTIONS FOR MEETING THE OBJECTIVES OF THE PROPOSAL, APART FROM THE BAU CASE OR MANDATING COMPLIANCE WITH AS/NZS 4755?

Electric vehicles

If centralised control of load in the DRSP-style methodology supported by this paper is determined to be the way forward, it would be preferable to align communications and control methodologies with global standards for EV charging (OCPP protocol, ISO15118). Australia should work with IEC committees in the development of these global standards.

Equipment manufacturers do not consider centralised control to be the right approach, but some are willing to consider it. Opinion is divided as to the question of whether schemes such as those used in some European countries to mandate smart EV chargers will meet the objectives being sought in the paper. The challenge is essentially that the minimum viable infrastructure in a typical domestic home in Australia is already present, in the form of a power-point in the garage or next to the driveway. The concern is that if a more costly smart charger, with inherent ongoing management costs, is mandated wherever dedicated charging equipment is installed, the extra cost will encourage homeowners to default to using standard power-points instead.

In the case of apartment complexes, as distinct from standalone homes, a wide range of solutions from many vendors are already available on the market to address this challenge. Mandating AS4755 in this context will run the risk of removing from the market solutions that have already been established to solve the problem.

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?

Energy users

Neither labelling nor voluntary compliance is likely to deliver a substantially higher share than at present of controllable DR-capable devices. This would make it harder to unlock demand response potential, leading to greater reliance on a narrower and more expensive mix of flexible electricity resources.

Air-conditioning

Air conditioning suppliers support AREMA's view that labelling is not a viable alternative. However they do support voluntary compliance to AS/NZ 4755.3.1 2012 for air-conditioners between 4kW and 19 kW, excluding self-installed i.e. window walled and portable air-conditioners.

Electric vehicles

Generally, voluntary compliance with AS/NZS 4755 would potentially be viable, provided sufficient value was demonstrated to the consumer.

Amenity to the user of an EV charger is not closely linked to time of energy consumption. That is positive for demand response, since shifting the time of consumption may have a very low cost, but much of this potential is likely to be realised anyway. EV charging is already easily scheduled to non-peak periods, to take advantage of off-peak pricing without any loss of amenity. Facilitating remote control by a demand response service provider may yield further benefits, particularly for less active consumers than EV early adopters, but these may be subsidiary to the primary benefit from avoiding peak period charging.

3A. DO YOU SUPPORT PERMITTING COMPLIANCE WITH *EITHER* AS/NZS 4755.3 *OR* (DR) AS 4755.2?

Providing flexibility on compliance pathways is preferable if a standard is to be mandated. It makes sense to allow compliance either via interaction with DREDs and physical connections, or via unmediated interaction with a remote agent.

3B. DO YOU SUPPORT REQUIRING COMPLIANCE WITH ALL DEMAND RESPONSE MODES (DRMS)?

Physical capability of a wider range of forms of demand response makes it more likely that options agreeable to consumers can be unlocked with reasonable incentives.

4. DO YOU AGREE WITH THE SCOPE OF THE PROPOSAL:

A. AIR CONDITIONERS: UP TO 19 KW COOLING CAPACITY;

Air conditioning suppliers support a scope covering 4kw to 19 kw air-conditioning systems excluding self-installed products.

B. POOL PUMP-UNIT CONTROLLERS;

No comment

C. ELECTRIC STORAGE WATER HEATERS (EXCLUDING SOLAR-ELECTRIC AND HEAT PUMP WATER HEATERS); AND

Hot water system suppliers have raised concerns about the mandatory application of AS/NZS 4755 to small electric water heaters with a storage capacity of 50L or less. When small electric water heaters are installed in homes, space and fuel sources are limited, so they tend to be the only water heating option for consumers in these circumstances. The highest volume line of small water heaters is the 50L size,

and our members' experience is that these mainly service small one and two bedroom apartments or non-residential applications, like shops and offices.

Small water heaters are usually connected to continuous tariffs, to ensure they heat immediately after use, thus allowing a second or third person to access hot water over a relatively short time period. For example, the average shower (7 minutes, 40 degree hot water, 9L minute shower head), consumes more than 60% of a 50L tank's hot water, and it should take less than 30 minutes to reheat the tank to capacity.

