

Stage 03: Report to the Authority

Grid Code

GC0050 Demand Control And OC6

What stage is this document at?

01 Workgroup Report

02 Industry Consultation

03 Report to the Authority

This proposal seeks to modify the Grid Code to meet the existing capabilities and requirements of the Distribution Network Operators to implement Demand Control Instructions

The purpose of this document is to assist the Authority in its decision of whether to implement the proposed Grid Code Modification.

Published on: 29 April 2014



National Grid recommends:

National Grid supports the implementation of GC0050 as it better facilitates the Applicable Grid Code Objectives (i) and (iii)



High Impact:

Network Operators.



Medium Impact:

None identified



Low Impact:

None identified

Contents

1	<i>Executive Summary</i>	3
2	<i>Why Change?</i>	4
3	<i>Solution</i>	5
4	<i>Summary of Workgroup Discussions</i>	6
5	<i>Impact & Assessment</i>	11
6	<i>Consultation Responses</i>	13
	<i>Annex 1 - Proposed Legal Text</i>	14
	<i>Annex 2 – GCRP Paper pp11/02</i>	17
	<i>Annex 3 – Workgroup Terms of Reference</i>	21
	<i>Annex 4 – Results from Operation Juniper Demand Control Exercise</i>	23
	<i>Annex 5: Consultation Responses</i>	25



Any Questions?

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About this document

This document is the Report to the Authority for GC0050 which contains the responses to the Industry Consultation and the National Grid recommendation. The purpose of this document is to assist the Authority in their decision whether to implement the GC0050 proposed changes.

The revisions to the Grid Code proposed by National Grid and sent to the Authority require approval by that body and will, if approved, come into force on such date (or dates) of which Authorised Electricity Operators will be notified by National Grid, in accordance with the Authority's approval.

Document Control

Version	Date	Author	Change Reference
1.0	07 March 2014	National Grid	Final Report to the Authority
2.0	29 April 2014	National Grid	Re-submission of Final Report to the Authority

1 Executive Summary

- 1.1 GC0050 was proposed by National Grid following the submission of the Grid Code paper (pp11/02) on “Demand Control and OC6” (Annex 2). This paper described the existing Distribution Network Operators (DNOs) capability, and put forward the benefits for customers of using Voltage Reduction as a means of providing demand reduction. This paper proposed a revision of the Grid Code obligations relating to Demand Control OC6.
- 1.2 The Grid Code Review Panel recommended that a Grid Code Workgroup be established to consider the issues further and relevant Terms of Reference (ToR) (Annex 3) were agreed on 19 September 2012.
- 1.3 The Workgroup was established on 05 December 2012 and concluded on 21 November 2013 following 5 meetings.
- 1.4 Operation Juniper was organised by the Workgroup to ascertain the actual Voltage Reduction delivery timescales and achievable reduction in demand. Results from these tests showed that the majority of the reduction in demand deliverable via Voltage Reduction can be achieved within 5 minutes of implementation with all the achievable reduction in demand being delivered within 10 minutes. The results also showed that a 3% Voltage Reduction would reduce the demand by an average of 1.5% (Annex 4).
- 1.5 The Workgroup concluded that changing the Grid Code to require Voltage Reduction to be implemented within 10 minutes (rather than the present 5 minutes requirement) recognised the observed performance of the systems used to implement Voltage Reduction without increasing the risks to the transmission system as the majority of the demand reduction will be achieved within 5 minutes. Furthermore the enhanced understanding of the Voltage Reduction systems arising from the discussions together with the ability to explicitly request either a Voltage Reduction or Demand Disconnection service represents a reduction in the risk to the transmission system in a major incident.
- 1.6 An Industry Consultation was published on 30 January 2014 for 20 business days. The consultation completed on 28th February 2014 in which a total of four responses were received, all of which were supportive of the proposed changes, although it was noted that these changes should not increase the frequency in which Voltage Reduction is utilised as a means of Demand Control and any change in the frequency of usage should result in further consultation.

National Grid Recommendation

- 1.7 National Grid supports the implementation of GC0050 as it better facilitates the Applicable Grid Code Objectives (i) and (iii). This is achieved by:
 - Providing accurate information required to enable National Grid to better manage the transmission system in an emergency situation.
 - Facilitating information exchange between DNOs and National Grid such that accurate knowledge of available Demand Control tools is received in a timely manner.

2 Why Change?

- 2.1 The GCRP paper (pp11/02) summarised DNOs positions around Demand Control being implemented within five minutes and investigated the timing of each of the steps that need to be taken to implement Voltage Reduction.
- 2.2 The historic expectation has been that a 3% Voltage Reduction would deliver a demand reduction of 5%; however tests carried out in 2008 indicated that the demand reduction arising from a 3% Voltage Reduction was variable, and more likely to be in the region of 3%. The current drafting of the Grid Code requires a 5% reduction in demand at the time of the instruction be delivered by either Voltage Reduction or Demand Disconnection. DNO's have suggested that they are unlikely to actually deliver a 3% Voltage Reduction within a five minute period, and all DNOs agreed that Demand Control via Voltage Reduction is more likely to be completely delivered in a period between 5 and 13 minutes.

Background

- 2.3 The Grid Code obligations relating to Demand Control are documented in OC6.5. OC6.5.3 specifies the functional requirements of the scheme;
- 2.4 OC6.5.3
 - (a) Whether a National Electricity Transmission System Warning – High **Risk of Demand Reduction** or **National Electricity Transmission System Warning - Demand Control Imminent** has been issued or not:-
 - (i) provided the instruction relates to not more than 20 per cent of its total **Demand** (measured at the time the **Demand** reduction is required); and
 - (ii) if less than that, is in four integral multiples of between four and six per cent, each **Network Operator** will abide by the instructions of **NGET** with regard to **Demand** reduction under OC6.5 without delay.
 - (b) The **Demand** reduction must be achieved within the **Network Operator's System** as far as possible uniformly across all **Grid Supply Points** (unless otherwise specified in the **National Electricity Transmission System Warning - High Risk of Demand Reduction**) either by **Customer** voltage reduction or by **Demand Disconnection**, as soon as possible but in any event no longer than five minutes from the instruction being given by **NGET**.
- 2.5 The GCRP paper pp11/02 highlighted that most DNOs plan to achieve the Grid Code requirements by a combination of Voltage Reduction and Demand Disconnection. In relation to Voltage Reduction, there are two factors associated with the requirement i.e. demand reduction achieved (which in practice is likely to be less than previously expected) and the implementation time (which in practice is likely to be longer than as currently defined in the Grid Code).

3 Solution

- 3.1 The proposed solution is to amend OC6.5 and OC6.7 to improve clarity with regard to explicitly distinguishing between Voltage Reduction and Demand Disconnection services, and the implementation timescales.
- 3.2 The text required to give effect to the proposal is contained in Annex 1 of this document.
- 3.3 Regular assessment of Demand Control available via Voltage Reduction should be carried out through annual tests coordinated by National Grid with the DNOs.

