

Ofgem Consultation:

Quicker and more efficient distribution connections

Prepared by Honeywell

May 2015

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Introduction

Ofgem is investigating the factors surrounding network spare capacity to accommodate new connections. Significant building works, construction time and customers having to pay upfront for network reinforcement can all affect whether or not a project goes ahead.

Looking forward, if new capacity can be created in anticipation of future connection requirements then delays can be avoided. This includes DNOs finding smart ways to reduce the need for additional capacity.

Honeywell cannot provide a view on many of the factors involved in network connections but, based on experience working with DNOs to use digital solutions to provide smarter ways to 'free up' network capacity, does wish to provide a response to Question 22 in scenario 4.

Honeywell would be more than willing to meet with Ofgem or answer any questions Ofgem may have on the information contained in this response paper.

Honeywell Response

Executive summary

Honeywell is a Global Company with extensive experience of working with Governmental Energy Departments and Energy Regulators and providing tailored Demand Side Response (DSR) solutions for Utilities, TSOs, DNOs and DSR Aggregators around the world.

Honeywell has proven that DSR technology can have a major impact on helping DNOs to improve the resilience of their electricity infrastructure in a simple and cost effective manner such as in its application for managing supply-demand issues in SSEPD's LCNF Thames Valley Vision project and across the world.

With much of this DSR accessed by adjusting electrical load temporarily in buildings in an automated fashion without adversely affecting the building's performance or comfort conditions, the UK's significant building stock can be considered as potential 'storage facilities', offering a flexible resource which can help DNOs to 'free up' capacity to manage their network in a fast, reliable, clean and cost effective manner.

Employing open communication standards for DSR allows for the greatest number of competitive offerings and participants. It also enables DNOs (and others) to avoid being locked-in to a single provider's proprietary technology.

DNOs can access the network capacity management service from competing DSR Aggregators. This would ensure they obtain the service in the most cost effective manner. However, DSR Aggregators need the surety of long term DSR provision to enable business models to be attractive and so long term contracts need to be offered, justifying the significant investment they need to make in a DSR solution infrastructure.

Ofgem invited responses addressing some or all of the questions in its 'Quicker and more efficient distribution connections' consultation of 19 February 2015. Honeywell has provided an answer to question 22 in scenario 4:

Scenario 4: Other ways of making it easier to connect

Reducing the need for reinforcement via network management

Q22. Are there any other changes which could be made to reduce the need for reinforcement?

Answer

A key challenge for all DNOs is that it is difficult for them to predict what type of new customer connections will emerge on the networks they manage. This uncertainty introduces major risks for anticipatory reinforcement, predominantly being the financial investment in reinforcement work in advance of forecast connections.

If the expected number of connections does not occur for a number of reasons outside of the DNO's control eg negative economic conditions, the DNO can effectively be left with 40 year life stranded assets costing consumers many millions of pounds.

In addition, the growth of renewable energy sources such as solar PV is creating network headroom issues for DNOs. Due to capacity issues on certain 'near full' networks, DNOs are unable to manage the feeding back of electricity to their networks at various times of peak supply. This results in DNOs informing customers that they are unable to accept further connections for renewable energy sources to these networks.

A new 'tool' which DNOs can utilize to manage network capacity is Automated Demand Response (ADR). Buildings connected to a DNO's network adjust their electrical demand by responding to a request signal from the DNO via the internet. In this way, a DNO can free up network capacity at times of peak demand. This enables the DNO to be able to cater for additional connections to its networks and defer network reinforcement.

DNOs can access the ADR tool for network capacity management as a service provided by competing Demand Side Response Aggregators. This ensures the DNOs obtain the service in the most cost effective manner. It also means that should external factors occur which would reduce demand on a network, such as a large electricity using facility being closed down, the DNO can simply cancel the service (within the contract terms). This then avoids the DNO being left with the costly stranded assets should traditional reinforcement have been made.

ADR systems are 'cloud based', meaning that they are constantly updated at no extra cost to the DNO, there are no development costs or server costs to the DNO and the software license can be cancelled when the system is no longer required.

This solution exists today and has been proven on SSEPD's Thames Valley Vision LCNF project where 30 buildings on their Bracknell network (and other networks) are connected to an ADR system, enabling SSEPD operators to adjust load on the network and create headroom at times of peak demand or stress. To date, over 250 load adjustment events have been conducted by SSEPD without a single person in any of the participating buildings noticing or being adversely affected. 3% of network load has been shown to be reduced solely from 10 of the buildings and SSEPD plans to hold >1000 load adjustment events over the next twelve months, providing

network headroom management for up to 3 hours at different times of the day and different days of the week.

For load adjustment periods of greater than ~3 hours, ADR can be supplemented with other cost effective, clean solutions such as energy storage.

ADR systems employ the internet using *open* signaling standards; an important consideration. Systems employing open standards would facilitate the development of an inclusive and competitive service market for DSR, from both individual facility owners and third party service providers (DSR Aggregators). This also enables any building using these standards to participate, independent of the controls or metering they have in place. It also means that the DNOs and building owners would avoid being locked-in to a single solution provider's proprietary technology.

