GC0097: Grid Code Processes supporting TERRE

What stage is this document at?

01	Proposal Form
02	Workgroup Consultation
03	Workgroup Report
04	Industry Consultation
05	Report to the Authority

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.

This document contains the discussion of the Workgroup which formed in January 2017 to develop and assess the proposal. Any interested party is able to make a response in line with the guidance set out in Section 5 of this document.

Published on: **8 January 2018**

Length of Consultation: **15 Working Days**

Responses by: **26 January 2018**

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

Medium Impact:
Distribution Network Operators

Low Impact:
None

Contents

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)

Any questions?

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7 August 2018	Implementation

About this document

This report contains the discussion of the Workgroup which formed in January 2017 to develop and assess the proposal.

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 • 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 • 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 • 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 • 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: • 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	Section 3 of the Report

Specific Area	Location in the report
actions taken by the GB TSO for TERRE etc.	
Reporting to individual bodies, to the Market as a whole, and to Regulatory bodies • Describe the expected new flow of information required to support TERRE	Section 3 of the Report

Document Control

Version	Date	Author	Change Reference
0.1	18 December 2017	National Grid	Draft Workgroup Report
0.2	27 December 2017	National Grid	Draft after first set of comments from Workgroup review
1.0	8 January 2018	National Grid	Workgroup Consultation Report issued

1 Summary

This document describes the Original GC0097 Grid Code Modification Proposal (the Proposal) and the deliberations of the Workgroup.

GC0097 was proposed by National Grid and was submitted to the Grid Code Review Panel for consideration in December 2016. A copy of this Proposal is provided within Annex 1.

The Panel decided to send the Proposal to a Workgroup to be developed and assessed against the Grid Code Applicable Objectives.

This Workgroup Consultation 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

2 Original Proposal

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.

As part of this Workgroup Consultation Parties can suggest alternative solutions that could be developed by the Workgroup.

3 Workgroup Discussions

The Workgroup convened twelve 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 (MW)	Quantity offered

Price	The price of the product
Exclusive identification number	This is an identification used to link bids that are to be treated mutually exclusive. If the bid is not exclusive then the attribute is not used. 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. 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. If bid one bid is activated (based on clearing price) then all others linked exclusive bids are to be ignored

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

Data Item	Description
Linking identification number	This is an identification used to associate bids that are to be linked together. If the bid is not linked then the attribute is not used. 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. 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. When offers are linked, all or none of the linked offers are activated based on the clearing price 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.
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)

- 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) - Acceding 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 P344[1]. 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 >= 1MW (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.

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 the 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 associated with aggregator and smaller player participation (e.g. more representative baseline)	Would require significant changes to settlement arrangements to 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. The Grid Code Review Panel will review any such repeated failures that are identified by the TSO.

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.

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 Rules[2].

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.

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.

[2] National Grid Data Validation, Consistency and Defaulting Rules: https://www.nationalgrid.com/sites/default/files/documents/32071-DVCD%20Rules%20v9.pdf

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.

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.

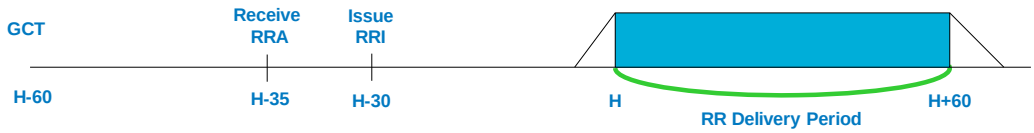
It was noted that the TSO would endeavour to issue as few RRIs as possible for the delivery period. This is dependent on the extent to which

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-optimise 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



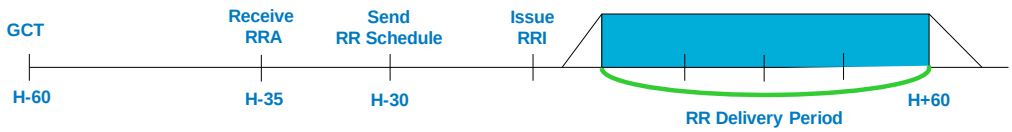
Option 2 – Issue RRIs as close as possible to real-time

