

# **Appendix 2**

**Balancing**

**Services**

**Adjustment Data**

**Methodology**

**Statement**

**Version Date:**

**Effective in respect of Settlement Days from and including  
28/11/03**

## **Version Control**

<b><u>Date</u></b>	<b><u>Version No.</u></b>	<b><u>Notes</u></b>
<b>20.3.01</b>	<b>1.0</b>	<b>Initial version</b>
<b>10.4.01</b>	<b>1.1</b>	<b>Revision to include price adjusters for reserve option fees</b>
<b>24.9.01</b>	<b>1.2</b>	<b>Revision to incorporate implementation of P8 and P18 within the BSC. Effective in respect of Settlement Days from and including 25 September 2001</b>
<b>28.3.02</b>	<b>2.0</b>	<b>Revision to incorporate implementation of P48 within the BSC. Effective in respect of Settlement Days from and including 2 April 2002.</b>
<b>25.3.03</b>	<b>2.1</b>	<b>Revision to incorporate implementation of P74/P78 within the BSC. Effective in respect of Settlement Days from and including [Date to be coincident with P74/P78 Implementation]</b>
<b>24.10.03</b>	<b>3.0</b>	<b>Revision to amend the allocation of standing reserve option fees</b>
<b>28.11.03</b>	<b>3.1</b>	<b>Revision to incorporate changes associated with Maximum Generation Service.</b>

This Statement has been developed in consultation with the Authority/Director. The Statement may only be modified in accordance with the processes set out in Special Condition AA4 of the Transmission Licence. Where we buy, sell or acquire any Relevant Balancing Services of a kind or under a mechanism which is not covered by this Statement then we shall promptly seek to establish a revised Statement covering such Balancing Services and/or

mechanisms in accordance with the relevant provisions of Special Condition AA4 of the Transmission Licence.

In the event that it is necessary to modify this Statement in advance of issuing an updated version of this document, then this will be done by issuing a supplement to this Statement.

The latest version of this document is available, together with the relevant change marked version (if any), electronically from the National Grid Website;

[http://www.nationalgridinfo.co.uk/balancing/mn\\_transmission.html](http://www.nationalgridinfo.co.uk/balancing/mn_transmission.html)

Alternatively a copy may be requested from:

Commercial Frameworks Manager

National Grid Transco

NGT House

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Gallows Hill

Warwick CV34 6DA

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## **PART A: INTRODUCTION**

### **1. Purpose of Document**

This document sets out the Balancing Services Adjustment Data methodology which The National Grid Company plc is required to establish in accordance with special Condition AA4 of the Transmission Licence. The purpose of this Statement is to set out the information on Relevant Balancing Services that will be taken into account under the Balancing and Settlement Code for the purposes of determining Imbalance Price(s).

In the event that it is necessary to modify this Statement in advance of issuing an updated version of this document, then this will be done by issuing a supplement to this Statement.

This Statement has been developed in consultation with the Authority/Director. The Statement may only be modified in accordance with the processes set out in Special Condition AA4 of the Transmission Licence. Where we buy, sell or acquire any Relevant Balancing Services of a kind or under a mechanism which is not covered by this Statement then we shall promptly seek to establish a revised Statement covering such Balancing Services and/or mechanisms in accordance with the relevant provisions of Special Condition AA4 of the Transmission Licence.

The Statement makes reference to a number of definitions contained in the Grid Code and Balancing and Settlement Code. In the event that any of the relevant provisions in the Grid Code or Balancing and Settlement Code are amended it may become necessary for us to modify the Statement in order that it remains consistent with the Grid Code or Balancing and Settlement Code.

In any event, where our statutory obligations or the provisions of the Grid Code are considered inconsistent with any part of this Statement, then the relevant statutory obligation and/or Grid Code provision will take precedence.

Unless defined in this Statement, terms used herein shall have the same meanings given to them in the Transmission Licence, the Grid Code and/or the Balancing and Settlement Code as the case may be.

