

Stage 03: Workgroup Report

Grid Code

GC0097: Grid Code processes supporting TERRE

What stage is this document at?

01	Modification Proposal
02	Workgroup Consultation
03	Workgroup Report
04	Code Admin Consultation
05	Draft Final Modification Report
06	Final Grid Code Modification Report

Purpose of Modification: This proposal seeks to modify the Grid Code to set GB processes to allow market participants and the TSO to coordinate with one another to facilitate participation in the EU Trans-European Replacement Reserve Exchange.

Published on:

18 April 2018



High Impact:

Existing and potential providers of Balancing Services in GB;
Transmission System Operator;



Medium Impact:

Distribution Network Operators



Low Impact:

None

Contents



Any Questions?

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Timetable

The Code Administrator recommends the following timetable:

8 January 2018	Workgroup Consultation issued (15 working days ~ close date 26 January 2018)
7 February 2018	Workgroup meeting Thirteen (review responses) GC0097 Only
21 February 2018	Workgroup meeting Fourteen review responses for P344 (joint with P344)
7 March 2018	Workgroup Fifteen (joint P344) to consider alternative options and vote
22 March 2018	Workgroup Sixteen (joint P344) to consider alternative options and vote
26 April 2018	Workgroup Report presented to Grid Code Review Panel
30 April 2018	Code Admin Consultation Report issued (15 Working Days ~ close date 22 May 2018)
5 June 2018	Draft Modification Report issued to Industry and Panel (5 Working Days)

14 June 2018	Draft Final Modification Report presented to Panel
21 June 2018	Modification Panel Recommendation Vote (5 Working Days)
26 June 2018	Final Modification Report submitted to the Authority
31 August 2018	Authority Decision (25WDs)
7 August 2018	Implementation

About this document

This document is a Workgroup Report which details the discussions of the Workgroup which formed in January 2017 to develop and assess the Proposal, the responses to the Workgroup Consultation which closed on 26 January 2018, the Voting of the Workgroup held on 22 March 2018 and the Workgroup's final conclusions.

This Workgroup Report has been prepared in accordance with the terms of the Grid Code. An electronic copy can be found on the National Grid Website:

<https://www.nationalgrid.com/uk/electricity/codes/grid-code/modifications/gc0097-grid-code-processes-supporting-terre>

1 Summary

This report outlines the Proposer's original Modification, the Proposer's Solution and the Workgroup's deliberations.

This Modification was proposed by National Grid Electricity Transmission and submitted to the Grid Code Review Panel for their consideration on December 2016. A copy of this Proposal can be found within Annex 1 of this Report. The Panel decided to send the Proposal to Workgroup to be developed and assessed against the Grid Code Objectives.

Section 2 (Original Proposal) is sourced directly from the Proposer and any statements or assertions have not been altered or substantiated/supported or refuted by the Workgroup. Section 3 of the Workgroup contains the discussion by the Workgroup on the Proposal and the potential solution.

The Grid Code Review Panel detailed in the Terms of Reference the scope of work for the GC0097 Workgroup and the specific areas that the Workgroup should consider.

The table below details these specific areas and where the Workgroup have covered them or will cover post Workgroup Consultation.

Specific Area	Location in the report
Balancing Services Provider (BSP) participation data submission to the TSO <ul style="list-style-type: none"> The necessary data items needed from BSPs to participate in TERRE The processes (e.g. systems) by which these are submitted to the GB TSO The approach for parties to be dispatched by the TSO once activated by TERRE 	Section 3 of the Report
Dispatch Methodology <ul style="list-style-type: none"> The dispatch processes for TERRE activations (including timings), and consider the interactions with the Balancing Mechanism. 	Section 3 of the Report
Participation by non-BM and Aggregators/Virtual PPMs <ul style="list-style-type: none"> Confirmation of whether proposals are fit for purpose for smaller parties (i.e. those who may not existing or future Balancing Mechanism participants), as well as aggregators. 	Section 3 of the Report
Pre-qualification and enabling participation <ul style="list-style-type: none"> Set out the pre-qualification requirements for GB participation in TERRE, including any minimum technical requirements specified in other EU regulatory frameworks 	Section 3 of the Report
TERRE Coordination with DNOs and BSCCo Confirm: <ul style="list-style-type: none"> Any Grid Code obligations required for the GB TSO and DNOs to coordinate to manage participation from distribution-connected BSPs, as well as any reporting obligations to the BSCCo, based on actions taken by the GB TSO for TERRE etc. 	Section 3 of the Report
Reporting to individual bodies, to the Market as a whole, and to Regulatory bodies <ul style="list-style-type: none"> Describe the expected new flow of information required to support TERRE 	Section 3 of the Report

Background

GC0097 seeks to align the BSC with the European Balancing Project TERRE (Trans-European Replacement Reserves Exchange) requirements. Project TERRE is an advanced implementation project that forms part of the implementation of the European Electricity Balancing Guideline (EB GL). Project TERRE aims to harmonise the Transmission System Operator (TSO) despatch of Replacement Reserve (RR) across several TSO areas. (Great Britain, France, Switzerland, Spain, Portugal, Italy, Czech Republic, Romania, Poland and Hungary – Greece, Norway, Sweden, Finland and Denmark are currently observers). It will do this by introducing a common TERRE product, which will be similar to current GB products such as BSC Bid-Offers or Short Term Operating Reserve (STOR) submissions. This Modification will allow the implementation of the project at GB national level

and ensure GB compliance with the first tranche of obligations in the European Network Codes (ENCs).

National Grid, as the GB TSO, raised Modification GC0097 in January 2017, with a view that the Modification should be implemented at the time the central TERRE product commences its parallel run phase and hence in advance of the formal go live window for the product. Parallel running is currently scheduled to commence in Q2 2019 calendar year, with formal go live for balancing using the TERRE product expected to be October-December 2019. However it is not clear what the full arrangements for the parallel running phase may be, whether these timescales will be met by the central TERRE project. Should there be any material technical amendments or alterations to delivery timescales from a central TERRE project perspective, there will likely be impacts upon implementation timescales for GC0097.

The scope of the work included in this workgroup report includes all aspects of the TERRE end to end process which must be documented in the Grid Code, including:

- Pre-qualification and registration
- Data submission
- Dispatch and Delivery
- Reporting

Pre-qualification and registration

Requirements for Pre-qualification are set out in Article 162 of the System Operator Guideline (SOGL). The requirements include maximum time limits on each part of the pre-qualification process. Article 161 of the SOGL sets out the minimum technical requirements for providers of Replacement Reserves; these include that a provider must be able to comply with the activation instructions sent by the TSO, and that they are able to provide a time stamped power output if they are over a certain size.

The solution states that from go-live all existing BMUs will be assumed as pre-qualified for participating in TERRE, and there will be a simple function that allows units to state whether they wish to be part of the market or not. From this point onwards the pre-qualification process for provision of RR will be separate to existing pre-qualification processes for other services. Operational metering for all units down to a minimum of 1 MW will need to be provided to National Grid in order to provide RR. It is noted that close coordination between the TSO and DNOs is essential in order for the implementation of TERRE to be successful, and so a detailed registration process will be agreed between the two parties.

Data Submission

In order to participate in the TERRE market, all GB BSPs will need to submit their bids directly to National Grid Electricity System Operator. The details of these submissions can be found in section 3 of this report. The TSO must receive all bids from BSPs by the agreed RR Gate closure time (to be confirmed by the central TERRE project); however they can be submitted up to 5 days in advance. These must be communicated via electronic communication facilities except in exceptional circumstances. Any bids submitted by providers must be physically realisable.

Once these bids are received by the TSO, they will be checked for manifest errors; for example, checking that the relevant units have a PN for the period in question. The TSO will perform security analysis to validate that the bids do not violate any transmission or distribution constraints. Any bids that do violate these constraints will be marked as “restricted” before being passed to the optimiser and therefore will not be activated by the algorithm.

In parallel to the above process the TSO will also be calculating imbalance need to be submitted into the central algorithm (LIBRA). All of this data will then be submitted to LIBRA, which will perform netting and matching and establish a pay as clear price. LIBRA sends the price along with a list of activated units back to the TSO.

Dispatch and Delivery

The TSO then has the responsibility of instructing those units which have been activated by LIBRA. This will be done by using an instruction which looks similar to a Bid Offer Acceptance (BOA). Ramps will be added to the blocks of energy that were accepted by LIBRA according to the units’ dynamic parameters. The feasibility of delivery is checked for each instruction and if an instruction is found to be infeasible then adjustments will be made to ensure that is possible for the unit to deliver the instructed profile. Replacement Reserve Instructions (RRIs) are sent so that the Full Activation Time (FAT) of 30 minutes is honoured for each 15 minute period. For the final two 15 minute periods of each hour, the final physical notifications (FPN) will not immediately be available meaning that an accurate instruction reflecting the level that the unit must move to cannot be sent. Therefore final instructions may be delayed until the FPNs are available whilst still respecting the 30 minute FAT.

There are some instances in which the TSO may not send an RR instruction to a unit following that unit being accepted in TERRE. For instance, if the unit declares a change in availability which means they can no longer deliver the activated level. Also, If the TSO has issued interim BOAs due to system issues it may mean that the RR volume can no longer be instructed due to a change in system conditions. Where a BOA has been issued before an RR Instruction and both instructions are in the same direction and the BOA volume is larger than the RR volume then no RR Instruction will be issued, and the unit will be deemed to have delivered its RR volume. If the same aforementioned situation occurs but the BOA volume is smaller than the RR volume, then an RR instruction will be issued for the residual volume to bring the unit in line with the RR volume activated by LIBRA.

Reporting

Once per hour, approximately 45 minutes before the hour starts, National Grid shall send to Balancing Mechanism Reporting Agent or BSCCo details of all RR Bids submitted by GB parties for that RR Auction Period.

Once per hour, approximately 30 minutes before the hour starts, National Grid shall send to Balancing Mechanism Reporting Agent or BSCCo all necessary data items. This includes information on price and accepted bids, which can then be fed into the cash out price as necessary.

Section 2 (Original Proposal) are sourced directly from the Proposer and any statements or assertions have not been altered or substantiated/supported or refuted by the Workgroup.

Why

These changes are required to support GB compliance with EU legislation (EU Balancing Guideline). An ENTSO-E consultation suggested that implementing TERRE could lead to a cost saving of around €13m per annum for GB.

https://consultations.entsoe.eu/markets/terre/supporting_documents/20160307_TERRE_Consultation_FV.pdf

The Third Energy Package, adopted in July 2009 by the European Union (EU) provided a key step forward in developing a more harmonised European energy market. This legislation included a requirement to develop and implement European Network Codes (ENCs) to cover areas of cross-border impact.

The ENCs are set to become European Regulations, meaning that they will hold the force of European Law. Therefore, the ENCs will take precedence over any existing GB law or arrangements, including any existing licences and codes that impact National Grid and other industry participants at domestic level. Consequently, GB will need to ensure compliance with the requirements of the ENCs. Failure to do so would mean GB risking infraction proceedings and the potential for fines to be levied against Market Participants.

Project TERRE is a key implementation initiative for the European Electricity Balancing Guideline (EB GL), which aims to establish a pan-European market for Balancing Energy. The project is seeking to design and develop a central platform to facilitate the close to real-time (15min lead time) between Transmission System Operators (TSOs) in Europe. The project currently consists of six member states (GB, France, Switzerland, Spain, Portugal and Italy). Ireland and Greece are currently observers. It is due to go live in the third quarter of 2019.

The project is strategically important as it will enable GB to be compliant with EU legislation and will also form the basis for subsequent phases to meet other legal obligations stretching out until 2023.

Note that participation on the TERRE process by Balancing Service Providers is on a voluntary basis. Existing Balancing Mechanism processes will continue to operate in parallel with the TERRE process.

What

The GB implementation of TERRE is focusing on three aspects:

- 1) The coordination between the GB TSO and the TERRE Central Platform
- 2) The trading and settlement for participation in TERRE
- 3) The facilitation of participation of GB parties, including dispatch, by the GB TSO in coordination with the TERRE Central Platform.

This final (3) aspect will be the focus of GC0097, in coordination with BSC workgroup P344 for item 2, and National Grid System Operator in coordination with the TERRE Central project.

Specifically, this workgroup will investigate how and if the existing Grid Code Balancing Code (BC1-3) sections which facilitate the Balancing Mechanism process can be duplicated for use in TERRE. The group will also consider how to deploy market facilitation processes for TERRE to permit parties not currently bound by Grid Code requirements; potentially in coordination with the Distribution Code or perhaps via a commercial contractual route.

How

We will use the TERRE GB Impact Assessment to understand existing Grid Code processes flagged as being affected, or with potential to be replicated for use, in implementing TERRE. This is expected to primarily consist of the Balancing Code (BC) section of the Grid Code, namely BC1-3, but could also refer to the OCs regarding Electronic Dispatch. We will also consider what changes are needed to facilitate the participation of parties not currently bound by Grid Code or existing Balancing Mechanism process. This may need coordination with the Distribution Code.

Proposed solution

The Proposer is raising this Modification has not prescribed the preferred solution and has used the Workgroup discussed to form a potential solution. Information on this can be found in section 3.

The Workgroup convened sixteen times to discuss the issue, detail the scope of the proposed defect, devise potential solutions and assess the proposal in terms of the Grid Code Applicable Objectives. The Workgroup will in due course conclude these tasks after this consultation (taking account of responses to this consultation).

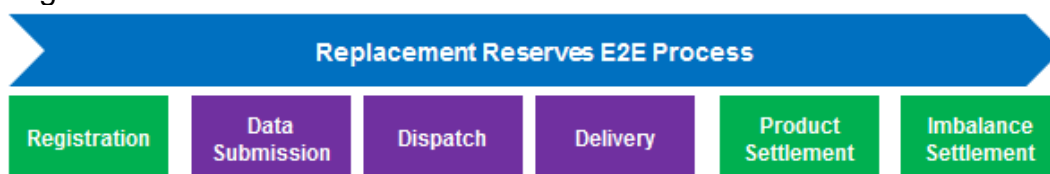
The Proposer presented the scope of TERRE (Trans-European Replacement Reserves Exchange) and GC0097. It was confirmed that Project TERRE is an advance implementation project that forms part of the implementation of the European Electricity Balancing Guideline. Project TERRE aims to harmonise the TSO dispatch of RR across several TSO areas (Great Britain, France, Switzerland, Spain, Portugal and Italy - Ireland and Greece are currently observers). It will do this by introducing a common TERRE product, consisting of 15 minute blocks of upward and/or downward energy volumes (energy volumes will be at MW level).

The TERRE go-live date is currently scheduled for Q3 2019 and the intention is that the GB market will be available to participate from this date.

The Workgroup discussed the GC0097 scope to understand which aspects of the GB TERRE process were settlement related (and so were to be dealt with within the BSC workgroup P344), and which were related to service provider-to-TSO coordination which is specific to Grid Code and GC0097. The discussions and views of the Workgroup are outlined below.

Diagram 1 below sets out the interaction between Grid Code (GC0097 in purple) and BSC (P344 in green) process areas:

Diagram 1



In order to implement TERRE in an efficient way – i.e. trying to maintain a ‘minimum necessary change’ philosophy for EU implementation work in GB – the existing processes to facilitate the GB Balancing Mechanism were proposed as a template for facilitating TERRE participation.

1. LIBRA Platform

LIBRA is the central TERRE platform – throughout this document the interaction between GB industry processes and those implemented via LIBRA will be described.

2. Key TERRE Products

It was confirmed that the RR Product must be compliant with TSOs requirements and meet 12 criteria, which are set out below:

- a. Full activation time (FAT) of 30 minutes. FAT is the sum of the preparation period and ramping period.

- b. Preparation period from 0 to 30 minutes.
- c. Ramping period from 0 to 30 minutes.
- d. Minimum quantity of 1 MW.
- e. Minimum delivery period of 15 minutes or multiples of 15 minutes (i.e. “blocks”).
- f. Maximum delivery period of 60 minutes.
- g. Location (bidding zone) – this will be Great Britain for parties bidding into TERRE in respect of GB-based generation or demand.
- h. The validity period as defined by Balancing Service Provider (BSP) but equal or less than 60 minutes.
- i. The recovery period as defined by BSP (time before another activation is possible).
- j. The maximum MW size will be:
 - in case of divisible (part-acceptance possible), no maximum is requested.
 - in case of indivisible (all or nothing acceptance), the local rules will be implemented.
- k. Divisibility will be under the responsibility of BSP. The volume:
 - Min power (resolution): 1MW.
 - Resolution after common merit order (CMO): 0.1MW.
 - For divisible (not applicable for indivisible).
- l. Price: the cap and floor prices will be compliant with the local market rules

3. **EBGL Data Submission Requirement**

Balancing Service Providers participating in TERRE will be required to submit the set of data items specified in the following tables (Table 1, and 3).

Please note: This is not the final list of data items. More information will be available from January.

Table 1: Data Submission by Balancing Service Providers

Data Item	Description
Provider ID	The balance service provider (BSP) identification.
Associated TSO	Corresponds to the EIC identification of the TSO area providing the reserves.
Market balance area	This is currently not used – to be re-confirmed with Alexander
Type	To mark upward/downward offers
Minimum quantity (MW)	Required if marked as divisible
Maximum quantity	Quantity offered

(MW)	
Price	The price of the product
Exclusive identification number	<p>This is an identification used to link bids that are to be treated mutually exclusive.</p> <p>If the bid is not exclusive then the attribute is not used.</p> <p>All bids that are associated shall carry the same identification in the attribute linkedBidsIdentification / multipartBidIdentification / exclusiveBidsIdentification. So if for example there are 3 linked bids then all 3 shall have the same string value "abc" (for example) in the attribute linkedBidsIdentification.</p> <p>It is sufficient that the values used in the linkedBidsIdentification / multipartBidIdentification / exclusiveBidsIdentification are unique within the reserve bid file. They may be reused in subsequent delivery periods.</p> <p>If bid one bid is activated (based on clearing price) then all others linked exclusive bids are to be ignored</p>

Table 2: Specific data items for Linked Bids and Incremental Bids in TERRE

Data Item	Description
Linking identification number	<p>This is an identification used to associate bids that are to be linked together.</p> <p>If the bid is not linked then the attribute is not used.</p> <p>All bids that are associated shall carry the same identification in the attribute linkedBidsIdentification / multipartBidIdentification / exclusiveBidsIdentification. So if for example there are 3 linked bids then all 3 shall have the same value "abc" (for example) in the attribute linkedBidsIdentification.</p> <p>It is sufficient that the values used in the linkedBidsIdentification / multipartBidIdentification / exclusiveBidsIdentification are unique within the reserve bid file. They may be reused in subsequent delivery periods.</p> <p>When offers are linked, all or none of the linked offers are activated based on the clearing price</p> <p>For e.g. Offer 1 (9-9.15am, xMW @ £20) , 2 (9.15 – 9.30am, xMW @ £30), 3(9.30-9.45am yMW @ £25) are linked and the clearing price is £30, all of the offers will be activated.</p>
Starting & Ending time	The start and end time of the period.

Incremental size	Incremental size is the size of the steps by which a divisible offer may be partially accepted For example, if minimum quantity is 10 MW, maximum quantity is 10.5 MW and incremental size is 0.1 MW, the accepted quantity may be 10.0, 10.1, 10.2, 10.3, 10.4 or 10.5 MW. (Note this example is from central TERRE – GB TSO implementation will work in whole MWs as BM does now)
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- Data requirements for participating in both TERRE and BM will remain consistent. The data requirements are set out in the table 3 below:

Table 3: GB specific data items and their relationship to TERRE participation

Data Item	Used for BM?	Used for TERRE?
Physical Notification (PN)	Yes- used as a baseline for any BOAs	Yes – used as a baseline for any RRI
Run up/ run down rates	Yes, used to calculate instruction profile	Yes, used to calculate instruction profile
Maximum Export Limit (MEL), Maximum import limit (MIL)	Yes	Yes (will use this to indicate a fault on the unit)
Stable Export limit (SEL), Stable Import Limit (SIL)	Yes	No
Minimum Zero Time (MZT), Minimum Non-Zero Time (MNZT)	Yes	No

4. Pre-Qualification

It was noted by the Workgroup that there would be a number of pre-requisites for Party to participate in the GB market and that a number of these would be set out as part of the System Operator Guidelines (SOGL) implementation. The high level principles are described below and are expanded to cover how these principles would work in practice.

The minimum prequalification requirements for TERRE are set out in SOGL article 161 and 162. **They require that a GB RR Provider:**

- Is compliant with the appropriate BSC registrations (P344) - Accessing to the appropriate BSC Participation capacity and undertaking the necessary registrations;
- Can use Electronic Data Communication facilities to communicate with the TSO;
- Has the capability to submit **feasible** baseline and dynamic data;
- Has operational metering to allow output to be monitored; and
- Is capable of responding to an RR Instruction by effecting an output deviation which can be controlled for a fixed duration, **and monitored in real-time (SOGL)**
- Is compliant with the relevant clauses in the Grid Code which set out key aspects of the GB TERRE process

SOGL RR Requirements. The Workgroup discussed the RR requirements defined under SOGL. **In reviewing Article 161 RR and the minimum technical requirements it was confirmed that the Replacement Reserve providers shall:**

- have a connection to only one reserve connecting TSO;
- be activated/deactivated according to a set-point received from the reserve instructing TSO;
- ensure that the RR activation of the RR providing units within a reserve providing group can be monitored. For that purpose, the RR provider shall be capable of supplying to the TSO real-time measurements of the connection point or another point of interaction agreed;
- fulfil the RR availability requirements as specified by the TSO; and
- inform the TSO about a reduction of the actual availability or a forced outage of its RR providing unit/group as soon as possible

As part of the **early feedback on this Workgroup Report it was pointed out that although Article 161 does not include references to DNOs/DSOs a further requirement at pre-qualification should be included, namely:**

- when connected in the distribution network, the RR provider shall be capable of supplying to the DNO availability and activation information in real-time if required

The Workgroup then considered Article 162 and the RR prequalification process:

- Each TSO shall develop and publish a RR prequalification process 12 months after entry into force of the Regulation

- A potential RR provider shall demonstrate to the TSO that it complies with the RR technical minimum requirements, availability requirements in Article 161 by successfully completing the prequalification process.

The Workgroup acknowledged the requirements under SOGL and noted that participation would require pre-qualification steps to be defined under GC0097 and the corresponding BSC Modification P344¹. The Workgroup considered the SOGL and in particular Article 162 and the RR prequalification process.

It was the view of the Proposer that a potential RR provider is required to demonstrate that it complies with RR technical minimum requirements in Article 161.

The Proposer confirmed the prequalification process would comprise the following elements:

- within 8 weeks of receiving the formal application, the TSO shall confirm that the application is complete (in terms of information required).
- If the application is incomplete the RR provider shall provide the additional required information within 4 weeks of the request from the TSO (if the provider does not comply the application is deemed to be withdrawn).
- Within 3 months from the confirmation of completeness the TSO shall confirm if the potential RR provider meets the criteria for prequalification.

It was confirmed that Qualification will be reassessed at least once every five years or where technical requirements or equipment changes.

From this high-level principle, the Workgroup and **the Proposer confirmed how pre-Qualification would work in practice.**

- At go-live the TSO will assume that all BMUs that already actively participate in the Balancing Mechanism have the minimum technical requirements to participate in TERRE, i.e. they will not be expected to apply separately as a BSP and that this will be a one off exercise;
- All existing BMUs will be considered to have already pre-qualified as RR providers (noting that actual participation in TERRE is voluntary); and
- National Grid TSO will assume that the details and evidence provided as part of prequalification is correct and will not carry out onsite testing etc. *(it was noted to the Workgroup this replicated the current arrangements for STOR).*

For future new units post go-live, **it was the view of the Proposer that:**

¹ P344 Information can be obtained using the following link:

<https://www.elexon.co.uk/mod-proposal/p344/>

- BMUs (including Secondary BMUs) will be registered in the normal way (under the BSC and Grid Code);
- If a party wishes to participate in the Balancing Mechanism (i.e. submit Bids and Offers) they will indicate this as normal;
- If a party wishes to withdraw from the Balancing Mechanism they will do as described in the Grid Code (section BC2.5.5.1)
- If a party wishes to participate (or withdraw) from TERRE as a BSP they will follow the procedure described in SOGL (articles 161 & 162);
- The process will be “codified” in a new section of the Grid Code to be called BC 4.

Every 5 years the status of all qualified RR Providers would be reviewed. The review will consist of each RR Provider re-submitting the data used for pre-qualification and the TSO will check historic performance against this criterion.

The rationale for the Proposer considering that all existing BMUs should be considered as pre-qualified was BMU technical qualification includes all the technical parameters required under TERRE and is in fact more onerous than RR pre-qualification (for example the dynamic data requirements are greater than those required under TERRE).

The process outlined by the Proposer would enable all existing BM parties to participate in TERRE. A number of Workgroup members felt that there could be a separate process to indicate a provider wishes to participate in the RR process. However the proposer confirmed that TERRE participation remains voluntary.

The Workgroup explored Article 161 of SOGL and how the GC0097 Proposal would support the RR minimum technical requirements. The view was that:

- the RR Provider and its unit(s) should comply with activation and de-activation according to set point from the TSO and
- there will be a time stamped scheduled active power output for each RR providing unit and group (and each generating module or demand unit of a RR group) with maximum active power $\geq 1\text{MW}$ (code states 1.5MW but workgroup agreed 1MW).

The Proposer confirmed that for the fulfilment of availability requirements:

- the TSO shall specify RR availability requirements and requirements for control quality;
- the RR provider will inform the TSO about actual availability or forced outage (using existing data flows (e.g. MEL and MIL declarations as required under the Grid Code); and
- If applicable the associated DNO will also be informed about actual availability or forced outage

In respect of operational metering the Proposer discussed with the Workgroup the information requirements in the SOGL. It was noted that SOGL requires operational metering down to 1.5MW, that STOR is set at a minimum of 3MW service and TERRE is set as a minimum 1MW. An RR provider with a maximum of 1 MW will not have a large effect on frequency but given the service is at 1MW this cannot be ignored by the proposal.

When considering what level operational metering should be considered this could be at:

- 1MW so that TERRE provision can be monitored; or
- 1.5MW to provide consistency with SOGL; or
- 3MW for consistency with STOR

The Proposer confirmed that the solution for GC0097 would be set at 1MW because the service is at this level and metering should be able to measure the provision as intended.

In relation to the accuracy of operational metering it was the view of the Proposer that whilst STOR has a number of measures of accuracy that the largest is an accuracy of 2.5% and that this should be adopted for RR. The Workgroup agreed with this approach and noted that STOR in its current form may not exist in the future and therefore requirements may need to be updated in light of EBGL.

For RR Availability, it was the view of the Proposer that for an RR provider the solution will use MEL or MIL to limit availability.

An RR provider that submits a TERRE offer for a period will be assumed to be available for that period (the TERRE window).

It was confirmed that following a TERRE auction, a unit would indicate its availability through a MIL or MEL declaration. Such a change in availability may occur:

- after the RR provider submits bids
- after a TERRE auction but prior to a unit receiving a Replacement Reserve Acceptance notification (RRA); or
- following an RRA but prior to a Replacement Reserve despatch Instruction (RRI)

In these circumstances, it was confirmed that the TSO will issue a bid/offer acceptance (BOA) to respect the change in availability.

It was noted that if a unit is unavailable after the issue of an RRI, the unit would fail to deliver the TERRE volumes and that this would be recognised in the TERRE settlement arrangements (see the solution under BSC Modification P344).

For RR Availability and secondary BMU, it was set out that the solution would need a means to indicate a forced outage is still required for a problem which develops while waiting for an RRA or after the RRI is issued. This could either be via a new “unavailability” signal or also use a MEL/MIL concept. It was agreed that it would use MIL and MEL for consistency.

5. Data submission

Proposals for data elements needed for TERRE in GB

The Workgroup discussed how the solution should define data submission. It was agreed that Replacement Reserve (RR) providers should submit data via Electronic Communication Facilities (as per Grid Code definition).

The Workgroup discussed the potential data elements (in addition to those requested in the Electricity Balancing Guideline (EBGL) in relation to RR bids that would allow GB providers to be instructed by the TSO:

- Provider ID
- Associated TSO
- Associated DNO (not part of specification from central TERRE but included as useful)
- Market balance area
- Offer type
- Minimum quantity (MW)
- Maximum quantity (MW)
- Price
- Exclusive offer identification number
- Linking offer identification number
- Starting & Ending time for the offer – will take values corresponding to HH:15, HH:30, HH:45 and HH:00
- Incremental size *-the size of the steps by which a divisible offer may be partially accepted*

The proposer's solution for GC0097 requires RR providers to submit a **Physical Notification, Run Up and Run Down Rates and MIL and MEL** which have the meaning set out in the Grid Code Glossary and Definitions.

Baselines and Physical Notifications

The Workgroup and the Proposer considered how the baseline position at the "Gate Closure for TERRE submissions" could be established.

This base line is needed in order to dispatch and settle RR providers. There were essentially two options:

- to use the existing notification process for physical positions as set out in the Grid Code and BSC or
- to establish an alternative baseline arrangement

Notifications of Physical Positions in the Grid Code and BSC: It was noted to the Workgroup that the existing practice for the BM was to use the 'Physical Notification' for this:

Physical Notification - Grid Code definition:

"Data that describes the BM Participant's best estimate of the expected input or output of Active Power of a BM Unit and/or (where

relevant) Generating Unit, the accuracy of the Physical Notification being commensurate with Good Industry Practice.”

Final Physical Notification - BSC definition:

“The Final Physical Notification for BM Unit is the level of Import or Export (as the case may be) that the Party expects to Import or Export from BM Unit i, in Settlement Period j, in the absence of any Balancing Mechanism Acceptances from the System Operator.”

Alternative Baseline Approach: The Workgroup considered whether a new parameter was required and could be used by market participants to provide the level from which they expected to be instructed from to deliver the RR. The Workgroup also considered how this new parameter would be submitted to the TSO and whether this new parameter may better support new RR Providers, particularly smaller players or Aggregators, who may not be able to produce an accurate Physical Notification. It was noted that this new parameter could be deemed, potentially at (zero) 0MW for smaller players or Aggregators.

Table 4 & 5 below details the pro and con of using the different parameters:
Table 4

Physical Notification	
Pro	Con
PN is existing practice for Grid Code users and BM participants, so minimal change for some RR Providers, plus the TSO and BSCCo	Data validations by TSO on PNs may cause operational/compliance issues for ‘non-BM’ RR Providers
Likely to better avoid non-delivery	
Provides more accuracy for settlement	
Aligned with current settlement arrangements for bids and offers	

Table 5

New ‘baseline’ parameter	
Pro	Con
Distinguishes RR from BM (which are different markets)	New parameter – may require significant work by all parties to make it work
Better supports aggregator and smaller player participation - removes a potential operational barrier to RR participation	Does it contradict the intent of GB EU implementation which aims for ‘minimum necessary change’?
New base lines may better represent the conditions	Would require significant changes to settlement arrangements to

associated with aggregator and smaller player participation (e.g. more representative baseline)	accommodate the new base line
---	-------------------------------

It was the view of the Proposer that Physical Notification (PN) would be the baseline for any RR activations. A PN will be required for every period for which offer(s) are submitted and that checking for a PN will be part of NG's technical validation process. For any offers received where no PN is submitted, or where parties have opted not to default their PN the offers will be rejected. For parties that are actively participating in the BM the existing PN will be used.

The workgroup's consensus was that the Physical Notification should be used, and that as part of the required changes to the Grid Code additional legal drafting would specify best practice for forming this submission for the purposes of participating in TERRE.

It was noted that for aggregators or small players it may be more difficult to establish the Final Physical Notification. It was noted that the Capacity Market has adopted a "baseline" approach towards the setting of the effective physical position for capacity market units that do not have physical notifications. It may be feasible to utilise the capacity market baseline approach for aggregators and smaller players provided that it is compatible and equivalent to the physical notification used under the preferred Grid Code approach.

More work may be required under the Grid Code to consider the equivalence of capacity market baselines to physical notifications for the purpose of participation in TERRE. If the baseline approach can be considered as equivalent to a physical notification then this could be used as a Final Physical Notification under the BSC for settlement of TERRE acceptances from aggregators or smaller participants.

However, it is **the opinion of the Proposer that for the purposes of this modification** the Capacity Market baseline approach will not be used.

Dynamic Parameters

The Workgroup did discuss the dynamic parameters submitted under the Grid Code that are required under the TERRE process. These are reviewed in Table 6 below.

Table 6 Grid Code Dynamic Parameters and TERRE

Data Item	Used for BM?	Used for TERRE?
Physical Notification (PN)	Yes- used as a baseline for any BOAs	Yes – used as a baseline for any RRI

Run up/ run down rates	Yes, used to calculate instruction profile	Yes, used to calculate instruction profile
Maximum Export Limit (MEL), Maximum import limit (MIL)	Yes	Yes (will use this to indicate a fault on the unit)
Stable Export limit (SEL), Stable Import Limit (SIL)	Yes	No
Minimum Zero Time (MZT), Minimum Non-Zero Time (MNZT)	Yes	No

The workgroup agreed that SEL, SIL, MZT and MNZT parameters are not explicitly required for TERRE submissions. However, it was noted that for RR Providers that will also participate in the Balancing Mechanism it was up to the RR providers to ensure that their RR bids, and the way that these bids may be accepted in the LIBRA auction, are compliant with the Grid Code.

For the avoidance of doubt, **it is the opinion of the Proposer that they will instruct an RRI even if this would break the rules normally applied in the BM to SEL, SIL, MZT and MNZT.**

MIL and MEL will be respected as we have agreed that this is the mechanism that an RR Provider will use to indicate unavailability due to technical problems that have arisen in short timescales.

For RR Providers that are not participating in the Balancing Mechanism the SEL, SIL, MZT and MNZT have no meaning and will not be used (even if default values are given to the GB TSO).

General Requirements for Data Submission

Implementation of GC0097 will require a number of changes to data submission under the Grid Code and section header 31 of section 3 of this report details the high-level Grid Code changes.

With respect to data submission the Grid Code [BC 1-3 and a new BC 4] shall be amended to specify that all submissions in respect of RR participation shall be made in accordance with good industry practice.

Failures in relation to Data Submission

The TSO shall monitor the failure of RR Providers to submit feasible data and bids. The TSO will produce standard reports as defined in the System Operator Guidelines and these will be presented to the Grid Code Review Panel.

Failures by individual RR Providers that repeatedly cause issues for the LIBRA platform or locally for the TSO may be considered as a potential breach of the requirements of the relevant provisions of the Grid Code. A Workgroup Member suggested that the Grid Code Review Panel should review any such repeated failures that are identified by the TSO however after clarifying that the Panel do not have such powers it was suggested the TSO would act as a key intermediary with the regulator to make a decision on consequences to repeated failures.

In relation to data submission failures, the TSO may:

- Suspend access to the RR market for a defined period for particular failures of an RR Provider subject to a remedial action plan for that RR provider, or
- Temporarily revoke a Party's access for a defined period for failures at all RR providers associated with that Party to participate in the TERRE market subject to a remedial action plan; or
- Permanently revoke a Party's access to participate in the RR market for multiple instances of failure.

Albeit the consequences in relation to data submission failures are already in place, the Workgroup identified a future scope to define the process for when the TSO would apply the above sanctions.

A Party may be able to submit any relevant information to the TSO in relation to the circumstances that gave rise to a failure. The TSO must review information submitted by the Party in relation to any failure. The TSO may undertake a hearing in relation to failures at which evidence may be submitted by the relevant Party.

The TSO in consultation with the Authority and the relevant Party will determine whether that has been a breach or potential breach of the Grid Code and either reject or ratify the decision to suspend or revoke participation in TERRE (either temporarily or permanently).

Parties shall use the electronic data communication facilities as specified in BC1.4.

For the avoidance of doubt, parties already obligated to submit the above Grid Code data in compliance to existing GB arrangements should continue to do so, noting the additional requirements above on feasibility for TERRE. Those parties not obliged to submit this information as above, but who wish to participate in TERRE, must submit this data in line with the relevant provisions of the Grid Code in respect of RR participation only.

Systems for Data Submission

The TSO will specify which electronic submission systems will be used for the transfer of data between the RR providers and the SO. To be clear – participants are expected to use electronic means to communicate with the SO. The use of telephone, faxes etc. is only allowed during systems failures.

6. Data Defaulting arrangements

The Workgroup also discussed what should be the defaulting arrangements for data submissions. It was agreed that for **PN data** that participants will have a choice of whether they wish their PNs to default to the previously submitted data once we have received a value. Alternatively they could opt to submit an updated value each time a unit wishes to participate in TERRE.

In respect of **offer data** it was agreed that due to the fact that a new identification number needs to be generated for each RR offer and also the complex nature of some offer bid formats that the solution will not include the defaulting of offer data. It was considered by the Proposer that bulk submissions should provide some of the flexibility that would have been provided by defaulting. The Proposer clarified that bulk submission of data would mean that RR Providers will be able to submit RR offers in bulk ahead of time and the rules for this will be in line with existing BM data submission arrangements e.g. a maximum limit of data submission is equal to the end of the current Operational Day + 5 days.

7. Data validation

The Workgroup discussed how the solution should set out any data validation requirements on RR submissions, including consideration of what level of quality assurance could reasonably be performed by the TSO within the timescales available pre-submission to the Central TERRE platform.

The Workgroup explored the different levels of validation that could be performed. Some workgroup members favoured more stringent validation steps to be performed by the TSO. They proposed making use of Dynamic Parameter data to assess that RR offers are operationally viable as for some Workgroup members this approach would prevent GB participants distorting the TERRE auction, and the TSO receiving RR Acceptances that RR Providers cannot fulfil.

The Proposer was supportive of the principle suggested by the workgroup, but had significant reservations given the number of system and timings constraints involved in such an activity.

It was the view of the Proposer that the TSO should only restrict a RR Provider's lodged RR bids if they are operating under a GB constraint and that "excessive" balancing costs would be incurred if their bid was passed through to LIBRA and subsequently accepted. The TSO should have the information available to undertake this activity for Transmission constraints,

and on-going work between the TSO and the DNOs will better enable Distribution constraints to be factored into this.

On-going work between the GB TSO and DNOs will determine the industry standard on coordinating services and conflict avoidance in order to prevent distribution constraints being triggered by a TERRE service provider.

The Proposal that the Workgroup agreed was the only practical and pragmatic solution, would be that National Grid System Operator would only undertake a technical validation of the above items (plus the values specified in EBGL) to ensure submissions are not ‘*manifestly erroneous*. as per EBGL requirement in Article 29:

The connecting TSOs shall not modify or withhold balancing energy bids, except for... balancing energy bids that are manifestly erroneous and include an unfeasible delivery volume...”

It was confirmed that the data validation requirements for any dynamic data submission would continue to follow the existing processes in the National Grid Data Validation, Consistency and Defaulting Rules².

8. Grid Supply Point or Grid Supply Point Group

The Workgroup discussed at what level BM Unit data should be aggregated to: Grid Supply Point (GSP) or Grid Supply Point Group (GSPG).

The proposal to aggregate at the GSP Group level was based on the current settlement arrangements under the BSC. Currently supplier BMUs are defined at the GSP Group level. There are 14 default base BMUs for each supplier. The Supplier BMUs are not “instructable” by the TSO and so do not cause constraint issues. In addition the BSC allows a Supplier to create an Additional BMU that at the GSP Group level (although in reality this has never happened). The proposals under P344 would facilitate the aggregation of meters at as GSP Group level. This enables a number of meters within a GSP Group to comprise a BMU.

The proposal to aggregate at the GSP level was based on the operational requirements of the TSO in relation to exports and constraints. It was envisaged the aggregators would only be permitted to assign meters to each GSP rather than to a GSP group.

It was the view of the Proposer that aggregation at GSPG may lead to operational uncertainty and had the potential to impact system security. The GSP Group definition could lead to the risk that the TSO may not have the required visibility if the large volumes of energy which may potentially exacerbate constraints when delivered at multiple GSPs.

² National Grid Data Validation, Consistency and Defaulting Rules:

<https://www.nationalgrid.com/sites/default/files/documents/32071-DVCD%20Rules%20v9.pdf>

These concerns were recognised by the workgroup. The workgroup agreed that if a BMU was defined at a GSP Group level and if there were active constraints then a pragmatic solution was for the TSO to constrain the TERRE submissions from such. This would mean that the TSO could mark submissions as restricted when passed to the TERRE platform.

The workgroup agreed that even though a BMU was not defined at a single GSP information will be requested that provides information about the location of their sub-components (meters). This information may allow the TSO (and DNO) to understand where on the network RR provision will have an effect.

The workgroup noted that the GSPG solution is a pragmatic way of delivering TERRE and recognised that further work may be required following implementation of the TERRE solution to provide better locational information that enables more parties to submit bids into the TERRE process.

9. RR Dispatch Timetable

The Proposer set out the RR dispatch timelines. The following timeline sets the end-to-end proposed solution for Grid Code process for TERRE. Where the solution refers to 'H' – this is the start of the one hour delivery period for RR. All process points are set out in relation to this point in time.

By H-60 minutes

The **RR Provider** shall:

- Submit their RR bid/offer information in line with the Electricity Balancing Guideline for the full RR delivery period ahead (H to H+60).
- Submit the following data elements necessary for GB dispatch/settlement for the specified durations:
 - A Physical Notification for the first 30 minutes of the RR delivery period ahead (H to H+30)
- Ensure a Run Up and Run Down Rate has been submitted/is in place to cover the RR delivery period ahead

Between H-60 to H-45 minutes

The **TSO** shall

- Validate the submitted RR Participant data and identify any submissions which are “manifestly erroneous”
- Undertake a security assessment for GB system (in collaboration with DNOs) and identify any RR Providers that are subject to network constraints and may have these TERRE bids ‘restricted’
- Compile the GB TSO need for TERRE and lodge this, along with the compiled RR Participant data to LIBRA

H-45 to H-28

- The LIBRA algorithm runs to produce the RR Acceptances
- These are then issued to the GB TSO

By H-30 minutes

The **GB TSO** shall:

Publish the RR Acceptances and this action will advise whether a RR Provider will be activated (noting 30 minute full activation) or has been an unsuccessful and why (if the reason is not related to being out of merit in respect of bid/offer price)

The **RR Provider** shall

- Submit the following data elements necessary for GB dispatch/settlement for the specified durations:
 - A Physical Notification for the second 30 minutes of the RR delivery period ahead (H+30 to H+60)
 - Ensure correct Run Up and Run Down Rates are available to the GB TSO
 - Ensure availability is identified using MIL and MEL

By at least 25 minutes before the first non-zero deviation from an RRA

The **TSO** shall

- issue instructions where applicable (e.g. instructions will not be issued if a BOA has been issued in the opposite direction)

When FPNs are available for ramp down/up for the last RRA are available

The **TSO** shall

- issue instructions for the last block

GATE Closure for TERRE bid submissions

The proposer confirmed that the gate closure for RR bid submissions would be 60 minutes before the relevant settlement period.

The workgroup discussed the impact of gate closure at 60 minutes on parties that are participating in TERRE. There are a number of issues:

- Parties will be required to prepare TERRE bids prior to the submission of FPNs. Therefore there is a level of uncertainty associated with the baselines RR bids for parties that arise from the risk that FPNs may not accurately reflect the TERRE baseline;
- The nature of the TERRE process may require acknowledgement that the RR bids have been received by the TERRE platform. This acknowledgement or rejection process will require parties to make submissions some time before FPN gate closure. This is analogous to the ECVN notification process which introduces a de facto earlier gate closure (ca 15 minutes) for contract notifications;
- The TERRE process will interact with the Xbid process. It is already acknowledged that the Xbid process will result in a different gate closure for the final positions of interconnectors (some 5 minutes after FPN gate closure). Parties that participate in TERRE may also wish to participate in Xbid, and may wish to notify final FPNs as close to gate closure as possible.

The workgroup discussed the possibility of submissions to the TERRE platform after the gate closure for FPNs. For example, there could be Gate Closure for TERRE submissions 5 minutes after FPN gate closure to enable parties to assess final baselines and prepare bids for submission into the TERRE platform. Some workgroup members supported this approach towards TERRE submissions.

The proposer indicated that a TERRE gate closure after FPN gate closure may not be compatible with the operation of the central TERRE process including the calculation of TSO needs, the processing time for the TERRE algorithm and the process for publishing TERRE acceptances and instructions.

The workgroup expressed concerns that the design of the TERRE central process may introduce undue uncertainty for parties that wish to prepare RR bids.

The central TERRE platform are re-visiting the gate closure timings due to XBID which was set to be 60 minutes however following strong feedback from market participants this has now been proposed to 55 minutes to allow more time to update bids in between gate closure times.

The TSO's expressed issues around shortening the time to carry out securities and communication. The project is now in discussion with providers to shorten the optimisation time to an overall of 55 minutes. The reason being, when bids are received, time is required to assess which would go forward and which would be rejected. NGET have 10 minutes to run processes and confirm their position, and that they would be unable to shorten this time and therefore shortening the providers' timings is being negotiated.

A Workgroup Member expressed that the Grid Code solution should allow 60 minutes to allow for the process of market participants after.

The Proposer explained that trials are expected to take place in 2019 to analyse the timings with the systems in place and until such time there will be no change to the agreed timings as the commercial impacts until doing so is unknown. On the basis that we are still unsure and developments of system processes still needing to take place suggest the group leave this issue for now and re-address when there is more real data.

A Workgroup Member suggested that rather than determining a set time without having any data or trials to make an assumption on. Instead, the wording within Article 7 of the implementation framework should be used more namely the '55-60 minutes' to provide a range as opposed to a set value.

The Workgroup and the Proposer identified that by putting in a range as per the implementation document would result in the default obligation to become the lesser value of 55 minutes and therefore the Proposer expressed the view that the

default timing should be 60 minutes and if this did not work once the systems have gone live then there would be an option to modify this in the future.

The Workgroup did explore the option that if a range were to be used as opposed to a definitive value then from a legal point of view it would be better placed to implement a framework as to how the timings should be determined as opposed to a range which would be uncertain.

10. Feasibility of bids

The Workgroup and the Proposer discussed a number of different approaches for considering the feasibility of bids.

It was the view of the Proposer that initially there was a desire to keep the GC0097 solution for feasibility of bids as simple as possible e.g. virtually no checks so that the SO would just pass through the submissions. It was noted to the Workgroup, however that as the solution has been further developed the risk of ignoring errors in TERRE bids may lead to more problems at a later time.

The Proposer provided an example to illustrate the point: if the TSO didn't check the MW values being submitted and one party puts in an infeasibly large volume that the available capacity at a cheap price then they could distort the auction outcome. In addition, the TSO may have to issue BOAs on other units to make up the "missing" MWs.

The intention was that the TSO check the feasibility of bids using the following criteria (*note all bids will be sent to LIBRA but those failing feasibility checks will be flagged as restricted*):

- Bids will be restricted if they fail basic data checks such as lack of data, letters where there should be numbers etc.
- There is no corresponding PN for the relevant time periods (pure RR Providers may not bid for all time periods so as part of defaulting we will not assume that they have values for every 15 minutes).
- The max and min values in the submission don't make sense.
- They violate Transmission constraints.
- The RR Provider has already accepted prior SO commitments such as ancillary services contracts, sync decisions for a unit's MNZT/MZT, etc;.
- Units that have been BOA'd for reserve and response; and
- Prior DNO/DSO commitments or Distribution constraints (if known)

11. Dispatch Processes - RR Instruction

In defining the solution for how the TSO would instruct RR Providers to deliver the TERRE volumes the Proposer considered that this element could be designed in a number of ways.

The first consideration was **when** to issue instructions

1. Issue all instructions as close to HH-30 as possible
2. Issue instructions as close as possible to real-time

The second consideration was the **format** of the RR instruction

- i. BOA based RR Instructions
- ii. Delta MW RR Instructions

The Proposer highlighted to the Workgroup that when considering the above options, the relationship between the number of instructions and the variation of volume per 15mins (either due to TERRE or underlying PN/BOA) and the number of points per instruction had to be factored in.

In developing the solutions to the dispatch process the workgroup assumed the following:

- The central TERRE platform would produce a set of TERRE acceptances that would require the relevant TSO to deliver the relevant volumes for the cross border exchanges;
- The central TERRE platform would publish the relevant volumes for each accepted RR bid;
- The relevant TSO would issue a set of TERRE acceptances to the local TERRE providers based on the central platform acceptances;
- In GB the TERRE acceptances would be published to the Balancing Mechanism Reporting System (administered by ELEXON). These would be known as RR Acceptances (RRAs);
- In GB the TERRE acceptances would be converted by the TSO into specific instructions for dispatch of the relevant units; and
- In GB the RR dispatch instructions would be issued to the control point by the TSO and would be in the same format as bid/offer acceptances. These would be known as RR Instructions (RRIs).

The workgroup discussed a number of options regarding the timing of RRAs and RRIs (see also Section 9). These are discussed below.

Option 1: issuing all RR Instructions as close to H-30 as possible

Under this option the TSO would receive RRA information from the central TERRE platform at H-35 (i.e. 35 minutes prior to the 1 hour delivery period). From this the SO would create MW profile (max 5 points) for each RRA (energy block + ramps) and sends RRIs to relevant control points for RR Providers starting at H-30 i.e. 30 minutes prior to the 1 hour delivery period). The TSO would run an optimiser to check whether RRI's sent to Balancing Service Providers (BSP's) are still correct from a balancing perspective and if not, NG sends the required instruction using BM (BOAs).

This option is based on the assumption that the TSO **must issue** all RRIs at H-30 to be compliant with EBGL.

It was noted that the TSO would endeavour to issue as few RRIs as possible for the delivery period. This is dependent on the extent to which RR providers allow TERRE flexibility to activate them up and down in the delivery period. It was the view of the Proposer that RR providers should link bids/offers to avoid this. Further RRIs may be required to deliver the required RR profile.

The Workgroup discussed that the advantage of this approach would give a clear view for the TSO of what has been instructed at H-30 and allows 30 minutes to re-optimize the system. It would fit within technical capability of IT solutions and allows simple automation of RRIs.

The disadvantages however of option 1 was there was potential for unfeasible RRI's to be sent as final FPN data for the full RR delivery period may not be available noting that the requirement to ensure feasibility of bids would be on RR Providers. Additionally it was noted that under option 1 the RR provider Control Point will have to keep track of RRIs to change output accordingly.

Diagram 2



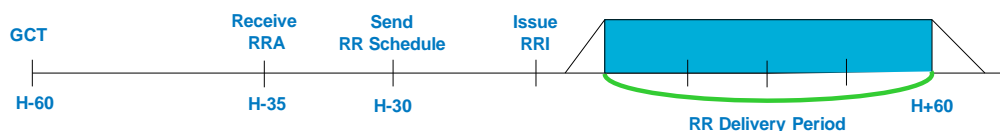
Option 2 – Issue RRIs as close as possible to real-time

Under this option the TSO would receive RRAs from TERRE system at H-35. From this the TSO would create MW profiles (energy block + ramps) and send the RRAs to ELEXON (for Settlement and publication purposes). This option is based on the assumption that the System Operator *must notify the control point* RR Providers of accepted RR offers at H-30 and RRIs will be issued to the control points at the latest possible time.

The advantage of option 2 is that it would reduce the possibility of sending infeasible RRI's and would be easier for RR provider Control Point as RRIs are sent just before the start of energy delivery.

The disadvantage of option 2 is that RR providers would get later notification of the intention of the TSO to take an RRA.

Diagram 3



It was the view of the proposer that option 1 would be the preferred option as it requires the least changes of IT systems and would be easier for ENCC to deal with issued RRIs rather than provisionally instructed RRIs.

Furthermore this option could be seen as potentially more transparent for settlement purposes and for RR providers, as RRAs = RRI and would be in line with EB GL definition of Full Activation Time. However it was realised after further analysis that there may be cases where an RRI will not be issued (e.g. if a BOA had been issued in the opposite direction or if an RR provider was to re-declare down their MEL – this is explained later in the report).

