

*National Grid
Electricity
Transmission plc
Balancing
Mechanism Review*

16 May 2019

*Approach Document for year ended
31 March 2019*

Final

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I Introduction

- 1.1 The introduction of the New Electricity Trading Arrangements ('NETA') on 27 March 2001 required National Grid Electricity Transmission plc ('NGET') to submit certain data to the Balancing Mechanism Reporting Agent ('BMRA') and Settlement Administration Agent ('SAA'). This obligation is set out in Section Q of the Balancing and Settlement Code ('BSC'), to which NGET as the Transmission Company is a signatory.
- 1.2 The BSC also requires NGET to appoint a Balancing Mechanism Auditor ('BM Auditor') to review the compilation and submission of the data referred to in paragraph 1.1 above. The results of the BM Auditor's work are to be forwarded to the BSC Auditor, who will issue an opinion on the operation of the Balancing and Settlement Systems and, in so doing, will place reliance on the work of the BM Auditor.
- 1.3 This document confirms our review approach in our role as BM Auditor for the year ended 31 March 2019. The document has two main purposes:
 - to communicate to NGET and the BSC Auditor our approach to the BM Audit; and
 - to provide an internal planning document, at an overview level, of our review approach.

Basis for review

- 1.4 The basis for our appointment as BM Auditor is set out in Section H 5.1.6 of the BSC. This states that "The following matters shall be audited by an independent auditor of internationally recognised standing appointed by the Transmission Company (the "BM Auditor"):
 - (a) the compiling and submission of Final Physical Notification ('FPN') Data by the Transmission Company pursuant to and in accordance with Section Q of the BSC;
 - (b) the compiling and submission of Bid-Offer Data by the Transmission Company pursuant to and in accordance with Section Q;
 - (c) the compiling and submission of Acceptance Data by the Transmission Company pursuant to and in accordance with Section Q; and
 - (d) the submission of other data by the Transmission Company pursuant to and in accordance with Section Q6."
- 1.5 This Review Approach has been prepared by PricewaterhouseCoopers LLP and accepted by NGET as the basis for the current year's audit, as required in the contractual arrangements in place between PricewaterhouseCoopers LLP and NGET in respect of this audit.
- 1.6 The BM audit is subject to the International Standard on Assurance Engagements ("ISAE") 3000 (Revised) which sets the standard for 'Assurance engagements other than audits or reviews of historical financial information'. We will use the International Standards of Accounting (ISA) for guidance, where applicable.
- 1.7 We set out the remainder of this document as follows:
 - Section 2 an explanation of the scope of the BM Audit as set out in the BSC
 - Section 3 a description of our relationship with the BSC Auditor
 - Section 4 a description of the key dates, materiality and reporting arrangements applicable to the review

- Section 5 our preliminary assessment of the key risks that we perceive to be relevant to the review, and our proposed response to such risks
 - Section 6 a more detailed description of our proposed review approach
- 1.8 This document has been prepared in the expectation that both NGET and the BSC Auditor (as recipients of our report) will have sufficient knowledge of the Balancing and Settlement systems to understand and evaluate the contents without further background explanation.

II Scope of the BM Audit as defined in the BSC

- 2.1 The overall scope of the BM Audit is defined, as referred to above, in Section H 5.1.6 of the BSC. Our review includes:
- (a) reviewing the relevant computer systems and/or internal operating procedures that NGET have in place that enable us to achieve the specific objectives as set out in paragraph 1.4 above;
 - (b) testing on a sample basis, to the extent we think necessary, the ongoing operation of the relevant computer systems and/or internal operating procedures during the year subject to review; and
 - (c) testing on a sample basis, to the extent we think necessary, the data processed by the relevant computer systems and/or internal operating procedures during the year subject to review.
- 2.2 Section H 5.1.6 of the BSC refers to Section Q: Balancing Mechanism Activities of the BSC where the obligations on NGET in respect of the compilation and submission of Balancing Mechanism data is described in more detail. We describe below the scope of the BM Audit by reference to the Balancing Mechanism activities described in Section Q of the BSC.