The latest version of this document is available electronically from the National Grid Website;

[http://www.nationalgridinfo.co.uk/balancing/mn\\_transmission.html](http://www.nationalgridinfo.co.uk/balancing/mn_transmission.html)

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## **PART B: BALANCING SERVICES ADJUSTMENT DATA 'BSAD'**

### **1. Basis of Calculation**

#### **1.1 Variables included in the BSAD**

The BSAD is specified in Section Q, Paragraph 6.3 of the Balancing and Settlement Code and includes:

- (i) SBVA – Net Buy Price Volume Adjustment (System);
- (ii) SSVA – Net Sell Price Volume Adjustment (System);
- (iii) EBVA – Net Buy Price Volume Adjustment (Energy);
- (iv) ESVA – Net Sell Price Volume Adjustment (Energy);
- (v) EBCA – Net Buy Price Cost Adjustment (Energy);
- (vi) ESCA – Net Sell Price Cost Adjustment (Energy);
- (vii) BPA – Buy Price Price Adjustment; and
- (viii) SPA – Sell Price Price Adjustment.

This data is used in the calculation of Energy Imbalance Prices, System Buy Price (SBP) and the System Sell Price (SSP) as specified in Section T, Paragraphs 4.4.5 and 4.4.6 of the Balancing and Settlement Code. The summations of System Buy Price (SBP) and System Sell Price (SSP) are defined in BSC Paragraphs T4.4.5 and T4.4.6. NIV Tagged Accepted Offers and Bids, Arbitrage Tagged Accepted Offers and Bids, and Bid Offer Acceptances with an acceptance time of less than the Continuous Acceptance Duration Limit (CADL)<sup>1</sup> are excluded from the summations. The SBVA and SSVA will be used to determine the size of the appropriate bid/offer stack, and then be tagged out, and not used in the calculation of SBP or SSP

Where an implicit adjustment for Transmission Losses is not already included in the contracted volume for relevant services described in this Methodology Statement, National Grid will make the necessary adjustments for Transmission Losses by the application of a ex-ante Transmission Loss Multiplier. The values of  $ETLMO_j^+$  and  $ETLMO_j^-$  as

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<sup>1</sup> CADL is a variable defined within the BSC. The value of CADL is determined by the BSC Panel. For information, the level of CADL as at 25 September 2001 was 15 minutes.

used by the Balancing Mechanism Reporting Agent will be used. This adjustment will be made prior to submission of the BSAD data.

## **1.2 Balancing Services contract costs for inclusion in the BSAD**

Balancing Services are defined in the Procurement Guidelines which National Grid is required to establish in accordance with Special Licence Condition AA4 of the Transmission Licence. The purpose of the Procurement Guidelines is to set out the kinds of Balancing Services which we may be interested in purchasing, together with the mechanisms by which we envisage purchasing such Balancing Services. BSAD covers a subset of the Balancing Services that we intend to procure.

The following relevant Balancing Services contracts will be included in the calculation of the BSAD:

- **Standing Reserve** – In these contracts we will pay option fees either £/h or £/MWh for service availability during specific half-hour periods. Utilisation payments for participants within the Balancing Mechanism will be dealt with automatically via the BM and will feed into the energy imbalance price calculation via the acceptance of an Offer. Utilisation payments for non-BM participants will be made via a separate Balancing Services contract payment.

The calculation of BSAD will include the option fees paid to all service providers. Standing Reserve Option Fees feed into the calculation of BPA and will be allocated into specific settlement periods in accordance with the weighting factors set out in Schedule 1.

- **Regulating Reserve** – For firm provision of this service we will pay option fees with any utilisation fees being fixed via agreement of BM Offers.

Firm Regulating Reserve option payments for increasing generation or reducing demand will feed into the calculation of the BPA. This will be calculated by dividing the total option fee in any settlement period by the total contracted capability.

Similarly any option payments for reducing generation or increasing demand (negative reserve) will feed into the calculation of the SPA.

