

~~Balancing~~ ~~Services~~ ~~Adjustment Data~~ ~~Methodology~~ ~~Statement~~

Balancing Services Adjustment Data

Methodology Statement

Version Date: ~~1 April 2007~~ 05th November 2009

Version Control

<u>Date</u>	<u>Version No.</u>	<u>Notes</u>
20.3.01	1.0	Initial version
10.4.01	1.1	Revision to include price adjusters for reserve option fees
24.9.01	1.2	Revision to incorporate implementation of P8 and P18 within the BSC. Effective in respect of Settlement Days from and including 25 September 2001
28.3.02	2.0	Revision to incorporate implementation of P48 within the BSC. Effective in respect of Settlement Days from and including 2 April 2002.
25.3.03	2.1	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]
24.10.03	3.0	Revision to amend the allocation of standing reserve option fees
28.11.03	3.1	Revision to incorporate changes associated with Maximum Generation Service.
01.01.05	3.2	Revisions to incorporate changes relating to BETTA
15.07.05	3.3	Revisions to incorporate changes as a result of CAP076: Treatment of System to Generating Intertripping Schemes
01.11.06	4.0	Revisions to incorporate changes as a result of

		BM Start-Up service
22.01.07	4.1	Revisions to update the Standing Reserve Weighting Factors and to clarify the treatment of Supplemental Standing Reserve in the BPA calculation
01.04.07	4.2	Revisions to incorporate Short Term Operating Reserve (STOR) and to publish STOR weighting factors on National Grid's industry information website
<u>05.11.09</u>	<u>5</u>	<u>Revisions to incorporate changes as a result of P217A: Revised Tagging Process and Calculation of Cash Out</u>

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 Standard Condition C16 of the Transmission Licence. Where we buy, sell or acquire any ~~R~~rrelevant ~~B~~balancing ~~S~~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 ~~B~~balancing ~~S~~services and/or mechanisms in accordance with the relevant provisions of Standard Condition C16 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

Alternatively a copy may be requested from:

The Electricity Codes Manager

Transmission Commercial

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PART A: INTRODUCTION

1. Purpose of Document

This document sets out the Balancing Services Adjustment Data methodology which National Grid Electricity Transmission plc is required to establish in accordance with Standard Condition C16 of the Transmission Licence. The purpose of this Statement is to set out the information on **R**relevant **B**balancing **S**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 Standard Condition C16 of the Transmission Licence. Where we buy, sell or acquire any **R**relevant **B**balancing **S**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 **B**balancing **S**services and/or mechanisms in accordance with the relevant provisions of Standard Condition C16 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.

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)¹ 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_i⁺ and ETLMO_i⁻ as~~

¹CADL 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 13 November 2003 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 Standard Condition C16 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:~~

- ~~• **Short Term Operating Reserve (STOR)** – 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. STOR 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 Part D.~~

- ~~**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.~~

- ~~**BM Start-Up**~~

~~The BM Start Up service allows National Grid to access MW from BM Units that would not otherwise have run, and are unable to start-up within BM timescales on the day. Firm payments for this service are made on a £/h basis, to remunerate the costs of preparing a BMU to start up and synchronise within BM timescales.~~

~~The costs incurred in creating additional reserve availability will feed into the calculation of BPA, and will be allocated into the periods where the requirement exists (as identified by National Grid at the time of instruction). As National Grid's reserve requirements vary with lead-time, the accrual of costs will need to take account of the amount of reserve that these costs are being incurred to meet, at the relevant lead-time.~~

- ~~**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.~~

~~● **System to Generator Operational Intertipping**~~

~~This is a System Service that results, in certain circumstances, in the automatic tripping of Generating Unit(s). The contract details associated with a System to Generator Operational Intertipping Scheme are contained in section 4.2A of the CUSC and Appendix F3 of a generator's Bilateral Connection Agreement. The volume for inclusion in BSAD will be calculated as SE_{s,j} in accordance with the methodology outlined within the ABSVD Methodology Statement, where service s is System to Generator Operational Intertipping.~~

~~● **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, SSVA, 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'² 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.~~

2. The Balancing Service Adjustment Data ('BSAD') variables

The Balancing Service Adjustment Data ('BSAD') is used as part of the electricity imbalance price calculation specified in section T, paragraphs 4.4.5 and 4.4.6 of the Balancing and Settlement Code. Section Q Paragraph 6.3.2 of the Balancing and Settlement Code specifies the BSAD data for each settlement period as:

- (a) the number of Balancing Services Adjustment Actions;
- (b) for each Balancing Services Adjustment Action:
 - i. the Balancing Services Adjustment Volume;
 - ii. the Balancing Service Adjustment Cost¹; and
 - iii. Whether the Balancing Service is SO Flagged;

¹Provision of Balancing Service Adjustment Cost is dependant on the approval of Modification P239

²~~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.~~

- (c) Buy Price Adjuster;
- (d) Sell Price Adjuster.