The compilation and submission of Final Physical Notification ('FPN') Data

- 2.3 Section Q 6.2.1 (a) of the BSC requires NGET, as the Transmission Company, to send to the SAA in respect of each Settlement Day, "the Final Physical Notification Data established pursuant to paragraph 3.2 of Section Q in respect of each Settlement Period within such Settlement Day" within the target time of 15 minutes following the end of the relevant Settlement Day. Section Q 6.1.11 requires the same data to be submitted to the BMRA not later than 15 minutes following Gate Closure.
- 2.4 In respect of the Final Physical Notification Data, the scope of the BM Audit covers:
- (a) the submission of FPN data to the SAA and BMRA; and
 - (b) the timeliness of the provision of such data against the target times set out in Section Q of the BSC.
- 2.5 The scope of the BM Audit will not include the application of default FPN Data required where Physical Notification Data for a Settlement Period is not provided by a BM Unit prior to Gate Closure.

The compilation and submission of Bid-Offer Data

- 2.6 Section Q 6.2.1 (d) of the BSC requires NGET to submit Bid-Offer data to the SAA in respect of each Settlement Period within 15 minutes of the end of the relevant Settlement Day. Section Q 6.1.12 requires the same data to be submitted to the BMRA not later than 15 minutes following Gate Closure.
- 2.7 In addition to the above, Section Q 4.2.1 of the BSC sets out an obligation on NGET to apply default data to Bid-Offer Pair data in the event that, "in respect of a relevant BM Unit and a Settlement Period, no Bid-Offer Pairs are received by the Transmission Company..."

2.8 In respect of Bid-Offer data, the scope of the BM Audit covers:

- (a) the submission of Bid-Offer data to both the SAA and BMRA;
- (b) the timeliness of the provision of such data against the target times set out in Section Q of the BSC; and
- (c) the application of default data to Bid-Offer Pair data.

The compilation and submission of Bid-Offer Acceptance Data

2.9 Section Q 5.1 and 5.3 of the BSC describe on what basis NGET may accept Bid-Offer Data and in what form the notification of the resulting Acceptance must take. Section Q 5.2 details data items with which the Acceptance must be consistent for the Acceptance to be considered valid. Finally, Sections Q 6.1.12 and 6.2.1 (e) require, respectively, NGET to submit Acceptance Data to the BMRA in respect of each Settlement Period not later than 15 minutes following Gate Closure and to submit the same data to the SAA within 15 minutes of the end of the relevant Settlement Day.

2.10 In respect of Acceptance Data, the scope of the BM Audit covers:

- (a) the preparation of data, including SO flagging which is required since 5 November 2009, in respect of the acceptance of a Bid or Offer in the Balancing Mechanism;
- (b) the validity of the Acceptance Data prepared by reference to its consistency with the data items detailed in paragraph 5.2 of Section Q of the BSC;
- (c) the submission of Acceptance Bid-Offer data to both the SAA and BMRA; and
- (d) the timeliness of the provision of such data against the target times set out in Section Q of the BSC.

The submission of other data

2.11 Section Q 6 of the BSC requires NGET to notify the BMRA and SAA of various other data items during the course of the Settlement Day. The required data and the target timescales by which it should be submitted to the BMRA and SAA are detailed in Sections Q 6.1 to Q 6.4 and include:

- (a) data that BM Units submit to NGET, such as: Dynamic Data Sets; Maximum Export Limit and Maximum Import Limit; and Quiescent Physical Notification data. NGET is required to submit any change in this data to the BMRA within the target time of 5 minutes following the receipt of the notification of the change and to submit any changes to the SAA within 15 minutes of the end of the Settlement Day to which the change relates;
- (b) data that is calculated by NGET, such as: demand forecast, indicated margin, indicated imbalance, indicated demand, indicated generation on both a national and zonal basis; Initial National Demand Out-turn; Balancing Services Adjustment Data; and Applicable Balancing Services Volumes generation data. NGET is required to submit forecast data on a rolling basis for 52 week, 2 week and day ahead timescales. The required frequency and submission target times for this data is set out in Sections Q 6.1 to Q 6.4;
- (c) data NGET have to submit regarding out-turn and reference temperatures; wind generation forecast; instantaneous and half-hourly generation by fuel type; daily energy volumes transported across the transmission system (based on initial demand out-turn); and non-balancing mechanism (non-BM) short term operating reserve (STOR); instructed volumes, as required by modifications (P220) to section Q which are applicable since 6 November 2008; and