- **Maximum Generation**

This service is for a non-firm provision of energy, above MEL, called upon after gate closure. Contracts for Maximum Generation are utilisation based only. National Grid will estimate volume and associated cost of the service and will include this estimate in a re-submission of BSAD to the SAA for use in the calculation of the Interim Information Settlement Run. Actual energy delivered, and the associated cost of provision, will not be known until  $QM_{ij}$  volumes, as defined within the BSC, are available following the Interim Information Run. National Grid will provide final volumes and costs associated with Maximum Generation Services as soon as practicable, but in any case prior to the Initial Settlement Run.

- **Forward Contracts**

The costs and volumes of the following Balancing Services (as defined within the Procurement Guidelines) will also feed into the calculation of the BSAD variables:

- Energy Related Products
- PGB Transactions
- System-to-System services

These Balancing Services will be termed Forward Contracts in this document.

Each instance of these Forward Contracts will be categorised as 'energy' related or 'system' related, and this will dictate the treatment of each individual transaction.

In general, energy balancing action is non-locational, and is undertaken purely to ensure the ongoing matching of generation and demand. A system balancing action will generally be used to address very short term effects (less than the Continuous Acceptance Duration Limit) or be location specific (for example resolution of transmission constraints) or provision of frequency response.

System volumes will be targeted to the half-hours in which they are incurred/utilised. Energy costs and volumes will be targeted to the half-hours in which they are incurred/utilised.

For contracts covering bundled services, we will attempt to accurately identify the costs associated with each particular service. If this cannot be achieved then we will allocate the costs equally to each of the contracted services.

### **1.3 BSAD Provision**

BSAD will be submitted in accordance with section Q, Paragraph 6.3 of the Balancing and Settlement Code. In outline this entails the submission of BSAD to the Balancing Mechanism Reporting Agent (BMRA) at or before 5pm each day to cover the 24 hour period from half-hour ending 00:30 to half-hour ending 24:00 for the following day. BSAD amendments for previous periods will also be included in the submission.

This initial submission of BSAD to the BMRA will include the eight variables SBVA, SSSVA, EBVA, ESVA, EBCA, ESCA, BPA and SPA for each settlement period.

The costs and volumes of System to System services and Maximum Generation services will be included in a post event re-submission of BSAD as described in section 1.5.

BSAD will also be published on the National Grid Website.

BSAD will also be submitted on a reasonable endeavours basis to the BMRA on a half hourly basis as soon as possible after Gate Closure. In the event that the half hourly data is not available, then the day ahead submission will prevail.

#### **1.4 Basis of BSAD**

The calculation of the BSAD will be performed on the following basis:

- Reserve availability will be calculated on the basis of week ahead submissions of availability from service providers;
- If no week ahead submission is received from a service provider then zero availability of that contract will be assumed in the calculation of BPA; and
- Any forward contracts struck prior to the submission of BSAD at 5pm at the day-ahead stage will be included. Best endeavours will be employed to include all the contracts that have been entered into prior to 5pm.

#### **1.5 Re-submission of BSAD**

The BSAD will be re-submitted, if required, post event to cover:

- The correction of any errors in the original submission made at 5pm at the Day Ahead stage;
- Adjustments to any of the variables to account for any forward contracts entered into between the day ahead and real time that were not included in the original submission;
- Inclusion of any changes caused by the utilisation of contracts with 'difference<sup>2</sup>' payments;
- Inclusion of any System to System services; and
- Inclusion of any Maximum Generation Service volumes and payments.

Any of these circumstances could result in revisions to any of the variables within BSAD and hence SBP and SSP.

If re-submission of BSAD is required, for any of the reasons above, then National Grid will endeavour to do this in sufficient time to allow the revised variables to be included in the calculation of SSP and SBP in the Interim Information Settlement Run.

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<sup>2</sup> A 'difference' payment will occur if the contract allows a service provider to offer prices into the Balancing Mechanism at any level, but if the contract is exercised then the provider is paid at a fixed level. The difference payment will result from the difference between the BM payment and the contract payment and this will feed into the cost terms of BSAD as appropriate.