3. Balancing Service Adjustment Actions

Any relevant balancing service, taken outside the Balancing Mechanism, will be provided through BSAD as Balancing Service Adjustment Actions.

For each balancing service provided as Balancing Service Adjustment Actions, the energy bought or sold in MWh and the cost paid for each service in £ will be included. Each Balancing Service Adjustment Action will also be accompanied by an identifier indicating whether the balancing service was used for system management reasons. The System Management Action Flagging Methodology Statement describes the process National Grid will use to identify whether Balancing Service Adjustment Actions were used for system management reasons.

~~1.2 3.1.~~ Balancing Services contract costs for inclusion in the BSAD Balancing services included within Balancing Service Adjustment Actions

Balancing services are defined in the Procurement Guidelines which National Grid is required to establish in accordance with Standard Condition C16 of the Transmission Licence. The purpose of the Procurement Guidelines is to set out the kinds of balancing services which ~~we~~ National Grid may be interested in purchasing in the role of System Operator, together with the mechanisms by which National Grid envisages purchasing such balancing services.

Balancing Service Adjustment Actions may include, but are not limited to, the following balancing services:

Forward Contracts

The costs and volumes of the following ~~B~~balancing ~~S~~services (as defined within the procurement Guidelines) ~~will also feed into the calculation of the BSAD variables:~~ be included as Balancing Service Adjustment Actions:

- ~~E~~energy ~~R~~related ~~P~~products
- ~~PGB~~ pre gate balancing Transactions ('PGBTs'); and
- ~~S~~ystem-to-~~S~~ystem services (including Constraint Management & Balancing service and Emergency Assistance service)

All system-to-system services will be included within BSAD as individual Balancing Service Adjustment Actions. Except in circumstances where multiple system-to-system actions, initiated by the same party are taken within a particular settlement period on a particular interconnector from a particular service. In such cases, these services will be provided as a single Balancing Service Adjustment Action and consequently, the volume and cost of these services will be aggregated. This reflects the current contractual arrangements.

Below is an example of single aggregated situation. Note that this example is for illustration purposes only.

1. National Grid sells 50MWh in settlement period 10 over the French link at a price of £50/MWh from the Constraint Management & Balancing Service.
2. National Grid later buys 75MWh in settlement period 10 over the French link at a price of £60/MWh from the Constraint Management & Balancing Service.

The output from this example to the Balancing Service Adjustment Actions is as follows:

$$\underline{75\text{MWh} - 50\text{MWh} = 25\text{MWh}}$$

$$\underline{\text{The Balancing Service Adjustment Volume} = 25\text{MWh}}$$

[25MWh * £60/MWh = £1500](#)

[The Balancing Service Adjustment Cost = £1500](#)

Maximum Generation

This service is for a non-firm provision of energy, above [generators Maximum Export Level \(MEL\), 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 [Settlement Administration Agent \(SAA\)](#) 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 [BM Unit Metered Volume \(QM_{ij}\) 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.

System to Generator Operational Intertripping

~~This is a s~~[System to Generator Operational Intertripping](#) service ~~that~~ results, in certain circumstances, in the automatic tripping of Generating Unit(s). The contract details associated with a System to Generator Operational Intertripping Scheme are contained in section 4.2A of the CUSC and Appendix F3 of a generator's Bilateral Connection Agreement. The volume for inclusion in BSAD will be calculated as [the expected energy delivered \(SE_{sj}\)](#) in accordance with the methodology outlined within the ABSVD Methodology Statement, where service s is System to Generator Operational Intertripping. [The volume for such balancing services will be included within BSAD as Balancing Service Adjustment Actions. However this service is not paid on a £/MWh basis and therefore the volume will be unpriced.](#)

4. Price Adjuster

Where National Grid pays option fees to either, facilitate access to MW capacity within the Balancing Mechanism or to facilitate the withdrawal of MW capacity from the Balancing Mechanism, such fees will be represented through the Price Adjusters. Specifically, fees paid to facilitate additional MW capacity will be represented through the Buy Price Adjuster and fees paid to facilitate the withdrawal of MW capacity through the Sell Price Adjuster.

