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Dear Colleague

**Consultation on accommodating Demand Side Response in Engineering Recommendation P2/6**

Through this letter Electricity North West is consulting with the industry, to gather views on the ability of Engineering Recommendation P2/6 (ER P2/6) "Security of Supply" to recognise appropriately customer load management and demand side response (collectively termed DSR) and the requirement or otherwise for modification of ER P2/6 in the short term to include explicitly the effects of DSR.

ER P2/6, through definitions of Group Demand and Network Capability, or otherwise, does not explicitly specify the consideration of the intermittent and controlled nature of loads provided by DSR to be evaluated in security of supply assessments. Consequently, the potential avoided reinforcement benefits due to DSR could be restricted.

It is proposed that changes to ER P2/6 are required to explicitly allow for demand side response to ensure that the full benefits of the growing number of novel operational techniques can be realised without the need for derogations.

This could be considered as an immediate issue as distribution network operators begin to trial the use demand side response for the deferment or avoidance of network reinforcement, whilst strict compliance with ER P2/6 is necessitated through its inclusion in the Distribution Licence<sup>1</sup>. Ofgem's recent consultation<sup>2</sup> on changes to LCN Fund governance suggests that more future projects supported by the LCN Fund will explore techniques to reduce or shift electrical demand, so increasing the need to resolve uncertainties regarding ER P2/6 compliance and DSR.

An example of the current trialling of DSR is Electricity North West's Capacity to Customers (C<sub>2</sub>C) project<sup>3</sup>. This project which is supported by Ofgem's Low Carbon Networks Fund aims to increase the amount of energy that can be transmitted through existing network infrastructure by using the capacity that exists within the current network to meet the requirements of ER P2/6.

It has already been recognised that a wider review of P2/6 is required as discussed in my open letter<sup>4</sup> as Chairman of the Distribution Code Review Panel, dated 11 December 2012. However, resolution of wider security issues are likely to result in a significant update which is likely to take several years to complete. Hence we are consulting on the need for an update just related to recognising DSR within ER P2/6 in the interim period. This is based upon an anticipated

<sup>1</sup> Distribution Licence : Standard Licence Condition 24.1 states "The licensee must plan and develop its Distribution System in accordance with: (a) a standard not less than that set out in Engineering Recommendation P.2/6 of the Energy Networks Association so far as that standard is applicable to it;"

<sup>2</sup> [http://www.ofgem.gov.uk/Networks/ElecDist/lcnf/Documents1/Electricity demand reduction.pdf](http://www.ofgem.gov.uk/Networks/ElecDist/lcnf/Documents1/Electricity%20demand%20reduction.pdf)

<sup>3</sup> <http://www.enwl.co.uk/c2c>

<sup>4</sup> [http://www.energynetworks.info/storage/P2\\_Security\\_of\\_Supplies\\_Open\\_Letter.pdf](http://www.energynetworks.info/storage/P2_Security_of_Supplies_Open_Letter.pdf)

increase in the use of DSR throughout this distribution price control period (to March 2015), and the next, referred to as RIIO ED1, beginning April 2015.

If the outcomes from this consultation recommends any changes to ER P2/6 these shall be referred to the Distribution Code Review Panel which presides over the formal governance of ER P2/6, and ultimately to Ofgem for the approval of any changes.

Our detailed reasons for the requirement to consider modifications to ER P2/6 in the short term are provided in the Annex to this letter along with discussion of options for the changes.

Respondents to this letter are invited to comment on the proposals and in particular the following questions:

- 1) Do you see a likely need for derogations from ER P2/6 if it were not changed to accommodate DSR in the short term?
- 2) Is a detailed description of how DSR is to be incorporated required or would the lesser change simply making reference to an appropriate allowance be sufficient?
- 3) Do you consider that ER P2/6, should in the short term, include limits for loading of an intact system (no outages) to restrict pre-fault loading including responsive demands?
- 4) Should a prospective allowance for responsive demands be used to adjust the Network Capability or Group Demand defined within ER P2/6 or is an alternative approach required?
- 5) Is it necessary to develop a detailed methodology to evaluate the allowance for responsive demand, considering such factors as: demand capacity, diversity between responsive demands, contractual restrictions, reliability of automation controlling demand and connection voltage?

Responses to this consultation are invited by email to [paul.turner@enwl.co.uk](mailto:paul.turner@enwl.co.uk) by Friday 22 February 2013.

