nationalgrid

Stage 01: Workgroup Report

Grid Code

Offshore Balancing Mechanism Unit Configuration Workgroup Report

What stage is this document at?

01	Workgroup Report
02	Industry Consultation
03	Report to the Authority

This report puts forward a proposal to modify the Grid Code to improve the information exchanged between NGET and Transmission Users regarding the configuration of Power Park Modules and BM Units given the operational flexibility now facilitated under the Transmission Frameworks

This document contains the findings of the Workgroup which formed on 9 September 2011 and concluded on 12 September 2012.

Published on: **14 September 2012**

The Workgroup recommends:
Changing the Grid Code to enable the exchange of information needed to coordinate Power Park Module and Transmission System Operation efficiently and effectively

High Impact:
None identified

Medium Impact:
Owners, operators and developers of Power Park Modules.

Low Impact:
None identified

Contents

About this document

This document is a Workgroup Report which contains the discussions and recommendations of the Offshore Balancing Mechanism Unit Configuration Workgroup Report.

Document Control

Version	Date	Author	Change Reference
0.1	10 February 2012	National Grid	First Draft Workgroup Report
0.2	15 May 2012	National Grid	Second Draft Workgroup Report
0.3	10 August 2012	National Grid	Third Draft Workgroup Report
1.0	14 September 2012	National Grid	Final Workgroup Report

Any Questions?

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1 Executive Summary

1.1 The Workgroup was asked to review the information exchanged by both NGET and Users to enable NGET to manage the Transmission System given that the configuration and constituent parts of a BM Unit can change in some circumstances. The group determined that this issue needed to be addressed as a result of BSC modification P240 which introduced the concept of Switching Groups and delivered the benefit of facilitating the re-configuration of Power Park Modules within their BM Units.

1.2 The need to consider the information required to manage the transmission system as BM Unit configurations change initially became apparent in the context of Offshore Transmission and Offshore BM Units. The Workgroup also considered the applicability of new requirements to Onshore BM Units.

1.3 The Workgroup found that in considering the Grid Code provisions relating to Offshore Power Park Modules, it was essential to consider the provisions relating to Offshore Power Park Modules in the BSC, as these defined the flexibility that Users had in configuring their Offshore BM Units. The Group made some observations which could be addressed under BSC governance.

1.4 The Group explored how different degrees of aggregation of Power Park Modules (PPMs) into BM Units impacted on National Grid's requirements to control the Transmission network. The group concluded that an appropriate balance needed to be struck, between levels of detail and minimisation of information transfer, which could vary for different network designs.

1.5 The Group also noted that information on the composition of a Power Park Module (essentially the number of turbines within it) was required, and that this may need to be revised during planned and unplanned outages (which the BSC had been changed to facilitate). Generators are currently obliged to provide this information via the PPM Availability Matrix and are required to update this should the composition of a PPM change.

1.6 The group observed that it was unlikely that all changes to PPM configuration needed to be notified to National Grid via a Grid Code submission and concluded that a degree of flexibility needed to be incorporated into the proposed change. The group also observed that there was no mechanism under the Grid Code to link PPMs to the Balancing Mechanism Unit that they were part of. The Group felt this was a flaw as the Balancing Mechanism Unit was the only entity which could be controlled using an instruction.

1.7 The group acknowledged that the proposed solution, whilst addressing the specific question to hand, did not resolve a number of outstanding problems with matrix submission under the Grid Code. It was felt that these could not be addressed within the scope of the group and that wider changes to the relevant information exchange processes were required. The group therefore asks that the Electricity Balancing Systems and CBSG Workgroups consider the issues raised in this report.

1.8 The Workgroup recommends:

(a) Modifying the PPM Planning Matrix in OC2 Appendix A and PPM Availability Matrix in BC1 Appendix 1 and the provisions of PC.A.3.2.2 and PC.A.3.2.4 to link PPMs to their respective BM Units; and

(b) Modifying the provisions of BC1 to relax the requirement to re-submit the PPM Availability Matrix in the event of a change, and instead stipulate that changes should be notified by telephone and only supplemented by fax when deemed absolutely necessary by National Grid.

2 Purpose & Scope of Workgroup

2.1 It was agreed at the 18 November 2010 Grid Code Review Panel meeting to establish a Grid Code Workgroup to establish the information exchanged by both NGET and Users to enable NGET to manage the Transmission System given that BM Unit Configurations can change as a consequence of BSC modification P240.

2.2 The GCRP agreed that this issue required further investigation and approved the Terms of Reference.

Terms of Reference

2.3 A copy of the Terms of Reference can be found in Annex 1.

Timescales

2.4 It was agreed that this Workgroup would report back to the March 2012 GCRP.

2.5 The Workgroup met four times over the period of 08 September 2011 and 14 February 2012.

Workgroup Members

2.6 The Workgroup was comprised of the following members;

Name	Company
Graham Stein (Chair)	National Grid
John Towie	National Grid
Steve Curtis/Tim Truscott	National Grid
John Norbury	RWE
Jane McArdle	SSE Renewables
John Lucas	Elexon
Sarah Graham	ScottishPower Renewables

3 Workgroup Discussions

3.1 The first Workgroup meeting was held on 08 September 2011. The Group met 4 times over the period between 08 September 2011 and 14 February 2012 and reviewed subsequent Workgroup report drafts by teleconference.

3.2 The Workgroup discussed the following key areas:

- The clarity of the existing definitions and rules behind 'Switching Groups' and BM Unit reconfigurations;
- Determining a simple means of data submission between NGET and User to allow and monitor reconfiguration of BM Units in real time;
- How these submissions should be formatted and submitted in future to cater for increased flexibility in Offshore BM Unit configurations; and
- Any Grid Code changes required to facilitate the recommendations derived from the above considerations.

Offshore Network Definitions & BSC Definition of Switching Group

3.3 Agreement was reached during the first meeting that the Workgroup should focus on Offshore BM Unit Configurations initially. Consideration of onshore configurations could be undertaken once group members had established an understanding of the relevant issues.

3.4 Discussions commenced with a review of current provisions, and touched on the sections of the BSC that were relevant to the subject at hand. The provisions relating to Switching Groups were examined (BSC K3.1.4A to D). These allow a combination of PPMs to be identified collectively as a Switching Group and allow the PPMs within a Switching Group to be moved between the BM Units which have also been identified as part of that Switching Group. This facility was introduced by the BSC modification P240.

