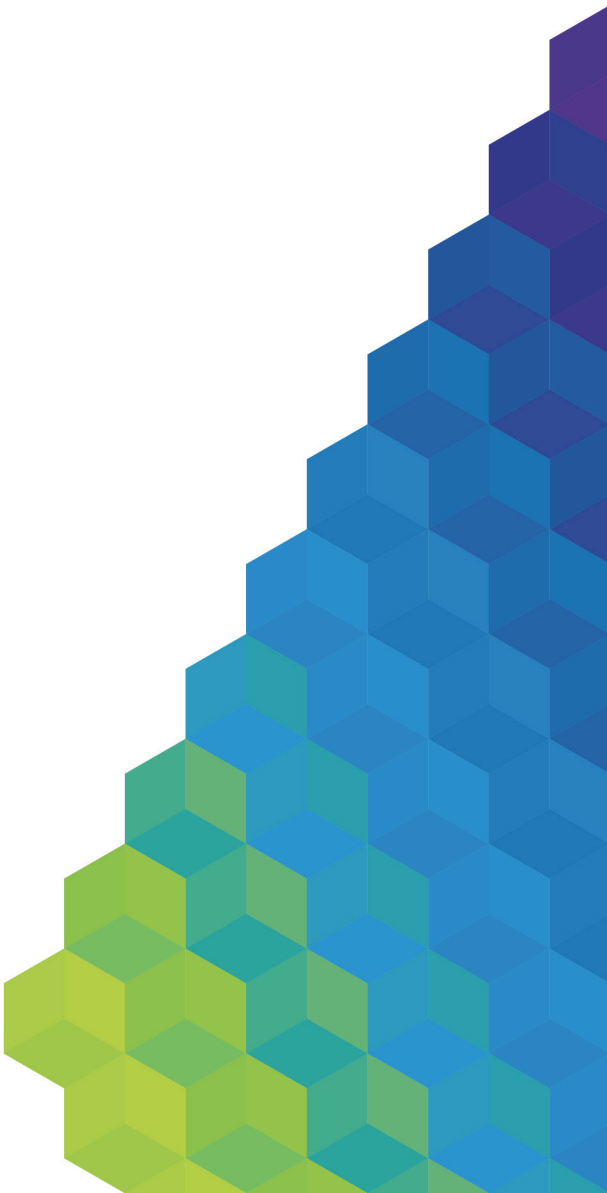
Smart Demand Response Capabilities for Selected Appliances

Response to Consultation Paper

23 September 2019



Summary

AusNet Services appreciates the opportunity to make this submission on the consultation paper. We have supported the EL-054 initiatives over many years; via Smart Grid Australia (SGA) initially and recently via Energy Networks Australia (ENA). This commitment has been made through recognition of the opportunity and potential for simple and standardised demand management of significant electrical appliances for the electrical network directly and ultimately our customers.

Automated demand management has been part of the Australian electricity grid's landscape for many years – managing hot water storage via dedicated circuits. The approach has been implemented through a range of technology including dedicated time clocks, Audio Frequency Load Control (AFLC, otherwise known as ripple control), or in the case of Victoria by smart meters. This approach is encouraged through financial tariffs but is predicated by the capabilities of the environment – in this case timers and meters. For more sophisticated demand (and generation) appliances, one of the barriers for DNSPs (Distribution Network Service Providers) like AusNet Services to engage with customers on automated demand response has been the costs of "the last mile" – i.e. from the electrical grid's communication systems to the appliance itself. AS/NZS 4755.2 seeks to reduce the costs of this link in the communications chain by facilitating a collaborative arrangement with the customer, the vendor of the customer's appliance, and the DNSP. This arrangement can be imagined by using the customer's WiFi network to communicate with the appliance, allowing the customer to monitor and control the appliance. Simultaneously, the vendor can communicate with the DNSP (with the customer's permission) and allow the customer to provide the DNSP with the service of demand management via their appliance.