The Workgroup agreed with the concept of the TSO issuing an electronic instruction to RR provider to deliver their TERRE MW. Unlike in other Member States, the GB market is contingent on parties being dispatched centrally, as opposed to self-dispatch. This would be maintained in GB for TERRE.

It was confirmed that the TSO will attempt to issue as many RR Instructions as possible to control points, matching the received RR Acceptances, but a small number of exception cases have come to light as covered later. The Workgroup then discussed the format of the RR Instructions and the two options for the format of the electronic RR Instruction:

a) MW Profile instruction as per existing BOA

Under this option the TSO will use the submitted (PN) or baseline and issue a MW profile instruction in the form of a flat-topped deviation for the delivery period ahead.

It was the view of the Workgroup that this should be the default WG position as this is existing BM practice but noted that there are limitations for RR; the instruction is formed of five fixed points from PN + for a BOA there is a 'flat top'. A number of discussions surrounded the product shape for a BM. The Workgroup discussed that if the product shape was not critical would this approach work for RRI where the delivery is in blocks and whether 'profiled' PNs need to be restricted? It was confirmed that these situations could be handled by issuing multiple instructions.

b) Delta MW instruction

Under this option the TSO would use the submitted (PN) or deemed baseline and issue a delta instruction in the form of a +/-MW set-point deviation for the delivery period ahead and that submitted ramp rates must be followed.

The RR Provider would be issued a set-point to follow fixing a held delta from their baseline PN and which could therefore be profiled. It was noted that this may cause problems in issuing BOAs on top of RRI and that this would be a new process and as such may require more system development for all parties.

Tables 7 & 8 below details the pro and con of option a) 'Profile Option'

Table 7

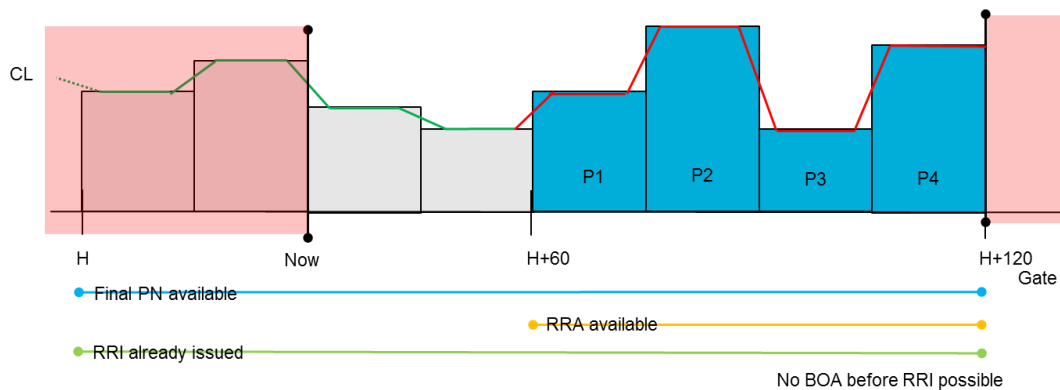
<u>Pro of profile option</u>	<u>Con of the profile Option</u>
Is in a format more familiar to existing BM participants, reducing the need for IS and process changes	May present difficulties for settlement processes if no PN
Better fits with the BSC P344 proposed solution for settlement	Multiple instructions may be needed for complex RRAs

Table 8

<u>Pros of delta option</u>	<u>Cons of delta Option</u>
Would be a more simple instruction	Is a different instruction format to existing BM, which may require existing BM providers to act differently for RRI. Significant implications for control points and would require new systems processes and training
Better supports aggregator and smaller player participation	May require the BSC P344 solution for BSC settlement to be revisited. In effect it requires a different form of settlement for post gate closure actions by the TSO.
Doesn't require PN to be fixed for 2nd half of delivery period	Potentially complex to deliver
Better reflects the nature of the RR product	Unclear how it interacts with bid/offer acceptances post gate closure

The **Proposed solution for Dispatch of RRI**s was that the TSO will instruct units activated in TERRE using a BOA based format on the Replacement Reserve Instruction (RRI). The RRI will start being issued at H-30 and these RRI will be issued in sequence as close as possible to each other once the previous RRI has been accepted (see example below). As the ramp after P4 is outside the BM gate, the RRI will have to be modified by the starting ramp of the next RR cycle or will be returned to FPN at or shortly after H-30, i.e. at the point when the FPN is known for that last 30 minutes of the TERRE delivery period?

Diagram 4



12. TERRE Dispatch Principles for the GB Market

The following rules will be applied when issuing an RRI (Replacement Reserve Instruction) after receiving results from the Libra platform in the form of RRAs (Replacement Reserve Acceptances).

New definitions

- A. PRRL (Post Replacement Reserve Level) = FPN (Final Physical Notification) + RRA. For the avoidance of doubt, no ramps are applied at this stage. The PRRL will have discontinuities if the RRAs for given 15 minute periods are at different levels. In calculating this variable no BOAs are included.
- B. CL (Committed Level) = the level an RR provider was previously instructed to, that is the sum of all previous actions that have been accepted (FPNs, BOAs and RRIs)
- C. PRCL (Post Reserve Committed Level) – the proposed new level for the one hour period covering the results of the Libra auction including the addition of ramps. In calculating this variable no BOAs are included.

Rules

- I. If a BOA (Bid Offer Acceptance) has been previously accepted in the opposite direction to any of the received RRAs no RRI will be sent to the RR Provider. This is true for the full one hour period even if the BOA and the opposite direction RRA are not coincident in time. The logic for restricting all RRAs, instead of considering a subset of those overlapping with the BOA, is that the RRAs may have been linked in the submission (please see example 1 below).
- II. If a BOA has been accepted in the same direction as all of the RRAs an RRI will be sent to the RR Provider (see later for details). These BOAs are not added to the RRAs as will be explained later.
- III. When calculating the PRCL from the PRRL blocks ramps will be applied between each PPRL block starting at -5 minutes from the end of earlier

block and ending at +5 minutes into the next block (i.e. a 10 minute ramp). The ramps used will be the prevailing run up and run down rates. If the run up/run down rates result in a non-symmetric ramp across the block boundary the start and end time of the ramping will be adjusted down to achieve this (e.g. -4/+4 minutes, -3/+3 minutes, -2/+2 minutes and -1/+1 minute). The closest to symmetry will be used. If using the declared run up/run down rates it is found that the MW level cannot be achieved the infeasibility rule given below will be applied.

- IV. For the first PRRL for which a non-zero RRA was provided up to 30 minutes of ramping time is allowed. The ramp must project back in time to meet the CL of the RR provider. Initially ramps are checked for symmetry as described earlier. If the ramp is a “slow ramp” it will start at +5 minutes into the PRRL and will be projected back to meet the CL for up to a maximum of 30 minutes. If this cannot be achieved the infeasibility rule described below will be applied.
- V. For the last PRRL for which a non-zero RRA was provided there is no limit on ramping time. The ramp must project forwards in time to meet the CL of the RR provider. Initially ramps are checked for symmetry as described earlier. If the ramp is a “slow ramp” it will start at -5 minutes from the end of the PRRL and will be projected forward to meet the CL.
- VI. To create an PRRL the effect of an RRA must be added to the FPN. If in the 5 minute “flat top” period within each PRRL the combination of the shape of the underlying FPN causes ramps that are not consistent with the declared run up/run down rates no attempt will be made to alter this. It is assumed that the RR Provider will deal with this inconsistency or will ensure that their FPNs do not lead to this situation (see example 2).
- VII. It is possible that the results of the Libra auction lead to a PRCL that is physically infeasible according to the declared run up and run down rates. If any of the above rules (rules 3 or 4, not rule 6) result in an infeasible PRCL the following procedure will apply. In order to ensure consistency throughout the TERRE period the rule starts at the first non-zero RRA block and works forwards to the last non-zero RRA. Applying this rule can result in radically different MW levels from that intended by the Libra auction but consistency is required for a feasible PRCL.
 - a. The first non-zero deviation RRA will be considered. If the infeasibility arises in rule 4 the ramp rate will be applied from CL at the time 25 minutes before the start of the PFFL and ending at +5 minutes into the start of the PFFL period.
 - b. The RR provider will then be kept at the calculated MW level for 5 minutes and will then ramp up or down toward the next PFFL block for 10 minutes.
 - c. The last rule will be repeated until the last non-zero RRA period
 - d. In the last PRRL, at -5 minutes from the end of the block, the RR provider will ramp towards the CL. The period for it to intersect the CL may be longer than 30 minutes.
 - e. Example 3 provides an example of these rules.

- VIII. If a BOA in the same direction was issued and accepted before the TERRE results it will be applied after the PRCL is calculated so that only deviations from the BOA are sent as part of the new RRs
- IX. The PRCL is broken down into a number of RRs following the turning points within the PRCL. For the PRCL shown in example 3 three RRs will be required. The final RRI will be held back until the FPNs beyond the TERRE auction period are available.
- X. Limit to the number of RRs. The underlying FPN can theoretically change every minute leading to a PRCL with multiple turning points and a large number of RRs (up to 28 instructions – please see example 4). Such a large number of RRs cannot be processed in time – possible ways to reduce the number of RRs are (options to be discussed)
- Increase the number of points in an individual instruction
 - Limit the number of turning points in the FPN
 - Take an average of FPN over a period
- XI. If an RR Provider submits FPNs and TERRE bids resulting in infeasible results from the Libra auction they will be reported and may have to withdraw from the TERRE process.

Example 1

An RR Provider has a constant FPN of 200MW. Before the results of the Libra platform are received the System Operator issues a BOA which is accepted by the RR Provider with the following characteristics

- BOA start time = 09:31
- BOA end time = 10:01
- BOA value = 100MW (the RR Provider is instructed down from 200MW)
- For the TERRE period starting at 10:00 the following RRAs are received
- RRA(1) from 10:00 to 10:15 = -100MW (down)
- RRA(2) from 10:15 to 10:30 = -50MW (down)
- RRA(3) from 10:30 to 10:45 = -100MW (down)
- RRA(4) from 10:45 to 11:00 = +1MW (up)
- In this case the RRA will not be converted into an RRI for sending on to the RR Provider

Example 2

- Assume an RR Provider has the following characteristics
- The run up/run down rate for the RR Provider is 10MW/min
- FPN from 10:00 to 10:10 = 200MW
- FPN from 10:20 to 10:30 = 400MW
- Note that the FPN run up rate is 20MW/min
- RRA(1) from 10:00 to 10:15 = 100MW
- RRA(2) from 10:15 to 10:30 = 100MW
- Between 10:10 and 10:20 the PRCL will have a run up rate not consistent with 10MW/min – no attempt will be made to rectify this.

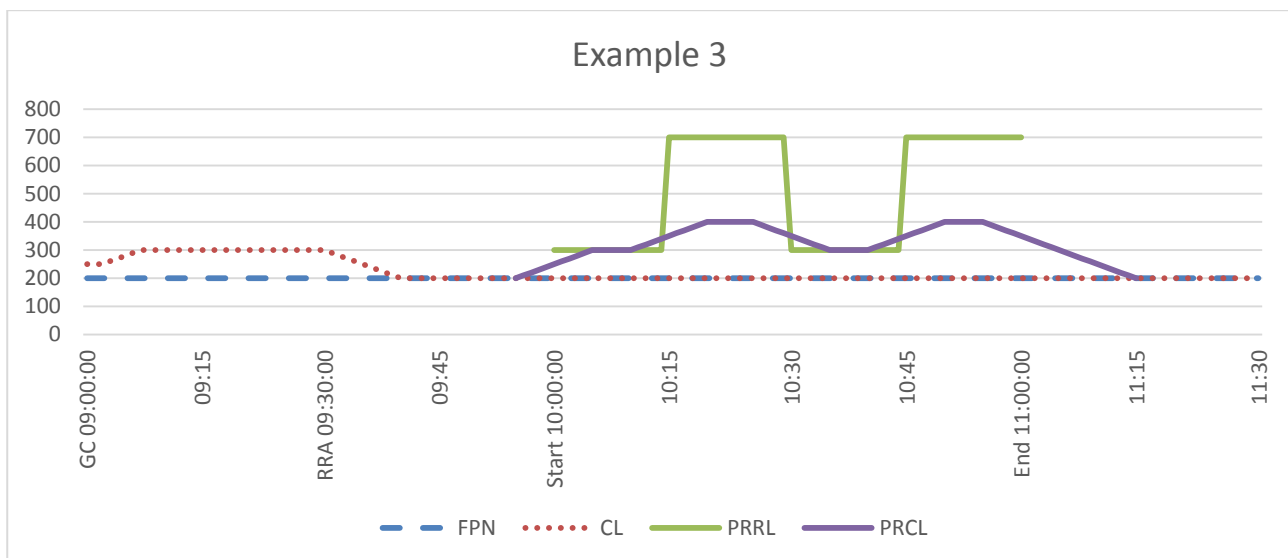
- In this example an RRI will be sent using this form – it is for the RR Provider to ensure that their declared FPNs and the way they expect to be called off in Libra result in a physically realisable RRI.

Example 3

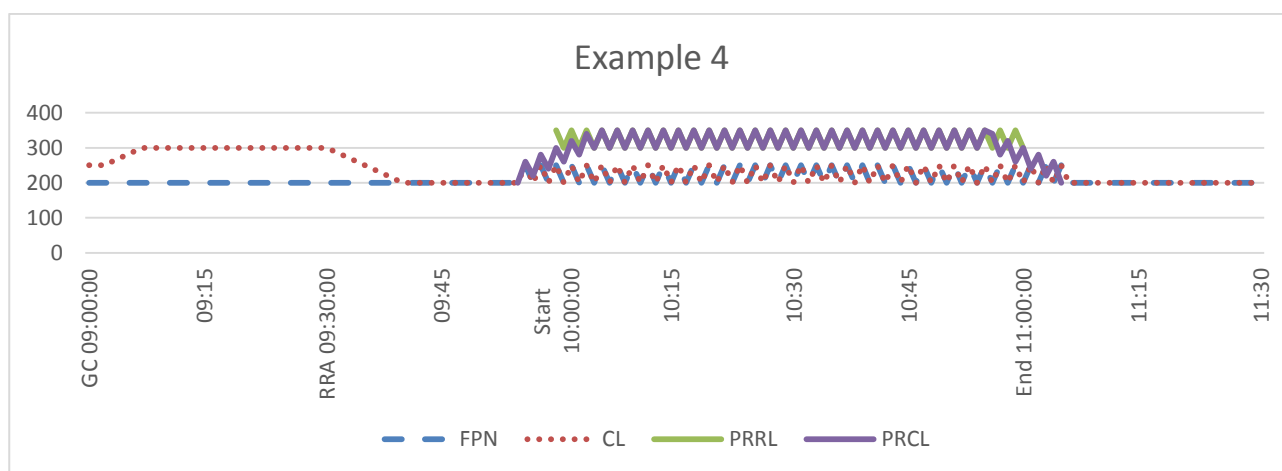
- The declared run up and run down rates for an RR Provider are equal and are 10 MW/min. there are no BOAs in this TERRE period and the FPN = 200MW
- The RRAs are as follows
 - RRA(1) from 10:00 to 10:15 = 100MW
 - RRA(2) from 10:15 to 10:30 = 500MW
 - RRA(3) from 10:30 to 10:45 = 100MW
 - RRA(4) from 10:45 to 11:00 = 500MW
- The PRRL are as follows
 - PRRL(1) from 10:00 to 10:15 = 300MW
 - PRRL(2) from 10:15 to 10:30 = 700MW
 - PRRL(3) from 10:30 to 10:45 = 300MW
 - PRRL(4) from 10:45 to 11:00 = 700MW

The maximum change that can be achieved from one PRRL to the next PRRL is 100MW (e.g. if started to ramp up at 10:10 ending at 10:20) and so these results are infeasible.

Using the above infeasibility rules will result in the following PRCL:



Example 4

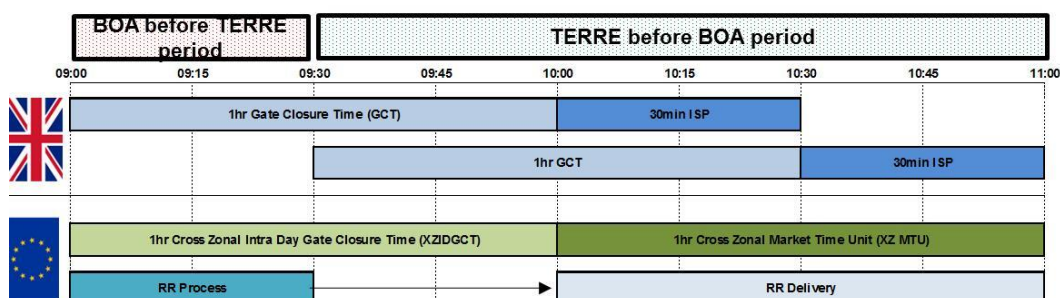


13. TERRE/ BM interactions: RRI before BOA

The Proposer set out their thinking in respect of RRIs being issued before a BOA. It was confirmed that following the issuing of the RRI, National Grid will continue to use the BM and that this would result in a 1.5hr window where BOAs could be issued to units that are in both TERRE and the BM and may have already been issued an RRI. It was the view of the Proposer that in this instance a TERRE RRI is treated exactly the same as when further BOAs are issued on top of previously issued BOAs.

14. TERRE/ BM interactions: BOA before RRI

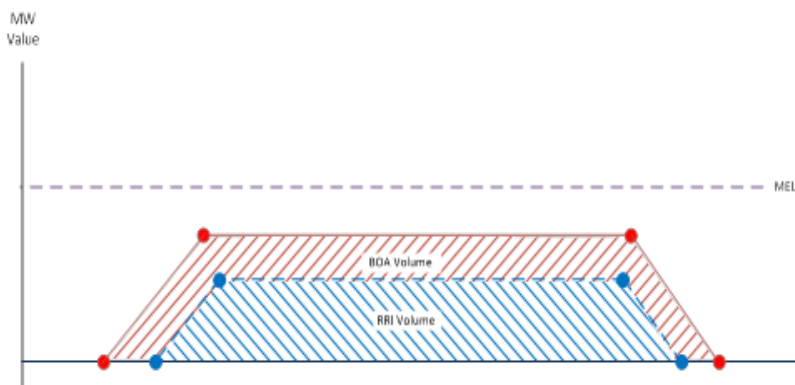
Diagram 5



As shown in diagram 5 above due to the delay in RR offer submissions and activations in each 2hr window there is a 30min window where it is possible to issue BOAs to a unit that is then subsequently activated in TERRE.

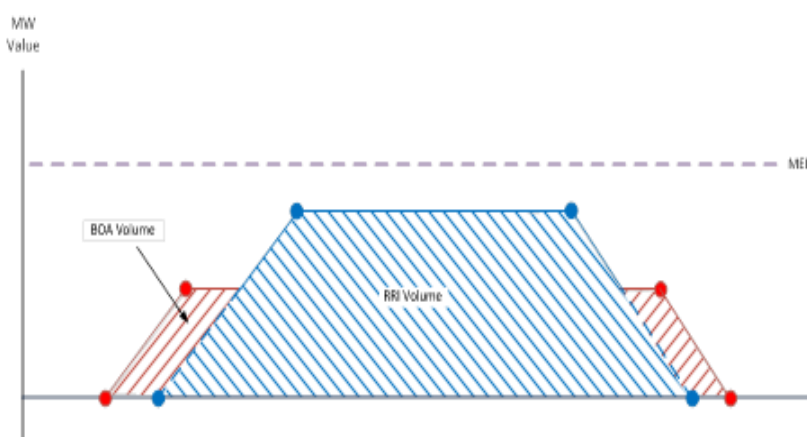
When a BOA has been issued before an RRI and they are in the same direction and the BOA level is larger than the RRI at all time points, no RRI will be issued and the unit will be settled for the RRI volume using the RR Activation with the remaining volume settled at the BOA price (i.e. the red area in diagram 6).

Diagram 6



When a BOA has been issued before an RRI and they are in the same direction and the RRI level is larger than the BOA for some time points, a RRI will be issued for the difference in the periods where BOA MW > RRI MW (e.g. blue area above red area in diagram 7). The RR schedule will be used to ensure that the unit is paid the TERRE clearing price for the blue area and BOA price for the blue area.

Diagram 7



For actions in opposite directions, where a BOA has been issued before an RRI and they are in opposite directions the RRI will not be issued and the unit will continue to follow the instructed BOA output (diagram 8).

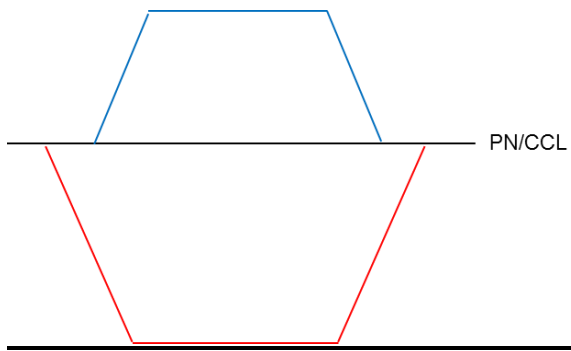
Any BOA in the opposite direction for the one hour TERRE period will mean no RRI will be issued – even if the BOA and RRI do not overlap.

It was noted to the Workgroup that this could raise a potential risk in parties gaming between TERRE and BM that could result in the unwinding of RRIs being exploited. The following options are being considered to mitigate this:

- Option 1: By automatically unwinding the RRI at the bid/offer price in the BM
- Option 2: By automatically unwinding the RRI at the bid/offer price in the BM but capping the unwinding cost at £0
- Option 3: By removing any unwinding cost for the RRI

The Workgroup concluded that Option 1 was the preferred option.

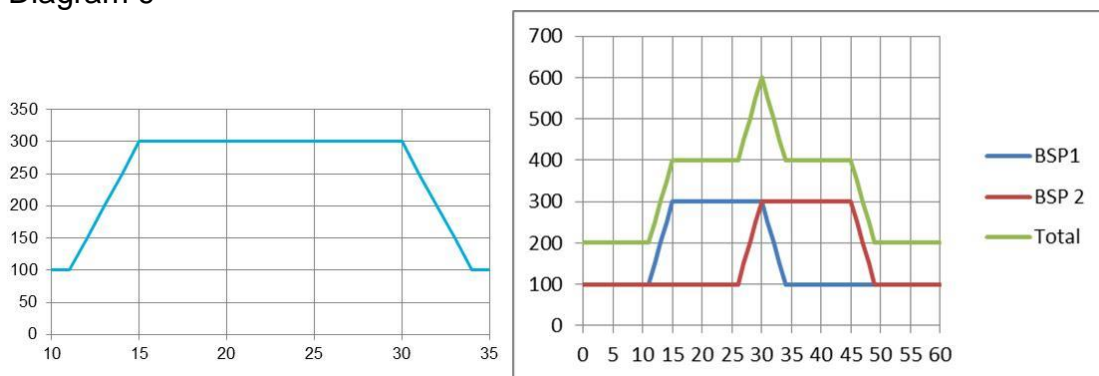
Diagram 8



15. Shape of Delivery

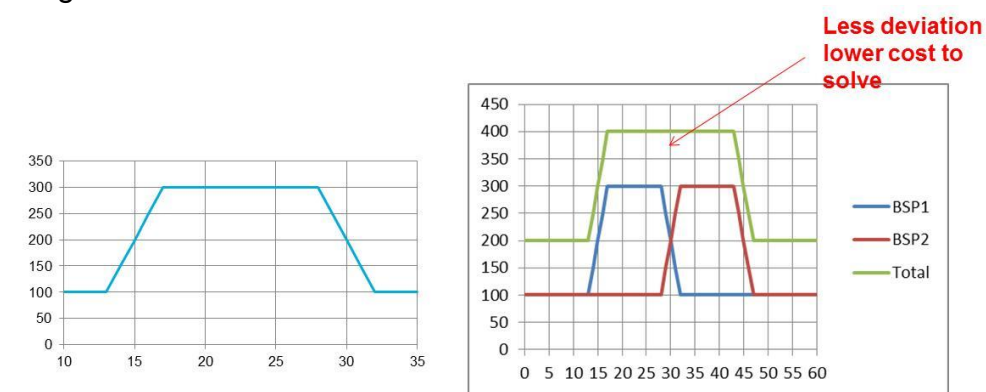
During Workgroups discussions had centred on whether the standard TERRE product is a block (ramping energy outside 15min delivery window) or a trapezoid (standardised ramps). It was confirmed to the Workgroup that the Proposal considered that in the situation where the standard TERRE product is a block and the ramping energy is outside of the 15min delivery period and is unpriced. This results in a consistent over delivery of net energy due to ramps. See Diagram 9

Diagram 9



Considering the shape of delivery when there is full delivery up to 5mins after product boundary diagram 10 demonstrates the situation where the standard TERRE product is a trapezoid with standardised ramps of 10mins (5mins either side of the boundary) and the ramping energy is partly outside/inside the 15min delivery period and the standard ramp is priced. This should lower the net over delivery of energy due to ramps.

Diagram 10

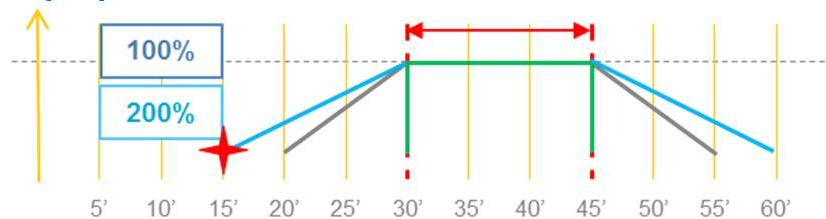


In considering the product shape and the total energy delivered diagram 11 shows both what the original proposal and the updated view which was presented to the Workgroup. This change was due to the fact that this shape mitigates (but does not completely eliminate) the possibility of frequency deviations at the 15 minute boundaries.

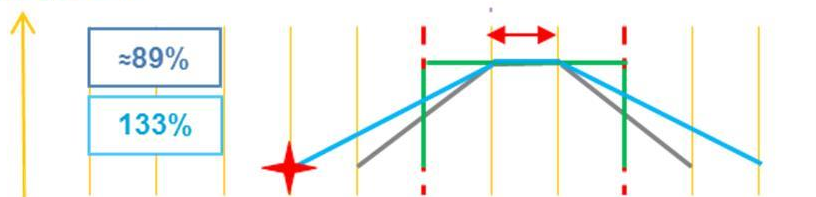
The dark blue box shows the % of the volume delivered in the period requested, whilst the light blue box shows the total % of energy delivered compared to what was requested. Using a trapezoid standard product means that less ramping energy is unpriced but that less energy is delivered within the requested period however the overall volume delivered is less versus requested is less.

Diagram 11

Original proposal:



Latest proposal:

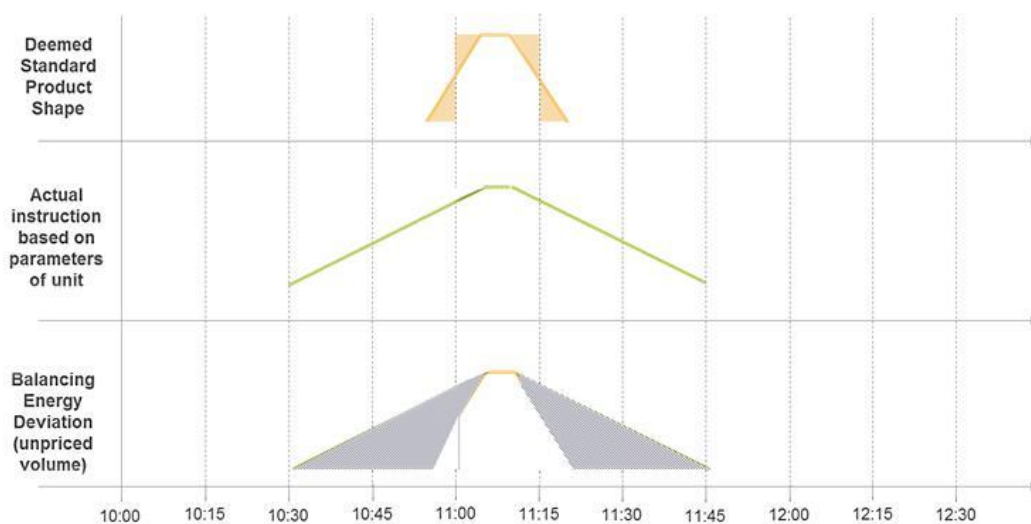


It was confirmed to the Workgroup that the proposed solution, in respect of the TERRE product shape of delivery, would assume

- A standardised ramp is 10mins starting 5mins before the delivery period.
- For RR Providers that can ramp faster than 10 minutes the ramp shape will be symmetric around the 15-minute boundary. Hence a faster ramping unit could ramp from -4 minutes to + 4 minutes around the boundary, or -3/+3. -2/+2 or -1/+1. In the case where rounding must occur the most symmetric time will be chosen.
- For RR Providers which are too slow to ramp in 10 minutes the ramp will end at +5 minutes into the period (or in the case of ramping down -5 minutes before the end of the 15 minute period) and will extend to a maximum of 30 minutes ramping.

A Deemed Standard Product Shape and Balancing Energy Deviation would be used for Settlement (for full details see P344 consultation)

Diagram 12



16. Incentivising the standard product shape

The Workgroup discussed whether the GC0097 solution should incentivise the standard product shape and how this could be achieved. Details relating to this are covered in the P344 consultation.

17. Ramping

The Workgroup discussed how the GC0097 solution should factor in run up and run down rates and how the implications for units that had longer or shorter run rates than the desired state. The Proposer and the Workgroup agreed on the principle that for any RR Providers that are deemed to be instructable via the BM then GC0097 would honour these and the run up/run down rates will be the same as the BM run-up/ run-down rates.

18. Interaction with the BM

Interaction with the BM has already been discussed earlier (see sections titled “RRI before BOA” and “BOA before RRI”).

For completeness it should be recorded that the Workgroup discussed the option of a moratorium on issuing BOAs before the results of the LIBRA auction were known.

It was concluded that this was not a feasible option for the TSO since it would potentially create system security issues.

19. Suitability for ‘non-BM’ participants

Both the GC0097 and P344 Workgroups explored how the solution could be suitable for providers who are currently not BM participants and noted that aligned with the concept of a Secondary BMU the solution works for non-BM and BM providers alike.

In terms of the BSC solution, the Proposer’s view was that the solution worked to ensure wider access to both TERRE and the Balancing Mechanism through the Secondary BMU model. The Proposer also felt

that the changes in the Grid Code in terms of TERRE would work for Secondary BMUs.

In terms of prequalification, it is anticipated that Virtual Lead Parties registering Secondary BMUs for provision of TERRE and participation in the BM would be required to go through the prequalification processes proposed as discussed in sub-header 4 earlier in this section.

For wider access to the Balancing Mechanism and TERRE, Virtual Lead Parties would be required to comply with the existing relevant parts of the existing Grid Code (e.g. BC1 and BC2) and for any new TERRE-specific sections.

Under the P344 solution, Virtual Lead Parties will accede to the BSC. Further work is required to understand the contractual mechanism by which Virtual Lead Parties will undertake to ensure compliance with the relevant sections of the Grid Code. It is anticipated that any other technical requirements that fall outside of the Grid Code that would normally be covered under a connection agreement or ancillary services contract will also be considered as part of this work.

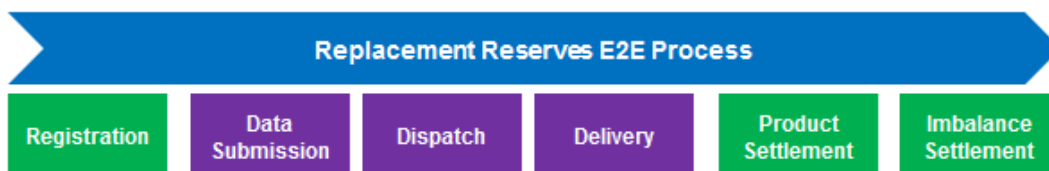
20. Obligations and requirements for ‘non-BM’ participants

The Grid Code will set out a number of obligations on parties as RR providers. In terms of non-BM parties who are not currently party to the Grid Code a mechanism/agreement will need to be developed to enable RR providers to accede to the relevant sections of the Grid Code. Options for this are currently being discussed and this section will be updated post the Workgroup Consultation phase.

21. Interaction with P344

The GC0097 modification is working in close coordination with BSC mod P344 (“Project TERRE implementation into GB market arrangements”). The diagram below summarises the areas of the TERRE solution which are covered by GC0097 (purple) and the areas which will be addressed by P344 (green):

Diagram 13



The scope of the P344 modification includes:

- TSO Balancing Service Provider (BSP) settlement i.e. payments made to GB BSPs (By National Grid via ELEXON Clear) to settle RR acceptances issued by project TERRE

- Inclusion of RR acceptance volumes in Imbalance Pricing and determination of imbalances and associated cashflows including non-delivery and balancing energy deviation
- New BSC provisions to facilitate voluntary inclusion of current non-Balancing Mechanism (BM) Balancing providers within the TERRE process using a subset of the BM and the BSC provisions, including adjustment of host supplier imbalance volumes.

22. Market Failure Scenarios

The Workgroup questioned whether there would be a back-up process and whether the TSO would use a substitute RR in instances of a communication failure or would the use of the BM be the back-up or what would be the trigger point for the RR market to be suspended.

It was the view of the Proposer that in the situation that communications with the LIBRA platform were to fail or if GB TSO-to-BSP communications fail then the arrangement will be to revert to existing national processes (i.e. in the case of GB the BM and other ancillary services).

23. Beyond the wall issue

It was noted that the 1-hour TERRE delivery period comprises 2 half hour settlement periods.

The initial data submission (h-60) occurs at the physical notification time (BM gate closure) for the first half hour. The physical notification gate closure for the second half hour occurs after the RRAs are issued by the LIBRA platform to the TSOs.

Consequently, the time of receipt of the RRAs from the central LIBRA platform the FPNs covering the second half hour of the TERRE period will only just be available. i.e. Physical notification gate closure for the second half hour has not yet occurred at the time that the RRAs are available to the TSO but will be available by the time RRs are issued.

In addition, physical notification for the half hour after the TERRE delivery prior only occurs at H. Consequently a physical notification for the first settlement period after the TERRE delivery period may be different to the profile envisaged at the time of the RRA. Essentially this is a “beyond the wall” issue for the relevant settlement period.

To resolve this the workgroup discussed two options

- allow the RR Instruction to hang at the “wall” or
- delay issuing the final RR instruction until H+30 minutes by which time Physical Notification gate closure will have occurred for the relevant settlement period after the TERRE delivery period and the FPN will be available.

Instructing up to the wall currently happens for some BOAs and so some of the workgroup felt this approach could be used for RR instructions.

Other workgroup participants felt that the nature of the TERRE product meant the instruction should return to FPN that relates to that period.

The conclusion of the workgroup was that going back to FPN was preferable.

To assist settlement it was also agreed that the final ramp can last longer than 30 minutes.

24. Assessment of RR bids in context of providing other capacity/balancing services

Under the proposed solution it was the view that if a RR Provider participates in multiple markets and has obligations to deliver capacity/balancing MWs (excluding BM) to either TSO or DNO/DSO, that this commitment be honoured before bidding into TERRE.

The TSO (in coordination with the DNO) should be aware of which units are participating in 'conflicting' capacity/balancing services and the TSO would restrict the RR Provider in the same way as a network constraint.

25. Coordination between GB TSO and Network Operators

Enhanced coordination of services and network constraints between DNO/DSO and SO will be required in order for TERRE BSPs embedded in the Distribution network to provide services without detrimental effects to the network. Wider industry work between GB DNOs/DSOs and GB SO will determine the industry standard on coordinating services and conflict avoidance. This will influence any requirements on Grid Code changes.

26. Impact on Interconnectors and provision of information for EBGL

In order for GB to comply with the obligations in the Electricity Balancing Guideline (EB GL), it is vital that the relevant interconnectors fulfil the role of facilitating the cross-border exchange of the Replacement Reserves product.

The interconnectors connecting to GB are separate entities to the TSO, and this unique arrangement means that ensuring these obligations are sufficiently covered by the appropriate frameworks must be carefully considered. The best way of doing this is currently being considered, and this work will be to some extent interlinked with the regulator's decision on the UK TSO allocation of responsibilities for EB GL, due to be published in the New Year.

27. Impact on Licence Condition C16

Consequential changes will be required within the C16 Statements and Methodologies (<https://www.nationalgrid.com/uk/electricity/market-and-operational-data/transmission-licence-c16-statements-and-consultations>) which set out the balancing services that National Grid procures, methods for procurement and how data is passed to ELEXON in relation to these. If the modification is approved by Ofgem, it is anticipated that these changes would form part of the 2018/19 annual update process. This will commence

in late 2018, be consulted on in early 2019 with the updated set of statements and methodologies published by 1 April 2019.

28. Publication of Data

Article 12 of the Electricity Balancing Guideline (EB GL) requires TSOs to ensure that certain information related to the Replacement Reserves product is published. In line with the requirements set out in this article, this section summarises the content and location of the information that will be published.

Information to be published at a European level

Much of this information will be available at a European level. Working Group Market Information and Transparency (WG MIT) within ENTSO-E are currently examining developing the format, timings, and route through which this information will be published and further information will be available in the first half of 2018. The following information will be published:

- a. Type of product
- b. Delivery period
- c. Offered volume
- d. Activated volume
- e. Offered price
- f. Paid price
- g. Activation purpose of activated bid
- h. Information on whether the bid was declared as restricted

This information will be published no later than 30 minutes after the end time of the validity period to the pre-defined destination, to be confirmed under WG MIT.

The following information will be available via the European transparency platform:

- a. Total volume of offered and activated bids for RR product
- b. Total volume of unavailable bids

Information to be published nationally

The following information will be published via BMRS.

Disaggregated Secondary BM Unit and TERRE data will need to be published on BMRS upon receipt from National Grid. Data items include:

- BM Unit Id / TERRE Provider Id;
- Associated TSO;
- Associated DNO (if applicable);
- Market balance area;
- Offer type (upward or downward);
- Minimum quantity (MW);
- Maximum quantity (MW);

- Price (£/MWh);
- Exclusive offer Id number (where applicable);
- Linking offer Id number (where applicable);
- Starting & ending time for the offer (must be on quarter hour boundary with a minimum 15 and maximum 60 minute duration)
- Incremental size (where applicable)

Information relating to Secondary BM Unit Physical, Dynamic and Bid/Offer data will also be published to BMRS. Data items include:

- Final Physical Notifications (FPNs);
- Dynamic Data Set
- Bid Offer Data; and
- BOAs

National Grid will also publish auction results from TERRE via BMRS. For each relevant Interconnector, the following data items will be provided:

- Interconnector Id
- Volume (in MW) accepted by TERRE for each quarter hour period within the hour

In addition, National Grid will provide the following data items for each quarter-hour period within the hour:

- TERRE GB clearing price (£/MWh)
- Volume of GB need met (MWh)

For each RR Acceptance, the following data items will be provided:

- BM Unit Id
- Start Time and End Time (each being on a quarter-hour boundary within the hour)
- MW level (positive for an upwards adjustment, negative for downwards adjustment)
- Price
- [Pay-as-cleared or Pay-as-bid identifier]

National Grid will publish RR instruction data via BMRS:

- a 'From' MW level and an associated 'From' time;
- a 'To' MW level and an associated 'To' time;
- a flag stating whether that Acceptance is relating to an RR Acceptance, and

all other relevant BOA acceptance data

The following RR schedule data will be published to BMRS. The RR schedule data will have similar content to a BOA. It will consist of one or more acceptance volume pairs, each with:

- a 'From' MW level and an associated 'From' time;
- a 'To' MW level and an associated 'To' time;
- a flag stating whether that Acceptance Data is relating to an RR Schedule,

and all other relevant BOA acceptance data

The SO will also provide a report on the BMRS on GB restricted TERRE bids for each settlement period including

- the BMU id (this may be anonymised)
- The restricted volume
- The relevant settlement periods
- The relevant TERRE auction
- The reason for the restriction (e.g. non-compliance/transmission constraints/distribution constraints/interconnector constraints)

29. TERRE: Financially firm Products

It was confirmed to the Workgroup that TERRE would always been a financially firm product. The RR Acceptance 'block' will always be paid to/payable by the GB BSP at the TERRE GB clearing price for that quarter-hour.

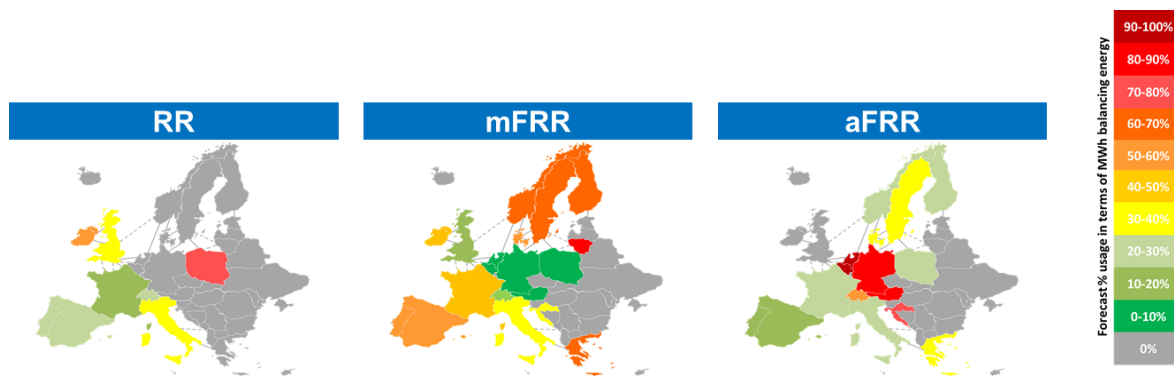
Details of how to achieve this are contained in P344 consultation.

30. Wargames

Following our internal war games analysis was conducted to understand the below questions:

- a. How much could we use TERRE?
 1. Use to stand down STOR earlier – 164MWh per day (7MW average)
 2. Coarse energy balancing – 1.4GWh per day (60MW average)
 3. Controlling I/C flows – 1.4GWh per day (60MW average)
 4. Total yearly volume 1.10TWh out of 4.42TWh total actions – 25% of needs
- b. What sort of volumes could be offered into TERRE by the GB market?
 1. Normal market headroom of up to 1.8GW, but some required for response
 2. Volume of distributed generation that won contracts in T4 auctions and could offer into TERRE is around 2GW
 3. Total volume that could be offer into TERRE up to 3.8GW
- c. What sort of volumes are other TSOs expecting?

Diagram 14



d. Legal text changes required

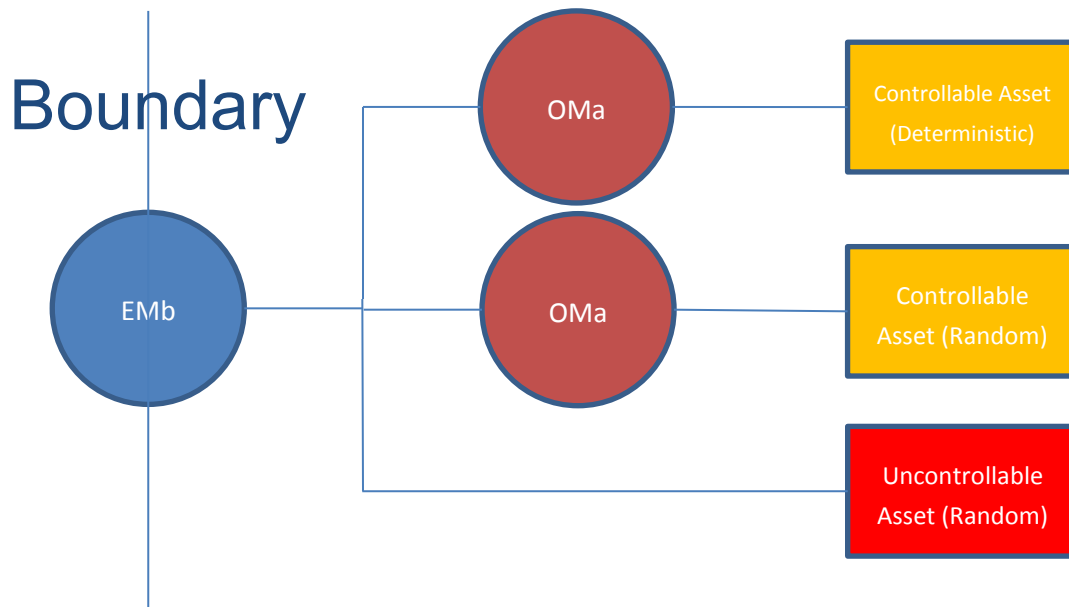
The Proposer set out the key areas where a change will be required to the Grid Code. The actual draft changes to the clauses are still being considered but the principles were discussed with the Workgroup and it was noted that the main changes would be to BC1 and BC2 and that a new BC (BC4) would be created to support GC0097 submissions and data flows.

- Notification process for a BM Unit to register and un-register as a TERRE participant
- Expected gate closure from RR/process timeliness to cover all forms of gate closure
- Submissions and validation of data from BSPs
- Checks performed before passing to TERRE platform
- Receipt of results from TERRE platform
- Issuing of RR instructions
- Timing conventions for instructions and other data flows
- Publication of RR data
- Defaulting to BM in event of a communication or algorithm failure from TERRE platform
- Use of single ramp rate

31. FPNs and operational metering

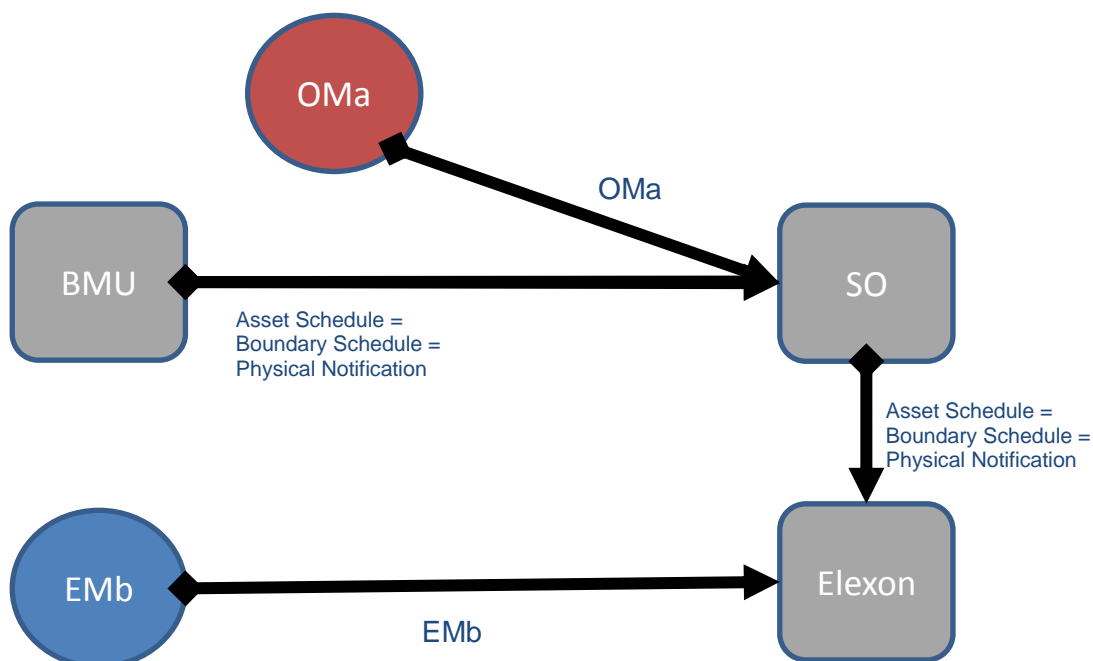
The Workgroup discussed the following possible metering configurations:

The below shows the system operator asset is getting boundary schedule information from the BM unit.