3.5 The Workgroup reached a view that the 'switching group' definitions, particularly that within BSC K3.1.4A (as added by P240), could be clearer, summarising that 2 possible issues with the P240 definition of Switching Group, which could be addressed under BSC governance if deemed appropriate, are;

- The BSC does not clearly prohibit PPMs in a single BM Unit from belonging to different Switching Groups. P240 was drafted assuming '1 PPM per BM Unit' which could be a cause of the ambiguity. It was concluded that the legal text could be clarified to address this; and
- Paragraph K3.1.4B of P240 could be too restrictive for more complex configurations as it implies that all PPMs within a Switching Group must be selectable to al the BM Units within that Switching Group. The Workgroup questioned whether the switching group 'rules' would work with a complex wind farm configuration.

3.6 Enquiry was made as to whether a failure to register Plant & Apparatus to a Switching Group following a change in configuration had a consequence (i.e. practical implications). It was noted that this would constitute a compliance issue against the BSC.

3.7 Uncertainty was expressed over whether BSC K3.1.4 (g), as amended by P237, which defines the criteria for combined Offshore BM Units, was restricted to Offshore. It was agreed that it was but that that a similar effect could be achieved by following the non standard BM Unit registration process.

3.8 The Workgroup briefly discussed the implications of registering each Power Park string as a BM Unit. Metering was seen an issue with this solution as Users would bear the expense of a meter on each string which may not be efficient. Also, if each string was a separate BM Unit then a single infeed into the system would comprise of multiple BM Units. Thus if NGET wanted to vary that infeed then it would need to issue Bid Offer Acceptances to multiple BM Units, and would need to receive and process the relevant data.

3.9 An alternative would be to meter at a point common to more strings (e.g. the LV side of each 132/33kV transformer) and hence aggregate the contribution from each string.

3.10 Fewer BM Units were generally considered easier and more efficient manage but with a potential loss of required information. More BM Units would however require more discrete meters which could be preferred due to greater flexibility and the ease of determining 'what is coming from where' and applying responsibility.

Discussion of BM Unit Configuration, Ownership and Metering Arrangements

3.11 The group discussed how various combinations of PPMs within BM Units could be metered effectively. The group found it useful to examine these by evaluating which active power flow indications needed to be available to National Grid to manage the network.

3.12 The examples shown below summarise the main points of discussion by illustrating different levels of aggregation and looking at the impact of one particular outage, planned or otherwise. Two configurations are shown.

3.13 Configuration A features the capability to direct the output of turbines to different platforms, whilst Configuration B features cross-connected platforms and transformers. Each diagram shows metering points and normal direction of power flow. The group noted that some of the options illustrated were unlikely to be adopted in practice.

3.14 The group also discussed the impact of different ownership boundaries, but noted that meters do not need to be placed at the Ownership Boundary for standard Offshore BM Unit configurations following BSC modification P238.

3.15 Figure 1 illustrates the situation where each string is registered as a BM Unit. Each string is therefore metered, and it is possible to monitor and control power flows through the transformers and offshore circuit using the BM Units as registered.

3.16 Given that information on the number of turbines within a PPM forms part of a generator's Grid Code data submission, this arrangement has the advantage of providing all information required under intact conditions. However, NGET has to aggregate a number of BM Units in order to control system conditions and the generator has to manage the data submissions of a number of BM Units.

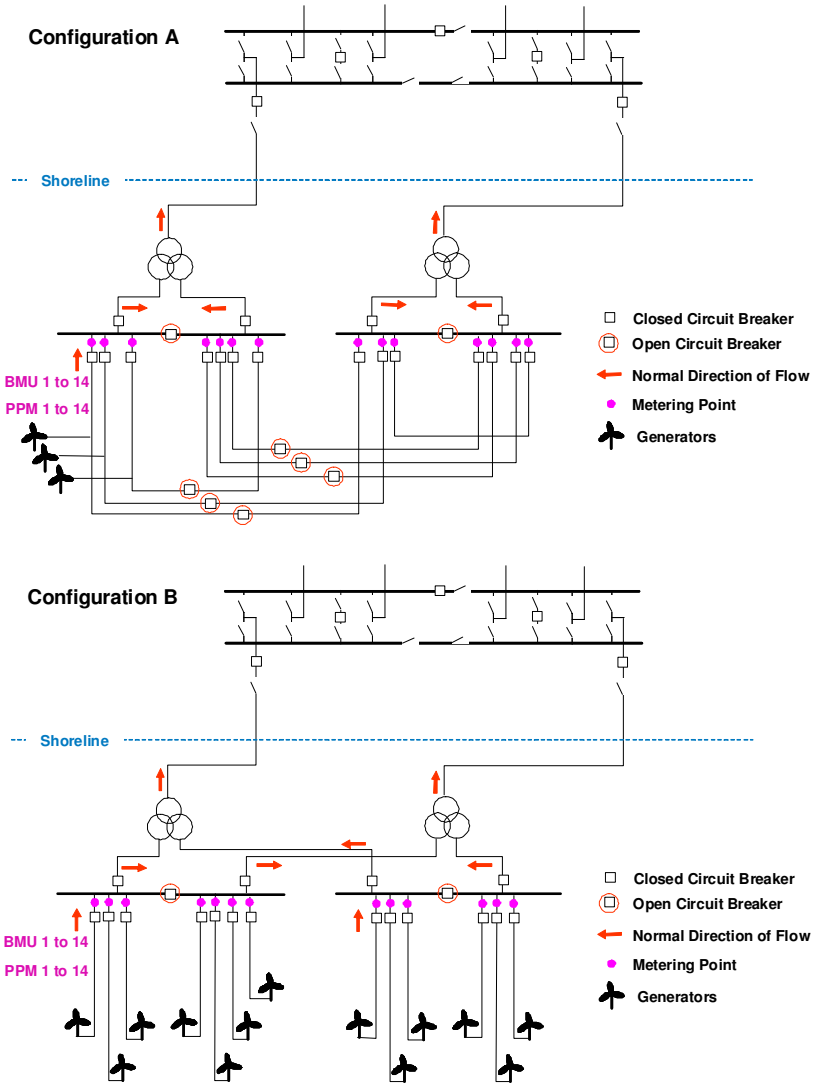

Figure 1: One BM Unit per String

3.17 Figure 2 shows the impact of an outage, which means redirecting the output of some wind turbines to the alternative 'platform' or transformer in these examples. Here it is possible to measure and control metered flow using the BM Units and meters available.