4 Summary of Workgroup Discussions

Purpose & Scope of Workgroup

- 4.1 At the September 2011 GCRP, Alan Creighton presented pp11/02 which provided additional clarity on the effectiveness of the Voltage Reduction schemes deployed by most DNOs, identified the customer benefits of using Voltage Reduction as a means of delivering Demand Control and suggested a possible change to the drafting of OC6.5. The GCRP agreed that a Workgroup should be established to examine implementation timescales for Demand Control instructions.
- 4.2 The GCRP agreed that this issue required further investigation and approved the Terms of Reference.
- 4.3 The Workgroup met five times over the period between 05 December 2012 and 21 November 2013 where the following topics were discussed.

Grid Code Requirements in relation to OC6 and Demand Control

- 4.4 The Workgroup focused on Section OC6.5 of the Grid Code that allows National Grid to instruct DNOs to reduce demand by up to 20% in four stages, or under certain circumstances up to 40% in 8 stages. Each stage is nominally 5% to be delivered within 5 minutes of instruction. This facility is only used under extreme conditions when all available sources of generation have been exhausted and the only option available to balance the system is to reduce demand.
- 4.5 Discussions commenced around Demand Control and whether this can be achieved either through Voltage Reduction or the disconnection of customer demand. It has historically been assumed that the first two Demand Control stages can be achieved through Voltage Reductions with a 3% Voltage Reduction providing a 5% demand reduction, and a 6% Voltage Reduction providing a 10% demand reduction. Further demand reductions would require direct disconnection of customer demand.
- 4.6 Further discussions focused on the requirements within Grid Code OC6.5.3 which states that Demand Control should be implemented as soon as possible but in the event no longer than five minutes from the instruction being given by National Grid.
- 4.7 Uncertainty was expressed over where the 5 minute timescale originated as no documentation is available to provide a definitive answer. The Workgroup discussed that this timescale may have been originally worded as 'promptly', meaning the time taken to take the call and respond. It is suspected that five minutes comes from the same root as five minute reserve, in that it's the point where National Grid can reasonably expect to implement manual action following on from primary response (10 seconds) and secondary response (30 seconds to 30 minutes) to ensure that the system frequency is restored back within operational limits (in this case when there is no further reserve that can be called upon).
- 4.8 The Workgroup reached a view that currently not enough was known about the effectiveness of Voltage Reduction to provide certainty over what it can deliver.

Voltage Reduction

- 4.9 The Workgroup discussed that Voltage Reduction is implemented at DNO primary substations and the findings of the DNOs assessment of the implementation timescales presented in GCRP paper pp11/02. This assessment showed that, in practice the reduction in demand would be seen on the network between 5 and 13 minutes after the implementation of the Voltage Reduction instruction. This timescale arises from the sequential nature of the SCADA scripts and the communications infrastructure used to convey the instruction to the several hundred primary substations per DNO required to implement Voltage Reduction.
- 4.10 Alan Creighton summarised the paper that had been presented to the GCRP (pp11/02) to the Workgroup explaining DNOs positions around Demand Control being implemented with five minutes, and investigations on the timing of each of the steps that need to be taken to implement Voltage Reduction. The following points were discussed:
- The historic expectation was that a 3% Voltage Reduction would deliver a demand reduction of 5%; however studies carried out in 2008 had indicated that the demand reduction for a 3% Voltage Reduction was variable, and more likely to be in the region of 3%.
 - The Grid Code is drafted to require 5% reduction in the demand on the system at the time at which the instruction is given and this also introduced a degree of uncertainty around what would actually be delivered.
 - The information collated by the DNO's suggested that one DNO might be able to deliver a 3% Voltage Reduction within five minutes, however it was agreed that in general demand reduction is more likely to be delivered in a period between 5 and 15 minutes.
 - The results presented in the paper illustrated that not all DNOs expected to be able to achieve this 5 minute timescale and it was suggested by the DNOs that implementation of a Voltage Reduction instruction within 5 minutes may never have been achievable. However, as Demand Control has been rarely called upon there have been limited opportunities to assess the timescales for delivery. On those occasions where Voltage Reduction has been called upon the service has performed sufficiently to manage the issue on the transmission system at that time. This piece of work carried out by DNOs provided a view on the timescales in which Voltage Reduction could reasonably be expected to deliver a reduction in demand.
- 4.11 During the period that the Workgroup met some DNOs revised their systems for implementing Voltage Reduction, for example by running several SCADA scripts in parallel. The result of these efforts, as demonstrated by Operation Juniper, has been such that approximately 70% of the demand reduction deliverable by Voltage Reduction can now be expected to be delivered within 5 minutes.
- 4.12 Workgroup debated that the key advantage of Voltage Reduction as a means of Demand Control was that it generally has no observable impact on domestic, industrial or commercial customers and in particular does not result in disconnection of customer supplies. It was generally accepted that because of this Demand Control via Voltage Reduction, is a valuable tool that can be used in a system event to reduce the prospects of implementing Demand Control via Demand Disconnection. The key to its value is to understand the demand reduction that it is likely to deliver, the timescales in

which that reduction can be delivered and how it should be used in conjunction with other demand management tools available to National Grid.

- 4.13 Workgroup also debated feedback following internal discussions within National Grid concerning Voltage Reduction / Demand Disconnection requirements. The view of the Electricity National Control Centre (ENCC) at National Grid at that time was that the 5 minute timescale from instruction by National Grid is a requirement based on being able to stabilise and secure the National Electricity Transmission System in emergency situations. This is due to the initial time required to analyse incidents and instigate manual actions which would take 5 minutes, leading to a total time of 10 minutes. The view at the time was that timescales greater than 10 minutes from an initial incident were considered to place the system at increased risk.
- 4.14 Much of the discussion and suggestions, at this point, had been based on assumptions, as little or no testing has taken place in this area. The Demand Control response has never been formally tested (as black start is) it has only been used when required, which is on relatively rare occasions. It was highlighted that a benchmarking exercise with all DNOs could be beneficial.

Emergency STOR

- 4.15 In light of the above debate, emergency STOR was discussed. National Grid's current tender volumes equate to around 6GW of which 2.8GW is presently contracted. Within the implementation timescale suggested current availability in the market totals less than 50MW/hr far below the emergency requirement. Worst case scenario to be comparable with OC6 this only equates to 20% of overall demand needed to cover all demand in an emergency situation.
- 4.16 It was agreed by the Workgroup that STOR has potential to be part of the solution and the idea of emergency STOR is worth pursuing within other generation forums where National Grid participate, but not the whole answer for the demand control requirements of the Workgroup.

Review of Current Processes

- 4.17 The Workgroup discussed an option of explicitly separating the Voltage Reduction and Demand Disconnection elements of the present OC6 obligation such that these services could be called upon separately by National Grid depending on the rate at which a system incident develops; Voltage Reduction could be used in a slower developing incident (as this would take longer to implement and deliver a less certain demand reduction). Demand Disconnection however, could be used in a rapidly developing incident (as it would be implemented quicker and deliver a more certain demand reduction – although customer supplies would be interrupted). Based on the relationship between voltage reduction and demand reduction as it was understood at the time (i.e. as described in Paragraph 4.11), two Voltage Reduction (VR) stages of 3% were thought likely to deliver in the region of 3% Demand Reduction each. Consequently, to maintain the existing OC6 functionality of up to 20% Demand Reduction, three Demand Disconnection (DD) stages of between 4 – 6% would be required in addition to the Voltage Reduction stages.

