9th April 2021

Consultation on Proposed Demand Response Capabilities for Selected Appliances in South Australia and Proposed Amendments to Local Energy Performance Requirements for Water Heaters

By email: dem.smartappliances@sa.gov.au

Thank you for the opportunity to provide feedback on the consultation paper.

Despite the best intentions of the Department, Dux believes that past decisions, in relation to South Australia's water heater policy, have been incorrectly weighted to picking 'fuel favourites' with no regard to water efficiency. We further believe it is in the best interest of South Australians that some of these past decisions should be urgently reviewed and modified delivering better alignment to the state's renewable energy goals.

Dux, like the Australian Hot Water Forum, want to help the South Australian Government develop better water heater policies for the benefit of current and future South Australians and all Australians.

In this submission, Dux is only commenting on the proposed demand response capabilities for water heaters and no other appliance. Dux is not informed about other appliances and accordingly makes no comment.

About Dux Hot Water

Established in 1915, Dux Hot Water is the oldest water heater manufacturer in Australia. By volume, near 90% of our revenue is from products manufactured locally in our Moss Vale factory, in the NSW Southern Highlands.

Dux manufactures or markets a full range of water heaters including Electric Storage, Gas Storage, Gas Continuous Flow, Solar, Heat Pump and Commercial water heaters.

Office of Best Practice Regulation determined Demand Response decision making as non-compliant

Whilst Dux continues work on a Demand Response solution, it believes its national implementation is still far from certain, even in July 2023. Dux understands that the relevant Minister refused to accept the decision based on a review by the Commonwealth Office of Best Practice Regulation:

> *"… OBPR assessed the level of analysis in the RIS as not adequate nor commensurate with the potential economic and social impacts of the proposal. As the decision to introduce demand response capability requirements for selected appliances was based on this draft Decision RIS, the Energy Council is non-compliant with the COAG best practice regulation requirements"*

Smart Demand Response Capabilities for Selected Appliances | Regulation Impact Statement Updates (pmc.gov.au)

Adding further doubt, Dux understands that there is currently an intellectual property dispute that needs to be resolved, which has the potential to cause further delay.

Any delay, or even the abandonment of national AS4755 adoption, could lead to a situation where the South Australian market becomes a lone adopter of any such technology. Electric storage water heater sales in SA represent less than 10% of Dux's annual sales. It is doubtful that we could even meet the minimum internal investment hurdles within our business to justify the development for SA alone.

SA's proposed timeline is impossible

Even if there was a favourable business case, which in Dux's opinion doesn't seem to exist, there is no way that a July 2021 timeline is achievable with the current state of global supply chains. Only last month, Japanese and US car companies stood down production in their respective markets due to the lack of availability of semi-conductors.

If the Japanese and US automakers are struggling, there is no realistic chance for an Australian water heater manufacturer to source the relevant components for AS4755 compliance. Further, electric water heaters are 'declared articles' (meaning the highest level of risk). Dux refuses to take short cuts that may introduce subsequent risk.

Costs are understated yet benefits are overstated

Costs appear understated, whilst benefits appear overstated. The Australian Water Heater Forum has done an outstanding job of identifying understated costs in their submission, so Dux will not go into further detail in this submission.

Activation rates are uncertain

> *"The technical DR capability of a water heater is not effective unless it is 'activated' – connected to a Demand Response Service Provider's (DSRP's) communication system."* (EES Final Report pg.5)

At this stage, the existence of a DR market is purely theoretical, as

> *"The level of activation will ultimately be dictated by the rate of development of the market for DR services, which is still somewhat uncertain as final rules have just been released and do not commence until late 2021 for large users (timetable for smaller users or aggregators is still unclear)."* (EES Final Report pg.5)

It is unclear how DSRP's will actually monetise these activations for a sufficient return that will ultimately drive any involvement. Whilst Dux has been critical of some aspects of the report, it highlights that the authors have been very upfront about the uncertainty of activations and any DSRP business model.

