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By email: sustainability@environment.nsw.gov.au
cc: The Hon. Dr (Geoff) Lee, Member for Parramatta

12 May 2022

Subject: Peak Demand Reduction Scheme

Thank you for the opportunity to provide input into the development of NSW's Peak Demand Reduction Scheme.

Rheem is Australia's largest supplier of domestic water heaters (both imported and locally manufactured). Our Rydalmere facility based in NSW is Australia's largest water heater manufacturing facility. We are also the largest supplier of water heaters to the Australian commercial market. Our product range encompasses all water heating technologies, including electric storage, gas storage, continuous flow, heat pump, solar and smart connected devices. With this background we have a significant interest in the outcome of your consultation.

We are supportive of the objectives of the scheme and understand the need for the total water heater energy load to be managed as we transition towards a decarbonised grid. Our research and development program has, over the last decade, focussed on these issues and has led to the development of breakthrough water heater solutions that deliver environmental, grid stability and cost benefits for consumers.

We therefore understand the issues that that Department is attempting to address and the role that water heater technologies can play in delivering against desired objectives. It is on this basis that we raise two concerns with the proposals laid out in the consultation:

1. The inclusion of domestic heat pumps as a peak demand reduction technology would be inappropriate.

Whilst there is only a reference to Commercial Heat Pumps included in the consultation (PDRS WH1) Rheem is aware that there has been some lobbying to include domestic heat pumps in the scheme. We also note that the consultation question 6 references a "PDRS WH2" activity that is not listed in the consultation. Was this originally set aside for domestic heat pumps?



Regardless of the plans, Rheem has conducted an analysis of the performance of a heat pump water heater and compared this to an off-peak electric water heater.

As can be seen from Figures 1 and 2 (below), the off-peak electric water heater provides substantially higher peak demand reduction than does the heat pump. Given that most of the large electric water heaters installed in NSW (the sizes most suitable for replacement by a heat pump) are connected to off peak rates, this would suggest that the promotion of heat pumps will in fact increase Peak Demand.

Figure 1 – Heat Pump Water Heater Electrical Consumption

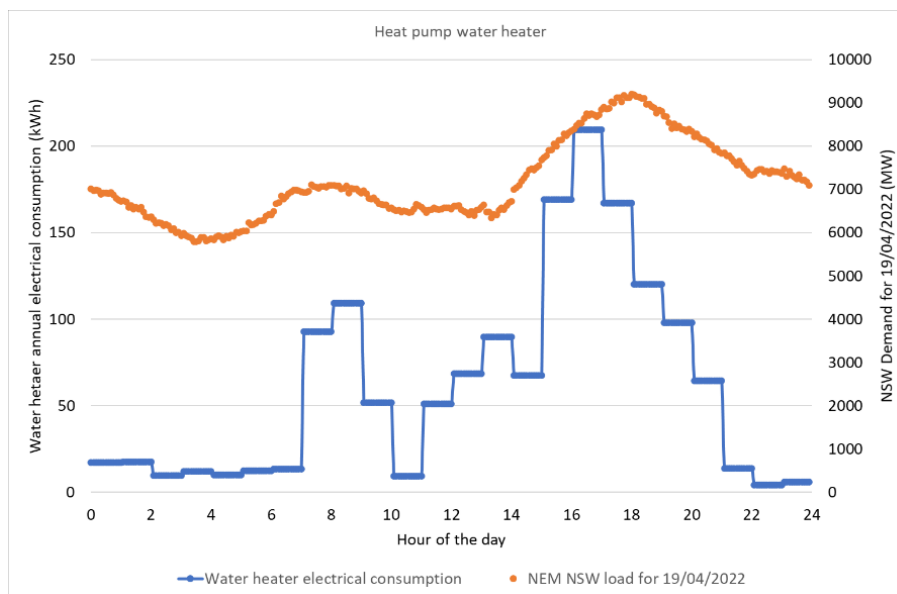
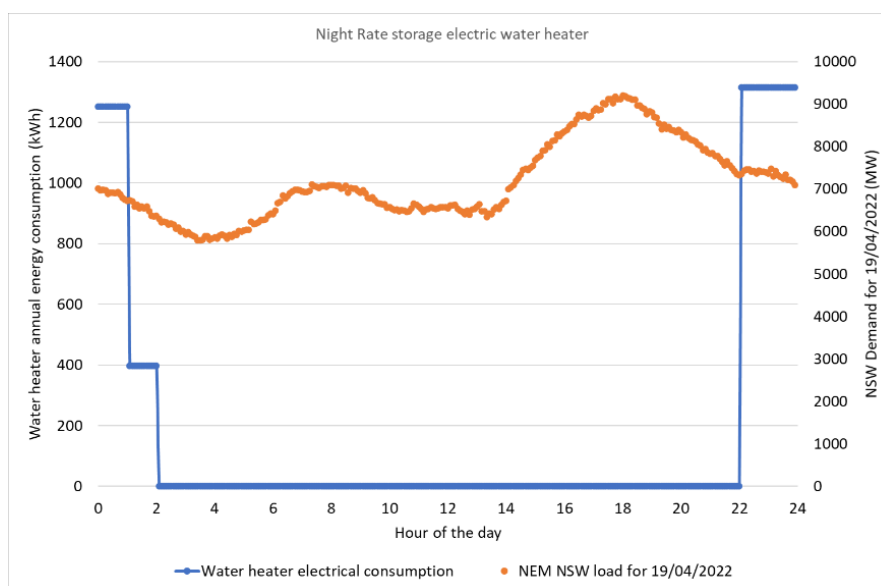