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 = RRIs 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 RRIs 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

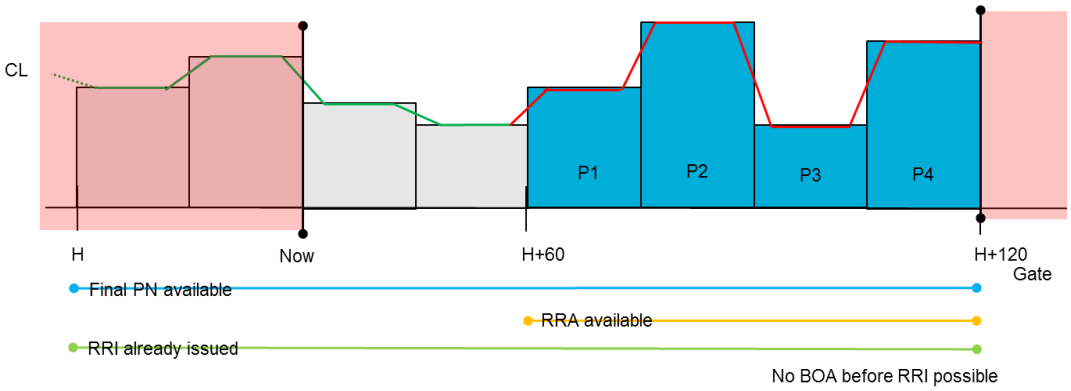
Pro of profile option	Con of the profile Option
Is in a format more familiar to existing BM participants, reducing the need for IS and process changes	May present difficulties for settlement processes if no PN
Better fits with the BSC P344 proposed solution for settlement	Multiple instructions may be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

Table 8

Pros of delta option	Cons of delta Option
Would be a more simple instruction	Is a different instruction format to existing BM, which may require existing BM providers to act differently for RRIs. 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 RRIs** was that the TSO will instruct units activated in TERRE using a BOA based format on the Replacement Reserve Instruction (RRI). The RRIs will start being issued at H-30 and these RRIs 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 RRIs

IX. The PRCL is broken down into a number of RRIs following the turning points within the PRCL. For the PRCL shown in example 3 three RRIs 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 RRIs. The underlying FPN can theoretically change every minute leading to a PRCL with multiple turning points and a large number of RRIs (up to 28 instructions – please see example 4). Such a large number of RRIs cannot be processed in time – possible ways to reduce the number of RRIs are (options to be discussed)

   a. Increase the number of points in an individual instruction
   b. Limit the number of turning points in the FPN
   c. 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