4.1 Buy Price Adjuster ('BPA')

~~BPA = (((Aggregated cost of purchases of STOR option fees for the relevant day * (relevant STOR weighting factor as set out in Part D)) + Aggregated cost of purchases of firm regulating reserve option fees + Aggregated cost of purchases of Forward Contract option fees) / (MWh capability of STOR contracts purchased + MWh capability of firm regulating reserve contracts purchased + Contracted MWh associated with options for Forward Contracts purchased)) +~~

$$\frac{\sum_{t \in \{BMStartUp\ time\}} \frac{BMStartUp\ Cost}{BMStartUp\ Volume}}{3}$$

The formula below illustrates how the costs associated with such option fees are converted into a £/MWh figure.

$$BPA = \frac{[\left(\sum SC\right) * wf + \sum RC + \sum FC]}{(cS + cR + cF)} + \sum_{t \in BMStartUpTime} \frac{BC}{cB}$$

³BM StartUp time = all minutes associated with BM Start-Ups instructed for this BPA period
BM StartUp Cost (£) = Total cost of applicable BM Start-ups instructed for this BPA period during minute t associated with a requirement defined by National Grid
BM StartUp volume (MWh) = Total capacity (MW) of applicable BM Start-ups instructed for this BPA period during minute t multiplied by the number of hours associated with a requirement defined by National Grid;

SC = cost of purchases of STOR option fees for the relevant day (£)
wf = relevant STOR weighting factor as set out in Appendix A
RC = cost of purchases of firm regulating reserve option fees (£)
FC = cost of purchases of Forward Contract option fees (£)
cS = capability of STOR contracts for the relevant settlement period (MWh)
cR = capability of firm regulating reserve contracts for the relevant settlement period (MWh)
cF = capability of Forward contracts for the relevant settlement period (MWh)
BC = cost of BM StartUp instructions to minute t (£)
cB = volume capability of BM StartUp instructions over the defined BPA period to minute t (MWh)
BMStartUp Time = all minutes associated with BM StartUp instruction

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.

4.1.1. Balancing services included within the Buy Price Adjuster

The Buy Price Adjuster may include, but is not limited to, the following balancing services:

Short Term Operating Reserve (STOR)

In these contracts ~~we~~ National Grid will pay option fees either in £/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 ~~B~~balancing ~~S~~services contract payment.

~~The calculation of BSAD will include the option fees paid to all service providers.~~ STOR 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 [Part D Appendix A](#).

BM Start-Up

The BM Start-Up service allows National Grid to access MW from BM Units that would not otherwise have run and are unable to start-up within BM timescales on the day. Firm payments for this service are made on a £/h basis, to remunerate the costs of preparing a BMU to start up and synchronise within BM timescales.

The costs incurred in creating additional reserve availability will feed into the calculation of BPA, and will be allocated into the periods where the requirement exists (as identified by National Grid at the time of instruction). As National Grid's reserve requirements vary with lead-time, the accrual of costs will need to take account of the amount of reserve that these costs are being incurred to meet, at the relevant lead-time.

[For the avoidance of doubt, the costs will not feed into the BPA calculation in circumstances where National Grid uses BM Start-Up services for system management reasons \(as defined within the System Management Action Flagging Methodology Statement\).](#)

Regulating Reserve

For firm provision of this service ~~we~~ [National Grid](#) 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.

4.1.2. Worked Example – Buy Price Adjuster

This example shows how options fees paid by National Grid for balancing services are reflected within the Buy Price Adjuster. This example is illustrative only, for the purposes of demonstrating how BPA is calculated.