In summary:

- VR Stage 1: 3% Voltage Reduction
- VR Stage 2: 3% Voltage Reduction
- DD Stage 1: 4-6% Demand reduction via Demand Disconnection
- DD Stage 2: 4-6% Demand reduction via Demand Disconnection
- DD Stage 3: 4-6% Demand reduction via Demand Disconnection

4.18 Following discussion within the Workgroup and with the ENCC, it was agreed that Voltage Reduction stages should be substantially implemented within 5 minutes of instruction from National Grid with complete delivery within 10 minutes. Demand Disconnection stages should be completed within 5 minutes of instruction from National Grid. ENCC agreed that the timescales for delivery of Demand Control through Voltage Reduction could be relaxed to 10 minutes as Demand Disconnection stages would remain at a delivery time of within 5 minutes.

Training Procedures

4.19 The Workgroup discussed the merits of an educational process with a familiarisation of Demand Control implementation procedures to identify where any improvements could be made prior to any national testing. DNOs and National Grid reviewed the existing processes and made some minor procedural updates before the formal exercise took place.

4.20 DNOs and National Grid reviewed current procedures for managing a system event (rather than specifically implementing a demand reduction instruction which is discussed earlier), and the existing information that might be available such that DNOs could be made more aware of an unfolding incident so that they were better prepared to respond to a Demand Control instruction if it was issued. DNOs asked whether National Grid could share the document that is used to DNOs which is used in this situation, suggesting that this document should be very high-level and include process diagrams to clearly define procedures and management approvals. National Grids internal process was presented at the Working Group meeting 2.

European Codes

4.21 The Workgroup discussed potential changes required to comply with European Code changes. Currently there are no code requirements covering Demand Reduction criteria with reference in Article 7 Frequency Control Management of the Network Code for Operational Security that "Each TSO shall implement the necessary Remedial Actions, including Demand Side Management or Load Shedding in order to maintain the frequency quality within Operational Security Limits in its Responsibility Area."

Voltage Reduction Testing

4.22 The Workgroup discussed that a trial, Operation Juniper, should be carried out to enable the actual demand reduction delivered by a 3% Voltage Reduction to be established. The tests were carried out in autumn 2013 during different load windows, morning (10:00am-12:00pm) and afternoon (14:00pm-16:00pm) during periods of relative flat demand. Results from these tests can be found in Annex 4.

4.23 The results of Operation Juniper indicated that the demand reduction delivered via a 3% Voltage Reduction varied considerably, ranging from 0%

to 2.7% (average 1.5%), confirming that 5% demand reduction from Voltage Reduction was no longer achievable. This was less the initial assumptions of the Workgroup, which were based on the results of the tests carried out in 2008, that 3% Voltage Reduction would deliver a 3% demand reduction.

- 4.24 The results of Operation Juniper also indicated that the time to implementation was generally good and that all the demand reduction was observed within the proposed 10 minute requirement. Demand Control was substantially delivered within 5 minutes (70% delivered).
- 4.25 A copy of the full Workgroup Report can be found on the National Grid website at:

<http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/Grid-code/Modifications/GC0050/>

Workgroup Recommendations

- 4.26 Operation Juniper has shown that two Voltage Reduction stages can be expected to deliver on average 1.5% demand reduction each. In order to maintain the existing OC6 functionality of up to 20% demand reduction, this would require three Demand Disconnection stages of between 4 – 6% each.
- In Summary:
- VR Stage 1: 3% Voltage Reduction (expected to deliver around 1.5% demand reduction)
 - VR Stage 2: 3% Voltage Reduction (expected to deliver around 1.5% demand reduction)
 - DD Stage 1: 4-6% Demand reduction via Demand Disconnection
 - DD Stage 2: 4-6% Demand reduction via Demand Disconnection
 - DD Stage 3: 4-6% Demand reduction via Demand Disconnection
- 4.27 The Workgroup recommend that the changes to the Grid Code identified in Annex 1 should be progressed to Industry Consultation. The objective of these changes is to improve clarity with regard to explicitly distinguishing between Voltage Reduction and Demand Disconnection services, and the implementation timescales.
- 4.28 The Workgroup recommend that annual Voltage Reduction tests should be carried out with each DNO to confirm the demand reduction achievable via Voltage Reduction. These will be coordinated by National Grid.
- 4.29 The Workgroup recommend that DNO and ENCC procedures and documentation are reviewed, and required changes implemented, to clarify that where a DNO makes Voltage Reduction services available to National Grid, the Demand Control instruction clearly states whether it requires a DNO to implement Voltage Reduction or Demand Disconnection.
- 4.30 The Workgroup recommend that the Week 24 Guidance Document published by National Grid to provide guidance to DNOs is updated to reflect the changes in OC6.5 and OC6.7. In particular this will require a minor revision to section 4.2 and the pro-forma Table 12B provided by National Grid.

5 Impact & Assessment

Impact on the Grid Code

- 5.1 GC0050 requires amendments to the following parts of the Grid Code:
- OC6.5
 - OC6.7
- 5.2 The text required to give effect to the proposal is contained in Annex 1 of this document.

Impact on National Electricity Transmission System (NETS)

- 5.3 The proposed changes will enhance the economic and efficient operation of the National Electricity Transmission System. The changes will clarify achievable timescales and levels of demand reduction enabling the ENCC to better manage demand control procedures.

Impact on Grid Code Users

- 5.4 The proposed modification will not change the DNOs current operational practices hence the impact is negligible on Grid Code Users.

Impact on Greenhouse Gas emissions

- 5.5 The proposed modification will not have any impact on Greenhouse Gas emissions.

Assessment against Grid Code Objectives

- 5.6 National Grid considers that GC0050 would better facilitate the Grid Code objective:

to permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity;

This proposal better facilitates this objective by providing the information required to better manage the transmission system for the purposes of operating the transmission system in an emergency situation.

to facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity);

The proposal has a neutral impact on this objective

subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole; and

The proposal better facilitates this objective by providing the information required to manage the transmission system.

to efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency.

The proposal has a neutral impact on this objective

Impact on core industry documents

5.7 The proposed modification does not impact on any core industry documents

Impact on other industry documents

5.8 The proposed modification does not impact on any other industry documents

Implementation

5.9 National Grid proposes that GC0050 should be implemented 10 business days after an Authority decision.

5.10 Following implementation the DNOs will be required to provide changes to the Demand Control it will use, in accordance with OC6.5.3 (e). This should be done seven weeks after the implementation.