3.18 However, under configuration A some BM Units now contain additional turbines and therefore have a higher potential active and reactive power output, amongst other features. The system operator would in this case need to factor this change into its operational decisions.

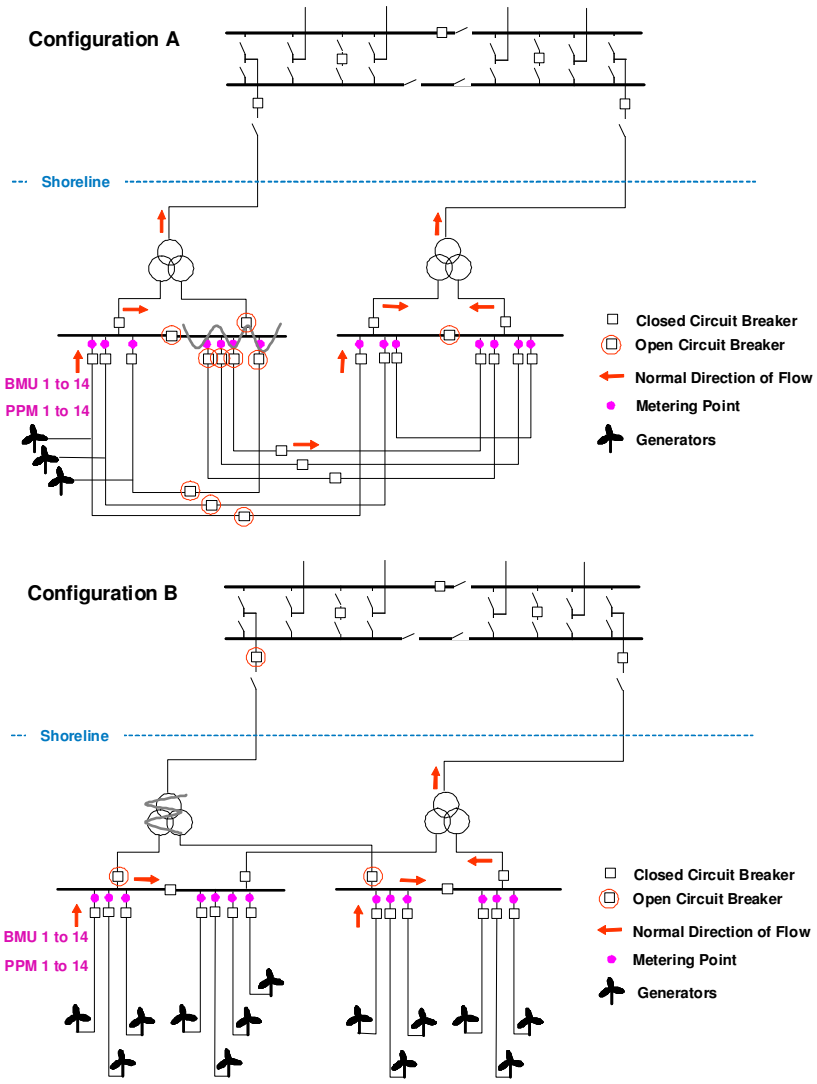

Figure 2: One BM Unit per String – busbar or transformer Outage

3.19 Figure 3 illustrates the situation where the collection of strings connected to a busbar is defined as a PPM, and each PPM is registered as a BM Unit. In this case flows through the transformers (the flow into the LV winding is equivalent to a BM Unit) and circuits onshore (the sum of two BM Units) can be monitored and controlled with a smaller overhead for both generator and NGET than in the previous example.

