CMFTP226 Amendments to BSUoS Methodology to reflect changes to the Transmission Licence

What stage is this document at?

01	Draft CUSC Modification Fast Track Report
02	Approved CUSC Modification Fast Track Report

Submission Date: 22 January 2014

Details of proposer: Tushar Singh, National Grid, CUSC Party

Details of proposer's alternate: Dave Corby, National Grid, CUSC Party

Published on: 23 January 2014

Objections to be received by: [Code Administrator to insert date]
(15 Working days after approved CUSC Fast Track Report publication)

The CUSC Panel determination : [insert date - Code Administrator to complete once CUSC Panel decision received]

Contents

About this document

This CUSC Modification Fast Track Proposal will be presented to the CUSC Panel on 31 January 2014.

The CUSC Panel will consider the Proposer's view, and agree whether this is a CUSC Modification Fast Track Proposal and make a determination.

Document Control

Version	Date	Author	Change Reference
0.1	23 January 2014	Code Administrator	Draft CUSC Modification Fast Track Proposal Report
1.0	DD Month Year	Code Administrator	CUSC Panel view

Any Questions?

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Code Administrator

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Proposer:
Tushar Singh
National Grid

1 Why Change

1.1 The Proposer believes that CMFTP226 meets the Fast Track Criteria because it satisfies the following condition -

Updating out of date references to other documents or paragraphs.

1.2 The Statement of the Balancing Services Use of System (BSUoS) Charging Methodology (in CUSC Section 14) contains references to the Transmission Licence which explain how the BSUoS charges are calculated.

1.3 Ofgem directed changes to the Transmission Licence in July 2013 to facilitate the implementation of new Balancing Services Incentive Scheme (BSIS). The new incentive scheme (hence the changes to Transmission Licence) apply retrospectively from 01 April 2013. The CUSC has not been updated to reflect the changes to the Transmission Licence.

1.4 This proposal seeks to address the following variations between CUSC Section 14 and the Transmission Licence –

(i) update the BSUoS charges calculation equations, examples and list of Acronym definitions.

(ii) delete obsolete text and references.

(iii) update the tables and graphs associated with annual cap/collar and sharing factor as per the new incentive scheme.

(iv) correct typographical errors.

1.5 The changes to the CUSC to bring it up to date with the Transmission Licence have no material impact on any existing and new customers as the BSUoS charges are already being calculated in compliance with the modified Transmission Licence.

2 Solution

2.1 It is proposed that that a number of changes are made to CUSC Section 14, Part 2, Section 2 – The Statement of the Balancing Services Use of System Charging Methodology. The proposed updates can be seen in the legal text contained within this document.

3 Proposed Legal Text

3.1 The Proposed Legal Text can be found in Annex 1 of this document.

4 CUSC Panel Determination - This section and subsequent sections to be filled in by the Code Administrator

4.1 On [Panel Meeting date] the CUSC Modifications Panel considered CMP### and confirmed [unanimously] that CMP### meets the Fast Track Criteria and unanimously determined that the CUSC Modification should be made.

The CUSC Modification Fast Track Proposal if implemented would meet the Self Governance Criteria and the Fast Track Criteria as detailed below:

Self Governance Criteria

(a) is unlikely to have a material effect on:

(i) existing or future electricity consumers; and

(ii) competition in the generation, distribution, or supply of electricity or any commercial activities connected with the generation, distribution or supply of electricity; and

(iii) the operation of the **National Electricity Transmission System**; and

(iv) matters relating to sustainable development, safety or security of supply, or the management of market or network emergencies; and

(v) the **CUSC**'s governance procedures or the **CUSC**'s modification procedures, and

(b) is unlikely to discriminate between different classes of **CUSC Parties**.

Fast Track criteria

(c) is properly a housekeeping modification required as a result of some error or factual change; including but not limited to:

i) updating names or addresses listed in the **CUSC**;

ii) correcting minor typographical errors;

iii) correcting formatting and consistency errors, such as paragraph numbering or

iv) updating out of date references to other documents or paragraphs.

5 Proposed Implementation

5.1 It is proposed that CMFTP226 is implemented no sooner than the 16th business day after publication of the approved CUSC Modification Fast Track Report providing no objections have been raised see Section 6.

5.2 The implementation date will be [insert date].

6 Objections

6.1 If you wish to raise an objection please email the CUSC Panel Secretary at CUSC.Team@nationalgrid.com, with an explanation as to why you believe the CUSC Modification Fast Track Proposal does not meet the Fast Track Criteria by [insert date].

6.2 The Approved CUSC Modification Fast Track Proposal will not be implemented if an objection is received.

6.3 The CUSC Panel Secretary will notify the CUSC Panel, the Authority and CUSC Parties if an objection is received.

6.4 The CUSC Panel Secretary shall notify the proposer that additional information is required if the proposer wishes the CUSC Fast Track Modification to continue as a CUSC Modification Proposal.

7 Annex 1 – Proposed Legal Text

Section 2 – The Statement of the Balancing Services Use of System Charging Methodology

14.29 Principles

14.29.1 The Transmission Licence allows The Company to derive revenue in respect of the Balancing Services Activity through the Balancing Services Use of System (BSUoS) charges. This statement explains the methodology used in order to calculate the BSUoS charges.

14.29.2 The Balancing Services Activity is defined in the Transmission Licence as the activity undertaken by The Company as part of the Transmission Business including the operation of the transmission system and the procuring and using of Balancing Services for the purpose of balancing the transmission system.

14.29.3 The Company in its role as System Operator keeps the electricity system in balance (energy balancing) and maintains the quality and security of supply (system balancing). The Company is incentivised on the procurement and utilisation of services to maintain the energy and system balance and other costs associated with operating the system. Users pay for the cost of these services and any incentivised payment/receipts through the BSUoS charge.

