Report on Issue 44 - Balancing Mechanism Pricing Issue

Meeting Name	BSC Panel
Meeting Date	11 October 2012
Purpose of paper	For Information
Summary	This paper summarises the conclusions of the Issue 44 Group. The Group does not recommend any Modification to the BSC at this point. It recommends that a potential solution for modelling of multi-shaft BM Units should be investigated further, but that this is best carried out under Grid Code Governance by the Electricity Balancing System Multi-Shaft Modelling (MSM) Subgroup[1]. We invite you to note the Group's views and that Issue 44 is now closed.

1. What is the issue highlighted by the Proposer?

1.1 National Grid (on behalf of the MSM Subgroup) raised Issue 44 to examine potential issues with the rules for Bid-Offer Acceptance Prices in the Balancing Mechanism that can result in inefficient pricing and/or reduced flexibility to meet the challenges of future system operation. These issues are at their most significant for the following types of generation:

- Multi-shaft Combined Cycle Gas Turbine (CCGTs); and
- Cascade Hydro Schemes.

1.2 These types of generation comprise of multiple Generating Units, but are currently modelled in the Balancing Mechanism as single Balancing Mechanism Units (BM Units), with a single set of Dynamic Data and a single monotonically increasing set of Bid-Offer Prices. This limits the Generator's ability to submit Bid Offer data that accurately reflects the balancing services it is willing to provide, and can create artificial incentives to increase the price of generation above minimum output and/or reduce the offered flexibility of the Plant.

2. Why this issue and why now?

2.1 These issues have existed since NETA Go-Live, but have been raised now for two reasons:

- National Grid is replacing the existing Balancing Mechanism system with a global best practice 'Electricity Balancing System' (EBS) for balancing the real-time electricity supply and demand. The new system is envisaged to go live in 2013, and provides new capabilities that could be used in the GB market if appropriate (e.g. for modelling the configurations of multi-shaft CCGT Modules).
- At the same time market conditions have (and will continue) to change, with CCGTs needing to run more flexibly as the amount of intermittent generation increases.

[1] The Grid Code Review Panel has established the Electricity Balancing System Group (EBSG) to consider Grid Code changes that may be appropriate as a result of the new Electricity Balancing System. The MSM Subgroup reports to the EBSG, and requested that National Grid raise Issue 44.

2.2 National Grid consulted on the potential capabilities of the new system in October 2010, and the industry responses received were generally supportive of improved modelling[2]. The EBS Multi-Shaft Modelling Subgroup was therefore established to examine this.

3. Summary of Issue 44 Discussions

3.1 The Issue 44 Group held one meeting on 22 June 2012. They concluded that the issues identified by the Proposer fall into two categories:

- Some of the issues are not specific to multi-shaft CCGT and Cascade Hydro Schemes, but apply more broadly to other forms of generation. In particular, pricing inefficiencies can arise because the GB Balancing Mechanism (unlike power markets in some other countries) limits Generators to £/MWh prices, and does not allow start-up or no-load prices. Section 4 of this paper summarises the Group's discussion of these issues.
- Other issues arise from treating multiple related Generating Units as a single BM Unit, and are therefore specific to multi-shaft CCGT Modules and Cascade Hydro Schemes. Section 5 of this paper summarises the Group's discussion of these issues.

4. Issues Potentially Affecting all Market Participants

4.1 Unlike some other power markets, the GB Balancing Mechanism does not allow Generators to include a start-up price in their Bid Offer Data. In the absence of start-up prices, Generators must include any start-up costs in their £/MWh Bid Offer Prices. For example, a Generator might construct Bid Offer Data to ensure that its start-up costs are recovered in the event that the BM Unit is instructed to its Stable Export Limit (SEL). If the Generator is then instructed to a level other than SEL inefficient pricing may result e.g. the BM Unit may end up priced higher than the Generator would like for output above the level of SEL.

4.2 The MSM Subgroup noted that start-up prices were part of the pricing structure under the Pool Arrangements and were seen by some as part of the problem with those arrangements. However, it is the view of the subgroup that it was its use in the calculation of System Marginal Price that was the main problem, whereas there is no such calculation under NETA and BM participants are "paid as bid", rather than receiving System Marginal Price. EBS has the capability to support the submission of start-up prices.