The example:

- STOR contracts
Total STOR option cost for the day = £1000
SC = £1000
STOR weighting factor for the settlement period = 0.06
wf = 0.06
Declared STOR capability for the settlement period = 20MWh
cS = 20MWh
- No firm Regulating Reserve contracts have been purchased
RC = £0
cR = 0MWh
- No Forward contract option fees have been purchased
FC = £0
cF = 0MWh
- BM Start-Up
BM Start-Up cost = £2000 / hr
Period unit is warmed = 8hrs
BC = £2000 * 8hrs
BC = £16000
Generator capacity = 250MW
Requirement period = 4hrs
cB = 250MW * 4hrs
cB = 1000MWh

$$BPA = \frac{[\sum SC * wf) + \sum RC + \sum FC)}{(cS + cR + cF)]} + \sum_{t \in StartUpTime} \frac{BC}{cB}$$

$$BPA = \frac{[\sum ((£1000) * 0.06) + £0 + £0]}{(20MWh + 0MWh + 0MWh)} + \sum_{t \in StartUpTime} \frac{£16000}{1000MWh}$$

$$BPA = £3 / MWh + £16 / MWh$$

$$BPA = £19 / MWh$$

4.2. Sell Price Adjuster ('SPA')

The formula below illustrates how the costs associated with such option fees are converted into a £/MWh figure.

$$SPA = \frac{(\sum NC + \sum FC)}{(cN + cF)}$$

NC = cost of negative reserve option fees (£)

FC = cost of purchases of Forward Contract option fees (£)

cN = capability of negative reserve (MWh)

cF = capability of Forward contracts (MWh)

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.

4.2.1. Worked Example – Sell Price Adjuster

This example shows how options fees paid by National Grid for particular balancing services are provided through the Sell Price

Adjuster. This example is illustrative only, for the purposes of demonstrating how SPA is calculated.

The example:

- Forward contracts option fees

Total option fees of £3000 to withdraw 150MWh per settlement period

$cF = 150MWh$

Aggregated cost of forward contract option fees per settlement period

$= £3000 / 15$

$= £200$

$FC = £200$

$$SPA = \frac{(\sum NC + \sum FC)}{(cN + cF)}$$

$$SPA = \frac{(\pounds 0 + \pounds 200)}{(0MWh + 150MWh)}$$

$$SPA = \pounds 1.333 / MWh$$

PART C: BSAD **Methodology** Submission

~~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 price⁴ of all relevant Balancing Services purchased and sold for energy balancing purposes;~~

~~ESCA = ESVA * weighted average price³ of all relevant Balancing Services purchased and sold for energy balancing purposes;~~

⁴ $Weighted \text{ average price} = \frac{\sum_{i=1}^n (volume_i * price_i)}{\sum_{i=1}^n volume_i}$

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

$$\begin{aligned}
& \text{BPA} = [((\text{Aggregated cost of purchases of STOR option fees for the} \\
& \text{relevant day} * (\text{relevant STOR weighting factor as set out in Part D})) + \\
& \text{Aggregated cost of purchases of firm regulating reserve option fees} + \\
& \text{Aggregated cost of purchases of Forward Contract option fees}) / (\text{MWh} \\
& \text{capability of STOR contracts purchased} + \text{MWh capability of firm} \\
& \text{regulating reserve contracts purchased} + \text{Contracted MWh associated} \\
& \text{with options for Forward Contracts purchased})] + \\
& \frac{\sum_{t \in \{\text{BMStartUp time}\}} \text{BMStartUp Cost}}{\text{BMStartUp Volume}} \quad ^5
\end{aligned}$$

$$\begin{aligned}
& \text{SPA} = (\text{Aggregated cost of negative reserve option fees} + \text{Aggregated} \\
& \text{cost of sales of Forward Contract option fees}) / (\text{Aggregated volume of} \\
& \text{negative reserve contracts} + \text{Contracted MWh associated with options} \\
& \text{for Forward Contracts sold})
\end{aligned}$$

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;

⁵BM StartUp time = all minutes associated with BM Start-Ups instructed for this BPA period
 BM StartUp Cost (£) = Total cost of applicable BM Start-ups instructed for this BPA period during minute t associated with a requirement defined by National Grid
 BM StartUp volume (MWh) = Total capacity (MW) of applicable BM Start-ups instructed for this BPA period during minute t multiplied by the number of hours associated with a requirement defined by National Grid;

~~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 – STOR & Regulating Reserve Service only~~

