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Australian Energy Market Operator
Notice of First Stage of Rules Consultation
20 Bond St,
Sydney NSW 2000

By lodgement: DERProgram@aemo.com.au

29 September 2020

Subject: INITIAL DISTRIBUTED ENERGY RESOURCE MINIMUM TECHNICAL STANDARDS – FOR CONSULTATION ISSUES PAPER

Thank you for the opportunity to provide input into your consultation.

Rheem is the largest local manufacturer of domestic and commercial water heaters in Australia. As our products are clearly considered to be part of the future Australian Distributed Energy Resource (DER) market we have a significant interest in the outcome of your consultation.

Over the last 5 years we have expanded our traditional water heating business to include the supply of photo-voltaic and embedded storage battery systems. We have also undertaken the development, manufacturing and supply of "smart" remotely managed water heaters that interoperate with a home's other DER. At the time of writing we are managing the DER of approximately 1200 sites across Australia.

Given the impact that new DER market guidelines may have on our products and our consumers' enjoyment of them, we welcome the opportunity to contribute to the discussion at an early stage of their development. Our investments in both building a sales organisation around the supply of DER, and our development of DER interoperable water heating products, means that we welcome a long overdue discussion on the standardisation of DER interoperability in Australia.

Rheem's experience with consumers already participating in Australia's nascent DER market would suggest that there is both a high level of enthusiasm amongst those with knowledge in this area, and a typical Australian willingness to adopt new technologies. This is a precious thing and not something that should be taken for granted. The poor experience of the Victorian roll out of smart meters in the noughties still resonates with the Australian population more than a decade later. Any failure to meet broader consumer expectations as they commence their DER journey will have the potential to undermine acceptance and participation across the community, and slow the realisation of the benefits that DER management can bring.

We therefore believe that any proposed DER rules should ensure that consumers have choice regarding their participation in the DER "market", including choice of their "Energy Market Service Provider", that they are fairly rewarded for their participation, and that any loss of

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their amenity is minimised. Technical guidelines regarding DERs, and the regulations and rules that mandate these requirements, should therefore take these issues into account.

Additionally, we believe that it essential that any technical standards do not create circumstances where consumers are liable to hold the manufacturers of their appliances liable for any poor experience arising from participation in the DER market. It is essential that all standards are written such as to minimise the impact of DER participation on consumer amenity, so as to avoid consumers requiring service calls through their misunderstanding of DR events.. Similarly, market rules regarding the operation of DER appliances should be written so as to restrict the future "controllers" of DER appliances (aggregators, retailers, DNSPs etc) from doing so in a way that shortens the life of the product. For example, a daily limit should be set on the number of demand response signals sent to water heaters, so that continuous switching (burst fire) strategies are not adopted. Continuous switching has the potential to quickly wear out electronic components within the water heater, which will in turn render the consumer warranty void.

With regard to the specific questions raised within the issues paper we have limited our responses to those questions raised in that are most relevant to our business and our consumers:

5. What are the technical challenges faced by each industry sector in integrating DER?

Rheem's experience to date has been that there is little commonality of control, or interoperability, between current DER devices on the market. For example, one major battery manufacturer has adopted a "walled garden" approach that requires control of the battery (i.e. embedded generation) to be from the manufacturer's cloud platform. This absence of a local control capability severely inhibits the orchestration of these batteries with all other smart DER devices within a home. This in turn financially impacts the consumer and locks the consumer's asset (i.e. the battery) such that the home owner wishing to accept a competitive offer from an Energy Market Service provider (without a relationship with the battery manufacturer) is precluded from controlling the battery asset of the home owner.

If vertical monopolies such as this were to become the norm, there is a risk that multiple smart DER devices would all be individually controlled from their own clouds, without local orchestration to optimise the best outcomes for the consumer and for the grid. This would also dilute the effectiveness of response of the individual DER devices. For example, a response to an FCAS event by a battery in isolation may cause an unwanted response by other DER under the control of a Home Energy Management System, effectively diluting or even negating the response of the battery.

Additionally, debates regarding future communication protocols (Open ADR, IEEE2030.5), and a general unwillingness of the industry and regulators to look to international standards (e.g. CTA 2045) for guidance has hindered penetration of the DER control.

As smart DER continues to be deployed, in the absence of an immediate move to an overriding preferred architecture and standardised protocols, it is import that interim measures ensure that DER comply now with accepted industry standard local control interfaces and protocols or provide for a local interface and published protocol to enable a site Energy Management Gateway to provide that standardised interface.