4.3 The Issue 44 Group noted that the current structure of Bid Offer Data does provide a mechanism for Generators to recover their costs (including those associated with start-up), as these can be taken into account when setting Bid Offer Prices. However, the Group did agree that there is a potential issue with inefficient pricing for levels of output between SEL and Maximum Export Limit (MEL), and discussed potential solutions, including:

- Removing the current requirement that Bid Offer Prices be monotonically increasing; or
- Allowing Generators to include start-up and/or no-load prices in their Bid Offer Data.

[2] The consultation and the industry responses are available on the EBS page of the National Grid website.

4.4 The Group was concerned about the potential unintended consequences of either of these solutions. The current arrangements are well-understood, and additional complexity in the structure of the market could reduce transparency and decrease competition. Some members of the group believed that more complex price structures could lead to market inefficiencies in the Balancing Mechanism (and with a potential knock-on effect to power markets ahead of Gate Closure).

4.5 The recommendation of the Group is that these potential changes to the overall pricing structure should not be progressed.

5. Issues Specific to Multi-Shaft CCGT Modules and Cascade Hydro Schemes

5.1 Although they are represented in the Balancing Mechanism as single BM Units, these types of generation actually consist of multiple Generating Units, and the BM Unit capabilities may vary significantly depending upon the configuration. For example, a CCGT Module might be able to comply with a Bid Offer Acceptance by starting up two Gas Turbines (2GT) or two Gas Turbines and one Steam Turbine (2GT + 1ST). The costs incurred by the Generator and the subsequent flexibility of the Plant could vary significantly depending upon which option was chosen, but current systems provide no mechanism for these complexities to be communicated between market participants and National Grid.

5.2 This weakness in existing systems and data flows is currently mitigated to some extent using fax-based submissions of data:

- Section BC1 of the Grid Code includes provisions for submission of CCGT Module Matrices and Cascade Hydro Scheme Matrices; and
- There are also fax-based processes for Generators to notify opportunities to despatch above MEL (by synchronising an additional GT) or below SEL. Such notifications are reported to the market on National Grid's SONAR website.

5.3 However, these manual submissions do not describe BM Unit capabilities in a way that is consistent with other Balancing Mechanism data or that can be understood by industry-standard scheduling algorithms. They do not provide the System Operator with a coherent model of BM Unit capabilities when starting up or shutting down units within a module, and the net result is constraints in the operational flexibility of these modules.

5.4 The Group concluded that this issue does limit the ability of the System Operator to access the full flexibility offered by these BM Units. This is likely to become increasingly significant as the volume of intermittent generation increases, and the role of CCGT Modules in responding flexibly increases.

5.5 The Group recommends that further investigation is required to identify a solution that allows the Electricity Balancing System to model the configurations of these BM Units. Such a solution would require amendments to data flows between System Operator and Generators to identify explicitly Plant configurations and the parameters and prices associated with them. The Group discussed whether any solution should allow each configuration to have its own 'ladder' of Bid-Offer Prices, and concluded that it should, as the benefit of configuration modelling to Generators and to the System Operator would otherwise be reduced.

6. Next Steps

6.1 The proposed next step is further work to identify and assess a solution for configuration modelling of multi-shaft CCGT Modules. This work will require consideration of changes to Grid Code data flows and the Electricity Balancing System, and the Group therefore believes that it would be better carried out by the MSM Subgroup (under Grid Code governance).

6.2 The MSM Subgroup has now started this work. The subgroup met on 22 August to define a 'straw man' solution, which will be developed further at the next meeting on 8 October.

6.3 Any solution identified by the MSM Subgroup will be progressed through the Grid Code Modification process. There are also likely to be consequential impacts on BSC Systems such as the Balancing Mechanism Reporting Service (BMRS) and Settlement Aggregation Agent (SAA), which would need to be assessed through BSC Modification Procedures. The Group agreed that these can be progressed through a new Modification or Issue at the appropriate time, and that in the meantime Issue 44 should be closed.

7. Recommendations

7.1 We invite you to:

a) **NOTE** the Issue 44 Group's discussions and conclusions;

b) **NOTE** the Group's unanimous recommendation that a BSC Modification Proposal should not be raised to introduce start-up or no load prices;

c) **NOTE** that further work on modelling of BM Unit configurations is currently being progressed under Grid Code governance; and

d) **NOTE** that Issue 44 is closed.

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