- (d) notification of System Warnings as required by Section Q 6.1.14.
- 2.12 In respect of other data described in Sections Q 6.1 to Q 6.5, the scope of the BM Audit covers:
- (a) the submission of the data to the SAA, the BSCCo and the BMRA as required; and
 - (b) the timeliness of the provision of such data against the target times set out in Section Q 6.
- 2.13 Where Ofgem approves Modification Proposals to the BSC, and those changes have an impact on the sections of the BSC within the scope of the work conducted for the purposes of the BM Audit, we amend our testing accordingly.
- 2.14 The Modification Proposal P217 (Revised tagging process and calculation of cash out prices) requiring the tagging of bids and offers became effective from 5 November 2009. National Grid performs the tagging of bids and offers, based on a range of factors that exist at the time of their acceptance, as part of its normal control room operations. The procedure for tagging of bids and offers; the subsequent validation of tagging activity; and reporting to the market is defined in the System Management Action Flagging Methodology Statement (“SMAF”). Our audit of the tagging requirement, as specified by P217, will consist of the following:
- (a) Confirming all accepted bids and offers are tagged as required by paragraph 5.3.1 of Section Q. The scope does not include validation of the engineering decisions taken by National Grid when accepting bids and offers;
 - (b) Confirming that the post event checking of bids and offers has been performed in line with the guidance in SMAF; and
 - (c) Confirming that reporting to the market is performed in line with SMAF and reflects the results of the tagging activity.
- 2.15 The scope of the BM Audit does not include the calculation of the data in paragraph 2.11(b) above, in particular it does not include the calculation of Balancing Settlement Adjustment Data and Applicable Balancing Services Volumes which are required in the calculation of System Sell Price and System Buy Price. The scope does not include validation of the engineering decisions taken by National Grid as part of the balancing activities. The scope of the BM Audit also does not include the validity of data submitted on behalf of BM Units to NGET, but is restricted to reviewing the onward submission of this data to the BMRA or SAA, as required.

III Relationship with the BSC Auditor

- 3.1 The work carried out by the BM Auditor is to provide assurance to the BSC Auditor that activities for which NGET is responsible and that are within the scope of the BM Audit, as defined in the BSC, are performed in accordance with the requirements of the BSC. As such the BSC Auditor will be copied with all formal reports, as described later in this document, prepared as a result of the BM Audit.
- 3.2 In addition, the BSC Auditor has the right to attend formal planning meetings between the BM Auditor and NGET and also the clearance meetings that will be held in each review year.
- 3.3 We have agreed with NGET that we will liaise with the BSC Auditor both in the preparation of this approach document and as our review progresses such that the BSC Auditor is kept informed on the progress of our review and any significant issues arising. However, the BSC Auditor acknowledges that any oral or draft reporting, which we might provide, will not constitute our definitive opinions and conclusions. These will be contained solely in our formal reports.

IV Key dates, materiality and reporting arrangements

- 4.1 The BSC Panel has agreed that the BSC Auditor should issue the opinion for the year ended 31 March 2019. We have planned the BM Audit for the year ended 31 March 2019 so that the results arising from the BM Audit can be subsumed as part of that BSC Audit opinion.

Reporting

- 4.2 We plan to produce our final reports for the year ended 31 March 2019 by 22 May 2019.
- 4.3 In addition to the year end opinion, if we consider it appropriate, we will prepare a BM Audit Issues report setting out any specific control issues which we identify and which we believe are of sufficient importance to warrant communication to NGET and the BSC Auditor.
- 4.4 All our reports will be addressed to NGET with a copy being provided to the BSC Auditor for them to rely on. It is our intention that as recipients of our reports, NGET and the BSC Auditor will be able to rely upon those reports, with the BM Auditor owing no duty of care to any other party.
- 4.5 All documents will be discussed with NGET's System Operation Director, or their nominee, before being issued.
- 4.6 The reporting arrangements in prior periods have been such that the results of our work have been subsumed within the overall BSC period-end review opinion. The BSC Auditor has then delivered the BSC Audit Report to the BSC Panel, and provided a copy of that report to each Trading Party, Ofgem and the Transmission Company. Furthermore, in preparing his BSC period-end review opinion, the BSC Auditor has previously placed some reliance on our audit work as detailed in our Approach documents relating to prior periods.
- 4.7 We are also aware that in prior periods ELEXON Limited ('ELEXON'), on behalf of the BSC Panel, has produced, in conjunction with the BSC Auditor, a version of the BSC Audit report that was suitable for publication. This version of the BSC Audit report has been posted on the ELEXON web-site as well as being provided to any person who may request it. The report posted to the website contained a statement from ELEXON informing all readers that it was not intended that they should be able to place reliance on the opinion.
- 4.8 To meet the requirements of Section H 5.7.4 of the BSC in respect of providing all participants with an appropriate level of transparency of the BM Audit, it has been previously agreed by NGET, ELEXON and PwC that the BM Audit report provided to the Directors of NGET shall be made available on the NGET website. Whilst access to this report has not been restricted, it is subject to the agreement by the reader of certain terms and conditions.