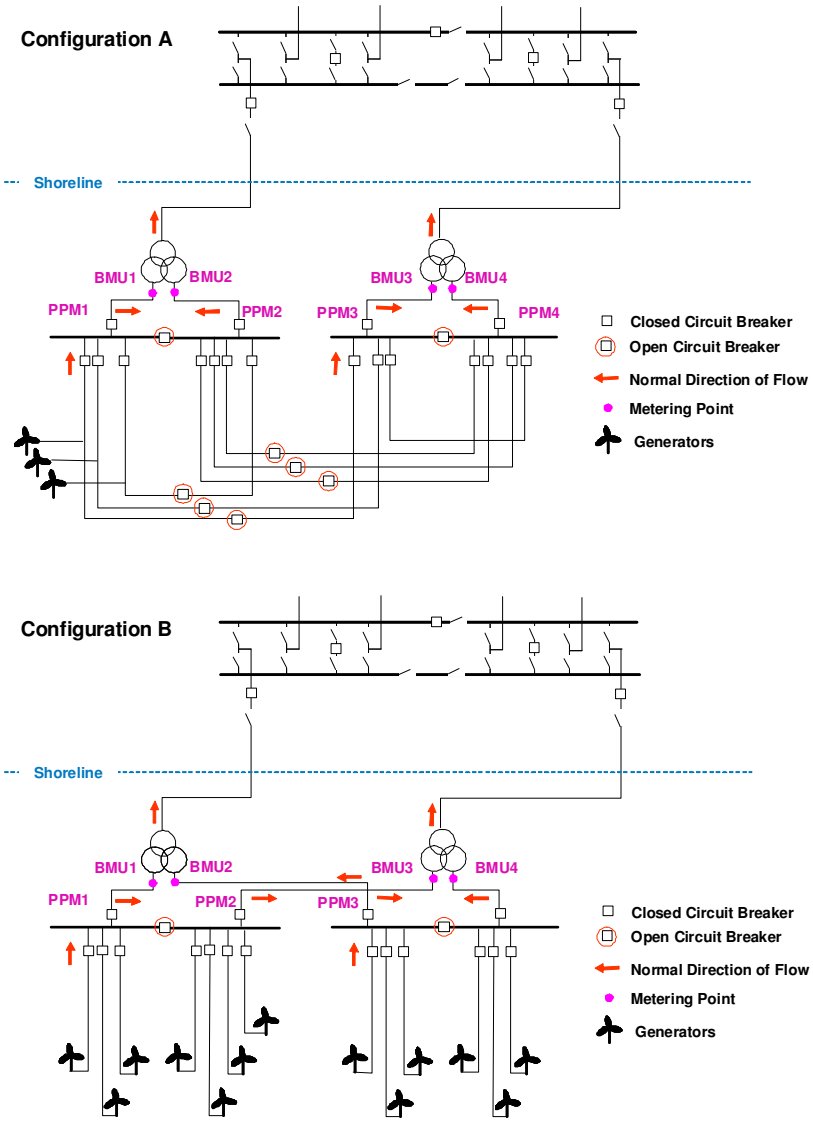

Figure 3: One PPM per BM Unit

3.20 Figure 4 shows the impact of a busbar or transformer outage, which as previously means redirecting the output of some wind turbines. Here it is possible to measure and control metered flow using the BM Units and meters available.

3.21 One of the PPMs has now moved to form part of a different BM Unit. This BM Unit now contains additional turbines and therefore has a higher potential active and reactive power output amongst other features. The system operator would in this case need to factor this change into its operational decisions. However, in these examples, the information may only be required for the BM Unit which now comprises more strings and therefore more turbines.

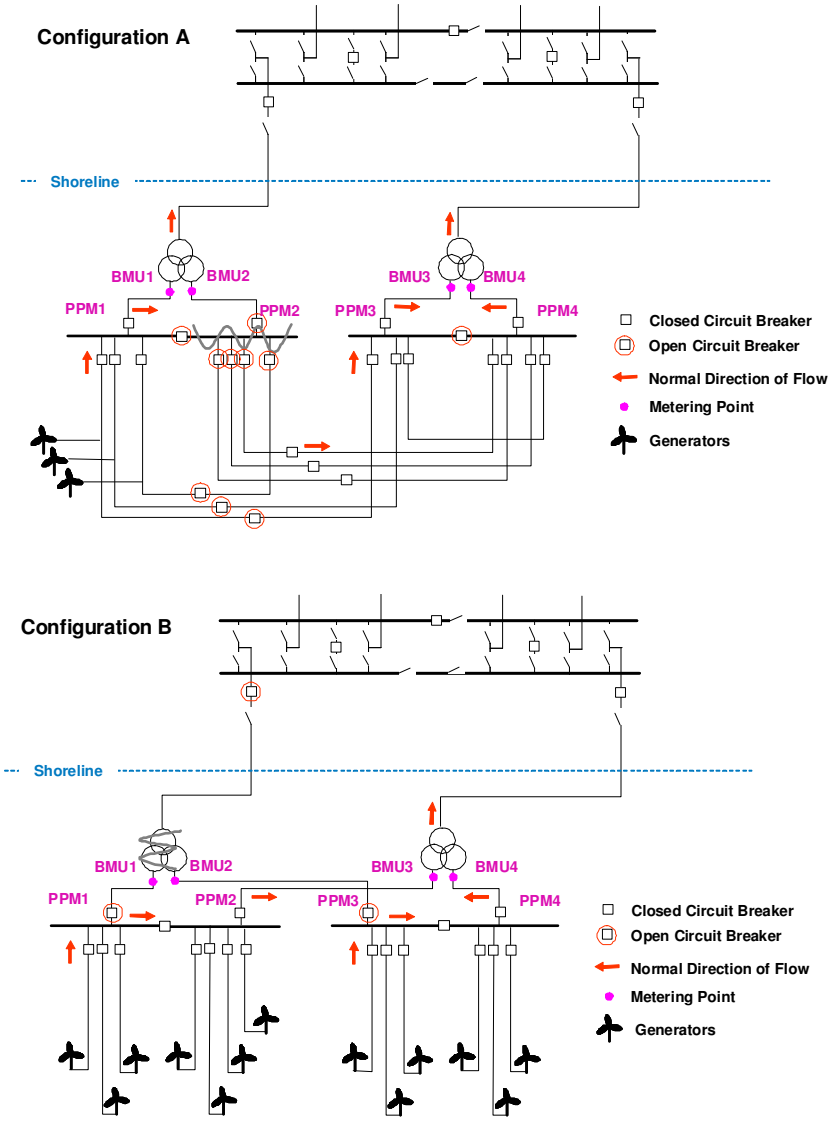

Figure 4: One PPM per BM Unit – busbar or transformer outage

3.22 Figure 5 illustrates the situation where the collection of strings connected to a busbar is defined as a PPM, and each PPM is paired with another to form a BM Unit.

3.23 In this case flows through the transformers cannot be controlled by despatching a BM Unit but the onshore circuits can be monitored and controlled. The group concluded that under intact conditions, the inability to control the output of a PPM by despatching a BM Unit was unlikely to cause a problem as the network would most likely be designed to cater for maximum output.