Yours sincerely,

Mike Kay  
Networks Strategy & Technical Support Director

# Consultation on accommodating Demand Side Response in Engineering Recommendation P2/6

## ANNEX

### 1 Background

Compliance with Engineering Recommendation P2/6 is a distribution licence condition (Standard Licence Condition 24, “Distribution System planning standard and quality of performance reporting”) and is included as a reference document at Appendix 1 of The Distribution Code.

The evaluation of the effects on demand levels due to the operation of responsive loads is not explicitly permitted in ER P2/6. However, DNOs are able to make allowances for individual customers when undertaking customer connections and network reinforcement assessments. Guidance Note 1 of The Distribution Code permits that a customer can elect to receive security at a level lower than a ER P2/6 connection, provided that it does not affect the quality of supply to any other customer in that network.

For this reason the industry might consider that ER P2/6 does accommodate individual and collective responsive demands and so it is considered that clarification is required as suggested by this consultation.

Demand side response should allow consumers to respond to variations in the price of electricity which could reflect environmental impacts and accept commercial contracts which will allow the Distribution Network Operators (DNOs) to avoid system reinforcement and network construction through better use of the existing assets. The industry is now beginning to employ such techniques and their use is likely to grow during next price control period R110 ED1 beginning April 2015. The appetite to explore the application of demand side response is growing due to the anticipation that it will contribute to the Government’s targets to reduce carbon emissions through the avoidance of network reinforcement.

Wholesale review of ER P2/6 has been suggested in the open letter<sup>5</sup> from the Chairman of the Distribution Code Review Panel. However, it is not anticipated that the timescales of the proposed major modification will be suitable for the more imminent widespread application of demand side response. Consequently, this consultation is based upon how responsive demand behaviour could be explicitly incorporated within the existing ER P2/6 in the short term.

### 2 Electricity North West’s Capacity to Customer Project

In November 2011 Electricity North West’s Capacity to Customers (C<sub>2</sub>C) project was awarded £9.1 million funding from the Low Carbon Networks Fund<sup>6</sup>. The C<sub>2</sub>C project aims to show how, through the use of new technology and innovative commercial contracts, the amount of energy that can be transmitted through the existing infrastructure can be increased. Within the trials the project proposes to take advantage of the capacity that presently exists within the network<sup>7</sup> to allow new Low Carbon Technologies to connect to the existing distribution network, without reinforcement. It is proposed that new and/ or existing customers are allowed to connect new demands resulting in a system loaded beyond the level which could be supplied in compliance with ER P2/6, based on the understanding that they will reduce their demand when the system is operating abnormally ie in an outage/fault Condition. Widespread rollout of C<sub>2</sub>C contracts could lead to reduced costs for new connections, incentive payments for participating businesses and reduce the amount of new infrastructure that would normally be needed to meet the growing demand for electricity.

<sup>5</sup> [http://www.energynetworks.info/storage/P2\\_Security\\_of\\_Supplies\\_Open\\_Letter.pdf](http://www.energynetworks.info/storage/P2_Security_of_Supplies_Open_Letter.pdf)

<sup>6</sup> <http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=163&refer=Networks/ElecDist/lcnf/stlcnf/year2>

<sup>7</sup> An obligation enshrined in the ER P2/6 Security of Supply document

The C<sub>2</sub>C project will involve energy users in the region signing up to a trial which will offer incentives to delay restoration of their non-essential energy usage following a circuit outage. This 18 month trial will assess the willingness of new and existing customers to adopt new forms of commercial arrangements ie post fault demand side response and also test associated technical arrangements to automatically provide the response.

The existing network will be enhanced to provide the active management functionality required to operate the system within the proposed commercial arrangements. Proven low cost remote control will be installed at Normal Open Points (NOP), between two adjacent radial high voltage (HV) circuits which will be closed to form a HV closed ring, along with additional remote control at intermediate points on both HV circuits. The new automation will allow flexible and rapid restoration of supplies to customers following an outage, and decrease the amount of time customers are without supply due to a fault. Also, the automation will minimise the need to manage C<sub>2</sub>C demands, even though this is permitted by their contract, by ensuring that as many loads as possible are reconnected within the capability of the network. Further information on the C<sub>2</sub>C project is available from the project website<sup>8</sup>.