## PART C: BSAD Methodology

### 1. Principles

As detailed in Part B, the variables associated with BSAD are as follows:

SBVA = max (Aggregated volume of all relevant Balancing Services purchased for system balancing purposes – Aggregated volume of all relevant Balancing Services sold for system balancing purposes, 0);

SSVA = min (Aggregated volume of all relevant Balancing Services purchased for system balancing purposes – Aggregated volume of all relevant Balancing Services sold for system balancing purposes, 0);

EBVA = max (Aggregated volume of all relevant Balancing Services purchased for energy balancing purposes – Aggregated volume of all relevant Balancing Services sold for energy balancing purposes, 0);

ESVA = min (Aggregated volume of all relevant Balancing Services purchased for energy balancing purposes – Aggregated volume of all relevant Balancing Services sold for energy balancing purposes, 0);

EBCA = EBVA \* weighted average price<sup>3</sup> of all relevant Balancing Services purchased and sold for energy balancing purposes;

ESCA = ESVA \* weighted average price<sup>3</sup> of all relevant Balancing Services purchased and sold for energy balancing purposes;

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<sup>3</sup>  $Weighted \_ average \_ price = \frac{\sum_{i=1}^n (|volume \_ i| * price \_ i)}{\sum_{i=1}^n |volume \_ i|}$

Where the summations (i=1 to n) are performed against all the energy balancing actions (either purchases or sales).

BPA = ((Aggregated cost of purchases of standing reserve option fees for the relevant day \* (relevant standing reserve weighting factor as contained in Schedule 1)) + Aggregated cost of purchases of firm regulating reserve option fees + Aggregated cost of purchases of Forward Contract option fees) / (MWh capability of standing reserve contracts purchased + MWh capability of firm regulating reserve contracts purchased + Contracted MWh associated with options for Forward Contracts purchased)

SPA = (Aggregated cost of negative reserve option fees + Aggregated cost of sales of Forward Contract option fees) / (Aggregated volume of negative reserve contracts + Contracted MWh associated with options for Forward Contracts sold)

For the avoidance of doubt, if the denominator of BPA or SPA is zero in any settlement period, then BPA or SPA will be set to zero in that period.

## 2. **Worked Examples**

Four examples are given below of how the variables of BSAD are calculated in different situations.

These examples show the following situations:

Example 1: Reserve Services only are in place;

Example 2: Reserve Services are in place, and Forward Contracts have been purchased for energy balancing purposes;

Example 3: Reserve Services are in place, and Forward Contracts have been purchased and sold for energy balancing purposes, and

Example 4: Reserve Services are in place, and Forward Contracts have been purchased and sold for energy and system balancing purposes.

Any necessary adjustments for Transmission Losses are already included in the volume terms in the examples.

The prices included in these examples are illustrative only and are provided to demonstrate the way in which the BSAD variables are calculated.

## 2.1 Example 1 - Standing & Regulating Reserve Service only

Assumptions for a given Settlement Period:

- Standing reserve contracts
  - Total standing reserve option payments for the day £1000
  - Standing reserve weighting factor that the settlement period 0.06
  - Declared standing reserve capability for the settlement period 35MW
- The following Firm Regulating Reserve contracts are in place,
  - Contract C
    - Option Fee (Price £ per hour) £10 per hour;
    - Contracted Capability 5MW
- No Forward Contracts have been purchased;
- No Forward Contracts have been sold;
- SBVA = max (Aggregated volume of all relevant Balancing Services purchased for system balancing purposes – Aggregated volume of all relevant Balancing Services sold for system balancing purposes, 0)  
= 0 MWh;
- SSVA = min (Aggregated volume of all relevant Balancing Services purchased for system balancing purposes – Aggregated volume of all relevant Balancing Services sold for system balancing purposes, 0)  
= 0 MWh;
- EBVA = max (Aggregated volume of all relevant Balancing Services purchased for energy balancing purposes– Aggregated volume of all relevant Balancing Services sold for energy balancing purposes, 0)  
= 0 MWh;