These heaters appear less relevant to relevant to demand response than larger-capacity units. With less storage their ability to time-shift energy use is lower. The most obvious current use case for demand response is minimising the wholesale and network costs of extremely hot summer afternoons and evenings; small residential water heaters' most intensive energy use is typically during and immediately after hot showers, and households may be less likely to have hot showers under those conditions.

Furthermore small water heaters sell at a much lower price point than large ones; since, as the paper acknowledges, the absolute incremental cost of adding electronic controls will be similar across all sizes of water heater, the proportionate impact on the price of small systems will be higher and the relativities to larger systems will shift.

On the other hand, exclusion of smaller water heaters from a mandate could also alter their attractiveness relative to large ones, though this may be subsidiary to the space, family size and fuel availability drivers of water heater selection.

The Committee should therefore re-examine the specific costs and benefits of applying a mandate to small water heaters, and exclude these devices unless the concerns above are resolved.

D. CHARGE/DISCHARGE CONTROLLERS FOR ELECTRIC VEHICLES (SAE LEVEL 2 OR IEC MODE 3).

We therefore recommend that the initial mandate not extend to EV chargers, but that the questions of whether to mandate a standard and which standard to choose should be revisited in two years in light of further local and international standards development work.

E. IF NOT, WHAT PRODUCTS (OR CAPACITY LIMITS) WOULD YOU PROPOSE BE INCLUDED OR EXCLUDED, AND WHY?

No comment

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? IS SO, PLEASE PROVIDE THIS INFORMATION AND SPECIFY WHICH PARTICULAR "SMART" DEVICES? (PLEASE BE SPECIFIC WITH REGARD TO THE CAPABILITIES YOU ENVISAGE FOR SUCH DEVICES OR SYSTEMS, AND WHETHER YOU WOULD EXPECT THEM TO CONFORM TO ANY PARTICULAR STANDARDS).

No comment

B. WOULD ADOPTION OF PROPRIETARY "SMART HOME" SYSTEMS UNDERMINE THE BENEFITS OF PEAK DEMAND REDUCTION INTO THE FUTURE?

No comment

C. HOW MANY PRODUCTS CURRENTLY ON THE MARKET HAVE THE ABILITY TO CONNECT TO DEMAND RESPONSE PROGRAMS? IF SO, WHICH OR WHAT TYPE OF PROGRAMS?

No comment

D. 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?

Electric vehicles

The timing of the vehicle drawing energy when plugged in at home can be set within the vehicle, or in some cases via an App on the drivers' phone. EV drivers routinely use this capability to take advantage of off-peak energy pricing, where they are incentivised to do so. There are multiple brands of EV charging equipment already on the market with WiFi and cellular connections, which can be used to achieve the same goal. AS/NZS4755 is already redundant in this context at a technical level.

The challenge with respect to EV charging is that at present, even though avoiding consumption during peak times is easily avoidable by the driver with zero loss of amenity, the domestic homeowner is often not sufficiently incentivised to set their charging time outside of peak hours. More work promoting the benefits of ToU tariffs for EV drivers would be a good response to this issue. In South Australia, SAPN encouraging EV charging equipment to be installed on the controlled load circuits is an example of an excellent medium-term response.

This risk inherent in mandating AS/NZS 4755 in this context is that solutions to this challenge will emerge globally over time, and other markets are already years ahead of us in this space. Mandating

AS/NZS 4755 in the context of EV charging raises the risk that we will not be able to adopt good solutions to this challenge that emerge in other markets, as and when they emerge.

Examples of schemes that are emerging to deal with this challenge include:

- Smart home solutions compliant to the existing Australian Technical Specification SA/SNZ TS ISO/IEC 14543.3 are capable of managing the EV charging load in coordination with the demand of the building. While EV is not specifically covered in this standard it allows the integrator to provide the managed solution utilising recognised compliant products.
- TOU incentive schemes such as the SDG&E Power Your Drive program 2018. Smart EV controllers also offer the ability for retailers to offer TOU tariffs.

On this basis EV chargers should not be within the initial scope of a mandate, and the questions of whether to mandate a standard and which standard to choose should be revisited in two years in light of further local and international standards development work.

6. WHAT IS YOUR ESTIMATE OF HOW MUCH COMPLYING WITH THE REQUIREMENT WILL INCREASE THE PRICE OF EACH PRODUCT? IF A PRODUCT COMPLIES WITH DRM 1, ARE THERE ANY ADDITIONAL COSTS INCURRED FOR A PRODUCT TO COMPLY WITH THE OTHER DRM MODES?