14.29.4 All CUSC Parties acting as Generators and Suppliers (for the avoidance of doubt excluding all BMUs and Trading Units associated with Interconnectors) are liable for Balancing Services Use of System charges based on their energy taken from or supplied to the National Grid system in each half-hour Settlement Period.

14.29.5 BSUoS charges comprise the following costs:

(i) The Total Costs of the Balancing Mechanism
(ii) Total Balancing Services Contract costs
(iii) Payments/Receipts from National Grid incentive schemes
(iv) Internal costs of operating the System
(v) Costs associated with contracting for and developing Balancing Services
(vi) Adjustments
(vii) Costs invoiced to The Company associated with Manifest Errors and Special Provisions.
(viii) BETTA implementation costs

14.30 Calculation of the Daily Balancing Services Use of System charge

Calculation of the Daily Balancing Services Use of System charge

14.30.1 The BSUoS charge payable by customer c, on Settlement Day d, will be calculated in accordance with the following formula:

$$BSUoSTOT_{cd} = \sum_{i \in c} \sum_{j \in d} BSUoSTOT_{ij}$$

Where:

i	-	refers to the individual BM Unit
j	-	refers to an individual Settlement Period
$\sum_{i \in c} \sum_{j \in d}$	-	refers to the sum over all BM units 'i', for which customer 'c' is the Lead Party* summed over all Settlement Periods 'j' on a Settlement Day 'd'

14.30.2 A customer's charge is based on their proportion of BM Unit Metered Volume for each Settlement Period relative to the total BM Unit Metered Volume for each Settlement Period

Deleted: , adjusted for transmission losses by the application of the relevant Transmission Losses Multiplier

For all liable importing and exporting BM Units in delivering Trading Units in a Settlement Period:

$$BSUoSTOT_{ij} = \frac{BSUoSTOT_j * QM_{ij} * TLM_{ij}}{\left\{\left|\sum^{+}(QMBSUoS_{ij} * TLM_{ij})\right| + \left|\sum^{-}(QMBSUoS_{ij} * TLM_{ij})\right|\right\}}$$

Comment [t1]: This equation has been replaced by the equation below.

$$BSUoSTOT_{ij} = \frac{BSUoSTOT_j * QM_{ij}}{\left\{\left|\sum^{+}(QMBSUoS_{ij})\right| + \left|\sum^{-}(QMBSUoS_{ij})\right|\right\}}$$

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For all liable importing and exporting BM Units in offtaking Trading Units in a Settlement Period:

$$BSUoSTOT_{ij} = \frac{-1 * BSUoSTOT_j * QM_{ij} * TLM_{ij}}{\left\{\left|\sum^{+}(QMBSUoS_{ij} * TLM_{ij})\right| + \left|\sum^{-}(QMBSUoS_{ij} * TLM_{ij})\right|\right\}}$$

Comment [t2]: This equation has been replaced by the equation below.

$$BSUoSTOT_{ij} = \frac{-1 * BSUoSTOT_j * QM_{ij}}{\left\{\left|\sum^{+}(QMBSUoS_{ij})\right| + \left|\sum^{-}(QMBSUoS_{ij})\right|\right\}}$$

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Where:

$BSUoSTOT_j$	Total BSUoS Charge applicable for Settlement Period j
QM_{ij}	BM Unit Metered Volume **
$QMBSUoS_{ij}$	BSUoS Liable BM Unit Metered Volume

Deleted: TLM_{ij} - .. Transmission Loss Multiplier **

* or CUSC party associated with the BMUnits (listed in Appendix C of the BEGA) who is exempt from also being a BSC Party

** Detailed definition in Balancing and Settlement Code Annex X2 – Technical Glossary

$\sum^{+}$ - refers to the sum over all BM Units that are in delivering Trading Units in Settlement Period 'j'

$\sum^{-}$ - refers to the sum over all BM Units that are in offtaking Trading Units in Settlement Period 'j'

'delivering' and 'offtaking' in relation to Trading Units have the meaning set out in the Balancing and Settlement Code (excluding all Interconnector BMUs and Trading Units)

14.30.3 For the avoidance of doubt, BM Units that are registered in Trading Units will be charged on a net Trading Unit basis i.e. if a BM Unit is exporting to the system and is within a Trading Unit that is offtaking from the system then the BM Unit in essence would be paid the BSUoS charge. Conversely, if a BM Unit is importing from the system in a delivering Trading Unit then the BM Unit in essence would pay the BSUoS charge.

Interconnector BM Units

14.30.4 BM Unit and Trading Units associated with Interconnectors, including those associated with the Interconnector Error Administrator, are not liable for BSUoS charges.

Total BSUoS Charge (Internal + External) for each Settlement Period ($BSUoSTOT_{jd}$)

14.30.5 The Total BSUoS charges for each Settlement Period ($BSUoSTOT_{jd}$) for a particular day are calculated by summing the external BSUoS charge ($BSUoSEXT_{jd}$) and internal BSUoS charge ($BSUoSINT_{jd}$) for each Settlement Period.

$$BSUoSTOT_{jd} = BSUoSEXT_{jd} + BSUoSINT_{jd}$$

External BSUoS Charge for each Settlement Period ($BSUoSEXT_{jd}$)

14.30.6 The External BSUoS Charges for each Settlement Period ($BSUoSEXT_{jd}$) are calculated by taking each Settlement Period System Operator BM Cash Flow ($CSOBM_j$) and Balancing Service Variable Contract Cost ($BSCCV_j$) and allocating the daily elements on a MWh basis across each Settlement Period in a day.