- ESVA = min (Aggregated volume of all relevant Balancing Services purchased for energy balancing purposes – Aggregated volume of all relevant Balancing Services sold for energy balancing purposes, 0)  
= 0 MWh
- EBCA = EBVA \* weighted average price of all relevant Balancing Services purchased and sold for energy balancing purposes  
= £0
- ESCA = ESVA \* weighted average price of all relevant Balancing Services purchased and sold for energy balancing purposes  
= £0
- BPA = ((Aggregated cost of purchases of standing reserve option fees for the relevant day \* (relevant standing reserve weighting factor as contained in Schedule 1)) + Aggregated cost of purchases of firm regulating reserve option fees + Aggregated cost of purchases of Forward Contract option fees) / (MWh capability of standing reserve contracts purchased + MWh capability of firm regulating reserve contracts purchased + Contracted MWh associated with options for Forward Contracts purchased)  
= ((£1000\*0.06) + 10 £/hr) / (35MW + 5 MW)  
= (£60 + £5)/(20MWh) in that settlement period  
= £ 3.25/MWh
- SPA = (Aggregated cost of negative reserve option fees + Aggregated cost of sales of Forward Contract option fees) / (Aggregated volume of negative reserve contracts + Contracted MWh associated with options for Forward Contracts sold)  
= £0/MWh

## 2.2 Example 2 - Standing & Firm Regulating Reserve Service and Forward Contracts purchased for Energy Balancing purposes

Assumptions for a given Settlement Period:

- Standing reserve contracts
  - Total standing reserve option payments for the day £1000
  - Standing reserve weighting factor that the settlement period 0.06
  - Declared standing reserve capability for the settlement period 35MW
- The following Firm Regulating Reserve contracts are in place,
  - Contract C
    - Option Fee (Price £ per hour) £10 per hour;
    - Contracted Capability 5MW
- Forward Contracts have been purchased for energy balancing purposes;
  - Contract D
    - Contract for 500MW at £20/MWh for 10 hours,
    - Total payment is therefore £100,000, or £5,000 per settlement period. Contracting party reflects the 500MW in his physical notification.
  - Contract E
    - Option Fee over 20 settlement periods of £5,000 to utilise 200MW at £18/MWh. Contract is exercised pre-gate closure for all 20 periods;
- No Forward Contracts have been sold;
- $SBVA = \max (\text{Aggregated volume of all relevant Balancing Services purchased for system balancing purposes} - \text{Aggregated volume of all relevant Balancing Services sold for system balancing purposes}, 0)$ 
  - =0 MWh;

- SSVA = min (Aggregated volume of all relevant Balancing Services purchased for system balancing purposes – Aggregated volume of all relevant Balancing Services sold for system balancing purposes, 0)  
= 0 MWh;
  - EBVA = max (Aggregated volume of all relevant Balancing Services purchased for energy balancing purposes – Aggregated volume of all relevant Balancing Services sold for energy balancing purposes, 0)  
= (500MW +200MW)/2 = 350 MWh;
  - ESVA = min (Aggregated volume of all relevant Balancing Services purchased for energy balancing purposes – Aggregated volume of all relevant Balancing Services sold for energy balancing purposes, 0)  
= 0 MWh;
  - EBCA = EBVA \* weighted average price of all relevant Balancing Services purchased and sold for energy balancing purposes  
= 350 \*((500 MW \* £20/MWh) +(200 MW \*£18/MWh))/700MW = £6,800;
  - ESCA = ESVA \* weighted average price of all relevant Balancing Services purchased and sold for energy balancing purposes  
= £0;
- ;
- BPA = ((Aggregated cost of purchases of standing reserve option fees for the relevant day \* (relevant standing reserve weighting factor as contained in Schedule 1)) + Aggregated cost of purchases of firm regulating reserve option fees + Aggregated cost of purchases of Forward Contract option fees) / (MWh capability of standing reserve contracts purchased + MWh capability of firm regulating reserve contracts purchased + Contracted MWh associated with options for Forward Contracts purchased)  
= ((£1000\*0.06) + 10 £/hr + 500 £/hr) / (35MW + 5 MW + 200MW)

$$= (£60 + £5 + £250) / (120 \text{MWh}) \text{ for that settlement period}$$

$$= £ 2.625 / \text{MWh}$$

- SPA = (Aggregated cost of negative reserve option fees + Aggregated cost of sales of Forward Contract option fees) / (Aggregated volume of negative reserve contracts + Contracted MWh associated with options for Forward Contracts sold)  
= £0/MWh