Materiality

- 4.9 The BM Audit will be undertaken using the same level of materiality as is set for the BSC Audit. For the year ended 31 March 2019 we understand that the materiality for the BSC Audit will be 1.2TWh. Accordingly, we will use a materiality of 1.2TWh for the BM Audit..

Ways of working

- 4.10 If significant issues arising from our review are identified these are brought promptly to the attention of the System Operation Director at NGET, or their nominee.
- 4.11 We hold meetings with the System Operation Director, or their nominee, at the end of our visits, to discuss the overall findings of our work.

Letter of representation

- 4.12 To increase our assurance in those areas of our review where we are unable to obtain adequate corroborative evidence and it is reasonable for us to expect such evidence not to be available, we request a letter of representation from NGET's Group Director System Operation. This letter of representation is dated the same day as our review opinion.

V Preliminary assessment of key risks

- 5.1 In planning our review, we assess the risk of a significant non-compliance of the areas within the scope of our review. Our assessment of risk is principally obtained from:
- (a) our understanding of the processes and procedures relevant to the Balancing Mechanism activities undertaken by NGET and within the scope of the BM Audit;
 - (b) the risks noted during the BM Audit for the period ended 31 March 2019; and
 - (c) regular discussions with senior employees of System Operation.
- 5.2 Throughout our work, we continue to monitor developments that impact Balancing Mechanism activities and where we identify a resulting risk in respect of our review we assess the risk and determine an appropriate review response. Circumstances may result in us increasing the number of days or areas to be reviewed. Any change to the extent of our review is discussed and agreed with NGET prior to commencing such work.
- 5.3 We select eight Settlement Days for testing in the year. The selection of the particular days to be reviewed is based solely on our assessment of risk, and represents a mix of "normal" days and other days where circumstance would suggest a higher risk of non-compliance with the BSC. This may include weekends, clock change days or days around a specific event.
- 5.4 We have identified the following specific matters and areas of change to Balancing Mechanism activities that, by their nature, represent areas of risk. These may impact the compliance of NGET with the requirements of the BSC for the year ended 31 March 2019, and we address each risk by performing appropriate levels of testing as we consider necessary.

Risk	Our response
<p>System and process changes</p> <p>The introduction of NETA and the subsequent implementation of British Electricity Trading and Transmission Arrangements (BETTA) required NGET to develop and implement new computer systems and surrounding processes relating to Balancing Mechanism activities. In turn, this required System Operation staff to become familiar with new operating procedures and controls. Whilst these systems and processes have been in place for in excess of 3 years, they continue to be revised as the BSC is refined and changed.</p>	<p>We maintain close contact with System Operation staff at NGET and follow up all instances of 'operator error' to assess whether such incidents should be considered isolated incidents or indicative of a more systematic misunderstanding or control weakness in the system. We consider increasing the sample size for substantive tests until we have accumulated evidence that controls and procedures are operating consistently as required.</p>