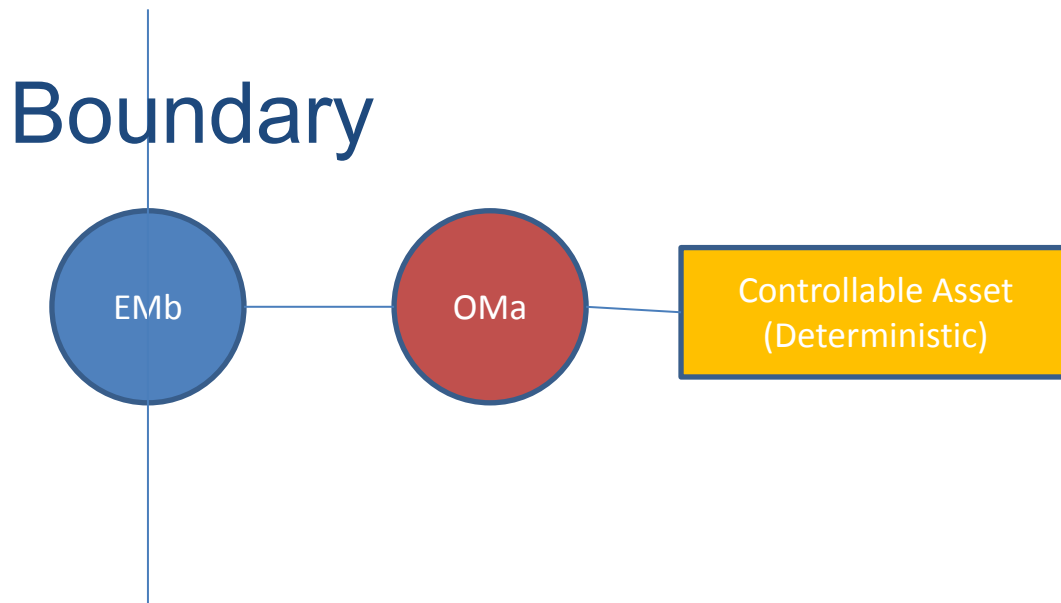
- EMb - Energy Metering at the boundary / OMa - Operational Metering at the asset
- Deterministic – control parameters are visible (pumps, diesel gens etc.)
- Random - control parameters are not visible (wind, collection of fridges etc.)
- Controllable asset – can be sent a signal and will respond by changing active power
- Uncontrollable asset – currently not available for control, appears random even if it may have some deterministic sources embedded

The below shows current data flows:



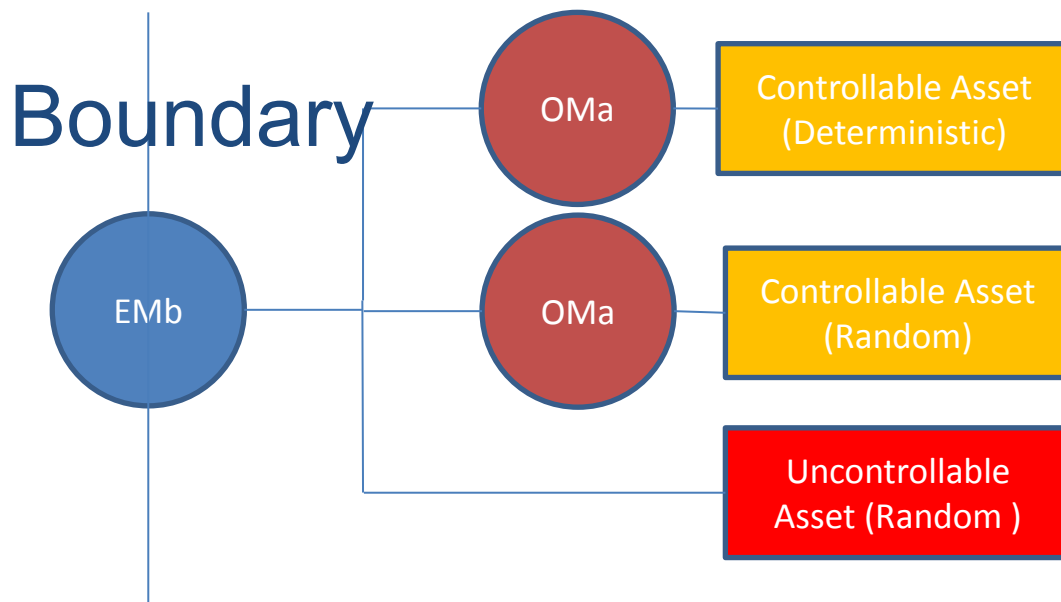
- Asset Schedule = forecast active power output at the asset level
- Boundary Schedule = forecast active power output at the boundary
- Physical Notification = current implementation covering both of the above

The below shows an example of a controllable deterministic asset only:



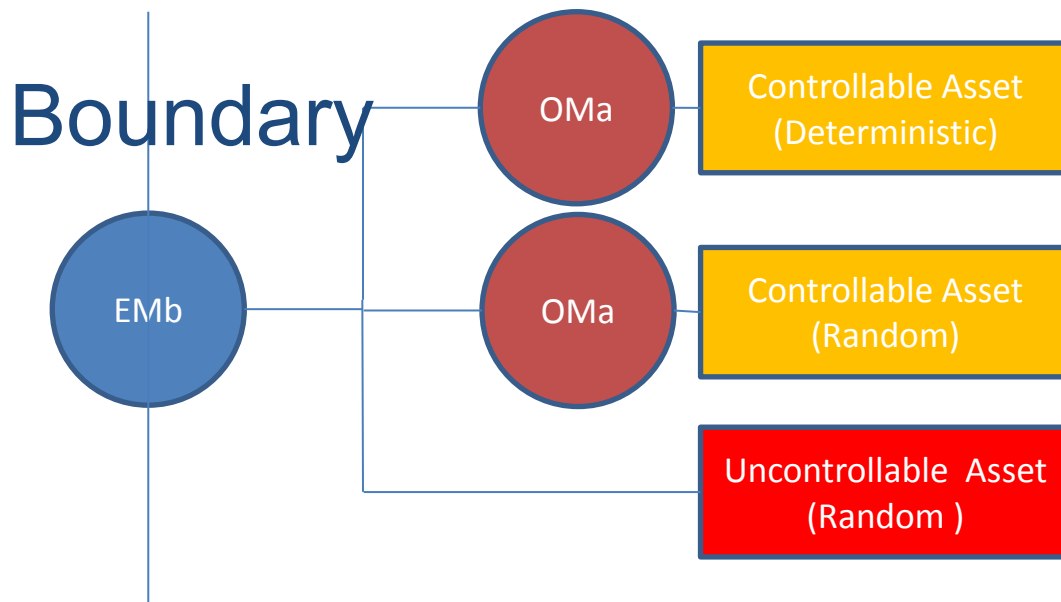
- To a high degree of accuracy Asset Schedule should correspond to OMa
- To a high degree of accuracy Boundary Schedule should correspond to EMb
- Asset Schedule = Boundary Schedule = Physical Notification
- In this case current data flows work correctly

The below shows current mixture of assets:



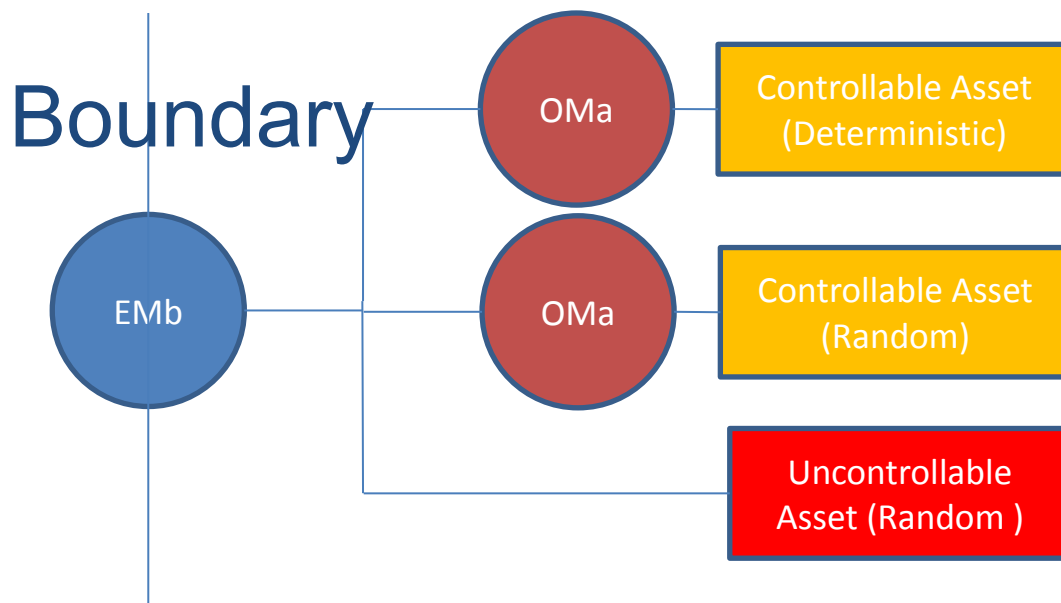
- Asset Schedule will not equal Boundary Schedule
- Physical Notification is most likely to correspond to Asset Schedule
- Dataflows will not work – the Physical Notification will not be as expected for use in settlement calculations

The below shows a mixture of assets with different schedules:



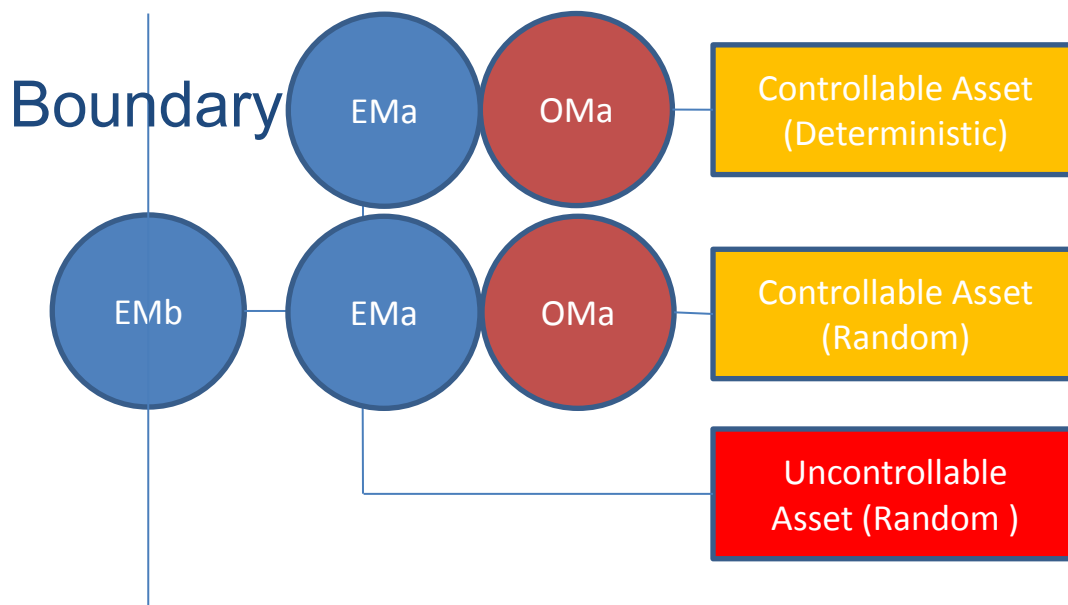
- Asset Schedule will not equal Boundary Schedule
- Asset Schedule will be submitted to the SO by the owner of the assets
- Asset Schedule will be the best estimate of expected active power
- Boundary Schedule will be calculated using an agreed methodology either by the BMU or by a party behalf of the BMU
- Boundary Schedule will be sent to BSSCo and used as the basis for calculating Bid Offer Acceptance volumes

The below shows a mixture of assets with different schedules or a PN of 0:



- Asset Schedule will not equal Boundary Schedule
- An Asset Schedule profile for the controllable deterministic asset and will be submitted to the SO by the owner of the assets – this will be best estimate of active power
- For the controllable random asset it will be assumed that the Asset Schedule = 0
- Boundary Schedule will be calculated using an agreed methodology either by the BMU or by a party behalf of the BMU
- Boundary Schedule will be sent to Elexon and used as the basis for calculating Bid Offer Acceptance volumes

The below shows a mixture of assets with added metering:



- Asset Schedule will not equal Boundary Schedule but everything now will be referred back to the asset
- Asset Schedule will be submitted to the SO by the owner of the assets and will be treated as the Physical Notification
- Original data flows now work

The System Operator (SO) would need to know what a controllable asset's active power will be in the future, the range by which it can vary (up and down) and the price for changing active power output. Future time variation is important because the SO has to plan ahead. If a constant schedule was used, future time changes in up and down variations would still have to be supplied. It is most likely that the SO needs an asset level schedule and it needs to reflect time variation

For controllable assets driven by random control variables it is more difficult to estimate a future schedule. However a provider of these services must have a good estimate of the up and down variation they are offering in the market. To derive this they must have an idea of the minimum and the maximum they can go to. To know what variation to offer they must have an idea of where they within this range

The Workgroup then considered the following options:

1. If there are only controllable assets at a boundary point
 - a. Providers submits PN as now to the SO and normal data flows prevail
2. If there are controllable and uncontrollable assets at a boundary
 - a. Provider provides asset level schedule to the SO
 - b. Third party provides boundary level schedule to Elexon
3. Do not allow mixed assets for the start of TERRE
 - a. In the future consider changing metering points and then option 1 is the natural position

For a process to be clarified there would be a requirement to outline how you settle and then an operational requirement. The baselining would be considered to be a settlement issue and then there is a quality issue which would be addressed in the operational requirement as there needs to be clear actions as a result of the information being provided.

One Workgroup Member suggested for settlement to occur at the boundary whilst the remaining Workgroup Members suggested that for settlement to occur at the asset to pass pre-qualification.

Alternatively, a Workgroup Member suggested if you have an FPN at the boundary, whether the assets are determined or random do not make a difference. Rather, when calculating a volume and being the user of the volume itself; how this is measured or instructed would be irrelevant. The user would already be aware of what they are delivering.

On this basis, an additional option for a boundary schedule for the SO was considered and agreed as the most appropriate approach by the Workgroup.

This would mean that the FPN will come from boundary point for BM unit, its effect will be at several boundary points, the SO will then get a final PN but not a schedule because there is a controllability issue. Any instruction sent will be relevant to the FPN, the operational metering will tell the SO that what is or isn't being delivered. In terms of who supplies the FPN – this should come from the owner of the BMU – this can be done by the individual party or via 3rd party. Then for the qualification process there must be evidence that the individual party can respond to an instruction caveating that this would be the supplier's burden to provide.

32. Implementation costs

The Workgroup were presented with an estimate of the costs for NGET to implement the proposed change. The named costs were outlined to be approximately £25 million. The Proposer confirmed that £13 million of this constituted the current costs of the TERRE algorithms and that the remainder costs were to deliver GC0097 and address any wider impacts.

A Workgroup Member was in the view that NGET should be required to provide a justification of the costs due to the estimate being such a significant amount. Additionally, the Workgroup Member suggested that the breakdown of the costs were imperative to assess the impact against the perceived benefits of GC0097 and understand industry cost to participate in the market.

Nonetheless, the Workgroup Members were of the view that despite such extreme costs and a need for their justification that the Modification does meet the minimum requirements to be compliant.

Subsequently the Proposer presented a breakdown of the costs associated with TERRE and Wider Access to the Workgroup. A copy of which can be found within Annex 4 of this Report.

4 Workgroup Vote

The GC0097 Workgroup met on the 22 March 2018 to cast their Workgroup Vote. All Workgroup members voted that the Original solution was the best option.

Vote recording guidelines:

"Y" = Yes

"N" = No

"-" = Neutral

Vote 1 – does the original or WACM facilitate the objectives better than the Baseline?

Workgroup Member	Better facilitates AGCO (i)	Better facilitates AGCO (ii)?	Better facilitates AGCO (iii)?	Better facilitates AGCO (iv)?	Better facilitates AGCO (v)?	Overall (Y/N)
Bill Reed						
Original	Y	Y	Y	Y	Y	Y
Voting Statement:						
The Modification proposal will provide the TSO to a wide range of Reserves providers across EU to support local system management (Objective (i) and (iii)); provide additional market opportunities to potential Balancing Services Providers of +/-1MW capacity and up (Objective (ii); ensures GB compliance with EU legislation (Objective (iv)); and reinsures alignment between the Grid Code and BSC (Objective (v)). Overall the modification will better meet the Grid Code Objectives.						
Christopher Proudfoot						
Original	Y	Y	Y	Y	Y	Y
Voting Statement:						
"TERRE represent a huge change to the operation of the Balancing Mechanism in the UK and very probably in other counties too. It puts a significant strain on system operators and also places additional burden on the settlement systems, as well as challenges to those market participants that wish to participate. Even those that do not wish to participate would be wise to understand what is happening under TERRE. The proposals drawn up by the working group represent a workable solution in the timescales available."						
Paul Jones						
Original	-	Y	-	Y	-	Y
Voting Statement:						
Facilitates TERRE which allows NG to meet requirements of the Electricity Balancing Guideline. By facilitating a wider variety of Balancing Services Providers this should promote competition and result in greater number of options to ensure security of supply is achieved.						
Rick Parfett						
Original	Y	Y	Y	Y	Y	Y
Voting Statement:						
Saskia Barker						

Original	Y	Y	Y	Y	-	Y
WACM1	Y	Y	Y	Y	-	Y
WACM2	Y	Y	Y	Y	-	Y
<p>Voting Statement:</p> <p>The modification proposal most obviously better facilitates GCO (iv) as it facilitates GB participation in TERRE. The proposal also opens participation in TERRE and the BM to parties that cannot currently participate in the BM, as well as giving National Grid more direct access to bids in other European markets, which better facilitates GCO (i), (ii) and (iii). In using existing balancing mechanism systems to facilitate the implementation of this modification it better facilitates AGCO (v). Overall, the proposal better facilitates grid code objectives.</p>						
Sophie Tilley						
Original	Y	Y	Y	Y	-	Y
<p>Voting Statement:</p> <p>Overall the modification proposal will better facilitate the achievement of the Grid Code objectives, particularly objective IV in meeting European code requirements. The solution takes a pragmatic approach to the implementation of requirements in the EB GL by building on current processes and facilitating access for all parties.</p>						
Steve Taylor						
Original	Y	Y	-	Y	-	Y
<p>Voting Statement:</p> <p>Aside from the legal requirement for the RR Market to be introduced (which clearly requires the Baseline to be modified) GC0097 will, through both providing access to the RR market for existing and new participants and widening participation in the BM, increase competition and provide the TSO with more options for balancing actions. Whilst I support the requirement that the new class of BM Unit - namely the Secondary BM Unit - should in respect of the submission of PNs be treated as any other BM Unit providing Balancing Services it does seem that a commonly-agreed methodology for the production of these remains an outstanding issue, as does the day-ahead despatch decision via the Aggregator Impact Matrix for Secondary BM Units - although I acknowledge the pragmatism behind this approach. Whilst GC0097 may reduce balancing actions costs, reduce the need both for new transmission connected assets and for additional transmission capacity, it remains to be seen what effect it will have on the ability to maintain the quality of supply and on the investment in new large capacity transmission-connected assets. TERRE will reduce National Grid's autonomy and introduce new XB participants into GB balancing that may (almost certainly will) be operating in a very different technical environment (e.g. different ramping and despatch regimes) and this may cause market distortions across the interconnectors. GC0097 introduces new and in some way complex arrangements into the Grid Code and it's not clear to me that in doing so GC0097 at the same time promotes efficiency in their implementation; similarly I am unable to comment on whether GC0097 promotes efficiency in the administration of the Grid Code arrangements.</p>						

Vote 2 – Which option is the best?

Workgroup Member	BEST Option?
Bill Reed	Original
Christopher Proudfoot	Original
Paul Jones	Original
Rick Parfett	Original
Saskia Barker	Original
Sophie Tilley	Original
Steve Taylor	Original

5 Workgroup Consultation Responses

The GC0097 Workgroup Consultation was issued on 8 January 2018 for 15 Working Days, with a close date of 26 January 2018. In addition to the standard Workgroup consultation questions, the Workgroup asked two specific questions:

- For those respondents that are not existing Grid Code Users (e.g. a non BM Participant) are you aware that GC0097 will extend your obligations that arise from becoming a BSC Party under P344. Do you have any comments on these requirements and obligations?
- Do you believe that the solution described in this Workgroup Report aligns with current arrangements in the Capacity Market?

Fourteen responses were received to the Workgroup Consultation and are summarised in the table further below. The full responses can also be found within Annex 3 of this Report.

The GC0097 Workgroup, in conjunction with the P344 Workgroup, discussed the responses received to the GC0097 Workgroup Consultation and identified nine key themes:

1. DNO-TSO interactions

A number of respondents raised that the GC0097 solution must ensure that conflicts between DNO and TSO networks are managed and resolved effectively, and avoid impact to secure operation of DNOs and that the TERRE solution needs to work more closely with DNOs and projects such as the Open Networks project and that the solution must ensure that conflicts between DNO and TSO networks are managed and resolved effectively, and avoid impact to secure operation of DNOs.

The Proposer confirmed that NGET would be working with the ENA and DNOs in respect of the Open Networks projects. It was also confirmed that a review of what may be needed in the legal text for GC0097 to define the exchange of information noting that the Grid Code already defined some of the exchange information and that GC0097 would take the approach of minimum legal text changes.

It was the view of the Proposer that a further modification may be required post GC0097 to fully define the data exchange once further information on what should be included was available.

Workgroup Members noted that there may be a risk that DNOs could take actions to prevent Parties from participating in the market.

2. Pre-qualification

Responses indicated that the solution needs to ensure that prequalification processes are not too onerous, particularly when adding or changing one component and that further detail needed on the process including timescales. The Proposer agreed that the solution would be further clarified and these changes would be reflected in the solution.

3. Baselineing

A variety of views were received in respect of PNs vs. baselineing and ensuring that the solution supported smaller parties being able to access the market.

Alternative Proposal

The Workgroup discussed what the alternative solution covered and that it would provide an alternative means of measuring delivery to the submission of Physical Notifications (PNs). It proposes use of a standard profile baseline methodology, with adjustment for the day of an event. This is proposed as an optional alternative to submission of PNs, not as a replacement solution and that this approach would support participants that do not have real time equipment to estimate the baseline which creates a barrier for entry for market participants. It was the view of The Ade that the alternative provides a simpler way of calculating the baseline.

The GC0097 Proposer raised some concerns with the methodology set out in the alternative solution as in practice the methodology is not as easy as it may seem and questioned whether it should be the role of a SO to amend position as PN's are a commercial parameter. The submission of the PN informs the SO of what a site will be doing and changes the site will make. For the SO to be doing this on behalf of a Party does not seem correct as the SO would be predicting the actions of the site. It would seem prudent that the aggregators should be providing the information noting may be difficult for the aggregator to predict the PN's; however if the aggregator is unsure then the SO would not be better placed to do so and take on this responsibility.

Some Workgroup Members could see merit in the Grid Code including information of the methodology to demonstrate what good industry could look like.

The Workgroup discussed the potential alternative further highlighting that the requirement of the alternative would be to an adjustment to the baseline. The natural place for which would be within the ELEXON systems.

Therefore the potential alternative was discounted in relation to GC0097.

4. Process timings and interaction with other processes

A number of respondents raised that further clarity was needed in the original GC0097 solution in respect of timings for how complex interaction and the concerns that the GC0097 solution should not impact or reduce liquidity in the market.

The Proposer confirmed that it would consider these points and how the BM and TERRE timescales overlap and that the work under the war games had been useful in trying to understand the issues.

It was noted that TERRE has gate closure at 60 minutes before real time and that the Central TERRE project was looking at how this could be pushed back as it had received concerns both from the Central TERRE consultation and also through the national consultation that TSOs need processing time to secure systems and that the Central Project is looking at the whole process to see if any time can be recovered elsewhere to see if gate closure can be pushed by a few minutes.

5. Capacity Market

Within the Workgroup Consultation a specific question had been raised (Q5) on “For those respondents that are not existing Grid Code Users (e.g. a non BM Participant) are you aware that GC0097 will extend your obligations that arise from becoming a BSC Party under P344. Do you have any comments on these requirements and obligations?”

For those respondents that answered this question the general consensus was that the GC0097 solution should be treated like a BOA in terms of the Capacity Market, noting that this would likely result in changes being proposed to the Capacity Market rules.

The Workgroup agreed that any proposed amendment to the Capacity Rules was out of scope of the GC0097 Modification but noted that the NGET Proposer would look to raise a change if required.

6. Publication of Information

It was the view of a number of respondents that clarity was needed on when the cash-out price would be published and information on constraints noting that this may impact market behaviour.

Workgroup Members noted that Article 12 of the EGBL contained what needs to be published. Workgroup Members questioned the timings of publication and that this shouldn't be before others to avoid non-compliance by giving a competitive advantage. The Workgroup also

discussed what data should be anonymised to ensure that no Party has a competitive advantage.

The Proposer agreed to define the solution further in respect of publication of information.

7. Implementation timelines

A number of respondents raised concerns and risks with the implementation timescales and the limited window this would give potential participants to develop systems and participate in the parallel running phase and that any amendments to dates need to be communicated early to industry.

The Proposer confirmed that as part of the TERRE implementation NGET intends to set up an IT forum to go through delivery timescales and what is to be delivered and that this would be the forum to get updates out to industry.

Workgroup Members questioned whether EBS would need to be ready for TERRE to work. It was confirmed that the focus is getting EBS to work and that at this stage it couldn't be confirmed if EBS would be used for TERRE but that the key thing was that there will be a solution that supports TERRE.

8. Legal Text

A number of respondents raised the issue that without the draft legal text that was hard to fully understand the contractual obligations and how compliance with Grid code will be ensured. Furthermore points were raised on what the role of the Grid Code Review Panel would be and what powers would be available to act on parties that continually submit infeasible bids. The Proposer confirmed that this is an area that needs to be developed.

9. Defaulting arrangements

An area that additional information was requested was what would happen under GC0097 should a party default – what would be the process and how this would work. The Proposer agreed that this needed to be defined.

Alternative Proposals

It was noted that only one potential alternative Proposal had been put forward as part of the Workgroup Consultation and that this was by the ADE.

GC0097: Workgroup Consultation consolidated responses

Questions 1 (standard question)

Respondent	Q1: Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?
<p><i>Mark Howitt, Storelectric Ltd</i></p>	<p>It makes some bits better but other bits worse. Overall it reduces energy security still further by increasing the country's dependence on imports. It exacerbates the problem that our contracting mechanism and carbon price are effectively subsidising overseas generation at the cost of UK generation: subsidies for interconnectors currently undermine UK power stations' profitability by importing off-peak electricity which therefore increases the cost of peak electricity, balancing and ancillary services. Please see the accompanying analysis, "The Truth about Curtailment" which describes how this comes about, and evaluates its costs to the UK system. This proposal makes it worse by increasing competition for ancillary services, which will thereby reduce still further the revenue streams available for UK generation and require UK generators to amortise their costs over even less energy sold, thereby increasing prices still further – this aspect is always ignored in your cost/benefit analyses that (in this case) suggest a €10m p.a. saving for the UK while in fact these considerations will add more to those costs than these evaluated benefits.</p> <p>Moreover, there is no consideration of charging the differential carbon price. UK generators pay £31/tonne while continental ones pay £9/tonne; unless we charge imports the differential £23/tonne, we are using UK money to subsidise overseas generation at the cost of UK generation.</p> <p>It is claimed that UK generators can export, and that this proposal allows them to do so more, but the above considerations tilt the playing field against UK generators.</p>
<p><i>Steve Taylor, Quorum Development Ltd</i></p>	<p>Yes given the requirement under the EBGL for the introduction of the RR market and the opening of the same to independent Demand Side Aggregators. In seeking to match the existing mechanisms for bidding, despatch and settlement as closely as possible the joint P344/GC0097 solution seems to be a pragmatic way to integrate the two different markets in a transparent and efficient way.</p>

Respondent	Q1: Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?
<i>Rob Wilson, National Grid SO</i>	The GC0097 proposal better facilitates objective (iv) of the Grid Code in allowing implementation of the TERRE project forming part of the requirements of EU legislation (the EU Balancing Guideline). Implementing TERRE will give GB access to a wider reserve market which will address objectives (i)-(iii) and an ENTSO-E consultation as referenced in the report has suggested that implementing TERRE could lead to a cost saving of around €13m per annum for GB.
<i>Joshua Logan, Drax Power Ltd</i>	<p>We would agree that the Original Proposal better facilitates the Grid Code Objectives.</p> <p>(a) To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity. Positive – provides the TSO with a range of reserve providers across the EU to support system operation.</p> <p>(b) 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) Positive – provides additional market opportunities to potential Balancing Services Providers of +/-1MW capacity and above.</p> <p>(c) 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. Positive – provides the TSO with a range of reserve providers across the EU to support system operation.</p> <p>(d) 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; Positive – GC0097 will ensure GB compliance with EU regulation.</p> <p>(e) To promote efficiency in the implementation and administration of the Grid Code arrangements Positive – Joint working between the Grid Code and the BSC is required to manage the implementation of TEERE.</p>

Respondent	Q1: Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?
<i>Saskia Barker, Flexitricity Limited</i>	I believe that the GC0097 Proposal better facilitates Grid Code Objectives, particularly objectives (i), (ii) and (iv). Project TERRE will open the BM and TERRE to parties who currently cannot participate, which will increase the efficiency of the transmission of electricity. It will also help National Grid to discharge it's obligations under the EB GL and the new market created by project TERRE should better facilitate competition.
<i>Bill Reed, RWE</i>	Yes, the proposal does better facilitate the Grid Code objectives in respect of competition in the generation of electricity and to discharge obligations imposed by the European Commission.
<i>Alastair Frew, Scottish Power Generation</i>	Yes
<i>Paul Jones, Uniper</i>	Yes. Generally, it seems that the solution is workable and, in conjunction with BSC modification P344, will support the implementation of Project TERRE. The modifications also provide a framework to bring a wider variety of parties into the Balancing Mechanism by allowing the separation of the roles of Balancing Services Provider (BSP) and Balancing Responsible Party. Therefore it should support Objectives iv) and ii).
<i>Rick Parfett, The Ade</i>	<p>The ADE believes that the GC0097 Original Proposal better facilitates Grid Code Objectives i) and iii), as Project TERRE is likely to increase efficiency of procurement of electricity and promote the security and efficiency in the national electricity system operator as a whole.</p> <p>We believe, however, that the Original Proposal fails to facilitate Grid Code Objective ii), “to facilitate competition in the generation and supply of electricity” as effectively as possible, due to the absence of any transparent and effective alternative baselining methodology to the submission of Physical Notifications (PNs).</p> <p>The ADE has therefore raised a WG Consultation Alternative Request, which is identical to the GC0097 Original Proposal but adds a robust and transparent alternative baselining methodology as an option for participants in TERRE. This will facilitate</p>

Respondent	Q1: Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?
	aggregator and smaller player participation, improving competition and delivering Grid Code Objective ii) more effectively.
Vince Hammond, National Grid Interconnectors Limited	The key Grid Code objective to satisfy is (iv) around the compliance with European legislation. Other objectives which might also be relevant are promoting competition and/or efficiency.
Simon Bateman, Engie	<p>ENGIE has the following comments on the GC00097 consultation.</p> <p>Incomplete solution</p> <p>In general, responding to this consultation is hampered by the solution being incomplete. For example, the consultation notes that</p> <p><i>“It was noted that for aggregators or small players it may be more difficult to establish the Final Physical Notification. It was noted that the Capacity Market has adopted a “baseline” approach...”</i></p> <p>The consultation then goes onto say</p> <p><i>“More work may be required under the Grid Code to consider the equivalence of capacity market baselines to physical notifications for the purpose of participation in TERRE. If the baseline approach can be considered as equivalent to a physical notification then this could be used as a Final Physical Notification under the BSC for settlement of TERRE acceptances from aggregators or smaller participants. However, it is the opinion of the Proposer that for the purposes of this modification the Capacity Market baseline approach will not be used.”</i></p>

Respondent	Q1: Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?
	<p>The consultation does not offer a solution that does provide a baseline for aggregators or smaller participants. This must be a necessary part of the solution and it is not clear how it can be implemented with this absent.</p> <p>On page 24 , the consultation lists which TERRE bids will be restricted. One of these is where there is a “<i>Prior DNO/DSO commitments or Distribution constraints (if known)</i>”. We understand that the Open Networks Project is developing a solution to enable the TSO to have sight of distribution constraints. This would seem to be a precursor to TERRE implementation as without it, the TSO may not have knowledge of these, at the least taking actions that have to be undone by the DSO and at worst, creating a security of supply risk.</p> <p>A further restriction is where “<i>Units that have been BOA’d for reserve and response</i>”. Presumably this would be at the point of submission of bids to the TSO . If this is the case, how would the TSO know that these were going to continue over the TERRE delivery period? If this is not the case and it is based on an expectation that units may be delivery reserve or response in the TERRE delivery period, then how would the TSO know who would be delivering response in the TERRE periods an hour in advance when the reserve or response instruction has not been issued? Either way, it would appear to rule out providers of reserve and response from taking part in TERRE.</p> <p>On page 38 “<i>Under the P344 solution, Virtual Lead Parties will accede to the BSC. Further work is required to understand the contractual mechanism by which Virtual Lead Parties will undertake to ensure compliance with the relevant sections of the Grid Code. It is anticipated that any other technical requirements that fall outside of the Grid Code that would normally be covered under a connection agreement or ancillary services contract will also considered as part of this work</i>”</p> <p>Again, this should be covered ahead of any decision to implement the modification to give industry confidence that a workable solution is being delivered</p>

Respondent	Q1: Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?
	<p>Publication of cashout prices</p> <p>Clarity is also needed on when the cashout price will be published. Ultimately this is a BSC issue but to ensure there is not the backward step of delaying publication of the cashout price, the SO will need to send TERRE acceptance data to settlements more quickly than that specified by TERRE (30 minutes after the end of the delivery period).</p>
<p><i>John West, Energy Networks Association (ENA)</i></p>	<p><u>Pre statement</u></p> <p><u>Introduction</u></p> <p>This response is on behalf of the ENA and its members participating in the Open Networks project.</p> <p>The Open Networks project has been established by the network operators in GB to take forward work to improve the experience and outcomes for customers and consumers as we transition to a lower carbon future. This work encompasses how we enable the most effective use of Distributed Energy Resources (DER), whole system processes for investment and operation and the transition of DNOs to DSOs.</p> <p>A major area of the Open Networks project through 2017 was the early development of models to enable increased and effective participation of DER in the provision of services to network operators. This work is continuing in Phase 2 of the Open Networks project through 2018.</p> <p><u>Potential Distribution Network Impacts of TERRE Proposals</u></p> <p>From the Network Operator perspective, it remains unclear as to the volume of distribution connected resources that will participate in TERRE. The war games analysis referenced in the consultation document suggests distributed generation volumes of 2GW or greater. As well as distributed generation, there is the potential for demand side participation. Distribution connected</p>

Respondent	Q1: Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?
	<p>resources would also be able to participate in the provision of GB Balancing Services through Secondary BM Units.</p> <p>This increasing use of distribution resources to provide wider system services has the potential to impact secure operation of distribution networks. With increasing levels of active DER and networks being operated closer to capacity limits, distribution network operation is becoming more complex. If distribution resources are scheduled without assessing all network impacts, there is the potential to put areas of distribution networks at risk. Furthermore, as distribution connected resources are often connected within Active Network Management (ANM) arrangements, the instruction of these resources to provide a GB or European level service could be countermanded by the operation of the ANM scheme. For example, the reduction of demand within an ANM zone could result in equivalent generation resources being turned down to satisfy an ANM scheme limit.</p> <p>If these conflicts are not managed and resolved effectively, this could greatly disadvantage customers with distribution resources connected in constrained areas. Moreover, unresolved service conflicts and non-optimisation of whole system flexibility dispatch will ultimately result in customers paying more for the balancing services required for system operation. To ensure economic and efficient use of the system going forward it is essential that the impacts to both active and non-active customers are considered in a whole system cost benefit analysis.</p> <p>It is good that the need for close working between transmission and distribution network operators is recognised in the GC0097 consultation document. For example, in the discussion of Data Validation (section 7), it is noted that on-going work between the GB TSO and DNOs will determine the industry standard on coordinating services and conflict avoidance in order to prevent distribution constraints being triggered by a TERRE service provider. Also, in the discussion of Coordination between GB TSO and Network Operators, it is noted that “Wider industry work between GB DNOs/DSOs and GB SO will determine the industry standard on coordinating services and conflict avoidance.” and that “This will influence any requirements on Grid Code changes.”</p> <p><u>Proposed Way Forward</u></p>

Respondent	Q1: Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?
	<p>Through the ENA Open Networks project, we would like to work closely with the working group and TERRE project team to ensure that the necessary co-ordination and data exchanges to enable the effective participation of distributed resources in TERRE and the BM are developed in line with the preferred industry models for the management of DER services.</p> <p>Through the Open Networks Phase 2 work, we will further develop a range of models for the management of DER services. This will include the development of processes for service co-ordination, service conflict management and data exchange as well as further consultation with stakeholders to help establish a preferred model. Through this work, we will achieve greater clarity on the preferred models by end-2018.</p> <p>Whilst the data exchange mechanisms need to be agreed ahead of these timescales to meet the TERRE timeline, we would like to work with the working group and TERRE project team to ensure that the arrangements for TERRE are consistent with the Open Network project proposals.</p> <p>~~~~~</p> <p>Response to Q1</p> <p>The proposal has the potential to positively impact Grid Code objectives if steps are included to ensure that the wider impacts of scheduling further distributed resources for TERRE and other balancing market services are understood and mitigated. This is expanded in the response above.</p> <p>Grid Code objectives i. and ii. would be positively impacted through development and implementation of the proposal. There is opportunity to facilitate a wider European market for reserve and to enable increased participation of small-scale resources.</p> <p>Objective iii. would be positively impacted by developing closer and more effective interactions between transmission and distribution network operators. This is recognised in the working group consultation and we believe this would be best achieved by</p>

Respondent	Q1: Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?
	developing the transmission-distribution interactions for GC0097 alongside the industry work on DER services that is being co-ordinated through the ENA's Open Networks project.
<i>Martin Mate, EDF Energy</i>	<p>Yes. GC0097 should increase liquidity and competition in the provision of system balancing by increasing the potential sources of balancing, so better facilitating Grid Code objectives i, ii, iii, iv.</p> <p>There is a risk that GB balancing resources could be diverted to meet external balancing requirements. This could increase costs for GB consumers, but analysis indicates a net benefit in practice. Export of balancing resources could also conceivably reduce GB internal system security, but we assume NGET will assess GB need, interconnection capacity and excluded bids to avoid this, and it will tend to be self-correcting because opportunity in GB will bring resources back to GB given limited interconnection capacity.</p>
<i>Jack Abbott, Centrica</i>	<p>Yes – Below are some specific comments around selected objectives:</p> <p>Objective ii) We believe the TERRE project should improve liquidity and a wider range of providers than in the Balancing Mechanism (BM) currently. The P344 modification will allow access to the BM and TERRE for technologies - including DSR, storage and decentralised assets - that struggle to access the BM.</p> <p>Objective iii) Careful consideration is needed on the interactions between TERRE, which operates on an hourly basis and the BM, which operates on a half hourly basis. National Grid must ensure that liquidity is not affected by these different timescales. A European-wide scheme such as TERRE, will be affected by national policies, such as the UK's Carbon Price Floor; the System Operator and the Regulator should consider the impact of P344 on the proportion of GB domestic capacity that is helping to balance the GB system.</p>

Questions 2 (standard question)

Respondent	Q2: Do you support the proposed implementation approach?
<i>Mark Howitt, Storelectric Ltd</i>	<p>No: we need a genuinely level playing field between:</p> <ul style="list-style-type: none"> • UK and overseas generation • Generation and storage (stop triple charging grid access for storage: base its definition on that for interconnectors as storage moves electricity in time without generating any) • Generation and interconnectors <p>We also need policies to enable UK demand to be met by UK generation and storage: we cannot rely on imports for core needs.</p>
<i>Steve Taylor, Quorum Development Ltd</i>	<p>Yes but see specific observations point 5 below.</p>
<i>Rob Wilson, National Grid SO</i>	<p>Yes, while noting that the GC0097 consultation is on the TERRE solution and is not currently supported by full legal text.</p>
<i>Joshua Logan, Drax Power Ltd</i>	<p>Broadly, we agree with the proposed implementation approach. Regarding time scales, it seems sensible that GC0097 should be aligned with P344 and ensure compliance with the TERRE Central Project go-live timetable.</p> <p>The solution addresses an array of changes to the grid code that are necessary to implement project TERRE. In particular, the solution enables the submission of bids to the TSO, the dispatch process and product delivery.</p> <p>We believe the solution to be robust, nevertheless, any practical issue should be identified in the parallel running stage. As such, it's important to adhere to the proposed implementation approach to ensure that there is sufficient time to remedy any issues before the TERRE go-live date.</p>

Respondent	Q2: Do you support the proposed implementation approach?
	From a system operation perspective, we appreciate that National Grid have limited knowledge of how market participants will behave under TERRE arrangements. We support the “War Games” and believe it will be beneficial to both National Grid and market participants.
<i>Saskia Barker, Flexitricity Limited</i>	Yes
<i>Bill Reed, RWE</i>	Details of the actual implementation in the Grid Code are not clear. With no legal text it is hard to see what the actual changes are. We agree with the proposed product outline though it is a little too far removed from a GC format to state its compatibility with the GC structure.
<i>Alastair Frew, Scottish Power Generation</i>	<p>At a high level yes, but there appear to be a number of potential issues, which may or may not exist given there is no legal text and the report does not give a clear indication of the proposed solution.</p> <p>1) We agree that a bidder requires to submit a FPN before gate closure as this is the simplest way to ensure there is a baseline for all instructions.</p> <p>2) Section 3 Subsections 12, 13 & 14 includes various rules relating to BOAs and it appears to state if a BOA has already been issued in the opposite direction to a TERRE acceptance then an RRI will not be issued. Given the fact the TSO has issued a BOA and TERRE has issued an acceptance the net volume of both instructions must be needed, it therefor makes more sense to sum them rather than leave the system imbalance. The question is how will the TSO make up the volume imbalance? Will they issue BOAs to other units or even issue BOAs to the original user who wasn’t issued the RRI? The original user is the most obvious choice as they must have the spare capacity and as a RRA has been issued and are already being paid for the volume they are not be being asked to provide. If BOAs are being issued with no RRI what baseline will be used for the subsequent BOAs and is there a chance with this option the parties could be paid twice.</p> <p>3) Section 3 Subsection 5 suggests that Grid Code Review Panel (GCRP) will review RR Providers who repeatedly fail to comply</p>

Respondent	Q2: Do you support the proposed implementation approach?
	<p>with the relevant requirements. This is currently out with the terms of reference of the GCRP and it is not clear what the GCRP are expected to or can do about these issues.</p> <p>4) Section 3 Subsection 4 suggests that there will be a requirement to participate in TERRE that operational metering is fitted down to 1 MW. This section also states the SOGL only requires operational metering down to 1.5MW. Given that the SOGL is Statute Law, is it legal to prohibit market access to parties without operational metering below 1.5 MW?</p>
<i>Paul Jones, Uniper</i>	Yes
<i>Rick Parfett, The Ade</i>	The ADE supports the proposed approach of GC0097 being implemented 10 days after an Authority decision, ensuring compliance with the TERRE Central Project go-live timetable and alignment with BSC modification P344.
<i>Vince Hammond, National Grid Interconnectors Limited</i>	NGIC supports in principle, whilst recognising that significant details are still to be developed.
<i>Simon Bateman, Engie</i>	Please refer to Q1
<i>John West, Energy Networks</i>	Implementation of TERRE through the extension of BM arrangements is a pragmatic approach to enabling a European market in replacement reserves.

Respondent	Q2: Do you support the proposed implementation approach?
<p><i>Association (ENA)</i></p>	<p>The timescales for TERRE implementation are ambitious and will require solutions for improved transmission-distribution data exchange to be developed through 2018 and deployed in 2019.</p> <p>As models for the management of DER services are further developed by the Open Networks project through 2018, detailed transmission-distribution processes and data exchanges to support these models are being developed. We would like to work closely with the TERRE working group and project team to ensure a consistency of approach for network operators and stakeholders.</p>
<p><i>Martin Mate, EDF Energy</i></p>	<p>We support the broad approach of facilitating TERRE alongside the existing Balancing Mechanism arrangements, allowing submission of bids into both TERRE and BM at the same time, and using existing communications and despatch functionality as far as practical.</p> <p>TERRE is effectively an auction for short term balancing soon after (every other) GB gate closure. Although it may displace or increase actions currently taken in the BM and/or some non-BM actions, it is not a replacement for the BM. Flexibility that is not utilised in TERRE should remain available to NGET under the BM, as under the proposal.</p> <p>However, we note that some of the operational timings for TERRE are fundamentally inconsistent with intraday market trading and with current GB BM operational timings. The interactions are complicated, and compromises are unavoidable. We have concerns that:</p> <ul style="list-style-type: none"> • Many details remain to be fully defined, both for the central TERRE/LIBRA arrangements, and for the GB implementation. • The particular compromises chosen might turn out to create perverse incentives, or have unexpected consequences. <p>Future refinements to the proposed approach seem very likely, during development or following practical experience. Significant IT and process development will be required by NGET, Elexon, intended participants, and other parties that may be affected. Consequently, we think the notice period for intended implementation in Q3 2019 following regulatory approval by Q3</p>

Respondent	Q2: Do you support the proposed implementation approach?
	2018 will be insufficient. Implementation with at least 18 months' notice, in 2020, seems more realistic.
<i>Jack Abbott, Centrica</i>	<p>We are broadly supportive of the approach.</p> <p>We acknowledge the good joint working between Elexon and National Grid and believe that this timeline is ambitious but achievable. We support the idea of parallel running; this plan must also include BM access for secondary BMUs. We would appreciate clarity on implementation progress of other TERRE participants and early indication of any delay would be welcome. The appropriate changes should be implemented to ensure that Secondary BMUs can access the Balancing Mechanism by April 2019. We believe that this should be the implementation date for Secondary BMUs, as it is expected that spill payments (an important revenue stream for assets that struggle to access the Balancing Mechanism currently) will be removed – as implemented through BSC modification P354.</p> <p>An additional benefit will be that this will allow a longer period for National Grid and Elexon to ensure that this methodology is ready for TERRE go-live.</p> <p>We believe that if there is any delay to the TERRE timelines, full access to the BM for secondary BMUs should still be in place by the implementation date. Question 3 contains comments on specific areas of the consultation document.</p>

Questions 3 (standard question)

Respondent	Q3: Do you have any other comments?
<i>Mark Howitt, Storelectric Ltd</i>	Brexit is wholly ignored. The one thing that is certain about Brexit is that we are exiting the single market and the supervision of the ECJ. This means that our neighbours will be legally allowed to prioritise their consumers over ours. Meanwhile NG plans to supply 20-25% of peak demand with imports; reducing the revenues that UK generators get from ancillary services will make this

Respondent	Q3: Do you have any other comments?
	worse. This is a recipe for black-outs in future.
<i>Steve Taylor, Quorum Development Ltd</i>	I have some specific minor points to make on the text of the consultation document, see below.
<i>Rob Wilson, National Grid SO</i>	No
<i>Joshua Logan, Drax Power Ltd</i>	No
<i>Saskia Barker, Flexitricity Limited</i>	<ol style="list-style-type: none"> 1. The full registration process for Secondary BMUs has not been decided, but there is a possibility that the qualification process could be onerous for Secondary BMUs. Secondary BMUs are more likely to need to either add or remove a single unit, due to a site joining or leaving the aggregator or supplier's portfolio. It would be useful if a site leaving a Secondary BMU would not trigger the whole BMU to need to requalify. Similarly it would be useful if new sites could be qualified independently and then added to an already qualified Secondary BMU to avoid the whole BMU becoming disqualified for 3 months every time a site joins or leaves. 2. On page 11 it says 'when connected in the distribution network, the RR provider shall be capable of supplying to the DNO availability and activation information in real-time if required'. While this is a sensible idea in terms of constraint management, there must be reasonable limits on what the DNO can require. It is important that the DNO does not put overly onerous requirements on providers to stop them from providing services as they have a monopoly on the site's ability to connect to the system. 3. The accuracy limit of 2.5% on operational metering is sensible. It is important that the way this is verified in practice is not overly onerous, especially as these meters will not be used fiscally. Specifically, lessons should be learned from some of the

Respondent	Q3: Do you have any other comments?
	more arduous parts of the Capacity Market metering process.
<i>Bill Reed, RWE</i>	This workgroup report has been released too early and lacks the concrete code changes that would allow evaluation of the modification. Legal text which actually displays what is changing is an essential element of any code modification.
<i>Alastair Frew, Scottish Power Generation</i>	In general the report is very difficult to read, does not clearly identify the issues nor the proposed solution. Going forward it would be useful include some of the initial sections from the P344 report which clearly explain the issue. Also reviewing the structure it is not clear where one topic ends and a new topic begins.
<i>Paul Jones, Uniper</i>	The solution has entails a number of compromises being made, particularly given the tight timescales for implementing the requirements of the European Guideline on Electricity Balancing. The solution for TERRE puts a certain amount of onus on balancing service providers to ensure that their bids will turn out to be feasible even though actions taken for other balancing services such as the Balancing Mechanism, and possibly in due course Project MARI, could result in original assumptions being incorrect. Therefore, TERRE is likely to be a higher risk solution to BSPs than the Balancing Mechanism, which may undermine its effectiveness if parties price in that risk into TERRE bids and/or opt to operate in the BM instead. However, it appears to be the best solution which could be implemented in the circumstances and there is scope for further improvements to be made when parties have greater experience and understanding of how it works.
<i>Rick Parfett, The Ade</i>	<p>The ADE supports the GC0097 Proposal, but has a number of concerns. We understand that, due to limited timescales and the complexity of the solution, the proposed implementation approach focuses on creating a workable solution, with further refinement possible. However, we believe that it is important to highlight the following issues for further consideration and further collaboration with industry as, without this, National Grid's goal of delivering market access to non-BM participants is liable to fail.</p> <ol style="list-style-type: none"> 1. If participants do not have access to an alternative baselining methodology, aggregator and small player participation in TERRE is likely to be limited. The ADE's WG Consultation Alternative Request form contains details of our proposed alternative baselining methodology, which is robust, transparent and has been implemented successfully in several other

Respondent	Q3: Do you have any other comments?
	<p>markets. For more details of this methodology, please see the form. If National Grid decide not to allow the suggested alternative methodology, it is important that they outline how they will address the problems that this methodology aims to resolve (i.e. limited scope for aggregator and small player participation in TERRE if submission of PNs is the only option).</p> <p>2. The Proposer confirmed that, as part of the prequalification process for TERRE, “Qualification will be reassessed...where technical requirements or equipment changes” (p.12 of the GC0097 consultation document). While the Proposer stated at the TERRE Industry Day that detail of what constitutes a change of equipment or technical requirements have yet to be decided, further clarity on this point is essential. Without further clarity, there is a risk that a current issue being dealt with through Capacity Market rule changes would be duplicated in the requirements for Qualification for TERRE. Under current CM rules, there is a range of circumstances in which something that happens to just one component of a DSR CMU would trigger the need to re-test all the other components of the CMU. This is illogical and unreasonable, since nothing has changed with any of those other components, so nothing is learned by testing them again. The re-testing simply imposes extra costs on customers, in effect punishing them for having chosen an aggregator who happened to allocate them to a CMU (or group of CMUs) that included some other customer who later had an issue. The ADE is therefore eager to ensure a similar scenario does not arise in the TERRE Qualification process, as this would represent a significant barrier to market entry for aggregators and small players. We would welcome the opportunity to work closely with the Proposer to ensure that Qualification reassessments provide reassurance of delivery while not creating a barrier to market entry. The simplest and best approach would be to test everything on a per-component basis, rather than reassessing the whole of Qualification for TERRE. Any requirement to obtain a certificate for a Secondary BMU would be replaced with a requirement to obtain a certificate for each Secondary BMU component. Anything that invalidates a certificate would only invalidate the certificates for the affected components. This would enable a VLP to test any new component separately and then add them to an existing, tested Secondary BMU. A Secondary BMU should also be allowed to continue to operate without need to undergo a retest in cases where a component is removed. It should be noted that RTE’s interpretation of the TERRE Qualification process in France involves skipping the prequalification phase and considering a portfolio as de facto validated. They then outline a number of criteria that, if not met, will result in the removal of ‘qualified’ status if</p>

Respondent	Q3: Do you have any other comments?
	<p>a number of activations are poorly executed. Qualification requirements are therefore likely to be minimal in other participating countries in TERRE; it is important that Qualification requirements for UK parties are not an order of magnitude more arduous, otherwise this will negatively impact competitiveness within the European market.</p> <p>The proposal is for BM Unit data will be aggregated at Grid Supply Point Group level, enabling a number of meters within a GSP Group to comprise a BMU. Even though a BMU is not defined at a single GSP, information will also be requested that provides information about the location of their sub-components (meters), to allow the TSO to understand where on the network RR provision will have an effect.</p> <p>While the ADE appreciates that this approach 5 of 6 represents a sensible compromise, guidance is needed on a standard method for selecting the appropriate GSP. This will ensure that a uniform method is being used by all participants and improve the usefulness of the data that the TSO receives.</p>
<i>Vince Hammond, National Grid Interconnectors Limited</i>	<p>The statement in §26 that arrangements for Interconnector TSOs will need to be considered further is noted with interest. The following issues will potentially have a bearing on the future design and development (between GC0097, BSC P344 and methodologies at the European level):</p> <ul style="list-style-type: none"> - firmness implications and appropriate incentivisation - the process for modifying Interconnector Scheduled Flows - I/C losses - implications for the Interconnector Administrator and Interconnector Error Administrator - legal/contractual ramifications for I/C access
<i>Simon</i>	<p>See Q1</p>

Respondent	Q3: Do you have any other comments?
<i>Bateman, Engie</i>	
<i>John West, Energy Networks Association (ENA)</i>	No further comments.
<i>Martin Mate, EDF Energy</i>	<ol style="list-style-type: none"> 1. NGET should publish its detailed methods of performing associated activities, to give confidence that it is acting consistently and to provide transparency for market participants. For example: <ol style="list-style-type: none"> a. Interfaces and information exchange with distribution system operators in relation to GB distribution and transmission constraints. b. Potential interaction of TERRE bids (and other balancing procurement) with distribution and transmission constraints. c. Interfaces and information exchange with interconnectors, other TSOs and market operators in relation to interconnection capacities and constraints. d. Methods used to exclude TERRE bids, including criteria for embedded bids identifiable only by GSP Group, and those identifiable by GSP. e. Reporting to TERRE participants and to wider market. f. Currency conversion. g. Determination of TERRE balancing need, including criteria for the level and pricing of elastic need. h. Monitoring of TERRE bid feasibility and participant and interconnector delivery. i. Reporting of costs and benefits within GB and between GB and other TSOs. 2. The timescales for pre-qualification in TERRE (page 12 of consultation) are proposed to be as long as 6 months. There may be a rush of TERRE participants initially, but in the longer term this timescale seems unnecessarily long (though we note and

Respondent	Q3: Do you have any other comments?
	<p>support that existing BM participants will be considered qualified).</p> <ol style="list-style-type: none"> 3. Consultation page 13 refers to ‘scheduled power output for each RR providing unit and group (and each generating module or demand unit of a RR group) with maximum active power ≥ 1 MW’. What is an RR group and how does it differ from an RR unit? 4. Consultation page 23 proposes that participant PN and bids for each TERRE hour must be fixed at Gate Closure, at which time some final results of intraday trading may not be available. Ideally, participants would have a short time to incorporate such trades into TERRE submissions. This issue exists for the existing BM, but we note it is compounded for the second half-hour of each TERRE hour and for the half-hour following. NGET’s determination of need, and participant’s bids into TERRE, may reflect this uncertainty. 5. Ideally, the TERRE process would turn round very quickly so that the relative timing of TERRE acceptances and BM acceptances would be clearer. 6. Under the standard terms of EMR Contracts For Difference (CFD), “Balancing Mechanism means the balancing mechanism operated at the Agreement Date by the Transmission System Operator and designed to balance supply and demand for electricity in real time on the national electricity transmission system, and shall include any substitute or equivalent mechanism or arrangements;”. Reference is made to the bid-offer regime and bids made into the Balancing Mechanism. The definition of Balancing Mechanism here is probably wide enough to include TERRE bids, but this should be confirmed.