Ofgem granted a derogation from ER P2/6 in order to trial the proposed C<sub>2</sub>C operating regime. However, a small number of respondents to the Ofgem consultation on our derogation commented that such a derogation was not required because ER P2/6 did not specifically exclude allowance for responsive demand. This highlights some of the lack of clarity regarding the interpretation of ER P2/6.

Electricity North West recognises that planning standards can be interpreted to preclude the use of demand side response and so committed to review standards with regard to accommodating the trialled techniques as part of the C<sub>2</sub>C project. An internal workshop was hosted and an industry workshop has been organized to help inform the proposal for changing ER P2/6.

### 3 Drivers for Change

Demand side response is already being trialled; specifically the LCN Fund is supporting this through a number of projects, for example “Customer-Led Network Revolution” delivered by Northern Power Grid, Western Power Distribution’s FALCON project, “Low Carbon London” delivered by UK Power Networks and Southern Electric Power Distribution’s “Innovation Squared” project. It is essential that the benefits from any wide spread application of demand side response are not restricted by our industry standards. It is anticipated that the number of trials of demand side response will increase, particularly within Tier 1 LCN Fund projects.

The requirement to be able to make allowance for the operation of responsive demands with confidence whilst remaining compliant with ER P2/6 is likely to be soon, meaning that the changes must be made in the short term.

The views of the industry expressed informally and through previous consultations have highlighted confusion and how ER P2/6 could be interpreted differently. We suggest that there is a need for clarification of responsive demand within ER P2/6 in the short term and hence are interested to hear if the existing ER P2/6 may influence your plans to apply demand side response. Hence we ask the question:

**Question 1: Do you see a likely need for derogations from ER P2/6 if it were not changed to accommodate demand side response in the short term?**

### 4 Proposals for Change

Assuming a need for change to ER P2/6, the issue becomes how the changes might be made. In this section we start by considering how great the changes need to be; is detailed change necessary or is a simple modification sufficient to clarify the situation before the wider amendments come along in ER P2/7?

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<sup>8</sup> <http://www.enwl.co.uk/c2c>

Application of demand side response such as C<sub>2</sub>C introduces the possible need for more checks on loading in an intact system rather than only the system with outages. In the text below we consider if it is necessary to describe the additional assessment in ER P2/6. We then move on to consider where an allowance for responsive demand would fit within ER P2/6 and what influences how big the allowance for responsive demand should be.

#### **4.1 Overall**

There are two potential options when considering the overall change to ER P2/6; the first option is for minimal change and the second is for inclusion of a detailed methodology.

The minimal change approach could simply involve permitting consideration of demand side response within system security assessments by adding a generic phrase or clarifying the inclusion of responsive demand within the definitions. This would allow flexibility within the application of ER P2/6 to reflect the evolving demand side response techniques whilst remaining compliant and being able to realise the benefits of responsive demands.

However, the alternative approach of including a detailed methodology, which would define how to evaluate the allowances for responsive demands in security assessments, would ensure consistency.

Preferences with regard to the required level of detail expressed through responses to this consultation will be used to inform the recommended changes. Our question is therefore:

**Question 2: Is a detailed description of how demand side response is to be incorporated required or would the lesser change simply making reference to an appropriate allowance be sufficient?**

#### **4.2 Need for System Intact Assessments**

Traditionally network planning is based upon ER P2/6 restoration requirements and checks that the load level is within the rating of the system with the worst case critical outage. Introduction of widespread responsive demand, depending on its behaviour, may require system planners to undertake an assessment of the intact system, based upon the capacity of the network without an outage.

We suggest that it may be appropriate to include operational limits for an intact system within ER P2/6 for consistency. The National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS), applicable to GB transmission systems, includes definition of system normal operational requirements in addition to system planning criteria. ER P2/6 is the equivalent distribution network standard, but differs because it only provides planning requirements and operational limits are inferred rather than specific.

Preferences with regard to the requirement for system intact assessments within ER P2/6 expressed through responses to this consultation will be used to inform the recommended changes. Hence our question is:

**Question 3: Do you consider that ER P2/6 should in the short term include limits for loading of an intact system (no outages) to restrict pre-fault loading including responsive demands?**

#### **4.3 Where to include an allowance for Responsive Demand**

A system's ability to satisfy the requirements of ER P2/6 is judged by comparing the Group Demand with the capability of the network. Group Demand is presently defined as the sum of the Measured and Latent demands, where Latent demand is the increase in demand which would be observed if all distributed generation (DG) in the group were not producing any output. Capability of the network is presently assessed considering the capability of the network equipment following an outage of the most critical circuit, and includes allowances for the transfer capacity to adjacent circuits and for any appropriately available DG.