Some of the main barriers to the adoption of demand response programs under AS/NZS 4755.1 have been the combined costs of the Demand Response Enabling Device (DRED) and its installation, the DRED's communication mechanism (e.g. 3G / 4G) and the compatibility with the appliance to support a DRED. AS/NZS 4755.2 seeks to resolve most of these issues by avoiding the need for a physical DRED and AusNet Services is supportive of this approach.

AusNet Services also supports the mandating of a minimum level of demand response capabilities on air conditioners, electric vehicles, energy storage systems and solar PV installations as we believe that this will be to the long-term benefit of customers.

We are less certain of direct benefits for our customers for the mandatory inclusion of support of demand management protocols for pool pumps and electric storage hot water systems as these appliances are either not seen in significant numbers in our jurisdiction, or are already managed via other means. That said, should these appliances include demand management capabilities via AS 4755.2, and there are sufficient appliances to be economically viable, AusNet Services would look to extend our demand management scope to include pool pumps and electric hot water storage in the future. We therefore support the application of AS 4755.2 in a voluntary capacity for these appliances.

Additionally, we consider that product labelling and marketing at the appliance level with regard to the suitability of appliances to participate in demand response programs (potentially jurisdictionally located) is highly valuable to assist consumers. This labelling and marketing will help consumers select appliances that are readily suitable for any future AS/NZS 4755.2 based demand management programs.

Response to questions

AusNet Services positions with respect to these questions raised in the consultation paper are given in the answers below:

Question	Response
Question 1	
1. Do you support the proposal to mandate compliance with AS/NZS 4755 for the nominated priority appliances? Please give reasons.	AusNet Services is supportive of greater regulatory incentives for manufactures of high power electricity domestic appliances to meet AS/NZS 4755. We would support mandating for: • Air conditioning; • Electric Vehicles charging installations at premises also referred to as Electric Vehicle Supply Equipment (EVSE); • Batteries or Energy Storage System (ESS); and • PV systems (without storage) We note, air conditioning is a major driver of peak network load especially during hot summer days. Demand management for air conditioning load is strongly supported. Pool pumps are not currently identified as a significant load in the AusNet Services network. Hot Water Storage units are currently managed for load via the AMI network with off-peak tariffs and randomisation. The ability for Hot Water Storage to be switched during the day may be useful but this can be done with meters with direct load control. Electric Vehicles are recognised as a major driver for future network load and an opportunity for network support. Demand management for Electric Vehicle Supply Equipment (EVSEs) at a residential level is strongly supported and has the potential to offer very significant demand resources for wholesale electricity markets and in support of networks. Although not proposed in the Consultation Paper, AusNet Services recommends the inclusion of batteries/ESS and PV systems (without storage) for demand management via mandating in AS/NZS 4755. PV systems that can be controlled to curtail grid export can be effective for LV voltage management and increasing the numbers of solar systems able to be connected to the network. An ESS interface could help open up the market for ESS to provide network support services. The ability to isolate PV systems for safety and confirm they are isolated when our lines-people are working on the network would be desirable.
Question 2	
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?	We consider that, currently there is no other protocol or standard that covers all of the appliances identified in the Consultation Paper without imposing significant additional costs to the appliance and also addresses the B2B protocols for demand response in the Australian market. IEEE 2030.5 is often proposed as an alternative, but this is a “last mile” solution which could be incorporated into AS/NZS 4755.2 or AS/NZS 4755.1/3.x. The IEEE 2030.5 standard does not provide the