Respondent	Q3: Do you have any other comments?
	<p>7. TERRE product ramping period must be in range 0 to 30 minutes (consultation page 8). Does this include ramps to return to FPN following delivery?</p> <p>8. Is it correct to assume that multiple mutually exclusive different offers in different directions for the same quarter hour may be submitted (pages 8-9)?</p> <p>9. More detail is required on the calculation and issue of Replacement Reserve Instructions which may span as long as 2 hours from the time when TERRE results are known, and their interaction with BM acceptances.</p>
<p><i>Jack Abbott, Centrica</i></p>	<p>Qualification of assets in TERRE National Grid has stated that “Qualification will be reassessed at least once every five years or where technical requirements or equipment changes”. A secondary BMU entering in to the TERRE auction can change daily. Secondary BMUs must not go through onerous qualification processes for every component change in the secondary BMU. Therefore, National Grid needs to provide more clarity about its statement around qualification for “technical requirements or equipment changes”. Secondary BMU We strongly support the introduction of the Secondary BMU; this will ensure that there is a wide range of providers of Replacement Reserve.</p> <p>We agree with the Workgroup that the components making up a Secondary BMU should be aggregated at GSP Group level, rather than GSP level. National Grid should explore whether aggregation, regardless of location, could be of value. Physical Notification and Baselining</p> <p>We believe that National Grid should allow either a baselining methodology or a Physical Notification (PN) methodology to be used. Both parameters have different pros and cons – as highlighted in the consultation document – and hence both should be made available for participants within TERRE. We agree with the Workgroup that if TERRE proceeded with just the Physical</p>

Respondent	Q3: Do you have any other comments?
	<p>Notification methodology that “Data validations by TSO on PNs may cause operational/compliance issues for ‘non-BM’ RR Providers” Assets would be signatories to the Grid Code and hence would be obligated to submit a truthful PN. There would also be operational metering which will be able to validate such Physical Notifications to ensure that gaming is avoided. We believe that BMUs should be investigated by the System Operator and/or the Regulator if there is suspicion around Physical Notifications, with appropriate penalties if found to be gaming.</p> <p>A baselining methodology will ensure a maximum amount of participation within TERRE and the Balancing Mechanism by aggregators and small players. We believe that the TERRE and Balancing Mechanism baselining methodology, should draw upon the baselining methodology in the Capacity Market.</p> <p>For both these methodologies, there should be a clear methodology for dispute resolution.</p> <p>Restricted bids, due to TNO and DNO constraints We are concerned that National Grid will class bids as “Restricted”, if there are known transmission or distribution network constraints. We accept that it may be physically impossible for assets to provide balancing services due to constraints. However, the TNO or DNO must not notify constraints without undergoing a proper rigorous analysis of the real-time interaction between different distribution and transmission networks, to ensure that the lowest cost solution for the whole system is chosen.</p> <p>A lower cost solution may be that a constraint may be alleviated if a flexibility solution is commercially procured, rather than National Grid acting to restrict balancing services from a specific location.</p> <p>As much information as possible would need to be published by National Grid about the reasons for constraints; this will better inform investors where assets are needed by the system and to inform the right commercial decisions to benefit the whole system. It will also give balancing services providers confidence that distribution or transmission network constraints are being managed as efficiently as possible, and TERRE providers are only being “restricted” when it is necessary. TERRE providers should be informed in advance of</p>

Respondent	Q3: Do you have any other comments?
	<p>any known constraints by TNO or DNOs. TERRE / BM Interaction We share the workgroup concerns that the “design of the TERRE central process may introduce undue uncertainty for parties that wish to prepare RR bids”. This is driven by the fact that a Final Physical Notification is submitted for TERRE on an hourly basis, whereas at the Balancing Mechanism is on a half-hourly basis. We believe that the ideal solution would be to move the time of RR Instructions in advance of the FPN deadline for second BMU period, i.e. T-35 minutes on the TERRE window. We believe there is still scope for TERRE timings to be altered as it is still in implementation phase. If this change is not possible, National Grid will have to accept that for the second (30 minute) settlement period within the hour TERRE window, the notified TERRE PN may be different to the BM FPN. Providers should not be made to choose between the two products as this will reduce liquidity, and potentially the effectiveness of one or both products. National Grid should publish the Bid Offer Acceptances (BOA) actions that it must take due to infeasible Replacement Reserve Instructions (RRIs), and consider whether it is cost-effective, i.e. the costs from the BOA action to alleviate TERRE issues, is lower than the benefits from utilising a TERRE product in GB. TERRE product characteristics Centrica supports that flexibility services are procured in a competitive manner, and the TERRE product – which is procured in short-term, pay-as clear auctions – is preferable to long-term tender products to STOR. However, we believe that National Grid should not hastily reduce the procured STOR volume, until the TERRE product has been implemented and shown to demonstrably provide replacement reserve cost-effectively. Any changes in STOR (or other balancing services) capacities should be clearly signalled by the System Operator with adequate warning. We note that within TERRE, assets are disincentivised to provide a quicker (or slower) ramping time than the default shape (10 minutes 6 of 7 from zero to full load). We believe that National Grid produce a piece of analysis to demonstrate whether there may be a benefit from incentivising assets to provide quicker ramping through TERRE.</p>

Questions 4 (standard question)

Respondent	Q4: Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider?
<i>Mark Howitt, Storelectric Ltd</i>	No response indicated
<i>Steve Taylor, Quorum Development Ltd</i>	No
<i>Rob Wilson, National Grid SO</i>	n/a
<i>Joshua Logan, Drax Power Ltd</i>	No response indicated
<i>Saskia Barker, Flexitricity Limited</i>	No
<i>Bill Reed, RWE</i>	No response provided
<i>Alastair Frew, Scottish Power Generation</i>	No response provided
<i>Paul Jones, Uniper</i>	No
<i>Rick Parfett, The Ade</i>	Yes – form attached
<i>Vince Hammond, National Grid Interconnectors Limited</i>	No alternative to propose.
<i>Simon Bateman, Engie</i>	No response provided
<i>John West, Energy Networks Association (ENA)</i>	No alternative is proposed.
<i>Martin Mate, EDF Energy</i>	No
<i>Jack Abbott, Centrica</i>	No

Questions 5: GC0097 specific question

Respondent	Q5: For those respondents that are not existing Grid Code Users (e.g. a non BM Participant) are you aware that GC0097 will extend your obligations that arise from becoming a BSC Party under P344. Do you have any comments on these requirements and obligations?
Mark Howitt, Storelectric Ltd	We are not aware of this, and this sounds detrimental. We already having increasing numbers of generators and storage operators avoiding registration under the grid code because of the excessively onerous nature of grid code compliance.
Steve Taylor, Quorum Development Ltd	<p>I have some specific minor points to make on the text of the consultation document, see below.</p> <p>Some specific observations on the Consultation Document text</p> <ol style="list-style-type: none"> 1. I am not sure Rule III in Section 12, page 29 is clear in explaining the difference between the 'Standard Product' ramp rates and the plant's actual ramp rates. 2. I don't believe Rule VII (b) and Rule VII (c) correctly describe the transitions between adjacent RR Blocks accurately—should not these transitions be made at the plant's declared rates and not be 10 minute ramp rates? 3. Page 36, bullet 2 beneath Diagram: I'm not sure that the phrase ' ... the most symmetric time will be chosen' makes sense – all the potential ramping options (+/-4 mins, +/- 3 mins etc) seem to be equally symmetrical. Is this paragraph really saying that the symmetrical ramp rate that is closest the real plant ramp rates will be used, subject to the real ramp rates not being exceeded? 4. For a STOR unit, is the intention of paragraph 24, page 40, to say that such a Unit can only provide RR balancing MW outside of a STOR window, and that the existence of a STOR contract is not in itself a bar to participation in TERRE, provided that the meters for the Unit are only assigned to a single BM Unit providing balancing services? 5. Implementation timescales will be tight – it is essential that clear and complete specification and guidance documents (e.g. what are the RR Despatch Principles, how do linked and exclusive Bids work, how can advance Bids be nullified, how later Bids for an auction period affect earlier Bids for the same period should these later submissions be permissible, etc) are published in a timely manner as the detail of the solution emerges, and that full engagement with

Respondent	Q5: For those respondents that are not existing Grid Code Users (e.g. a non BM Participant) are you aware that GC0097 will extend your obligations that arise from becoming a BSC Party under P344. Do you have any comments on these requirements and obligations?
	Market Participants and other interested parties is maintained throughout the implementation period. One obvious area where such communication and engagement is essential is the decisions on which interface and protocol to use for RR Bid submission and RR Instructions issuance – will it be EDT/EDL, EDT*/EDL*, or some other interface?
<i>Rob Wilson, National Grid SO</i>	National Grid appreciates that stakeholders have been given the opportunity to provide input on this question, but we would like to point out that participation in TERRE is not mandatory.
<i>Joshua Logan, Drax Power Ltd</i>	N/A
<i>Saskia Barker, Flexitricity Limited</i>	Yes, we are aware to the extent they have been decided so far. There are still details that need to be finalised, but their scope so far seems reasonable. There is certainly more work to be done on the exact details of the obligations, and without more information it is difficult to comment further.
<i>Bill Reed, RWE</i>	No response provided
<i>Alastair Frew, Scottish Power Generation</i>	n/a
<i>Paul Jones, Uniper</i>	n/a
<i>Rick Parfett, The Ade</i>	Some members that are not existing Grid Code Users have indicated that they are aware of this. The scope of the requirements and obligations decided so far is reasonable, but the lack of detail makes a full response to this question difficult. It is important that more details of the obligations are provided and that industry parties are involved in advising about the viability of detailed technical requirements.

Respondent	Q5: For those respondents that are not existing Grid Code Users (e.g. a non BM Participant) are you aware that GC0097 will extend your obligations that arise from becoming a BSC Party under P344. Do you have any comments on these requirements and obligations?
<i>Vince Hammond, National Grid Interconnectors Limited</i>	n/a
<i>Simon Bateman, Engie</i>	Please refer to Q1
<i>John West, Energy Networks Association (ENA)</i>	No comment
<i>Martin Mate, EDF Energy</i>	No response indicated
<i>Jack Abbott, Centrica</i>	n/a

Questions 6: GC0097 specific question

Respondent	Q6: Do you believe that the solution described in this Workgroup Report aligns with current arrangements in the Capacity Market?
<i>Mark Howitt, Storelectric Ltd</i>	Unfortunately, yes. That means that it makes the problems described above much worse.
<i>Steve Taylor, Quorum Development Ltd</i>	No view on this question.
<i>Rob Wilson, National Grid SO</i>	Where there is any overlap, yes. The development of the TERRE solution has been designed to work in conjunction with the capacity market.
<i>Joshua Logan, Drax Power Ltd</i>	We believe the TERRE arrangements would need to be added of the list of Relevant Balancing Services in the Capacity Market (CM), this will ensure the relevant adjustment is made to the amount of power a generator participating in TERRE would have to deliver in a CM Stress Event.
<i>Saskia Barker, Flexitricity Limited</i>	<p>It would follow the logic of current Capacity Market arrangements for balancing by the TSO that TERRE actions should be treated in the same way as other balancing instructions for the TSO. The only way I believe this to be achievable is through a Capacity Market rule change, which is outside the scope of this modification.</p> <p>The two most obvious solutions are either to treat TERRE instructions the same way BOAs are currently treated in the Capacity Market, or to treat TERRE as an applicable/relevant balancing service like those outlined in Schedule 4 of the Capacity Market Rules.</p> <p>The downside of treating TERRE instructions in the same way as BOAs is that it may cause an issue for Secondary BMUs where the BMU does not have a one to one relationship with a CMU. The disaggregated MSID pair data that is part of this proposal may offer a possible foundation for a solution to that issue.</p>

Respondent	Q6: Do you believe that the solution described in this Workgroup Report aligns with current arrangements in the Capacity Market?
	<p>The downside of treating TERRE as a balancing service like those listed in Schedule 4 of the Capacity Market Rules is that these provisions mostly apply to services outside the BM, which may make it an unsuitable mechanism for traditional BMUs.</p> <p>The other issue is that if a downward TERRE instruction is the result of the needs of a TSO outside GB and whether awarding those instructed BMUs as if they had helped the GB system during a system stress event would be contrary to the intention of the Capacity Market.</p>
<i>Bill Reed, RWE</i>	The proposed mechanism doesn't align with the capacity market if compliance with the Grid Code is to be met. A change to the Capacity Market arrangements or some form of rejection ability in the GC/TERRE dispatch process is needed.
<i>Alastair Frew, Scottish Power Generation</i>	Yes
<i>Paul Jones, Uniper</i>	There does not appear to be an issue with the solution described in the workgroup report. However, the Capacity Provider's Adjusted Load Following Capacity Obligation under the CM rules should be adjusted to reflect any RR actions it has been instructed to undertake, in a similar manner to how BM actions are accounted for. This is probably an issue for a CM Rule change rather than anything that can be done within the Grid Code (or BSC).
<i>Rick Parfett, The Ade</i>	<p>While Project TERRE is a new product, its interaction with current arrangements in the Capacity Market should be no different than that of the other products that National Grid uses to balance the system. Various stages of the proposed solution are based on similar arrangements in the BM, citing consistency and ease of understanding. It would therefore make sense for the interactions between TERRE and the CM to be treated in a similar manner to interactions between the BM and the CM.</p> <p>Under the BM, if a participant is instructed down through a BOA during a system stress event, the BOA volume is credited back onto the participant's CM delivery volume as if they had generated it. This mechanism ensures that participants are not penalised for following an instruction from the TSO. A similar provision exists for BM balancing</p>

Respondent	Q6: Do you believe that the solution described in this Workgroup Report aligns with current arrangements in the Capacity Market?
	services, for example in a scenario where a participant participating Mandatory Frequency Response is instructed to provide frequency response.
<i>Vince Hammond, National Grid Interconnectors Limited</i>	No reasons to believe that current proposal would not align with capacity market.
<i>Simon Bateman, Engie</i>	Please refer to Q1
<i>John West, Energy Networks Association (ENA)</i>	No comment
<i>Martin Mate, EDF Energy</i>	<p>We support the proposal to require and use a Final Physical Notification as a reference level for instruction and delivery of TERRE volumes from all TERRE participants, rather than Capacity Market baseline or similar. This is necessary in order to use existing BM instruction and monitoring processes, and to help ensure competition on equivalent terms between large sources, and small sources within Supplier portfolios.</p> <p>Capacity Market changes may be required to ensure that balancing volumes delivered for TERRE are allowed for in determining CM delivery in a stress event, in the same way as existing BM volumes are allowed for.</p> <p>Consideration should be given to the impact on determination of capacity requirements of potentially increased information on reference levels of generation and demand within distribution.</p>
<i>Jack Abbott, Centrica</i>	In section 24 on page 40, the document states “Under the proposed solution it was the view that if a RR Provider participates in multiple markets and has obligations to deliver capacity/balancing MWs (excluding BM) to either TSO or DNO/DSO, that this commitment be honoured before bidding into TERRE”. We do not believe that there is a scenario

Respondent	Q6: Do you believe that the solution described in this Workgroup Report aligns with current arrangements in the Capacity Market?
	<p>that a TERRE bid should be marked as 'restricted' due to Capacity Market obligations. National Grid cannot know at the time of the TERRE auction, whether a provider would be obligated to meet its Capacity Market obligation. Within the Capacity Market, a Capacity Market Unit is required to generate during 'stress events'; this is only known post-event. A Capacity Market Warning (given 4 hours before the event) does not necessarily mean there will be a stress event; it is a notification of 500 MW or less margin between forecast system demand and supply.</p> <p>A unit's Capacity Market Obligation is amended when a balancing service is designated as a 'Relevant Balancing Service'. We believe that the TERRE product should be included as a Relevant Balancing Service in the Capacity Market. Ofgem will need to amend this through its Capacity Market Rules change process.</p>

Impact on the Grid Code

Does this modification impact a Significant Code Review (SCR) or other significant industry change projects, if so, how?

No impact on SCR

Consumer Impacts

TERRE could provide balancing services cost savings to GB of around €12-14m per annum, so might have a positive consumer impact.

Cross-code impacts

TERRE has an identified impact on the BSC and Grid Code. Workgroups under the Panel governance of these codes are already joint-working to ensure a consistent implement approach and to mitigate cross-code impacts and duplication. We will also need to consider how we interact with the GC0095 workgroup that is progressing the implementation of the Transmission System Operation Guideline (TSOG), which contains a procedure for pre-qualification for Replacement Reserve providers.

Impact on Greenhouse Gas Emissions

None

Impact of the modification on the Applicable Grid Code Objectives (Charging):

Relevant Objective	Identified impact (Positive/negative/neutral)
(a) To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity;	Positive – provides TSO to a wide range of Reserves providers across EU to support local system management
(b) 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);	Positive – provides additional market opportunities to potential Balancing Services Providers of +/-1MW capacity and up
(c) 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;	Positive – See objective (a)
(d) 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; and	Positive – is directly aimed at ensuring GB compliance to EU legislation
(e) To promote efficiency in the implementation and administration of the Grid Code arrangements	Positive – joint working between the Grid Code and BSC is paramount in managing implementation of TERRE

Proposer's initial view:

The view of the Proposer was that GC0097 would be implemented 10 business days after an Authority decision, ensuring compliance with the TERRE Central Project go-live timetable. At the time of writing, this is expected to be April 2019. This modification also needs to be aligned with its corresponding BSC modification P344.

TERRE Acronyms

- BSCCo = Balancing and Settlement Code Company aka ELEXON
- BEP – Balancing Energy Product
- BRP = Balancing Responsible Party
- BSP = Balancing Service Provider
- EBGL = Electricity Balancing Guideline
- RR = Replacement Reserves
- TERRE = Trans-European Replacement Reserves Exchange
- TSO = Transmission System Operator
- TSOG = Transmission System Operation Guideline
- SOGL = Transmission System Operation Guideline
- **RRA – Replacement Reserve Acceptance** *The notification from the TERRE ‘central platform’ to the TSO advising the volume of RR to be instructed*
- **RRI - Replacement Reserve Instruction** *the electronic notification in the form of a MW profile to advise an accepted BSP to deviate from their submitted baseline (FPN)*
- **RR Schedule** – calculated by settlement to represent what the RR Provider should have been doing after receiving the RRA if the TSO had not withheld some instructions

Activated Network Management Scheme	An automated scheme that changes flows on a network by balancing Active Power output
Additional BM Unit	Has the meaning as set out in the BSC
Aggregator	A BM Participant who controls one or more Additional BM Units or Secondary BM Units .
Aggregator Impact Matrix	Defined for an Additional BM Unit or a Secondary BM Unit . Provides data allowing NGET to model the result of a Bid-Offer Acceptance on each of the Grid Supply Points within the GSP Group over which the Additional BM Unit or Secondary BM Unit is defined
<u>Committed Level</u>	<u>The expected Active Power output from a BM Unit after accepting a Bid- Offer Acceptance or RR Instruction or a combination of Bid-Offer Acceptances and RR Instructions</u>
European Regulation (EU) 2017/1485	Commission Regulation (EU) 2017/1485 establishing a guideline on electricity transmission system operation
European Regulation (EU) 2017/2195	Commission Regulation (EU) 2017/2195 of 17 December 2017 establishing a guideline on electricity balancing
GSP Group	Has the meaning as set out in the BSC
MSID	Has the meaning as set out in the BSC , covers Metering System Identifier
RR Acceptance	The results of the TERRE auction for each BM Participant
<u>Restricted</u>	<u>Applies to a TERRE Bid which has been marked so that it will be passed to the TERRE Central Platform but will not be used in the auction</u>
RR Instruction	Replacement Reserve Instruction – used for instructing BM Participants after the results of the TERRE auction. An RR Instruction has the same format as a Bid-Offer Acceptance but has type field indicating it is for TERRE
Secondary BM Unit	Has the meaning set out in the BSC
TERRE	Trans European Replacement Reserves Exchange – a market covering the procurement of replacement reserves across Europe as described European Regulation (EU) 2017/2195 (EBGL) and European Regulation (EU) 2017/1485
TERRE Activation Period	A period of time lasting 15 minutes and starting at either 0, 15, 30 or 45 minutes past the hour (e.g. 10:00 to 10:15). There are 4 TERRE Activation Periods in one TERRE Auction Period
TERRE Auction Period	A period of time lasting one hour and starting and ending on the hour (e.g. from 10:00 to 11:00). Hence there are 24 TERRE Auction Periods in a day
TERRE Bid	A submission by a BM Participant covering the price and MW deviation offered into the TERRE auction (please note – in the Balancing Mechanism the term bid has a different meaning – in this case a bid can be an upward or downward MW change)

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TERRE Central Platform	IT system which implements the TERRE auction
TERRE Gate Closure	60 minutes before the start of the TERRE Auction period (note still ongoing discussions if this may become 55 minutes)
TERRE Instruction Guide	Details specific rules for creating an RR Instruction from an RR Acceptance
TERRE Data Validation and Consistency Rules	A document produced by the central TERRE project detailing the correct format of submissions for TERRE

GC0102
BALANCING CODE 1 LEGAL TEXT
DATED 10/01/2018

BALANCING CODE NO. 1
(BC1)
PRE GATE CLOSURE PROCESS
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(This contents page does not form part of the Grid Code)

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BC1.1

INTRODUCTION

Balancing Code No1 (BC1) sets out the procedure for:

- (a) the submission of **BM Unit Data** and/or **Generating Unit Data** (which could be part of a **Power Generating Module**) by each **BM Participant**;
 - (b) the submission of certain **System** data by each **Network Operator**; and
 - (c) the provision of data by **NGET**,
- in the period leading up to **Gate Closure**.

BC1.2

OBJECTIVE

The procedure for the submission of **BM Unit Data** and/or **Generating Unit Data** is intended to enable **NGET** to assess which **BM Units** and **Generating Units** (which could be part of a **Power Generating Module**) are expected to be operating in order that **NGET** can ensure (so far as possible) the integrity of the **National Electricity Transmission System**, and the security and quality of supply.

Where reference is made in this **BC1** to **Generating Units** and/or **Power Generating Modules** (unless otherwise stated) it only applies:

- (a) to each **Generating Unit** which forms part of the **BM Unit** of a **Cascade Hydro Scheme**; and
- (b) at an **Embedded Exemptable Large Power Station** where the relevant **Bilateral Agreement** specifies that compliance with **BC1** is required:
 - (i) to each **Generating Unit** which could be part of a **Synchronous Power Generating Module**, or
 - (ii) to each **Power Park Module** where the **Power Station** comprises **Power Park Modules**.

BC1.3

SCOPE

BC1 applies to **NGET** and to **Users**, which in this **BC1** means:-

- (a) **BM Participants**;
- (b) **Externally Interconnected System Operators**; and
- (c) **Network Operators**.

BC1.4

SUBMISSION OF DATA

In the case of **Additional BM Units** or **Secondary BM Units** any data submitted by **Users** under this **BC1** must represent the value of the data at the relevant **GSP Group**.

In the case of all other **BM Units** or **Generating Units Embedded** in a **User System**, any data submitted by **Users** under this **BC1** must represent the value of the data at the relevant **Grid Supply Point**.

BC1.4.1

Communication With Users

- (a) Submission of **BM Unit Data** and **Generating Unit Data** by **Users** to **NGET** specified in BC1.4.2 to BC1.4.4 (with the exception of BC1.4.2(f)) is to be by use of electronic data communications facilities, as provided for in CC.6.5.8 or ECC.6.5.8 (as applicable). However, data specified in BC1.4.2(c) and BC1.4.2(e) only, may be submitted by telephone or fax.
- (b) In the event of a failure of the electronic data communication facilities, the data to apply in relation to a pre-**Gate Closure** period will be determined in accordance with the **Data Validation, Consistency and Defaulting Rules**, based on the most recent data received and acknowledged by **NGET**.

- (c) **Planned Maintenance Outages** will normally be arranged to take place during periods of low data transfer activity.
- (d) Upon any **Planned Maintenance Outage**, or following an unplanned outage described in BC1.4.1(b) (where it is termed a "failure") in relation to a pre-**Gate Closure** period:
 - (i) **BM Participants** should continue to act in relation to any period of time in accordance with the **Physical Notifications** current at the time of the start of the **Planned Maintenance Outage** or the computer system failure in relation to each such period of time subject to the provisions of BC2.5.1. Depending on when in relation to **Gate Closure** the planned or unplanned maintenance outage arises such operation will either be operation in preparation for the relevant output in real time, or will be operation in real time. No further submissions of **BM Unit Data** and/or **Generating Unit Data** (other than data specified in BC1.4.2(c) and BC1.4.2(e)) should be attempted. Plant failure or similar problems causing significant deviation from **Physical Notification** should be notified to **NGET** by the submission of a revision to **Export and Import Limits** in relation to the **BM Unit** and/or **Generating Unit** so affected;
 - (ii) during the outage, revisions to the data specified in BC1.4.2(c) and BC1.4.2(e) may be submitted. Communication between **Users Control Points** and **NGET** during the outage will be conducted by telephone; and
 - (iii) no data will be transferred from **NGET** to the **BMRA** until the communication facilities are re-established.

BC1.4.2

Day Ahead Submissions

Data for any **Operational Day** may be submitted to **NGET** up to several days in advance of the day to which it applies, as provided in the **Data Validation, Consistency and Defaulting Rules**. However, **Interconnector Users** must submit **Physical Notifications**, and any associated data as necessary, each day by 11:00 hours in respect of the next following **Operational Day** in order that the information used in relation to the capability of the respective **External Interconnection** is expressly provided. **NGET** shall not by the inclusion of this provision be prevented from utilising the provisions of BC1.4.5 if necessary.

The data may be modified by further data submissions at any time prior to **Gate Closure**, in accordance with the other provisions of **BC1**. The data to be used by **NGET** for operational planning will be determined from the most recent data that has been received by **NGET** by 11:00 hours on the day before the **Operational Day** to which the data applies, or from the data that has been defaulted at 11:00 hours on that day in accordance with BC1.4.5. Any subsequent revisions received by **NGET** under the Grid Code will also be utilised by **NGET**. In the case of all data items listed below, with the exception of item (e), **Dynamic Parameters** (Day Ahead), the latest submitted or defaulted data, as modified by any subsequent revisions, will be carried forward into operational timescales. The individual data items are listed below:

(a) Physical Notifications

Physical Notifications, being the data listed in **BC1** Appendix 1 under that heading, are required by **NGET** at 11:00 hours each day for each **Settlement Period** of the next following **Operational Day**, in respect of;

(1) **BM Units:**

- (i) with a **Demand Capacity** with a magnitude of 50MW or more in **NGET's Transmission Area** or 10MW or more in **SHETL's Transmission Area** or 30MW or more in **SPT's Transmission Area**; or
- (ii) comprising **Generating Units** (as defined in the Glossary and Definitions and not limited by BC1.2) and/or **Power Generating Modules** and/or **CCGT Modules** and/or **Power Park Modules** in each case at **Large Power Stations**, **Medium Power Stations** and **Small Power Stations** where such **Small Power Stations** are directly connected to the **Transmission System**; or

- (iii) where the **BM Participant** chooses to submit **Bid-Offer Data** in accordance with BC1.4.2(d) for **BM Units** not falling within (i) or (ii) above,

and

- (2) each **Generating Unit** where applicable under BC1.2.

Physical Notifications may be submitted to **NGET** by **BM Participants**, for the **BM Units**, and **Generating Units**, specified in this BC1.4.2(a) at an earlier time, or **BM Participants** may rely upon the provisions of BC1.4.5 to create the **Physical Notifications** by data defaulting pursuant to the **Grid Code** utilising the rules referred to in that paragraph at 11:00 hours in any day.

Physical Notifications (which must comply with the limits on maximum rates of change listed in **BC1** Appendix 1) must, subject to the following operating limits, represent the **Users** best estimate of expected input or output of **Active Power** and shall be prepared in accordance with **Good Industry Practice**. **Physical Notifications** for any **BM Unit**, and any **Generating Units**, should normally be consistent with the **Dynamic Parameters** and **Export and Import Limits** and must not reflect any **BM Unit** or any **Generating Units**, proposing to operate outside the limits of its **Demand Capacity** and (and in the case of **BM Units**) **Generation Capacity** and, in the case of a **BM Unit** comprising a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC1.2) and/or **Power Generating Module** and/or **CCGT Module** and/or **Power Park Module**, its **Registered Capacity**.

These **Physical Notifications** provide, amongst other things, indicative **Synchronising** and **De-Synchronising** times to **NGET** in respect of any **BM Unit** comprising a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC1.2) and/or **Power Generating Module** and/or **CCGT Module** and/or **Power Park Module**, and for any **Generating Units**, and provide an indication of significant **Demand** changes in respect of other **BM Units**.

- (b) Quiescent Physical Notifications

Each **BM Participant** may, in respect of each of its **BM Units**, submit to **NGET** for each **Settlement Period** of the next following **Operational Day** the data listed in **BC1** Appendix 1 under the heading of “**Quiescent Physical Notifications**” to amend the data already held by **NGET** in relation to **Quiescent Physical Notifications**, which would otherwise apply for those **Settlement Periods**.

- (c) Export and Import Limits

Each **BM Participant** may, in respect of each of its **BM Units** and its **Generating Units** submit to **NGET** for any part or for the whole of the next following **Operational Day** the data listed in **BC1** Appendix 1 under the heading of “**Export and Import Limits**” to amend the data already held by **NGET** in relation to **Export and Import Limits**, which would otherwise apply for those **Settlement Periods**.

Export and Import Limits respectively represent the maximum export to or import from the **National Electricity Transmission System** for a **BM Unit** and a **Generating Unit** and are the maximum levels that the **BM Participant** wishes to make available and must be prepared in accordance with **Good Industry Practice**.

- (d) Bid-Offer Data

Each **BM Participant** may, in respect of each of its **BM Units**, but must not in respect of its **Generating Units** submit to **NGET** for any **Settlement Period** of the next following **Operational Day** the data listed in **BC1** Appendix 1 under the heading of “**Bid-Offer Data**” to amend the data already held by **NGET** in relation to **Bid-Offer Data**, which would otherwise apply to those **Settlement Periods**. The submitted **Bid-Offer Data** will be utilised by **NGET** in the preparation and analysis of its operational plans for the next following **Operational Day**. **Bid-Offer Data** may not be submitted unless an automatic logging device has been installed at the **Control Point** for the **BM Unit** in accordance with CC.6.5.8(b) or ECC.6.5.8(b) (as applicable).

(e) Dynamic Parameters (Day Ahead)

Each **BM Participant** may, in respect of each of its **BM Units**, but must not in respect of its **Generating Units** submit to **NGET** for the next following **Operational Day** the data listed in **BC1** Appendix 1 under the heading of “**Dynamic Parameters**” to amend that data already held by **NGET**.

These **Dynamic Parameters** shall reasonably reflect the expected true operating characteristics of the **BM Unit** and shall be prepared in accordance with **Good Industry Practice**. In any case where non-zero **QPN** data has been provided in accordance with BC1.4.2(b), the **Dynamic Parameters** will apply to the element being offered for control only, i.e. to the component of the **Physical Notification** between the **QPN** and the full level of the **Physical Notification**.

The **Dynamic Parameters** applicable to the next following **Operational Day** will be utilised by **NGET** in the preparation and analysis of its operational plans for the next following **Operational Day** and may be used to instruct certain **Ancillary Services**. For the avoidance of doubt, the **Dynamic Parameters** to be used in the current **Operational Day** will be those submitted in accordance with BC2.5.3.1.

(f) Other Relevant Data

By 11:00 hours each day, each **BM Participant**, in respect of each of its **BM Units** and **Generating Units** for which **Physical Notifications** are being submitted, shall, if it has not already done so, submit to **NGET** (save in respect of item (vi) and (vii) where the item shall be submitted only when reasonably required by **NGET**), in respect of the next following **Operational Day** the following:

- (i) in the case of a **CCGT Module** and/or a **Synchronous Power Generating Module**, a **CCGT Module Matrix** and/or a **Synchronous Power Generating Module Matrix** as described in **BC1** Appendix 1;
- (ii) details of any special factors which in the reasonable opinion of the **BM Participant** may have a material effect or present an enhanced risk of a material effect on the likely output (or consumption) of such **BM Unit(s)**. Such factors may include risks, or potential interruptions, to **BM Unit** fuel supplies, or developing plant problems, details of tripping tests, etc. This information will normally only be used to assist in determining the appropriate level of **Operating Margin** that is required under OC2.4.6;
- (iii) in the case of **Generators**, any temporary changes, and their possible duration, to the **Registered Data** of such **BM Unit**;
- (iv) in the case of **Suppliers**, details of **Customer Demand Management** taken into account in the preparation of its **BM Unit Data**;
- (v) details of any other factors which **NGET** may take account of when issuing **Bid- Offer Acceptances** for a **BM Unit** (e.g., **Synchronising** or **De-Synchronising** Intervals);
- (vi) in the case of a **Cascade Hydro Scheme**, the **Cascade Hydro Scheme Matrix** as described in **BC1** Appendix 1; ~~and~~
- (vii) in the case of a **Power Park Module**, a **Power Park Module Availability Matrix** as described in **BC1** Appendix 1; ~~and~~
- (viii) in the case of an **Additional BM Unit** or a **Secondary BM Unit** an **Aggregator Impact Matrix** as described in **BC1** Appendix 1.-

(g) Joint BM Unit Data

BM Participants may submit **Joint BM Unit Data** in accordance with the provisions of the **BSC**. For the purposes of the Grid Code, such data shall be treated as data submitted under **BC1**.

BC1.4.3 Data Revisions

The **BM Unit Data**, and **Generating Unit Data**, derived at 1100 hours each day under BC1.4.2 above may need to be revised by the **BM Participant** for a number of reasons, including for example, changes to expected output or input arising from revised contractual positions, plant breakdowns, changes to expected **Synchronising** or **De-Synchronising** times, etc, occurring before **Gate Closure**. **BM Participants** should use reasonable endeavours to ensure that the data held by **NGET** in relation to its **BM Units** and **Generating Units**, is accurate at all times. Revisions to **BM Unit Data**, and **Generating Unit Data** for any period of time up to **Gate Closure** should be submitted to **NGET** as soon as reasonably practicable after a change becomes apparent to the **BM Participant**. **NGET** will use reasonable endeavours to utilise the most recent data received from **Users**, subject to the application of the provisions of BC1.4.5, for its preparation and analysis of operational plans.

BC1.4.4 Receipt Of BM Unit Data Prior To Gate Closure

BM Participants submitting **Bid-Offer Data**, in respect of any **BM Unit** for use in the **Balancing Mechanism** for any particular **Settlement Period** in accordance with the **BSC**, must ensure that **Physical Notifications** and **Bid-Offer Data** for such **BM Units** are received in their entirety and logged into **NGET's** computer systems by the time of **Gate Closure** for that **Settlement Period**. In all cases the data received will be subject to the application under the **Grid Code** of the provisions of BC1.4.5.

For the avoidance of doubt, no changes to the **Physical Notification**, **QPN** data or **Bid-Offer Data** for any **Settlement Period** may be submitted to **NGET** after **Gate Closure** for that **Settlement Period**.

BC1.4.5 BM Unit Data Defaulting, Validity And Consistency Checking

In the event that no submission of any or all of the **BM Unit Data** and **Generating Unit Data** in accordance with BC1.4.2 in respect of an **Operational Day**, is received by **NGET** by 11:00 hours on the day before that **Operational Day**, **NGET** will apply the **Data Validation, Consistency and Defaulting Rules**, with the default rules applicable to **Physical Notifications, Quiescent Physical Notifications** and **Export and Import Limits** data selected as follows:

- (a) for an **Interconnector Users BM Unit**, the defaulting rules will set some or all of the data for that **Operational Day** to zero, unless the relevant Interconnector arrangements, as agreed with **NGET**, state otherwise (in which case (b) applies); and
- (b) for all other **BM Units** or **Generating Units**, the defaulting rules will set some or all of the data for that **Operational Day** to the values prevailing in the current **Operational Day**.

A subsequent submission by a **User** of a data item which has been so defaulted under the **Grid Code** will operate as an amendment to that defaulted data and thereby replace it. Any such subsequent submission is itself subject to the application under the **Grid Code** of the **Data Validation, Consistency and Defaulting Rules**.

BM Unit Data and **Generating Unit Data** submitted in accordance with the provisions of BC1.4.2 to BC1.4.4 will be checked under the **Grid Code** for validity and consistency in accordance with the **Data Validation, Consistency and Defaulting Rules**. If any **BM Unit Data** and **Generating Unit Data** so submitted fails the data validity and consistency checking, this will result in the rejection of all data submitted for that **BM Unit** or **Generating Unit** included in the electronic data file containing that data item and that **BM Unit's** or **Generating Unit's** data items will be defaulted under the **Grid Code** in accordance with the **Data Validation, Consistency and Defaulting Rules**. Data for other **BM Units** and **Generating Units** included in the same electronic data file will not be affected by such rejection and will continue to be validated and checked for consistency prior to acceptance. In the event that rejection of any **BM Unit Data** and **Generating Unit Data** occurs, details will be made available to the relevant **BM Participant** via the electronic data communication facilities. In the event of a difference between the **BM Unit Data** for the **Cascade Hydro Scheme** and sum of the data submitted for the **Generating Units** forming part of such **Cascade Hydro Scheme**, the **BM Unit Data** shall take precedence.

BC1.4.6

Special Provisions Relating To Interconnector Users

- (a) The total of the relevant **Physical Notifications** submitted by **Interconnector Users** in respect of any period of time should not exceed the capability (in MW) of the respective **External Interconnection** for that period of time. In the event that it does, then **NGET** shall advise the **Externally Interconnected System Operator** accordingly. In the period between such advice and **Gate Closure**, one or more of the relevant **Interconnector Users** would be expected to submit revised **Physical Notifications** to **NGET** to eliminate any such over-provision.
- (b) In any case where, as a result of a reduction in the capability (in MW) of the **External Interconnection** in any period during an **Operational Day** which is agreed between **NGET** and an **Externally Interconnected System Operator** after 0900 hours on the day before the beginning of such **Operational Day**, the total of the **Physical Notifications** in the relevant period using that **External Interconnection**, as stated in the **BM Unit Data** exceeds the reduced capability (in MW) of the respective **External Interconnection** in that period then **NGET** shall notify the **Externally Interconnected System Operator** accordingly.

BC1.5

INFORMATION PROVIDED BY NGET

NGET shall provide data to the **Balancing Mechanism Reporting Agent** or **BSCCo** each day in accordance with the requirements of the **BSC** in order that the data may be made available to **Users** via the **Balancing Mechanism Reporting Service** (or by such other means) in each case as provided in the **BSC**. Where **NGET** provides such information associated with the secure operation of the **System** to the **Balancing Mechanism Reporting Agent**, the provision of that information is additionally provided for in the following sections of this BC1.5. **NGET** shall be taken to have fulfilled its obligations to provide data under BC1.5.1, BC1.5.2, and BC1.5.3 by so providing such data to the **Balancing Mechanism Reporting Agent**.

BC1.5.1

Demand Estimates

Normally by 0900 hours each day, **NGET** will make available to **Users** a forecast of **National Demand** and the **Demand** for a number of pre-determined constraint groups (which may be updated from time to time, as agreed between **NGET** and **BSCCo**) for each **Settlement Period** of the next following **Operational Day**. Normally by 1200 hours each day, **NGET** will make available to **Users** a forecast of **National Electricity Transmission System Demand** for each **Settlement Period** of the next **Operational Day**. Further details are provided in Appendix 2.

BC1.5.2 Indicated Margin And Indicated Imbalance

Normally by 1200 hours each day, **NGET** will make available to **Users** an **Indicated Margin** and an **Indicated Imbalance** for each **Settlement Period** of the next following **Operational Day**. **NGET** will use reasonable endeavours to utilise the most recent data received from **Users** in preparing for this release of data. Further details are provided in Appendix 2.

BC1.5.3 Provision Of Updated Information

NGET will provide updated information on **Demand** and other information at various times throughout each day, as detailed in Appendix 2. **NGET** will use reasonable endeavours to utilise the most recent data received from **Users** in preparing for this release of data.

BC1.5.4 Reserve And System Margin

Contingency Reserve

- (a) The amount of **Contingency Reserve** required at the day ahead stage and in subsequent timescales will be decided by **NGET** on the basis of historical trends in the reduction in availability of **Large Power Stations** and increases in forecast **Demand** up to real time operation. Where **Contingency Reserve** is to be allocated to thermal **Gensets**, **NGET** will instruct through a combination of **Ancillary Services** instructions and **Bid-Offer Acceptances**, the time at which such **Gensets** are required to synchronise, such instructions to be consistent with **Dynamic Parameters** and other contractual arrangements.

Operating Reserve

- (b) The amount of **Operating Reserve** required at any time will be determined by **NGET** having regard to the **Demand** levels, **Large Power Station** availability shortfalls and the greater of the largest secured loss of generation (ie, the loss of generation against which, as a requirement of the **Licence Standards**, the **National Electricity Transmission System** must be secured) or loss of import from or sudden export to **External Interconnections**. **NGET** will allocate **Operating Reserve** to the appropriate **BM Units** and **Generating Units** so as to fulfil its requirements according to the **Ancillary Services** available to it and as provided in the **BC**.

System Margin

- (c) In the period following 1200 hours each day and in relation to the following **Operational Day**, **NGET** will monitor the total of the Maximum Export Limit component of the **Export and Import Limits** received against forecast **National Electricity Transmission System Demand** and the **Operating Margin** and will take account of **Dynamic Parameters** to see whether the anticipated level of the **System Margin** for any period is insufficient.
- (d) Where the level of the **System Margin** for any period is, in **NGET's** reasonable opinion, anticipated to be insufficient, **NGET** will send (by such data transmission facilities as have been agreed) a **National Electricity Transmission System Warning - Electricity Margin Notice** in accordance with OC7.4.8 to each **Generator**, **Supplier**, **Externally Interconnected System Operator**, **Network Operator** and **Non-Embedded Customer**.
- (e) Where, in **NGET's** judgement the **System Margin** at any time during the current **Operational Day** is such that there is a high risk of **Demand** reduction being instructed, a **National Electricity Transmission System Warning - High Risk of Demand Reduction** will be issued, in accordance with OC7.4.8.
- (f) The monitoring will be conducted on a regular basis and a revised **National Electricity Transmission System Warning - Electricity Margin Notice** or **High Risk of Demand Reduction** may be sent out from time to time, including within the post **Gate Closure** phase. This will reflect any changes in **Physical Notifications** and **Export and Import Limits** which have been notified to **NGET**, and will reflect any **Demand Control** which has also been so notified. This will also reflect generally any changes in the forecast **Demand** and the relevant **Operating Margin**.

- (g) To reflect changing conditions, a **National Electricity Transmission System Warning - Electricity Margin Notice** may be superseded by a **National Electricity Transmission System Warning - High Risk of Demand Reduction** and vice-versa.
- (h) If the continuing monitoring identifies that the **System Margin** is anticipated, in **NGET's** reasonable opinion, to be sufficient for the period for which previously a **National Electricity Transmission System Warning** had been issued, **NGET** will send (by such data transmission facilities as have been agreed) a **Cancellation of National Electricity Transmission System Warning** to each **User** who had received a **National Electricity Transmission System Warning - Electricity Margin Notice** or **High Risk of Demand Reduction** for that period. The issue of a **Cancellation of National Electricity Transmission System Warning** is not an assurance by **NGET** that in the event, the **System Margin** will be adequate, but reflects **NGET's** reasonable opinion that the insufficiency is no longer anticipated.
- (i) If continued monitoring indicates the **System Margin** becoming reduced **NGET** may issue further **National Electricity Transmission System Warnings - Electricity Margin Notice** or **High Risk of Demand Reduction**.
- (j) **NGET** may issue a **National Electricity Transmission System Warning - Electricity Margin Notice** or **High Risk of Demand Reduction** for any period, not necessarily relating to the following **Operational Day**, where it has reason to believe there will be a reduced **System Margin** over a period (for example in periods of protracted **Plant** shortage, the provisions of OC7.4.8.6 apply).

BC1.5.5

System And Localised NRAPM (Negative Reserve Active Power Margin)

- (a) (i) System Negative Reserve Active Power Margin
Synchronised Gensets must at all times be capable of reducing output such that the total reduction in output of all **Synchronised Gensets** is sufficient to offset the loss of the largest secured demand on the **System** and must be capable of sustaining this response;
- (ii) Localised Negative Reserve Active Power Margin
Synchronised Gensets must at all times be capable of reducing output to allow transfers to and from the **System Constraint Group** (as the case may be) to be contained within such reasonable limit as **NGET** may determine and must be capable of sustaining this response.
- (b) **NGET** will monitor the total of **Physical Notifications** of exporting **BM Units** and **Generating Units** (where appropriate) received against forecast **Demand** and, where relevant, the appropriate limit on transfers to and from a **System Constraint Group** and will take account of **Dynamic Parameters** and **Export and Import Limits** received to see whether the level of **System NRAPM** or **Localised NRAPM** for any period is likely to be insufficient. In addition, **NGET** may increase the required margin of **System NRAPM** or **Localised NRAPM** to allow for variations in forecast **Demand**. In the case of **System NRAPM**, this may be by an amount (in **NGET's** reasonable discretion) not exceeding five per cent of forecast **Demand** for the period in question. In the case of **Localised NRAPM**, this may be by an amount (in **NGET's** reasonable discretion) not exceeding ten per cent of the forecast **Demand** for the period in question;
- (c) Where the level of **System NRAPM** or **Localised NRAPM** for any period is, in **NGET's** reasonable opinion, likely to be insufficient **NGET** may contact all **Generators** in the case of low **System NRAPM** and may contact **Generators** in relation to relevant **Gensets** in the case of low **Localised NRAPM**. **NGET** will raise with each **Generator** the problems it is anticipating due to low **System NRAPM** or **Localised NRAPM** and will discuss whether, in advance of **Gate Closure**:-
 - (i) any change is possible in the **Physical Notification** of a **BM Unit** which has been notified to **NGET**; or
 - (ii) any change is possible to the **Physical Notification** of a **BM Unit** within an

Existing AGR Plant within the **Existing AGR Plant Flexibility Limit**;

in relation to periods of low **System NRAPM** or (as the case may be) low **Localised NRAPM**. **NGET** will also notify each **Externally Interconnected System Operator** of the anticipated low **System NRAPM** or **Localised NRAPM** and request assistance in obtaining changes to **Physical Notifications** from **BM Units** in that **External System**.

- (d) Following **Gate Closure**, the procedure of BC2.9.4 will apply.

BC1.6 SPECIAL PROVISIONS RELATING TO NETWORK OPERATORS

BC1.6.1 User System Data From Network Operators

- (a) By 1000 hours each day each **Network Operator** will submit to **NGET** in writing, confirmation or notification of the following in respect of the next **Operational Day**:

- (i) constraints on its **User System** which **NGET** may need to take into account in operating the **National Electricity Transmission System**. In this BC1.6.1 the term "constraints" shall include restrictions on the operation of **Embedded Power Generating Modules**, and/or **Embedded CCGT Units**, and/or **Embedded Power Park Modules** as a result of the **User System** to which the **Power Generating Module** and/or **CCGT Unit** and/or **Power Park Module** is connected at the **User System Entry Point** being operated or switched in a particular way, for example, splitting the relevant busbar. It is a matter for the **Network Operator** and the **Generator** to arrange the operation or switching, and to deal with any resulting consequences. The **Generator**, after consultation with the **Network Operator**, is responsible for ensuring that no **BM Unit Data** submitted to **NGET** can result in the violation of any such constraint on the **User System**.
- (ii) the requirements of voltage control and MVAR reserves which **NGET** may need to take into account for **System** security reasons.
- (iii) where applicable, updated best estimates of **Maximum Export Capacity** and **Maximum Import Capacity** and **Interface Point Target Voltage/Power Factor** for any **Interface Point** connected to its **User System** including any requirement for post-fault actions to be implemented on the relevant **Offshore Transmission System** by **NGET**

(iv) constraints on its **User System** which **NGET** may need to take into account when issuing **Bid-Offer Acceptances** to **Additional BM units** or **Secondary BM Units**..

- (b) The form of the submission will be:

- (i) that of a **BM Unit** output or consumption (for MW and for MVAR, in each case a fixed value or an operating range, on the **User System** at the **User System Entry Point**, namely in the case of a **BM Unit** comprising a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC1.2) on the higher voltage side of the generator step-up transformer, and/or in the case of a **Power Generating Module**, at the point of connection and/or in the case of a **Power Park Module**, at the point of connection) required for particular **BM Units** (identified in the submission) connected to that **User System** for each **Settlement Period** of the next **Operational Day**;

- (ii) adjusted in each case for MW by the conversion factors applicable for those **BM Units** to provide output or consumption at the relevant **Grid Supply Points**.
- (c) At any time and from time to time, between 1000 hours each day and the expiry of the next **Operational Day**, each **Network Operator** must submit to **NGET** in writing any revisions to the information submitted under this BC1.6.1.

BC1.6.2 Notification Of Times To Network Operators

NGET will make available indicative **Synchronising** and **De-Synchronising** times to each **Network Operator**, but only relating to **BM Units** comprising a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC1.2) or a **Power Park Module** or a **CCGT Module** and/or a **Power Generating Module, Embedded** within that **Network Operator's User System** and those **Gensets** directly connected to the **National Electricity Transmission System** which **NGET** has identified under **OC2** as being those which may, in the reasonable opinion of **NGET**, affect the integrity of that **User System**. If in preparing for the operation of the **Balancing Mechanism**, **NGET** becomes aware that a **BM Unit** directly connected to the **National Electricity Transmission System** may, in its reasonable opinion, affect the integrity of that other **User System** which, in the case of a **BM Unit** comprising a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC1.2) and/or a **Power Generating Module** and/or a **CCGT Module** and/or a **Power Park Module**, it had not so identified under **OC2**, then **NGET** may make available details of its indicative **Synchronising** and **De-Synchronising** times to that other **User** and shall inform the relevant **BM Participant** that it has done so, identifying the **BM Unit** concerned.

BC1.7 SPECIAL ACTIONS

BC1.7.1 **NGET** may need to identify special actions (either pre- or post-fault) that need to be taken by specific **Users** in order to maintain the integrity of the **National Electricity Transmission System** in accordance with the **Licence Standards** and **NGET Operational Strategy**.

- (a) For a **Generator** special actions will generally involve a **Load** change or a change of required Notice to Deviate from Zero NDZ, in a specific timescale on individual or groups of **Gensets**.
- (b) For **Network Operators** these special actions will generally involve **Load** transfers between **Grid Supply Points** or arrangements for **Demand** reduction by manual or automatic means.
- (c) For **Externally Interconnected System Operators** (in their co-ordinating role for **Interconnector Users** using their **External System**) these special actions will generally involve an increase or decrease of net power flows across an **External Interconnection** by either manual or automatic means.