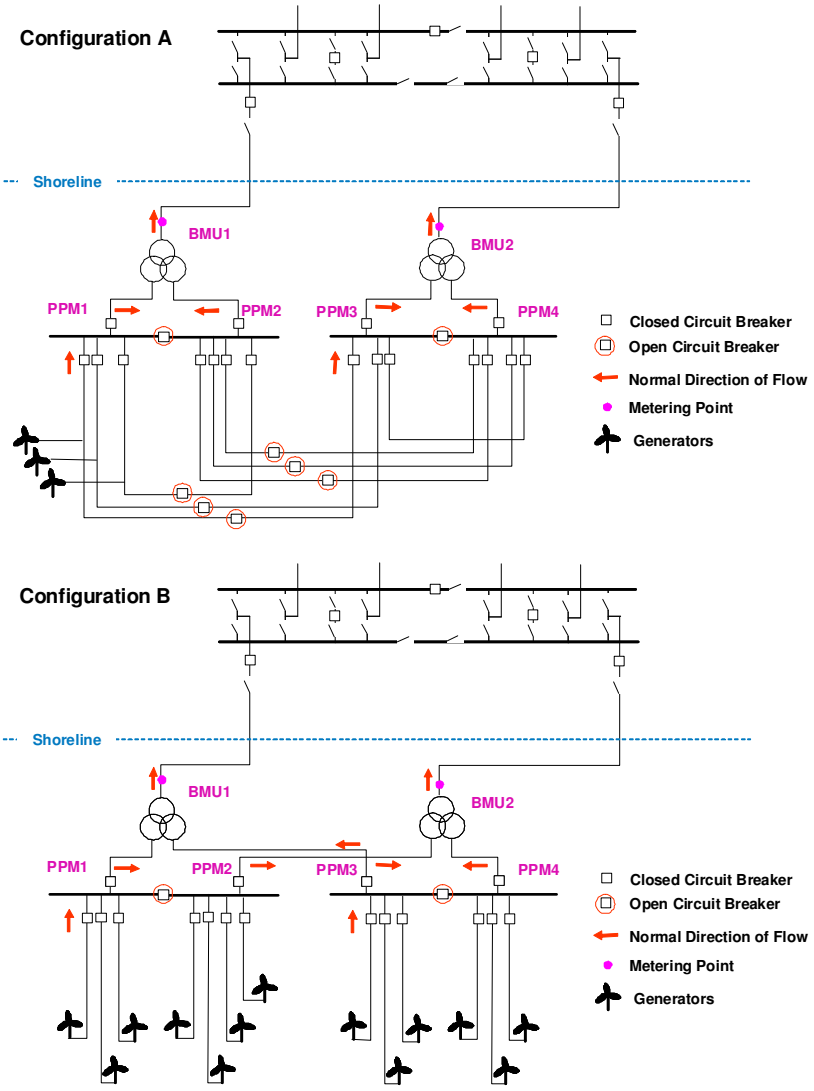

Figure 5: Multiple PPMs per BM Unit

3.24 Figure 6 shows the impact of a busbar or transformer outage on this arrangement. Here it is possible to measure and control metered flow using the BM Units and meters available. Again one of the PPMs has moved to form part of a different BM Unit, which now contains additional turbines and therefore has a higher potential active and reactive power output amongst other features.

3.25 The system operator would in this case need to factor this change into its operational decisions. Also, the flows through the transformer could only be controlled by despatching BMU 2 which, in the absence of any other measures could mean curtailing turbine output on strings which need not be (i.e. there is no way of focussing on the flow emerging from PPM3 as distinct to PPM4 as they are both part of BMU2 to which an instruction would need to be delivered). This arrangement may not be acceptable under some circumstances.

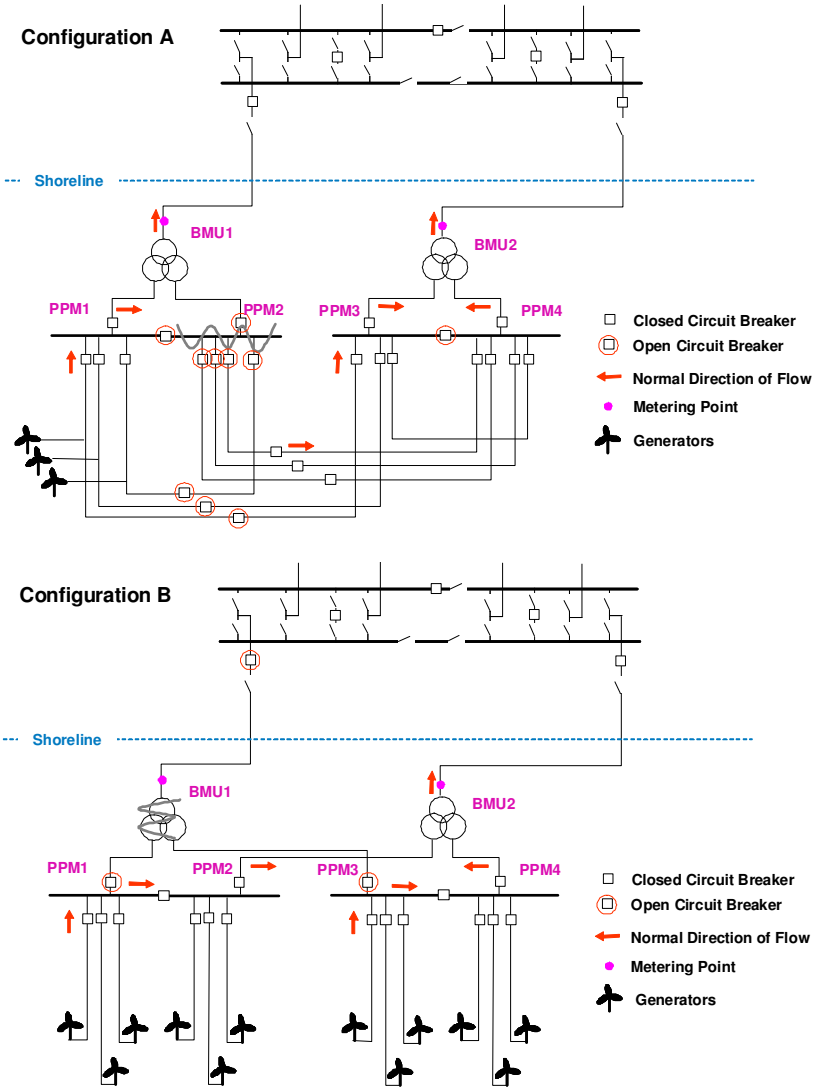

Figure 6: Multiple PPMs per BM Unit – busbar or transformer outage

Pre Defined Configuration Scenarios

3.26 A proposal to draw up a range of standard BM Unit, PPM and network configurations in response to particular scenarios, in advance of the event, was discussed at length.

3.27 The key issues identified for further discussion were;

- Communication between National Grid, the OFTO and the Generator, particularly in times were a situation arises were a standard configuration has not already been looked at and agreed upon;
- Format and quantity of the submitted data; and
- When/where the data should be submitted.

3.28 Generator representatives had considered a number of standard configurations which would be adopted in 'outage on transformer' scenarios. It was proposed that for an event such as this, a number or pre-agreed configurations, for example, would be available for the Generator to select from and simply indicate to National Grid. The group assumed Generators wouldn't want to be bound to one option and instead would prefer a range of configurations per scenario to choose from.