	B2B protocol available in AS/NZS 4755.2 and is not specifically designed for firm demand response. It may represent a complementary DER management protocol for a broader set of future DER use cases.
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?	AusNet Services considers that labelling compliant appliances is essential for consumer education but it is not a replacement for mandatory compliance arrangements. Labelling compliant appliances is essential for consumer education and their ability to select more effective and more compliant appliances. Voluntary compliance has been in place for many years and has not provided an effective pool of appliances for demand response. Without either a) the expectation amongst the vendor industry that air conditioner demand response would be mandated; b) the significant effort by Energex in their Peak Savers program, the current 30% of air conditioners that can be compliant with AS/NZS 4755 would be materially lower. Even though the AS/NZS 4755 standards have existed for pool pumps and hot water storage systems for over 5 years, no products are available to purchase today.
Question 3. Do you support?	
a. permitting compliance with either AS/NZS 4755.3 or (DR) AS 4755.2?	AusNet Services supports the introduction of obligations that facilitate compliance with AS/NZS 4755.2 in preference to AS/NZS 4755.3. The AS/NZS 4755.2 standard would be easier to deploy and likely provides additional consumer benefits (such as "remote control via vendor cloud").
b. requiring compliance with all Demand Response Modes (DRMs)?	We support all DRMs (where relevant) for mandated AS/NZS 4755 interfaces for the following appliances: air conditioners, electric vehicles, battery systems and PV systems.
Question 4. Do you agree with the scope of the proposal:	
a. air conditioners: up to 19 kW cooling capacity	We agree with the limit of 19 kW of cooling capacity
b. pool pump-unit controllers	No
c. electric storage water heaters (excluding solar-electric and heat pump water heaters)	No
d. charge/discharge controllers for electric vehicles (SAE Level 2 or IEC Mode 3)	Yes
e. If not, what products (or capacity limits) would you propose be included or excluded, and why?	AusNet Services recommends the incorporation of ESS and PV systems for the inclusion in mandated demand response standards. ESS will increase in their prevalence in the network over the next decade. ESS capacity provides an important opportunity for providing network support if coordinated appropriately. AS/NZS 4755 standards have potential to facilitate this necessary coordination. PV systems with AS/NZS 4755.2 capability could provide greater certainty safety isolation and for export curtailment if required for managing reverse flow and voltage impacts in areas of very high uptake of PV.
Question 5	
a. 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	We are not unaware of any of "smart home" devices (such as Google Home, Amazon Alexa or Apple Siri) currently providing support for a demand response protocol. However, some manufacturers offer some integration to these devices. If the definition of "smart home" devices is broadened to include the likes of devices such as Wi-Fi enabled infra-red remote controls (e.g.

"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).	Sensibo Sky) it is worth noting that they tend to use proprietary protocols and are limited to just air conditioners. Some of these systems use internal ambient temperature and/or humidity as a means to modify temperature set points and provide improved customer control. We continue to monitoring the evolution of these products however they represent an early stage market and are not as directly applicable to providing firmness of demand response. Providing a mass market demand response, would require a heterogeneous collection of different protocols to be assembled. This has formed a barrier to economic deployment of demand response programs in the past.
b. Would adoption of proprietary "smart home" systems undermine the benefits of peak demand reduction into the future?	We are not aware of circumstances where the adoption of proprietary smart home systems would undermine the benefits of peak demand reduction.
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?	We are aware of a small number of IR injector products (e.g. Sensibo Sky). These products tend to focus on a single appliance type, usually air conditioners (split systems). It is possible to use these styles of devices for demand response however the cost of the device is a factor in the economic rationale for the program, and the firmness of response has not yet been quantified.
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?	We consider the risk is largely mitigated through the design of the standard. The key tenet of AS/NZS 4755 is that it is agnostic of the communication system and increased focusses on the required appliance behaviour. It is also reasonable to expect that the AS/NZS 4755 standards will continue to evolve to new requirements and new appliances and interconnection technologies.
Question 6	
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?	AusNet Services consider the cost of supporting AS/NZS 4755.2 with cloud-based services would be minimal, where there is existing internet connectivity and where there are existing 4755.1/3/x capabilities, Where appliance level communication are not included we expect this could add in the order of $50 or more to the appliance.
Question 10	
10. Is lack of demand response capable products a barrier to the introduction of demand response programs for small consumers? Do you think that mandating demand response capability for these products will lead to their activation and to consumer enrolment in DR programs?	Yes, availability of demand response capable products will lower the barriers to introducing demand response programs and give customers more confidence to take part.
Question 11	
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?	Where there are existing communications such as WiFi, we agree that the incremental costs to support demand response capabilities will be negligible.
Question 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	For appliances that already have AS/NZS 4755.1/3.x conformance, and that are wifi enabled (the most common communication pathway expected), these appliances could be capable of orchestrated