6 Consultation Responses

- 6.1 National Grid has consulted Authorised Electricity Operators (AEOs) on this issue. The consultation period opened on 30 Jan 2014 and closed on 28 Feb 2014. 4 responses were received during the consultation period.
- 6.2 The below table provides an overview of the 4 responses received. Copies of the responses are included in Annex 5.

Ref	Company	Supportive	Comments
C/10-CR-01	RWE	Yes	<ul style="list-style-type: none">• Satisfied that proposed change better facilitates the Grid Code objectives.• RWE participated in the workgroup and all comments have been made via this process.
C/10-CR-02	EDF Energy	Yes	<ul style="list-style-type: none">• Supportive of changes.• Any increase in frequency of usage of voltage reduction should result in future consultation.
C/10-CR-03	Electricity North West	Yes	<ul style="list-style-type: none">• Supportive• Proposed Grid Code revisions available to be implemented.• Encourages a review on how demand schedules are initiated such as direct control via SCADA link.
C/10-CR-04	Northern Powergrid	Yes	<ul style="list-style-type: none">• Supportive.• Participated in workgroup.

National Grid Comments on Responses

- 6.3 National Grid would like to thank all of the respondents for their comments regarding GC0050. None raised specific comments on the proposed changes.

Annex 1 - Proposed Legal Text

This section contains the proposed legal text to give effect to the proposals. The proposed new text is in red and is based on Grid Code Issue 5 Revision 1.

OC6.5 PROCEDURE FOR THE IMPLEMENTATION OF DEMAND CONTROL ON THE INSTRUCTIONS OF NGET

OC6.5.1 A **National Electricity Transmission System Warning - High Risk of Demand Reduction** will, where possible, be issued by **NGET**, as more particularly set out in OC6.5.4, OC7.4.8 and BC1.5.4 when **NGET** anticipates that it will or may instruct a **Network Operator** to implement **Demand** reduction. It will, as provided in OC6.5.10 and OC7.4.8.2, also be issued to **Non-Embedded Customers**.

OC6.5.2 Where **NGET** expects to instruct **Demand** reduction within the following 30 minutes, **NGET** will where possible, issue a **National Electricity Transmission System Warning – Demand Control Imminent** in accordance with OC7.4.8.2(c) and OC7.4.8.6.

OC6.5.3 (a) Whether a **National Electricity Transmission System Warning - High Risk of Demand Reduction** or **National Electricity Transmission System Warning - Demand Control Imminent** has been issued or not:

(i) provided the instruction relates to not more than 20 per cent of its total **Demand** (measured at the time the **Demand** reduction is required); and

(ii) if the instruction relates to less than 20 per cent of its total **Demand**, is in

- two voltage reduction stages of between 2 and 4 percent, each of which can be expected to deliver around 1.5 percent **Demand** reduction; and
- up to three **Demand Disconnection** stages, each of which can reasonably be expected to deliver between four and six percent **Demand** reduction,

each **Network Operator** will abide by the instructions of **NGET**, which should specify whether a voltage reduction or **Demand Disconnection** stage is required; or

(iii) if the instruction relates to less than 20 per cent of its total **Demand**, is in four ~~integral multiples~~ of **Demand Disconnection** stages each of which can reasonably be expected to deliver between four and six per cent **Demand** reduction,

each **Network Operator** will abide by the instructions of **NGET** with regard to **Demand** reduction under OC6.5 without delay.

(b) The **Demand** reduction must be achieved within the **Network Operator's System** as far as possible uniformly across all **Grid**

Supply Points (unless otherwise specified in the **National Electricity Transmission System Warning - High Risk of Demand Reduction**) either by **Customer** voltage reduction or by **Demand Disconnection**; ~~as soon as possible but in any event no longer than five minutes from the instruction being given by NGET.~~

- (c) **Demand Control** initiated by voltage reduction shall be initiated as soon as possible but in any event no longer than two minutes from the instruction being received from **NGET**, and completed within 10 minutes of the instruction being received from **NGET**.
- (d) **Demand Control** initiated by **Demand Disconnection** shall be initiated as soon as possible but in any event no longer than two minutes from the instruction being received from **NGET**, and completed within five minutes of the instruction being received from **NGET**.
- (e) Each **Network Operator** must notify **NGET** in writing by calendar week 24 each year, ~~of the integral multiples it will use with effect from the succeeding Financial Year onwards.~~ for the succeeding **Financial Year** onwards, whether **Demand Control** is to be implemented either:
 - i) by a combination of voltage reduction and **Demand Disconnection**; or
 - ii) **Demand Disconnection** alone;

together with the magnitude of the voltage reduction stages (where applicable) and for **Demand Disconnection** stages, the demand reduction anticipated. Thereafter, any changes must be notified in writing to **NGET** at least 10 **Business Days** prior to the change coming into effect.

OC6.7 EMERGENCY MANUAL DISCONNECTION

- OC6.7.1 Each **Network Operator** will make arrangements that will enable it, following an instruction from **NGET**, to disconnect **Customers** on its **User System** under emergency conditions irrespective of **Frequency** within 30 minutes. It must be possible to apply the **Demand Disconnections** to individual or specific groups of **Grid Supply Points**, as determined by **NGET**.
- OC6.7.2 (a) Each **Network Operator** shall provide **NGET** in writing by week 24 in each calendar year, in respect of the next following year beginning week 24, on a **Grid Supply Point** basis, with the following information (which is set out in a tabular format in the Appendix):
 - (i) its total peak **Demand** (based on **Annual ACS Conditions**); and
 - (ii) the percentage value of the total peak **Demand** that can be disconnected ~~(and in the case of that in the first 5 minutes it must include that which can also be reduced by voltage reduction)~~ (and must include that which can also be reduced by voltage reduction, where applicable) within timescales of 5/10/15/20/25/30 minutes.

(b) The information should include, in relation to the first 5 minutes, as a minimum, the 20% of **Demand** that must be reduced on instruction under OC6.5.

- OC6.7.3 Each **Network Operator** will abide by the instructions of **NGET** with regard to **Disconnection** under OC6.7 without delay, and the **Disconnection** must be achieved as soon as possible after the instruction being given by **NGET**, and in any case, within the timescale registered in OC6.7.
The instruction may relate to an individual **Grid Supply Point** and/or groups of **Grid Supply Points**.
- OC6.7.4 **NGET** will notify a **Network Operator** who has been instructed under OC6.7, of what has happened on the **National Electricity Transmission System** to necessitate the instruction, in accordance with the provisions of **OC7** and, if relevant, **OC10**.
- OC6.7.5 Once a **Disconnection** has been applied by a **Network Operator** at the instruction of **NGET**, that **Network Operator** will not reconnect until **NGET** instructs it to do so in accordance with **OC6**.
- OC6.7.6 Each **Network Operator** will abide by the instructions of **NGET** with regard to reconnection under OC6.7 without delay, and shall not reconnect until it has received such instruction and reconnection must be achieved as soon as possible and the process of reconnection must begin within 2 minutes of the instruction being given by **NGET**.
- OC6.7.7 **NGET** may itself disconnect manually and reconnect **Non-Embedded Customers** as part of a **Demand Control** requirement under emergency conditions.
- OC6.7.8 If **NGET** determines that emergency manual **Disconnection** referred to in OC6.7 is inadequate, **NGET** may disconnect **Network Operators** and/or **Non-Embedded Customers** at **Grid Supply Points**, to preserve the security of the **National Electricity Transmission System**.
- OC6.7.9 Pursuant to the provisions of OC1.5.6 the **Network Operator** will supply to **NGET** details of the amount of **Demand** reduction or restoration actually achieved.