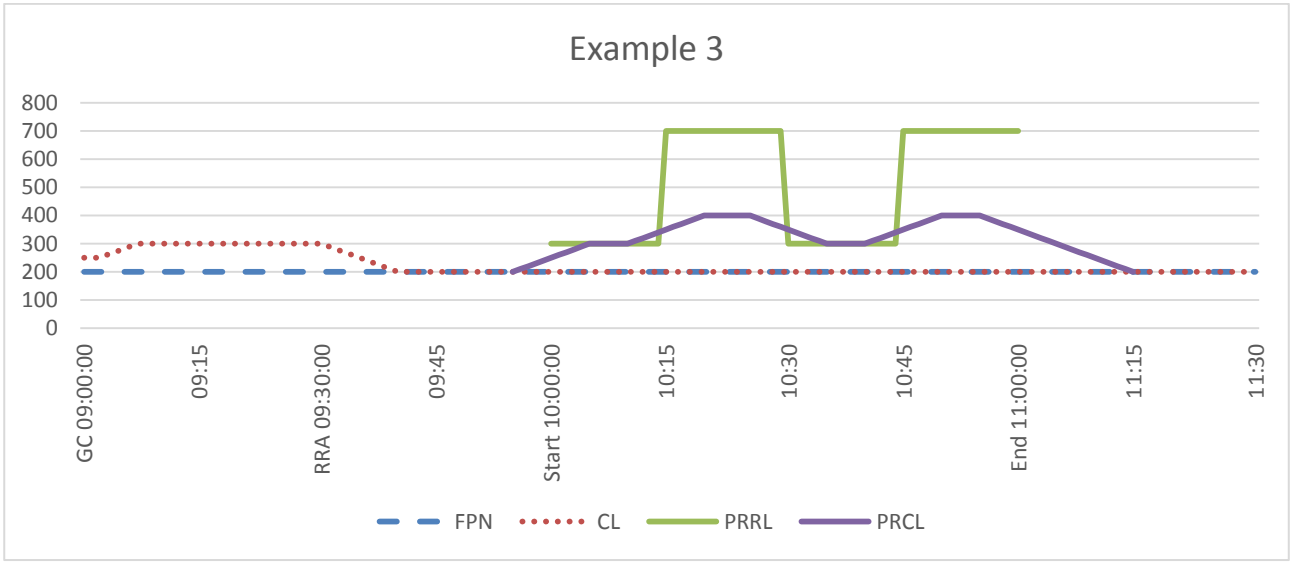
- Assume an RR Provider has the following characteristics
- The run up/run down rate for the RR Provider is 10MW/min
- FPN from 10:00 to 10:10 = 200MW
- FPN from 10:20 to 10:30 = 400MW
- Note that the FPN run up rate is 20MW/min
- RRA(1) from 10:00 to 10:15 = 100MW
- RRA(2) from 10:15 to 10:30 = 100MW
- 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 RRIs.

Example 3

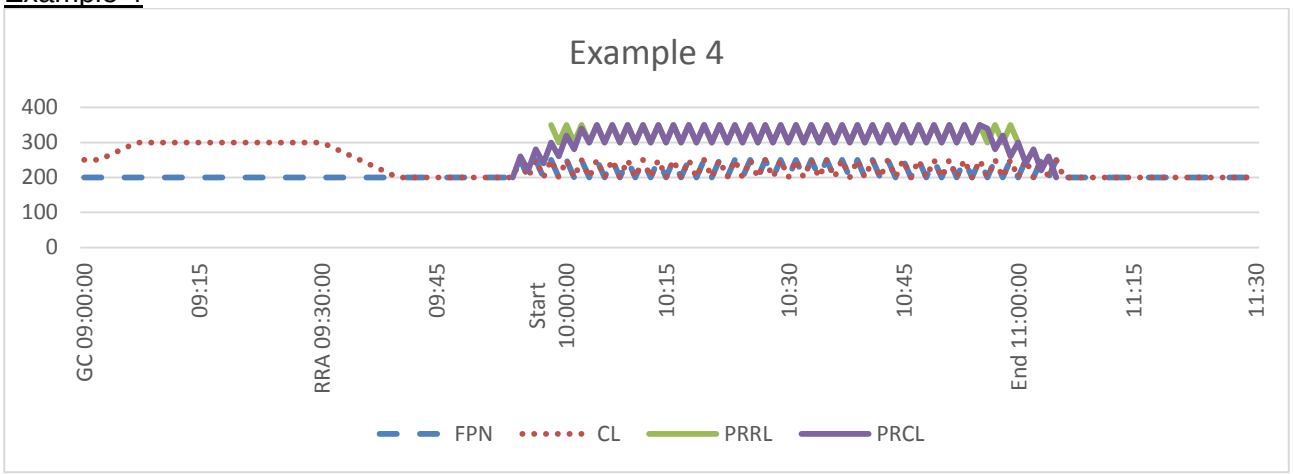
- The declared run up and run down rates for an RR Provider are equal and are 10 MW/min. there are no BOAs in this TERRE period and the FPN = 200MW
- The RRAs are as follows
- RRA(1) from 10:00 to 10:15 = 100MW
- RRA(2) from 10:15 to 10:30 = 500MW
- RRA(3) from 10:30 to 10:45 = 100MW
- RRA(4) from 10:45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