BC1.7.2 These special actions will be discussed and agreed with the relevant **User** as appropriate. The actual implementation of these special actions may be part of an "emergency circumstances" procedure described under **BC2**. If not agreed, generation or **Demand** may be restricted or may be at risk.

BC1.7.3 **NGET** will normally issue the list of special actions to the relevant **Users** by 1700 hours on the day prior to the day to which they are to apply.

BC1.8 PROVISION OF REACTIVE POWER CAPABILITY

BC1.8.1 Under certain operating conditions **NGET** may identify through its **Operational Planning** that an area of the **National Electricity Transmission System** may have insufficient **Reactive Power** capability available to ensure that the operating voltage can be maintained in accordance with **NGET's Licence Standards**.

In respect of **Onshore Synchronous Generating Unit(s)** belonging to **GB Code Users**

- (i) that have a **Connection Entry Capacity** in excess of **Rated MW** (or the **Connection Entry Capacity** of the **CCGT Module** exceeds the sum of **Rated MW** of the **Generating Units** comprising the **CCGT Module**); and

- (ii) that are not capable of continuous operation at any point between the limits 0.85 **Power Factor** lagging and 0.95 **Power Factor** leading at the **Onshore Synchronous Generating Unit** terminals at **Active Power** output levels higher than **Rated MW**; and
- (iii) that have either a **Completion Date** on or after 1st May 2009, or where its **Connection Entry Capacity** has been increased above **Rated MW** (or the **Connection Entry Capacity** of the **CCGT Module** has increased above the sum of **Rated MW** of the **Generating Units** comprising the **CCGT Module**) such increase takes effect on or after 1st May 2009 but only in respect of **GB Generators** that are classified as **GB Code Users** ; and
- (iv) that are in an area of potentially insufficient **Reactive Power** capability as described in this clause BC1.8.1,

NGET may instruct the **Onshore Synchronous Generating Unit(s)** to limit its submitted **Physical Notifications** to no higher than **Rated MW** (or the **Active Power** output at which it can operate continuously between the limits 0.85 **Power Factor** lagging to 0.95 **Power Factor** leading at its terminals if this is higher) for a period specified by **NGET**. Such an instruction must be made at least 1 hour prior to **Gate Closure**, although **NGET** will endeavour to give as much notice as possible. The instruction may require that a **Physical Notification** is re-submitted. The period covered by the instruction will not exceed the expected period for which the potential deficiency has been identified. Compliance with the instruction will not incur costs to **NGET** in the **Balancing Mechanism**. The detailed provisions relating to such instructions will normally be set out in the relevant **Bilateral Agreement**.

BC1.8.2

BC1.8.1 shall not apply to **EU Code Users** where the obligations under CC.6.3.2(a) apply only to **GB Generators**. For the avoidance of doubt, **EU Code User's** are only required to satisfy the requirements of the **ECC's** and not the **CC's**.

APPENDIX 1 - BM UNIT DATA

BC1.A.1 More detail about valid values required under the **Grid Code** for **BM Unit Data** and **Generating Unit Data** may be identified by referring to the **Data Validation, Consistency and Defaulting Rules**. In the case of **Embedded BM Units** and **Generating Units** the **BM Unit Data** and the **Generating Unit Data** shall represent the value at the relevant **Grid Supply Point**. Where data is submitted on a **Generating Unit** basis, the provisions of this Appendix 1 shall in respect of such data submission apply as if references to **BM Unit** were replaced with **Generating Unit**. Where **NGET** and the relevant **User** agree, submission on a **Generating Unit** basis (in whole or in part) may be otherwise than in accordance with the provisions of the Appendix 1.

BC1.A.1.1 Physical Notifications

For each **BM Unit**, the **Physical Notification** is a series of MW figures and associated times, making up a profile of intended input or output of **Active Power** at the **Grid Entry Point** or **Grid Supply Point**, as appropriate. For each **Settlement Period**, the first "from time" should be at the start of the **Settlement Period** and the last "to time" should be at the end of the **Settlement Period**.

The input or output reflected in the **Physical Notification** for a single **BM Unit** (or the aggregate **Physical Notifications** for a collection of **BM Units** at a **Grid Entry Point** or **Grid Supply Point** or to be transferred across an **External Interconnection**, owned or controlled by a single **BM Participant**) must comply with the following limits regarding maximum rates of change, either for a single change or a series of related changes :

- for a change of up to 300MW no limit;
- for a change greater than 300MW and less than 1000MW 50MW per minute;
- for a change of 1000MW or more 40MW per minute,

unless prior arrangements have been discussed and agreed with **NGET**. This limitation is not intended to limit the Run-Up or Run-Down Rates provided as **Dynamic Parameters**.

An example of the format of **Physical Notification** is shown below. The convention to be applied is that where it is proposed that the **BM Unit** will be importing, the **Physical Notification** is negative.

Data Name	BMU name	Time From	From level (MW)	Time To	To Level (MW)
PN , TAGENT ,	BMUNIT01 ,	2001-11-03 06:30 ,	77 ,	2001-11-03 07:00 ,	100
PN , TAGENT ,	BMUNIT01 ,	2001-11-03 07:00 ,	100 ,	2001-11-03 07:12 ,	150
PN , TAGENT ,	BMUNIT01 ,	2001-11-03 07:12 ,	150 ,	2001-11-03 07:30 ,	175

A linear interpolation will be assumed between the **Physical Notification** From and To levels specified for the **BM Unit** by the **BM Participant**.

BC1.A.1.2 Quiescent Physical Notifications (QPN)

For each **BM Unit** (optional) A series of MW figures and associated times, which describe the MW levels to be deducted from the **Physical Notification** of a **BM Unit** to determine a resultant operating level to which the **Dynamic Parameters** associated with that **BM Unit** apply.

An example of the format of data is shown below.

Data Name	BMU name	Time From	From level (MW)	Time To	To level (MW)
QPN , TAGENT ,	BMUNIT04 ,	2001-11-03 06:30 ,	-200 ,	2001-11-03 07:00 ,	-220
QPN , TAGENT ,	BMUNIT04 ,	2001-11-03 07:00 ,	-220 ,	2001-11-03 07:18 ,	-245
QPN , TAGENT ,	BMUNIT04 ,	2001-11-03 07:18 ,	-245 ,	2001-11-03 07:30 ,	-300

A linear interpolation will be assumed between the **QPN** From and To levels specified for the **BM Unit** by the **BM Participant**.

BC1.A.1.3 Export And Import Limits

BC1.A.1.3.1 Maximum Export Limit (MEL)

A series of MW figures and associated times, making up a profile of the maximum level at which the **BM Unit** may be exporting (in MW) to the **National Electricity Transmission System** at the **Grid Entry Point** or **Grid Supply Point** [or GSP Group](#), as appropriate.

For a **Power Park Module**, the Maximum Export Limit should reflect the maximum possible **Active Power** output from each **Power Park Module** consistent with the data submitted within the **Power Park Module Availability Matrix** as defined under BC.1.A.1.8. For the avoidance of doubt, in the case of a **Power Park Module** this would equate to the **Registered Capacity** less the unavailable **Power Park Units** within the **Power Park Module** and not include weather corrected MW output from each **Power Park Unit**.

BC1.A.1.3.2 Maximum Import Limit (MIL)

A series of MW figures and associated times, making up a profile of the maximum level at which the **BM Unit** may be importing (in MW) from the **National Electricity Transmission System** at the **Grid Entry Point** or **Grid Supply Point** [or GSP Group](#), as appropriate.

An example format of data is shown below. MEL must be positive or zero, and MIL must be negative or zero.

Data Name	BMU name	Time From	From level (MW)	Time To	To level (MW)
MEL , TAGENT ,	BMUNIT01 ,	2001-11-03 05:00 ,	410 ,	2001-11-03 09:35 ,	410
MEL , TAGENT ,	BMUNIT01 ,	2001-11-03 09:35 ,	450 ,	2001-11-03 12:45 ,	450
MIL , TAGENT ,	BMUNIT04 ,	2001-11-03 06:30 ,	-200 ,	2001-11-03 07:00 ,	-220

BC1.A.1.4 Bid-Offer Data

For each **BM Unit** for each
Settlement Period:

Up to 10 Bid-Offer Pairs as defined in the **BSC**.

An example of the format of data is shown below.

Data	Name	BMU name	Time from	Time to	Pair ID	From Level (MW)	To Level (MW)	Offer (£/MWh)	Bid (£/MWh)
BOD, TAGENT, BMUNIT01			2000-10-28 12:00	2000-10-28 13:30	4	30	30	40	35
BOD, TAGENT, BMUNIT01			2000-10-28 12:00	2000-10-28 13:30	3	20	20	35	30
BOD, TAGENT, BMUNIT01			2000-10-28 12:00	2000-10-28 13:30	2	40	40	32	27
BOD, TAGENT, BMUNIT01			2000-10-28 12:00	2000-10-28 13:30	1	50	50	30	25
BOD, TAGENT, BMUNIT01			2000-10-28 12:00	2000-10-28 13:30	-1	-40	-40	25	20
BOD, TAGENT, BMUNIT01			2000-10-28 12:00	2000-10-28 13:30	-2	-30	-30	23	17

This example of Bid-Offer data is illustrated graphically below:



BC1.A.1.5 Dynamic Parameters

The **Dynamic Parameters** comprise:

- Up to three Run-Up Rate(s) and up to three Run-Down Rate(s), expressed in MW/minute and associated Run-Up Elbow(s) and Run-Down Elbow(s), expressed in MW for output and the same for input. It should be noted that Run-Up Rate(s) are applicable to a MW figure becoming more positive;
- Notice to Deviate from Zero (NDZ) output or input, being the notification time required for a **BM Unit** to start importing or exporting energy, from a zero **Physical Notification** level as a result of a **Bid-Offer Acceptance**, expressed in minutes;
- Notice to Deliver Offers (NTO) and Notice to Deliver Bids (NTB), expressed in minutes, indicating the notification time required for a **BM Unit** to start delivering Offers and Bids respectively from the time that the **Bid-Offer Acceptance** is issued. In the case of a **BM Unit** comprising a **Genset**, NTO and NTB will be set to a maximum period of two minutes;
- Minimum Zero Time (MZT), being either the minimum time that a **BM Unit** which has been exporting must operate at zero or be importing, before returning to exporting or the minimum time that a **BM Unit** which has been importing must operate at zero or be exporting before returning to importing, as a result of a **Bid-Offer Acceptance**, expressed in minutes;
- Minimum Non-Zero Time (MNZT), expressed in minutes, being the minimum time that a **BM Unit** can operate at a non-zero level as a result of a **Bid-Offer Acceptance**;
- Stable Export Limit (SEL) expressed in MW at the **Grid Entry Point** or **Grid Supply Point or GSP Group**, as appropriate, being the minimum value at which the **BM Unit** can, under stable conditions, export to the **National Electricity Transmission System**;
- Stable Import Limit (SIL) expressed in MW at the **Grid Entry Point** or **Grid Supply Point or GSP Group**, as appropriate, being the minimum value at which the **BM Unit** can, under stable conditions, import from the **National Electricity Transmission System**;
- Maximum Delivery Volume (MDV), expressed in MWh, being the maximum number of MWh of Offer (or Bid if MDV is negative) that a particular **BM Unit** may deliver within the associated Maximum Delivery Period (MDP), expressed in minutes, being the maximum period over which the MDV applies.
- Last Time to Cancel Synchronisation, expressed in minutes with an upper limit of 60 minutes, being the notification time required to cancel a **BM Unit's** transition from operation at zero. This parameter is only applicable where the transition arises either from a **Physical Notification** or, in the case where the **Physical Notification** is zero, a **Bid-Offer Acceptance**. There can be up to three Last Time to Cancel Synchronisation(s) each applicable for a range of values of Notice to Deviate from Zero.

BC1.A.1.6 CCGT Module Matrix

BC1.A.1.6.1 **CCGT Module Matrix** showing the combination of **CCGT Units** running in relation to any given MW output, in the form of the diagram illustrated below. The **CCGT Module Matrix** is designed to achieve certainty in knowing the number of **CCGT Units** synchronised to meet the **Physical Notification** and to achieve a **Bid-Offer Acceptance**.

BC1.A.1.6.2 In the case of a **Range CCGT Module**, and if the **Generator** so wishes, a request for the single **Grid Entry Point** at which power is provided from the **Range CCGT Module** to be changed in accordance with the provisions of BC1.A.1.6.4 below:

CCGT Module Matrix example form

CCGT MODULE ACTIVE POWER	CCGT GENERATING UNITS* AVAILABLE								
	1st GT	2 nd GT	3 rd GT	4th GT	5th GT	6th GT	1st ST	2nd ST	3rd ST
	ACTIVE POWER OUTPUT								
	150	150	150				100		
0MW to 150MW	/								
151MW to 250MW	/						/		
251MW to 300MW	/	/							
301MW to 400MW	/	/					/		
401MW to 450MW	/	/	/						
451MW to 550MW	/	/	/				/		

* as defined in the Glossary and Definitions and not limited by BC1.2

BC1.A.1.6.3 In the absence of the correct submission of a **CCGT Module Matrix** the last submitted (or deemed submitted) **CCGT Module Matrix** shall be taken to be the **CCGT Module Matrix** submitted hereunder.

BC1.A.1.6.4 The data may also include in the case of a **Range CCGT Module**, a request for the **Grid Entry Point** at which the power is provided from the **Range CCGT Module** to be changed with effect from the beginning of the following **Operational Day** to another specified single **Grid Entry Point** (there can be only one) to that being used for the current **Operational Day**. **NGET** will respond to this request by 1600 hours on the day of receipt of the request. If **NGET** agrees to the request (such agreement not to be unreasonably withheld), the **Generator** will operate the **Range CCGT Module** in accordance with the request. If **NGET** does not agree, the **Generator** will, if it produces power from that **Range CCGT Module**, continue to provide power from the **Range CCGT Module** to the **Grid Entry Point** being used at the time of the request. The request can only be made up to 1100 hours in respect of the following **Operational Day**. No subsequent request to change can be made after 1100 hours in respect of the following **Operational Day**. Nothing in this paragraph shall prevent the busbar at the **Grid Entry Point** being operated in separate sections.

BC1.A.1.6.5 The principles set out in PC.A.3.2.3 apply to the submission of a **CCGT Module Matrix** and accordingly the **CCGT Module Matrix** can only be amended as follows:

(a) Normal CCGT Module

if the **CCGT Module** is a **Normal CCGT Module**, the **CCGT Units** within that **CCGT Module** can only be amended such that the **CCGT Module** comprises different **CCGT Units** if **NGET** gives its prior consent in writing. Notice of the wish to amend the **CCGT Units** within such a **CCGT Module** must be given at least 6 months before it is wished for the amendment to take effect;

(b) Range CCGT Module

if the **CCGT Module** is a **Range CCGT Module**, the **CCGT Units** within that **CCGT Module** can only be amended such that the **CCGT Module** comprises different **CCGT Units** for a particular **Operational Day** if the relevant notification is given by 1100 hours on the day prior to the **Operational Day** in which the amendment is to take effect. No subsequent amendment may be made to the **CCGT Units** comprising the **CCGT Module** in respect of that particular **Operational Day**.

- BC1.A.1.6.6 In the case of a **CCGT Module Matrix** submitted (or deemed to be submitted) as part of the other data for **CCGT Modules**, the output of the **CCGT Module** at any given instructed MW output must reflect the details given in the **CCGT Module Matrix**. It is accepted that in cases of change in MW in response to instructions issued by **NET** there may be a transitional variance to the conditions reflected in the **CCGT Module Matrix**. In achieving an instruction the range of number of **CCGT Units** envisaged in moving from one MW output level to the other must not be departed from. Each **Generator** shall notify **NET** as soon as practicable after the event of any such variance. It should be noted that there is a provision above for the **Generator** to revise the **CCGT Module Matrix**, subject always to the other provisions of this **BC1**;
- BC1.A.1.6.7 Subject as provided above, **NET** will rely on the **CCGT Units** specified in such **CCGT Module Matrix** running as indicated in the **CCGT Module Matrix** when it issues an instruction in respect of the **CCGT Module**;
- BC1.A.1.6.8 Subject as provided in BC1.A.1.6.5 above, any changes to the **CCGT Module Matrix** must be notified immediately to **NET** in accordance with the relevant provisions of **BC1**.
- BC1.A.1.7 Cascade Hydro Scheme Matrix
- BC1.A.1.7.1 A **Cascade Hydro Scheme Matrix** showing the performance of individual **Generating Units** forming part of a **Cascade Hydro Scheme** in response to **Bid-Offer Acceptance**. An example table is shown below:

Cascade Hydro Scheme Matrix example form

Plant	Synchronises when offer is greater than.....
Generating Unit 1MW
Generating Unit 2MW
Generating Unit 3MW
Generating Unit 4MW
Generating Unit 5MW

- BC1.A.1.8 Power Park Module Availability Matrix
- BC1.A.1.8.1 **Power Park Module Availability Matrix** showing the number of each type of **Power Park Units** expected to be available is illustrated in the example form below. The **Power Park Module Availability Matrix** is designed to achieve certainty in knowing the number of **Power Park Units Synchronised** to meet the **Physical Notification** and to achieve a **Bid-Offer Acceptance** by specifying which **BM Unit** each **Power Park Module** forms part of. The **Power Park Module Availability Matrix** may have as many columns as are required to provide information on the different make and model for each type of **Power Park Unit** in a **Power Park Module** and as many rows as are required to provide information on the **Power Park Modules** within each **BM Unit**. The description is required to assist identification of the **Power Park Units** within the **Power Park Module** and correlation with data provided under the **Planning Code**.

Power Park Module Availability Matrix example form

BM Unit Name				
Power Park Module [unique identifier]				
POWER PARK UNIT AVAILABILITY	POWER PARK UNITS			
	Type A	Type B	Type C	Type D
Description (Make/Model)				
Number of units				
Power Park Module [unique identifier]				
POWER PARK UNIT AVAILABILITY	POWER PARK UNITS			
	Type A	Type B	Type C	Type D
Description (Make/Model)				
Number of units				

BC1.A.1.8.2 In the absence of the correct submission of a **Power Park Module Availability Matrix** the last submitted (or deemed submitted) **Power Park Module Availability Matrix** shall be taken to be the **Power Park Module Availability Matrix** submitted hereunder.

BC1.A.1.8.3 **NGET** will rely on the **Power Park Units**, **Power Park Modules** and **BM Units** specified in such **Power Park Module Availability Matrix** running as indicated in the **Power Park Module Availability Matrix** when it issues an instruction in respect of the **BM Unit**.

BC1.A.1.8.4 Subject as provided in PC.A.3.2.4 any changes to **Power Park Module** or **BM Unit** configuration, or availability of **Power Park Units** which affects the information set out in the **Power Park Module Availability Matrix** must be notified immediately to **NGET** in accordance with the relevant provisions of **BC1**. Initial notification may be by telephone. In some circumstances, such as a significant re-configuration of a **Power Park Module** due to an unplanned outage, a revised **Power Park Module Availability Matrix** must be supplied on **NGET's** request.

BC1.A.1.9 **Synchronous Power Generating Module Matrix**

BC1.A.1.9.1 **Synchronous Power Generating Module Matrix** showing the combination of **Synchronous Power Generating Units** running in relation to any given MW output, in the form of the table illustrated below. The **Synchronous Power Generating Module Matrix** is designed to achieve certainty in knowing the number of **Synchronous Power Generating Units** synchronised to meet the **Physical Notification** and to achieve a **Bid-Offer Acceptance**.

BC1.A.1.9.2 This data need not be provided where a submission has been made in respect of BC1.A.1.6, BC1.A.1.7 or BC1.A.1.8

Synchronous Power Generating Module Matrix example form

SYNCHRONOUS POWER GENERATING MODULE MATRIX	SYNCHRONOUS POWER GENERATING UNITS*								
	AVAILABLE								
	1st GT	2 nd GT	3 rd GT	4th GT	5th GT	6th GT	1st ST	2nd ST	3rd ST
	ACTIVE POWER OUTPUT								
MW	150	150	150				100		
0MW to 150MW	/								
151MW to 250MW	/						/		
251MW to 300MW	/	/							
301MW to 400MW	/	/					/		
401MW to 450MW	/	/	/						
451MW to 550MW	/	/	/				/		

* as defined in the Glossary and Definitions and not limited by BC1.2

- BC1.A.1.9.3 In the absence of the correct submission of a **Synchronous Power Generating Module Matrix** the last submitted (or deemed submitted) **Synchronous Power Generating Module Matrix** shall be taken to be the **Synchronous Power Generating Module Matrix** submitted hereunder.
- BC1.A.1.9.4 The principles set out in PC.A.3.2.5 apply to the submission of a **Synchronous Power Generating Module Matrix** and accordingly the **Synchronous Power Generating Module Matrix** can only be amended as if the **Synchronous Power Generating Units** within that **Synchronous Power Generating Module** can only be amended such that the **Synchronous Power Generating Module** comprises different **Synchronous Power Generating Units** if NGET gives its prior consent in writing. Notice of the wish to amend the **Synchronous Power Generating Units** within such a **Synchronous Power Generating Module** must be given at least 6 months before it is wished for the amendment to take effect;
- BC1.A.1.9.5 In the case of a **Synchronous Power Generating Module Matrix** submitted (or deemed to be submitted) as part of the other data for **Synchronous Power Generating Modules**, the output of the **Synchronous Power Generating Module** at any given instructed MW output must reflect the details given in the **Synchronous Power Generating Module Matrix**. It is accepted that in cases of change in MW in response to instructions issued by NGET there may be a transitional variance to the conditions reflected in the **Synchronous Power Generating Module Matrix**. In achieving an instruction the range of number of **Synchronous Power Generating Units** envisaged in moving from one MW output level to the other must not be departed from. Each **Generator** shall notify NGET as soon as practicable after the event of any such variance. It should be noted that there is a provision above for the **Generator** to revise the **Synchronous Power Generating Module Matrix**, subject always to the other provisions of this **BC1**;
- BC1.A.1.9.6 Subject as provided above, NGET will rely on the **Synchronous Power Generating Units** specified in such **Synchronous Power Generating Module Matrix** running as indicated in the **Synchronous Power Generating Module Matrix** when it issues an instruction in respect of the **Synchronous Power Generating Module**;
- BC1.A.1.9.7 Subject as provided in BC1.A.1.9.4 above, any changes to the **Synchronous Power Generating Module Matrix** must be notified immediately to NGET in accordance with the relevant provisions of **BC1**.

BC1.A.10 Aggregator Impact Matrix

BC1.A.10.1 For each **Additional BM Unit** and **Secondary BM Unit** the relevant **BM Participant** will submit data relating to the effect of a Bid-Off Acceptance on each **Grid Supply Point** within the **GSP Group** over which the **Additional BM Unit** or **Secondary BM Unit** was defined.

BC1.A.10.2 For each **Additional BM Unit** and **Secondary BM Unit** the relevant BM Participant will also provide the post-codes and MSIDs ~~for all settlement meters~~ that make up the **Additional BM Unit** or **Secondary BM Unit**

Aggregator Impact Matrix example form

Formatted: Centered

BMU Name			
Operational Day from which values apply			
Grid Supply Point	% Impact	Grid Supply Point	% Impact

APPENDIX 2 - DATA TO BE MADE AVAILABLE BY NGET

BC1.A.2.1 Initial Day Ahead Demand Forecast

Normally by 09:00 hours each day, values (in MW) for each **Settlement Period** of the next following **Operational Day** of the following data items:-

- (i) Initial forecast of **National Demand**;
- (ii) Initial forecast of **Demand** for a number of predetermined constraint groups.

BC1.A.2.2 Initial Day Ahead Market Information

Normally by 12:00 hours each day, values (in MW) for each **Settlement Period** of the next following **Operational Day** of the following data items:-

- (i) Initial National **Indicated Margin**

This is the difference between the sum of **BM Unit** MELs and the forecast of **National Electricity Transmission System Demand**.

- (ii) Initial National **Indicated Imbalance**

This is the difference between the sum of **Physical Notifications** for **BM Units** comprising **Generating Units** (as defined in the Glossary and Definitions and not limited by BC1.2) and/or **Power Generating Modules** and/or **CCGT Modules** and/or **Power Park Modules** and the forecast of **National Electricity Transmission System Demand**.

- (iii) Forecast of **National Electricity Transmission System Demand**.

BC1.A.2.3 Current Day And Day Ahead Updated Market Information

Data will normally be made available by the times shown below for the associated periods of time:

Target Data Release Time	Period Start Time	Period End Time
02:00	02:00 D0	05:00 D+1
10:00	10:00 D0	05:00 D+1
16:00	05:00 D+1	05:00 D+2
16:30	16:30 D0	05:00 D+1
22:00	22:00 D0	05:00 D+2

In this table, D0 refers to the current day, D+1 refers to the next day and D+2 refers to the day following D+1.

In all cases, data will be ½ hourly average MW values calculated by **NGET**. Information to be released includes:

National Information

- (i) National **Indicated Margin**;
- (ii) National **Indicated Imbalance**;
- (iii) Updated forecast of **National Electricity Transmission System Demand**.

Constraint Boundary Information (For Each Constraint Boundary)

(i) **Indicated Constraint Boundary Margin;**

This is the difference between the Constraint Boundary Transfer limit and the difference between the sum of **BM Unit** MELs and the forecast of local **Demand** within the constraint boundary.

(ii) **Local Indicated Imbalance;**

This is the difference between the sum of **Physical Notifications** for **BM Units** comprising **Generating Units** (as defined in the Glossary and Definitions and not limited by BC1.2) and/or **Power Generating Modules** and/or **CCGT Modules** and/or **Power Park Modules** and the forecast of local **Demand** within the constraint boundary.

(iii) Updated forecast of the local **Demand** within the constraint boundary.

< END OF BALANCING CODE NO. 1 >

GC0102
BALANCING CODE 2 LEGAL TEXT
DATED 10/01/2018

BALANCING CODE NO. 2
(BC2)
POST GATE CLOSURE PROCESS
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BC2.1

INTRODUCTION

Balancing Code No 2 (BC2) sets out the procedure for:

- (a) the physical operation of **BM Units** and **Generating Units** (which could be part of a **Power Generating Module**) in the absence of any instructions from **NGET**;
- (b) the acceptance by **NGET** of **Balancing Mechanism** Bids and Offers,
- (c) the calling off by **NGET** of **Ancillary Services**;
- (d) the issuing and implementation of **Emergency Instructions**; and
- (e) the issuing by **NGET** of other operational instructions and notifications.

In addition, **BC2** deals with any information exchange between **NGET** and **BM Participants** or specific **Users** that takes place after **Gate Closure**.

In this **BC2**, “consistent” shall be construed as meaning to the nearest integer MW level.

In this **BC2**, references to “a **BM Unit** returning to its **Physical Notification**” shall take account of any **Bid-Offer Acceptances** already issued to the **BM Unit** in accordance with BC2.7 and any **Emergency Instructions** already issued to the **BM Unit** or **Generating Unit** (which could be part of a **Power Generating Module**) in accordance with BC2.9.

BC2.2

OBJECTIVE

The procedure covering the operation of the **Balancing Mechanism** and the issuing of instructions to **Users** is intended to enable **NGET** as far as possible to maintain the integrity of the **National Electricity Transmission System** together with the security and quality of supply.

Where reference is made in this **BC2** to **Power Generating Modules** or **Generating Units** (unless otherwise stated) it only applies:

- (a) to each **Generating Unit** which forms part of the **BM Unit** of a **Cascade Hydro Scheme**; and
- (b) at an **Embedded Exemptable Large Power Station** where the relevant **Bilateral Agreement** specifies that compliance with **BC2** is required:
 - (i) to each **Generating Unit** which could be part of a **Synchronous Power Generating Module**, or
 - (ii) to each **Power Park Module** where the **Power Station** comprises **Power Park Modules**.

BC2.3

SCOPE

BC2 applies to **NGET** and to **Users**, which in this **BC2** means:-

- (a) **BM Participants**;
- (b) **Externally Interconnected System Operators**, and
- (c) **Network Operators**.

BC2.4

INFORMATION USED

BC2.4.1

The information which **NGET** shall use, together with the other information available to it, in assessing:

- (a) which bids and offers to accept;
- (b) which **BM Units** and/or **Generating Units** to instruct to provide **Ancillary Services**;
- (c) the need for and formulation of **Emergency Instructions**; and
- (d) other operational instructions and notifications which **NGET** may need to issue

will be:

- (a) the **Physical Notification** and **Bid-Offer Data** submitted under **BC1**;
- (b) **Export and Import Limits**, **QPNs**, and **Joint BM Unit Data** in respect of that **BM Unit** and/or **Generating Unit** supplied under **BC1** (and any revisions under **BC1** and **BC2** to the data); and
- (c) **Dynamic Parameters** submitted or revised under this **BC2**.

BC2.4.2 As provided for in BC1.5.4, **NGET** will monitor the total of the Maximum Export Limit component of the **Export and Import Limits** against forecast **Demand** and the **Operating Margin** and will take account of **Dynamic Parameters** to see whether the anticipated level of **System Margin** is insufficient. This will reflect any changes in **Export and Import Limits** which have been notified to **NGET**, and will reflect any **Demand Control** which has also been so notified. **NGET** may issue new or revised **National Electricity Transmission System Warnings – Electricity Margin Notice** or **High Risk of Demand Reduction** in accordance with BC1.5.4.

BC2.5 PHYSICAL OPERATION OF BM UNITS

BC2.5.1 Accuracy Of Physical Notifications

As described in BC1.4.2(a), **Physical Notifications** must represent the **BM Participant's** best estimate of expected input or output of **Active Power** and shall be prepared in accordance with **Good Industry Practice**.

Each **BM Participant** must, applying **Good Industry Practice**, ensure that each of its **BM Units** follows the **Physical Notification** in respect of that **BM Unit** (and each of its **Generating Units** follows the **Physical Notification** in the case of **Physical Notifications** supplied under BC1.4.2(a)(2)) that is prevailing at **Gate Closure** (the data in which will be utilised in producing the **Final Physical Notification Data** in accordance with the **BSC**) subject to variations arising from:

- (a) the issue of **Bid-Offer Acceptances** which have been confirmed by the **BM Participant**; or
- (b) instructions by **NGET** in relation to that **BM Unit** (or a **Generating Unit**) which require, or compliance with which would result in, a variation in output or input of that **BM Unit** (or a **Generating Unit**); or
- (c) compliance with provisions of **BC1**, **BC2** or **BC3** which provide to the contrary.

Except where variations from the **Physical Notification** arise from matters referred to at (a),(b) or (c) above, in respect only of **BM Units** (or **Generating Units**) powered by an **Intermittent Power Source**, where there is a change in the level of the **Intermittent Power Source** from that forecast and used to derive the **Physical Notification**, variations from the **Physical Notification** prevailing at **Gate Closure** may, subject to remaining within the **Registered Capacity**, occur providing that the **Physical Notification** prevailing at **Gate Closure** was prepared in accordance with **Good Industry Practice**.

If variations and/or instructions as described in (a),(b) or (c) apply in any instance to **BM Units** (or **Generating Units**) powered by an **Intermittent Power Source** (e.g. a **Bid Offer Acceptance** is issued in respect of such a **BM Unit** and confirmed by the **BM Participant**) then such provisions will take priority over the third paragraph of BC2.5.1 above such that the **BM Participant** must ensure that the **Physical Notification** as varied in accordance with (a), (b) or (c) above applies and must be followed, subject to this not being prevented as a result of an unavoidable event as described below.

For the avoidance of doubt, this gives rise to an obligation on each **BM Participant** (applying **Good Industry Practice**) to ensure that each of its **BM Units** (and **Generating Units**), follows the **Physical Notifications** prevailing at **Gate Closure** as amended by such variations and/or instructions unless in relation to any such obligation it is prevented from so doing as a result of an unavoidable event (existing or anticipated) in relation to that **BM Unit** (or a **Generating Unit**) which requires a variation in output or input of that **BM Unit** (or a **Generating Unit**).

Examples (on a non-exhaustive basis) of such an unavoidable event are:

- plant breakdowns;
- events requiring a variation of input or output on safety grounds (relating to personnel or plant);
- events requiring a variation of input or output to maintain compliance with the relevant Statutory Water Management obligations; and
- uncontrollable variations in output of **Active Power**.

Any anticipated variations in input or output post **Gate Closure** from the **Physical Notification** for a **BM Unit** (or a **Generating Unit**) prevailing at **Gate Closure** (except for those arising from instructions as outlined in (a), (b) or (c) above) must be notified to **NGET** without delay by the relevant **BM Participant** (or the relevant person on its behalf). For the avoidance of doubt, where a change in the level of the **Intermittent Power Source** from that forecast and used to derive the **Physical Notification** results in the **Shutdown** or **Shutdown** of part of the **BM Unit** (or **Generating Unit**), the change must be notified to **NGET** without delay by the relevant **BM Participant** (or the relevant person on its behalf).

Implementation of this notification should normally be achieved by the submission of revisions to the **Export and Import Limits** in accordance with BC2.5.3 below.

BC2.5.2 Synchronising And De-Synchronising Times

BC2.5.2.1 The **Final Physical Notification Data** provides indicative **Synchronising** and **De-Synchronising** times to **NGET** in respect of any **BM Unit** which is **De-Synchronising** or is anticipated to be **Synchronising** post **Gate Closure**.

Any delay of greater than five minutes to the **Synchronising** or any advancement of greater than five minutes to the **De-Synchronising** of a **BM Unit** must be notified to **NGET** without delay by the submission of a revision of the **Export and Import Limits**.

BC2.5.2.2 Except in the circumstances provided for in BC2.5.2.3, BC2.5.2.4, BC2.5.5.1 or BC2.9, no **BM Unit** (nor a **Generating Unit**) is to be **Synchronised** or **De-Synchronised** unless:-

- (a) a **Physical Notification** had been submitted to **NGET** prior to **Gate Closure** indicating that a **Synchronisation** or **De-Synchronisation** is to occur; or
- (b) **NGET** has issued a **Bid-Offer Acceptance** requiring **Synchronisation** or **De-Synchronisation** of that **BM Unit** (or a **Generating Unit**).

BC2.5.2.3 **BM Participants** must only **Synchronise** or **De-Synchronise** **BM Units** (or a **Generating Unit**);

- (a) at the times indicated to **NGET**, or
- (b) at times consistent with variations in output or input arising from provisions described in BC2.5.1,

(within a tolerance of +/- 5 minutes) or unless that occurs automatically as a result of **Operational Intertripping** or **Low Frequency Relay** operations or an **Ancillary Service** pursuant to an **Ancillary Services Agreement**

BC2.5.2.4 **De-Synchronisation** may also take place without prior notification to **NGET** as a result of plant breakdowns or if it is done purely on safety grounds (relating to personnel or plant). If that happens **NGET** must be informed immediately that it has taken place and a revision to **Export and Import Limits** must be submitted in accordance with BC2.5.3.3. Following any **De-Synchronisation** occurring as a result of plant failure, no **Synchronisation** of that **BM Unit** (or a **Generating Unit**) is to take place without **NGET's** agreement, such agreement not to be unreasonably withheld.

In the case of **Synchronisation** following an unplanned **De-Synchronisation** within the preceding 15 minutes, a minimum of 5 minutes notice of its intention to **Synchronise** should normally be given to **NGET** (via a revision to **Export and Import Limits**). In the case of any other unplanned **De-Synchronisation** where the **User** plans to **Synchronise** before the expiry of the current **Balancing Mechanism** period, a minimum of 15 minutes notice of **Synchronisation** should normally be given to **NGET** (via a revision to **Export and Import Limits**). In addition, the rate at which the **BM Unit** is returned to its **Physical Notification** is not to exceed the limits specified in **BC1**, Appendix 1 without **NGET's** agreement.

NGET will either agree to the **Synchronisation** or issue a **Bid-Offer Acceptance** in accordance with BC2.7 to delay the **Synchronisation**. **NGET** may agree to an earlier **Synchronisation** if **System** conditions allow.

BC2.5.2.5 Notification Of Times To Network Operators

NGET will make changes to the **Synchronising** and **De-Synchronising** times available to each **Network Operator**, but only relating to **BM Units Embedded** within its **User System** and those **BM Units** directly connected to the **National Electricity Transmission System** which **NGET** has identified under **OC2** and/or **BC1** as being those which may, in the reasonable opinion of **NGET**, affect the integrity of that **User System** and shall inform the relevant **BM Participant** that it has done so, identifying the **BM Unit** concerned.

Each **Network Operator** must notify **NGET** of any changes to its **User System** Data as soon as practicable in accordance with BC1.6.1(c).

BC2.5.3 Revisions To BM Unit Data

Following **Gate Closure** for any **Settlement Period**, no changes to the **Physical Notification**, to the **QPN** data or to **Bid-Offer Data** for that **Settlement Period** may be submitted to **NGET**.

BC2.5.3.1

At any time, any **BM Participant** (or the relevant person on its behalf) may, in respect of any of its **BM Units**, submit to **NGET** the data listed in **BC1**, Appendix 1 under the heading of **Dynamic Parameters** from the **Control Point** of its **BM Unit** to amend the data already held by **NGET** (including that previously submitted under this BC2.5.3.1) for use in preparing for and operating the **Balancing Mechanism**. The change will take effect from the time that it is received by **NGET**. For the avoidance of doubt, the **Dynamic Parameters** submitted to **NGET** under BC1.4.2(e) are not used within the current **Operational Day**. The **Dynamic Parameters** submitted under this BC2.5.3.1 shall reasonably reflect the true current operating characteristics of the **BM Unit** and shall be prepared in accordance with **Good Industry Practice**.

Following the **Operational Intertipping** of a **System** to **Generating Unit** or a **System** to **CCGT Module** and/or a **System** to **Power Generating Module**, the **BM Participant** shall as soon as reasonably practicable re-declare its MEL to reflect more accurately its output capability.

BC2.5.3.2

Revisions to **Export and Import Limits** or **Other Relevant Data** supplied (or revised) under **BC1** must be notified to **NGET** without delay as soon as any change becomes apparent to the **BM Participant** (or the relevant person on its behalf) via the **Control Point** for the **BM Unit** (or a **Generating Unit**) to ensure that an accurate assessment of **BM Unit** (or a **Generating Unit**) capability is available to **NGET** at all times. These revisions should be prepared in accordance with **Good Industry Practice** and may be submitted by use of electronic data communication facilities or by telephone.

BC2.5.3.3 Revisions to **Export and Import Limits** must be made by a **BM Participant** (or the relevant person on its behalf) via the **Control Point** in the event of any **De-Synchronisation** of a **BM Unit** (or a **Generating Unit**) in the circumstances described in BC2.5.2.4 if the **BM Unit** (or a **Generating Unit**) is no longer available for any period of time. Revisions must also be submitted in the event of plant failures causing a reduction in input or output of a **BM Unit** (or a **Generating Unit**) even if that does not lead to **De-Synchronisation**. Following the correction of a plant failure, the **BM Participant** (or the relevant person on its behalf) must notify **NGET** via the **Control Point** of a revision to the **Export and Import Limits**, if appropriate, of the **BM Unit** (or a **Generating Unit**), using reasonable endeavours to give a minimum of 5 minutes notice of its intention to return to its **Physical Notification**. The rate at which the **BM Unit** (or a **Generating Unit**) is returned to its **Physical Notification** is not to exceed the limits specified in **BC1**, Appendix 1 without **NGET's** agreement.

BC2.5.4 Operation In The Absence Of Instructions From NGET

In the absence of any **Bid-Offer Acceptances**, **Ancillary Service** instructions issued pursuant to BC2.8 or **Emergency Instructions** issued pursuant to BC2.9:

- (a) as provided for in BC3, each **Synchronised Genset** producing **Active Power** must operate at all times in **Limited Frequency Sensitive Mode** (unless instructed in accordance with BC3.5.4 to operate in **Frequency Sensitive Mode**);
- (b)
 - (i) in the absence of any MVar **Ancillary Service** instructions, the MVar output of each **Synchronised Genset** located **Onshore** should be 0 MVar upon **Synchronisation** at the circuit-breaker where the **Genset** is **Synchronised**. For the avoidance of doubt, in the case of a **Genset** located **Onshore** comprising of **Non-Synchronous Generating Units, Power Park Modules, HVDC Systems** or **DC Converters** the steady state tolerance allowed in CC.6.3.2(b) or ECC.6.3.2.4.4 may be applied
 - (ii) In the absence of any MVar **Ancillary Service** instructions, the MVar output of each **Synchronised Genset** comprising **Synchronous Generating Units** located **Offshore** (which could be part of a **Synchronous Power Generating Module**) should be 0MVar at the **Grid Entry Point** upon **Synchronisation**. For the avoidance of doubt, in the case of a **Genset** located **Offshore** comprising of **Non-Synchronous Generating Units, Power Park Modules, HVDC Systems** or **DC Converters** the steady state tolerance allowed in CC.6.3.2(e) or ECC.6.3.2.5.1 or ECC.6.3.2.6.2 (as applicable) may be applied;
- (c)
 - (i) subject to the provisions of 2.5.4(c) (ii) and 2.5.4 (c) (iii) below, the excitation system or the voltage control system of a **Genset** located **Offshore** which has agreed an alternative **Reactive Power** capability range under CC.6.3.2 (e) (iii) or ECC.6.3.2.5.2 or ECC.6.3.2.6.3 (as applicable) or a **Genset** located **Onshore**, unless otherwise agreed with **NGET**, must be operated only in its constant terminal voltage mode of operation with VAR limiters in service, with any constant **Reactive Power** output control mode or constant **Power Factor** output control mode always disabled, unless agreed otherwise with **NGET**. In the event of any change in **System** voltage, a **Generator** must not take any action to override automatic MVar response which is produced as a result of constant terminal voltage mode of operation of the automatic excitation control system unless instructed otherwise by **NGET** or unless immediate action is necessary to comply with **Stability Limits** or unless constrained by plant operational limits or safety grounds (relating to personnel or plant);
 - (ii) In the case of all **Gensets** comprising **Non-Synchronous Generating Units, DC Converters, HVDC Systems** and **Power Park Modules** that are located **Offshore** and which have agreed an alternative **Reactive Power** capability range under CC.6.3.2 (e) (iii), or ECC.6.3.2.5.2 or ECC.6.3.2.6.3 (as applicable) or that are located **Onshore** only when operating below 20 % of the **Rated MW** output, the voltage control system shall maintain the reactive power transfer at the **Grid Entry Point** (or **User System Entry Point** if **Embedded**) to 0 MVar. For the avoidance of doubt the relevant steady state tolerance allowed for **GB Generators** in CC.6.3.2(b) or CC.6.3.2 (e) and for **EU Generators** in ECC.6.3.2.4.4,

ECC.6.3.2.5.1 and ECC.6.3.2.6.2 and ECC.6.3.2.8.2 may be applied. In the case of any such **Gensets** owned or operated by **GB Code Users** comprising current source **DC Converter** technology or comprising **Power Park Modules** connected to the **Total System** by a current source **DC Converter** when operating at any power output the voltage control system shall maintain the reactive power transfer at the **Grid Entry Point** (or **User System Entry Point** if **Embedded**) to 0 MVar. For the avoidance of doubt the relevant steady state tolerance allowed in CC.6.3.2(b) or CC.6.3.2 (c) (i) may be applied.

- (iii) In the case of all **Gensets** located **Offshore** which are not subject to the requirements of BC2.5.4 (c) (i) or BC2.5.4 (c) (ii) the control system shall maintain the **Reactive Power** transfer at the **Offshore Grid Entry Point** at 0MVar. For the avoidance of doubt the steady state tolerance allowed by CC.6.3.2 (e) or ECC.6.3.2.4.4, ECC.6.3.2.5.1 and ECC.6.3.2.6.2 may be applied.
- (d) In the absence of any MVar **Ancillary Service** instructions,
 - (i) the MVar output of each **Genset** located **Onshore** should be 0 MVar immediately prior to **De-Synchronisation** at the circuit-breaker where the **Genset** is **Synchronised**, other than in the case of a rapid unplanned **De-Synchronisation** or in the case of a **Genset** comprising of **Power Generating Modules** and/or **Non-Synchronous Generating Units** and/or **Power Park Modules** and/or **HVDC Converters** or **DC Converters** which is operating at less than 20% of its **Rated MW** output where the requirements of BC2.5.4 (c) part (ii) apply, or;
 - (ii) the MVar output of each **Genset** located **Offshore** should be 0MVar immediately prior to **De-Synchronisation** at the **Offshore Grid Entry Point**, other than in the case of a rapid unplanned **De-Synchronisation** or in the case of a **Genset** comprising of **Non-Synchronous Generating Units**, **Power Park Modules**, **HVDC Converters** or **DC Converters** which is operating at less than 20% of its **Rated MW** output and which has agreed an alternative **Reactive Power** capability range (for **GB Code Users**) under CC.6.3.2 (e) (iii) or ECC.6.3.2.4.4, ECC.6.3.2.5.1 and ECC.6.3.2.6.2 (for **EU Code Users**) where the requirements of BC2.5.4 (c) (ii) apply.
- (e) a **Generator** should at all times operate its **CCGT Units** in accordance with the applicable **CCGT Module Matrix**;
- (f) in the case of a **Range CCGT Module**, a **Generator** must operate that **CCGT Module** so that power is provided at the single **Grid Entry Point** identified in the data given pursuant to PC.A.3.2.1 or at the single **Grid Entry Point** to which **NGET** has agreed pursuant to BC1.4.2(f);
- (g) in the event of the **System Frequency** being above 50.3Hz or below 49.7Hz, **BM Participants** must not commence any reasonably avoidable action to regulate the input or output of any **BM Unit** in a manner that could cause the **System Frequency** to deviate further from 50Hz without first using reasonable endeavours to discuss the proposed actions with **NGET**. **NGET** shall either agree to these changes in input or output or issue a **Bid-Offer Acceptance** in accordance with BC2.7 to delay the change.
- (h) a **Generator** should at all times operate its **Power Park Units** in accordance with the applicable **Power Park Module Availability Matrix**.

BC2.5.5 Commencement Or Termination Of Participation In The Balancing Mechanism

BC2.5.5.1 In the event that a **BM Participant** in respect of a **BM Unit** with a **Demand Capacity** with a magnitude of less than 50MW in **NGET's Transmission Area** or less than 10MW in **SHETL's Transmission Area** or less than 30MW in **SPT's Transmission Area** or comprising **Generating Units** (as defined in the Glossary and Definitions and not limited by BC2.2) and/or **Power Generating Modules** and/or **CCGT Modules** and/or **Power Park Modules** at a **Small Power Station** notifies **NGET** at least 30 days in advance that from a specified **Operational Day** it will:

- (a) no longer submit **Bid-Offer Data** under BC1.4.2(d), then with effect from that **Operational Day** that **BM Participant** no longer has to meet the requirements of BC2.5.1 nor the requirements of CC.6.5.8(b) or ECC.6.5.8(b) (as applicable) in relation to that **BM Unit**. Also, with effect from that **Operational Day**, any defaulted **Physical Notification** and defaulted **Bid-Offer Data** in relation to that **BM Unit** arising from the **Data Validation, Consistency and Defaulting Rules** will be disregarded and the provisions of BC2.5.2 will not apply;
- (b) submit **Bid-Offer Data** under BC1.4.2(d), then with effect from that **Operational Day** that **BM Participant** will need to meet the requirements of BC2.5.1 and the requirements of CC.6.5.8(b) or ECC.6.5.8(b) (as applicable) in relation to that **BM Unit**.

BC2.5.5.2

In the event that a **BM Participant** in respect of a **BM Unit** with a **Demand Capacity** with a magnitude of 50MW or more in **NGET's Transmission Area** or 10MW or more in **SHETL's Transmission Area** or 30MW or more in **SPT's Transmission Area** or comprising **Generating Units** (as defined in the Glossary and Definitions and not limited by BC2.2) and/or **Power Generating Modules** and/or **CCGT Modules** and/or **Power Park Modules** at a **Medium Power Station** or **Large Power Station** notifies **NGET** at least 30 days in advance that from a specified **Operational Day** it will:

- (a) no longer submit **Bid-Offer Data** under BC1.4.2(d), then with effect from that **Operational Day** that **BM Participant** no longer has to meet the requirements of CC.6.5.8(b) or ECC.6.5.8(b) (as applicable) in relation to that **BM Unit**; Also, with effect from that **Operational Day**, any defaulted **Bid-Offer Data** in relation to that **BM Unit** arising from the **Data Validation, Consistency and Defaulting Rules** will be disregarded;
- (b) submit **Bid-Offer Data** under BC1.4.2(d), then with effect from that **Operational Day** that **BM Participant** will need to meet the requirements of CC.6.5.8(b) or ECC.6.5.8(b) (as applicable) in relation to that **BM Unit**.

BC2.6

COMMUNICATIONS

Electronic communications are always conducted in GMT. However, the input of data and display of information to **Users** and **NGET** and all other communications are conducted in London time.

BC2.6.1

Normal Communication With Control Points

- (a) With the exception of BC2.6.1(c) below, **Bid-Offer Acceptances** and, unless otherwise agreed with **NGET**, **Ancillary Service** instructions shall be given by automatic logging device and will be given to the **Control Point** for the **BM Unit**. For all **Planned Maintenance Outages** the provisions of BC2.6.5 will apply. For **Generating Units** (including **DC Connected Power Park Modules** (if relevant)) communications under **BC2** shall be by telephone unless otherwise agreed by **NGET** and the **User**.
- (b) **Bid-Offer Acceptances** and **Ancillary Service** instructions must be formally acknowledged immediately by the **BM Participant** (or the relevant person on its behalf) via the **Control Point** for the **BM Unit** or **Generating Unit** in respect of that **BM Unit** or that **Generating Unit**. The acknowledgement and subsequent confirmation or rejection, within two minutes of receipt, is normally given electronically by automatic logging device. If no confirmation or rejection is received by **NGET** within two minutes of the issue of the **Bid-Offer Acceptance**, then **NGET** will contact the **Control Point** for the **BM Unit** by telephone to determine the reason for the lack of confirmation or rejection. Any rejection must be given in accordance with BC2.7.3 or BC2.8.3.
- (c) In the event of a failure of the logging device or a **NGET** computer system outage, **Bid-Offer Acceptances** and instructions will be given, acknowledged, and confirmed or rejected by telephone. The provisions of BC2.9.7 are also applicable.
- (d) In the event that in carrying out the **Bid-Offer Acceptances** or providing the **Ancillary Services**, or when operating at the level of the **Final Physical Notification Data** as provided in BC2.5.1, an unforeseen problem arises, caused on safety grounds (relating to personnel or plant), **NGET** must be notified without delay by telephone.

- (e) The provisions of BC2.5.3 are also relevant.
- (f) Submissions of revised MVar capability may be made by facsimile transmission, using the format given in Appendix 3 to **BC2**.
- (g) Communication will normally be by telephone for any purpose other than **Bid-Offer Acceptances**, in relation to **Ancillary Services** or for revisions of MVar Data.
- (h) Submissions of revised availability of **Frequency Sensitive Mode** may be made by facsimile transmission, using the format given in Appendix 4 to **BC2**. This process should only be used for technical restrictions to the availability of **Frequency Sensitive Mode**.

BC2.6.2 Communication With Control Points In Emergency Circumstances

NGET will issue **Emergency Instructions** direct to the **Control Point** for each **BM Unit** [or **Generating Unit**] in **Great Britain**. **Emergency Instructions** to a **Control Point** will normally be given by telephone (and will include an exchange of operator names).

BC2.6.3 Communication With Network Operators In Emergency Circumstances

NGET will issue **Emergency Instructions** direct to the **Network Operator** at each **Control Centre** in relation to special actions and **Demand Control**. **Emergency Instructions** to a **Network Operator** will normally be given by telephone (and will include an exchange of operator names). **OC6** contains further provisions relating to **Demand Control** instructions.