3.29 The likelihood and desirability of identifying all possible configurations was considered. If this meant a large amount of unnecessary configuration information and diagrams were generated, this approach would be undesirable. The Workgroup concluded that a more suitable solution could be that a number of planned configurations, across a number of scenarios, were submitted and that, perhaps via the Balancing Codes a process could be implemented whereby generators would be able to "state we are on configuration X of Y, for example".

3.30 With regards to format of reconfiguration data submitted by Generators, a "number in the box" approach, as opposed to submission via drawings, was seen as a preferred approach. If pre defined configuration data is utilised, only the configuration reference (e.g. 1-5) would need to be transferred with the PPM Matrix could be used to capture further required details.

Defining the Relationship between PPMs & BM Unit

3.31 The group discussed the current provisions relating to the PPM Matrix as required to be submitted under the Planning Code, Operating Codes and Balancing Codes.

3.32 The group identified a weakness in the current provisions in that there is no obvious mechanism to communicate the PPM to BM Unit relationship, and hence no explicit link between the PPM and the metered, despatchable entity. PPM Matrix data, as submitted in Grid Code OC2, gives detail of what is in the PPM, but not the relationship between PPM and BM Unit.

3.33 An ability to determine this relationship, at any point in time, is key and therefore developing a method of defining it became a primary objective of the Workgroup.

3.34 The three options to capture the PPM/BM Unit relationship discussed were;

1) Telemeter all of the switchgear that can affect the configuration of the site;
2) Extend the PPM Matrix to include the BM Unit that each PPM is part of; or
3) Change the PPM Matrix so that it becomes a BM Unit Matrix.

3.35 There are currently provisions within BCAs to specify the plant items within a PPM. For proposal (2) above, it could therefore be argued that the BCA already establishes the necessary link. However, this information is not held through a 'real time' document. The PPM Matrix and BCA combination could be used to capture the range of possible configurations. The Workgroup decided this could be possible, but the number of conceivable configurations would have to be looked at further as these were likely to be too numerous to be practicable.

3.36 In a situation where National Grid controlled the busbar and/or switching on an Offshore platform, then National Grid would have all the information it required via the PPM matrix or telemetering. However, if the Generator has the responsibility of controlling the switchgear, a matrix which explicitly tied PPM to BM Unit would be required.

3.37 In response to a Generator representative query as to whether individual turbines out of service would need to be communicated with submission of a new matrix; it was concluded that major changes would definitely require a resubmission and that clarification of instances when resubmissions are required should be further considered. Brief consideration was given to using TOGA as a means of capturing these restrictions and a second submission as a means of demonstrating configurations. However, the idea was set aside with the intention of identifying a simpler method (i.e. one which involved the need for only one submission). Telemetering was also briefly highlighted as a possible solution to indicate the active turbines per module, however, this idea was similarly set aside because of the associated cost and that National Grid would prefer to know in advance of turbines becoming out of service.

3.38 The Workgroup agreed that options 2 or 3 described in paragraph 3.34 were currently the preferred options. Option 2 was seen as the simplest implementation by the Workgroup whilst still meeting the most Workgroup requirements.

3.39 A proposed PPM/BM Unit Matrix suitable for use in the Grid Code and the subsequent code change requirements that would arise from its implementation are included in this report.

Discussion of possible issues with proposed PPM/BM Unit Matrix

3.40 The Workgroup expressed concern that PPMs do not seem to be named in submissions at present. Denoting which BM Unit each PPM belongs to (i.e. explicitly indicating 'belongs to BM Unit 1') could solve this issue, as opposed to giving each PPM a name. It was noted that this issue applied equally to onshore and Offshore PPMs.

3.41 It was also noted that the term BM Unit is defined in the BSC and not in the Grid Code where a proposed PPM/BM Unit Matrix would be placed. The definition of BM Unit in Grid Code is made by cross-reference to the BSC. The Workgroup concluded that referring to a BM Unit in the Grid Code would not present a problem and that making use of the term was preferable to relying on the BCA to specify how a PPM related to its BM Unit.

3.42 Knowing the number of turbines per BM Unit would not remove the need for information on a per PPM basis as, in the Grid Code, the reactive requirements for example are defined per module. Therefore, the number of turbines per PPM would need to be known.

3.43 The Workgroup also expressed concern with the means by which the information would be submitted. Currently this seemed to be restricted to an exchange of faxes.

3.44 The Workgroup also discussed whether it was necessary for National Grid to know that PPM and hence BM Unit configurations had changed in all circumstances. The Group concluded that there were a number of situations where the information was necessary to manage active and reactive power flows, ancillary services and in some situations issues such as fault levels. However, the Group noted that module matrix submissions are not being pursued regularly by National Grid at the moment, suggesting that the information was only required in certain situations.

Interaction with other (similar) Workgroups

3.45 The Workgroup considered whether the PPM/BM Unit Matrix should capture:

- Configuration changes only; or
- Configuration changes plus additional information around wind availability, MEL etc.

3.46 The group felt that the second option was potentially infringing on other existing Workgroups (Electricity Balancing Systems and Managing Intermittent Generation) and was possibly broader than scope.

Conclusions

3.47 The group concluded that there was a need to define a link between PPMs and the relevant BM Unit within the information submitted under the Grid Code which could be achieved by adding information to the PPM matrices.

3.48 The group observed that it was unlikely that all changes to PPM configuration needed to be notified to National Grid via a Grid Code submission and concluded that appropriate flexibility needed to be incorporated into the proposed change. The group concluded that the current requirement to notify configuration changes by fax placed an excessive and unnecessary burden on all parties and that operational liaison by telephone would give National Grid enough information to assess whether circumstances meant that notification by fax was necessary.

3.49 The group acknowledged that the proposed solution, whilst addressing the specific question to hand, did not resolve a number of outstanding problems with matrix submission under the Grid Code. It was felt that these could not be addressed within the scope of the group and that wider changes to the relevant information exchange processes were required. The group therefore asks that the Electricity Balancing Systems and CBSG Workgroups consider the issues raised in this report.

4 Impact & Assessment

Impact on the Grid Code

4.1 The Workgroup proposals require amendments to the following parts of the Grid Code:

- PCA.3.2.2 and PCA.3.2.4;
- OC2.4.2 and OC2 Appendix 4; and
- BC1.4.2 and BC1.A.1.8.