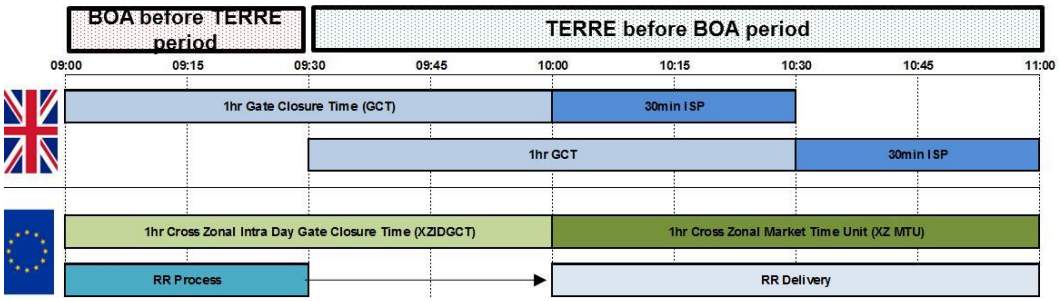


13. TERRE/ BM interactions: RRI before BOA

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

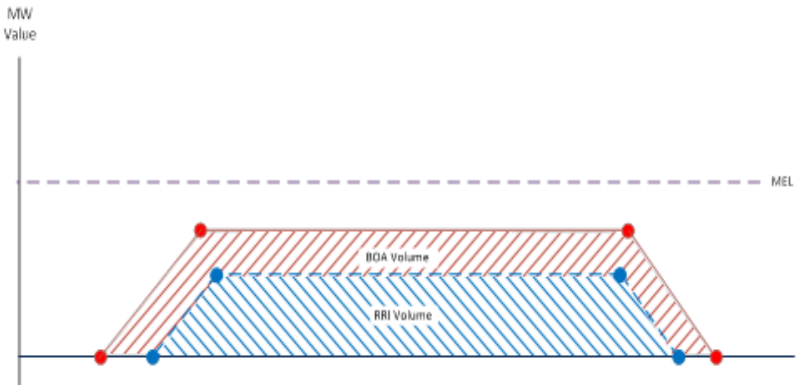
Diagram 5



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.

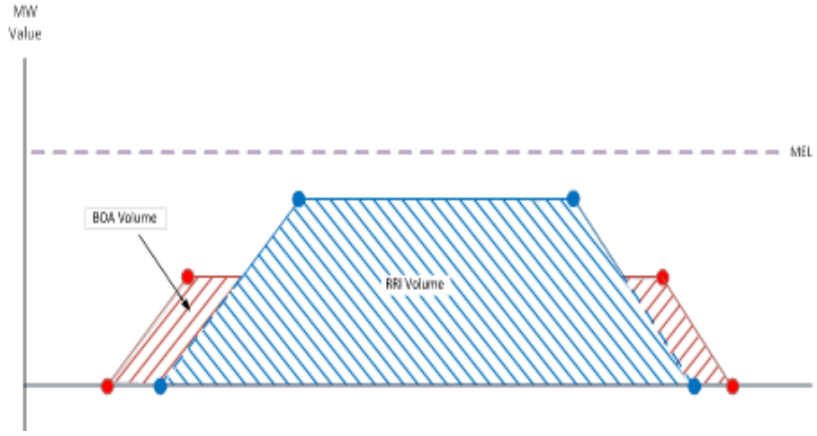
When a BOA has been issued before an RRI and they are in the same direction and the BOA level is larger than the RRI at all time points, no RRI will be issued and the unit will be settled for the RRI volume using the RR Activation with the remaining volume settled at the BOA price (i.e. the red area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