~~$$BSUoSEXT_{jd} = CSOBM_{jd} + BSCCV_{jd} + [\ (IncpayEXT_d + BSCCA_d + ET_d - OM_d)$$~~

~~$$*\{\ \left|\sum^{+}(QMBSUoS_{ijd} * TLM_{ijd})\right| + \left|\sum^{-}(QMBSUoS_{ijd} * TLM_{ijd})\right|\ \}/$$~~

~~$$\sum_{j \in d}\{\ \left|\sum^{+}(QMBSUoS_{ijd} * TLM_{ijd})\right| + \left|\sum^{-}(QMBSUoS_{ijd} * TLM_{ijd})\right|\ \}\ ]$$~~

Comment [t3]: This equation has been replaced by the equation below

$$BSUoSEXT_{jd} = CSOBM_{jd} + BSCCV_{jd} + [\ (IncpayEXT_d + BSCCA_d + ET_d - OM_d + RFIIR_d + ROV_d\ \ BSFS_d + NC_d + IONT_d)$$

$$*\{\ \left|\sum^{+}(QMBSUoS_{ijd} * TLM_{ijd})\right| + \left|\sum^{-}(QMBSUoS_{ijd} * TLM_{ijd})\right|\ \}/$$

$$\sum_{j \in d}\{\ \left|\sum^{+}(QMBSUoS_{ijd} * TLM_{ijd})\right| + \left|\sum^{-}(QMBSUoS_{ijd} * TLM_{ijd})\right|\ \}\ ]$$

Calculation of the daily External Incentive Payment ($IncpayEXT_d$)

14.30.7 In respect of each Settlement Day d, IncpayEXTd is calculated as the difference between the new total incentive payment (FKIncpayEXTd) and the incentive payment that has been made to date for the previous days from the commencement of the scheme (ξk=1≡d-1IncpayEXTk):

$$IncpayEXT_d = FKIncpayEXT_d - \sum_{k=0}^{d-1} IncpayEXT_k$$

14.30.8 The forecast incentive payment made to date (from the commencement of the scheme) ($FKIncpayEXT_d$) is calculated as the ratio of total forecast external incentive payment across the duration of the scheme: the number of days in the scheme, multiplied by the sum of the profiling factors to date.

$$FKIncpayEXT_d = \frac{FYIncpayEXT_d}{NDS} * \sum_{k=1}^{d} PFT_k$$

Inclusion of Profiling Factors

14.30.9 Profiling factors have been included to give an effective mechanism for calculating a representative level of the incentive payments to/from The Company according to the time of year. All PFT_d are assumed to be one for the duration of the current external incentive scheme.

14.30.10 The forecast External incentive payment for the duration of the External incentive scheme ($FYIncpayEXT_d$) is calculated as the difference between the External Scheme target (M_t) and the forecast Balancing cost (FBC) subject to sharing factors (SF_t) and a cap/collar (CB_t).

$$FYIncpayEXT_d = SF_t * (M_t - FBC_d) + CB_t$$

14.30.11 The relevant value of the External incentive payment (BSUoSEXT) can then be calculated by reference to Table 9.1 and the selection and application of the appropriate sharing factors and offset dependent upon the value of the forecast Balancing Services cost (FBC).

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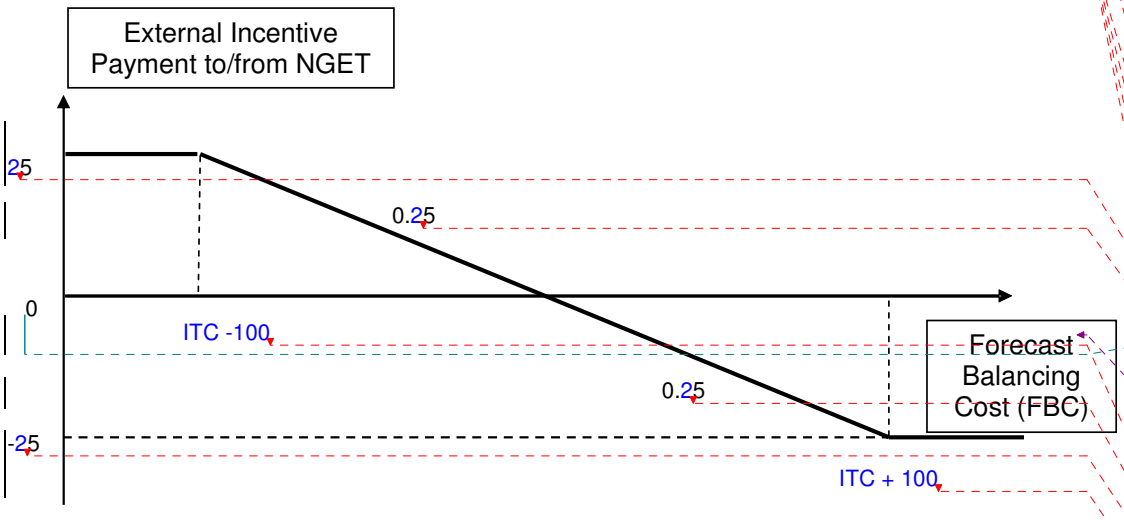
Table 9.1

Forecast Balancing Cost (FBC)	M_t £m	SF_t	CB_t £m
FBC < (Incentive Target Cost – 100)	0	0	25
(Incentive Target Cost -100) < FBC < (Incentive Target Cost)	Incentive Target Cost	25%	0
Incentive Target Cost = FBC	FBC	0	0
(Incentive Target Cost) < FBC <= (Incentive Target Cost + 100)	Incentive Target Cost	25%	0
(Incentive Target Cost + 100)	0	0	-25



14.30.12 In respect of each Settlement Day d, the forecast incentivised Balancing Cost (FBC_d) will be calculated as follows:

$$FBC_d = \frac{\sum_{k=1}^{d} IBC_k}{\sum_{k=1}^{d} PFT_k} * NDS$$

Where:

NDS = Number of days in Scheme.