Air-conditioning

Air conditioning suppliers estimate that for hardware changes only the cost would be $30-40 per unit. This does not take into account the cost for unit re-design, software update, verification and validation testing, manufacturing processes change, product compliance re-testing. In the end, they estimate consumers will potentially pay a $100-120 additional premium on top of the cost to purchase the unit. For air-conditioning units under 4kW this can be as much as 30% of the unit price.

Electric vehicles

For EV charging, the current price premium for an EV charger that may comply with the as-yet unelaborated standard is a minimum of $500 per unit. This is the existing market price difference between a standard domestic EV charger without upstream communications equipment, and one with either a cellular, wifi or ethernet connection, manufactured as a globally standard product for a global market. This does not take into account amortisation of R&D costs across a small sales volume, which could readily add an additional $500-$1000 per unit to this premium.

Further to this, using a new control signal external to existing developed communication protocols may also mean special development of EV BMS SW (building management system software) uniquely for the Australian market, further amplifying total system costs.

The real issue here is that in the context of EV charging, faced with an excessive price for a dedicated EV charging unit, the consumer can easily use a standard 'dumb' power-point in their garage to meet their actual needs. In Norway, a country about 12 years ahead of Australia on uptake of EVs, 63% of 11,274 surveyed EV drivers do exactly this. Refer page 8 of paper published at EVS30: https://wpstatic.idium.no/elbil.no/2016/08/EVS30-Charging-infrastrucure-experiences-in-Norway-paper.pdf.

Raising the costs of specialised charging infrastructure to meet AS/NZS 4755 will act as a perverse incentive, pushing more consumers towards spending nothing on specialised infrastructure, and encouraging the use of uncontrolled (and uncontrollable) power-points in garages across the country for the purpose of vehicle recharging.

7. ARE THE DATA AND ASSUMPTIONS USED IN THE COST-BENEFIT ESTIMATES REASONABLE? DO YOU HAVE INFORMATION OR DATA THAT CAN IMPROVE THESE ESTIMATES?

Energy users

The assumptions about the value of demand response in the emerging electricity market are conservative but a reasonable starting point given uncertainty about climate policies and the overall effect of energy market reforms currently agreed, planned or under consideration.

Wholesale prices can vary from -$1000 to +$14,000/MWh, making the assumed $100/MWh impact of substantial demand response during extreme conditions quite modest.

Many existing coal-fired electricity generators will close in coming years, and much more variable large-scale and distributed renewable energy will participate. This will increase the value and opportunity for demand response.

While the assumptions only assign RERT value in South Australia and Victoria, these states' reliance on emergency reserve is currently set to tail off beyond 2019-20, while NSW may nudge up against the reliability standard from 2022-23. Greater availability of demand response may well mean less reliance on RERT and more on DR participating in the regular wholesale market.

Electric vehicles

The assumptions around electric vehicle penetration, charger activation and availability are somewhat difficult to put together, but it appears that the analysis is based on a very large penetration of EVs by 2035 (accounting for around 9% of total electricity demand by 2038), and a relatively small share of these that are actively being charged during summer peak events (diversified curtailable kW per activated unit in 2020 of 0.22kW, out of an assumed average charger load of 9.6kW). There is considerable uncertainty about future EV penetration rates and charging behaviour in Australia. 2017 survey evidence from Norway, a jurisdiction with high EV penetration, is that most drivers charge from regular household sockets (63%), with 3kW home charging units more common (at 19%) than 7-22kW units (12%). It is hard to be confident about assumptions at this point, but reasonable to expect (as the proposal analysis appears to) that a relatively low share of EVs will be charging during peak events, and discount the available DR capacity accordingly. There is a need to consider the internal consistency of a scenario where a large number of consumers are sufficiently insensitive to peak pricing to be charging at peak times, but are willing to take up demand response incentives.

8. DO YOU THINK THE ESTIMATES OF ACTIVATION RATES AND COSTS ARE REASONABLE? DO YOU HAVE INFORMATION OR DATA THAT CAN IMPROVE THESE ESTIMATES?