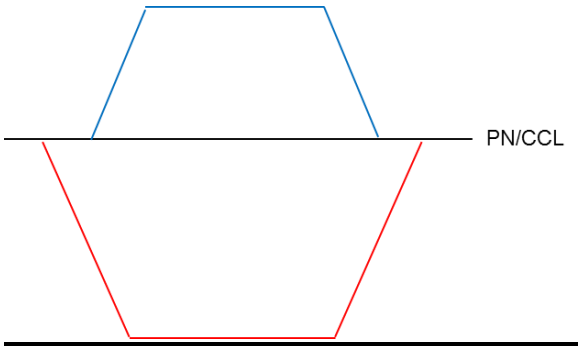
Any BOA in the opposite direction for the one hour TERRE period will mean no RRI will be issued – even if the BOA and RRI do not overlap.

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.

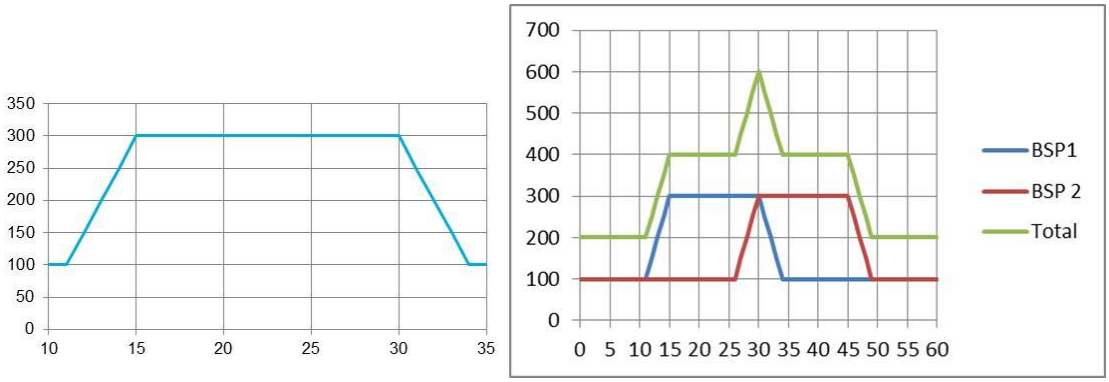
Diagram 8



15. Shape of Delivery

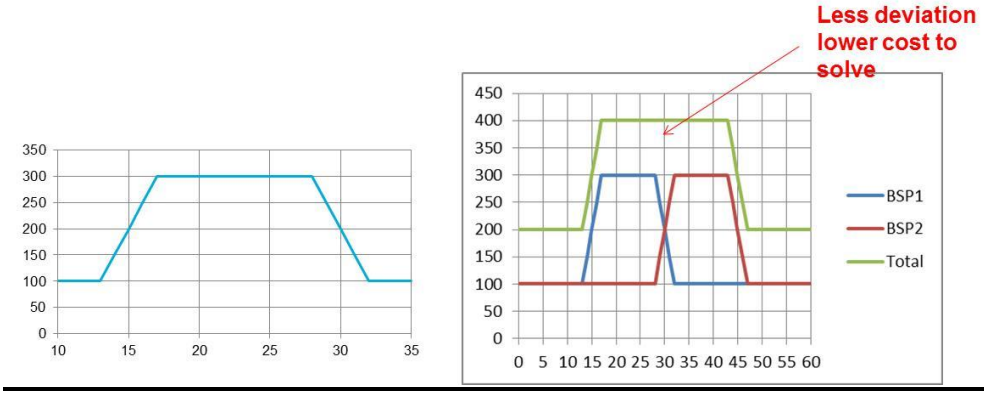
During Workgroups discussions had centred on whether the standard TERRE product is a block (ramping energy outside 15min delivery window) or a trapezoid (standardised ramps). It was confirmed to the Workgroup that the Proposal considered that in the situation where the standard TERRE product is a block 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.