14.30.13 Daily Incentivised Balancing Cost (IBC_d) is calculated as follows:

$$IBC_d = \sum_{j \in d} (CSOBM_{jd} + BSCCV_{jd} + NIA_{jd} + TLIC_{jd}) + BSCCA_d - OM_d - RT_d$$

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$$IBC_d = \sum_{j \in d} (CSOBM_{jd} + BSCCV_{jd}) + BSCCA_d - OM_d - RT_d - BSFS_d$$

Internal BSUoS Charge for each Settlement Period ($BSUoSINT_{jd}$)

14.30.14 The Internal BSUoS Charges ($BSUoSINT_{jd}$) for each Settlement Period j for a particular day are calculated by taking the incentivised and non-incentivised SO Internal Costs for each Settlement Day allocated on a MWh basis across each Settlement Period in a day.

$$BSUoSINT_{jd} = (CSOC_d + IncpayINT_d + NC_d + IAT_d + IONT_d)$$
$$*\{ \left| \sum^{+} (QMBSUoS_{ijd} * TLM_{ijd}) \right| + \left| \sum^{-} (QMBSUoS_{ijd} * TLM_{ijd}) \right| \}$$
$$/ \sum_{j \in d} \{ \left| \sum^{+} (QMBSUoS_{ijd} * TLM_{ijd}) \right| + \left| \sum^{-} (QMBSUoS_{ijd} * TLM_{ijd}) \right| \}$$

$$BSUoSINT_{jd} = [(SOPU_d + SOMOD_d + SOTRU_d) * RPIF_t]$$
$$*\{ \left| \sum^{+} (QMBSUoS_{ijd}) \right| + \left| \sum^{-} (QMBSUoS_{ijd}) \right| \}$$
$$/ \sum_{j \in d} \{ \left| \sum^{+} (QMBSUoS_{ijd}) \right| + \left| \sum^{-} (QMBSUoS_{ijd}) \right| \}$$

Inclusion of Profiling Factors

14.30.15 Profiling factors have been included to give an effective mechanism for calculating a representative level of the incentive payments to/from The Company according to the time of year. All PFT_k are assumed to be one for the duration of the current external incentive scheme

14.31 Settlement of BSUoS

Settlement and Reconciliation of BSUoS charges

14.31.1 There are two stages of the reconciliation of BSUoS charges described below:

- Initial Settlement (SF)
- Final Reconciliation (RF)

Initial Settlement of BSUoS

14.31.2 The Company will calculate initial settlement (SF) BSUoS charges in accordance with the methodology set out in section 14.30 above, using the latest available data, including data from the Initial Settlement Run and the Initial Volume Allocation Run.

Reconciliation of BSUoS Charges

14.31.3 Final Reconciliation will result in the calculation of a reconciled charge for each settlement day in the scheme year. The Company will calculate Final

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Deleted: <#>Table 9.2 below summarises the annual SO Internal cost variables for Financial Year 20010/11 as set out in the Transmission Licence¶ ¶ **Table 9.2¶** ¶ **Internal SO Cost Variab** ... [1]

Deleted: **Calculation of the daily Internal Incentive Payment ($IncpayINT_d$)¶** ¶ <#>In respect of each Settlement Day d, $IncpayINT_d$ is calculated as the difference between the overall total incentive payment ($FKIncpayINT_d$) due to that date and the overall incentive payment made up to the previous day ($\xi_{k=0=d-1} IncpayINT_k$) plus the daily cost of Manifest Errors and Special Provisions:¶

$$IncpayINT_d = (FKIncp$$

¶ ¶ <#>The forecast incentive payment made to date (from the commencement of the scheme) ($FKIncpayINT_d$) is calculated as the ratio of total forecast internal incentive payment across the duration of the scheme ($FYIncpayINT$): the number of days in the scheme, multiplied by the sum of the profiling factors to date.¶ ¶

$$FKIncpayINT_d = \frac{FYIn}{}$$

¶ ¶ <#>The Company daily Internal incentive payments ($IncPayINT_d$) are calculated by comparing the Daily ... [2]

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Deleted: **Manifest Errors and Special Provisions for IT system failures¶** ¶ <#>The Company may, in certain circumstances, be required to pay compensation to BSC Parties as a resu ... [3]

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Reconciliation (RF) BSUoS charges (with the inclusion of interest as defined in the CUSC) in accordance with the methodology set out in section 14.30 above, using the latest available data, including data from the Final Reconciliation Settlement Run and the Final Reconciliation Volume Allocation Run.

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Unavailability of Data

14.31.4 If any of the elements required to calculate the BSUoS charges in respect of any Settlement Day have not been notified to The Company in time for it to do the calculations then The Company will use data for the corresponding Settlement Day in the previous week. If no such values for the previous week are available to The Company then The Company will substitute such variables as it shall, at its reasonable discretion, think fit and calculate Balancing Services Use of System charges on the basis of these values. When the actual data becomes available a reconciliation run will be undertaken.

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Disputes

14.31.5 If The Company or any customer identifies any error which would affect the total Balancing Services Use of System charge on a Settlement Day then The Company will recalculate the charges following resolution of the error. Revised invoices and/or credit notes will be issued for the change in charges, plus interest as set out in the CUSC. The charge recalculation and issuing of revised invoices and/or credit notes will not take place for any day where the total change in the Balancing Services charge is less than £2000.

Relationship between the Statement of the Use of System Charging Methodology and the Transmission Licence

14.31.6 BSUoS charges are made on a daily basis and as such of this Statement sets out the details of the calculation of such charges on a daily basis. Customers may, when verifying charges for Balancing Services Use of System refer to the Transmission Licence which sets out the maximum allowed revenue that The Company may recover in respect of the Balancing Services Activity.

14.31.7 The Company has, where possible and appropriate, attempted to ensure that acronyms allocated to variables within the Balancing Services charging software, and associated reporting, match with the acronyms given to those variables used within this statement.

14.31.8 Balancing Services Use of System Acronym Definitions

For the avoidance of doubt "as defined in the BSC" relates to the Balancing and Settlement Code as published from time to time.