Demand Control OC6**Industry Technical Code Group****Background**

1. The Grid Code obligations relating to Demand Control are documented in OC6.5. OC6.5.3 specifies the functional requirements of the scheme:

OC6.5.3
(a) Whether a National Electricity Transmission System Warning – High Risk of Demand Reduction or National Electricity Transmission System Warning - Demand Control Imminent has been issued or not:-

 - (i) provided the instruction relates to not more than 20 per cent of its total Demand (measured at the time the Demand reduction is required); and
 - (ii) if less than that, is in four integral multiples of between four and six per cent, each Network Operator will abide by the instructions of NGET with regard to Demand reduction under OC6.5 without delay.

(b) The Demand reduction must be achieved within the Network Operator's System as far as possible uniformly across all Grid Supply Points (unless otherwise specified in the National Electricity Transmission System Warning - High Risk of Demand Reduction) either by Customer voltage reduction or by Demand Disconnection, as soon as possible but in any event no longer than five minutes from the instruction being given by NGET.
2. Key points to draw out from these requirements are:
 - The demand reduction is a percentage of the demand at the time of the instruction
 - The requirement is to reduce demand; voltage control is a method of achieving demand reduction as is demand disconnection
 - There is some flexibility (4-6%) in the size of each block
 - The demand reduction should be uniformly applied
 - The demand reduction needs to be implemented within 5 minutes
 - There is a need to consider time for the Control Engineer to receive and interpret and respond to the instruction from NGET and initiate the SCADA switching sequence.
3. Most DNOs plan to achieve the Grid Code requirements by a combination of voltage reduction and demand disconnection. There are two key factors associated with this requirement i.e. the demand reduction achieved and the implementation time.

Voltage Reduction – Demand Reduction

4. The historic expectation was that a 3% voltage reduction would achieve a demand reduction of approximately 5% and that a further 3% voltage reduction would deliver a total demand reduction of 10%. Due to this expectation the standard industry approach is typically for voltage reduction to form the first two stages of demand control, thus providing a reduction in the demand on the transmission system whilst continuing to maintain supplies to all customers. This functionality is generally hardwired in to the voltage control schemes installed in approximately 3000 DNO primary substations (e.g. 66/11, 33/11 and 33/6kV substation).
5. Following the Black Start Exercise Phoenix, questions were raised about the effectiveness of voltage reduction given that distribution networks now supply an increasing population of non linear loads i.e. where the demand does not reduce

with the supplied voltage. Two Network Operators conducted limited tests on their live network during the summer and autumn of 2008 to attempt to establish the effectiveness of voltage reduction.

6. Tests were undertaken on three types of primary site; predominately domestic customers, commercial customers and finally large industrial customers.
7. The tests confirmed that voltage reduction will have an impact on the demand but as expected the results differ across the different types of customers. For a 3% voltage reduction instruction the resultant demand reduction ranged from 2.57% to 5.09%. In most cases the demand reduction was sustained for the period of the test, but a slight recovery in demand was observed at times.

Voltage reduction %	Demand reduction %
3.47	2.57
2.63	4.46
4.3	4.34
3.03	3.29
2.02	5
4.35	32.9 ¹
2.68	2.67
3.57	3.73
2.64	5.09

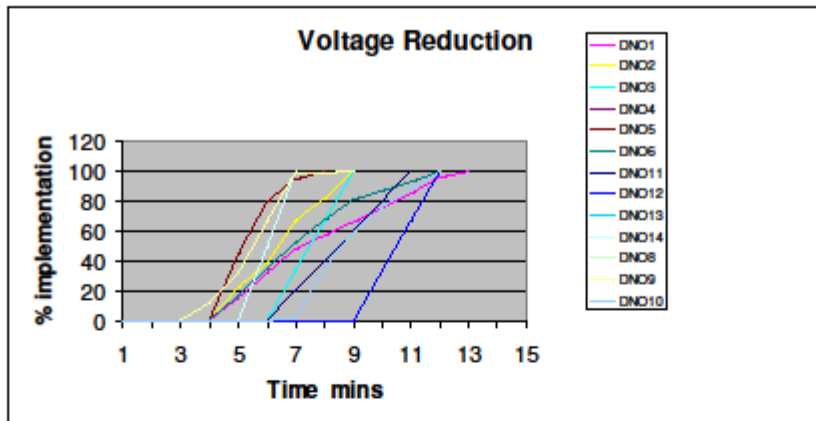
8. The results show that the demand reduction associated with a 3% voltage reduction is variable and could be as low as 2.6%; it might be more reasonable to assume from an operational management perspective that a 3% voltage reduction is more likely to result in a 3% demand reduction rather than the 5% that has been historically assumed.

Voltage Reduction – Implementation time

9. As part of the investigation of the 27 May 2008 incident DNOs were asked to provide information to Ofgem relating to the implementation time of the demand reduction scheme. This information provided indicated that the voltage reduction might take longer than the 5 minutes which is specified in Grid Code OC6.5. As a result of this finding DNOs carried out a further assessment of the time taken to implement a voltage reduction stage.
10. This assessment took into account the time taken for the voltage reduction instruction to propagate through their SCADA systems, the time taken for the voltage control scheme to respond and the time taken for the tap changer to progress through a tap change cycle.
11. The following graph summarises the responses from DNOs. The graph illustrates that a single voltage reduction could take up to 13 minutes to implement².

¹ Abnormal demand resulted in the high demand reduction

² These times include an additional two minute period for receiving an instruction from NGET and initiating the voltage reduction process. It is not clear if all the DNO responses already include for this activity, and it may be that some DNO voltage reduction schemes could be completed two minutes earlier than indicated in this graph.



12. The implementation time is influenced by several factors including:
- The time taken for the Control Engineers to respond to the NGET instruction.
The time for SCADA systems to convey the instruction from the Control Rooms to the substations. These timescales are largely influenced by the architecture of the SCADA and associated communications infrastructure.
The time for the tap change relay and tap changer to respond to the instruction.
This timescale is governed by the basic design of the voltage control scheme in each of substations.

Voltage Reduction – summary

13. The results of investigations carried out by DNOs provide a degree of transparency of the performance of the voltage reduction schemes which have been in place for many years. This additional transparency has identified that there is likely to be a technical non compliance with the Grid Code OC6.5 in terms of the demand reduction delivered by voltage reduction the timescale of delivery.
14. The systems that deliver voltage reduction form an intrinsic part of DNO SCADA and individual substation based systems.