BC2.6.4 Communication With Externally Interconnected System Operators In Emergency Circumstances

NGET will issue **Emergency Instructions** directly to the **Externally Interconnected System Operator** at each **Control Centre**. **Emergency Instructions** to an **Externally Interconnected System Operator** will normally be given by telephone (and will include an exchange of operator names).

BC2.6.5 Communications During Planned Outages Of Electronic Data Communication Facilities

Planned Maintenance Outages will normally be arranged to take place during periods of low data transfer activity. Upon any such **Planned Maintenance Outage** in relation to a post **Gate Closure** period:-

- (a) **BM Participants** should operate in relation to any period of time in accordance with the **Physical Notification** prevailing at **Gate Closure** current at the time of the start of the **Planned Maintenance Outage** in relation to each such period of time. Such operation shall be subject to the provisions of BC2.5.1, which will apply as if set out in this BC2.6.5. No further submissions of **BM Unit Data** (other than data specified in BC1.4.2(c) and BC1.4.2(e)) should be attempted or **Generating Unit Data**. Plant failure or similar problems causing significant deviation from **Physical Notification** should be notified to **NGET** by the submission of a revision to **Export and Import Limits** in relation to the **BM Unit** or **Generating Unit** so affected;
- (b) during the outage, revisions to the data specified in BC1.4.2(c) and BC1.4.2(e) may be submitted. Communication between **Users Control Points** and **NGET** during the outage will be conducted by telephone;
- (c) **NGET** will issue **Bid-Offer Acceptances** by telephone; and
- (d) no data will be transferred from **NGET** to the **BMRA** until the communication facilities are re-established.
- (e) The provisions of BC2.9.7 may also be relevant.

BC2.7 BID-OFFER ACCEPTANCES

BC2.7.1 Acceptance Of Bids And Offers By NGET

Bid-Offer Acceptances may be issued to the **Control Point** at any time following **Gate Closure**. Any **Bid-Offer Acceptance** will be consistent with the **Dynamic Parameters**, **QPNs**, **Export and Import Limits**, and **Joint BM Unit Data** of the **BM Unit** in so far as the **Balancing Mechanism** timescales will allow (see BC2.7.2).

- (a) **NGET** is entitled to assume that each **BM Unit** is available in accordance with the **BM Unit Data** submitted unless and until it is informed of any changes.
- (b) **Bid-Offer Acceptances** sent to the **Control Point** will specify the data necessary to define a MW profile to be provided (ramp rate break-points are not normally explicitly sent to the **Control Point**) and to be achieved consistent with the respective **BM Unit's Export and Import Limits**, **QPNs** and **Joint BM Unit Data** provided or modified under **BC1** or **BC2**, and **Dynamic Parameters** given under BC2.5.3 or, if agreed with the relevant **User**, such rate within those **Dynamic Parameters** as is specified by **NGET** in the **Bid-Offer Acceptances**.
- (c) All **Bid-Offer Acceptances** will be deemed to be at the current "**Target Frequency**", namely where a **Genset** is in **Frequency Sensitive Mode** they refer to target output at **Target Frequency**.
- (d) The form of and terms to be used by **NGET** in issuing **Bid-Offer Acceptances** together with their meanings are set out in Appendix 1 in the form of a non-exhaustive list of examples.

BC2.7.2

Consistency With Export And Import Limits, QPNs And Dynamic Parameters

- (a) **Bid-Offer Acceptances** will be consistent with the **Export and Import Limits**, **QPNs**, and **Joint BM Unit Data** provided or modified under **BC1** or **BC2** and the **Dynamic Parameters** provided or modified under **BC2**. **Bid-Offer Acceptances** may also recognise **Other Relevant Data** provided or modified under **BC1** or **BC2**
- (b) In the case of consistency with **Dynamic Parameters** this will be limited to the time until the end of the **Settlement Period** for which **Gate Closure** has most recently occurred. If **NGET** intends to issue a **Bid-Offer Acceptance** covering a period after the end of the **Settlement Period** for which **Gate Closure** has most recently occurred, based upon the then submitted **Dynamic Parameters**, **QPN's**, **Export and Import Limits**, **Bid-Offer Data** and **Joint BM Unit Data** applicable to that period, **NGET** will indicate this to the **BM Participant** at the **Control Point** for the **BM Unit**. The intention will then be reflected in the issue of a **Bid-Offer Acceptance** to return the **BM Unit** to its previously notified **Physical Notification** after the relevant **Gate Closure** provided the submitted data used to formulate this intention has not changed and subject to **System** conditions which may affect that intention. Subject to that, assumptions regarding **Bid-Offer Acceptances** may be made by **BM Participants** for **Settlement Periods** for which **Gate Closure** has not yet occurred when assessing consistency with **Dynamic Parameters** in **Settlement Periods** for which **Gate Closure** has occurred. If no such subsequent **Bid-Offer Acceptance** is issued, the original **Bid-Offer Acceptance** will include an instantaneous return to **Physical Notification** at the end of the **Balancing Mechanism** period.

BC2.7.3

Confirmation And Rejection Of Acceptances

Bid-Offer Acceptances may only be rejected by a **BM Participant** :

- (a) on safety grounds (relating to personnel or plant) as soon as reasonably possible and in any event within five minutes; or
- (b) because they are not consistent with the **Export and Import Limits**, **QPNs**, **Dynamic Parameters** or **Joint BM Unit Data** applicable at the time of issue of the **Bid-Offer Acceptance**.

A reason must always be given for rejection by telephone.

Where a **Bid-Offer Acceptance** is not confirmed within two minutes or is rejected, **NGET** will seek to contact the **Control Point** for the **BM Unit**. **NGET** must then, within 15 minutes of issuing the **Bid-Offer Acceptance**, withdraw the **Bid-Offer Acceptance** or log the **Bid-Offer Acceptance** as confirmed. **NGET** will only log a rejected **Bid-Offer Acceptance** as confirmed following discussion and if the reason given is, in **NGET's** reasonable opinion, not acceptable and **NGET** will inform the **BM Participant** accordingly.

BC2.7.4 Action Required From BM Participants

- (a) Each **BM Participant** in respect of its **BM Units** will comply in accordance with BC2.7.1 with all **Bid-Offer Acceptances** given by **NGET** with no more than the delay allowed for by the **Dynamic Parameters** unless the **BM Unit** has given notice to **NGET** under the provisions of BC2.7.3 regarding non-acceptance of a **Bid-Offer Acceptance**.
- (b) Where a **BM Unit's** input or output changes in accordance with a **Bid-Offer Acceptance** issued under BC2.7.1, such variation does not need to be notified to **NGET** in accordance with BC2.5.1.
- (c) In the event that while carrying out the **Bid-Offer Acceptance** an unforeseen problem arises caused by safety reasons (relating to personnel or plant), **NGET** must be notified immediately by telephone and this may lead to revision of **BM Unit Data** in accordance with BC2.5.3

BC2.7.5 Additional Action Required when responding to Bid-Offer Acceptances From Generators

- (a) When complying with **Bid-Offer Acceptances** for a **CCGT Module** a **Generator** will operate its **CCGT Units** in accordance with the applicable **CCGT Module Matrix**.
- (b) When complying with **Bid-Offer Acceptances** for a **CCGT Module** which is a **Range CCGT Module**, a **Generator** must operate that **CCGT Module** so that power is provided at the single **Grid Entry Point** identified in the data given pursuant to PC.A.3.2.1 or at the single **Grid Entry Point** to which **NGET** has agreed pursuant to BC1.4.2 (f).
- (c) On receiving a new MW **Bid-Offer Acceptance**, no tap changing shall be carried out to change the MVar output unless there is a new MVar **Ancillary Service** instruction issued pursuant to BC2.8.
- (d) When complying with **Bid-Offer Acceptances** for a **Power Park Module** a **Generator** will operate its **Power Park Units** in accordance with the applicable **Power Park Module Availability Matrix**.
- (e) When complying with **Bid-Offer Acceptances** for a **Synchronous Power Generating Module** a **Generator** will operate its **Generating Units** in accordance with the applicable **Synchronous Power Generating Module Availability Matrix**.
- (f) When complying with Bid-Offer Acceptances for an Additional BM Unit or Secondary BM Unit they will operate in accordance with the applicable Aggregator Impact Matrix.

BC2.8 ANCILLARY SERVICES

This section primarily covers the call-off of **System Ancillary Services**. The provisions relating to **Commercial Ancillary Services** will normally be covered in the relevant **Ancillary Services Agreement**.

BC2.8.1 Call-Off Of Ancillary Services By NGET

- (a) **Ancillary Service** instructions may be issued at any time.
- (b) **NGET** is entitled to assume that each **BM Unit** (or **Generating Unit**) is available in accordance with the **BM Unit Data** (or the **Generating Unit Data**) and data contained in the **Ancillary Services Agreement** unless and until it is informed of any changes.

- (c) **Frequency** control instructions may be issued in conjunction with, or separate from, a **Bid-Offer Acceptance**.
- (d) The form of and terms to be used by **NGET** in issuing **Ancillary Service** instructions together with their meanings are set out in Appendix 2 in the form of a non-exhaustive list of examples including **Reactive Power** and associated instructions.
- (e) In the case of **Generating Units** that do not form part of a **BM Unit** any change in **Active Power** as a result of, or required to enable, the provision of an **Ancillary Service** will be dealt with as part of that **Ancillary Service Agreement** and/or provisions under the **CUSC**.
- (f) A **System to Generator Operational Intertripping Scheme** will be armed in accordance with BC2.10.2(a).

BC2.8.2 Consistency With Export And Import Limits, QPNs And Dynamic Parameters

Ancillary Service instructions will be consistent with the **Export and Import Limits, QPNs**, and **Joint BM Unit Data** provided or modified under **BC1** or **BC2** and the **Dynamic Parameters** provided or modified under **BC2**. **Ancillary Service** instructions may also recognise **Other Relevant Data** provided or modified under **BC1** or **BC2**.

BC2.8.3 Rejection Of Ancillary Service Instructions

- (a) **Ancillary Service** instructions may only be rejected, by automatic logging device or by telephone, on safety grounds (relating to personnel or plant) or because they are not consistent with the applicable **Export and Import Limits, QPNs, Dynamic Parameters, Joint BM Unit Data, Other Relevant Data** or data contained in the **Ancillary Services Agreement** and a reason must be given immediately for non-acceptance.
- (b) The issue of **Ancillary Service** instructions for **Reactive Power** will be made with due regard to any resulting change in **Active Power** output. The instruction may be rejected if it conflicts with any **Bid-Offer Acceptance** issued in accordance with BC2.7 or with the **Physical Notification**.
- (c) Where **Ancillary Service** instructions relating to **Active Power** and **Reactive Power** are given together, and to achieve the **Reactive Power** output would cause the **BM Unit** to operate outside **Dynamic Parameters** as a result of the **Active Power** instruction being met at the same time, then the timescale of implementation of the **Reactive Power** instruction may be extended to be no longer than the timescale for implementing the **Active Power** instruction but in any case to achieve the MVAR **Ancillary Service** instruction as soon as possible.

BC2.8.4 Action Required From BM Units

- (a) Each **BM Unit** (or **Generating Unit**) will comply in accordance with BC2.8.1 with all **Ancillary Service** instructions relating to **Reactive Power** properly given by **NGET** within 2 minutes or such longer period as **NGET** may instruct, and all other **Ancillary Service** instructions without delay, unless the **BM Unit** or **Generating Unit** has given notice to **NGET** under the provisions of BC2.8.3 regarding non-acceptance of **Ancillary Service** instructions.
- (b) Each **BM Unit** may deviate from the profile of its **Final Physical Notification Data**, as modified by any **Bid-Offer Acceptances** issued in accordance with BC2.7.1, only as a result of responding to **Frequency** deviations when operating in **Frequency Sensitive Mode** in accordance with the **Ancillary Services Agreement**.
- (c) Each **Generating Unit** that does not form part of a **BM Unit** may deviate from the profile of its **Final Physical Notification Data** where agreed by **NGET** and the **User**, including but not limited to, as a result of providing an **Ancillary Service** in accordance with the **Ancillary Service Agreement**.

- (d) In the event that while carrying out the **Ancillary Service** instructions an unforeseen problem arises caused by safety reasons (relating to personnel or plant), **NGET** must be notified immediately by telephone and this may lead to revision of **BM Unit Data** or **Generating Unit Data** in accordance with BC2.5.3.

BC2.8.5 Reactive Despatch Network Restrictions

Where **NGET** has received notification pursuant to the Grid Code that a **Reactive Despatch to Zero MVar Network Restriction** is in place with respect to any **Embedded Power Generating Module** and/or **Embedded Generating Unit** and/or **Embedded Power Park Module** or **HVDC Converter** at an **Embedded HVDC Converter Station** or **DC Converter** at an **Embedded DC Converter Station**, then **NGET** will not issue any **Reactive Despatch Instruction** with respect to that **Power Generating Module** and/or **Generating Unit** and/or **Power Park Module** or **DC Converter** or **HVDC Converter** until such time as notification is given to **NGET** pursuant to the Grid Code that such **Reactive Despatch to Zero MVar Network Restriction** is no longer affecting that **Power Generating Module** and/or **Generating Unit** and/or **Power Park Module** or **DC Converter** or **HVDC Converter**.

BC2.9 EMERGENCY CIRCUMSTANCES

BC2.9.1 Emergency Actions

BC2.9.1.1 In certain circumstances (as determined by **NGET** in its reasonable opinion) it will be necessary, in order to preserve the integrity of the **National Electricity Transmission System** and any synchronously connected **External System**, for **NGET** to issue **Emergency Instructions**. In such circumstances, it may be necessary to depart from normal **Balancing Mechanism** operation in accordance with BC2.7 in issuing **Bid-Offer Acceptances**. **BM Participants** must also comply with the requirements of **BC3**.

BC2.9.1.2 Examples of circumstances that may require the issue of **Emergency Instructions** include:-

- (a) **Events** on the **National Electricity Transmission System** or the **System** of another **User**; or
- (b) the need to maintain adequate **System** and **Localised NRAPM** in accordance with BC2.9.4 below; or
- (c) the need to maintain adequate frequency sensitive **Gensets** in accordance with BC2.9.5 below; or
- (d) the need to implement **Demand Control** in accordance with OC6; or
- (e) (i) the need to invoke the **Black Start** process or the **Re-Synchronisation of De-Synchronised Island** process in accordance with OC9; or
- (ii) the need to request provision of a **Maximum Generation Service**; or
- (iii) the need to issue an **Emergency Deenergisation Instruction** in circumstances where the condition or manner of operation of any **Transmission Plant** and/or **Apparatus** is such that it may cause damage or injury to any person or to the **National Electricity Transmission System**.

BC2.9.1.3 In the case of **BM Units** and **Generating Units** in **Great Britain**, **Emergency Instructions** will be issued by **NGET** direct to the **User** at the **Control Point** for the **BM Unit** or **Generating Unit** and may require an action or response which is outside its **Other Relevant Data**, **QPNs**, or **Export and Import Limits** submitted under **BC1**, or revised under **BC1** or **BC2**, or **Dynamic Parameters** submitted or revised under **BC2**.

BC2.9.1.4 In the case of a **Network Operator** or an **Externally Interconnected System Operator**, **Emergency Instructions** will be issued to its **Control Centre**.

BC2.9.2 Implementation Of Emergency Instructions

BC2.9.2.1 **Users** will respond to **Emergency Instructions** issued by **NGET** without delay and using all reasonable endeavours to so respond. **Emergency Instructions** may only be rejected by an **User** on safety grounds (relating to personnel or plant) and this must be notified to **NGET** immediately by telephone.

- BC2.9.2.2 **Emergency Instructions** will always be prefixed with the words “This is an **Emergency Instruction**” except in the case of:
- (i) **Maximum Generation Service** instructed by electronic data communication facilities where the instruction will be issued in accordance with the provisions of the **Maximum Generation Service Agreement**; and
 - (ii) an **Emergency Deenergisation Instruction**, where the **Emergency Deenergisation Instruction** will be pre-fixed with the words ‘This is an **Emergency Deenergisation Instruction**’; and
 - (iii) during a **Black Start** situation where the **Balancing Mechanism** has been suspended, any instruction given by **NGET** will (unless **NGET** specifies otherwise) be deemed to be an **Emergency Instruction** and need not be pre-fixed with the words ‘This is an **Emergency Instruction**’; and
 - (iv) during a **Black Start** situation where the **Balancing Mechanism** has not been suspended, any instruction in relation to **Black Start Stations** and to **Network Operators** which are part of an invoked **Local Joint Restoration Plan** will (unless **NGET** specifies otherwise) be deemed to be an **Emergency Instruction** and need not be prefixed with the words ‘This is an **Emergency Instruction**’.
- In Scotland, any instruction in relation to **Gensets** that are not at **Black Start Stations**, but which are part of an invoked **Local Joint Restoration Plan** and are instructed in accordance with the provisions of that **Local Joint Restoration Plan**, will be deemed to be an **Emergency Instruction** and need not be prefixed with the words ‘This is an **Emergency Instruction**’.
- BC2.9.2.3 In all cases under this BC2.9 except BC2.9.1.2 (e) where **NGET** issues an **Emergency Instruction** to a **BM Participant** which is not rejected under BC2.9.2.1, the **Emergency Instruction** shall be treated as a **Bid-Offer Acceptance**. For the avoidance of doubt, any **Emergency Instruction** issued to a **Network Operator** or to an **Externally Interconnected System Operator** or in respect of a **Generating Unit** that does not form part of a **BM Unit**, will not be treated as a **Bid-Offer Acceptance**.
- BC2.9.2.4 In the case of BC2.9.1.2 (e) (ii) where **NGET** issues an **Emergency Instruction** pursuant to a **Maximum Generation Service Agreement** payment will be dealt with in accordance with the **CUSC** and the **Maximum Generation Service Agreement**.
- BC2.9.2.5 In the case of BC2.9.1.2 (e) (iii) where **NGET** issues an **Emergency Deenergisation Instruction** payment will be dealt with in accordance with the **CUSC**, Section 5.
- BC2.9.2.6 In the of BC2.9.1.2 (e) (i) upon receipt of an **Emergency Instruction** by a **Generator** during a **Black Start** the provisions of Section G of the **BSC** relating to compensation shall apply.
- BC2.9.3 Examples Of Emergency Instructions
- BC2.9.3.1 In the case of a **BM Unit** or a **Generating Unit**, **Emergency Instructions** may include an instruction for the **BM Unit** or the **Generating Unit** to operate in a way that is not consistent with the **Dynamic Parameters**, **QPNs** and/or **Export and Import Limits**.
- BC2.9.3.2 In the case of a **Generator**, **Emergency Instructions** may include:
- (a) an instruction to trip one or more **Gensets** (excluding **Operational Intertipping**); or
 - (b) an instruction to trip **Mills** or to **Part Load** a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC2.2); or
 - (c) an instruction to **Part Load** a **Power Generating Module** and/or **CCGT Module** or **Power Park Module**; or
 - (d) an instruction for the operation of **CCGT Units** within a **CCGT Module** (on the basis of the information contained within the **CCGT Module Matrix**) when emergency circumstances prevail (as determined by **NGET** in **NGET's** reasonable opinion); or
 - (e) an instruction to generate outside normal parameters, as allowed for in 4.2 of the **CUSC**; or

- (f) an instruction for the operation of **Generating Units** within a **Cascade Hydro Scheme** (on the basis of the additional information supplied in relation to individual **Generating Units**) when emergency circumstances prevail (as determined by **NGET** in **NGET's** reasonable opinion); or
- (g) an instruction for the operation of a **Power Park Module** (on the basis of the information contained within the **Power Park Module Availability Matrix**) when emergency circumstances prevail (as determined by **NGET** in **NGET's** reasonable opinion).

BC2.9.3.3 Instructions to **Network Operators** relating to the **Operational Day** may include:

- (a) a requirement for **Demand** reduction and disconnection or restoration pursuant to **OC6**;
- (b) an instruction to effect a load transfer between **Grid Supply Points**;
- (c) an instruction to switch in a **System to Demand Intertrip Scheme**;
- (d) an instruction to split a network;
- (e) an instruction to disconnect an item of **Plant** or **Apparatus** from the **System**.

BC2.9.4 Maintaining Adequate System And Localised NRAPM (Negative Reserve Active Power Margin)

BC2.9.4.1 Where **NGET** is unable to satisfy the required **System NRAPM** or **Localised NRAPM** by following the process described in BC1.5.5, **NGET** will issue an **Emergency Instruction** to exporting **BM Units** for **De-Synchronising** on the basis of **Bid-Offer Data** submitted to **NGET** in accordance with BC1.4.2(d).

BC2.9.4.2 In the event that **NGET** is unable to differentiate between exporting **BM Units** according to **Bid-Offer Data**, **NGET** will instruct a **BM Participant** to **Shutdown** a specified exporting **BM Unit** for such period based upon the following factors:

- (a) effect on power flows (resulting in the minimisation of transmission losses);
- (b) reserve capability;
- (c) **Reactive Power** worth;
- (d) **Dynamic Parameters**;
- (e) in the case of **Localised NRAPM**, effectiveness of output reduction in the management of the **System Constraint**.

BC2.9.4.3 Where **NGET** is still unable to differentiate between exporting **BM Units**, having considered all the foregoing, **NGET** will decide which exporting **BM Unit** to **Shutdown** by the application of a quota for each **BM Participant** in the ratio of each **BM Participant's Physical Notifications**.

BC2.9.4.4 Other than as provided in BC2.9.4.5 and BC2.9.4.6 below, in determining which exporting **BM Units** to **De-Synchronise** under this BC2.9.4, **NGET** shall not consider in such determination (and accordingly shall not instruct to **De-Synchronise**) any **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC2.2) within an **Existing Gas Cooled Reactor Plant**.

BC2.9.4.5 **NGET** shall be permitted to instruct a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC2.2) within an **Existing AGR Plant** to **De-Synchronise** if the relevant **Generating Unit** within the **Existing AGR Plant** has failed to offer to be flexible for the relevant instance at the request of **NGET** within the **Existing AGR Plant Flexibility Limit**.

BC2.9.4.6 Notwithstanding the provisions of BC2.9.4.5 above, if the level of **System NRAPM** (taken together with **System** constraints) or **Localised NRAPM** is such that it is not possible to avoid instructing a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC2.2) within an **Existing Magnox Reactor Plant** and/or an **Existing AGR Plant** whether or not it has met requests within the **Existing AGR Flexibility Limit** to **De-Synchronise NGET** may, provided the power flow across each **External Interconnection** is either at zero or results in an export of power from the **Total System**, so instruct a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC2.2) within an **Existing Magnox Reactor Plant** and/or an **Existing AGR Plant** to **De-Synchronise** in the case of **System NRAPM**, in all cases and in the case of **Localised NRAPM**, when the power flow would have a relevant effect.

BC2.9.4.7 When instructing exporting **BM Units** which form part of an **On-Site Generator Site** to reduce generation under this BC2.9.4, **NGET** will not issue an instruction which would reduce generation below the reasonably anticipated **Demand** of the **On-Site Generator Site**. For the avoidance of doubt, it should be noted that the term “**On-Site Generator Site**” only relates to Trading Units which have fulfilled the Class 1 or Class 2 requirements.

BC2.9.5 Maintaining Adequate Frequency Sensitive Generation

BC2.9.5.1 If, post **Gate Closure**, **NGET** determines, in its reasonable opinion, from the information then available to it (including information relating to a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC2.2) breakdown) that the number of and level of **Primary**, **Secondary** and **High Frequency Response** available from **Gensets** (other than those units within **Existing Gas Cooled Reactor Plant**, which are permitted to operate in **Limited Frequency Sensitive Mode** at all times under BC3.5.3) available to operate in **Frequency Sensitive Mode** is such that it is not possible to avoid **De-Synchronising Existing Gas Cooled Reactor Plant** then provided that:

- (a) there are (or, as the case may be, that **NGET** anticipates, in its reasonable opinion, that at the time that the instruction is to take effect there will be) no other **Gensets** generating and exporting on to the **Total System** which are not operating in **Frequency Sensitive Mode** (or which are operating with only a nominal amount in terms of level and duration) (unless, in **NGET's** reasonable opinion, necessary to assist the relief of **System** constraints or necessary as a result of other **System** conditions); and
- (b) the power flow across each **External Interconnection** is (or, as the case may be, is anticipated to be at the time that the instruction is to take effect) either at zero or result in an export of power from the **Total System**,

then **NGET** may instruct such of the **Existing Gas Cooled Reactor Plant** to **De-Synchronise** as it is, in **NGET's** reasonable opinion, necessary to **De-Synchronise** and for the period for which the **De-Synchronising** is, in **NGET's** reasonable opinion, necessary.

BC2.9.5.2 If in **NGET's** reasonable opinion it is necessary for both the procedure in BC2.9.4 and that set out in BC2.9.5.1 to be followed in any given situation, the procedure in BC2.9.4 will be followed first, and then the procedure set out in BC2.9.5.1. For the avoidance of doubt, nothing in this sub-paragraph shall prevent either procedure from being followed separately and independently of the other.

BC2.9.6

Emergency Assistance To And From External Systems

- (a) An **Externally Interconnected System Operator** (in its role as operator of the **External System**) may request that **NGET** takes any available action to increase the **Active Energy** transferred into its **External System**, or reduce the **Active Energy** transferred into the **National Electricity Transmission System** by way of emergency assistance if the alternative is to instruct a demand reduction on all or part of its **External System** (or on the system of an **Interconnector User** using its **External System**). Such request must be met by **NGET** providing this does not require a reduction of **Demand** on the **National Electricity Transmission System**, or lead to a reduction in security on the **National Electricity Transmission System**.
- (b) **NGET** may request that an **Externally Interconnected System Operator** takes any available action to increase the **Active Energy** transferred into the **National Electricity Transmission System**, or reduce the **Active Energy** transferred into its **External System** by way of emergency assistance if the alternative is to instruct a **Demand** reduction on all or part of the **National Electricity Transmission System**. Such request must be met by the **Externally Interconnected System Operator** providing this does not require a reduction of **Demand** on its **External System** (or on the system of **Interconnector Users** using its **External System**), or lead to a reduction in security on such **External System** or system.

BC2.9.7

Unplanned Outages Of Electronic Communication And Computing Facilities

BC2.9.7.1

In the event of an unplanned outage of the electronic data communication facilities or of **NGET's** associated computing facilities or in the event of a **Planned Maintenance Outage** lasting longer than the planned duration, in relation to a post-**Gate Closure** period **NGET** will, as soon as it is reasonably able to do so, issue a **NGET** Computing System Failure notification by telephone or such other means agreed between **Users** and **NGET** indicating the likely duration of the outage.

BC2.9.7.2

During the period of any such outage, the following provisions will apply:

- (a) **NGET** will issue further **NGET** Computing System Failure notifications by telephone or such other means agreed between **Users** and **NGET** to all **BM Participants** to provide updates on the likely duration of the outage;
- (b) **BM Participants** should operate in relation to any period of time in accordance with the **Physical Notification** prevailing at **Gate Closure** current at the time of the computer system failure in relation to each such period of time. Such operation shall be subject to the provisions of BC2.5.1, which will apply as if set out in this BC2.9.7.2. No further submissions of **BM Unit Data** or **Generating Unit Data** (other than data specified in BC1.4.2(c) (**Export and Import Limits**) and BC1.4.2(e) (**Dynamic Parameters**)) should be attempted. Plant failure or similar problems causing significant deviation from **Physical Notification** should be notified to **NGET** by telephone by the submission of a revision to **Export and Import Limits** in relation to the **BM Unit** or **Generating Unit Data** so affected;
- (c) Revisions to **Export and Import Limits** and to **Dynamic Parameters** should be notified to **NGET** by telephone and will be recorded for subsequent use;
- (d) **NGET** will issue **Bid-Offer Acceptances** by telephone which will be recorded for subsequent use;
- (e) No data will be transferred from **NGET** to the **BMRA** until the communication facilities are re-established.

BC2.9.7.3

NGET will advise **BM Participants** of the withdrawal of the **NGET** Computing System Failure notification following the re-establishment of the communication facilities.

- BC2.10 OTHER OPERATIONAL INSTRUCTIONS AND NOTIFICATIONS
- BC2.10.1 **NGET** may, from time to time, need to issue other instructions or notifications associated with the operation of the **National Electricity Transmission System**.
- BC2.10.2 Such instructions or notifications may include:
- Intertrips
- (a) an instruction to arm or disarm an **Operational Intertripping** scheme;
- Tap Positions
- (b) a request for a **Genset** step-up transformer tap position (for security assessment);
- Tests
- (c) an instruction to carry out tests as required under **OC5**, which may include the issue of an instruction regarding the operation of **CCGT Units** within a **CCGT Module** at a **Large Power Station**;
- Future BM Unit Requirements
- (d) a reference to any implications for future **BM Unit** requirements and the security of the **National Electricity Transmission System**, including arrangements for change in output to meet post fault security requirements;
- Changes to Target Frequency
- (e) a notification of a change in **Target Frequency**, which will normally only be 49.95, 50.00, or 50.05Hz but in exceptional circumstances as determined by **NGET** in its reasonable opinion, may be 49.90 or 50.10Hz.
- BC2.10.3 Where an instruction or notification under BC2.10.2 (c) or (d) results in a change to the input or output level of the **BM Unit** then **NGET** shall issue a **Bid-Offer Acceptance** or **Emergency Instruction** as appropriate.
- BC2.11 LIAISON WITH GENERATORS FOR RISK OF TRIP AND AVR TESTING
- BC2.11.1 A **Generator** at the **Control Point** for any of its **Large Power Stations** may request **NGET's** agreement for one of the **Gensets** at that **Power Station** to be operated under a risk of trip. **NGET's** agreement will be dependent on the risk to the **National Electricity Transmission System** that a trip of the **Genset** would constitute.
- BC2.11.2 (a) Each **Generator** at the **Control Point** for any of its **Large Power Stations** will operate its **Synchronised Gensets** (excluding **Power Park Modules**) with:
- (i) **AVRs** in constant terminal voltage mode with VAR limiters in service at all times. **AVR** constant **Reactive Power** or **Power Factor** mode should, if installed, be disabled; and
- (ii) its generator step-up transformer tap changer selected to manual mode, unless released from this obligation in respect of a particular **Genset** by **NGET**.
- (b) Each **Generator** at the **Control Point** for any of its **Large Power Stations** will operate its **Power Park Modules** with a **Completion Date** before 1st January 2006 at unity power factor at the **Grid Entry Point** (or **User System Entry Point** if **Embedded**).
- (c) Each **Generator** at the **Control Point** for any of its **Large Power Stations** will operate its **Power Park Modules** with a **Completion Date** on or after 1st January 2006 in voltage control mode at the **Grid Entry Point** (or **User System Entry Point** if **Embedded**). Constant **Reactive Power** or **Power Factor** mode should, if installed, be disabled.

- (d) Where a **Power System Stabiliser** is fitted as part of the excitation system or voltage control system of a **Genset**, it requires on-load commissioning which must be witnessed by **NGET**. Only when the performance of the **Power System Stabiliser** has been approved by **NGET** shall it be switched into service by a **Generator** and then it will be kept in service at all times unless otherwise agreed with **NGET**. Further reference is made to this in CC.6.3.8.

BC2.11.3 A **Generator** at the **Control Point** for any of its **Power Stations** may request **NGET's** agreement for one of its **Gensets** at that **Power Station** to be operated with the **AVR** in manual mode, or **Power System Stabiliser** switched out, or VAR limiter switched out. **NGET's** agreement will be dependent on the risk that would be imposed on the **National Electricity Transmission System** and any **User System**. Provided that in any event a **Generator** may take such action as is reasonably necessary on safety grounds (relating to personnel or plant) .

BC2.11.4 Each **Generator** shall operate its dynamically controlled **OTSDUW Plant and Apparatus** to ensure that the reactive capability and voltage control performance requirements as specified in CC.6.3.2, CC.6.3.8, CC.A.7 or ECC.6.3.2, ECC.6.3.8, ECC.A.7, ECC.A.8 and the **Bilateral Agreement** can be satisfied in response to the Setpoint Voltage and Slope as instructed by **NGET** at the **Transmission Interface Point**.

BC2.12 LIAISON WITH EXTERNALLY INTERCONNECTED SYSTEM OPERATORS

BC2.12.1 Co-Ordination Role Of Externally Interconnected System Operators

- (a) The **Externally Interconnected System Operator** will act as the **Control Point** for **Bid-Offer Acceptances** on behalf of **Interconnector Users** and will co-ordinate instructions relating to **Ancillary Services** and **Emergency Instructions** on behalf of **Interconnector Users** using its **External System** in respect of each **Interconnector Users BM Units**.
- (b) **NGET** will issue **Bid-Offer Acceptances** and instructions for **Ancillary Services** relating to **Interconnector Users BM Units** to each **Externally Interconnected System Operator** in respect of each **Interconnector User** using its **External System**.
- (c) If, as a result of a reduction in the capability (in MW) of the **External Interconnection**, the total of the **Physical Notifications** and **Bid-Offer Acceptances** issued for the relevant period using that **External Interconnection**, as stated in the **BM Unit Data** exceeds the reduced capability (in MW) of the respective **External Interconnection** in that period then **NGET** shall notify the **Externally Interconnected System Operator** accordingly. The **Externally Interconnected System Operator** should seek a revision of **Export and Import Limits** from one or more of its **Interconnector Users** for the remainder of the **Balancing Mechanism** period during which **Physical Notifications** cannot be revised.

APPENDIX 1 - FORM OF BID-OFFER ACCEPTANCES

- BC2.A.1.1 This Appendix describes the forms of **Bid-Offer Acceptances**. As described in BC2.6.1 **Bid-Offer Acceptances** are normally given by an automatic logging device, but in the event of failure of the logging device, **Bid-Offer Acceptances** will be given by telephone.
- BC2.A.1.2 For each **BM Unit** the **Bid-Offer Acceptance** will consist of a series of MW figures and associated times.
- BC2.A.1.3 The **Bid-Offer Acceptances** relating to **CCGT Modules** will assume that the **CCGT Units** within the **CCGT Module** will operate in accordance with the **CCGT Module Matrix**, as required by **BC1**. The **Bid-Offer Acceptances** relating to **Cascade Hydro Schemes** will assume that the **Generating Unit** forming part of the **Cascade Hydro Scheme** will operate, where submitted, in accordance with the **Cascade Hydro Scheme Matrix** submitted under **BC1**. The **Bid-Offer Acceptances** relating to **Synchronous Power Generating Modules** will assume that the **Synchronous Generating Units** within the **Synchronous Power Generating Module** will operate in accordance with the **Synchronous Power Generating Module Matrix**, as required by **BC1**.
- BC2.A.1.4 Bid-Offer Acceptances Given By Automatic Logging Device
- (a) The complete form of the **Bid-Offer Acceptance** is given in the EDL Message Interface Specification which can be made available to **Users** on request.
- (b) **Bid-Offer Acceptances** will normally follow the form:
- (i) **BM Unit Name**
 - (ii) Instruction Reference Number
 - (iii) Time of instruction
 - (iv) Type of instruction
 - (v) **BM Unit Bid-Offer Acceptance** number
 - (vi) Number of MW/Time points making up instruction (minimum 2, maximum 5)
 - (vii) MW value and Time value for each point identified in (vi)
- The times required in the instruction are input and displayed in London time, but communicated electronically in GMT.
- BC2.A.1.5 Bid-Offer Acceptances Given By Telephone
- (a) All run-up/run-down rates will be assumed to be constant and consistent with **Dynamic Parameters**. Each **Bid-Offer Acceptance** will, wherever possible, be kept simple, drawing as necessary from the following forms and BC2.7
- (b) **Bid-Offer Acceptances** given by telephone will normally follow the form:
- (i) an exchange of operator names;
 - (ii) **BM Unit Name**;
 - (iii) Time of instruction;
 - (iv) Type of instruction;
 - (v) Number of MW/Time points making up instruction (minimum 2, maximum 5)
 - (vi) MW value and Time value for each point identified in (v)
- The times required in the instruction are expressed in London time.

For example, for a **BM Unit** ABCD-1 acceptance logged with a start time at 1400 hours and with a FPN at 300MW:

“BM Unit ABCD-1 Bid-Offer Acceptance timed at 1400 hours. Acceptance consists of 4 MW/Time points as follows:

300MW at 1400 hours

400MW at 1415 hours

400MW at 1450 hours

300MW at 1500 hours”

BC2.A.1.6 Submission Of Bid-Offer Acceptance Data To The Bmra

The relevant information contained in **Bid-Offer Acceptances** issued by **NGET** will be converted into “from” and “to” MW levels and times before they are submitted to the **BMRA** by **NGET**.

APPENDIX 2 - TYPE AND FORM OF ANCILLARY SERVICE INSTRUCTIONS

BC2.A.2.1 This part of the Appendix consists of a non-exhaustive list of the forms and types of instruction for a **Genset** to provide **System Ancillary Services**. There may be other types of **Commercial Ancillary Services** and these will be covered in the relevant **Ancillary Services Agreement**. In respect of the provision of **Ancillary Services** by **Generating Units** the forms and types of instruction will be in the form of this Appendix 2 unless amended in the **Ancillary Services Agreement**.

As described in CC.8, **System Ancillary Services** consist of Part 1 and Part 2 **System Ancillary Services**.

Part 1 System Ancillary Services Comprise:

- (a) **Reactive Power** supplied other than by means of synchronous or static compensators. This is required to ensure that a satisfactory **System** voltage profile is maintained and that sufficient **Reactive Power** reserves are maintained under normal and fault conditions. **Ancillary Service** instructions in relation to **Reactive Power** may include:
 - (i) MVar Output
 - (ii) Target Voltage Levels
 - (iii) Tap Changes
 - (iv) Maximum MVar Output ('maximum excitation')
 - (v) Maximum MVar Absorption ('minimum excitation')
- (b) **Frequency** Control by means of **Frequency** sensitive generation. **Gensets** may be required to move to or from **Frequency Sensitive Mode** in the combinations agreed in the relevant **Ancillary Services Agreement**. They will be specifically requested to operate so as to provide **Primary Response** and/or **Secondary Response** and/or **High Frequency Response**.

Part 2 System Ancillary Services Comprise:

- (c) **Frequency** Control by means of **Fast Start**.
- (d) **Black Start Capability**
- (e) **System to Generator Operational Intertripping**

BC2.A.2.2 As **Ancillary Service** instructions are not part of **Bid-Offer Acceptances** they do not need to be closed instructions and can cover any period of time, not just limited to the period of the **Balancing Mechanism**.

BC2.A.2.3 As described in BC2.6.1, unless otherwise agreed with **NGET**, **Ancillary Service** instructions are normally given by automatic logging device, but in the absence of, or in the event of failure of the logging device, instructions will be given by telephone.

BC2.A.2.4 Instructions Given By Automatic Logging Device

- (a) The complete form of the **Ancillary Service** instruction is given in the EDL Message Interface Specification which is available to **Users** on request from **NGET**.
- (b) **Ancillary Service** instructions for **Frequency** Control will normally follow the form:
 - (i) **BM Unit Name**
 - (ii) Instruction Reference Number
 - (iii) Time of instruction
 - (iv) Type of instruction (REAS)
 - (v) Reason Code
 - (vi) Start Time
- (c) **Ancillary Service** instructions for **Reactive Power** will normally follow the form:

- (i) **BM Unit** Name
- (ii) Instruction Reference Number
- (iii) Time of instruction
- (iv) Type of instruction (MVAR, VOLT or TAPP)
- (v) Target Value
- (vi) Target Time

The times required in the instruction are input and displayed in London time, but communicated electronically in GMT.

BC2.A.2.5

Instructions Given By Telephone

(a) **Ancillary Service** instructions for **Frequency** Control will normally follow the form:

- (i) an exchange of operator names;
- (ii) **BM Unit** Name;
- (iii) Time of instruction;
- (iv) Type of instruction;
- (v) Start Time.

The times required in the instruction are expressed in London time.

For example, for **BM Unit** ABCD-1 instructed at 1400 hours to provide **Primary** and **High Frequency** response starting at 1415 hours:

"BM Unit ABCD-1 message timed at 1400 hours. Unit to **Primary and High Frequency Response** at 1415 hours"

(b) **Ancillary Service** instructions for **Reactive Power** will normally follow the form:

- (a) an exchange of operator names;
- (b) **BM Unit** Name;
- (c) Time of instruction;
- (d) Type of instruction (MVAR, VOLT, SETPOINT, **SLOPE** or TAPP)
- (e) Target Value
- (f) Target Time.

The times required in the instruction are expressed as London time.

For example, for **BM Unit** ABCD-1 instructed at 1400 hours to provide 100MVAR by 1415 hours:

"BM Unit ABCD-1 message timed at 1400 hours. MVAR instruction. Unit to plus 100 MVAR target time 1415 hours."

BC2.A.2.6 Reactive Power

As described in BC2.A.2.4 and BC2.A.2.5 instructions for **Ancillary Services** relating to **Reactive Power** may consist of any of several specific types of instruction. The following table describes these instructions in more detail:

Instruction Name	Description	Type of Instruction
MVAr Output	<p>The individual MVAr output from the Genset onto the National Electricity Transmission System at the Grid Entry Point (or onto the User System at the User System Entry Point in the case of Embedded Power Stations), namely on the higher voltage side of the generator step-up transformer or Grid Entry Point or User System Entry Point in the case of a Power Generating Module. In relation to each Genset, where there is no HV indication, NGET and the Generator will discuss and agree equivalent MVAr levels for the corresponding LV indication.</p> <p>Where a Genset is instructed to a specific MVAr output, the Generator must achieve that output within a tolerance of +/-25 MVAr (for Gensets in England and Wales) or the lesser of +/-5% of rated output or 25MVAr (for Gensets in Scotland) (or such other figure as may be agreed with NGET) by tap changing on the generator step-up transformer, or adjusting the Genset terminal voltage, subject to compliance with CC.6.3.8 (a) (v), or ECC.6.3.8.3.3 (as applicable) to a value that is equal to or higher than 1.0p.u. of the rated terminal voltage, or a combination of both. Once this has been achieved, the Generator will not tap again and will not readjust the Genset terminal voltage without prior consultation with and the agreement of NGET, on the basis that MVAr output will be allowed to vary with System conditions.</p>	MVAr

Instruction Name	Description	Type of Instruction
Target Voltage Levels	<p>Target voltage levels to be achieved by the Genset on the National Electricity Transmission System at the Grid Entry Point (or on the User System at the User System Entry Point in the case of Embedded Power Stations, namely on the higher voltage side of the generator step-up transformer or Grid Entry Point or User System Entry Point in the case of a Power Generating Module. Where a Genset is instructed to a specific target voltage, the Generator must achieve that target within a tolerance of ± 1 kV (or such other figure as may be agreed with NGET) by tap changing on the generator step-up transformer, or adjusting the Genset terminal voltage, subject to compliance with CC.6.3.8 (a) (v) or ECC.6.3.8.3.3 (as applicable), to a value that is equal to or higher than 1.0p.u. of the rated terminal voltage, or a combination of both. In relation to each Genset, where there is no HV indication, NGET and the Generator will discuss and agree equivalent voltage levels for the corresponding LV indication.</p> <p>Under normal operating conditions, once this target voltage level has been achieved the Generator will not tap again and will not readjust the Genset terminal voltage without prior consultation with, and with the agreement of, NGET.</p> <p>However, under certain circumstances the Generator may be instructed to maintain a target voltage until otherwise instructed and this will be achieved by tap changing on the generator step-up transformer, or adjusting the Genset terminal voltage, subject to compliance with CC.6.3.8 (a) (v) or ECC.6.3.8.3.3 (as applicable), to a value that is equal to or higher than 1.0p.u. of the rated terminal voltage, or a combination of both without reference to NGET.</p>	VOLT
Setpoint Voltage	<p>Where a Non-Synchronous Generating Unit, DC Converter or Power Park Module or HVDC Converter is instructed to a specific Setpoint Voltage, the Generator must achieve that Setpoint Voltage within a tolerance of $\pm 0.25\%$ (or such other figure as may be agreed with NGET).</p> <p>The Generator must maintain the specified Setpoint Voltage target until an alternative target is received from NGET.</p>	SETPPOINT

Instruction Name	Description	Type of Instruction
Slope	<p>Where a Non-Synchronous Generating Unit, DC Converter or Power Park Module or HVDC Converter is instructed to a specific Slope, the Generator must achieve that Slope within a tolerance of $\pm 0.5\%$ (or such other figure as may be agreed with NGET).</p> <p>The Generator must maintain the specified Slope target until an alternative target is received from NGET.</p> <p>The Generator will not be required to implement a new Slope setting in a time of less than 1 week from the time of the instruction.</p>	SLOPE
Tap Changes	<p>Details of the required generator step-up transformer tap changes in relation to a Genset. The instruction for tap changes may be a Simultaneous Tap Change instruction, whereby the tap change must be effected by the Generator in response to an instruction from NGET issued simultaneously to relevant Power Stations. The instruction, which is normally preceded by advance notice, must be effected as soon as possible, and in any event within one minute of receipt from NGET of the instruction.</p> <p>For a Simultaneous Tap Change, change Genset generator step-up transformer tap position by one [two] taps to raise or lower (as relevant) System voltage, to be executed at time of instruction.</p>	TAPP
Maximum MVar Output ("maximum excitation")	Under certain conditions, such as low System voltage, an instruction to maximum MVar output at instructed MW output ("maximum excitation") may be given, and a Generator should take appropriate actions to maximise MVar output unless constrained by plant operational limits or safety grounds (relating to personnel or plant).	
Maximum MVar Absorption ("minimum excitation")	Under certain conditions, such as high System voltage, an instruction to maximum MVar absorption at instructed MW output ("minimum excitation") may be given, and a Generator should take appropriate actions to maximise MVar absorption unless constrained by plant operational limits or safety grounds (relating to personnel or plant).	

BC2.A.2.7

In addition, the following provisions will apply to **Reactive Power** instructions:

- In circumstances where **NGET** issues new instructions in relation to more than one **BM Unit** at the same **Power Station** at the same time, tapping will be carried out by the **Generator** one tap at a time either alternately between (or in sequential order, if more than two), or at the same time on, each **BM Unit**.
- Where the instructions require more than two taps per **BM Unit** and that means that the instructions cannot be achieved within 2 minutes of the instruction time (or such longer period at **NGET** may have instructed), the instructions must each be achieved with the minimum of delay after the expiry of that period.
- It should be noted that should **System** conditions require, **NGET** may need to instruct maximum MVar output to be achieved as soon as possible, but (subject to the provisions of paragraph (BC2.A.2.7(b) above) in any event no later than 2 minutes after the instruction is issued.

- (d) An **Ancillary Service** instruction relating to **Reactive Power** may be given in respect of **CCGT Units** within a **CCGT Module** at a **Power Station** or **Generating Units** within a **Synchronous Power Generating Module** at a **Power Station** where running arrangements and/or **System** conditions require, in both cases where exceptional circumstances apply and connection arrangements permit.
- (e) In relation to MVAR matters, MVAR generation/output is an export onto the **System** and is referred to as "lagging MVAR", and MVAR absorption is an import from the **System** and is referred to as "leading MVAR".
- (f) It should be noted that the excitation control system constant **Reactive Power** output control mode or constant **Power Factor** output control mode will always be disabled, unless agreed otherwise with **NGET**.

APPENDIX 3 - SUBMISSION OF REVISED MVar CAPABILITY

BC2.A.3.1 For the purpose of submitting revised MVar data the following terms shall apply:

Full Output	In the case of a Synchronous Generating Unit (as defined in the Glossary and Definitions ((which could be part of a Synchronous Power Generating Module) and not limited by BC2.2) is the MW output measured at the generator stator terminals representing the LV equivalent of the Registered Capacity at the Grid Entry Point , and in the case of a Non-Synchronous Generating Unit (excluding Power Park Units), HVDC Converter or DC Converter or Power Park Module is the Registered Capacity at the Grid Entry Point
Minimum Output	In the case of a Synchronous Generating Unit (as defined in the Glossary and Definitions ((which could be part of a Synchronous Power Generating Module) and not limited by BC2.2) is the MW output measured at the generator stator terminals representing the LV equivalent of the Minimum Generation or Minimum Stable Operating Level at the Grid Entry Point , and in the case of a Non-Synchronous Generating Unit (excluding Power Park Units), HVDC Converter or DC Converter or Power Park Module is the Minimum Generation or Minimum Stable Operating Level or Minimum Active Power Transmission Capacity at the Grid Entry Point

BC2.A.3.2 The following provisions apply to faxed submission of revised MVar data:

- (a) The fax must be transmitted to **NGET** (to the relevant location in accordance with GC6) and must contain all the sections from the relevant part of Annexure 1 and from either Annexure 2 or 3 (as applicable) but with only the data changes set out. The "notification time" must be completed to refer to the time of transmission, where the time is expressed as London time.
- (b) Upon receipt of the fax, **NGET** will acknowledge receipt by sending a fax back to the **User**. The acknowledgement will either state that the fax has been received and is legible or will state that it (or part of it) is not legible and will request re-transmission of the whole (or part) of the fax.
- (c) Upon receipt of the acknowledging fax the **User** will, if requested, re-transmit the whole or the relevant part of the fax.
- (d) The provisions of paragraphs (b) and (c) then apply to that re-transmitted fax.

APPENDIX 3 - ANNEXURE 1

Optional
Logo

Company name **REVISED REACTIVE POWER**
CAPABILITY DATA

TO: National Electricity Transmission
System Control Centre

Fax telephone No.

Number of pages inc. header:.....

Sent By :

Return Acknowledgement Fax to

For Retransmission or Clarification ring.....

Acknowledged by **NGET**: (Signature)

.....

Acknowledgement time and date

.....

Legibility of FAX :

Acceptable

Unacceptable

(List pages if appropriate)

(Resend FAX)

APPENDIX 3 - ANNEXURE 2

To: National Electricity Transmission System Control Centre

From : [Company Name & Location]

REVISED REACTIVE POWER CAPABILITY DATA – GENERATING UNITS EXCLUDING POWER PARK MODULES AND DC CONVERTERS

Notification Time (HH:MM):	Notification Date (DD/MM/YY):
Start Time (HH:MM):	Start Date (DD/MM/YY):
Generating Unit*	

* For a **Synchronous Power Generating Module** and/or **CCGT Module** and/or a **Cascade Hydro Scheme**, the redeclaration is for a **Generating Unit** within a **Synchronous Power Generating Module** and/or **CCGT Module** and/or **Cascade Hydro Scheme**. For **BM Units** quote the **NGET** BM Unit id, for other units quote the **Generating Unit** id used for OC2.4.1.2 Outage Planning submissions. **Generating Unit** has the meaning given in the Glossary and Definitions and is not limited by BC2.2.