EXPRESSION	ACRONYM	Unit	Definition
BETTA Preparation Costs	BI	£	As defined in the Transmission Licence
Balancing Mechanism Unit	BM Unit or BMU		As defined in the BSC
Balancing service contract costs – non-Settlement Period specific	$BSCCA_d$	£	Non Settlement Period specific Balancing Contract Costs for settlement day d
Balancing Service Contract Cost	$BSCC_j$	£	Balancing Service Contract Cost from purchasing Ancillary services applicable to a Settlement Period j
Balancing service contract costs – Settlement Period specific	$BSCCV_{jd}$	£	Settlement Period j specific Balancing Contract Costs for settlement day d
External Balancing Services Use of System charge	$BSUoSEXT_{jd}$	£	External System Operator (SO) Balancing Services Use of System charge applicable to Settlement Period j for settlement day d
Internal Balancing Services Use of System charge	$BSUoSINT_{jd}$	£	Internal System Operator (SO) Balancing Services Use of System charge applicable to Settlement Period j for settlement day d
Total Balancing Services Use of System charge	$BSUoSTOT_{cd}$	£	The sum determined for each customer, c, in accordance with this Statement and payable by that customer in respect of each Settlement Day d, in accordance with the terms of the Supplemental Agreement
Total Balancing Services Use of System charge	$BSUoSTOT_j$	£	Total Balancing Services Use of System Charge applicable for Settlement Period j
System Operator BM Cash Flow	$CSOBM_j$	£	As defined in the Balancing and Settlement Code in force immediately prior to 1 April 2001

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EXPRESSION	ACRONYM	Unit	Definition
Daily balancing services adjustment	ET_d	£	Is the contribution on Settlement Day, d, to the value of ET_t where ET_t is determined pursuant to part 2 of Condition AA5A of the Transmission Licence
Forecast incentivised Balancing Cost	FBC_d	£	Forecast incentivised Balancing Cost for duration of the Incentive Scheme as at settlement day d
External Incentive payment to date	$FKIncpayEXT_d$	£	Total External Incentive Payment to date up to and including settlement day d
Total Forecast External incentive payment	$FYIncpayEXT_d$	£	Total forecast External incentive payment for the entire duration of the incentive scheme as at settlement day d
Allowed Income Adjustment relating to the SO-TO Code	IAT	£	As defined in the Transmission Licence
Daily Incentivised Balancing Cost	IBC_d	£	Is equal to that value calculated in accordance with paragraph 14.30.13 of Part 2 of this Statement
Daily External incentive payment	$IncpayEXT_d$	£	External Incentive payment for Settlement Day d
Outage Cost Adjustment	IONT	£	As defined in the Transmission Licence
Non-Incentivised Costs	NC	£	As defined in the Transmission Licence

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EXPRESSION	ACRONYM	Unit	Definition
Cost associated with the Provision of Balancing Services to others	OM_d	£	Is the contribution on Settlement Day, d, to the value of OM_t where OM_t is determined pursuant to part 2 of Condition AA5A of the Transmission Licence
Outage change allowance amount	ON	£	As defined in the Transmission Licence
Incentivised Balancing Cost daily profiling factor	PFT_d		The daily profiling factor used in the determination of forecast Incentivised Balancing Cost for settlement day d
BM Unit Metered Volume	QM_{ij}	MWh	As defined in the BSC
BSUoS Liable BM Unit Metered Volume	$QMBSUoS_{ij}$	MWh	QM_{ij} for all BM Units liable for BSUoS
Balancing services deemed costs	RT_d	£	Is the contribution on Settlement Day, d, to the value of RT_t where RT_t is determined pursuant to part 2 of Condition AA5A of the Transmission Licence
Tax Allowance	T	£	As defined in the Transmission Licence

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EXPRESSION	ACRONYM	Unit	Definition
Total System Energy Imbalance Volume	$TQEI_j$	MWh	As defined in the Balancing and Settlement Code in force immediately prior to 1 April 2001
Final Reconciliation Settlement Run			As defined in the BSC
Final Reconciliation Volume Allocation Run			As defined in the BSC
Initial Settlement Run			As defined in the BSC
Initial Volume Allocation Run			As defined in the BSC
Lead Party			As defined in the BSC
Black Start Feasibility Costs	BSFS		As defined in the Transmission Licence
Wind Forecast Incentive Cost	RFIIR		As defined in the Transmission Licence
System Operator Innovation Roll-Out Value	ROV		As defined in the Transmission Licence
SO Opening Base Revenue Allowance	SOPU		As defined in the Transmission Licence
Incremental change from SO Opening Base Revenue Allowance	SOMOD		As defined in the Transmission Licence
Revenue Adjustment with respect to actual and assumed RPI values	SOTRU		As defined in the Transmission Licence
Retail Price Index Adjustment Factor	RPIF		As defined in the Transmission Licence

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14.32 Examples of Balancing Services Use of System (BSUoS) Daily Charge Calculations

This example illustrates the operation of the Balancing Services Use of System Daily charge formula. The parameters used are for illustrative purposes only and have been chosen for ease of calculation. They do not relate to the agreed scheme for any particular year. The actual scheme parameters are shown in the main text.

The example is divided into the calculation of the External System Operator cost and Internal System Operator cost elements. All daily profiling factors (PFT_d) have been assumed to be one for this example.