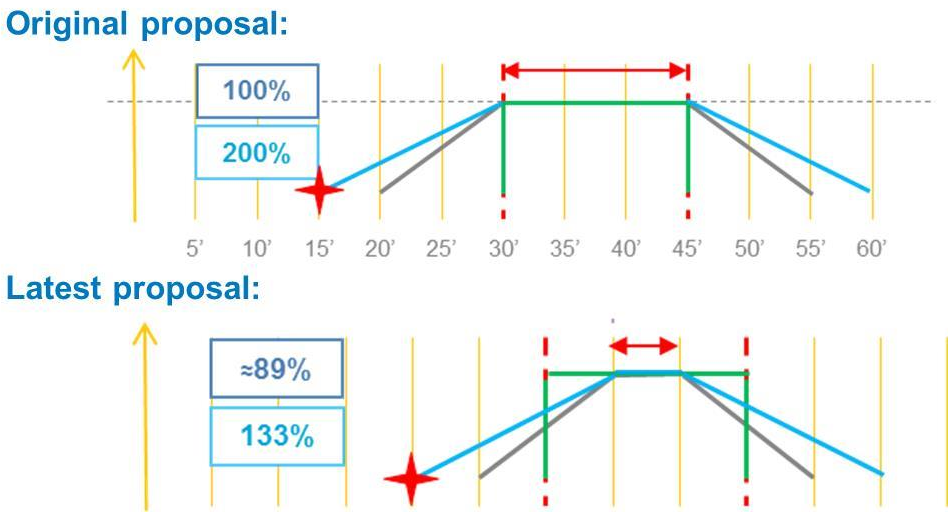
Diagram 10



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

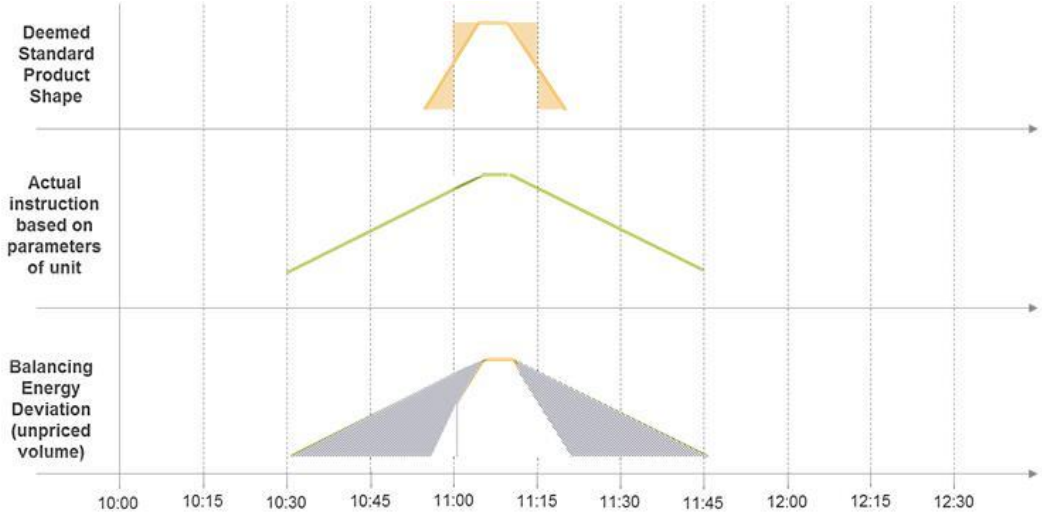


It was confirmed to the Workgroup that the proposed solution, in respect of the TERRE product shape of delivery, would assume

- 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 that 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 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 the1-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 RRIs 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.