Flexible Load – *a large, clean, untapped resource that exists across the UK*

To maintain the daily comfort and working conditions staff and visitors require, commercial and industrial buildings use electricity to power a range of devices such as lighting, heating, cooling, ventilating, air conditioning systems, pumps, fans and motors.

However, the electricity to these devices can be turned down or off for short lengths of time without adversely affecting the building's performance or comfort conditions. This is called the building's 'Flexible Load'. When flexible loads are aggregated across many sites in a co-ordinated and automated fashion, a 'Virtual Power Plant' (VPP) of negative watts or "Negawatts" is created on a particular network. Negawatts can provide significant operational and financial value to DNOs across the UK.

The DNOs would pay for the value a building's flexible load provides based on the contribution the building makes via the DSR Aggregator.

Flexible Load is a unique asset which is virtually untapped in the UK. This is due to three main reasons:

- Today DSR solutions have favoured fossil fuelled generation over clean demand adjustment or DNOs simply replace constrained distribution assets with larger equipment and do not consider using demand side response to manage existing assets.
- A lack of technology solutions which can deliver flexible load in a cost-effective, reliable, fast, automated and scalable fashion for DNOs.
- A lack of awareness by the UK's building owners of the value their flexible load could provide and how they could participate to offer it to DNO demand response programmes.

Automated Demand Response - *A new, simple but highly effective solution*

Automated Demand Response (ADR) is a proven technology solution with many Giga Watts of "negative load" already being utilised to reduce demand with success, in other parts of the world such as the USA, China, India and Australia. And recently ADR has been implemented for demand response programmes in the UK as described above for SSEPD.

ADR brings full automation to demand response by implementing automated market participation for DNOs and building owners. Its functionality supports programmes that range from simple electricity load curtailment to complex time of use, dynamic pricing and customer bidding. Demand Response event and tariff information from DNOs is turned into standardised 'OpenADR' signals which are received via the internet by an Open ADR Gateway device located on each building participating in the ADR programme. The Gateway will trigger an appropriate action based on the set of rules defined for the event and pre-approved by the building owner. This enables highly predictable electricity load reductions to be automated in direct collaboration with building owners in a way that has no impact on the building's performance or comfort conditions for its occupants.

The Important Role of Open Standards – *Enabling Competition & Protecting Building Owners*

While in many parts of the world, including the United States, automation of Demand Response programmes is widely accepted as an effective industry solution for shifting and shedding electric loads, unfortunately, many of the industry solutions available today are not standardised, creating problems for DNOs, Demand Response Service Providers (Aggregators) and Regulators. The Open Automated Demand Response (OpenADR) Alliance was formed to accelerate the development, adoption and compliance of OpenADR standards throughout the energy industry. Indeed, a number of Regulators in the US including in California, now *mandate* the use of the OpenADR standard for all demand response programmes. The European Commission supports its use in Europe.

The OpenADR standard allows any building using OpenADR compliant hardware to understand event or tariff messages and respond in an automated fashion. OpenADR is a communications data model built upon Internet Standards including XML and much of the complexity of the Demand Response programme is translated into simple signals for the building's existing control system. An open protocol allows for the greatest number of competitive offerings and participants.

The use of open standards is an important consideration for the UK Government as it facilitates the development of an inclusive and competitive service market for demand response going forward. This enables any building using a simple, low cost (hundreds of GB pounds, not thousands) OpenADR Gateway or OpenADR compliant plant (increasingly being developed by manufacturers) to participate. It also enables DNOs to avoid being locked-in to a single ADR provider's proprietary technology.

OpenADR leverages existing building controls and open protocol communication standards to help lower the cost of delivering ADR. For more information, visit the Open ADR Alliance, an independent industry global association (<http://www.openadr.org/>) which supports the adoption of OpenADR for demand response.

Commercial Considerations – *Service Providers need financial assurance*

While modern ADR technology is fast, simple, reliable, proven and very cost effective, for example, to provide 3 MW of clean DSR can entail connecting and aggregating the flexible electrical demand load from over 15 large buildings. To do this, DSR Aggregators must invest in:

- a. The IT system infrastructure required to monitor, control, action and audit DSR events – most often an annual software license.
- b. The set-up and running of an operations centre, including staff.
- c. The building audits, load shedding strategy design and controls technology required to connect buildings to the system.
- d. The incentive payments the DSR Aggregator must pay building owners for their availability and participation in DSR calls.

Taking these considerations into account when offering contracts for DSR, would greatly improve the attractiveness of investing in its provision for DNOs by DSR Aggregators.

Summary

DSR technology such as Automated Demand Response (ADR) offered to DNOs as a service can be used by the DNO as a simple, cost-effective and reliable tool to manage network capacity issues and provide headroom to enable future network connections without the potentially costly risks of traditional reinforcement.

ADR is a proven solution and should be considered by Ofgem when specifying solutions that DNOs should consider when managing their future network connection issues.

End