Day 1

Calculation of the Daily External SO Incentive Scheme Payment

The first step is to calculate the Daily Incentivised Balancing Cost (IBC_1 for day one) for that day using the following formula. These are the daily incentivised cost elements used to calculate the external SO incentive payment.

$$IBC_1 = CSOBM_1 + BSCCA_1 + BSCCV_1 - OM_1 - RT_1 - BSFS_1$$

$$= £800,000 + £500,000 + £250,000 - £0 - £0 - £0$$

$$= £1,550,000$$

Assuming that

$CSOBM_1$	=	£800,000	
$BSCCA_1$	=	£500,000	
$BSCCV_1$	=	£250,000	
OM_1	=	£0	
RT_1	=	£0	
$BSFS_1$	=	£0	

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Now that we know IBC_1, it is possible to calculate Forecast Balancing Services Cost (FBC_1) from that day's outturn as follows:

$$FBC_1 = \frac{\sum_{k=1}^{d=1} IBC_k}{\sum_{k=1}^{d=1} PFT_k} * NDS$$

$$= \frac{£1{,}550{,}000}{1} * 365$$

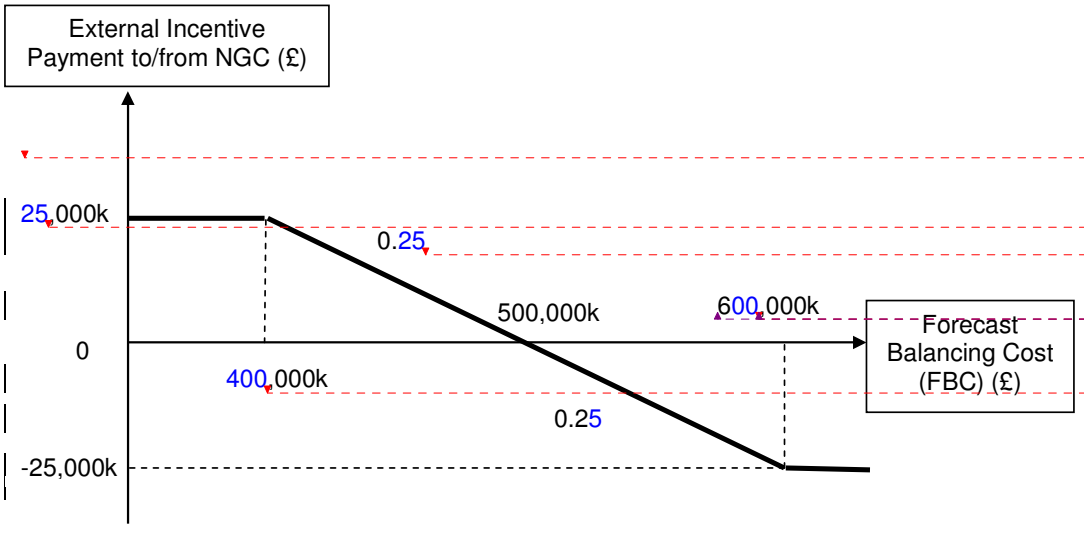
$$= £565{,}750{,}000$$

The values of SF_t and CB_t can now be read off table BS1 below. (**These values are used purely for illustrative purposes based on an incentive target of £500,000,000**). As FBC_1 is £565,750,000, SF_t is 0.25, CB_t is £0 and M_t is £500,000,000.

Table BS1

Forecast Balancing Cost (FBC_d)	M_t	SF_t	CB_t
£400,000,000 < FBC	£0	0	£25,000,000
£400,000,000 <= FBC < £500,000,000	£500,000,000	0.25	£0
FBC = £500,000,000	£500,000,000	0	£0
£500,000,000 < FBC <= £600,000,000	£500,000,000	0.25	£0
FBC > £600,000,000	£0	0	- £25,000,000

The table describes the external incentive scheme, which can also be illustrated by the graph below.



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¶

Using the values set out in the table above, the external SO incentive payment for the duration of the scheme (FYIncpayEXT) can be calculated as follows:

$$FYIncpayEXT_1 = SF_t * (M_t - FBC_1) + CB_t$$
$$= 0.25 * (£500{,}000{,}000 - £565{,}750{,}000) + £0$$
$$= -£16{,}437{,}500$$

In this case the incentive payment is negative (-£16,437,500) i.e. a payment from The Company.

The external SO incentive payment for the entire duration of the incentive scheme (FYincpayEXT) is then used to calculate the total incentive payment to date (FKIncpayEXT), shown as follows:

$$FKIncpayEXT_1 = \frac{FYIncpayEXT_1}{NDS} * \sum_{k=1}^{d=1} PFT_k$$
$$= \frac{-£16{,}437{,}500}{365} * 1$$
$$= -£45{,}034$$

Where:

NDS = Number of days in the external incentive scheme

The final step is to calculate today's external incentive payment ($IncpayEXT_1$ for day one), shown as follows:

$$IncpayEXT_1 = FKIncpayEXT_1 - \sum_{k=0}^{d-1=0} IncpayEXT_k$$
$$= -£45{,}034 - £0$$
$$= -£45{,}034$$

Calculating the External Balancing Services Use of System (BSUoS) charge for a Settlement Period j

The External Balancing Services Use of System (BSUoS) charge for Settlement Period 1 on this Settlement Day 1 can now be calculated using the following formula:

$$BSUoSEXT_{11} = CSOBM_{11} + BSCCV_{11} + [\ (IncpayEXT_1 + BSCCA_1 + ET_1 - OM_1)$$
$$* \{ \left| \sum^{+} (QM_{i11} * TLM_{i11}) \right| + \left| \sum^{-} (QM_{i11} * TLM_{i11}) \right| \} / \sum_{j \in 1} \{ \left| \sum^{+} (QM_{ij1} * TLM_{ij1}) \right| + \left| \sum^{-} (QM_{ij1} * TLM_{ij1}) \right| \}]$$

$$BSUoSEXT_{11} = CSOBM_{11} + BSCCV_{11} + [\ (IncpayEXT_1 + BSCCA_1 + ET_1 - OM_1 + RFIIR_1 + ROV_1 + BSFS_1 + NC_1 + IONT_1$$
$$* \{ \left| \sum^{+} (QM_{i11}) \right| + \left| \sum^{-} (QM_{i11}) \right| \} / \sum_{j \in 1} \{ \left| \sum^{+} (QM_{ij1}) \right| + \left| \sum^{-} (QM_{ij1}) \right| \}]$$

For simplicity, the BM Unit Metered Volume (QM_{ij}) is assumed to be the same in all half hour Settlement Periods in a Settlement Day. Therefore the daily BSUoS charge will be evenly allocated to each Settlement Period (1/48) i.e. the multiplier at the end of the equation.