Figure 2 – Off Peak Electric Water Heater Electrical Consumption



We also note that switching heat pump water heaters to an off-peak tariff does not overcome this issue, as the ambient temperatures at night are lower, hence the Co-efficient of Performance (COP), which measures the products efficiency, is reduced.



Additionally, noise complaints arising from of HP's working at night is outlawed by the NSW EPA through their requirement that there be no detectable HP noise in an inhabited space of a neighbouring property before 8am and after 10pm on weekends, or on public holidays or before 7am or after 10pm on all other days. A heat pump on an off-peak tariff would breach these guidelines.

The above graphs would suggest that ESS incentives for heat pump installations will actually undermine the objectives of the PDRS, and this unintended consequence of the ESS expansion may need to be reviewed.

If it is the intention of the department is to simply achieve peak energy reduction, the incentivisation of households to operate off peak storage electric water heaters should be considered as a method that meets the objectives of the PDRS.

2. The exclusion of smart grid connected water heaters as a peak demand reduction technology is a missed opportunity for both the proposed scheme and for NSW.

Water heaters provide an “essential service” and are found in every Australian household, regardless of their socio-economic status. Water heaters offer a greater short to medium term solution for the management of grid constraints, acting as either a solar “sink” for the broader grid, or in helping maximise self-consumption of solar generation at a household level.

Smart, grid interactive water heaters can also assist grid stability through demand response, being externally called upon to heat at optimum periods where there is excess energy on the grid (low spot prices), and directed not to heat in periods of energy shortfalls (high spot prices). Even on days of bad weather, smart grid interactive water heaters will still avoid the peak demand period and charge from the grid during periods of low demand. If programmed and or remotely managed to work in such a way, consumers can save considerable energy costs and the objectives of the PDRS will be met.

Rheem has invested considerably in the opportunities presented by smart, remotely managed water heaters, resulting in some clever digital innovations. In particular, we have developed the capability to vary a water heater’s input power instantly to match the highly variable nature of household DER, thus maximising the use of free excess solar PV. These capabilities are now available across Rheem’s PowerStore range of water heaters, of which there are already over 2000 remotely monitored and managed units installed throughout Australia.

The key attraction of using a water heater as a “thermal battery” for excess PV generated energy is the technology’s benefit to households. A 4.8kW PV system could supply up to 90% of a water heater’s energy consumption, using power that would otherwise have been exported to the grid for a feed in tariff. Independent analysis has identified that a 5.4kW PV system should provide 95.5% of hot water energy requirements.

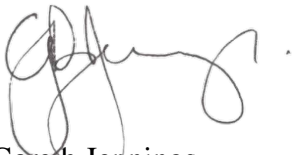
The incremental upfront cost of the extra technology in a smart water heater, including control and communications hardware suitable for whole of home DER orchestration, has a relatively low payback period of around five years. Regardless, this incremental cost is currently enough to deter many consumers from investing in grid-friendly

technology. To overcome this, making this category of products eligible under the PDRS scheme should be considered.

Further to the inherent benefits of smart connected water heaters listed above, we would also ask that the NSW Government give regard to the fact that these products are manufactured in NSW, at our western Sydney plant. Inclusion of this technology in the PDRS would result in increased economic activity in a key demographic area of NSW, as opposed to supporting other technologies that will mostly result in the stimulation of overseas economies.

If you have any queries regarding this response or our market, please don't hesitate to contact me.

Yours Sincerely



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