4.2 The text required to give effect to the proposal is contained in Annex 2 of this document.

Impact on National Electricity Transmission System (NETS)

4.3 The proposed changes will clarify the relationship between PPMs and BM Units meaning that networks can be controlled more effectively via the monitoring and despatch of BM Units.

Impact on Grid Code Users

4.4 The proposed modification will relax the obligation on Users to submit immediate revisions to the PPM Availability Matrix under BC1. Users will have to provide information setting out how PPMs relate to the relevant Balancing Mechanism Unit via the PPM Availability Matrix under BC1 and OC2.

Impact on Greenhouse Gas emissions

4.5 The proposed modification will minimise a risk of unnecessary curtailment under outage conditions.

Assessment against Grid Code Objectives

4.6 National Grid considers that would better facilitate the Grid Code objective:

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

The proposed change improves the information provided to NGET by establishing a clear relationship between Power Park Modules and Balancing Mechanism Units meaning that generation and transmission system operation can be co-ordinated more effectively.

(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);

The proposed change allows information on the configuration of Power Park Modules and their relationship to Balancing Mechanism Units to be conveyed without placing any restrictions on connection design.

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

The proposed change reduces the volume of information required to be exchanged between generators and NGET but provides for appropriate

operational liaison to ensure the transmission system can be operated efficiently safely and securely.

(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.

The proposed change is neutral in this regard.

Impact on core industry documents

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

Impact on other industry documents

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

5 Workgroup Recommendations

5.1 The Workgroup recommends:

(a) Modifying the Power Park Module Availability Matrix in OC2 Appendix A and BC1 Appendix 1 and the provisions of PC.A.3.2.2 and PC.A.3.2.4 to link PPMs to their respective BM Units; and

(b) Modifying the provisions of BC1 to relax the requirement to re-submit a Power Park Module Availability Matrix by fax in the event of a change, and instead stipulate that changes should be notified by telephone and only supplemented by fax when deemed absolutely necessary by National Grid.

Grid Code Offshore BM Unit Configuration Workgroup (OBC)
Terms of Reference

Governance

1. The OBC WG is established by Grid Code Review Panel (GCRP).

2. The group shall formally report to the GCRP.

Membership

3. Membership will be invited from the Grid Code standard distribution list with the addition of;
    - Known offshore wind farm developers;
    - Elexon rep
    - Ofgem rep
    - SO-TO Code Committee (STC Committee) rep.

Meeting Administration

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

5. National Grid will provide technical secretary resource to the OBC WG and handle administrative arrangements such as venue, agenda and minutes.

6. The OBC WG will have a dedicated section under the Grid Code part of National Grid's website.

Scope

7. It was agreed at the 18th November 2010 Grid Code Review Panel meeting to establish a Grid Code Workgroup to establish the information exchanged by both NGET and Users to enable NGET to manage the Transmission System given that BM Unit Configurations can change as a consequence of BSC modifications P237 and P240.

8. The need to consider the information required to manage the transmission system as BM Unit configurations change initially became apparent in the context of Offshore Transmission and Offshore BM Units. The Workgroup will consider the applicability of any new requirements to both Onshore and Offshore BM Units.

Deliverables

9. The Workgroup will:

    - Determine the current obligations for the provision of relevant operational data by Offshore PPMs.
    - Determine the operational information required by the NETS System Operator and Users in order to operate the NETS in an economic and efficient manner.

- Consequently, determine what additional information is required and when and determine the form by which it shall be presented. The Workgroup should be mindful not just of the current Offshore configurations but those anticipated for the future. Develop the Grid Code requirements to implement any changes identified.
- A Workgroup report will be delivered with the findings, a summary of discussions and final recommendations (including proposed revisions to the Grid Code).

Timescales

10. The Workgroup will produce a Workgroup report outlining its analysis, findings and recommendations which will be submitted to the Grid Code Review Panel at the meeting in January 2012.

Annex 2 - Proposed Legal Text

This section contains the proposed legal text to give effect to the Workgroup proposals. The proposed new text is in red and is based on Grid Code Issue 5 Revision 0.

PLANNING CODES

PC.A.3.2.2 Items (a), (b), (d), (e), (f), (g), (h), (i), (j) and (k) are to be supplied by each **Generator , DC Converter Station** owner or **Network Operator** (as the case may be) in accordance with PC.A.3.1.1, PC.A.3.1.2, PC.A.3.1.3 and PC.A.3.1.4. Items (a), (e) and (fj)(iv) are to be supplied (as applicable) by a **User** in the case of **OTSUA** which includes an **OTSDUW DC Converter**. Item (c) is to be supplied by each **Network Operator** in all cases:-

(a) …

(k) the number and types of the **Power Park Units** within a **Power Park Module**, identifying each **Power Park Unit**, ~~and~~ the **Power Park Module** of which it forms part and identifying the **BM Unit** of which each **Power Park Module** forms part, unambiguously. In the case of a **Power Station** directly connected to the **National Electricity Transmission System** with multiple **Power Park Modules** where **Power Park Units** can be selected to run in different **Power Park Modules** and/or **Power Park Modules** can be selected to run in different **BM Units**, details of the possible configurations should also be submitted. In addition for **Offshore Power Park Modules**, the number of **Offshore Power Park Strings** that are aggregated into one **Offshore Power Park Module** should also be submitted.

PC.A.3.2.4 Notwithstanding any other provision of this **PC**, the **Power Park Units** within a **Power Park Module**, and the **Power Park Modules** within a **BM Unit**, details of which are required under paragraph (k) of PC.A.3.2.2, can only be amended in accordance with the following provisions:-

(a) if the **Power Park Units** within that **Power Park Module** can only be amended such that the **Power Park Module** comprises different **Power Park Units** due to repair/replacement of individual **Power Park Units** if **NGET** gives its prior consent in writing. Notice of the wish to amend a **Power Park Unit** within such a **Power Park Module** must be given at least 4 weeks before it is wished for the amendment to take effect;

(b) if the **Power Park Units** within that **Power Park Module** and/or the **Power Park Modules** within that **BM Unit** can be selected to run in different **Power Park Modules** and/or **BM Units** as an alternative operational running arrangement, the **Power Park Units** within the **Power Park Module**, the **BM Unit** of which each **Power Park Module** forms part, and the **Grid Entry Point** at which the power is provided can only be amended as described in BC1.A.1.8.4.