~~Assumptions for a given Settlement Period:~~

- ~~• STOR contracts~~

 - ~~Total STOR option payments for the day £1000~~

 - ~~STOR weighting factor for the settlement period 0.06~~

 - ~~Declared STOR capability for the settlement period~~

 - ~~35MW~~

- ~~• The following Firm Regulating Reserve contracts are in place,~~

 - ~~Contract G~~

 - ~~Option Fee (Price £ per hour) £10 per hour;~~

 - ~~Contracted Capability 5MW~~

- ~~• No Forward Contracts have been purchased;~~

- ~~• No Forward Contracts have been sold;~~

- ~~• $SBVA = \max(\text{Aggregated volume of all relevant Balancing Services purchased for system balancing purposes} - \text{Aggregated volume of all relevant Balancing Services sold for system balancing purposes}, 0)$~~

 - ~~= 0 MWh;~~

- ~~$$\text{SSVA} = \min (\text{Aggregated volume of all relevant Balancing Services purchased for system balancing purposes} - \text{Aggregated volume of all relevant Balancing Services sold for system balancing purposes}, 0)$$

$$= 0 \text{ MWh};$$~~
- ~~$$\text{EBVA} = \max (\text{Aggregated volume of all relevant Balancing Services purchased for energy balancing purposes} - \text{Aggregated volume of all relevant Balancing Services sold for energy balancing purposes}, 0)$$

$$= 0 \text{ MWh};$$~~
- ~~$$\text{ESVA} = \min (\text{Aggregated volume of all relevant Balancing Services purchased for energy balancing purposes} - \text{Aggregated volume of all relevant Balancing Services sold for energy balancing purposes}, 0)$$

$$= 0 \text{ MWh}$$~~
- ~~$$\text{EBCA} = \text{EBVA} * \text{weighted average price of all relevant Balancing Services purchased and sold for energy balancing purposes}$$

$$= \text{£}0$$~~
- ~~$$\text{ESCA} = \text{ESVA} * \text{weighted average price of all relevant Balancing Services purchased and sold for energy balancing purposes}$$

$$= \text{£}0$$~~
- ~~$$\text{BPA} = ((\text{Aggregated cost of purchases of STOR option fees for the relevant day} * (\text{relevant STOR weighting factor as set out in Part D})) + \text{Aggregated cost of purchases of firm regulating reserve option fees} + \text{Aggregated cost of purchases of Forward Contract option fees}) / (\text{MWh capability of STOR contracts purchased} + \text{MWh capability of firm regulating reserve contracts purchased} + \text{Contracted MWh associated with options for Forward Contracts purchased})$$

$$= ((\text{£}1000 * 0.06) + 10 \text{ £/hr}) / (35 \text{ MW} + 5 \text{ MW})$$

$$= (\text{£}60 + \text{£}5) / (20 \text{ MWh}) \text{ in that settlement period}$$

$$= \text{£} 3.25 / \text{MWh}$$~~
- ~~$$\text{SPA} = (\text{Aggregated cost of negative reserve option fees} + \text{Aggregated cost of sales of Forward Contract option fees}) /$$~~

~~(Aggregated volume of negative reserve contracts + Contracted MWh associated with options for Forward Contracts sold)~~

~~_____ = £0/MWh~~

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

~~Assumptions for a given Settlement Period:~~

- ~~• STOR contracts~~

~~Total STOR option payments for the day £1000~~

~~STOR weighting factor that the settlement period _____ 0.06~~

~~_____ Declared STOR 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 (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)~~
~~= (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 STOR option fees for the relevant day * (relevant STOR weighting factor as set out in Part D)) + Aggregated cost of purchases of firm regulating reserve option fees + Aggregated cost of purchases of Forward Contract option fees) / (MWh capability of STOR 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)~~

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

$$= \pounds 2.625 / \text{MWh}$$

- ~~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)~~

$$= \pounds 0 / \text{MWh}$$

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

Assumptions for a given Settlement Period:

- ~~STOR contracts~~

~~Total STOR option payments for the day~~ £1000

~~STOR weighting factor that the settlement period~~ 0.06

~~Declared STOR capability for the settlement period~~

~~35MW~~

- ~~The following Firm Regulating Reserve contracts are in place,~~

Contract G

~~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 STOR option fees for the relevant day * (relevant STOR weighting factor as set out in Part D)) + Aggregated cost of purchases of firm regulating reserve option fees + Aggregated cost of purchases of Forward Contract option fees) / (MWh capability of STOR 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 - STOR & Firm Regulating Reserve Service and Forward Contracts Purchased and Sold for both Energy and System Balancing purposes**

Assumptions for a given Settlement Period:

- STOR contracts

Total STOR option payments for the day £1000

STOR weighting factor that the settlement period 0.06

Declared STOR capability for the settlement period

35MW

- The following Firm Regulating Reserve contracts are in place;

Contract G

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;~~

- ~~• BM Start-Up contracts are in place. Instructions have been issued on two contracts 'N' and 'O'. Instructions on contracts have proceeded to term. These instructions have been issued for a 2 hour period of service requirement.~~

~~Contract N~~

~~BM Start-Up rate = £1,000 / hr~~

~~Relevant NDZ = 8 hr~~

~~MEL = 600 MW~~

~~Contract O~~

~~BM Start-Up rate = £2,000 / hr~~

~~Relevant NDZ = 6 hr~~

~~MEL = 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(((650MW – 670MW)/2), 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)
= (200MW + 300MW + 150MW – 90MW – 100MW – 80MW – 400MW) / 2 = -10 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;~~

- ~~$$\begin{aligned} \text{ESVA} &= \min (\text{Aggregated volume of all relevant Balancing Services purchased for energy balancing purposes} - \text{Aggregated volume of all relevant Balancing Services sold for energy balancing purposes}, 0) \\ &= \min (((700\text{MW} - 300\text{MW})/2), 0) \\ &= 0 \text{ MWh}; \end{aligned}$$~~
- ~~$$\begin{aligned} \text{EBCA} &= \text{EBVA} * \text{weighted average price of all relevant Balancing Services purchased and sold for energy balancing purposes} \\ &= 200 * ((500\text{MW} * \text{£}20/\text{MWh}) + (200\text{MW} * \text{£}18/\text{MWh}) + (300\text{MW} * \text{£}17/\text{MWh})) / (500\text{MW} + 200 \text{ MW} + 300\text{MW}) = \text{£}3740; \end{aligned}$$~~
- ~~$$\begin{aligned} \text{ESCA} &= \text{ESVA} * \text{weighted average price of all relevant Balancing Services purchased and sold for energy balancing purposes} \\ &= \text{£} 0; \end{aligned}$$~~
- ~~$$\begin{aligned} \text{BPA} &= [((\text{Aggregated cost of purchases of STOR option fees for the relevant day} * (\text{relevant STOR weighting factor as set out in Part D})) + \text{Aggregated cost of purchases of firm regulating reserve option fees} + \text{Aggregated cost of purchases of Forward Contract option fees}) / (\text{MWh capability of STOR contracts purchased} + \text{MWh capability of firm regulating reserve contracts purchased} + \text{Contracted MWh associated with options for Forward Contracts purchased})] + \\ &\frac{\sum_{t \in \{\text{BMStartUp time}\}} \text{BMStartUp Cost}_t^6}{\text{BMStartUp Volume}} \\ &= ((\text{£}1000 * 0.06) + 10 \text{ £/hr} + 500 \text{ £/hr}) / (35\text{MW} + 5 \text{ MW} + 200\text{MW}) + [(2\text{hrs} * \text{£}1,000/\text{hr}) / (600\text{MW} * 2 \text{ hrs}) + (6\text{hrs} * \text{£}3,000/\text{hr}) / (1,000\text{MW} * 2\text{hrs})] \\ &= (\text{£}60 + \text{£}5 + \text{£}250) / (120\text{MWh}) + (\text{£}2,000 / 1,200\text{MWh} + \text{£}18,000 / 2,000\text{MWh}) \end{aligned}$$~~

⁶ BM StartUp time = all minutes associated with BM Start Ups instructed for this BPA period
 BM StartUp Cost (£) = Total cost of applicable BM Start ups instructed for this BPA period during minute t associated with a requirement defined by National Grid
 BM StartUp volume (MWh) = Total capacity (MW) of applicable BM Start ups instructed for this BPA period during minute t multiplied by the number of hours associated with a requirement defined by National Grid;

$$\begin{aligned}
&= (\pounds 315 / 120 \text{ MWh}) + (\pounds 1.67/\text{MWh} + \pounds 9/\text{MWh}) \\
&= \pounds 2.63/\text{MWh} + \pounds 10.67 / \text{MWh} \\
&= \pounds 13.30 / \text{MWh};
\end{aligned}$$

- ~~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)~~

$$= \frac{\pounds 400/\text{hr}/300\text{MW}}{\text{MWh}} = \pounds 1.333/\text{MWh};$$

1.3 5. 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, SSVa, EBVA, EBCA, ESCA~~ [Balancing Service Adjustment Actions](#), BPA and SPA for each settlement period.