Activation rates will depend very heavily on the success of a range of current and foreshadowed policies, programs and market reforms to incentivise demand response, and the evolution of the electricity market. Success is achievable; the policies are not guaranteed to be adopted, however – States have been very cautious about encouraging time-of-use pricing and wholesale demand response mechanisms have not yet been agreed (and have fallen over before agreement previously). For the purposes of this exercise the estimates of activation rates appear broadly reasonable.

While as discussed above some elements of the costs of compliance for the appliances themselves are contested by suppliers, the assumed additional costs to activate appear broadly reasonable for most appliances.

However, note that with respect to electric vehicle chargers, the only currently available models worldwide with relevant capability under the global OCPP protocol would require a relatively expensive dedicated cellular network connection to activate and use, at a cost estimated by electric vehicle charger suppliers as approximately $400 per charger per year. While cheaper forms of activation and operation should be possible with models designed for compliance (if and when a final Australian or international standard is available), the tiny size of the current Australian market for electric vehicles makes Australia-specific designs unlikely for now.

9. DO YOU THINK THE ESTIMATES OF ANNUAL PARTICIPANT COSTS ARE REASONABLE? DO YOU HAVE INFORMATION OR DATA THAT CAN IMPROVE THESE ESTIMATES?

Electric vehicles

As noted under Question 8 above, electric vehicle charger suppliers state that the costs of activating and using currently available equipment with relevant capability are significant at around $400 per year.

10A. IS LACK OF DEMAND RESPONSE CAPABLE PRODUCTS A BARRIER TO THE INTRODUCTION OF DEMAND RESPONSE PROGRAMS FOR SMALL CONSUMERS?

Energy users

Current use of demand response from small customers is very small, with modest experiments by retailers and networks delivering mixed results – some response, but also difficulties in getting uptake, predicting response and verifying that it has occurred. There are multiple barriers to demand response from small consumers, including lack of technical capability; lack of market rewards or price signals for takeup; inability of third party DRSPs to participate fully in the electricity market; and lack of consumer awareness. Small customers generally lack the time, skills or intense financial interest to optimise their use of energy. Capability for remotely controllable demand response would be very helpful in addressing this, but a range of complementary initiatives need to work together to realise the potential

of demand response. Electricity suppliers and the Australian Energy Market Commission have cited the lack of demand response capable products as a barrier to adoption of demand response, and that the future lies in automated demand response.

Air-conditioning

Ai conditioning suppliers advise that there are adequate numbers of product on the market with DR capability but there is minimal retailer or consumer interest.

10B. DO YOU THINK THAT MANDATING DEMAND RESPONSE CAPABILITY FOR THESE PRODUCTS WILL LEAD TO THEIR ACTIVATION AND TO CONSUMER ENROLMENT IN DR PROGRAMS?

Technical capability on its own will not be enough to deliver strong activation rates. The success of other policy processes to incentivise and reward demand response will be critical: time of use network tariffs, the delivery of a wholesale demand response market and its extension to aggregated small customers, the spread of retail prices that more closely reflect the wholesale price of electricity, potential triggering of the Retailer Reliability Obligation and more. Motivation and technical capability are both needed to deliver activation.

With respect to electric vehicle chargers there are additional barriers as explained above – the high cost of existing models with relevant capability and the unlikelihood of Australia-specific compliant models being developed while the local market remains tiny mean that consumers may be likely to use standard power points instead.

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? IF NOT, CAN YOU PROVIDE ESTIMATES OF THE PLATFORM SET-UP COSTS?

Energy users

There are a wide range of communications platforms available or developing, particularly in the context of the Internet of Things where low per-device connectivity costs are central. Navigating this proliferation and assembling a workable approach is a significant, but manageable, challenge for DRSPs.

Electric vehicles

Current market prices for solutions that will permit this style of control for EV charging using existing techniques (not AS/NZS4755, but the globally standard OCPP protocol), over existing cellular networks,

run approximately $400 per charger per year. This is approximately 20 times the cost suggested on page 32 of the paper.

With regard to technology selection, in the short to medium term, ripple control may be viable for EV charging in some jurisdictions, and for some dwelling types. The risk in this approach is that if crudely applied over time (10+ years), it may create a new peak load condition when the ripple signal is sent, which will have the potential to exceed the existing system maximum demand levels. In South Australia, the load presented by ripple controlled hot water services is an early indicator of the nature of this issue.

Smarter technologies such as more sophisticated local or remote energy management systems or smart home systems will allow for better control, so that a geographically concentrated group of EVs doesn't all start charging at once in response to a ripple signal. Broader systems will also allow for amortisation of the cost of direct load control across a wider set of appliances and activities.