REVISION TO THE REACTIVE POWER CAPABILITY AT THE GENERATING UNIT STATOR TERMINALS (at rated terminal volts) AS STATED IN THE RELEVANT ANCILLARY SERVICES AGREEMENT:

	MW	MINIMUM (MVA _r +ve for lag, -ve for lead)	MAXIMUM (MVA _r +ve for lag, -ve for lead)
AT RATED MW			
AT FULL OUTPUT (MW)			
AT MINIMUM OUTPUT (MW)			

COMMENTS *e.g. generator transformer tap restrictions, predicted end time if known*

Redeclaration made by (Signature)

APPENDIX 3 - ANNEXURE 3

To: National Electricity Transmission System Control Centre

From : [Company Name & Location]

REVISED REACTIVE POWER CAPABILITY DATA – POWER PARK MODULES, HVDC CONVERTERS AND DC CONVERTERS

Notification Time (HH:MM):	Notification Date (DD/MM/YY):
Start Time (HH:MM):	Start Date (DD/MM/YY):
Power Park Module / DC Converter*	

* For BM Units quote the **NGET** BM Unit id, for other units quote the id used for OC2.4.1.2 Outage Planning submissions

Start Time/Date (if not effective immediately)

REVISION TO THE REACTIVE POWER CAPABILITY AT THE COMMERCIAL BOUNDARY AS STATED IN THE RELEVANT ANCILLARY SERVICES AGREEMENT:

	MINIMUM (MVar +ve for lag, -ve for lead)	MAXIMUM (MVar +ve for lag, -ve for lead)
AT RATED MW		
AT 50% OF RATED MW		
AT 20% OF RATED MW		
BELOW 20% OF RATED MW		
AT 0% OF RATED MW		

COMMENTS e.g. generator transformer tap restrictions, predicted end time if known

Redeclaration made by (Signature)

APPENDIX 4 - SUBMISSION OF AVAILABILITY OF FREQUENCY SENSITIVE MODE

- BC2.A.4.1 For the purpose of submitting availability of **Frequency Sensitive Mode**, this process only relates to the provision of response under the **Frequency Sensitive Mode** and does not cover the provision of response under the **Limited Frequency Sensitive Mode**.
- BC2.A.4.2 The following provisions apply to the faxed submission of the **Frequency Sensitive Mode availability**;
- (a) The fax must be transmitted to **NGET** (to the relevant location in accordance with GC6) and must contain all the sections relevant to Appendix 4 - Annexure1 but with only the data changes set out. The “notification time” must be completed to refer to the time and date of transmission, where the time is expressed in London time.
 - (b) Upon receipt of the fax, **NGET** will acknowledge receipt by sending a fax back to the **User**. This acknowledging fax should be in the format of Appendix 4 – Annexure 1. The acknowledgement will either state that the fax has been received and is legible or will state that it (or part of it) is not legible and will request re-transmission of the whole (or part) of the fax.
 - (c) Upon receipt of the acknowledging fax the **User** will, if requested re-transmit the whole or the relevant part of the fax.
 - (d) The provisions of paragraph (b) and (c) then apply to the re-transmitted fax.
- BC2.A.4.3 The **User** shall ensure the availability of operating in the **Frequency Sensitive Mode** is restored as soon as reasonably practicable and will notify **NGET** using the format of Appendix 4 – Annexure 1. In the event of a sustained unavailability of **Frequency Sensitive Mode** **NGET** may seek to confirm compliance with the relevant requirements in the **CC** or **ECC** through the process in **OC5** or **ECP**.

APPENDIX 4 - ANNEXURE 1

To: National Electricity Transmission System Control Centre

From : [Company Name & Location]

Submission of availability of Frequency Sensitive Mode

Notification Time (HH:MM):	Notification Date (DD/MM/YY):
Start Time (HH:MM):	Start Date (DD/MM/YY):
Genset or DC Converter	

The availability of the above unit to operate in **Frequency Sensitive Mode** is as follows:

All contract modes: Available / Unavailable *[delete as applicable]; or*

Change to the availability of individual contract modes:

Contract Mode e.g. A	Availability for operation in Frequency Sensitive Mode [Y/N]

COMMENTS *e.g. reason for submission, predicted end time if known*

Redeclaration made by (Signature)_____

Receipt Acknowledgement from **NGET**

Legible (tick box)		Illegible (tick box)	
Explanation:			
Time: Date: Signature:			

< END OF BALANCING CODE 2 >

BALANCING CODE NO. 4
(BC4)

TERRE PROCESSES

CONTENTS

(This contents page does not form part of the Grid Code)

Paragraph No/Title

Page Number

BC4.1 INTRODUCTION

Balancing Code No 4 (BC4) sets out the procedures for:

- (a) prequalification requirements for participation in **TERRE** by **BM Participants**;
- (b) submission of data by **BM Participants** wishing to take part in **TERRE**;
- (c) validation of data from **BM Participants** wishing to take part in **TERRE**;
- (d) issuing of **RR Instructions**;
- (e) publication of **TERRE** related data.

BC4.2 OBJECTIVE

This procedure facilitates the participation of **BM Participants** in the **TERRE** market. Participation in **TERRE** is voluntary for **BM Participants**.

BC4.3 SCOPE

BC4 applies to :-

- (a) **NGET**;
- (b) **BM Participants**;
- (b) **Externally Interconnected System Operators**; and
- (c) **Network Operators**.

BC4.4 PREQUALIFICATION

European Regulation (EU) 2017/1485 provides an overview of the minimum technical requirements and the prequalification process for **TERRE**.

BC4.4.1 Minimum Technical Requirements

- (a) **BM Participants** must have the ability to submit data and receive instructions by the use of electronic data communication facilities as provided for in CC.6.5.8
- (b) **BM Participants** must be capable of following an **RR Instruction** issued by **NGET**
- (c) **BM Participants** must be able to provide **Physical Notifications**
- (d) **BM Participants** must be able to provide a subset of **Dynamic Parameters** (as detailed in BC4.5.2)
- (e) **BM Participants** must provide operational metering for their total output and for any individual component that may have an output greater than 1MW. This metering must have the following accuracy;
 - a. For a **BM Unit** with either **Generation Capacity** greater than 100MW or **Demand Capacity** greater than 100MW metering accuracy better than 0.5%
 - b. For a **BM Unit** with a **Generation Capacity** greater than 10MW but less than or equal to 100MW or **Demand Capacity** greater than 10MW but less than or equal to 100MW metering accuracy better than 1%
 - c. For all other **BM Units** an accuracy better than 2.5% is required
- (f) **BM Participants** must have the ability to inform **NGET** if their availability changes using **Export and Import Limits**
- (g) For **BM Participants** connected within a **User System** **BM Participants** must be capable of informing **Network Operators** of their availability and activation in realtime if required

BC4.4.2 Prequalification Timelines

European Regulation 2017/1485 gives the following minimum timescales for the prequalification process

- (a) Within 8 weeks of a formal application from the **BM Participant** **NGET** shall confirm the application is complete (from the perspective of information provision)
- (b) If the application is incomplete the **BM Participant** shall provide the missing evidence within 4 weeks of the a request from **NGET** or it will be presumed that the application has been withdrawn
- (c) Within 3 months of confirming that all information has been provided **NGET** shall confirm if the potential **BM Participant** meets the requirements in BC4.4.1. For the avoidance of doubt – **NGET** will not carry out independent tests but will review the evidence provided

BC4.4.3 Regualification criteria

Under certain conditions an **BM Participant** must requailify

- (a) Every five years a **BM Participant** must requailify to the technical requirements in BC4.4.1 and according to the timescales in BC4.4.2
- (b) If at any time a **BM Participant** becomes aware of changes to the configuration forming the **BM Unit** that means the minimum technical requirements in BC4.4.1 can no longer be met that **BM Participant** must withdraw from TERRE and must requailify-initiate another prequalification process

BC4.5 SUBMISSION OF TERRE RELATED DATA BY BM Participants

BC4.5.1 Communication from BM Participants to NGET

- (a) Submission of data specified in BC4.5.2 will be by use of electronic data communications facilities, as provided for in CC.6.5.8
- (b) In the event of a failure of the electronic data communication facilities the data used in the **TERRE** auction will be based on the most recent data received and acknowledged by **NGET**. In the event of missing data it will be assumed the **BM Participant** did not wish to submit data for the relevant **TERRE Auction Period**.
- (c) **Planned Maintenance Outages** will normally be arranged to take place during periods of low data transfer activity.
- (d) Upon any **Planned Maintenance Outage**, or following an unplanned outage described in BC4.5.1(b) (where it is termed a "failure") in relation to a pre-**TERRE Gate Closure**:
 - (i) If a **BM Participant** has submitted **Physical Notifications** and a **TERRE Bid** for a **TERRE Auction Period** the **BM Participant** should continue to act in relation to any period of time in accordance with the **Physical Notifications** current at the time of the start of the **Planned Maintenance Outage** or the computer system failure in relation to each such period of time subject to the provisions of BC2.5.1. Depending on when in relation to **TERRE Gate Closure** the planned or unplanned maintenance outage arises such operation will either be operation in preparation for the relevant output in real time, or will be operation in real time. No further submissions of **BM Participants** data should be attempted. **Plant** failure or similar problems causing significant deviation from **Physical Notification** should be notified to **NGET** by the submission of a revision to **Export and Import Limits** in relation to the **RR Provider** so affected;

- (ii) no data will be transferred from **NGET** to the **BMRA** until the communication facilities are re-established.

BC4.5.2 RR Provider Data submissions before TERRE Gate Closure

To participate in a **TERRE** auction a **BM Participant** must have prequalified and must submit a **TERRE Bid** covering at least one of the **TERRE Activation Periods** within the **TERRE Auction Period**.

In addition to a valid **TERRE Bid** a sub-set of **Balancing Mechanism** parameters are also required covering the **TERRE Auction Period** and the **Settlement Periods** immediately before and after the **TERRE Auction Period** (to allow ramping before and after).

If a **BM Participant** is active in the **Balancing Mechanism** the only additional data needed to participate in a **TERRE** auction is a valid **TERRE Bid** covering the relevant times.

For a **BM Participant** that is not active in the **Balancing Mechanism** the following subset of parameters are required with exceptions as noted below:

(a) Physical Notifications

Physical Notifications follow the same format and rules as covered in **BC1** and **BC2** with the following exceptions;

- (1) A **BM Participant** that is not active in the **Balancing Mechanism** but wishes to participate in **TERRE** is only required to have submitted **Physical Notifications** covering the **TERRE Auction Activation Period** and the **Settlement Periods** immediately before and after the **TERRE Auction Period** for which they have submitted a **TERRE Bid**.
- (2) Defaulting rules as described in the **Data Validation, Consistency and Defaulting Rules** will only apply to **Settlement Periods** for which the **BM Participant** previously submitted **Physical Notifications** for the previous Operational Day.

(b) Export and Import Limits

For a **BM Participant** that is not active in the **Balancing Mechanism** but wishes to participate in **TERRE** these are the same as described in **BC1** and **BC2**

(c) Run Up Rate and Run Down Rates

For a **BM Participant** that is not active in the **Balancing Mechanism** but wishes to participate in **TERRE** these are the same as described in **BC1** and **BC2**

- (d) For a **BM Participant** that is not active in the **Balancing Mechanism** but wishes to participate in **TERRE** the other **Dynamic Parameters** listed in **BC1.A.1.5** are not required

TERRE Bids must follow the formats and rules in the **TERRE Data Validation and Consistency Rules**

BC4.5.3 Re-submission of parameters by BM Participants before TERRE Gate Closure

The rules outlined in **BC1** and **BC2** for the ~~revision~~ re-submission of **Physical Notifications**, **Export and Import Limits**, **Run Up Rates** and **Run Down Rates** also apply for **TERRE**.

TERRE Bids can be ~~revised~~ re-submitted up to **TERRE Gate Closure** in order to be used in the **TERRE** auction (as described in the **TERRE Data Validation and Consistency Rules**).

BC4.5.4 Defaulting rules for TERRE Bids

TERRE Bids will not be defaulted using previously submitted values. This is due to the ability to link **TERRE Bids** and the re-use of sequence numbers. Hence a **BM Participant** wishing to participate in a particular **TERRE** auction must submit **RR Bids** specifically covering the relevant **TERRE Activation Periods**.

BC4.6 [Processing of TERRE Bids before passing to the TERRE Central Platform](#)

BC4.6.1 [Cases where a TERRE Bid will be Restricted](#)

TERRE Bids will be passed to the **TERRE Central Platform** but will be flagged as **Restricted** under the following cases

- (a) Data within the submission does not conform to formats required as detailed in the **TERRE Data Validation and Consistency Rules** (e.g. missing or incorrect keywords, data in the wrong order, corrupted files etc.)
- (b) If a **TERRE Bid** does not have a corresponding **Physical Notification** the **TERRE Bid** will be flagged as **Restricted**
- (c) If the acceptance of a **TERRE Bid** will result in violating a **System Constraint** it will be flagged as **Restricted**
- (d) If a **BM Participant** has already been instructed for an **Ancillary Service** or for **Reserve** a **TERRE Bid** may need to be flagged as **Restricted**. For the avoidance of doubt – participation in **TERRE** does not exclude an **BM Participant** from offering other services to **NGET** but on occasions if there are conflicts between services **NGET** may have to flag these **TERRE Bids** as **Restricted**

Comment [A1]: Need to check with Legal if this term includes Distribution

Comment [A2]: GC definition is quite clear. It is a limitation on the use of a User System or the NETS due to the lack of transmission capacity. So it doesn't include constraints due to lack of distribution capacity.

BC4.7 [Instructing BM Participants](#)

BC4.7.1 [Communication from NGET to BM Participants](#)

For the purposes of communication an **RR Instruction** will follow the same format as a **Bid-Offer Acceptance** and so the rules of BC2.7 also apply for **RR Instructions**.

BC4.7.2 [Creating RR Instructions from RR Acceptances](#)

Results from the **TERRE Central Platform** are returned to **NGET** in the form of **RR Acceptances**.

RR Acceptances do not include physical ramps and so **Run Up Rates** and **Run Down Rates** will be used to create **RR Instructions**

In order to comply with all of the **RR Acceptances** for a **BM Participant** several **RR Instructions** may be required.

RR instructions will ramp **BM Participants** from their **Committed Level**, hold them at the required output level, and then return the **BM Participant** back to the **Committed Level**.

The **TERRE** market wishes to incentivise **RR Instructions** which ramp within +/-5 minutes of the start and end of the **TERRE Activation Periods**. Hence, where possible, **Run Up Rates** and **Run Down Rates** will be applied so that ramping is symmetric around the start and end of the **TERRE Activation Periods**.

However the **TERRE Product** allows for up to 30 minute ramping to and from full activation and so for the first and final ramps up to 30 minutes of ramping can be used for creating an **RR Instruction**.

Details of how **RR Instructions** will be created can be found in the **TERRE Instruction Guide**.

BC4.7.3 [Cases where RR Instructions may not be issued](#)

In the time between receiving **TERRE Bids** and the **RR Acceptances** being returned to **NGET** system conditions may require the issuing of a **Bid Offer Acceptance** to the **BM Participant** for which the **RR Acceptance** applies.

In these cases it may be necessary to not issue an **RR Instruction** to the **BM Participant** or to modify the **RR Instruction** so that it is compatible with the **Bid Offer Acceptance** that has been previously been issued to the **BM Participant**.

This situation can only arise for a **BM Participant** which is also active in the **Balancing Mechanism**.

The following may apply:

- (a) If the **Bid Offer Acceptance** is in the same direction as the **RR Instruction** but the MW levels of the **RR Instruction** are less than the **Committed Level** after the **Bid Offer Acceptance** is applied the **RR Instruction** will not be issued.
- (b) If the **Bid Offer Acceptance** is in the same direction as the **RR Instruction** but the MW levels of the **RR Instruction** are greater than the **Committed Level** after the **Bid Offer Acceptance** is applied the **RR Instruction** will be issued relative to the **Committed Level**
- (c) If the **Bid Offer Acceptance** is in the opposite direction to the **RR Instruction** the **RR instruction** will not be issued

BC4.7.4 Infeasibility of RR Acceptances

If the **RR Acceptances** for an **BM Participant** are not consistent with the **Physical Notifications** and the **Run Up Rates** and **Run Down Rates** then **NGET** will adjust the MW levels so that **RR Instructions** can be created using the declared parameters.

Details of how these infeasibility rules will be applied are contained in the **TERRE Instruction Guide**.

BC4.8 Publication of TERRE Data

BC4.8.1 Publication of Data at the European level

This is a placeholder – waiting for WG MIT to confirm if data is from NGET or direct from the **TERRE Central Platform**

BC4.8.2 Publication of Data at the National level

NGET shall provide data in accordance with the requirements of the BSC –to the ~~**Balancing Mechanism Reporting Agent** or **BSCCo**~~. The following data items will be provided:

- (a) **TERRE Bids** and details of those restricted
- (b) **Final Physical Notifications**
- (c) **RR Activations**
- (d) **RR Instructions**
- (e) Interconnector Volumes per 15 minute period of the **TERRE Activation Period**
- (f) The **TERRE** clearing price
- (g) Volume of GB need met





BC4.9 Outages of computer systems leading to the suspension of the TERRE market

The **TERRE** market operates in short processing times meaning that **Planned Maintenance Outages** or unplanned computer system failures can result in the suspension of the **TERRE** market.

Suspension of the **TERRE** market in GB will occur in the following circumstances:

- (a) Loss of communication from **NGET** to the **TERRE Central Platform**
- (b) Failure of the **TERRE Central Platform** to produce **RR Acceptances**

- (c) Loss of communication from the **TERRE Central Platform** to **NGET**
- (d) Loss of **electronic logging devices** to a large number of **BM Participants**






Modification		At what stage is this document in the process?
<h1>GC0097:</h1> <h2>GB processes supporting TERRE participation and dispatch</h2>		<div>01 Modification</div> <div>02 Workgroup Report</div> <div>03 Draft Modification Report</div> <div>04 Final Modification Report</div>
<p>Purpose of Modification: <i>An early adoption project of the EU Electricity Balancing Framework, TERRE is expected to go-live in Q3 2018. It sets a common platform for Replacement Reserves across EU regions. GC0097 will consider the Grid Code impacts of TERRE and manage any necessary modifications.</i></p>		
	<p><i>Please provide an initial view of the preferred governance route/pathway and impacted parties</i></p> <p>The Proposer recommends that this modification should be: <i>(delete as appropriate)</i></p> <ul style="list-style-type: none"> assessed by a Workgroup <p>This modification will be presented by the Proposer to the Panel on 16 11 2016. The Panel will consider the Proposer's recommendation and determine the appropriate route.</p>	
	<p>High Impact: <i>Existing and new balancing services providers of +/-1MW capacity and above; GB Transmission System Operator;</i></p>	
	<p>Medium Impact: <i>Distribution Network Operators</i></p>	
	<p>Low Impact: <i>None specified</i></p>	

Guidance On The Use Of This Template:

Please complete all sections unless specifically marked for the Code Administrator.

Green italic text is provided as guidance and should be removed before submission.

The Code Administrator is available to help and support the drafting of any modifications, including guidance on completion of this template and the wider modification process. Contact: [add email address] or [add telephone number].

Contents		 Any questions?
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4	Solution	5
5	Impacts & Other Considerations	5
6	Relevant Objectives	5
7	Implementation	6
8	Legal Text	6
9	Recommendations	7
Timetable		 Grid.Code@nationalgrid.com
		 01926 653 283
		Proposer: Richard Woodward
		 Richard.woodward@nationalgrid.com
		 019267474 6596
The Proposer recommends the following timetable:		
Initial consideration by Workgroup	January 2017-May 2017	
Amended Modification considered by Workgroup	TBC	
Workgroup Report presented to Panel	TBC	
Draft Modification Report issued for consultation	TBC	
Consultation Close-out for representations	TBC	
Final Modification Report available for Panel	TBC	
Modification Panel decision	TBC	

1 Summary

What

The GB implementation of TERRE is focusing on three aspects

- 1) The coordination between the GB TSO and the TERRE Central Platform
- 2) The trading and settlement for participation in TERRE
- 3) The facilitation of participation of GB parties, including dispatch, by the GB TSO in coordination with the TERRE Central Platform.

This final (3) aspect will be the focus of GC0097, in coordination with BSC workgroup P344 for item 2, and National Grid System Operator in coordination with the TERRE Central project.

Specifically, this workgroup will investigate how and if the existing Grid Code Balancing Code (BC1-3) sections which facilitate the Balancing Mechanism process can be duplicated for use in TERRE. The group will also consider how to deploy market facilitation processes for TERRE to permit parties not currently bound by Grid Code requirements; potentially in coordination with the Distribution Code or perhaps via a commercial contractual route

Why

These changes are required to support GB compliance with EU legislation (EU Balancing Guideline), albeit that TERRE is a non-mandatory early adoption project. However, an ENTSO-E consultation suggested that implementing TERRE could lead to a cost saving of around €10m per annum for GB.

https://consultations.entsoe.eu/markets/terre/supporting_documents/20160307_TERRE_Consultation_FV.pdf

How

We will use the TERRE GB Impact Assessment to understand existing Grid Code processes flagged as being affected, or with potential to be replicated for use, in implementing TERRE. This is expected to primarily consist of the Balancing Code (BC) section of the Grid Code, namely BC1-3, but could also refer to the OCs regarding Electronic Dispatch.

We will also consider what changes are needed to facilitate the participation of parties not currently bound by Grid Code or existing Balancing Mechanism process. This may need coordination with the Distribution Code.

2 Why Change?

The Third Energy Package, adopted in July 2009 by the European Union (EU) provided a key step forward in developing a more harmonised European energy market. This legislation included a requirement to develop and implement European Network Codes (ENCs) to cover areas of cross-border impact.

The ENCs are set to become European Regulations, meaning that they will hold the force of European Law. Therefore, the ENCs will take precedence over any existing GB law or arrangements, including any existing licences and codes that impact National Grid and other industry participants at domestic level. Consequently, GB will need to ensure compliance with the requirements of the ENCs. Failure to do so

would mean GB risking infraction proceedings and the potential for fines to be levied against Market Participants.

Project TERRE is a key implementation initiative for the European Electricity Balancing Guideline (EB GL), which aims to establish a pan-European market for Balancing Energy.

The project is seeking to design and develop a central platform to facilitate the close to real-time (<1 hour) exchange of Replacement Reserves (balancing energy products with a >15min lead time) between Transmission System Operators (TSOs) in Europe.

The project currently consists of six member states (GB, France, Switzerland, Spain, Portugal and Italy). Ireland and Greece are currently observers. It is due to go live in the third quarter of 2018.

The project is strategically important as it will enable GB to be compliant with EU legislation and will also form the basis for subsequent phases to meet other legal obligations stretching out until 2023.

3 Code Specific Matters

Technical Skillsets

- Understanding of existing Grid Code processes for the Balancing Mechanism
- GB electricity market understanding
- Involvement of future TERRE participants who may not be a service provider to the TSO today

Reference Documents

ENTSO-E consultation on TERRE:

https://consultations.entsoe.eu/markets/terre/user_uploads/20160307_terre_consultation.pdf

BSC Workgroup P344:

<https://www.elexon.co.uk/mod-proposal/p344/>

National Grid SO Impact Assessment on TERRE Process:



08_258_05A_P344_I
nterim_Assessment_F

4 Solution

- TBC – potentially an EU equivalent of some of the BC sections of the Grid Code to set out the participation and dispatch stages of the TERRE process

5 Impacts & Other Considerations

Does this modification impact a Significant Code Review (SCR) or other significant industry change projects, if so, how?

No impact on SCR

Consumer Impacts

TERRE could provide balancing services cost savings to GB of around €10m per annum, so might have a positive consumer impact (see above for link to TERRE cost benefit analysis document).

Cross-code impacts

TERRE has an identified impact on the BSC and Grid Code. Workgroups under the Panel governance of these codes are already joint-working to ensure a consistent implement approach and to mitigate cross-code impacts and duplication.

We will also need to consider how we interact with the GC0095 workgroup progressing the implementation of the Transmission System Operation Guideline (TSOG), which contains a procedure for pre-qualification for Replacement Reserve providers.

6 Relevant Objectives

Impact of the modification on the Relevant Objectives:	
Relevant Objective	Identified impact
(i) to permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity;	Positive – provides TSO to a wide range of Reserves providers across EU to support local system management
(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);	Positive – provides additional market opportunities to potential Balancing Services Providers of +/-1MW capacity and up
(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;	Positive – See objective (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	Positive – is directly aimed at ensuring GB compliance to EU legislation
(v) to promote efficiency in the implementation and administration of the Grid Code arrangements.	Positive – joint working between the Grid Code and BSC is paramount in managing implementation of TERRE

7 Implementation

TERRE go-live is the target (Q3 2018); the work under the Grid Code is a dependency to BSC workgroup P344 which has already commenced.

8 Legal Text

The Proposer is welcome to put forward suggested legal text.

[Not provided]

9 Recommendations

Proposer's Recommendation to Panel

Panel is asked to:

- Refer this proposal to a Workgroup for assessment, commencing in early 2017.

GC0097 TERRE – Terms of Reference

Governance

1. A TERRE workgroup was endorsed by the Grid Code Review Panel (GCRP) at the 16 November 2016 GCRP meeting.
2. The Workgroup shall formally report to the GCRP.
3. It will be essential to coordinate with BSC modification P344, which is managing the settlement aspects of TERRE implementation. It will also need to coordinate with Grid Code mod GC0095, which is managed Transmission System Operation Guideline implementation, in regards to the Replacement Reserve prequalification provisions.

Membership

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

Name	Role	Representing
Ryan Place	Chair/Technical Secretary (x1)	Grid Code - Code Administrator
Richard Woodward	Lead (x1)	National Grid System Operator
Nazar Ivasyuk & Tim Truscott	Technical Expert (x2)	National Grid System Operator
John Lucas	BSCCo Rep (x1-2)	Elxon - BSCCo
Ian Tannar & Steve Tailor	Industry Representative (x2)	Market Participants: Small Generators/Demand Users
Tim Ellingham & Campbell McDonald	Industry Representative (x2)	Market Participants: Medium Generators/Demand Users
Paul Jones & Christopher Proudfoot	Industry Representative (x2)	Market Participants: Large Generators/Demand Users
Carolina Escudero (UK Power Networks)	Industry Representative (x2)	DNO
Grendon Thompson	Authority Representative (x1)	Ofgem

Meeting Administration

5. 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.
6. The Grid Code - Code Administrator will provide Chair and Technical Secretary resource to the Workgroup. They will also handle administrative arrangements such as venue, agenda and minutes.

7. 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

8. The Workgroup shall consider and report back on the following:

Workgroup Meeting One: Balancing Services Provider (BSP) participation data submission to the TSO and Dispatch Methodology

Agree:

- The necessary data items needed from BSPs to participate in TERRE
- The processes (e.g. systems) by which these are submitted to the GB TSO
- The approach for parties to be dispatched by the TSO once activated by TERRE

Workgroup Meeting Two: Dispatch Methodology (cont'd) and interaction with the BM

Continuing the topics from the first meeting, agree the dispatch processes for TERRE activations (including timings), and consider the interactions with the Balancing Mechanism.

Workgroup Meeting Three – Participation by non-BM and Aggregators/Virtual PPMs

Based on the proposals developed from the previous meeting, this session will confirm whether they are fit for purpose for smaller parties who may not be Balancing Mechanism participants), and for aggregators.

Workgroup Meeting Four – Pre-qualification and enabling participation

Workgroup Meeting Five –TERRE Coordination with DNOs and BSCCo

Confirm any Grid Code obligations required for the GB TSO and DNOs to coordinate to manage participation from distribution-connected BSPs, as well as any reporting obligations to the BSCCo, based on actions taken by the GB TSO for TERRE etc.

Workgroup Meeting Six – Placeholder in case required.

Out of scope

The scope of the Workgroup shall not include forming EU methodologies for facilitating TERRE, for example...

- BSP ramping;
- Currency for pricing or party settlement
- TSO unsharing/restricting TERRE bids
- Party prequalification

GC0097 will coordinate with the TERRE Central Project, GB TSO and P344 to apply appropriate methodologies from the above within the Grid Code if the workgroup appropriate.

Also out of scope:

- BSP Trading & Settlement procedural process steps – this will be managed in BSC workgroup P344
- Coordination with the TERRE central project in respect of their development of dispatch algorithms and communication links between TSOs and their central platform
- Adjustment of any TSO internal processes;

Deliverables

- The Workgroup will provide updates and a Workgroup Report to the Grid Code Review Panel which will:
 - Detail the findings of the Workgroup;
 - Draft, prioritise and recommend changes to the Grid 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

- It is anticipated that this Workgroup will provide an update to each GCRP meeting and present a Workgroup Report to the July 2017 GCRP meeting.
- 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.
- An indicative timetable for GC0097 milestones is shown below.

20 January 2017	Workgroup Meeting One
21 February 2017	Workgroup Meeting Two
27 March 2017	Workgroup Meeting Three
25 April 2017	Workgroup Meeting Four
24 May 2017	Workgroup Meeting Five
19 July 2017	Workgroup Meeting Six (joint WG with P344)
17 August 2017	Workgroup Meeting Seven (joint WG with P344)
31 August 2017	Workgroup Meeting Eight (joint WG with P344)
01 November 2017	Workgroup Meeting Nine (joint WG with P344)
14 November 2017	Workgroup Meeting Ten (joint WG with P344)
28 November 2017	Workgroup Meeting Eleven (joint WG with P344)
12 December 2017	Workgroup Meeting Twelve (joint WG with P344)
8 January 2018	Workgroup Consultation issued (15 working days ~ close date 26 January 2018)
8 February 2018	Workgroup meeting Thirteen (review responses) GC0097 Only
14 February 2017	Workgroup meeting Fourteen review responses for P344 (joint with P344)
21 February 2018	Workgroup Fifteen (joint P344) to consider alternative options and vote
07 March 2018	Workgroup Sixteen (joint P344) to consider alternative options and vote
21 March 2018	Workgroup Report presented to Grid Code Review Panel

26 March 2018	Code Admin Consultation Report issued (15 Working Days ~ close date 17 April 2018)
2 May 2018	Draft Modification Report issued to Industry and Panel (5 Working Days)
16 May2018	Draft Final Modification Report presented to Panel
24 May 2018	Modification Panel Recommendation Vote (5 Working Days)
29 May 2018	Final Modification Report submitted to the Authority
4 July 2018	Authority Decision (25WDs)
18 July 2018	Implementation

GGC0097 Workgroup Consultation Responses

Response	Pages
Storelectric	2- 7
Quorum Development	8 - 10
NGET	11 – 13
Drax	14 – 17
Flexitricity	18 – 21
RWE	22 - 24
Scottish Power	25 – 27
Uniper	28 – 30
The ADE	31- 40
National Grid Interconnectors	41 – 43
Engie	44 – 45
The ENA	46 – 50
EDF Energy	51 – 55
Centrica	56 - 62

GC0097 Grid Code Processes supporting TERRE

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 **5pm** on **Friday 26 January 2018** 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 by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating 'GC0097 Workgroup Consultation Query'

Respondent:	Mark Howitt, 07910 020 686, mhowitt@storelectric.com
Company Name:	Storelectric Ltd
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	<p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity 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) 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 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; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements

Standard Workgroup Consultation questions

Q	Question	Response
1	Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?	<p>It makes some bits better but other bits worse. Overall it reduces energy security still further by increasing the country's dependence on imports. It exacerbates the problem that our contracting mechanism and carbon price are effectively subsidising overseas generation at the cost of UK generation: subsidies for interconnectors currently undermine UK power stations' profitability by importing off-peak electricity which therefore increases the cost of peak electricity, balancing and ancillary services. Please see the accompanying analysis, "The Truth about Curtailment" which describes how this comes about, and evaluates its costs to the UK system. This proposal makes it worse by increasing competition for ancillary services, which will thereby reduce still further the revenue streams available for UK generation and require UK generators to amortise their costs over even less energy sold, thereby increasing prices still further – this aspect is always ignored in your cost/benefit analyses that (in this case) suggest a €10m p.a. saving for the UK while in fact these considerations will add more to those costs than these evaluated benefits.</p> <p>Moreover, there is no consideration of charging the differential carbon price. UK generators pay £31/tonne while continental ones pay £9/tonne; unless we charge imports the differential £23/tonne, we are using UK money to subsidise overseas generation at the cost of UK generation.</p> <p>It is claimed that UK generators can export, and that this proposal allows them to do so more, but the above considerations tilt the playing field against UK generators.</p>
2	Do you support the proposed implementation approach?	<p>No: we need a genuinely level playing field between:</p> <ul style="list-style-type: none"> • UK and overseas generation • Generation and storage (stop triple charging grid access for storage: base its definition on that for interconnectors as storage moves electricity in time without generating any) • Generation and interconnectors <p>We also need policies to enable UK demand to be met by UK generation and storage: we cannot rely on imports for core needs.</p>

3	Do you have any other comments?	Brexit is wholly ignored. The one thing that is certain about Brexit is that we are exiting the single market and the supervision of the ECJ. This means that our neighbours will be legally allowed to prioritise their consumers over ours. Meanwhile NG plans to supply 20-25% of peak demand with imports; reducing the revenues that UK generators get from ancillary services will make this worse. This is a recipe for black-outs in future.
4	Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider?	<i>If yes, please complete a WG Consultation Alternative Request form, available on National Grid's website:</i> https://www.nationalgrid.com/uk/electricity/codes/grid-code and return to the Grid Code inbox at grid.code@nationalgrid.com

Specific GC0097 Consultation Questions

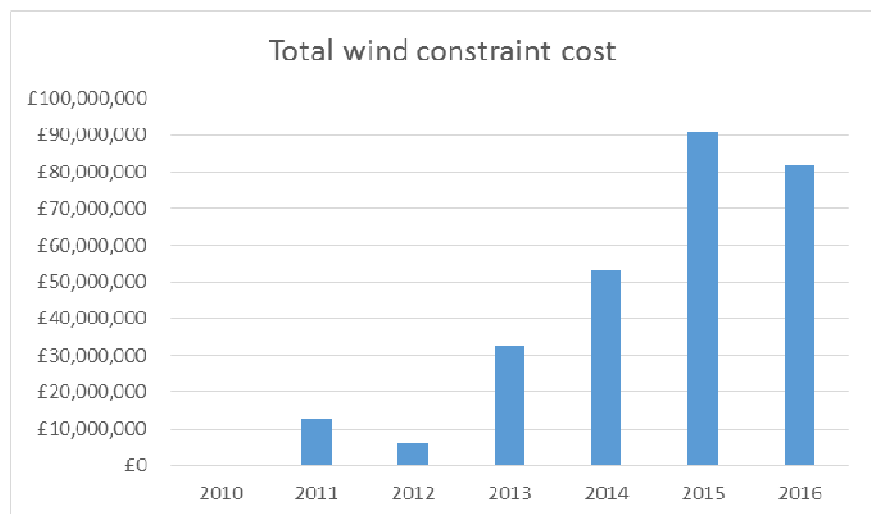
Q	Question	Response
5	For those respondents that are not existing Grid Code Users (e.g. a non BM Participant) are you aware that GC0097 will extend your obligations that arise from becoming a BSC Party under P344. Do you have any comments on these requirements and obligations?	We are not aware of this, and this sounds detrimental. We already having increasing numbers of generators and storage operators avoiding registration under the grid code because of the excessively onerous nature of grid code compliance.
6	Do you believe that the solution described in this Workgroup Report aligns with current arrangements in the Capacity Market?	Unfortunately, yes. That means that it makes the problems described above much worse.

The Truth about Curtailment

When the wind blows or the sun shines, and we don't need the electricity, we have to pay the wind farms anyway for electricity we don't use. Basically, we pay them for switching off: curtailment payments. National Grid recovers the cost of doing this through our electricity bills.

Over the years, these have caused big headlines because nobody wants to be paying for what we don't use, especially as the total electricity bill prices (and fuel poverty) are such political hot potatoes at the moment. But is it right to be bothered and, if so, what should be done about it?

Curtailment costs have settled down at £80-90m per annum¹. That seems like a lot, but isn't: spread around the country, it's only a tiny fraction of a percentage of our bills and is needed to keep the system from overload. But it's not the whole story.



Because we need electricity when we need it, and the wind and sun don't always oblige when we want it, National Grid is forced to cycle power stations very aggressively, turning them down when intermittent sources are generating and up again when they stop. That is like drag racing your car around town instead of driving it sedately up a motorway: fuel efficiency plummets, emissions per unit output (miles for the car; megawatt-hours [MWh] for the power station) rocket, maintenance increases, plant longevity drops and chargeable output (miles / MWh) drops like a stone. And gas prices increase because the majority of usage tilts towards peak times when gas prices also peak. So almost every single element of costs increase while invoiceable power generation (MWh) decreases, making them unsustainable. That is why they are closing at a very rapid rate.

Subsidies for power generation

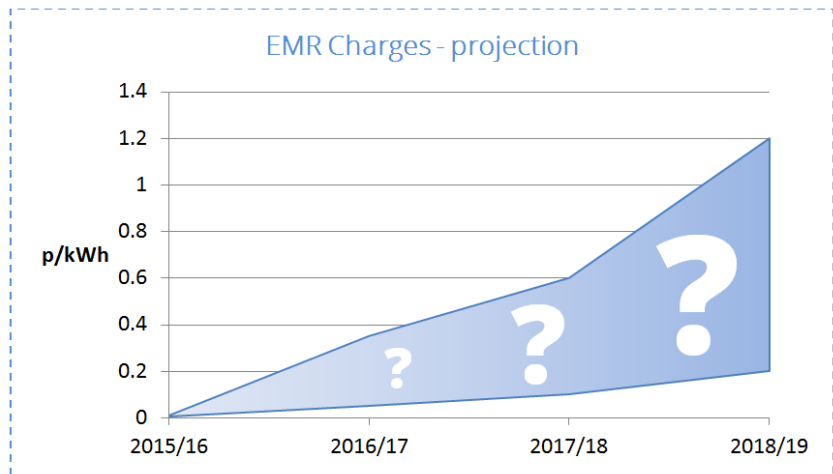
Therefore they need subsidies, which are much larger than curtailment and increasing rapidly. These subsidies include:

¹ <http://www.ref.org.uk/constraints/indextotals.php>

Grid-scale electricity storage using an innovative form of Compressed Air Energy Storage



- ◆ Capacity Market (=EMR): £1bn and rising each year, as per the graph² – note the great uncertainty about the forecast;
- ◆ Balancing and ancillary services, also £1bn and forecast to double within five years³;
- ◆ Bilateral contracts such as those last



year to keep Fiddlers Ferry⁴ and Eggborough⁵ power stations open: we don't know their value, but it's big – Eggborough had won a Capacity Market contract and felt that even so, it was more cost-effective to pay penalties than to stay open, that is, until the bilateral was signed.

Assuming that £800k of the balancing and ancillary services would be incurred anyway in a well-run system (that's how much they cost in 2014), the total of the above is already around £2bn (including a guesstimate for the bilateral contracts), 25 times as much as the total cost of curtailment – and rising fast.

There is an argument that the Capacity Market is necessary to provide an incentive for new build⁶, but this would be unnecessary if standard contracts were available with 15-year durations for new-build plants, especially if the start date of those contracts were to allow for grid connection time (transmission grid connections take 4-10 years).

How to Avoid Subsidies

So, what can be done about it? Essentially, large scale and long duration storage is needed to complement existing initiatives in batteries (small size, generally half-hour duration), demand side response (turning down customers' demand for short periods), interconnectors (depending on imported electricity, which is getting ever less certain) and pumped hydro-electric power storage (expensive to build, not many more sites available). The government's TINA report⁷ came to that conclusion: we

² <http://www.costadvice.co.uk/latest-news/the-rise-and-rise-of-non-commodity-costs>

³ <http://www.telegraph.co.uk/business/2016/06/26/balancing-demand-could-cost-national-grid-2bn/>

⁴ <https://www.ft.com/content/3a72f256-f681-11e5-96db-fc683b5e52db>

⁵ <http://uk.reuters.com/article/uk-eggborough-coal-extension/life-of-uks-eggborough-coal-plant-extended-to-march-2017-idUKKCN0VIOW2>

⁶ <https://www.gov.uk/government/publications/cost-of-energy-independent-review> p90-96

⁷ <https://www.carbontrust.com/resources/reports/technology/tinas-low-carbon-technologies/> Energy Networks and Storage report chart 2 p9 which splits it down into various technologies without considering the costs of doing so (batteries of all kinds with the required 5-hour durations and pumped hydro are much dearer than CAES) or availability (they exceed the country's pumped hydro potential),

Grid-scale electricity storage using an innovative form of Compressed Air Energy Storage



need 27.4GW of new storage, with an average discharge duration of 5 hours – that can't be done with batteries.

So, what can deliver such large amounts of storage? In the future, there will be electrolysed hydrogen, but for the time being that's too inefficient and expensive. There are only two technologies available today: pumped hydro-electric power (like Dinorwig⁸) and Compressed Air Energy Storage⁹ (CAES). As stated above, pumped hydro is too expensive and there are few sites available in the UK – certainly not enough to build 29.4GW of it. All existing projects which have been submitted for planning permission, added together regardless of economic viability, total under 1.3GW. As for CAES, what has been built is under 50% efficient and generates more than half of the emissions of a gas-fired power station.

Storelectric

But there are two other CAES technologies ready for construction, looking for finance: Storelectric's CAES are the two most efficient and cost-effective forms of CCS available in the world:

- ♦ TES CAES (TES = Thermal Energy Storage) costs about the same as traditional CAES but has higher round trip efficiency (68-70% v 50-54%) and zero emissions (v 50-60% of the emissions of an equivalent sized CCGT)
- ♦ CCGT CAES (CCGT = Combined Cycle Gas Turbine) is much cheaper, is more efficient (~60%) than existing CAES, emits correspondingly less, and uniquely can be retro-fitted to existing CCGT or OCGT power stations, thereby reducing capital costs much further and giving a new lease of life (with new revenue streams) to existing stranded assets, and almost doubling the generation that is permissible within emissions limits.

Uniquely, both of these technologies generate double digit whole-project IRRs even under existing regulatory and contractual framework – which is improving all the time. This means that Storelectric's two CAES technologies do not add to the costs of the electricity system – as compared with the current strategy of ever-increasing subsidies building a system that will soon breach all carbon budgets and emissions limits. (And 27GW of CAES by 2050, as per the TINA report, is a very big business – and 100 times bigger still when rolled out globally.) Thus, working with the other clean balancing technologies, Storelectric's CAES can enable renewables to power the world cost-effectively.

or the availability / practicality of the technology (thermal-to-electric stopped when Isentropic went into administration in 2016 <http://www.eti.co.uk/programmes/energy-storage-distribution/distribution-scale-energy-storage>, long before FES 2017 was published, despite £14m investment by ETI, <http://www.eti.co.uk/news/eti-invest-14m-in-energy-storage-breakthrough-with-isentropic>).

⁸ https://en.wikipedia.org/wiki/Dinorwig_Power_Station

⁹ https://en.wikipedia.org/wiki/Compressed_air_energy_storage

GC0097 Grid Code Processes supporting TERRE

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 **5pm** on **Friday 26 January 2018** 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 by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating 'GC0097 Workgroup Consultation Query'

Respondent:	<i>Steve Taylor, steve.taylor@quorumdev.com</i>
Company Name:	<i>Quorum Development Ltd</i>
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	<p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity 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) 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 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; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements

Standard Workgroup Consultation questions

Q	Question	Response
1	Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?	Yes given the requirement under the EBGL for the introduction of the RR market and the opening of the same to independent Demand Side Aggregators. In seeking to match the existing mechanisms for bidding, despatch and settlement as closely as possible the joint P344/GC0097 solution seems to be a pragmatic way to integrate the two different markets in a transparent and efficient way.
2	Do you support the proposed implementation approach?	Yes but see specific observations point 5 below.
3	Do you have any other comments?	I have some specific minor points to make on the text of the consultation document, see below.
4	Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider?	<p><i>If yes, please complete a WG Consultation Alternative Request form, available on National Grid's website:</i></p> <p>https://www.nationalgrid.com/uk/electricity/codes/grid-code and return to the Grid Code inbox at grid.code@nationalgrid.com</p> <p>No</p>

Specific GC0097 Consultation Questions

Q	Question	Response
5	For those respondents that are not existing Grid Code Users (e.g. a non BM Participant) are you aware that GC0097 will extend your obligations that arise from becoming a BSC Party under P344. Do you have any comments on these requirements and obligations?	I have some specific minor points to make on the text of the consultation document, see below.
6	Do you believe that the solution described in this Workgroup Report aligns with current arrangements in the Capacity Market?	No view on this question.

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Some specific observations on the Consultation Document text

1. I am not sure Rule III in Section 12, page 29 is clear in explaining the difference between the 'Standard Product' ramp rates and the plant's actual ramp rates.
2. I don't believe Rule VII (b) and Rule VII (c) correctly describe the transitions between adjacent RR Blocks accurately– should not these transitions be made at the plant's declared rates and not be 10 minute ramp rates?
3. Page 36, bullet 2 beneath Diagram: I'm not sure that the phrase ' ... the most symmetric time will be chosen' makes sense – all the potential ramping options (+/-4 mins, +/- 3 mins etc) seem to be equally symmetrical. Is this paragraph really saying that the symmetrical ramp rate that is closest the real plant ramp rates will be used, subject to the real ramp rates not being exceeded?
4. For a STOR unit, is the intention of paragraph 24, page 40, to say that such a Unit can only provide RR balancing MW outside of a STOR window, and that the existence of a STOR contract is not in itself a bar to participation in TERRE, provided that the meters for the Unit are only assigned to a single BM Unit providing balancing services?
5. Implementation timescales will be tight – it is essential that clear and complete specification and guidance documents (e.g. what are the RR Despatch Principles, how do linked and exclusive Bids work, how can advance Bids be nullified, how later Bids for an auction period affect earlier Bids for the same period should these later submissions be permissible, etc) are published in a timely manner as the detail of the solution emerges, and that full engagement with Market Participants and other interested parties is maintained throughout the implementation period. One obvious area where such communication and engagement is essential is the decisions on which interface and protocol to use for RR Bid submission and RR Instructions issuance – will it be EDT/EDL, EDT*/EDL*, or some other interface?

GC0097 Grid Code Processes supporting TERRE

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 **5pm** on **Friday 26 January 2018** 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 by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating 'GC0097 Workgroup Consultation Query'

Respondent:	<i>Rob Wilson 01926 653398</i>
Company Name:	<i>National Grid</i>
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	<p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity 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) 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 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; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements

Standard Workgroup Consultation questions

Q	Question	Response
1	Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?	The GC0097 proposal better facilitates objective (iv) of the Grid Code in allowing implementation of the TERRE project forming part of the requirements of EU legislation (the EU Balancing Guideline). Implementing TERRE will give GB access to a wider reserve market which will address objectives (i)-(iii) and an ENTSO-E consultation as referenced in the report has suggested that implementing TERRE could lead to a cost saving of around €13m per annum for GB.
2	Do you support the proposed implementation approach?	Yes, while noting that the GC0097 consultation is on the TERRE solution and is not currently supported by full legal text.
3	Do you have any other comments?	No.
4	Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider?	<p><i>If yes, please complete a WG Consultation Alternative Request form, available on National Grid's website:</i></p> <p>https://www.nationalgrid.com/uk/electricity/codes/grid-code and return to the Grid Code inbox at grid.code@nationalgrid.com</p> <p>N/A</p>

Specific GC0097 Consultation Questions

Q	Question	Response
5	For those respondents that are not existing Grid Code Users (e.g. a non BM Participant) are you aware that GC0097 will extend your obligations that arise from becoming a BSC Party under P344. Do you have any comments on these requirements and obligations?	National Grid appreciates that stakeholders have been given the opportunity to provide input on this question, but we would like to point out that participation in TERRE is not mandatory.
6	Do you believe that the solution described in this Workgroup Report aligns with current arrangements in	Where there is any overlap, yes. The development of the TERRE solution has been designed to work in conjunction with the capacity

	the Capacity Market?	market.
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GC0097 Grid Code Processes supporting TERRE

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Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating 'GC0097 Workgroup Consultation Query'

Respondent:	<i>Joshua Logan</i> <i>01757 612736</i>
Company Name:	<i>Drax Power Ltd</i>
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	<p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity 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) 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 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; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements

Standard Workgroup Consultation questions

Q	Question	Response
1	Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?	<p>We would agree that the Original Proposal better facilitates the Grid Code Objectives.</p> <p>(a) To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity.</p> <p>Positive – provides the TSO with a range of reserve providers across the EU to support system operation.</p> <p>(b) 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)</p> <p>Positive – provides additional market opportunities to potential Balancing Services Providers of +/-1MW capacity and above.</p> <p>(c) 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.</p> <p>Positive – provides the TSO with a range of reserve providers across the EU to support system operation.</p> <p>(d) 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;</p> <p>Positive – GC0097 will ensure GB compliance with EU regulation.</p> <p>(e) To promote efficiency in the implementation and administration of the Grid Code arrangements</p>

		Positive – Joint working between the Grid Code and the BSC is required to manage the implementation of TEERE.
2	Do you support the proposed implementation approach?	<p>Broadly, we agree with the proposed implementation approach. Regarding time scales, it seems sensible that GC0097 should be aligned with P344 and ensure compliance with the TERRE Central Project go-live timetable.</p> <p>The solution addresses an array of changes to the grid code that are necessary to implement project TERRE. In particular, the solution enables the submission of bids to the TSO, the dispatch process and product delivery.</p> <p>We believe the solution to be robust, nevertheless, any practical issue should be identified in the parallel running stage. As such, it's important to adhere to the proposed implementation approach to ensure that there is sufficient time to remedy any issues before the TERRE go-live date.</p> <p>From a system operation perspective, we appreciate that National Grid have limited knowledge of how market participants will behave under TERRE arrangements. We support the “War Games” and believe it will be beneficial to both National Grid and market participants.</p>
3	Do you have any other comments?	No.
4	Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider?	<p><i>If yes, please complete a WG Consultation Alternative Request form, available on National Grid's website:</i></p> <p>https://www.nationalgrid.com/uk/electricity/codes/grid-code and return to the Grid Code inbox at grid.code@nationalgrid.com</p>

Specific GC0097 Consultation Questions

Q	Question	Response
5	For those respondents that are not	N/A

	existing Grid Code Users (e.g. a non BM Participant) are you aware that GC0097 will extend your obligations that arise from becoming a BSC Party under P344. Do you have any comments on these requirements and obligations?	
6	Do you believe that the solution described in this Workgroup Report aligns with current arrangements in the Capacity Market?	We believe the TERRE arrangements would need to be added of the list of Relevant Balancing Services in the Capacity Market (CM), this will ensure the relevant adjustment is made to the amount of power a generator participating in TERRE would have to deliver in a CM Stress Event.

GC0097 Grid Code Processes supporting TERRE

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Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating 'GC0097 Workgroup Consultation Query'

Respondent:	<i>Saskia Barker, saskia.barker@flexitricity.com</i>
Company Name:	<i>Flexitricity Limited</i>
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	<p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity 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) 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 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; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements

Standard Workgroup Consultation questions

Q	Question	Response
1	Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?	I believe that the GC0097 Proposal better facilitates Grid Code Objectives, particularly objectives (i), (ii) and (iv). Project TERRE will open the BM and TERRE to parties who currently cannot participate, which will increase the efficiency of the transmission of electricity. It will also help National Grid to discharge it's obligations under the EB GL and the new market created by project TERRE should better facilitate competition.
2	Do you support the proposed implementation approach?	Yes.
3	Do you have any other comments?	<ol style="list-style-type: none"> 1. The full registration process for Secondary BMUs has not been decided, but there is a possibility that the qualification process could be onerous for Secondary BMUs. Secondary BMUs are more likely to need to either add or remove a single unit, due to a site joining or leaving the aggregator or supplier's portfolio. It would be useful if a site leaving a Secondary BMU would not trigger the whole BMU to need to requalify. Similarly it would be useful if new sites could be qualified independently and then added to an already qualified Secondary BMU to avoid the whole BMU becoming disqualified for 3 months every time a site joins or leaves. 2. On page 11 it says 'when connected in the distribution network, the RR provider shall be capable of supplying to the DNO availability and activation information in real-time if required'. While this is a sensible idea in terms of constraint management, there must be reasonable limits on what the DNO can require. It is important that the DNO does not put overly onerous requirements on providers to stop them from providing services as they have a monopoly on the site's ability to connect to the system. 3. The accuracy limit of 2.5% on operational metering is sensible. It is important that the way this is verified in practice is not overly

		onerous, especially as these meters will not be used fiscally. Specifically, lessons should be learned from some of the more arduous parts of the Capacity Market metering process.
4	Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider?	No.