At least with the above approach, the integration of more than one smart DER appliance on a site (e.g. a home) under the control of a centralised standards compliant gateway (e.g. a HEMs gateway supporting an outbound IEEE2030.5 interface) ensures that disparate smart DER can be orchestrated locally on the site to deliver the best outcomes for both the consumer and the grid.

6. What interoperability functions are needed to help address the challenges and realise the value of DER?

As detailed in our answers to Question 5, standards based interfaces and most importantly local control capability of DER devices is paramount to the successful orchestration of DER for the benefit of consumers and for the enablement of grid services/support.

The above can be achieved now by mandating that as a minimum smart DER must have:

1) A standards based local control interface e.g. RJ45 / Ethernet, RS485 etc AND support a communications protocol such as Sunspec Modbus.

OR

2) A site Energy Management Gateway that provides an outbound standards compliant interface such as IEEE2030.5 and is able to accommodate proprietary local smart DER interfaces.

Based on current local and international trends we would expect that a likely long term solution will be a requirement that all smart DER devices are equipped with both a local standardised communications interface and support an agreed protocol such as IEEE2030.5

However, the optimum model (with DNSP support) that is evolving is one where the site (e.g. the home) is treated as one DER device, with a smart energy gateway (e.g. IEEE2030.5 compliant) making decisions on not only the local orchestration of the connected DER (for the benefit of the consumer), but also effecting responses to grid services requests, such that impact to consumer amenity is minimised whilst best achieving the requirements of the DNSP or AEMO.

For example, it may be desirable to reduce the aggregated profile of demand on a particular feeder with a constraint issue. This may be achieved through battery discharge but that would raise grid voltage and that may be undesirable. However, the DNSP may issue a command to an aggregator with their requirements for voltage and other metrics and the aggregator may elicit a different response from each site dependent of the site characteristics and amenity thresholds. This could be as simple as turning off load (e.g. pool pumps, water heater etc) in lieu of discharging a storage battery.

7. What interoperability capabilities are available now for consideration in DER minimum technical standards? What capabilities will be required in the future?

We have addressed much of this in our earlier answers. Our experience to date in the orchestration of disparate smart DER on consumer sites has identified that the most important interoperability requirements for common smart DER appliances are:

For Solar PV Inverters:

- A local standardised physical control interface (e.g. RJ45/Ethernet, RS485). Note that our experience is that where WiFi is offered, access to higher order control functions are NOT always available for effective control of the Solar PV Inverter.

- An industry standard protocol such as Sunspec Modbus that enables access to all reasonable functionality of the inverter, for control, as a minimum, of dynamic exports limits, and where connected to the inverter, for full control of storage batteries to enable both local and grid services.

For Battery Inverters (e.g. A.C. coupled embedded storage batteries)

- A local standardised physical control interface (e.g. RJ45/Ethernet, RS485). Note that our experience is that where WiFi is offered, access to all higher order control functions are NOT always available for effective control of the storage battery inverters. Further, batteries specifying cloud only interface/control solutions cannot be locally orchestrated/optimised by a 3rd party site Energy Management gateway. This limits interoperability with other smart DER and precludes the offer of a full range of grid services such as FCAS due to communications delays.

- An industry standard protocol such as Sunspec Modbus that enables access to all reasonable functionality of the battery inverter for full uninhibited local control of the consumer's asset for both local orchestration with other smart DER and for grid services.

For Water Heaters:

- Please see our response to Question 8 below.

The above approach to interoperability is a quick path to enable the local orchestration of smart DER appliances by for instance a standards compliant site Energy Management Gateway. We have found this to be the most successful and future proof way to integrate and orchestrate smart DER at a local site level.

8. What are the priority interoperability capabilities to be taken forward in minimum standards over the next 2 years?

Rheem's experience suggests that two way communication between DER devices provides the gold standard for interoperability. Two way communication is vital for both confirmation that a product has responded to a DR signal, as well as providing the

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visibility regarding the operation of various appliances on a single site, enabling better DER orchestration and management of consumer amenity.

Unfortunately AS4755.3, scheduled to be mandated within the next 2 years, does not recognise the need for two way communication, which makes it a fundamentally flawed solution for a range of DER. Conversely, AS 4755.2 (currently under development) is a significantly superior standard as it deals with a more sophisticated DER arrangement including two way communication, cyber security, consumer control and greater interoperability. We are, however, concerned that lower cost 4755.3 appliances are set to dominate the market and are likely to undermine the uptake of superior 4755.2 appliances, especially where some form of 4755 compliance is mandated.