12. WHAT IMPLICATIONS (POSITIVE OR NEGATIVE) WOULD THE PROPOSALS HAVE FOR YOUR INDUSTRY, IN TERMS OF ACTIVITY, PROFITABILITY AND EMPLOYMENT?

Energy users

The high price of energy is the most frequently cited concern by Australian industry overall, reducing the competitiveness and profitability of swathes of trade exposed businesses. While many steps are needed to moderate these costs, one critical element is the delivery of flexible energy resources which can complement variable renewables and address demand surges or supply failures at lower overall cost than our current resources – peaking gas, emergency diesel and associated transmission and distribution infrastructure for extreme peak periods. Unlocking greater demand response capability will be helpful to the costs and competitiveness of industry at large.

Air-conditioning

Air conditioning suppliers note that modifying a product to include a DR capability involves unit re-design, software update, verification and validation testing, manufacturing processes change and product compliance re-testing, adding costs to product manufacturers and likely reducing consumer choice.

Electric vehicles

Electric vehicle suppliers note that this proposal would create additional cost and uncertainty for an emergent electric vehicle industry. Any additional costs would have to be passed on to consumers, slowing the uptake of electric vehicles and their associated benefits for energy productivity, greenhouse gas emissions, air quality, health, and energy security.

13. WHAT CAN APPLIANCE SUPPLIERS, INSTALLERS AND ENERGY UTILITIES DO TO FACILITATE CUSTOMER ENROLMENT IN DIRECT LOAD CONTROL OR DEMAND RESPONSE PROGRAMS?

Energy users

Energy retailers are critical to the spread of demand response programs. They can benefit from demand response as part of their portfolio of price and volume risk management; as part of compliance with the Retailer Reliability Obligation, if triggered; and to facilitate attractive offers to customers. Retailers are key mediators of incentives across the energy landscape: for instance, while time-of-use network tariffs are becoming more common, retailers decide whether and how to reflect these in the prices that customers see, and flat-priced offers are popular in a market where complexity is often identified with bad consumer value. As the underlying incentives for efficient use of energy resources strengthen, retailers and energy management businesses may elect to offer flat-rate or simple pricing to small customers but require some scope for direct load control as a condition of this. Retailers may also offer some level of spot price exposure, coupled with direct energy management to limit customer risk. Many different structures will be required to suit the different situations and interests of different customers, and direct load control can make more of them practical.

Electric vehicles

Electric vehicle suppliers note that appliance suppliers can (and are) offering solutions to market to mitigate peak demand where it is straight forward to do so. For example, in the context of electric vehicle charging in apartment complexes, there are relatively easy technical solutions to this problem, which are the subject of part of Ai Group's submission to the recent scoping study on energy efficiency by the Australian Building Codes Board.

Installers, who directly facing the consumer, can recommend offerings that offer the consumer value. Installers would need to be incentivised to do this by the DRSP, government, or energy utility provider

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)?

Air-conditioning

Air conditioning suppliers state that if the AS/NZS 4755.3.1 2014 is mandated then consumer choice may be reduced given the standards are "unique" and product is developed mainly overseas for international markets.

Electric vehicles

Electric vehicle suppliers state that a unique standard for a currently insignificant market would lead many manufacturers of charging equipment to opt not to produce AS/NZS compliant products, reducing consumer choice.

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?

Energy users

There is urgent need for more available demand response to reduce wholesale electricity prices and cut the cost of emergency reserves. Clarity about the availability of demand response is also urgent to enable electricity network businesses and the Australian Energy Regulator to take this into account in determining the required capital and operational expenses for the next five-year regulatory periods. These start as early as 2020 (in Queensland and South Australia); energy user savings beyond that date are still possible, though may be eroded by benefit-sharing with networks that reduce spending below approved levels. While implementation timelines must be practical, benefits to energy users will be higher if demand response grows sooner.

Air-conditioning

Air conditioning suppliers note that while existing products have some capability (although not to the 2014 standard or Part 2), typical lead times for commencement of such mandates are 3 years after the date that black letter law is proclaimed. These members support AREMA's assertion that the proposed 2021 commencement for air conditioning is completely unworkable.