### 2.3 **Example 3 - Standing & Firm Regulating Reserve Service and Forward Contracts Purchased and Sold for Energy Balancing Purposes**

Assumptions for a given Settlement Period:

- Standing reserve contracts
  - Total standing reserve option payments for the day £1000
  - Standing reserve weighting factor that the settlement period 0.06
  - Declared standing reserve capability for the settlement period 35MW
- The following Firm Regulating Reserve contracts are in place,
  - Contract C
    - Option Fee (Price £ per hour) £10 per hour;
    - Contracted Capability 5MW
- Forward Contracts have been purchased for energy balancing purposes;
  - Contract D
    - Contract for 500MW at £20/MWh for 10 hours,
    - Total payment is therefore £100,000, or £5,000 per settlement period. Contracting party reflects the 500MW in his physical notification.
  - Contract E

Option Fee over 20 settlement periods of £5,000 to utilise 200MW at £18/MWh (Call Option to buy). Contract is exercised pre-gate closure for all 20 periods;

- Forward Contracts have been sold for energy balancing purposes;
  - Contract F  
Option Fee over 15 settlement periods of £3000 to utilise 300MW at £17/MWh (Put Option to sell). Contract is exercised pre-gate closure for all 15 periods;
- SBVA = max (Aggregated volume of all relevant Balancing Services purchased for system balancing purposes – Aggregated volume of all relevant Balancing Services sold for system balancing purposes, 0)  
= 0 MWh;
- SSVA = min (Aggregated volume of all relevant Balancing Services purchased for system balancing purposes – Aggregated volume of all relevant Balancing Services sold for system balancing purposes, 0)  
= 0 MWh;
- EBVA = max (Aggregated volume of all relevant Balancing Services purchased for energy balancing purposes – Aggregated volume of all relevant Balancing Services sold for energy balancing purposes, 0)  
= (500 MW + 200 MW – 300 MW)/2 = 200 MWh;
- ESVA = min (Aggregated volume of all relevant Balancing Services purchased for energy balancing purposes – Aggregated volume of all relevant Balancing Services sold for energy balancing purposes, 0)  
= min (((700MW – 300MW)/2), 0)  
= 0 MWh;
- EBCA = EBVA \* weighted average price of all relevant Balancing Services purchased and sold for energy balancing purposes  
= 200 \* ((500MW \* £20/MWh) + (200MW \* £18/MWh) + (300MW \* £17/MWh))/(500MW + 200 MW + 300MW) = £3740;

- ESCA = ESVA \* weighted average price of all relevant Balancing Services purchased and sold for energy balancing purposes  
= £ 0;
- BPA = ((Aggregated cost of purchases of standing reserve option fees for the relevant day \* (relevant standing reserve weighting factor as contained in Schedule 1)) + Aggregated cost of purchases of firm regulating reserve option fees + Aggregated cost of purchases of Forward Contract option fees) / (MWh capability of standing reserve contracts purchased + MWh capability of firm regulating reserve contracts purchased + Contracted MWh associated with options for Forward Contracts purchased)  
= ((£1000 \* 0.06) + 10 £/hr + 500 £/hr) / (35MW + 5 MW + 200MW)  
= (£60 + £5 + £250)/(120MWh) for that settlement period  
= £ 2.625/MWh;
- SPA = (Aggregated cost of negative reserve option fees + Aggregated cost of sales of forward contract option fees) / (Aggregated volume of negative reserve contracts + Contracted MWh associated with options for Forward Contracts sold)  
= £400/hr/300MW = £1.333/MWh;

2.4 **Example 4 - Standing & Firm Regulating Reserve Service and Forward Contracts Purchased and Sold for both Energy and System Balancing purposes**

Assumptions for a given Settlement Period:

- Standing reserve contracts  
Total standing reserve option payments for the day £1000  
Standing reserve weighting factor that the settlement period 0.06  
Declared standing reserve capability for the settlement period 35MW
- The following Firm Regulating Reserve contracts are in place,

Contract C

Option Fee (Price £ per hour)	£10 per hour;
Contracted Capability	5MW

- Forward Contracts have been purchased for energy balancing purposes;

Contract D

Contract for 500MW at £20/MWh for 10 hours,  
Total payment is therefore £100,000, or £5,000 per settlement period. Contracting party reflects the 500MW in his physical notification.