Specific GC0097 Consultation Questions

Q	Question	Response
5	For those respondents that are not existing Grid Code Users (e.g. a non BM Participant) are you aware that GC0097 will extend your obligations that arise from becoming a BSC Party under P344. Do you have any comments on these requirements and obligations?	Yes, we are aware to the extent they have been decided so far. There are still details that need to be finalised, but their scope so far seems reasonable. There is certainly more work to be done on the exact details of the obligations, and without more information it is difficult to comment further.
6	Do you believe that the solution described in this Workgroup Report aligns with current arrangements in the Capacity Market?	<p>It would follow the logic of current Capacity Market arrangements for balancing by the TSO that TERRE actions should be treated in the same way as other balancing instructions for the TSO. The only way I believe this to be achievable is through a Capacity Market rule change, which is outside the scope of this modification.</p> <p>The two most obvious solutions are either to treat TERRE instructions the same way BOAs are currently treated in the Capacity Market, or to treat TERRE as an applicable/relevant balancing service like those outlined in Schedule 4 of the Capacity Market Rules.</p> <p>The downside of treating TERRE instructions in the same way as BOAs is that it may cause an issue for Secondary BMUs where the BMU does not have a one to one relationship with a CMU. The disaggregated MSID pair data that is part of this proposal may offer a possible foundation for a solution to that issue.</p> <p>The downside of treating TERRE as a balancing service like those listed in Schedule 4 of the</p>

		<p>Capacity Market Rules is that these provisions mostly apply to services outside the BM, which may make it an unsuitable mechanism for traditional BMUs.</p> <p>The other issue is that if a downward TERRE instruction is the result of the needs of a TSO outside GB and whether awarding those instructed BMUs as if they had helped the GB system during a system stress event would be contrary to the intention of the Capacity Market.</p>
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GC0097 Grid Code Processes supporting TERRE

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 **5pm on Friday 26 January 2018** 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 by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating 'GC0097 Workgroup Consultation Query'

Respondent:	<i>Please insert your name and contact details (phone number or email address)</i>
Company Name:	<i>Please insert Company Name</i>
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	<p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity 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) 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 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; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements

Standard Workgroup Consultation questions

Q	Question	Response
1	Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?	Yes, the proposal does better facilitate the Grid Code objectives in respect of competition in the generation of electricity and to discharge obligations imposed by the European Commission.
2	Do you support the proposed implementation approach?	Details of the actual implementation in the Grid Code are not clear. With no legal text it is hard to see what the actual changes are. We agree with the proposed product outline though it is a little too far removed from a GC format to state its compatibility with the GC structure.
3	Do you have any other comments?	This workgroup report has been released too early and lacks the concrete code changes that would allow evaluation of the modification. Legal text which actually displays what is changing is an essential element of any code modification.
4	Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider?	<i>If yes, please complete a WG Consultation Alternative Request form, available on National Grid's website:</i> https://www.nationalgrid.com/uk/electricity/codes/grid-code and return to the Grid Code inbox at grid.code@nationalgrid.com

Specific GC0097 Consultation Questions

Q	Question	Response
5	For those respondents that are not existing Grid Code Users (e.g. a non BM Participant) are you aware that GC0097 will extend your obligations that arise from becoming a BSC Party under P344. Do you have any comments on these requirements and obligations?	
6	Do you believe that the solution described in this Workgroup Report aligns with current arrangements in the Capacity Market?	The proposed mechanism doesn't align with the capacity market if compliance with the Grid Code is to be met. A change to the Capacity Market arrangements or some form of rejection ability in the GC/TERRE dispatch process is needed.

GC0097 Grid Code Processes supporting TERRE

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Respondent:	Alastair Frew
Company Name:	ScottishPower Generation
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	<p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity 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) 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 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; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements

Standard Workgroup Consultation questions

Q	Question	Response
1	Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?	Yes
2	Do you support the proposed implementation approach?	<p>At a high level yes, but there appear to be a number of potential issues, which may or may not exist given there is no legal text and the report does not give a clear indication of the proposed solution.</p> <ol style="list-style-type: none"> 1) We agree that a bidder requires to submit a FPN before gate closure as this is the simplest way to ensure there is a baseline for all instructions. 2) Section 3 Subsections 12, 13 & 14 includes various rules relating to BOAs and it appears to state if a BOA has already been issued in the opposite direction to a TERRE acceptance then an RRI will not be issued. Given the fact the TSO has issued a BOA and TERRE has issued an acceptance the net volume of both instructions must be needed, it therefore makes more sense to sum them rather than leave the system imbalance. The question is how will the TSO make up the volume imbalance? Will they issue BOAs to other units or even issue BOAs to the original user who wasn't issued the RRI? The original user is the most obvious choice as they must have the spare capacity and as a RRA has been issued and are already being paid for the volume they are not be being asked to provide. If BOAs are being issued with no RRI what baseline will be used for the subsequent BOAs and is there a chance with this option the parties could be paid twice. 3) Section 3 Subsection 5 suggests that Grid Code Review Panel (GCRP) will review RR Providers who repeatedly fail to comply with the relevant requirements. This is currently out with the terms of reference of the GCRP and it is not clear what the GCRP are expected to or can do about these issues. 4) Section 3 Subsection 4 suggests that there

		will be a requirement to participate in TERRE that operational metering is fitted down to 1 MW. This section also states the SOGL only requires operational metering down to 1.5MW. Given that the SOGL is Statute Law, is it legal to prohibit market access to parties without operational metering below 1.5 MW?
3	Do you have any other comments?	In general the report is very difficult to read, does not clearly identify the issues nor the proposed solution. Going forward it would be useful include some of the initial sections from the P344 report which clearly explain the issue. Also reviewing the structure it is not clear where one topic ends and a new topic begins
4	Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider?	<i>If yes, please complete a WG Consultation Alternative Request form, available on National Grid's website:</i> https://www.nationalgrid.com/uk/electricity/codes/grid-code and return to the Grid Code inbox at grid.code@nationalgrid.com

Specific GC0097 Consultation Questions

Q	Question	Response
5	For those respondents that are not existing Grid Code Users (e.g. a non BM Participant) are you aware that GC0097 will extend your obligations that arise from becoming a BSC Party under P344. Do you have any comments on these requirements and obligations?	n/a
6	Do you believe that the solution described in this Workgroup Report aligns with current arrangements in the Capacity Market?	Yes

GC0097 Grid Code Processes supporting TERRE

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Respondent:	<i>Paul Jones</i>
Company Name:	<i>Uniper UK Limited</i>
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	<p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity 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) 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 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; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements

Standard Workgroup Consultation questions

Q	Question	Response
1	Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?	Yes. Generally, it seems that the solution is workable and, in conjunction with BSC modification P344, will support the implementation of Project TERRE. The modifications also provide a framework to bring a wider variety of parties into the Balancing Mechanism by allowing the separation of the roles of Balancing Services Provider (BSP) and Balancing Responsible Party. Therefore it should support Objectives iv) and ii).
2	Do you support the proposed implementation approach?	Yes.
3	Do you have any other comments?	The solution has entails a number of compromises being made, particularly given the tight timescales for implementing the requirements of the European Guideline on Electricity Balancing. The solution for TERRE puts a certain amount of onus on balancing service providers to ensure that their bids will turn out to be feasible even though actions taken for other balancing services such as the Balancing Mechanism, and possibly in due course Project MARI, could result in original assumptions being incorrect. Therefore, TERRE is likely to be a higher risk solution to BSPs than the Balancing Mechanism, which may undermine its effectiveness if parties price in that risk into TERRE bids and/or opt to operate in the BM instead. However, it appears to be the best solution which could be implemented in the circumstances and there is scope for further improvements to be made when parties have greater experience and understanding of how it works.
4	Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider?	No.

Specific GC0097 Consultation Questions

Q	Question	Response
5	For those respondents that are not	n/a

	existing Grid Code Users (e.g. a non BM Participant) are you aware that GC0097 will extend your obligations that arise from becoming a BSC Party under P344. Do you have any comments on these requirements and obligations?	
6	Do you believe that the solution described in this Workgroup Report aligns with current arrangements in the Capacity Market?	There does not appear to be an issue with the solution described in the workgroup report. However, the Capacity Provider's Adjusted Load Following Capacity Obligation under the CM rules should be adjusted to reflect any RR actions it has been instructed to undertake, in a similar manner to how BM actions are accounted for. This is probably an issue for a CM Rule change rather than anything that can be done within the Grid Code (or BSC).

GC0097 Grid Code Processes supporting TERRE

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Respondent:	Rick Parfett, rick.parfett@theade.co.uk
Company Name:	The Association For Decentralised Energy (ADE)
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	<p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity 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) 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 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; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements

Standard Workgroup Consultation questions

Q	Question	Response
1	Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?	<p>The ADE believes that the GC0097 Original Proposal better facilitates Grid Code Objectives i) and iii), as Project TERRE is likely to increase efficiency of procurement of electricity and promote the security and efficiency in the national electricity system operator as a whole.</p> <p>We believe, however, that the Original Proposal fails to facilitate Grid Code Objective ii), “to facilitate competition in the generation and supply of electricity” as effectively as possible, due to the absence of any transparent and effective alternative baselining methodology to the submission of Physical Notifications (PNs).</p> <p>The ADE has therefore raised a WG Consultation Alternative Request, which is identical to the GC0097 Original Proposal but adds a robust and transparent alternative baselining methodology as an option for participants in TERRE. This will facilitate aggregator and smaller player participation, improving competition and delivering Grid Code Objective ii) more effectively.</p>
2	Do you support the proposed implementation approach?	The ADE supports the proposed approach of GC0097 being implemented 10 days after an Authority decision, ensuring compliance with the TERRE Central Project go-live timetable and alignment with BSC modification P344.
3	Do you have any other comments?	<p>The ADE supports the GC0097 Proposal, but has a number of concerns. We understand that, due to limited timescales and the complexity of the solution, the proposed implementation approach focuses on creating a workable solution, with further refinement possible. However, we believe that it is important to highlight the following issues for further consideration and further collaboration with industry as, without this, National Grid’s goal of delivering market access to non-BM participants is liable to fail.</p> <p>1. If participants do not have access to an alternative baselining methodology, aggregator and small player participation in TERRE is likely to be limited. The ADE’s WG Consultation Alternative Request form contains details of our proposed alternative baselining methodology, which is robust,</p>

		<p>transparent and has been implemented successfully in several other markets. For more details of this methodology, please see the form. If National Grid decide not to allow the suggested alternative methodology, it is important that they outline how they will address the problems that this methodology aims to resolve (i.e. limited scope for aggregator and small player participation in TERRE if submission of PNs is the only option).</p> <p>2. The Proposer confirmed that, as part of the prequalification process for TERRE, “Qualification will be reassessed...where technical requirements or equipment changes” (p.12 of the GC0097 consultation document). While the Proposer stated at the TERRE Industry Day that detail of what constitutes a change of equipment or technical requirements have yet to be decided, further clarity on this point is essential.</p> <p>Without further clarity, there is a risk that a current issue being dealt with through Capacity Market rule changes would be duplicated in the requirements for Qualification for TERRE. Under current CM rules, there is a range of circumstances in which something that happens to just one component of a DSR CMU would trigger the need to re-test all the other components of the CMU.</p> <p>This is illogical and unreasonable, since nothing has changed with any of those other components, so nothing is learned by testing them again. The re-testing simply imposes extra costs on customers, in effect punishing them for having chosen an aggregator who happened to allocate them to a CMU (or group of CMUs) that included some other customer who later had an issue.</p> <p>The ADE is therefore eager to ensure a similar scenario does not arise in the TERRE Qualification process, as this would represent a significant barrier to market entry for aggregators and small players. We would welcome the opportunity to work closely with</p>
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		<p>the Proposer to ensure that Qualification reassessments provide reassurance of delivery while not creating a barrier to market entry.</p> <p>The simplest and best approach would be to test everything on a per-component basis, rather than reassessing the whole of Qualification for TERRE. Any requirement to obtain a certificate for a Secondary BMU would be replaced with a requirement to obtain a certificate for each Secondary BMU component. Anything that invalidates a certificate would only invalidate the certificates for the affected components. This would enable a VLP to test any new component separately and then add them to an existing, tested Secondary BMU. A Secondary BMU should also be allowed to continue to operate without need to undergo a retest in cases where a component is removed.</p> <p>It should be noted that RTE's interpretation of the TERRE Qualification process in France involves skipping the prequalification phase and considering a portfolio as de facto validated. They then outline a number of criteria that, if not met, will result in the removal of 'qualified' status if a number of activations are poorly executed. Qualification requirements are therefore likely to be minimal in other participating countries in TERRE; it is important that Qualification requirements for UK parties are not an order of magnitude more arduous, otherwise this will negatively impact competitiveness within the European market.</p> <p>3. The proposal is for BM Unit data will be aggregated at Grid Supply Point Group level, enabling a number of meters within a GSP Group to comprise a BMU. Even though a BMU is not defined at a single GSP, information will also be requested that provides information about the location of their sub-components (meters), to allow the TSO to understand where on the network RR provision will have an effect.</p> <p>While the ADE appreciates that this approach</p>
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		represents a sensible compromise, guidance is needed on a standard method for selecting the appropriate GSP. This will ensure that a uniform method is being used by all participants and improve the usefulness of the data that the TSO receives.
4	Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider?	Yes

Specific GC0097 Consultation Questions

Q	Question	Response
5	For those respondents that are not existing Grid Code Users (e.g. a non BM Participant) are you aware that GC0097 will extend your obligations that arise from becoming a BSC Party under P344. Do you have any comments on these requirements and obligations?	Some members that are not existing Grid Code Users have indicated that they are aware of this. The scope of the requirements and obligations decided so far is reasonable, but the lack of detail makes a full response to this question difficult. It is important that more details of the obligations are provided and that industry parties are involved in advising about the viability of detailed technical requirements.
6	Do you believe that the solution described in this Workgroup Report aligns with current arrangements in the Capacity Market?	<p>While Project TERRE is a new product, its interaction with current arrangements in the Capacity Market should be no different than that of the other products that National Grid uses to balance the system. Various stages of the proposed solution are based on similar arrangements in the BM, citing consistency and ease of understanding. It would therefore make sense for the interactions between TERRE and the CM to be treated in a similar manner to interactions between the BM and the CM.</p> <p>Under the BM, if a participant is instructed down through a BOA during a system stress event, the BOA volume is credited back onto the participant's CM delivery volume as if they had generated it. This mechanism ensures that participants are not penalised for following an instruction from the TSO. A similar provision exists for BM balancing services, for example in a scenario where a participant participating Mandatory Frequency Response is instructed to provide frequency response.</p>

		<p>For Non-BM participants, provisions are made in Schedule 4 of the CM Rules, which lists the relevant balancing services. For STOR, for example, if a participant is available (whether or not they are instructed), the available volume is credited to delivery if they are not instructed. This prevents the participant being penalised for following the TSO's instruction or lack of instruction.</p> <p>The issue is probably outside the scope of the GC0097 Workgroup and is best achieved through a Capacity Market Rule Change. The TERRE product should be designated a Relevant Balancing Service in the Capacity Market, which would enable consistency of treatment in interactions.</p>
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Alternative request Proposal form

Grid Code

Modification potential alternative submitted to: GC0097

What stage is this document at?

GC0097

01

Proposed alternative

02

Formal Workgroup alternative

Mod Title: Grid Code Processes supporting TERRE

Purpose of alternative Proposal:

This proposal seeks to amend GC0097 by providing an alternative means of measuring delivery to the submission of Physical Notifications (PNs). It proposes use of a standard profile baseline methodology, with adjustment for the day of an event. This is proposed as an optional alternative to submission of PNs, not as a replacement solution.

Date submitted to Code Administrator: 26/1/18

You are: A Workgroup member submitting proposal to a Workgroup Consultation

Workgroup vote outcome: Formal alternative/not alternative

(Should your potential alternative become a formal alternative it will be allocated a reference)



Any Questions?

Contact:

Caroline Wright

Code Administrator



[caroline.wright](mailto:caroline.wright@nationalgrid.com)

[@nationalgrid.com](mailto:caroline.wright@nationalgrid.com)



07970498249

Alternative Proposer(s):

Rick Parfett

ADE



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020 3031 8757

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6	Legal Text.....	4

Should you require any guidance or assistance with this form and how to complete it please contact the Code Administrator at grid.code@nationalgrid.com

1 Alternative proposed solution for workgroup review

While the Original Proposal better facilitates Applicable Grid Code Objectives A, C, D and E than the baseline, the ADE does not believe that it facilitates Objective B – “To facilitate competition in the generation and supply of electricity” – as effectively as an alternative that offers the option to use a standard profile baseline methodology, with adjustment for the day of an event

The ADE is therefore proposing an Alternative Modification which is identical to the Original Proposal but adds a second option for notification, via a standard profile baseline methodology with adjustment on the day of an event. This better facilitates Applicable Grid Code Objective B by providing an alternative to submission of Physical Notifications to nominate capacity, which would be unsuitable or administratively intensive for many potential market participants and could therefore act as a serious barrier to entry, limiting competition.

While submitting Physical Notifications to nominate capacity will be useful for some sites, particularly those with demand which varies significantly with changing production schedules, it is not suitable as a default option for data submission. It is arduous and administratively intensive for many potential market participants and could act as a serious barrier to entry. In addition, it is likely to be more susceptible to gaming than other options, including the proposal below.

To be able to make TERRE or BM offers that they can reliably meet, consumers and aggregators need to forecast and monitor the volume of flexibility they will have available in each interval. However, this is a very different process from forecasting their total demand, which is what the proposed PN approach would require. The total demand often includes many other loads whose consumption is not controlled. Aggregators, in particular, have no insight into the behaviour of these other loads.

This is not to suggest that the PN option be removed: for a few large consumers, it will be the best approach. But these represent a small niche. Our point here is that making standardised baseline methodology available will reduce costs and broaden participation, providing clear value to market participants and to the system operator. We believe that the standardised methodology should be the default method, with PNs retained as an option (subject to considerable scrutiny, due to the potential for gaming).

The ADE recommends that P344 provide an objective, standardised baseline methodology, similar to those that have been successfully used in both the U.K. (in the Capacity Market) and several balancing markets in other countries. This will enable a transparent and accurate approach to baselining through the use of a robust, proven methodology.

As a concrete example, we suggest using a '10-in-10' adjusted methodology for calculation of the profile baseline by the TSO. This approach originated in California, but is now used in many markets. Within Europe, it is proposed for the Greek balancing market (see, for example, [p.44-5 of this document](#)).

This involves calculating a consumer's energy use during each settlement interval as the average of that consumer's energy use during the same interval on the previous ten comparable non-event days. (For events on business days, previous business days are used, and similar for non-business days.) This has the advantage that it captures regular variations: if the consumer usually ramps down their consumption in the early evening because it's the end of their working day, then the baseline will do the same. The average is then adjusted up or down in relation to the consumer's energy use in the four hours immediately preceding an instruction being issued. This improves accuracy and is particularly important because dispatches tend to occur on atypical days (e.g. particularly cold ones), where the baseline will be in need of some adjustment.

Our proposal differs slightly from the Greek example, which involves adjustment up or down in relation to the consumer's energy use in the four hours **immediately preceding an event**. Changing this to the four hours **immediately preceding an instruction being issued** helps to eliminate opportunities for gaming.

The baseline should be calculated from the same metering data streams that are used for settlement purposes. It does not have to be calculated in real time.

In some cases, aggregators may wish to install near-real time telemetry equipment to monitor the flows through boundary metering so that they can estimate the baseline in real-time, and hence know exactly how their performance will be measured. However, the important point of this approach (compared to only allowing PNs) is that it doesn't require all aggregators to do it on all sites, and to maintain the capability to calculate baselines and submit PNs all the time. Such requirements would create a barrier to entry for aggregators, and the per-site telemetry cost would render participation by small sites uneconomic, both of which would render the market less competitive. It ought to be possible for an aggregator to represent an aggregation of many small sites, and submit offers on the basis of the *change* in demand that the sites can reliably deliver, without needing continuous monitoring of the boundary meter or calculations of PNs.

2 Difference between this proposal and Original

The proposed solution is identical to the Original Proposal, except that it adds the option of using of a standard profile baseline methodology, with adjustment for the day of an event, as an alternative to the submission of PNs to measure delivery.

3 Justification for alternative proposal against Grid Code objectives

The alternative proposal will have the same impact upon the Applicable Grid Code Objectives as the Original Proposal, except for against Objectives A and B, where it will have a more positive impact than the Original Proposal. Providing a standardised baseline methodology available will reduce costs and broaden participation, facilitating competition in the generation and supply of electricity. This will provide clear value to both market participants and the System Operator.

Impact of the modification on the Relevant Objectives:	
Relevant Objective	Identified impact
To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity	Positive
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)	Positive
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	Positive
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; and	Positive
To promote efficiency in the implementation and administration of the Grid Code arrangements	Positive

4 Impacts and Other Considerations

The proposed alternative impacts P344 by providing an alternative approach to measuring delivery. As the methodology has already been successfully implemented in several other markets, the need for detailed development of the solution may be mitigated.

Consumer Impacts

The proposed alternative will have a low or medium impact upon consumers; by facilitating competition in the generation and supply of electricity, it could reduce costs. It may also improve security of supply by broadening participation in the provision of services.

5 Implementation

The ADE does not believe that the proposed alternative would have an impact upon the current implementation timescale for GC0097. Additional of a profile baseline methodology will require some minor changes to drafting, but this is highly unlikely to delay the modification's implementation.

6 Legal Text

No legal text has been provided thus far under GC0097. The alternative would look to adapt the legal text when developed.

GC0097 Grid Code Processes supporting TERRE

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 **5pm on Friday 26 January 2018** 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 by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating 'GC0097 Workgroup Consultation Query'

Respondent:	<i>Please insert your name and contact details (phone number or email address)</i>
Company Name:	<i>Please insert Company Name</i>
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	<p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity 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) 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 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; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements

Standard Workgroup Consultation questions

Q	Question	Response
1	Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?	The key Grid Code objective to satisfy is (iv) around the compliance with European legislation. Other objectives which might also be relevant are promoting competition and/or efficiency.
2	Do you support the proposed implementation approach?	NGIC supports in principle, whilst recognising that significant details are still to be developed.
3	Do you have any other comments?	<p>The statement in §26 that arrangements for Interconnector TSOs will need to be considered further is noted with interest.</p> <p>The following issues will potentially have a bearing on the future design and development (between GC0097, BSC P344 and methodologies at the European level):</p> <ul style="list-style-type: none"> - firmness implications and appropriate incentivisation - the process for modifying Interconnector Scheduled Flows - I/C losses - implications for the Interconnector Administrator and Interconnector Error Administrator - legal/contractual ramifications for I/C access
4	Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider?	<ul style="list-style-type: none"> - No alternative to propose.

Specific GC0097 Consultation Questions

Q	Question	Response
5	For those respondents that are not existing Grid Code Users (e.g. a non BM Participant) are you aware that GC0097 will extend your obligations that arise from becoming a BSC Party under P344. Do you have any comments on these requirements and obligations?	N/A.

6	Do you believe that the solution described in this Workgroup Report aligns with current arrangements in the Capacity Market?	No reasons to believe that current proposal would not align with capacity market.
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ENGIE has the following comments on the GC00097 consultation.

Incomplete solution

In general, responding to this consultation is hampered by the solution being incomplete. For example, the consultation notes that

“It was noted that for aggregators or small players it may be more difficult to establish the Final Physical Notification. It was noted that the Capacity Market has adopted a “baseline” approach...”

The consultation then goes onto say

“More work may be required under the Grid Code to consider the equivalence of capacity market baselines to physical notifications for the purpose of participation in TERRE. If the baseline approach can be considered as equivalent to a physical notification then this could be used as a Final Physical Notification under the BSC for settlement of TERRE acceptances from aggregators or smaller participants. However, it is the opinion of the Proposer that for the purposes of this modification the Capacity Market baseline approach will not be used.”

The consultation does not offer a solution that does provide a baseline for aggregators or smaller participants. This must be a necessary part of the solution and it is not clear how it can be implemented with this absent.

On page 24 , the consultation lists which TERRE bids will be restricted. One of these is where there is a *“Prior DNO/DSO commitments or Distribution constraints (if known)”*. We understand that the Open Networks Project is developing a solution to enable the TSO to have sight of distribution constraints. This would seem to be a precursor to TERRE implementation as without it, the TSO may not have knowledge of these, at the least taking actions that have to be undone by the DSO and at worst, creating a security of supply risk.

A further restriction is where *“Units that have been BOA’d for reserve and response”*. Presumably this would be at the point of submission of bids to the TSO . If this is the case, how would the TSO know that these were going to continue over the TERRE delivery period? If this is not the case and it is based on an expectation that units may be delivery reserve or response in the TERRE delivery period, then how would the TSO know who would be delivering response in the TERRE periods an hour in advance when the reserve or response instruction has not been issued? Either way, it would appear to rule out providers of reserve and response from taking part in TERRE.

On page 38 *“Under the P344 solution, Virtual Lead Parties will accede to the BSC. Further work is required to understand the contractual mechanism by which Virtual Lead Parties will undertake to ensure compliance with the relevant sections of the Grid Code. It is anticipated that any other technical requirements that fall outside of the Grid Code that would normally be covered under a connection agreement or ancillary services contract will also considered as part of this work”*

Again, this should be covered ahead of any decision to implement the modification to give industry confidence that a workable solution is being delivered

Publication of cashout prices

Clarity is also needed on when the cashout price will be published. Ultimately this is a BSC issue but to ensure there is not the backward step of delaying publication of the cashout price, the SO will

need to send TERRE acceptance data to settlements more quickly than that specified by TERRE (30 minutes after the end of the delivery period).

Please don't hesitate to contact me if you have any questions regarding the above.

Kind regards,

Simon.

GC0097 Grid Code Processes supporting TERRE

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 **5pm** on **Friday 26 January 2018** 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 by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating 'GC0097 Workgroup Consultation Query'

Respondent:	<i>John West, 07903551469</i>
Company Name:	<i>Energy Networks Association (ENA)</i>
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	<p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity 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) 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 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; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements <p><u>Introduction</u></p> <p>This response is on behalf of the ENA and its members participating in the Open Networks project.</p>

The Open Networks project has been established by the network operators in GB to take forward work to improve the experience and outcomes for customers and consumers as we transition to a lower carbon future. This work encompasses how we enable the most effective use of Distributed Energy Resources (DER), whole system processes for investment and operation and the transition of DNOs to DSOs.

A major area of the Open Networks project through 2017 was the early development of models to enable increased and effective participation of DER in the provision of services to network operators. This work is continuing in Phase 2 of the Open Networks project through 2018.

Potential Distribution Network Impacts of TERRE Proposals

From the Network Operator perspective, it remains unclear as to the volume of distribution connected resources that will participate in TERRE. The war games analysis referenced in the consultation document suggests distributed generation volumes of 2GW or greater. As well as distributed generation, there is the potential for demand side participation. Distribution connected resources would also be able to participate in the provision of GB Balancing Services through Secondary BM Units.

This increasing use of distribution resources to provide wider system services has the potential to impact secure operation of distribution networks. With increasing levels of active DER and networks being operated closer to capacity limits, distribution network operation is becoming more complex. If distribution resources are scheduled without assessing all network impacts, there is the potential to put areas of distribution networks at risk. Furthermore, as distribution connected resources are often connected within Active Network Management (ANM) arrangements, the instruction of these resources to provide a GB or European level service could be countermanded by the operation of the ANM scheme. For example, the reduction of demand within an ANM zone could result in equivalent generation resources being turned down to satisfy an ANM scheme limit.

If these conflicts are not managed and resolved effectively, this could greatly disadvantage customers with distribution resources connected in constrained areas. Moreover, unresolved service conflicts and non-optimisation of whole system flexibility dispatch will ultimately result in customers paying more for the balancing services required for system operation. To ensure economic and efficient use of the system

	<p>going forward it is essential that the impacts to both active and non-active customers are considered in a whole system cost benefit analysis.</p> <p>It is good that the need for close working between transmission and distribution network operators is recognised in the GC0097 consultation document. For example, in the discussion of Data Validation (section 7), it is noted that on-going work between the GB TSO and DNOs will determine the industry standard on coordinating services and conflict avoidance in order to prevent distribution constraints being triggered by a TERRE service provider. Also, in the discussion of Coordination between GB TSO and Network Operators, it is noted that “Wider industry work between GB DNOs/DSOs and GB SO will determine the industry standard on coordinating services and conflict avoidance.” and that “This will influence any requirements on Grid Code changes.”</p> <p><u>Proposed Way Forward</u></p> <p>Through the ENA Open Networks project, we would like to work closely with the working group and TERRE project team to ensure that the necessary co-ordination and data exchanges to enable the effective participation of distributed resources in TERRE and the BM are developed in line with the preferred industry models for the management of DER services.</p> <p>Through the Open Networks Phase 2 work, we will further develop a range of models for the management of DER services. This will include the development of processes for service co-ordination, service conflict management and data exchange as well as further consultation with stakeholders to help establish a preferred model. Through this work, we will achieve greater clarity on the preferred models by end-2018.</p> <p>Whilst the data exchange mechanisms need to be agreed ahead of these timescales to meet the TERRE timeline, we would like to work with the working group and TERRE project team to ensure that the arrangements for TERRE are consistent with the Open Network project proposals.</p>
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Standard Workgroup Consultation questions

Q	Question	Response
1	Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?	<p>The proposal has the potential to positively impact Grid Code objectives if steps are included to ensure that the wider impacts of scheduling further distributed resources for TERRE and other balancing market services are understood and mitigated. This is expanded in the response above.</p> <p>Grid Code objectives i. and ii. would be positively impacted through development and implementation of the proposal. There is opportunity to facilitate a wider European market for reserve and to enable increased participation of small-scale resources.</p> <p>Objective iii. would be positively impacted by developing closer and more effective interactions between transmission and distribution network operators. This is recognised in the working group consultation and we believe this would be best achieved by developing the transmission-distribution interactions for GC0097 alongside the industry work on DER services that is being co-ordinated through the ENA's Open Networks project.</p>
2	Do you support the proposed implementation approach?	<p>Implementation of TERRE through the extension of BM arrangements is a pragmatic approach to enabling a European market in replacement reserves.</p> <p>The timescales for TERRE implementation are ambitious and will require solutions for improved transmission-distribution data exchange to be developed through 2018 and deployed in 2019.</p> <p>As models for the management of DER services are further developed by the Open Networks project through 2018, detailed transmission-distribution processes and data exchanges to support these models are being developed. We would like to work closely with the TERRE working group and project team to ensure a consistency of approach for network operators and stakeholders.</p>
3	Do you have any other comments?	No further comments.

4	Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider?	<p>No alternative is proposed.</p> <p><i>If yes, please complete a WG Consultation Alternative Request form, available on National Grid's website:</i></p> <p>https://www.nationalgrid.com/uk/electricity/codes/grid-code and return to the Grid Code inbox at grid.code@nationalgrid.com</p>

Specific GC0097 Consultation Questions

Q	Question	Response
5	For those respondents that are not existing Grid Code Users (e.g. a non BM Participant) are you aware that GC0097 will extend your obligations that arise from becoming a BSC Party under P344. Do you have any comments on these requirements and obligations?	No comment.
6	Do you believe that the solution described in this Workgroup Report aligns with current arrangements in the Capacity Market?	No comment.

GC0097 Grid Code Processes supporting TERRE

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 **5pm** on **Friday 26 January 2018** 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 by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating 'GC0097 Workgroup Consultation Query'

Respondent:	<i>Martin Mate; martin.mate@edf-energy.com</i>
Company Name:	<i>EDF Energy</i>
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	<p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity 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) 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 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; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements

Standard Workgroup Consultation questions

Q	Question	Response
1	Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?	<p>Yes.</p> <p>GC0097 should increase liquidity and competition in the provision of system balancing by increasing the potential sources of balancing, so better facilitating Grid Code objectives i, ii, iii, iv.</p> <p>There is a risk that GB balancing resources could be diverted to meet external balancing requirements. This could increase costs for GB consumers, but analysis indicates a net benefit in practice. Export of balancing resources could also conceivably reduce GB internal system security, but we assume NGET will assess GB need, interconnection capacity and excluded bids to avoid this, and it will tend to be self-correcting because opportunity in GB will bring resources back to GB given limited interconnection capacity.</p>
2	Do you support the proposed implementation approach?	<p>We support the broad approach of facilitating TERRE alongside the existing Balancing Mechanism arrangements, allowing submission of bids into both TERRE and BM at the same time, and using existing communications and despatch functionality as far as practical.</p> <p>TERRE is effectively an auction for short term balancing soon after (every other) GB gate closure. Although it may displace or increase actions currently taken in the BM and/or some non-BM actions, it is not a replacement for the BM. Flexibility that is not utilised in TERRE should remain available to NGET under the BM, as under the proposal.</p> <p>However, we note that some of the operational timings for TERRE are fundamentally inconsistent with intraday market trading and with current GB BM operational timings. The interactions are complicated, and compromises are unavoidable. We have concerns that:</p> <ul style="list-style-type: none"> • Many details remain to be fully defined, both for the central TERRE/LIBRA arrangements, and for the GB implementation. • The particular compromises chosen might turn out to create perverse incentives, or have unexpected consequences. Future refinements to the proposed approach seem very likely, during development or following

		<p>practical experience.</p> <p>Significant IT and process development will be required by NGET, Elexon, intended participants, and other parties that may be affected. Consequently, we think the notice period for intended implementation in Q3 2019 following regulatory approval by Q3 2018 will be insufficient. Implementation with at least 18 months' notice, in 2020, seems more realistic.</p>
3	Do you have any other comments?	<ol style="list-style-type: none"> 1. NGET should publish its detailed methods of performing associated activities, to give confidence that it is acting consistently and to provide transparency for market participants. For example: <ol style="list-style-type: none"> a. Interfaces and information exchange with distribution system operators in relation to GB distribution and transmission constraints. b. Potential interaction of TERRE bids (and other balancing procurement) with distribution and transmission constraints. c. Interfaces and information exchange with interconnectors, other TSOs and market operators in relation to interconnection capacities and constraints. d. Methods used to exclude TERRE bids, including criteria for embedded bids identifiable only by GSP Group, and those identifiable by GSP. e. Reporting to TERRE participants and to wider market. f. Currency conversion. g. Determination of TERRE balancing need, including criteria for the level and pricing of elastic need. h. Monitoring of TERRE bid feasibility and participant and interconnector delivery. i. Reporting of costs and benefits within GB and between GB and other TSOs. 2. The timescales for pre-qualification in TERRE (page 12 of consultation) are proposed to be as long as 6 months. There may be a rush of TERRE participants initially, but in the longer term this timescale seems unnecessarily long (though we note and support that existing BM participants will be considered qualified). 3. Consultation page 13 refers to 'scheduled power output for each RR providing unit and group (and each generating module or

		<p>demand unit of a RR group) with maximum active power ≥ 1 MW'. What is an RR group and how does it differ from an RR unit?</p> <ol style="list-style-type: none"> 4. Consultation page 23 proposes that participant PN and bids for each TERRE hour must be fixed at Gate Closure, at which time some final results of intraday trading may not be available. Ideally, participants would have a short time to incorporate such trades into TERRE submissions. This issue exists for the existing BM, but we note it is compounded for the second half-hour of each TERRE hour and for the half-hour following. NGET's determination of need, and participant's bids into TERRE, may reflect this uncertainty. 5. Ideally, the TERRE process would turn round very quickly so that the relative timing of TERRE acceptances and BM acceptances would be clearer. 6. Under the standard terms of EMR Contracts For Difference (CFD), "Balancing Mechanism means the balancing mechanism operated at the Agreement Date by the Transmission System Operator and designed to balance supply and demand for electricity in real time on the national electricity transmission system, and shall include any substitute or equivalent mechanism or arrangements;". Reference is made to the bid-offer regime and bids made into the Balancing Mechanism. The definition of Balancing Mechanism here is probably wide enough to include TERRE bids, but this should be confirmed. 7. TERRE product ramping period must be in range 0 to 30 minutes (consultation page 8). Does this include ramps to return to FPN following delivery? 8. Is it correct to assume that multiple mutually exclusive different offers in different directions for the same quarter hour may be submitted (pages 8-9)? 9. More detail is required on the calculation and issue of Replacement Reserve Instructions
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		which may span as long as 2 hours from the time when TERRE results are known, and their interaction with BM acceptances.
4	Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider?	<p>No</p> <p>If yes, please complete a WG Consultation Alternative Request form, available on National Grid's website:</p> <p>https://www.nationalgrid.com/uk/electricity/codes/grid-code and return to the Grid Code inbox at grid.code@nationalgrid.com</p>

Specific GC0097 Consultation Questions

Q	Question	Response
5	For those respondents that are not existing Grid Code Users (e.g. a non BM Participant) are you aware that GC0097 will extend your obligations that arise from becoming a BSC Party under P344. Do you have any comments on these requirements and obligations?	-
6	Do you believe that the solution described in this Workgroup Report aligns with current arrangements in the Capacity Market?	<p>We support the proposal to require and use a Final Physical Notification as a reference level for instruction and delivery of TERRE volumes from all TERRE participants, rather than Capacity Market baseline or similar. This is necessary in order to use existing BM instruction and monitoring processes, and to help ensure competition on equivalent terms between large sources, and small sources within Supplier portfolios.</p> <p>Capacity Market changes may be required to ensure that balancing volumes delivered for TERRE are allowed for in determining CM delivery in a stress event, in the same way as existing BM volumes are allowed for.</p> <p>Consideration should be given to the impact on determination of capacity requirements of potentially increased information on reference levels of generation and demand within distribution.</p>

GC0097 Grid Code Processes supporting TERRE

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 **5pm on Friday 26 January 2018** 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 by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating 'GC0097 Workgroup Consultation Query'

Respondent:	Jack Abbott – jack.abbott@centrica.com 07557 615587
Company Name:	Centrica
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	<p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity 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) 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 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; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements

Standard Workgroup Consultation questions

Q	Question	Response
1	Do you believe that GC0097 Original Proposal or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?	<p>Yes – Below are some specific comments around selected objectives:</p> <p>Objective ii) We believe the TERRE project should improve liquidity and a wider range of providers than in the Balancing Mechanism (BM) currently. The P344 modification will allow access to the BM and TERRE for technologies - including DSR, storage and decentralised assets - that struggle to access the BM.</p> <p>Objective iii) Careful consideration is needed on the interactions between TERRE, which operates on an hourly basis and the BM, which operates on a half-hourly basis. National Grid must ensure that liquidity is not affected by these different timescales. A European-wide scheme such as TERRE, will be affected by national policies, such as the UK's Carbon Price Floor; the System Operator and the Regulator should consider the impact of P344 on the proportion of GB domestic capacity that is helping to balance the GB system.</p>
f2	Do you support the proposed implementation approach?	<p>We are broadly supportive of the approach.</p> <p>We acknowledge the good joint working between Elexon and National Grid and believe that this timeline is ambitious but achievable. We support the idea of parallel running; this plan must also include BM access for secondary BMUs. We would appreciate clarity on implementation progress of other TERRE participants and early indication of any delay would be welcome.</p> <p>The appropriate changes should be implemented to ensure that Secondary BMUs can access the Balancing Mechanism by April 2019. We believe that this should be the implementation date for Secondary BMUs, as it is expected that spill payments (an important revenue stream for assets that struggle to access the Balancing Mechanism currently) will be removed – as implemented through BSC modification P354. An additional benefit will be that this will allow a longer period for National Grid and Elexon to ensure that this methodology is ready for TERRE go-live.</p> <p>We believe that if there is any delay to the TERRE timelines, full access to the BM for secondary</p>

		<p>BMUs should still be in place by the implementation date.</p> <p>Question 3 contains comments on specific areas of the consultation document.</p>
3	Do you have any other comments?	<p><u>Qualification of assets in TERRE</u></p> <p>National Grid has stated that “<i>Qualification will be reassessed at least once every five years or where technical requirements or equipment changes</i>”. A secondary BMU entering in to the TERRE auction can change daily. Secondary BMUs must not go through onerous qualification processes for every component change in the secondary BMU. Therefore, National Grid needs to provide more clarity about its statement around qualification for “<i>technical requirements or equipment changes</i>”.</p> <p><u>Secondary BMU</u></p> <p>We strongly support the introduction of the Secondary BMU; this will ensure that there is a wide range of providers of Replacement Reserve.</p> <p>We agree with the Workgroup that the components making up a Secondary BMU should be aggregated at GSP Group level, rather than GSP level. National Grid should explore whether aggregation, regardless of location, could be of value.</p> <p><u>Physical Notification and Baselining</u></p> <p>We believe that National Grid should allow either a baselining methodology or a Physical Notification (PN) methodology to be used. Both parameters have different pros and cons – as highlighted in the consultation document – and hence both should be made available for participants within TERRE. We agree with the Workgroup that if TERRE proceeded with just the Physical Notification methodology that “<i>Data validations by TSO on PNs may cause operational/compliance issues for ‘non-BM’ RR Providers</i>”</p> <p>Assets would be signatories to the Grid Code and hence would be obligated to submit a truthful PN. There would also be operational metering which will be able to validate such Physical Notifications to ensure that gaming is avoided. We believe that BMUs should be investigated by the System Operator</p>

		<p>and/or the Regulator if there is suspicion around Physical Notifications, with appropriate penalties if found to be gaming.</p> <p>A baselining methodology will ensure a maximum amount of participation within TERRE and the Balancing Mechanism by aggregators and small players. We believe that the TERRE and Balancing Mechanism baselining methodology, should draw upon the baselining methodology in the Capacity Market.</p> <p>For both these methodologies, there should be a clear methodology for dispute resolution.</p> <p><u>Restricted bids, due to TNO and DNO constraints</u></p> <p>We are concerned that National Grid will class bids as “<i>Restricted</i>”, if there are known transmission or distribution network constraints.</p> <p>We accept that it may be physically impossible for assets to provide balancing services due to constraints. However, the TNO or DNO must not notify constraints without undergoing a proper rigorous analysis of the real-time interaction between different distribution and transmission networks, to ensure that the lowest cost solution for the whole system is chosen. A lower cost solution may be that a constraint may be alleviated if a flexibility solution is commercially procured, rather than National Grid acting to restrict balancing services from a specific location.</p> <p>As much information as possible would need to be published by National Grid about the reasons for constraints; this will better inform investors where assets are needed by the system and to inform the right commercial decisions to benefit the whole system. It will also give balancing services providers confidence that distribution or transmission network constraints are being managed as efficiently as possible, and TERRE providers are only being “<i>restricted</i>” when it is necessary.</p> <p>TERRE providers should be informed in advance of any known constraints by TNO or DNOs.</p> <p><u>TERRE / BM Interaction</u></p>
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	<p>We share the workgroup concerns that the <i>“design of the TERRE central process may introduce undue uncertainty for parties that wish to prepare RR bids”</i>. This is driven by the fact that a Final Physical Notification is submitted for TERRE on an hourly basis, whereas at the Balancing Mechanism is on a half-hourly basis.</p> <p>We believe that the ideal solution would be to move the time of RR Instructions in advance of the FPN deadline for second BMU period, i.e. T-35 minutes on the TERRE window. We believe there is still scope for TERRE timings to be altered as it is still in implementation phase.</p> <p>If this change is not possible, National Grid will have to accept that for the second (30 minute) settlement period within the hour TERRE window, the notified TERRE PN may be different to the BM FPN. Providers should not be made to choose between the two products as this will reduce liquidity, and potentially the effectiveness of one or both products.</p> <p>National Grid should publish the Bid Offer Acceptances (BOA) actions that it must take due to infeasible Replacement Reserve Instructions (RRIs), and consider whether it is cost-effective, i.e. the costs from the BOA action to alleviate TERRE issues, is lower than the benefits from utilising a TERRE product in GB.</p> <p><u>TERRE product characteristics</u></p> <p>Centrica supports that flexibility services are procured in a competitive manner, and the TERRE product – which is procured in short-term, pay-as-clear auctions – is preferable to long-term tender products to STOR. However, we believe that National Grid should not hastily reduce the procured STOR volume, until the TERRE product has been implemented and shown to demonstrably provide replacement reserve cost-effectively. Any changes in STOR (or other balancing services) capacities should be clearly signalled by the System Operator with adequate warning.</p> <p>We note that within TERRE, assets are disincentivised to provide a quicker (or slower) ramping time than the default shape (10 minutes</p>
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		from zero to full load). We believe that National Grid produce a piece of analysis to demonstrate whether there may be a benefit from incentivising assets to provide quicker ramping through TERRE.
4	Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider?	No

Specific GC0097 Consultation Questions

Q	Question	Response
5	For those respondents that are not existing Grid Code Users (e.g. a non BM Participant) are you aware that GC0097 will extend your obligations that arise from becoming a BSC Party under P344. Do you have any comments on these requirements and obligations?	n/a
6	Do you believe that the solution described in this Workgroup Report aligns with current arrangements in the Capacity Market?	<p>In section 24 on page 40, the document states <i>“Under the proposed solution it was the view that if a RR Provider participates in multiple markets and has obligations to deliver capacity/balancing MWs (excluding BM) to either TSO or DNO/DSO, that this commitment be honoured before bidding into TERRE”</i>. We do not believe that there is a scenario that a TERRE bid should be marked as ‘restricted’ due to Capacity Market obligations.</p> <p>National Grid cannot know at the time of the TERRE auction, whether a provider would be obligated to meet its Capacity Market obligation. Within the Capacity Market, a Capacity Market Unit is required to generate during ‘<i>stress events</i>’; this is only known post-event. A Capacity Market Warning (given 4 hours before the event) does not necessarily mean there will be a stress event; it is a notification of 500 MW or less margin between forecast system demand and supply.</p> <p>A unit’s Capacity Market Obligation is amended when a balancing service is designated as a</p>

		<p><i>'Relevant Balancing Service'</i>. We believe that the TERRE product should be included as a Relevant Balancing Service in the Capacity Market. Ofgem will need to amend this through its Capacity Market Rules change process.</p>
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TERRE and Wider Access Benefits and Costs

16th April 2018

nationalgrid



TERRE and Wider Access Benefits and Costs

Benefits for TERRE

- Reported benefits of TERRE (Public consultation document for the design of TERRE, Project Solution, 7th Mar 2016)
 - Based on historical analysis of data from France, GB, Spain, Greece, Switzerland and Italy from 2013
 - Total benefit across all six TSOs = 150m€ per annum
 - Benefit estimated for GB = 13m€ per annum

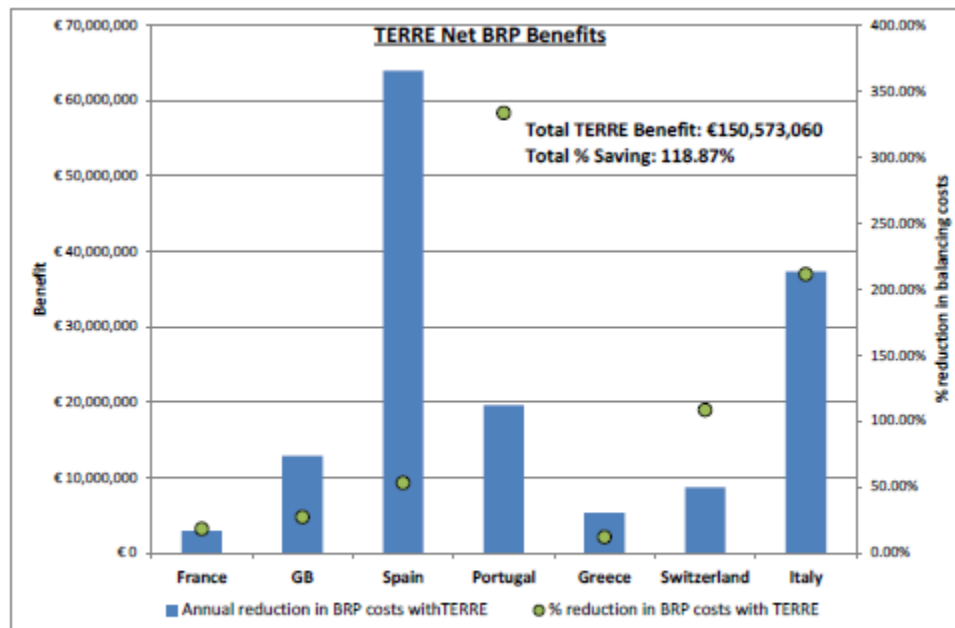


Figure 6-11: BRP Benefits of TERRE per Country

Discussion of benefits for TERRE

- The benefit analysis for TERRE is based on 2013 data which means that for GB (and for Europe in general) it does not have any forecast of the effect of demand side (given the historic situation)
- Hence if the TERRE platform presents opportunities for Aggregators the normal economic benefits associated with great liquidity etc. should be realised and so benefits would expect to be higher

TERRE and Wider Access Benefits and Costs

Benefits for Wider Access

- Reported benefits of Wider Access – a number of reports have been produced and quoted
 - “Understanding the Balancing Challenge”, Imperial College and NERA, August 2012
 - “An analysis of electricity system flexibility for GB”, Carbon Trust and Imperial College, November 2016
 - “An assessment of economic value of demand side participation in the BM and evaluation of options to improve access”, Charles Rivers Associates April 2017

IC and NERA, August 2012	Savings in 2020 of £500m pa
Carbon Trust and IS, Nov 2016	Cumulative to 2050 savings of £15bn to £40bn (estimated at £300m to £800m pa)
Charles Rivers, April 2017	£110 to £400 pa in 2020 rising to £160m to £400m pa in 2030

Discussion of Wider Access benefits

- Benefits quoted for wider access from several sources lead to very large estimates of savings
- Each report uses a different form of analysis
- Charles Rivers Associates cautions that not all savings may be passed on to consumers
- This latter report breaks down savings into three categories
 - Capacity cost savings
 - Reduced energy costs
 - Avoidance of network reinforcements
- National Grid cannot comment on the analysis techniques undertaken by these external parties however there seems to be a consistency in the orders of magnitude being reported
- If we take the lower range of all these estimates it gives a benefit of £100m pa

Process to separate out National Grid costs

- At the Workgroup meeting of 21st March National Grid (via the Transmission Impact Assessment) presented its estimate for delivery of the full GC97 solution
- It was pointed out that these estimates consisted of a number of ROMS (rough order of magnitudes) from a number of suppliers covering multiple day ahead, real time and post event systems
- Our intention is to derive detailed requirements and ask suppliers to re-quote by June 2018
- The Workgroup requested that we separate out costs so as to understand how they relate to business benefit
- In the last few weeks our internal Business Analysts have been looking at this - please note that we have not had updates of ROMs from suppliers – hence these numbers are based on our understanding of suppliers assumptions after further discussions

TERRE and Wider Access Benefits and Costs

Cases considered

	Features	Cost	Benefits to GB
TERRE only, with Aggregators defined over GSP groups	<ul style="list-style-type: none"> No participation of secondary BMUs in Balancing Mechanism Supports all external to NG interfaces from BMUs, LIBRA and Elexon Week ahead, day ahead and within day planning tools adapted for calculating needs and probability that need not met Modification to post event reporting tools Nine systems and internal interfaces modified for change to “one to many” relationships from “one to one” relationships 	£18m to £23m	> 13m€ pa
Wider access with Aggregators in GSP groups	<ul style="list-style-type: none"> No TERRE flows Nine systems and internal interfaces modified for change to “one to many” relationships from “one to one” relationships 	£17m to £21m	circa £100m pa
Wider access <i>without</i> GSP groups	<ul style="list-style-type: none"> Not considered a viable industry option, after feedback from Aggregators 	n/a	n/a
TERRE only, all BMUs at a single GSP	<ul style="list-style-type: none"> No participation of secondary BMUs in Balancing Mechanism Supports all external to NG interfaces from BMUs, LIBRA and Elexon Week ahead, day ahead and within day planning tools adapted for calculating needs and probability that need not met Modification to post event reporting tools 	£14m to £17m	13m€ pa
Full solution	<ul style="list-style-type: none"> Allows for extra benefits from European units 	£25m to £28m	> £100m pa