Electric vehicles

Electric vehicle suppliers state that AS 4755.3.4 will need to be developed, confirmed to be consistent with the requirements of automotive manufacturers, and ratified, which may take at least 2 years. We recommend that questions of whether to mandate a standard and which standard to choose should be revisited in 2 years in light of further local and international standards development work. Development of compliant products would then take another 2 years or more, subject to the published standard meeting the expectations and requirements of the global vehicle manufacturing industry. Prior to these steps, compliance will not be possible.

16. DO YOU CONSIDER THAT THERE ARE ANY MAJOR TECHNICAL OR FUNCTIONAL ISSUES RELATED TO THE PROPOSAL? IF SO, HOW SHOULD THESE BE ADDRESSED?

No further comment beyond the issues and solutions identified above.

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?

No comment.

18. HOW WILL THE PROPOSAL IMPACT ON ELECTRICITY PRICES AND ENERGY NETWORK COSTS AND INVESTMENT REQUIREMENTS?

Australia faces high and volatile electricity prices in the near term and a growing challenge to complement cheap but variable renewables with a cost-effective mix of more flexible resources. While electricity network costs have broadly stabilised in recent years after surging around 2010 (in NSW and QLD particularly), there is the potential for substantial further network cost growth to address continuing population growth; higher temperatures that raise summer peak demand; electrification of many activities; rapid growth of rooftop solar and its associated distribution network challenges; the replacement of a large cohort of ageing assets; and development of major transmission and interconnection assets to reinforce wholesale supply adequacy.

In light of all this, while specific electricity price projections have a poor track record, it is very plausible that greater availability of lower-cost demand response resources will reduce wholesale costs and help replace or defer a share of the network investment that would otherwise be required.

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?

Maximising value from demand response requires both technical capability and motivation. Action is needed on both fronts. Time of use pricing for energy and/or use of networks can help. There are also other ways to motivate efficient use of demand response capability, including specific DR participation in the wholesale electricity market (as proposed by the AEMC), special payments for DR (as in the RERT), an obligation on energy businesses to acquire DR (as in the Retailer Reliability Obligation, if triggered); and encouraging regulated network businesses to treat demand response on an equal basis with capital investment in meeting customer needs. Each of these can be implemented in many ways, including with mediation by electricity retailers and third party service providers. There are many current efforts in this direction and it is clear that there will be increasingly broad coverage of incentives to use the technical capability for demand response where it exists.

Where energy users have high technical capability or assistive technology beyond the scope of AS 4755, cost reflective pricing may be highly effective without AS 4755-compliant appliances. In particular electric vehicles with user-definable charging patterns are likely to be charged outside of ordinary peak times in response to time of use pricing.

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?

Energy users

While the cost benefit analysis considers RERT costs in relation to Victoria and South Australia only, it is quite possible that future retirements and investments will change the status quo. Emergency capacity costs may become relevant in any region – or could be obviated if the regular wholesale market has sufficient access to flexible resources like demand response.

21. (TO ELECTRICITY NETWORK SERVICE PROVIDERS, ELECTRICITY RETAIL COMPANIES AND DR AGGREGATORS SPECIFICALLY).

No comment

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?

Electric vehicles

Electric vehicle suppliers state consumers can already minimise their own direct charging costs by scheduling their charging (which is easy to do from the user interface in the vehicle) on a ToU tariff; if undertaken, this behaviour would achieve much of the wider economic benefit too. This technical pathway to demand management does require a relatively engaged customer, though the range of incentive approaches discussed above would be relevant here. As EV penetration grows beyond early adopters engagement may decline, making automated demand response more valuable – if it is incorporated by electricity retailers into the kinds of simple low-priced offerings focussed on low-engagement customers. Otherwise low-engagement consumers will be less likely to participate in demand response. The evolution of the Default Market Offer and Victorian Default Offer will be important in this regard.

Note that if DR-enabled chargers are significantly more expensive this would dissuade their use – standard wall sockets are an available alternative, and in a 2017 survey of EV users in Norway (a high EV penetration economy), 63% used this.

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?

Ai Group does not represent household energy users. However we do represent small businesses, who often face comparable challenges in contracting for, managing and understanding their energy arrangements. Specific approaches to consumer protection will need careful development, and are already under review; the AEMC has deferred consideration of extending its proposed wholesale demand response rule to small customers until this review is complete. Without prejudging the results of this, it would seem essential to ensure consumers are aware of which appliances may be controlled, how much and how frequent a reduction in availability they can expect, and the value of the payment or discount they will receive in return. The ability to pick among different levels and scopes of demand response availability seems useful.