Risk	Our response
<p>System failures (failure of balancing systems and other events affecting balancing process)</p> <p>System failures may require the System Operation staff to:</p> <ul style="list-style-type: none"> - Perform certain actions and subsequently recover systems and, potentially, data; or - Take decisions to ensure the continuity of the balancing processes. <p>Such events increase the risk of error or actions that are not consistent with the BSC.</p>	<p>Through discussion with System Operation staff and review of Elexon circulars, we identify any system failures experienced. We determine the impact of any such failures on operational activities and review recovery actions taken.</p>
<p>Impact of balancing system outages</p> <p>Outages of the balancing systems may be planned or unplanned and occur for various reasons. The severity of these outages can vary and consequently National Grid's response will depend on the conditions existing during the outage.</p> <p>During some outages data is required to be input manually into the system and there is a greater risk of error than where this is performed electronically using a stable and proven system. Also, where system failure, including failure of communication links, requires fall back to manual processes there is again a greater risk of error as the System Operation staff adopt processes that they are less familiar with.</p>	<p>As part of our more detailed planning for the assignment we identify key manual inputs and interactions with the systems and tailor our review work programme to address the inherent risk of these activities.</p> <p>As above we identify, through discussion with System Operation staff and review of appropriate event logs, periods where manual processes were implemented and develop appropriate tests to review the validity of actions taken.</p>

VI More detailed description of our proposed review approach

- 6.1 We design our testing to provide reasonable, but not absolute, assurance that Balancing Mechanism activities are carried out in accordance with the requirements of the BSC. Our review comprises a review of relevant computerised and manual systems coupled with compliance testing of System Operation' internal controls and substantive testing of data. Where adequate control processes exist we seek to place reliance on them. In areas where we have identified specific risks, or where weaknesses have been identified in the operation of specific internal controls, these compliance tests are supplemented by substantive tests of detail of the relevant underlying data.
- 6.2 In all cases our testing is on a sample basis, in line with our methodology. The samples are selected based on a variety of factors including periods of heightened activities and specific events occurring during the review period which affect the balancing process.
- 6.3 Where it is more efficient for us to do so, we use 'Data Assurance' techniques and run tests for the entire selected sample day. Data Assurance techniques involve the use of data manipulation tools to perform automated tasks such as matching two or more types of records, identifying patterns and looking for anomalies.
- 6.4 Our work can be divided into the main areas shown below (although this is not intended to be an exhaustive list).

The compilation of Final Physical Notification data, Bid/Offer data and Bid/Offer Acceptance data

- 6.5 Validity of data:
- Sample testing of Bid/Offer acceptances, confirming that the required data is present; and

- Sample testing Final Physical Notification data to ensure correctly derived from Initial Physical Notification data.

6.6 Default data:

- Sample testing Bid/Offer data items that have been defaulted, confirming that the correct default data has been applied; and
- Sample testing defaulted Bid/Offer data items, confirming that a valid Bid/Offer data submission was not made by the market participant.

6.7 Incidents/exceptions:

- Reviewing incidents where electronic transfer has been interrupted and actions taken to ensure no data files have been lost/duplicated; and
- Reviewing any correspondence/help desk queries from market participants questioning rejection of a data file.

The transfer to the BMRA, SAA and BSCCo of validated FPN and Bid-Offer data, Bid-Offer Acceptance Data and other required data

6.8 Accuracy, completeness and timeliness of data:

- Confirming on a sample basis that data (e.g. validated FPN from “operational database”, bids/ offers accepted from log file) agrees to data written to the BMRA/SAA/Balancing and Settlement Code Company (“BSCCo”) directory;
- Confirming on a sample basis that data written to the BMRA/SAA/BSCCo directory agrees to valid data held within SORT (e.g. validated FPN from “operational database”, bids/ offers accepted from log file); and
- Confirming on a sample basis that the date and time that data was written to the BMRA/SAA/BSCCo directory is within the agreed target timescales.

6.9 Incidents/exceptions:

- Reviewing any incidents where electronic transfer has been interrupted and actions taken to ensure no data files have been lost/ duplicated; and
- Reviewing any correspondence / help desk queries from market participants questioning rejection of a data file.

General IT Controls Testing

6.10 The majority of transactions regarding input and output of data will be sent and processed electronically. Consequently, assurance over these procedures by reviewing the strength of the relevant IT controls existing over these areas.

6.11 Our review will focus on the following in respect of controls over SPICE, SORT and EBS:

- Program development;
- Program changes;
- Computer Operations; and
- Access to programs and data.

This document has been prepared only for National Grid Electricity Transmission plc and solely for the purpose and on the terms agreed with National Grid Electricity Transmission plc. We accept no liability (including for negligence) to anyone else in connection with this document, and it may not be provided to anyone else.

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