Contract E

Option Fee over 20 settlement periods of £5,000 to utilise 200MW at £18/MWh (Call Option to buy). Contract is exercised pre-gate closure for all 20 periods;

- Forward contracts have been sold for energy balancing purposes;

Contract F

Option Fee over 15 settlement periods of £3000 to utilise 300MW at £17/MWh (Put Option to sell). Contract is exercised pre-gate closure for all 15 periods;

- Forward contracts have been purchased for system balancing purposes;

Contract G

PGB Transaction of 200 MW;

Contract H

PGB Transaction of 300 MW;

Contract I

System to System flow of 150 MW;

- Forward Contracts have been sold for system balancing purposes;

Contract J

PGB Transaction of 90 MW;

Contract K

PGB Transaction of 100 MW;

Contract L

PGB Transaction of 80 MW;

Contract M

System to System flow of 400 MW;

- SBVA = max (Aggregated volume of all relevant Balancing Services purchased for system balancing purposes – Aggregated volume of all relevant Balancing Services sold for system balancing purposes, 0)  
$$= \max(((650\text{MW} - 670\text{MW})/2), 0)$$
$$= 0 \text{ MWh};$$
- SSVA = min (Aggregated volume of all relevant Balancing Services purchased for system balancing purposes – Aggregated volume of all relevant Balancing Services sold for system balancing purposes, 0)  
$$= (200\text{MW} + 300\text{MW} + 150\text{MW} - 90\text{MW} - 100\text{MW} - 80\text{MW} - 400\text{MW}) / 2 = -10 \text{ MWh};$$
- EBVA = max (Aggregated volume of all relevant Balancing Services purchased for energy balancing purposes – Aggregated volume of all relevant Balancing Services sold for energy balancing purposes, 0)  
$$= (500 \text{ MW} + 200 \text{ MW} - 300 \text{ MW})/2 = 200 \text{ MWh};$$
- ESVA = min (Aggregated volume of all relevant Balancing Services purchased for energy balancing purposes – Aggregated volume of all relevant Balancing Services sold for energy balancing purposes, 0)  
$$= \min (((700\text{MW} - 300\text{MW})/2), 0)$$
$$= 0 \text{ MWh};$$
- EBCA = EBVA \* weighted average price of all relevant Balancing Services purchased and sold for energy balancing purposes  
$$= 200 * ((500\text{MW} * £20/\text{MWh}) + (200\text{MW} * £18/\text{MWh}) + (300\text{MW} * £17/\text{MWh})) / (500\text{MW} + 200 \text{ MW} + 300\text{MW}) = £3740;$$
- ESCA = ESVA \* weighted average price of all relevant Balancing Services purchased and sold for energy balancing purposes

= £ 0;

- BPA = ((Aggregated cost of purchases of standing reserve option fees for the relevant day \* (relevant standing reserve weighting factor as contained in Schedule 1)) + Aggregated cost of purchases of firm regulating reserve option fees + Aggregated cost of purchases of Forward Contract option fees) / (MWh capability of standing reserve contracts purchased + MWh capability of firm regulating reserve contracts purchased + Contracted MWh associated with options for Forward Contracts purchased)  
= ((£1000 \* 0.06) + 10 £/hr + 500 £/hr) / (35MW + 5 MW + 200MW)  
= (£60 + £5 + £250)/(120MWh) for that settlement period  
= £ 2.333/MWh;
- SPA = (Aggregated cost of negative reserve option fees + Aggregated cost of sales of Forward Contract option fees) / (Aggregated volume of negative reserve contracts + Contracted MWh associated with options for Forward Contracts sold)  
= £400/hr/300MW = £1.333/MWh;