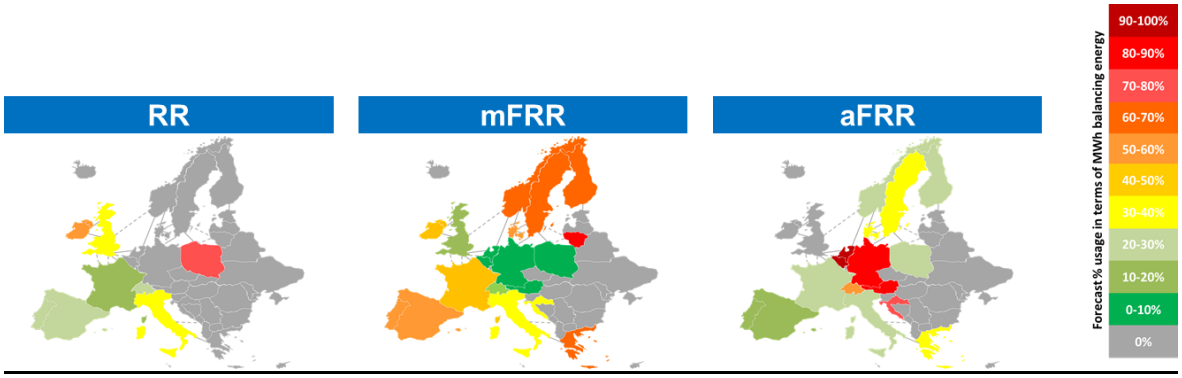
Details of how to achieve this are contained in P344 consultation.

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

4 Impact & Assessment

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

5 Workgroup Consultation Questions

The GC0097 Workgroup is seeking the views of Grid Code Users and other interested parties in relation to the issues noted in this document and specifically in response to the questions highlighted in the report and summarised below:

Standard Workgroup Consultation questions:

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?
2. Do you support the proposed implementation approach?
3. Do you have any other comments?
4. Do you wish to raise a Workgroup Consultation Alternative request for the Workgroup to consider?

Specific GC0097 Workgroup Consultations:

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?

Please send your response using the Response Proforma which can be found on the National Grid website via the following link: https://www.nationalgrid.com/uk/electricity/codes/grid-code/modifications/gc0097-grid-code-processes-supporting-terre

In accordance with Governance Rules Section 8 of the Grid Code, Any Authorised Electricity Operator; the Citizens Advice or the Citizens Advice Scotland, NGET or a Materially Affected Party may (subject to GR.20.17) raise a Workgroup Consultation Alternative Request. If you wish to raise such a request, please use the relevant form available at the weblink below:

http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/Grid-code/Modifications/Forms-and-guidance/

Views are invited upon the proposals outlined in this report, which should be received by **5pm on 26 January 2018**. Your formal responses may be emailed to: grid.code@nationalgrid.com

If you wish to submit a confidential response, please note that information provided in response to this consultation will be published on National Grid's website unless the response is clearly marked "Private & Confidential", we will contact you to establish the extent of the confidentiality. A response market "Private & Confidential" will be disclosed to the Authority in full but, unless agreed otherwise, will not be shared with the Grid Code Review Panel or the industry and may therefore not influence the debate to the same extent as a non-confidential response.

Please note an automatic confidentiality disclaimer generated by your IT System will not in itself, mean that your response is treated as if it had been marked “Private and Confidential”.

6 Relevant Objectives

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

7 Implementation

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.

8 Glossary of terms

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

Annex 1 – GC0097 Proposal

Modification	At what stage is this document in the process?
# GC0097: ## GB processes supporting TERRE participation and dispatch	

Purpose of Modification: *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.*

	*Please provide an initial view of the preferred governance route/pathway and impacted parties* The Proposer recommends that this modification should be: *(delete as appropriate)* • assessed by a Workgroup 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.
	High Impact: *Existing and new balancing services providers of +/-1MW capacity and above; GB Transmission System Operator;*
	Medium Impact: *Distribution Network Operators*
	Low Impact: *None specified*

***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

Timetable

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

Any questions?

Contact:
Code Administrator

Grid.Code@nationalgrid.com

01926 653 283

Proposer:
Richard Woodward

Richard.woodward@nationalgrid.com

019267474 6596

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.

Annex 2 – Terms of Reference

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)	Elexon - BSCCo
Ian Tanner & 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

9. 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

10. 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.

11. 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.

12. 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 (GC0097 Only)
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)
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