Options

15. There are a range of options for addressing the potential technical compliance with Grid Code OC6.5 which are considered briefly below:
16. Option 1
Reflect the likely performance of the voltage reduction schemes currently employed in terms of the demand reduction likely to be achieved and the implementation time in an amended version of the Grid Code.
17. Option 2
Improve the performance of the voltage reduction schemes currently employed by DNOs by increasing the speed of operation. This could require extensive changes to SCADA systems and changes to substation voltage control schemes. Assuming that there was a need to update the voltage control scheme in 3000 substations this could cost £90m (based at a cost of £30k per substation). Updating the voltage control scheme might deliver an increased implementation time of between 1 – 2 minutes. Changing the substation voltage control scheme would not improve the propagation time through SCADA. More detailed studies would be required to establish if it would be possible to reduce the SCADA propagation times and, if feasible, the associated costs.

Enhancing SCADA and substation equipment would not address the magnitude of the demand reduction achieved.

18. **Option 3**
There is provision in OC6.5 for DNOs to deliver the prescribed Demand Control using demand disconnection rather than voltage reduction. It would be possible to comply with OC6.5 as currently drafted by using demand disconnection only. Where there is a requirement is for a relatively modest demand reduction on the transmission system, the present voltage reduction scheme can deliver material benefits without disconnecting or having a significant impact on customers.

Recommendation

19. The Grid Code Review Panel is invited to:
- Note the additional transparency on the effectiveness of the voltage reduction schemes used by most DNOs to deliver Demand Control as required by OC6.5.
 - Recognise that there are customer benefits from delivering some degree of demand control via voltage reduction rather than relying solely on demand disconnection.
 - Consider the acceptability of changing OC6.5 as proposed in Appendix 1 recognising the Demand Control facilities that are generally provided by DNOs.

Annex 3: Workgroup Terms of Reference

pp12/44
September 2012 GCRP

Implementation of Demand Control Instructions TERMS OF REFERENCE

Governance

1. The Implementation of Demand Control Instructions Workgroup was established by Grid Code Review Panel (GCRP) at the September 2012 GCRP meeting.
2. The Workgroup shall formally report to the GCRP.

Membership

3. The Workgroup shall comprise a suitable and appropriate cross-section of experience and expertise from across the industry, which shall include:

Name	Role	Representing
Audrey Ramsay	Chair	National Grid
Damien McCluskey	Technical Secretary	National Grid
Jason Bareham	National Grid Representative	National Grid
Paul Roebuck	National Grid Representative	National Grid
Bill D'Albertanson	DNO Representative	UK Power Networks
Alan Creighton	DNO Representative	Northern Powergrid
David Mobsby	DNO Representative	Scottish & Southern Energy
Andy Dixon	DNO Representative	Scottish Power
Nigel Buckland	DNO Representative	Western Power Distribution
Dan Randels	DNO Representative	Electricity North West
Lisa Waters	Generator Representative	Waters Wye Associates
Graeme Dawson	DNO Representative	npower
Julian Wayne	Observer - Distribution List	Ofgem

Meeting Administration

4. The frequency of Workgroup meetings shall be defined as necessary by the Workgroup chair to meet the scope and objectives of the work being undertaken at that time.

5. National Grid will provide technical secretary resource to the Workgroup and handle administrative arrangements such as venue, agenda and minutes.
6. The Workgroup will have a dedicated section on the National Grid website to enable information such as minutes, papers and presentations to be available to a wider audience.

Scope

7. The Workgroup will:
 - Review the need for, and requirements of, Demand Control Instructions.
 - Review the existing capabilities of the DNOs to implement Demand Control Instructions.
 - Take account of relevant international practice and the approach taken in European Code development.
 - Evaluate the costs, benefits and risks of any actions necessary to ensure that DNOs can implement the required Demand Control Instructions in the required timescales under future system conditions.

Deliverables

8. The Workgroup will provide updates and a Workgroup Report to the Grid Code Review Panel and Distribution Code Review Panel which will:
 - Detail the findings of the Workgroup;
 - Draft, prioritise and recommend changes to the Grid Code, Distribution Code and associated documents in order to implement the findings of the Workgroup; and
 - Highlight any consequential changes which are or may be required

Timescales

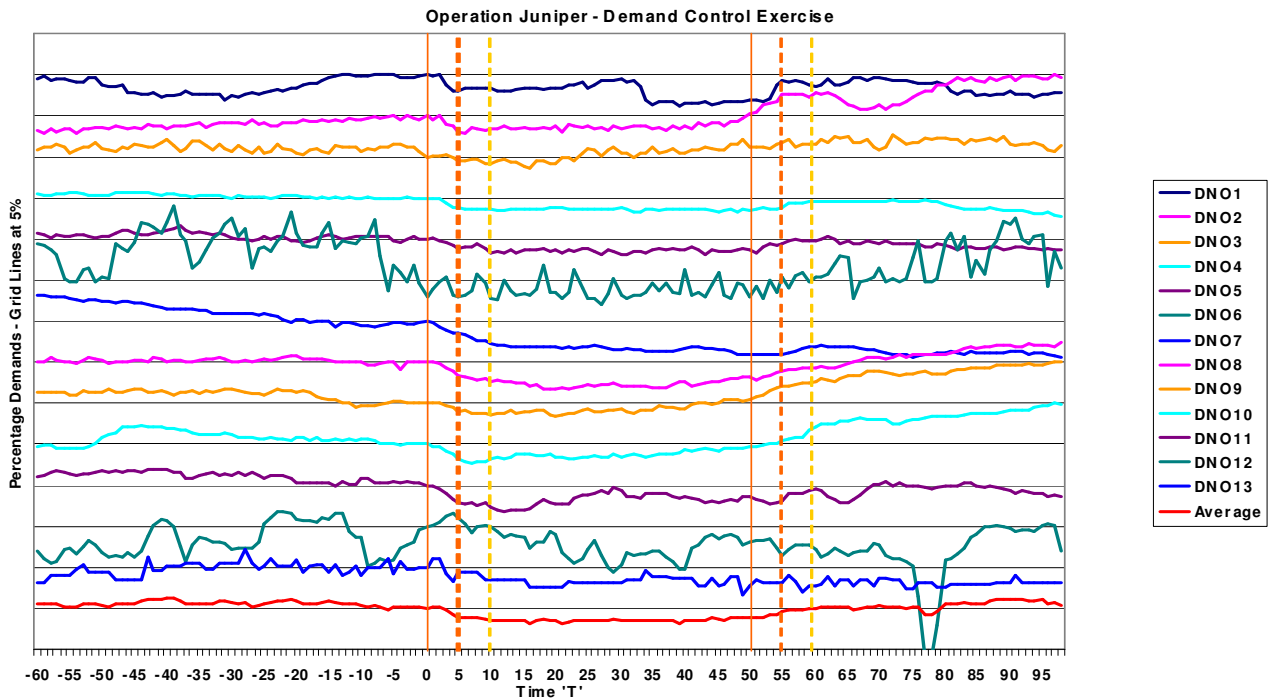
9. It is anticipated that this Group will discuss the issue and determine appropriate timescales. Once these timescales have been determined, the workgroup will confirm with the GCRP that they are suitable.
10. If for any reason the Workgroup is in existence for more than one year, there is a responsibility for the Workgroup to produce a yearly update report, including but not limited to; current progress, reasons for any delays, next steps and likely conclusion dates.