Rheem is also concerned that adoption of AS 4755 for demand response capable electrical products overlooks international standards such as CTA2045 that have the potential to deliver better outcomes for future DER markets and participants.

9. Should the DER Visibility and Monitoring Best Practice Guide developed by a sector of industry participants be utilised as a basis for review and inclusion in future minimum DER technical standards, and if not what other options should be considered?

Any standard should be reviewed by all parties that may be affected. The architecture adopted for the interoperability of DER will affect compliance with any such standard. For instance, where the standard is silent on best practice in the collection of static and real time dynamic data sets, the outcomes may be less than favourable in the instances where the data that would have been collected is the most valuable. As an example, DER such as embedded storage batteries that cannot be locally connected / orchestrated on a consumer site (by for example a standards based site energy management gateway) will not be orchestrated with other smart DER at the site, especially when there is a loss of site communications. Such a loss of site communications has a higher probability of occurrence during for an extreme weather event that will also impact grid security of supply. It is during these events where data sets stored and later retrieved can deliver valuable insight into the operation of orchestrated DER on a consumer's site.

We believe that further, wider consultation with industry on the guide is required to ensure it meets the needs of not just recognised DER such as Solar PV inverters and embedded storage batteries, but also emergent DER such as smart water heating.

10. What developments exist in communications, data and interoperability systems, for consideration in future DER minimum technical standards?

The DER minimum technical standards adopted should not seek to restrict the communications layer technology adopted, provided there is adherence to industry standards. As we have detailed in our responses, we see a move to embrace IEEE2030.5 as a mandated requirement, at least for an outbound connection to a consumer's site as the most likely path forward. Whilst the adoption of IEEE2030.5 at a DER appliance level is a consideration, we do not feel this should be mandatory, but rather optional (with periodic review) provided that the smart DER devices can be successfully integrated/orchestrated with other smart site DER, either directly via a standardised local communications interface and a standardised protocol (see previous answers), or in conjunction with a standardised site energy management gateway that supports IEEE2030.5

11. Should the Australian Implementation Guide for IEEE 2030.5 currently under development by a sector of industry participants be utilised as a basis for review and inclusion in future minimum DER technical standards, and if not what other options should be considered?

Yes it should for all the reasons given in our previous answers such as:

- Enables one point of connectivity to a site (e.g. site edge, energy management gateway);
- An industry supported connectivity standard for all DNSP's and AEMO;
- A mechanism to ensure the orchestration of all smart DER on a site for the benefit of consumers and the grid;
- An enabler to allow transfer of consumer's site DER to another energy market service provider for commercial reasons (consumer seeking a different offer) or in the event an energy market service provider can no longer provide a service due to financial or other considerations;
- As a mechanism to enhance grid security of supply, for example, AEMO taking override control of aggregated sites via a standardised IEEE2030.5 interface where there is a threat to grid security of supply due to the actions of a foreign actor that has taken control over an aggregation of consumer sites.

13. What are the benefits and risks/costs of staging implementation of the initial standard across jurisdictions?

Australia is a relatively small market, and many of the DER devices that will be sold on our market are sourced from factories and suppliers that require longer production runs to keep costs competitive. A staged rollout by jurisdiction is unlikely to be financially viable for suppliers given the low demand associated with some Australian jurisdictions, and the resultant higher costs associated with smaller production runs. Any higher costs would of course be passed on to consumers, which in turn could undermine acceptance of the DER policy. Rheem would therefore support a national rollout, staggered by technology type, to ensure financial impacts are minimised across a category of DER products.

Given these concerns, and in the interests of starting the journey quickly, we would recommend that the initial stages of DER rules development focus on those products that are already well advanced along the DER continuum. Responsiveness, connectedness and interoperability of PV and battery inverters should be the first priority of any standards rule-making as these are likely to be the easiest to implement and provide the greatest return on investment. DER standards for other more basic products, including the communication protocols needed to control them, could then be developed to ensure that consumers and manufacturers are not disadvantaged as their stand-alone appliances become part of the wider grid.

As you will have gathered from this paper, Rheem supports the need for a more consistent approach to DER standards and therefore welcomes this initiative. Rheem's position on any new regulation is that it should be well considered, future proof, have a long term horizon, and be signalled in advance. In the case of DER we have long held concerns that a lack of co-ordination in communication and interoperability could, if coupled with the regulatory overreach of mandated quick fixes, create a variety of DER products that could not work together, or which will fail to provide a benefit to the consumer. We are hopeful that the outcomes of this review ensures that Australia does not suffer this fate.

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

Yours Sincerely

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