The costs and volumes of System to System services, ~~and~~ Maximum Generation services, [and System to Generator Operational Intertrips](#) will be included in a post event re-submission of BSAD as described in section ~~1.5~~ [7](#).

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.

1.4.6. 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.

1.5.7. 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'⁷ payments;

⁷ 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.

- Inclusion of any System to System services; **and**
- Inclusion of any Maximum Generation Service volumes and payments; and
- Inclusion of any System to Generator Operational Intertripping volumes

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.

PART D Appendix A: Calculation and Publication of Short Term Operating Reserve (STOR) Weighting Factors

1. Introduction What are the weighting factors?

The calculation of BPA uses a set of weighting factors to allocate daily Short Term Operating Reserve (STOR) availability fees into settlement periods within the day. This **Part Appendix** describes the methodology for calculating these weighting factors.

The purpose of the weighting factors is to allocate reserve availability costs into availability windows according to the likely pattern of utilisation, determined from previous experience of reserve utilisation.

2. Key Steps steps in the Calculation calculation of the Weighting Factors-weighting factors

National Grid will calculate the weighting factors as described below:

- a) As part of the STOR service, National Grid will set out the seasons and availability windows as follows:
 - i. The current year will be divided into seasons in order to cater for the varying reserve utilisation pattern across the year. The duration of each season may change from time to time and National Grid will publish this information on its industry information website (<http://www.nationalgrid.com/uk/Electricity/Balancing/tenderreports/>).
 - ii. Each season will be divided into Working Days (including Saturdays) and Non-working Days (Sundays and most Bank Holidays) in order to account for the varying reserve utilisation pattern within the

week. Each day type (Working Day, Non-working Day) will be further divided into periods ('Availability Windows') of likely reserve utilisation; the Availability Windows will form the basis for allocating the weighted costs of STOR option fees.

- b) National Grid will compile the data on STOR utilisation from the previous year in order to determine a pattern of likely utilisation for the current year (1 April - 31 March); this data will consist of delivery of reserve from both BM and Non-BM Units where availability was procured to provide the STOR service.
 - i. For avoidance of doubt, National Grid will use the historical data associated with Standing Reserve and Supplemental Standing Reserve utilisation in 2006-07 in order to determine the STOR weighting factors for 2007-08. After implementation of the STOR service, National Grid will use historical data associated with STOR utilisation.
- c) The STOR data from the previous year will be categorised by season and by day type. For example, for 6 seasons and 2 day types, there will be 12 categories (season / day type combinations) of STOR data.
- d) For a given category in the current year, an aggregate STOR volume (MWh) will be determined for a given settlement period, which will be the sum of the STOR utilisation volumes (MWh) from all such settlement periods in the relevant category from the previous year. For example, the aggregate STOR volume for settlement period 1 for Working Days in season 1 will be the sum of STOR volumes in the first settlement period of all Working Days in season 1. Similarly, the aggregate STOR volumes will be determined for the remaining settlement periods in order to determine the volumetric utilisation profile for a given season and day type combination.

- e) The process outlined in item (d) will be repeated for the remaining categories, resulting in one volumetric profile for each season and day type combination. For example, for 6 seasons and 2 day types, there will be 12 such profiles.
- f) Each volumetric profile will be superimposed on the relevant Availability Windows for the current year (step a(ii)). In order to ensure 100% cost allocation within the Availability Windows, any volumetric data falling outside the Availability Windows will be set to zero.
- i. If no historical utilisation data exists for one or more settlement periods within the Availability Window for the current year, the volumetric data for such settlement period(s) will be set to zero.
- ii. If no historical utilisation data exists in the entire window (e.g. if a new availability window is introduced), National Grid will take into account historical utilisation of other balancing services and assess its appropriateness in the calculation of the weighting factors.
- g) For each volumetric profile, the volume (V_j) of STOR utilised in each settlement period 'j' (within the Availability Windows for the current year) will be added together to determine the total volume (V_T) of STOR utilised within the day.
- h) The weighting factor (WF_j) for each settlement period 'j' within the day will be derived as:
- $$WF_j (\%) = V_j / V_T * 100$$
- i) Steps (g) and (h) will be repeated for each season, resulting in two sets of weighting factors (WF_{wd_i} for working days and WF_{nwd_i} for non-working days) for the relevant season. A general form of the output from this

process (for one season) is shown in Table 1 below. Table 1 also shows that, for each day type, the weighting factors will add up to 100% thus ensuring 100% allocation of the daily STOR option fees.