Further, the new SA-NSW interconnector will provide a nominal 800MW import/export capacity, which will reduce both high priced events and negative events in the short to medium term.

With so many unknowns, even modelling a low activation rate seems to be over reaching. It is inconceivable that a high activation rate will ever be achieved unless mandated by any Government.

Almost no DRM1 benefit is available from electric storage water heaters

The report acknowledges (EES Final Report pg. 5)

> *"As most electric storage water heaters in South Australia are currently operated as controlled load (off peak), it is estimated that relatively few large water heaters will be drawing power during system peaks. Therefore, the load shedding capacity of electric storage water heaters under DRM1 is relatively small even by 2030"*

Dux agrees that large electric storage waters in SA are already overwhelmingly on controlled loads, which operate outside peak periods. Enabling DRM1 during a peak event will derive almost no benefit from electric storage water heaters.

The report acknowledges that the benefit of DRM1 would be "*valuable if aggregated with DR functions from other appliances such as air conditioners".* (EES Final Report pgs. 5/6)

Why are manufacturers, and ultimately consumers, of electric storage water heaters being unfairly targeted with DRM1 costs, when the benefits of DRM1 are only valuable when aggregated with air-conditioners? Surely any assessment of an appliance must be made in isolation.

'Solar sponge' has significant potential. Previous policy decisions must be reversed now!

Dux has consistently advised of the potential for electric storage water heaters to act as storage devices for renewable energy. We also strongly advised not to attempt to back winners. Another stakeholder referred to it as the Government playing 'fuel favourites".

Previous policy decisions, have significantly reduced the available size of any 'solar sponge' provided by electric storage water heaters and created a highly significant adverse outcome for South Australian drinking water supplies, which will be covered in more detail later.

Dux, then owned by GWA Group, provided previous stakeholder input to SA Department of Energy and Mining in 2008 and 2013 that restricting electric water heaters would reduce future renewable energy storage capability.

GWA Group (Australian water heater and household goods manufacturer)	• Gas has "high running costs" (*but no evidence provided*). • Renewable energy growth favours electric WH as long term low emissions solution, also can be used to store renewable energy. • Vehemently oppose 170 litre provision and removing geographical criteria; will force consumers to day rate tariffs or expensive LPG. • Directions continue to encourage imported instantaneous gas WH which threatens local manufacturing and waste water.

https://www.sa.gov.au/__data/assets/pdf_file/0006/35259/Water-Heater-Review-Report-Oct-2013.pdf

All restrictions on electric storage water heaters should be removed immediately (including Class 1A)

Emission intensity has changed significantly in South Australia due to renewable generation.

> *"SA is already close to 60% renewables in electricity generation. Target to reach net 100% renewables by 2030"* (EES Final report pg. 6)

> *"The historic case against electric storage water heaters as being 'high emission' is no longer valid in the current and future South Australian context. Indeed, electric storage water heaters appear*

to be a valuable asset when connected to the electric grid, as they can allow flexibility of operation and facilitate load shifting when operated with DRM1 and DRM4 controls" (EES Final Report pg. 9)

It is abundantly clear that electric storage water heaters are a valuable asset to South Australians.

- ✓ If 2030 SA targets are achieved, electric storage water heaters will generate zero emissions
- ✓ With the solar sponge tariff, the report concluded that they offer homeowners the lowest total ownership cost
- ✓ Even irrespective of the solar sponge tariff, at higher demand levels, typical of Class 1A homes, electric storage water heaters have lower annual energy costs [Figure ES-1]
  "On the basis of total hot water cost, the analysis lends much less support to the current installation of gas water heaters, as these tend to have much higher total hot water costs, especially at higher hot water loads" (EES Final Report pg. 9)
- ✓ Allows utilisation of the renewable energy currently generated during the 'duck curve'
- ✓ Reduced investment required in new electricity generation
- ✓ Increased flexibility of demand on the grid
- ✓ Electric storage water heaters waste significantly less water than continuous type water heaters

Dux acknowledges that in 2019, South Australia published a verification method to allow for electric storage water heaters with photovoltaic solar in new homes to seek compliance with the NCC. However, Dux believes applications are likely to have been modest.