OPERATING CODES

OC2.4.2 DATA REQUIREMENTS

OC2.4.2.1 When a **Statement** of **Readiness** under the **Bilateral Agreement** and/or **Construction Agreement** is submitted, and thereafter in calendar week 24 in each calendar year,

(a) …

(l) Each **Generator** shall in respect of each of its **Power Park Modules** at **Large Power Stations** submit to **NGET** in writing a **Power Park Module Planning Matrix**. It shall be prepared on a best estimate basis relating to how it is anticipated the **Power Park Module** will be running and which shall reasonably reflect the operating characteristics of the **Power Park Module** and the **BM Unit** of which it forms part**.** It will be applied (unless revised under this OC2) from the **Completion Date,** in the case of the one submitted with the **Statement of Readiness,** and in the case of the one submitted in calendar week 24, from the beginning of week 31 onwards. It must show the number of each type of **Power Park Unit** in the **Power Park Module** typically expected to be available to generate and the **BM Unit** of which it forms part, in the format indicated in Appendix 4. The **Power Park Module Planning Matrix** shall be accompanied by a graph showing the variation in MW output with **Intermittent Power Source** (e.g. MW vs wind speed) for the **Power Park Module**. The graph shall indicate the typical value of the **Intermittent Power Source** for the **Power Park Module**.

Any changes must be notified to **NGET** promptly. **Generators** should note that amendments to the composition of the **Power Park Module** at **Large Power Stations** may only be made in accordance with the principles set out in PC.A.3.2.4. If in accordance with PC.A.3.2.4 an amendment is made, an updated **Power Park Module Planning Matrix** must be immediately submitted to **NGET** in accordance with this OC2.4.2.1(a).

The **Power Park Module Planning Matrix** will be used by **NGET** for operational planning purposes only and not in connection with the operation of the **Balancing Mechanism**.

OC2 APPENDIX 4

Power Park Module Planning Matrix example form

BM Unit NAME				
POWER PARK MODULE {IDENTIFIER}:				
POWER PARK UNIT AVAILABILITY	**POWER PARK UNITS**			
	[Type A]	[Type B]	[Type C]	…
Description (Make/Model)				
Number of Units				
POWER PARK MODULE {IDENTIFIER}:				
POWER PARK UNIT AVAILABILITY	**POWER PARK UNITS**			
	[Type A]	[Type B]	[Type C]	…
Description (Make/Model)				
Number of Units				
…				

The **Power Park Module Planning Matrix** may have as many columns as are required to provide information on the different make and model for each type of **Power Park Unit** in a **Power Park Module** and as many rows as are required to provide information on the **Power Park Modules** within each **BM Unit**. The description is required to assist identification of the **Power Park Units** within the **Power Park Module** and correlation with data provided under the **Planning Code**.

BALANCING CODES

BC1.4.2 Day Ahead Submissions

Data for any **Operational Day** may be submitted to **NGET** up to several days in advance of the day to which it applies, as provided in the **Data Validation, Consistency and Defaulting Rules**. However, **Interconnector Users** must submit **Physical Notifications,** and any associated data as necessary, each day by 11:00 hours in respect of the next following **Operational Day** in order that the information used in relation to the capability of the respective **External Interconnection** is expressly provided. **NGET** shall not by the inclusion of this provision be prevented from utilising the provisions of BC1.4.5 if necessary. The data may be modified by further data submissions at any time prior to **Gate Closure**, in accordance with the other provisions of **BC1**. The data to be used by **NGET** for operational planning will be determined from the most recent data that has been received by **NGET** by 11:00 hours on the day before the **Operational Day** to which the data applies, or from the data that has been defaulted at 11:00 hours on that day in accordance with BC1.4.5. Any subsequent revisions received by **NGET** under the **Grid Code** will also be utilised by **NGET**. In the case of all data items listed below, with the exception of item (e), **Dynamic Parameters** (Day Ahead), the latest submitted or defaulted data, as modified by any subsequent revisions, will be carried forward into operational timescales. The individual data items are listed below:-

…

(f) **Other Relevant Data**

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

(i) in the case of a **CCGT Module**, a **CCGT Module Matrix** as described in **BC1** Appendix 1;

(ii) details of any special factors which in the reasonable opinion of the **BM Participant** may have a material effect or present an enhanced risk of a material effect on the likely output (or consumption) of such **BM Unit(s)**. Such factors may include risks, or potential interruptions, to **BM Unit** fuel supplies, or developing plant problems, details of tripping tests, etc. This information will normally only be used to assist in determining the appropriate level of **Operating Margin** that is required under OC2.4.6;

(iii) in the case of **Generators**, any temporary changes, and their possible duration, to the **Registered Data** of such **BM Unit**;

(iv) in the case of **Suppliers**, details of **Customer Demand Management** taken into account in the preparation of its **BM Unit Data**;

(v) details of any other factors which **NGET** may take account of when issuing **Bid-Offer Acceptances** for a **BM Unit** (e.g., **Synchronising** or **De- Synchronising** Intervals, the minimum notice required to cancel a **Synchronisation**, etc); and

(vi) in the case of a **Cascade Hydro Scheme**, the **Cascade Hydro Scheme Matrix** as described in **BC1** Appendix 1.

(vii) in the case of a **Power Park Module**, a **Power Park Module Availability Matrix** as described in **BC1** Appendix 1.

BC1.A.1.8 Power Park Module Availability Matrix

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

Power Park Module Availability Matrix example form

BM Unit NAME				
POWER PARK MODULE {IDENTIFIER}:				
POWER PARK UNIT AVAILABILITY	**POWER PARK UNITS**			
	[Type A]	[Type B]	[Type C]	…
Description (Make/Model)				
Number of Units				
POWER PARK MODULE {IDENTIFIER}:				
POWER PARK UNIT AVAILABILITY	**POWER PARK UNITS**			
	[Type A]	[Type B]	[Type C]	…
Description (Make/Model)				
Number of Units				
…				

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

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

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