Options for incorporating an allowance for Responsive Demand into ER P2/6 include:

- i. Adjust Group Demand
- ii. Adjust Network Capability
- iii. Define an additional demand level or network capability level.

### 4.3.1 Adjusting Group Demand

Group Demand would need to be decreased by an allowance for the responsive demands. Advantages of this approach include the view that Group Demand reflects the load to be restored following an outage and there may be no need to restore responsive demands. Also, Group Demand is often the basis of planning load forecasts in which it may not be appropriate to include responsive demands. The disadvantage with subtracting an allowance for responsive demand from Group Demand is that responsive demand is measurable as part of Group Demand and so it might be considered inappropriate to not leave it within Group Demand.

### 4.3.2 Adjusting Network Capability

The alternative is to increase the network capability by an allowance for responsive demand in the way that Transfer Capacity and Distributed Generation contribution are presently added to the capacity of the network. A disadvantage of this approach is that Group Demand would remain unchanged and consequently the Class of Supply associated with a demand may increase due to the demand taken by managed customers. The increase in Class of Supply may result in the requirement to provide improved system security which could be considered counter intuitive based on the objectives of demand side response. The definition of the Classes of Supply could be changed to make allowances for responsive demands and avoid any increase in security of supply due to the connection of such customers.

### 4.3.3 Additional Definitions

Definition of an additional demand level inclusive of responsive demand or definition of a new network capability may be considered more appropriate, but these options would be less in line with the present ER P2/6.

Preferences expressed through responses to this consultation will be used to inform the recommended changes. Hence our question is:

**Question 4: Should a prospective allowance for responsive demands be used to adjust the Network Capability or Group Demand defined within ER P2/6 or is an alternative approach required?**

## 4.4 Evaluating an allowance for Responsive Demands

The actual consumption taken by responsive demands will fluctuate over time, including daily, weekly and seasonal variations, and in the absence of measurements it is likely to be appropriate to evaluate an allowance for responsive demand.

The summation of the Maximum Capacities, MCs, of these customers would reflect the theoretical maximum benefit that could be achieved when disconnecting all responsive demand for a circuit outage. However, this total benefit is unlikely to occur in practice.

Development of a methodology to evaluate an allowance for responsive demands would need to be a compromise. Over estimation might result in a level which cannot be achieved in practice, but, under estimation might result in a more onerous assessment of security of supply.

Evaluation of a responsive demand allowance at primary level and above could potentially require the impractical summation of multiple responsive demands and the methodology would need to accommodate this and make the necessary approximations.

An evaluation methodology is likely to be based upon:

- i. Capacity of responsive demand
- ii. Diversity
- iii. Contractual restrictions

- iv. Reliability of the automation controlling responsive demands
- v. Voltage of the assessment and connection of the responsive demands.

It is suggested that the allowance for responsive demand could be calculated using a scaling factor, similar to the 'F' factor used in the determination of the contribution from intermittent distributed generation within the existing ER P2/6. The scaling factor would have dependencies on the five influences listed above.

It is suggested that a de minimis level could be defined below which there would be no need to evaluate the allowance for responsive demands, again similar to the handling of distributed generation.

**Question 5: Is it necessary to develop a detailed methodology to evaluate the allowance for responsive demand, considering such factors as:- demand capacity, diversity between responsive demands, contractual restrictions, reliability of automation controlling demand and connection voltage?**

## 5 Next Steps

It is our intention to collate responses to this consultation to inform the development of preferred proposals for amending ER P2/6. We shall share our proposals with the C<sub>2</sub>C project stakeholders and ensure that they are available to the wider industry through the project website. Ultimately, the proposals will be submitted to the Distribution Code Review Panel for their consideration.

In addition, outcomes from this consultation and any subsequent proposals shall be referred to Ofgem as part of the C<sub>2</sub>C project and may lead to a further consultation.

## 6 Responding to this Consultation

Responses to this consultation are invited by email to [paul.turner@enwl.co.uk](mailto:paul.turner@enwl.co.uk) by Friday 22 February 2013. Please address any queries with regard to this consultation to Paul Turner.