The water heater fuel type built into the home during construction will likely remain

The average life of a home is at least 50 years. If the water heater fuel type at construction is electric or gas, there is a high level of infrastructure inertia. It will likely never be changed due to high upfront switching costs. Whilst the heater may be replaced many times, the same fuel type will be used. Thus, wrong policy decisions on water heaters can have long lasting legacy consequences.

'Solar sponge' tariff is a WIN:WIN scenario. Much of the benefit can be realised without DRED

Dux believes the 'solar sponge' tariff proposed by SAPN is an outstanding initiative. It provides both a WIN:WIN scenario and a strong customer value proposition.

However, much of the benefit can be realised, without a DRED device, simply by the energy retailer enabling the appropriate interval meter settings.

SAPN advises that 25% of existing South Australian homes currently have an interval meter. This is expected to reach 50% by June 2025. If the interval meter is fitted or enabled with a controlled load, Dux's existing range of electric storage water heater could access 'solar sponge tariff' without any modification.

Additionally, customers with an older type 6 meter, can simply elect to request an interval meter from their retailer, which can then provide access to day time boosting during the duck curve.

With many of the benefits able to be realised without any DRED device on the electric water heater and next to no benefit from DRM1, any proposed cost impost of demand response, simply doesn't make sense. Dux is committed to engaging with the South Australian energy retailers and other stakeholders to devise the single best product to enable this WIN:Win scenario.

> 10 Gigalitres of SA drinking water has potentially already been wasted

In 2008, the Australian Government commissioned a study through Mech Lab at UNSW into the water waste from continuous flow water heaters relative to storage water heaters. Testing showed that the daily water wastage of a gas continuous flow water heaters ranged from a best case of 35 litres to a worst case of 70 litres. A storage water heater tested under the same conditions wasted only 4-5 litres per day. https://www.waterrating.gov.au/sites/default/files/2019-01/labelling-gas-water-heaters.doc

Dux, then owned by GWA Group, highlighted significant water wastage in its stakeholder submission.

GWA Group (Australian water heater and household goods manufacturer)	• Gas has "high running costs" (*but no evidence provided*). • Renewable energy growth favours electric WH as long term low emissions solution, also can be used to store renewable energy. • Vehemently oppose 170 litre provision and removing geographical criteria; will force consumers to day rate tariffs or expensive LPG. • Directions continue to encourage imported instantaneous gas WH which threatens local manufacturing and waste water.

https://www.sa.gov.au/__data/assets/pdf_file/0006/35259/Water-Heater-Review-Report-Oct-2013.pdf