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¶
To carry this out, The Company will forecast monthly incentivised SO operating costs (CSOOC) and profile them to a daily basis. For this illustration, monthly costs for the first month of the scheme (April in our example) are assumed to be **£4,500k,** profiled down to a daily forecast of **£150k** (£450,000k divided by 30).¶
¶
The calculation of the forecast SO internal operating cost for day one ($FSOINT_1$) is shown as follows:¶
¶

$$FSOINT_1 = \frac{\sum_{k=1}^{d=1} CSOOC_j}{\sum_{k=1}^{d=1} PFT_k}$$
$$= \frac{£150k}{1} * 365$$
$$= £54{,}750k$$

¶
¶
The relevant value of the **internal** incentive payment ($FYIncpayINT_1$) can then be calculated by reference to Table BS2 (figures shown for illustration only) and the selection and application of the appropriate sharing factors and offset dependent upon the value of the forecast incentivised internal SO operating cost (FSOINT).¶
¶
Table BS2¶
¶
FSOINT ... [4]

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The illustration below shows the external BSUoS charge ($BSUoSEXT_{11}$) for Settlement Period one of Settlement Day 1.

The costs of the external SO Settlement Period variables are as follows (these are the daily values included in the IBC_1 equation divided by 48 Settlement Periods).

CSOBM = £16,667
BSCCV = £5,208
$RFIIR_1$, ROV_1, $BSFS_1$, NC_1 and $IONT_1$ are all zero

The costs of the external SO Settlement Day variables are as follows:

IncpayEXT = £-45,034
BSCCA = £500,000
ET = £0
OM = £0

$$BSUoSEXT_{11} = £16,667 + £5,208 + [(-£45,034 + £500,000 + £0 - £0 + £0 + £0 + £0 + £0 + £0)$$
$$= £16,667 + £5,208 + £9,478$$
$$= £31,353$$

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Calculating the Internal Balancing Services Use of System (BSUoS) charge for a Settlement Period j

The Internal Balancing Services Use of System (BSUoS) charge for a Settlement Period 1 of Settlement Day 1 can now be calculated using the following formula:

$$BSUoSINT_{11} = (CSOC_1 + IncpayINT_1 + NSOC_1 + T_1 + P_1 + IAT_1 + BI_1 + ON_1 + IONT_1)$$
$$*\{ \left|\sum^{+}(QM_{i11} * TLM_{i11})\right| + \left|\sum^{-}(QM_{i11} * TLM_{i11})\right| \} / \sum_{j=1}\{ \left|\sum^{+}(QM_{i11} * TLM_{i11})\right| + \left|\sum^{-}(QM_{i11} * TLM_{i11})\right| \}$$

Comment [t14]: This equation has been replaced by the equation below

$$BSUoSINT_{11} = [\{(SOPU_1 + SOMOD_1 + SOTRU_1) / NDS\} * RPIF_1]$$
$$*\{ \left|\sum^{+}(QM_{i11})\right| + \left|\sum^{-}(QM_{i11})\right| \} / \sum_{j=1}\{ \left|\sum^{+}(QM_{i11})\right| + \left|\sum^{-}(QM_{i11})\right| \}$$

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As with the external BSUoS charge, for simplicity, the BM Unit Metered Volume (QM_{ij}) is assumed to be the same in all half hour Settlement Periods in a Settlement Day. Therefore the daily BSUoS charge will be evenly allocated to each Settlement Period (1/48).

Table BS2 below shows the annual Internal SO costs assumed for this example:

Table BS2

Internal SO Cost Variable	Annual Cost (£m)
$SOPU_t$	75,873,280
$SOMOD_t$	18,250,000
$SOTRU_t$	18,250,000

$RPIF_t = 1$

$$BSUoSINT_{11} = [(75{,}873{,}280 + 18{,}250{,}000 + 18{,}250{,}000)/365] * 1/48$$
$$= £6414$$

Calculating the Total Balancing Services Use of System (BSUoS) charge for a Settlement Period 1

The final step is to calculate the Total Balancing Services Use of System ($BSUoSTOT_{11}$) for a Settlement Period 1 on Settlement Day 1.

$$BSUoSTOT_{11} = BSUoSEXT_{11} + BSUoSINT_{11}$$
$$= £31{,}353 + £6{,}414$$
$$= £37{,}767$$

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¶
<#>CSOOC (incentivised Internal SO operating costs) = £150k¶
<#>CSOCEC (incentivised Internal SO capital expenditure) =£24, 657¶
<#>T (Tax allowance) = £13,699¶
<#>NSOC (Non controllable SO costs) = £82,192¶
<#>P (Pension allowance) = £2,740¶
<#>BI (BETTA preparation costs) = £32,876¶
<#>ON (Outage change allowance) = £8,219¶