Annex 4 – Results from Operation Juniper Demand Control Exercise

Overview

1. Operation Juniper was organised to take place in October 2013, each of the DNOs involved carried out a 3% Voltage Reduction to assess actual Demand Control that might be expected and the time take to see the effect.
2. Twelve England and Wales DNOs and Scottish Power took part in Operation Juniper
3. The Voltage Reduction tests were carried out with advance notice given in order to achieve the best results.
4. The tests were carried out in batches to minimise impact on balancing the system.
5. The results from operation Juniper are shown below.

Results



6. The chart above illustrates the demand reduction achieved by the thirteen DNOs who participated in the Voltage reduction tests.
7. The magnitude of the reductions is detailed in the table below.

	T=0	T=5	T=10	T=50	T=55	T=60
DNO1	0.0%	2.0%	1.6%	0.0%	2.3%	1.7%
DNO2	0.0%	1.9%	1.7%	0.0%	2.3%	2.5%
DNO3	0.0%	0.4%	0.7%	0.0%	0.6%	0.4%
DNO4	0.0%	1.2%	1.4%	0.0%	0.3%	1.1%
DNO5	0.0%	1.2%	1.7%	0.0%	0.9%	1.2%
DNO6	0.0%	0.1%	0.2%	0.0%	2.3%	2.4%
DNO7	0.0%	1.4%	2.7%	0.0%	0.2%	1.1%
DNO8	0.0%	1.6%	2.4%	0.0%	0.6%	1.0%
DNO9	0.0%	1.0%	1.4%	0.0%	1.6%	2.1%
DNO10	0.0%	1.8%	1.8%	0.0%	0.7%	2.4%
DNO11	0.0%	2.0%	2.6%	0.0%	-0.6%	0.8%
DNO12	0.0%	-1.2%	0.0%	0.0%	-1.9%	-1.0%
DNO13	0.0%	0.6%	1.6%	0.0%	0.5%	0.2%
Average	0.0%	1.1%	1.5%	0.0%	0.8%	1.2%

8. All of the DNOs were able to enact the Demand Control Instruction in a timely manner.
9. Demand Control varied considerably, ranging from 0% to 2.7% (average 1.5%), confirming that 5% Demand Control from Voltage Reduction was no longer achievable.
10. Time to implementation was generally good, providing 70% of total Demand Control at 5 minutes.

Annex 5: Consultation Responses

The following table provides a list of the responses received to the Grid Code Consultation GC0050.

Reference	Company
C/10-CR-01	RWE
C/10-CR-02	EDF Energy
C/10-CR-03	Electricity north West
C/10-CR-04	Northern Powergrid

Grid Code Workgroup Consultation Response Proforma

GC0050: Demand Control and OC6

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **28th February 2014** to Grid.Codes@nationalgrid.com. Please note that any responses received after the deadline or sent to a different email address may not receive due consideration.

Respondent:	John Norbury Network Connections Manager RWE Supply & Trading GmbH Windmill Hill Business Park Whitehill Way Swindon SN5 6PB T +44 (0)1793 89 2667 M +44 (0)7795 354 382 john.norbury@rwe.com
Company Name:	RWE group of UK companies, including RWE Npower plc, RWE Npower Renewables Limited and RWE Supply & Trading GmbH
Do you believe that GC0050 better facilitates the appropriate Grid Code objectives?	<p><i>For reference the applicable Grid Code objectives are:</i></p> <p><i>(i) to permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity;</i></p> <p><i>(ii) to facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity);</i></p> <p><i>(iii) subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole; and</i></p>

	<p><i>(iv) to efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency.</i></p> <p>RWE is satisfied that the proposed change better facilitates the Grid Code objectives for the reasons given in the consultation Paper.</p>
<p>Do you have any additional comments?</p>	<p>RWE was pleased to participate in the Workgroup preceding this consultation. RWE's comments have been made via this process and RWE does not have any additional comments.</p>



Email to: grid.code@nationalgrid.com

28th February 2014

Dear Grid Code team,

Consultation on GC0050 Demand Control and OC6

EDF Energy is one of the UK's largest energy companies with activities across the energy chain. We have interests in nuclear, coal, gas and renewable electricity generation, gas storage and energy supply to end users. We have over five million electricity and gas customer accounts in the UK, including homes and businesses.

Summary

We are generally supportive of the proposals under consultation. The changes will provide greater clarity in the tools available in these extreme cases and certainty over their use. We note that the changes under consultation should not change anything in terms of frequency of use of voltage reduction, so that it is still used only to manage out-of-limits frequency excursions. If another change should also occur, so that the frequency of use of voltage reduction increases, then we note that a consequence of this additional change is the need to re-assess whether voltage reduction should qualify as a "system stress event" in the proposed new capacity mechanism. While this is not within scope of this change, if this did occur in the future then we would expect National Grid to carefully consider this interaction and consult with the relevant authorities.

Response

Our response is set out in Annex 1 to this letter. Should you wish to discuss any of the issues raised in our response or have any queries, please contact Paul Mott on 0203 126 2314, or me on 01452 658415.

I confirm that this letter and its attachment may be published.

Yours sincerely,

Mark Cox
Head of Transmission and Trading Arrangements

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Annex 1

Your consultation asks these three questions:

- (i) Do you support the proposed implementation approach?**
- (ii) Do you believe that GC0050 better facilitates the appropriate Grid Code objectives?**
- (iii) Do you have any further comments?**

We find it easiest to answer these questions in relation to your core proposals, which are as italicised below (we give our views to each element, in turn)

4.23 The Workgroup recommend ... explicitly distinguishing between Voltage Reduction and Demand Disconnection services (when Grid calls the DNO to request demand control), and to improve clarity with regard to the implementation timescales

- We agree that the present restriction, which allows Grid to only call a DNO for "demand control", without specifying whether voltage reduction or demand disconnection is to be used, removes some element of control from Grid. The poor delivery timeframe for voltage reduction means that it is not usually able to be used in a crisis; by the time that OC6 is used, Grid generally has no choice but to call for demand disconnection.
- We agree, therefore, that grid should be able to call for voltage reduction separately, and in doing so grid can take due account of its typical delivery timeframe, and call for it in good time.
- We also agree with the workgroup's wider considerations, which seem to have been omitted from the recommendations section of the consultation (perhaps this is considered to be implicit within recommendation 4.23), to the effect that it makes sense for Grid to be permitted to call for both stages of voltage reduction at once, when the amount of demand control needed in a developing crisis, and the timing of that requirement, makes this the wise choice. Grid needs, it is evident, to be aware of the limited amount of response now available from stage 1 voltage reduction, and if the simultaneous and timely use of stage 2 can prevent demand disconnection, this would seem to be in the consumers' interest. The case for this flexibility is enhanced by the finding that where instructions for stage 1 and stage 2 voltage reduction are issued separately, significant delays are incurred by control signal "queueing" on the DNOs' SCADA networks, due to the extremely limited bandwidth of these systems.