SA			Water Loss	
Qtr	Dwelling units commenced; South Australia; Houses; New	Cumulative Completions with IGWH	Best Case (gl)	Worst Case (gl)
Sep-09	2,114			
Dec-09	2,525			
Mar-10	2,310			
Jun-10	2,732			
Sep-10	2,577	1,903	0.005	0.011
Dec-10	2,086	4,175	0.011	0.025
Mar-11	1,672	6,254	0.017	0.038
Jun-11	1,923	8,713	0.024	0.052
Sep-11	1,882	11,032	0.030	0.066
Dec-11	1,801	12,910	0.035	0.078
Mar-12	1,568	14,414	0.039	0.087
Jun-12	1,688	16,145	0.044	0.097
Sep-12	1,457	17,839	0.049	0.107
Dec-12	1,960	19,460	0.053	0.117
Mar-13	1,437	20,871	0.057	0.126
Jun-13	1,675	22,390	0.061	0.135
Sep-13	1,977	23,702	0.065	0.143
Dec-13	2,091	25,466	0.070	0.153
Mar-14	1,852	26,759	0.073	0.161
Jun-14	2,387	28,266	0.077	0.170
Sep-14	2,019	30,046	0.082	0.181
Dec-14	2,260	31,928	0.087	0.192
Mar-15	1,791	33,594	0.092	0.202
Jun-15	1,710	35,743	0.098	0.215
Sep-15	2,084	37,560	0.103	0.226
Dec-15	1,731	39,594	0.108	0.238
Mar-16	1,810	41,206	0.113	0.248
Jun-16	2,062	42,745	0.117	0.257
Sep-16	1,980	44,620	0.122	0.269
Dec-16	2,081	46,178	0.126	0.278
Mar-17	1,650	47,807	0.131	0.288
Jun-17	1,946	49,663	0.136	0.299
Sep-17	2,097	51,445	0.141	0.310
Dec-17	2,012	53,318	0.146	0.321
Mar-18	1,865	54,803	0.150	0.330
Jun-18	2,236	56,554	0.155	0.341
Sep-18	2,007	58,442	0.160	0.352
Dec-18	1,787	60,252	0.165	0.363
Mar-19	1,683	61,931	0.170	0.373
Jun-19	1,859	63,943	0.175	0.385
Sep-19	1,994	65,750	0.180	0.396
Dec-19	1,965	67,358	0.184	0.406
Mar-20	1,950	68,873	0.189	0.415
Jun-20	1,769	70,546	0.193	0.425
Sep-20	2,216	72,340	0.198	0.436
Dec-20		74,109	0.203	0.446
Mar-21		75,864	0.208	0.457
	88,278		4.644	10.217

Dux has calculated the water wastage from the 2008 policy decision based on conservative assumptions

- ABS data for South Australian dwelling commencements from July 2009 to September 2020 (last available record)
- Data lagged 1 year for construction
- Best case and worse case continuous flow from MechLab report relative to worst and best case from storage water heaters
- Conservative assumption that only 90% of commencements were gas continuous flow
    - Dux's sales to builders over this period were 99% continuous flow, even for non-reticulated gas
    - Dux interviewed two different sources, who are major suppliers of water heaters to project builders in SA. Both said 99% continuous flow usage.

Based on these assumptions, under the best case scenario, 4.6 Gigalitres has already been wasted. Worst case, >10 Gigalitres has already been wasted.

Over the next 50 years, the legacy water wastage from only those houses commenced from July 09 to September 20 is nearly 100 Gigalitres, which equivalent to 6 months drinking water for South Australia.

This doesn't even consider wasted energy intensity from filtering, pumping and even desalinating this drinking water before it was wasted, although this could be readily modelled.

Dux acknowledges that gas continuous flow water heaters provide significant benefits to their users. Dux's parent company is one of the largest worldwide manufacturers of gas continuous flow water heaters.

They have a strong place in the market and provide unlimited, energy efficient hot water. However, it is well known that they do waste significantly more water than storage water heaters, which is consistent with the Mechlab report findings.

Dux has long advocated that in new construction water saving devices should be added. Unfortunately, this has not been Dux's experience. Whilst nationally Dux has sold well in excess of 100,000 gas continuous flow water heaters over the last decade, it has sold just over 200 water saving devices in the same period. In 2020, Dux scrapped over $50k worth of these water saving devices due to obsolescence.

Dux 2019 recommendations to Australian Building Codes Board for NCC 2020

For consistency, please be advised that Dux made 2 recommendations to the ABCB for NCC 2022

1. We recommended water saving devices be fitted to continuous flow. Highly energy efficient but without recirculation devices they can each waste up 25,000 litres per year

2. Where electricity generation is low emission in any jurisdiction or rooftop PV has been installed or provisioned in any dwelling, electric storage should be allowed.

Thank you for taking the time to read Dux's submission. It will likely generate some questions. Dux would be please to attend any subsequent meeting in person or by videoconference, should SA Department of Energy and Mining think it beneficial.

Should you have any queries or questions, please don't hesitate to contact me at your earliest convenience.

Yours sincerely

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