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?

No comment

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?

In response to rule changes and regulator pressure, network businesses are growing much more active in seeking demand response as a supplement or alternative to capital investment in their networks. However, we often hear from them that they experience limits to the amount of suitably reliable capacity that is available to contract. More widespread technical capability for controlled demand response would likely increase the traction of existing encouragements to network businesses.

26. A. 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?

Both the RRO and, especially, the wholesale demand response mechanism proposed by the AEMC will make it much easier to monetise the value that can be created by demand response. It is unclear when the RRO may be triggered – this depends on whether a gap in reliability is projected 36 months out – but its existence strengthens the interest of electricity retailers and other market customers in developing demand response resources. A triggering would accelerate this. The wholesale demand

response rule would more immediately increase the rewards to demand response through access to the wholesale electricity market. However, the rule is not yet agreed and small customers have been left out of its initial scope pending resolution of a review of customer protections. Based on discussions with the AEMC and other stakeholders we are confident that inclusion of small customers with appropriate rules will be a high priority once the review is done.

Both of these reforms will be made more effective if there is a more substantial base of directly controllable appliances.

We also note the recent introduction of the Default Market Offer and Victorian Default Offer, which aim to deliver better value to disengaged electricity retail customers who have previously been on expensive standing offers. The evolution of these offers may be an important avenue for the takeup of remotely managed demand response. If the definitions and determinations of residential flat rates and controlled load rates take account of demand response capability, they may prescribe maximum standing offer rates that are more easily achievable with automated demand response. This would incentivise retailers to incorporate DRM into their basic offerings to disengaged customers.

B. WOULD A NEW CLASS OF DR AGGREGATORS MAKE USE OF AS/NZS 4755 DR PLATFORM? IF SO, WHY. IF NOT, WHY NOT?

No comment

C. 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?

There is some need for caution to avoid double-counting benefits, or excluding costs, between multiple reforms. However, with respect to small customer demand response it seems clear that mobilising a high share of the potential will require both technical capability and effective incentives to use that capability. Either step on its own is likely to be much less effective.

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?

We interpret this question as relating to financial incentives for the takeup of compliant appliances – for instance through rebates arranged with major retailers – rather than for participation in demand response. Appliance incentives are complex to administer and are unlikely to be as effective as a

regulated standard. Consumer awareness is likely to be low and effectiveness will be highly dependent on the knowledge, incentives and competing priorities of appliance retail staff. Governments, utilities and DRSPs will have to develop new relationships with retailers, undertake promotional activities with energy users, and establish verification processes for applicants. Incentives for the purchase of efficient appliances – a distinct but comparable activity – have long been an available approach under the Victorian Energy Upgrades scheme, but have accounted for a negligible volume of certificate generation over the last decade.

28. (TO MANUFACTURERS AND DISTRIBUTORS OF THE PRODUCTS IN THE SCOPE OF THIS PROPOSAL). WHAT PERCENTAGE OF THE PRODUCTS YOU SOLD IN AUSTRALIA AND IN NEW ZEALAND IN THE LAST YEAR: A. MEET THE MINIMUM REQUIREMENTS OF THE RELEVANT PART OF AS/NZS 4755; B. MEET ADDITIONAL REQUIREMENTS (E.G. ADDITIONAL DRMS); AND C. COMPLY WITH OTHER PUBLISHED DR STANDARDS (PLEASE STATE WHICH)?

Air-conditioning

Air conditioning suppliers support the AREMA and CESA responses referring to the CSIRO report that indicates the majority of suppliers on the market do not comply with the AS/NZS 4755.3.1 2014 standard.

Electric vehicles

Electric vehicle suppliers note that there is not yet any published Australian Standard for EVs, and hence no product on the market can be compliant with one.

The closest to it is EV charging equipment with built in ethernet and cellular connectivity, designed to be connected to either a cloud-based service or a local load management system. This is generally achieved using the globally standard OCPP protocol.

Indicative figures from some Ai group members:

- Approximately 60% of EV charging equipment sold by NHP is of this nature, compared to 40% which is not capable of connecting to higher level systems in this way.
- Approximately 90% of EV charging equipment sold by ABB have been specified with OCPP connectivity.