Table 1
Format for Weighting Factors

Settlement Period	Weighting Factors for Season 1	
	Working Days (%)	Non-Working Days (%)
1	WFwd ₁	WFnwd ₁
2	WFwd ₂	WFnwd ₂
3	WFwd ₃	WFnwd ₃
4	WFwd ₄	WFnwd ₄
5	WFwd ₅	WFnwd ₅
6	WFwd ₆	WFnwd ₆
7	WFwd ₇	WFnwd ₇
8	WFwd ₈	WFnwd ₈
9	WFwd ₉	WFnwd ₉
10	WFwd ₁₀	WFnwd ₁₀
11	WFwd ₁₁	WFnwd ₁₁
12	WFwd ₁₂	WFnwd ₁₂
13	WFwd ₁₃	WFnwd ₁₃
14	WFwd ₁₄	WFnwd ₁₄
15	WFwd ₁₅	WFnwd ₁₅
16	WFwd ₁₆	WFnwd ₁₆
17	WFwd ₁₇	WFnwd ₁₇
18	WFwd ₁₈	WFnwd ₁₈
19	WFwd ₁₉	WFnwd ₁₉
20	WFwd ₂₀	WFnwd ₂₀
21	WFwd ₂₁	WFnwd ₂₁
22	WFwd ₂₂	WFnwd ₂₂
23	WFwd ₂₃	WFnwd ₂₃
24	WFwd ₂₄	WFnwd ₂₄
25	WFwd ₂₅	WFnwd ₂₅
26	WFwd ₂₆	WFnwd ₂₆
27	WFwd ₂₇	WFnwd ₂₇
28	WFwd ₂₈	WFnwd ₂₈
29	WFwd ₂₉	WFnwd ₂₉
30	WFwd ₃₀	WFnwd ₃₀
31	WFwd ₃₁	WFnwd ₃₁
32	WFwd ₃₂	WFnwd ₃₂
33	WFwd ₃₃	WFnwd ₃₃
34	WFwd ₃₄	WFnwd ₃₄
35	WFwd ₃₅	WFnwd ₃₅
36	WFwd ₃₆	WFnwd ₃₆
37	WFwd ₃₇	WFnwd ₃₇
38	WFwd ₃₈	WFnwd ₃₈
39	WFwd ₃₉	WFnwd ₃₉
40	WFwd ₄₀	WFnwd ₄₀
41	WFwd ₄₁	WFnwd ₄₁
42	WFwd ₄₂	WFnwd ₄₂
43	WFwd ₄₃	WFnwd ₄₃
44	WFwd ₄₄	WFnwd ₄₄
45	WFwd ₄₅	WFnwd ₄₅
46	WFwd ₄₆	WFnwd ₄₆
47	WFwd ₄₇	WFnwd ₄₇
48	WFwd ₄₈	WFnwd ₄₈
Total	100%	100%

j) A complete set of weighting factors for all seasons and day types will be derived, and summarised, in a similar format to Table 1.

- k) National Grid will endeavour to update the weighting factors on a rolling basis using previous year's STOR utilisation data. However, the timing and frequency of updates will depend on the availability of previous year's STOR utilisation data.

- l) National Grid will update the weighting factors periodically in order to ensure that they reflect the changes in utilisation pattern, and will endeavour to do so at least one month in advance of the relevant season to which the weighting factors apply. For example, for the seasons falling in the period from April to October in a given year, the weighting factors will be updated by the end of February in the same calendar year, and, for the seasons falling in the period from October to April, the weighting factors will be updated by the end of August.

- m) In exceptional circumstances, if the weighting factors have not been revised, National Grid will use the prevailing weighting factors for the calculation of BPA.

3. Publication of the Weighting Factors

- i. National Grid will publish the weighting factors on its industry information web site (<http://www.nationalgrid.com/uk/Electricity/Balancing/>) as soon as these are available. The timing of publication of the weighting factors will depend on the availability of the historical data used in the determination of the weighting factors.

- ii. The weighting factors will be published at least one month in advance of the relevant seasons to which the weighting factors apply.