

Rinnai New Zealand (Rinnai NZ) would like to make the following submission in respect of the recent consultation around adding Demand Response (DR) capability to Hot Water Cylinders.

### **General Comments**

Rinnai NZ are generally supportive of the concept of Demand Response (DR) functionality being available and used by network operators in the NZ market. Rinnai NZ understand the opportunity and benefits such DR functionality would bring to the NZ electricity supply network and the environmental and societal benefits in the longer term that DR would bring to NZ. Rinnai NZ has no insight or commentary on the Australian market as we do not operate in that market.

We are also supportive of mandating DR functionality in Air Conditioners. DR already exists in the majority of products we supply to the NZ market, and it can be easily added to the products that don't already have it. We also believe the proposed time times for air conditioners are achievable.

### **Rinnai NZ Concerns about DR Hot Water Cylinders**

Our main concerns center around the detail of the proposal for the inclusion of DR capability in Electric Hot Water Cylinders. We are concerned that the time frame for notification to the NZ industry and the time allocated to provide a submission has been extremely short. This has impacted our ability to research and give depth to our feedback.

We note that there seems to have been limited interaction with the New Zealand Hot Water Cylinder Manufacturers during the proposal phase. Additionally, there has been limited NZ representation from the NZ Hot Water Cylinder industry during the standards formulation. So the proposal document and premise may not accurately reflect New Zealand market conditions and industry view point accurately.

Including DR capability into hot water cylinders is a much more fundamental change than air conditioners, and this should be considered as part of the process. The majority (+99%) of hot water cylinders in NZ have electromechanical controls. None have DR capability. Adding DR capability to these appliances is a fundamental change as it will require designing and replacing the controls with an electronic system and integrating into a DR system. For Hot Water Cylinders there currently is no device in existence in New Zealand that can fully meet the proposed requirement as outlined in the consultation document.

### **Costs for adding DR capability to Electric HWCs**

We are aware of a device under development by a major controls manufacturer that could, if commercialised and approved by the appropriate compliance laboratories, be able to provide the DR capability required by AS/NZS4755. From preliminary information received we believe the direct additional retail price increase to every HWC fitted with this device would be approximately

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\$150 or around a 15% increase in the purchase price. The actual price could vary from this by a considerable margin.

Rinnai NZ estimates its re-compliance costs could be as high as NZ\$200K. In addition to this the cylinders would need to be redesigned, with an additional cost of up to NZ\$100K. These costs would need to be amortised over the cylinders sold in the first years of production, putting further upward pressure on the unit sell pricing.

### **Concerns around limited uptake of DR capable Hot Water Cylinders**

We have reservations that uptake for DR connected hot water cylinder would be anywhere near the suggested figures in the proposal. Case Studies quoted in the proposal were taken from the HVAC (aircon) market. The AC market has a reasonable level of product differentiation, and consumers make the decision on the appliance. In the AU air conditioning trial, connections were driven by the consumer. The Hot Water Cylinder market is the opposite and is largely driven by cost. Much of the product is commoditised and there is very little product differentiation. The Primary purchase decision maker is the installer or specifier not the home owner. Given this the products usually chosen are the ones that meet the minimum level of compliance and are the easy and fastest to install as this benefits the installer. Considering this we don't see many consumers requesting the connection of the DR system, and installers will actively avoid it as it will require a more complicated, time consuming installation. So the additional investment made by the homeowners/ end users in the great majority of installations will not provide any financial return. The end result could mean (obviously depending on actual vs projected uptake) this specific DR implementation

(ie DR HWC's) may not provide payback at the project level.

### **Rinnai NZ experience with electronic HWC controls**

Rinnai have direct experience with this as we have introduced a smart thermostat technology into the NZ cylinder market as a product differentiator with limited success despite significant marketing spend targeted at both end users and trade customers. Simply the market defaults to the lowest cost proposition. Additionally where we have visited end consumers of our smart thermostat product few actually knew they had this product. As the decision had not been taken by them the installer in respect to replacement cylinders had made the decision to fit this product or a specifier in the case of new build installs. Some consumers had sought the product out as it offered direct benefit to the consumer (lower power bills) opposed to a DR capability which is centered around peak loading shift and control where the benefit largely lies with the network operator. Also it is important to note that in the NZ market the default control for hot water cylinders has been a simple electromechanical thermostat which is broadly the same regardless of manufacturer. Which has

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proven to be highly reliable and simple to service and maintain. The installer base is therefore highly familiar with this. Regardless of what type of device eventuates from any mandating or DR. The Installer base will need training / upskilling. It's also important to realise that with any increase in complexity / utility will come an increase in service / failure and replacement requirement. This could have potentially the opposite of the intended effect and reduce the amount of connected electric hot water cylinders due to customers installing gas hot water. It may also be worth considering who will make any connection between a DR control device and control network? Is this work within the scope of work a Plumber with limited electrical licence can undertake or is it in the domain of an electrician? What impact on installation costs might this have?

#### **Comments on DRM 4**

Table 2 of the consultation paper lists a set of proposed mandatory modes. This includes a mandatory switch on / store mode DRM 4 for a Storage water heater. To achieve DRM4 means increasing the stored HW temperature in the cylinder beyond the nominal set point but below the mandated safety temp of 95 degrees. So a temperature between 60 and 95 degrees. The effect of elevated hot water temperatures as the result of the use of DRM 4 on plumbing system components upstream of any temperature moderation fitting (ie thermostatic mixing valve) would need to be considered. Given that all water must be delivered to the fixture at a safe temperature (as per NZBC G12 AS1 6.14) existing systems will be built on the premise that the maximum temperature likely to be seen is 60 degrees. With DRM4 in place the system may see elevated temperatures more frequently if the cylinder is used as an energy repository. If the DRM4 is mandatory, all water heaters and plumbing systems upstream of the thermostatic mixing valve will need to be suitable for elevated temperatures (similar to installations for solar and uncontrolled heat sources). As per NZBC G12 AS1 6.5 electric thermostats need to comply with either NZS 6214 or AS 1308. Clearly there would need to be some changes made to the NZBC Approved Solution to accommodate systems that meet AS/NZS 4755. As AS/NZS 4755 is not currently considered as part of an acceptable solution within the NZBC.

Including DRM4 will also mean a more complex and less reliable control system. This function requires the adjustment of the maximum temperature, which would require an additional sensor / thermostat, further adding cost. One possible solution would be to eliminate the requirement for DRM4 for the NZ market.

#### **Implementation dates too tight**

Rinnai NZ has reservation around the proposed implementation date for DR capability for Hot Water Cylinders in NZ. While we can understand the desire to 'get on with it'. Development

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timeframes have to be realistic and achievable. Also no meaningful development effort will begin until the requirement is mandated. Based on this we would think it reasonable for there to be a 24 month window to allow for quality product development and compliance activity to occur between the DR requirement being mandated and field implementation of DR equipped product in the NZ market.

**Rinnai**