final requirements?	demand response (via AS/NZS 4755.2) inside of 6 months – just the cloud service would need to be upgraded and the DNSP/DRSP would need to develop a AS/NZS 4755.2 client. Whilst this would also need the customer to opt-in, a reasonable number of devices could be online quickly and provide limited but effective demand response.
Question 16	
16. Do you consider that there are any major technical or functional issues related to the proposal? If so, how should these be addressed?	AusNet Services considers more work needs to be done to enable the proposal and any technical (or functional) issues can be resolved as part of the work of those concerned. • The AS/NZS 4755.2 protocol, currently remains in draft, needs to be completed and published as quickly as possible. • The EVSE part of the standard (AS/NZS 4755.3.4) would need to be completed and published. Alternatively, AS/NZS 4755.2 would need to include updated contents from the unpublished 4755.3.4. • AS/NZS 4755.3.5 would need to become part of the impact assessment (already part of AS/NZS 4755.2). • A new version of AS/NZS 4755.3.5 (or an entire part 3.x created) for the inclusion of PV systems.
Question 17	
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?	AusNet Services 99% small customers are using Smart Meters today, and the verification of demand response is generally a routine exercise. This has been successfully trialled under our GoodGrid behavioural demand response program using individual baselines.
Question 18	
18. How will the proposal impact on electricity prices and energy network costs and investment requirements?	If demand response enabled by this proposal can defer network augmentation projects then the savings would be passed on to our customers.
Question 19	
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?	Cost-reflective pricing, e.g. time-of-use (TOU) tariffs, provide one mechanism for incentivising demand response on a daily basis would benefit marginally from the proposal. However, greater use of critical peak response tariffs and network rebates or incentives would make the proposal more relevant.
Question 20	
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?	In Victoria, the most significant factor of the predominant energy needs of customer is access to reticulated gas, which as largely available near Melbourne and regional centres east and west of Melbourne. Where reticulated gas is available, networks air conditioning demand response is the predominant opportunity. Where reticulated gas is not available, localised demand response (of predominantly hot water and air conditioning load) can assist in managing load in small LV distribution network and also in long, stretched, rural HV networks.
Question 21	
a. Is it your company's intention to offer tariff or other incentives for customers to have demand response capabilities on the appliances in question activated and to participate in demand response programs? Are there any specific barriers (or lack of incentives) that would prevent	AusNet Services already had incentivised tariffs for hot water load control outside of peak demand time periods and offer a range of cost reflective network tariff pricing options. We are also in discussions with stakeholders to introduce a specific EV tariff. In addition to these network tariffs, we have a number of demand response incentive payment schemes including critical peak reduction

your company from offering and promoting such programs?	for large customers and GoodGrid demand response for participating small customers.
b. Would you offer tariff or other incentives to customers to participate in demand response programs using "smart home" device functionality? (if so, please specify the type of functionality/ies). Are there any specific barriers (or lack of incentives) that would prevent your company from offering and promoting such programs?	Additional experience with "smart home" device operations would need to be quantified as well as customer comfort impact. Similarly a case would need to be made as to how such a service can comply with the B2B requirements of AS/NZS 4755.2. These devices can already be used by the customer in undertaking behavioural demand response as part of our GoodGrid demand response program.
Question 22	
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?	Based on behavioural response program conducted by AusNet Services in 2018 and 2019 – Good Grid, we found that 8% of directly contacted customers agreed to participate in the program. Of those who participated, over 75% participated in each Good Grid demand reduction event communicated digitally. With additional experience and development of customer-engagement approaches for demand response including automated techniques, we would expect participation rates to continue to increase.