4.24 The Workgroup recommend that annual Voltage Reduction tests should be carried out by each DNO to confirm the demand reduction achievable via Voltage Reduction. These will be coordinated by National Grid.

- given the recent surprising findings that have challenged previous understanding of how much demand control can be accessed, and how quickly, by voltage reduction, and given the differences from the earlier results reported to the February 2011 GCRP, we strongly support this recommendation.

4.25 The Workgroup recommend that DNO and ENCC procedures and documentation are reviewed, and required changes implemented, to clarify that where a DNO makes Voltage Reduction services available to National Grid, the Demand Control instruction clearly states whether it requires a DNO to implement Voltage Reduction of Demand Disconnection. These changes should take effect upon implementation of Grid Code changes identified in Annex 1.

- We agree with this recommendation

4.26 The Workgroup recommend that the Week 24 Guidance Document published by National Grid to provide guidance to DNOs is updated to reflect these changes. In particular this will require a minor revision to section 4.2 and the proforma Table 1.2B provided by National Grid. These changes should take effect upon implementation of Grid Code changes identified in Annex 1.

- We agree with this recommendation.

Further Comments

We have an additional point to make about Supplier energy imbalances. These changes should not affect the use of demand control as it is to be used as a last resort facility. However with these beneficial changes which make "easier" the use of demand control, and in particular voltage reduction, there is a risk that voltage reduction is used more regularly. The use of any type of demand control will cause Suppliers to incur energy imbalances, as it makes their forecasts inaccurate. It will also cause Suppliers and other parties providing demand control either as DSBR or as a form of participation in the capacity mechanism, to under-deliver or over-deliver their demand control into those mechanisms, depending on what is taken to be baseline demand. If the frequency of use changes then this matter needs to be considered carefully. Also National Grid is to have an obligation under DECC's approach to implementing EMR in terms of industry codes and transmission licences, just consulted-on, to ensure that Grid Code changes are consistent with EMR. National Grid need to ensure that they consider this matter through any changes. Early information to Suppliers will help but it could be necessary, as a result of this change, for the

commercial mechanisms to be designed so as to hold DSR providers harmless against such impacts, so that they are not penalised for something outside of their control.

We note that the changes under consultation should not change anything in terms of frequency of use of voltage reduction, so that it is still used only to manage out-of-limits frequency excursions. If another change should also occur, so that the frequency of use of voltage reduction increases, then we note that a consequence of this additional change might be that it would no longer be appropriate for voltage reduction to qualify as a "system stress event" in the proposed new capacity mechanism; we would expect, prior to such any such change, that National Grid would flag this issue to the relevant authorities.

Objectives

We believe that GC0050 has the potential to better facilitate the appropriate Grid Code objectives, as long as our concerns regarding EMR and DSBR, and the possible interaction with system stress events under the capacity mechanism, are acted upon.

EDF Energy
February 2014

Grid Code Industry Consultation Response Proforma

GC0050: Demand Control and OC6

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by 28 February 2014 to Grid.Code@nationalgrid.com. Please note that any responses received after the deadline or sent to a different email address may not receive due consideration.

These responses will be included in the Report to the Authority which is drafted by National Grid and submitted to the Authority for a decision.

Respondent:	Anthony Pointon Electricity North West Control Room Manager anthony.pointon@enwl.co.uk
Company Name:	Electricity North West Limited
Do you support the proposed implementation approach?	Electricity North West supports the implementation approach.
Do you believe that GC0050 better facilitates the appropriate Grid Code Objectives?	<p><i>(i) to permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity;</i></p> <p><i>(ii) to facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity);</i></p> <p><i>(iii) subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution system operator area taken as a whole; and</i></p> <p><i>(iv) to efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency.</i></p>

Electricity North West Comments:

GC0050 revises the Grid Code with achievable demand response blocks for demand response by voltage reduction. Electricity North West agrees with the observations made with respect to achievable demand response via voltage reduction and the timeframe of 10mins to implement can be achieved by Electricity North West which complies with OC6.5.3 (c).

The recent National Grid exercise 'Juniper' confirmed our response to demand control by voltage reduction. Exercise 'Juniper' demonstrated our ability to comply with the revised OC6.5.3 (II) which states: Two voltage reduction stages each of between two and four percent. Electricity North West observed during this exercise a 3% Voltage reduction equating to a 3% Demand reduction within 10 minutes of the associated SCADA instruction.

OC6.5.3 (II) The demand disconnection blocks are already embedded within the current Operational IT control systems at Electricity North West. Whilst the strategy of choosing which blocks to use for demand disconnection have not changed for many years, the blocks are regularly maintained to validate their effectiveness and each disconnection stage is expected to deliver between four and six percent demand reduction.

The rota disconnection schedules within Electricity North West are configured to comply with OC6.5.3 (d). A SCADA instruction to run a disconnection schedule will initiate immediate demand response and it is expected that a rota will be completed within the required five minutes specified under the Grid Code.

GC0050 clearly distinguishes between demand reduction by voltage control, and demand reduction by demand disconnection. The clarity of the instruction will allow Electricity North West to respond to a request with a clear objective and without the need to interpret the requirement.

The revisions to the Grid Code are already available to implement by Electricity North West if the recommendations within this review are accepted.

Electricity North West also supports the proposal for annual testing of OC6 demand reduction by voltage reduction.

Exercise 'Juniper' did not create any voltage complaints from the affected customers and allowed Electricity North West and National Grid to test their communication and capabilities.

Do you have any additional comments?

Electricity North West would encourage a review on how demand schedules are initiated.

An option for NGC to directly control our schedules through a SCADA link could potentially lead to a reduction in implementation time, and achieve shorter timescales for realising the objectives of OC6.5

An initiative that we are leading, CLASS (Customer Load Active System Services) is trialling new innovative techniques to control voltage and maximise the use of our electricity network. This project may offer some efficiencies relating to demand control.

Grid Code Industry Consultation Response Proforma

GC0050: Demand Control and OC6

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **28 February 2014** to Grid.Code@nationalgrid.com. Please note that any responses received after the deadline or sent to a different email address may not receive due consideration.

These responses will be included in the Report to the Authority which is drafted by National Grid and submitted to the Authority for a decision.

Respondent:	<i>Alan Creighton</i> <i>alan.creighton@northernpowergrid.com</i>
Company Name:	<i>Northern Powergrid</i>
Do you support the proposed implementation approach?	<i>Yes.</i>
Do you believe that GC0050 better facilitates the Applicable Grid Code Objectives?	<i>Yes.</i> <i>This proposal better facilitates Grid Code objectives (i) and (iii) as it makes available additional information and clarity on the capability of existing plant and equipment to assist in the operation of the transmission system during times of duress.</i>
Do you have any other comments?	<i>No.</i>