## Schedule1 - Standing Reserve Weighting Factors

Settlement Period 'j'	<i>W<sub>j</sub> - Standing Reserve Weighting Factor</i>									
	1 <sup>st</sup> April – 2 <sup>nd</sup> June		2 <sup>nd</sup> June – 1 <sup>st</sup> September		1 <sup>st</sup> September – 25 <sup>th</sup> October		25 <sup>th</sup> October – 2 <sup>nd</sup> February		2 <sup>nd</sup> February – 1 <sup>st</sup> April	
	WD	NWD	WD	NWD	WD	NWD	WD	NWD	WD	NWD
1	0	0	0	0	0	0	0.007337	0.039644556	0.020004	0
2	0	0	0	0	0	0	0.004389	0	0.008887	0
3	0	0	0	0	0	0	0.000939	0	0	0
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0.000143	0.000714612	0.000538	0
6	0	0	0	0	0	0	0.001618	0.024118919	0.013999	0
7	0	0	0	0	0	0	0	0.022851966	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0
15	0.043172	0	0.039276	0	0.098584	0	0.046292	0	0.030396	0
16	0.062776	0	0.024366	0	0.068312	0	0.021918	0	2.94E-05	0
17	0.058649	0	0.045625	0	0.053409	0	0.029349	0	0	0
18	0.018862	0	0.042776	0	0.027776	0	0.003675	0	0.023745	0
19	0.046908	0	0.054513	0	0.026396	0	0.006116	0	0.053517	0
20	0.056349	0	0.043483	0	0.023419	0	0.019042	0	0.047803	0
21	0.044234	0.039064582	0.038447	0	0.022225	0	0.036411	0.001202981	0.058674	0
22	0.051299	0.107320727	0.061277	0	0.019521	0	0.030806	0.003562656	0.038594	0
23	0.061083	0.164195155	0.092258	0	0.012168	0	0.019961	0.047464715	0.030186	0
24	0.081057	0.151824565	0.103204	0.1498869	0.011101	0	0.011944	0.172607287	0.038937	0
25	0.082464	0.18716449	0.096822	0.1450518	0.005519	0	0.009296	0.266269504	0.059232	0
26	0.044365	0.119570055	0.068244	0.1391949	0.000986	0	0.001531	0.233151109	0.04753	0
27	0.017033	0	0.044916	0	0.044916	0	0.004899	0	0.045686	0
28	0	0	0.016166	0	0	0	0.007507	0	0.037962	0
29	0	0	0.010654	0	0	0	0.005751	0	0	0
30	0	0	0.008543	0	0	0	0.000435	0	0	0
31	0	0	0.007015	0	0	0	0.003531	0	0	0
32	0	0	0.020126	0	0	0	0.011751	0	0	0
33	0.032555	0	0.027232	0	0	0	0.038808	0	0	0
34	0.04321	0	0.031834	0	0.052616	0	0.127923	0	0.000909	0
35	0.032884	0	0.024401	0	0.060223	0	0.178985	0	0.034208	0
36	0.014964	0	0.015856	0	0.041537	0	0.158056	0	0.106411	0
37	0.009044	0	0	0	0.061291	0.0375659	0.090332	0.031233828	0.134475	0.3910555
38	0.009044	0	0	0	0.061291	0.0375659	0.090332	0.031233828	0.134475	0.3910555
39	0.002047	0	0	0	0.089139	0.3372521	0.014125	0.069978879	0.010949	0.217889
40	0.008382	0.018336135	0	0.0338454	0.099555	0.2942657	0.016802	0.05596516	0.022854	0
41	0.041362	0.212524291	0.022154	0.532021	0.115	0.2933504	0	0	0	0
42	0.067465	0	0.020295	0	0.049932	0	0	0	0	0
43	0.070793	0	0.022368	0	0	0	0	0	0	0
44	0	0	0.007461	0	0	0	0	0	0	0
45	0	0	0.010688	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0
47	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0

<i>SUM</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>1</i>
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