Comment [t15]: Calculation updated

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Day 2

Calculation of the Daily External SO Incentive Scheme Payment

Again, the first step is to calculate the Daily Incentivised Balancing Cost for day 2 (IBC_2) using the following formula:

$$IBC_2 = CSOBM_2 + BSCCA_2 + BSCCV_2 - OM_2 - RT_2 - BSFS_2$$

$$= £600,000 + £150,000 + £100,000 - £0 - £0 - £0$$

$$= £850,000$$

Assuming that

$CSOBM_2$	=	£600,000
$BSCCA_2$	=	£150,000
$BSCCV_2$	=	£100,000
OM_2	=	£0
RT_2	=	£0
$BSFS_2$	=	£0

With IBC_d known for day one, it is possible to calculate Forecast Balancing Services Cost (FBC_2) from the outturn to date as follows:

$$FBC_2 = \frac{\sum_{k=1}^{d=2} IBC_k}{\sum_{k=1}^{d=2} PFT_k} * NDS$$

$$= \frac{(£1,550,000 + £850,000)}{2} * 365$$

$$= £438,000,000$$

The values of SF_t, M_t and CB_t can now be read off table BS1 given previously. As FBC_2 is £438,000,000, SF_t is now 0.25, M_t is £500,000,000 and CB_t is 0, calculated as follows:

$$FYIncpayEXT_2 = SF_t * (M_t - FBC_2) + CB_t$$

$$= 0.25 * (£500,000,000 - £438,000,000) + £0$$

$$= £15,500,000$$

The external SO incentive payment for the entire duration of the incentive scheme ($FYincpayEXT_2$) is then used to calculate the total incentive payment to date ($FKIncpayEXT_2$), shown as follows:

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$$FKIncpayEXT_2 = \frac{FYIncpayEXT_2}{NDS} * \sum_{k=1}^{d=2} PFT_k$$
$$= \frac{£15{,}500{,}000}{365} * 2$$
$$= £84{,}932$$

Where:

NDS = Number of days in the incentive scheme

In this case the incentive payment forecast for the year is £84,932.

Again, the final step is to calculate today's external incentive payment ($IncpayEXT_2$ for day two), shown as follows:

$$IncpayEXT_2 = FKIncpayEXT_2 - \sum_{k=0}^{d-1=1} IncpayEXT_k$$
$$= £84{,}932 - -£45{,}034$$
$$= £129{,}966$$

The costs of the external SO Settlement Period variables are as follows:

CSOBM = £12,500
BSCCV = £2,083

$RFIIR_2$, ROV_2, $BSFS_2$, NC_2 and $IONT_2$ are all zero.

The costs of the external SO Settlement Day variables are as follows:

IncpayEXT = £129,966
BSCCA = £150,000
ET = £0
OM = £0

$$BSUoSEXT_{12} = £12{,}500 + £2{,}083 + [(£129{,}966 + £150{,}000 + £0 - £0k + £0 + £0 + £0 + £0 + £0)/48$$
$$= £12{,}500 + £2{,}083 + £5{,}833$$
$$= £20{,}416$$

Annual internal SO costs assumed for this example have been listed in table BS2 above.

$RPIF_t = 1$

$$BSUoSINT_{12} = [(75{,}873{,}280 + 18{,}250{,}000 + 18{,}250{,}000)/365] * 1/48$$
$$= £6{,}414$$

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Calculation of the Daily Internal SO Incentive Scheme Payment¶
¶
The first step is to calculate the forecast SO internal cost for day two ($FSOINT_2$). The same forecast of **£150k** for daily incentivised SO operating costs (CSOOC) used for day one is used for day two.¶
¶
The calculation of the forecast SO internal cost ($FSOINT_2$) is shown as follows:¶
¶

$$FSOINT_2 = \frac{\sum_{k=1}^{d=2} CSOO}{\sum_{k=1}^{d=2} PFT}$$
$$= \frac{(£150{,}000 + £150{,}0}{2}$$
$$= £54{,}750k$$

¶
¶
Using the forecast SO internal cost ($FSOINT_2$), the forecast internal SO incentive payment for the duration of the scheme ($FYIncpayINT_2$) can be calculated as follows (with reference to the values in Table BS2).¶
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Calculating the Total Balancing Services Use of System (BSUoS) charge for a Settlement Period j

The final step is to calculate the Total Balancing Services Use of System ($BSUoSTOT_{12}$) for Settlement Period 1 on Settlement Day 2.

$$BSUoSTOT_{12} = BSUoSEXT_{12} + BSUoSINT_{12}$$
$$= £20{,}416 + £6414$$
$$= £26{,}830$$

Comment [t24]: Calculation updated

Day 365

If we now move to the end of the year, then once again the first step is to calculate the Daily Incentivised Balancing Cost for the final day (IBC_{365}) using the formula below:

Calculation of the Daily External SO Incentive Scheme Payment

$$IBC_{365} = CSOBM_{365} + BSCCA_{365} + BSCCV_{365} - OM_{365} - RT_{365} - BSFS_{365}$$

$$= £700,000 + £200,000 + £150,000 + £200,000 - £0 - £0 - £0$$

$$= £1,050,000$$

Assuming that

$CSOBM_{365}$	=	£700,000
$BSCCA_{365}$	=	£200,000
$BSCCV_{365}$	=	£150,000
OM_{365}	=	£0
RT_{365}	=	£0
$BSFS_{365}$	=	£0

With $\sum_{364} IBC_d$ assumed to be £432,000,000 for the previous 364 days, it is possible to calculate Forecast Balancing Services Cost (FBC_{365}) from the outturn to date as follows:

$$FBC_{365} = \frac{\sum_{k=1}^{d=365} IBC_k}{\sum_{k=1}^{d=365} PFT_k} * NDS$$

$$= \frac{£432,000,000 + £1,050,000}{365} * 365$$

$$= £433,050,000$$

The values of SF_t, M_t and CB_t can now be read off table BS1. As FBC_{365} is £433,050,000, SF_t is now 0.25, M_t is £500,000,000 and CB_t is 0. Therefore $FYIncpayEXT_{365}$ is calculated as follows:

$$FYIncpayEXT_{365} = SF_t * (M_t - FBC_{365}) + CB_t$$

$$= 0.25 * (£500,000,000 - £433,050,000) + £0$$

$$= £16,737,500$$

The external SO incentive payment for the entire duration of the incentive scheme (FYincpayEXT) is then used to calculated the total incentive payment to date (FKIncpayEXT), shown as follows:

$$FKIncpayEXT_{365} = \frac{FYIncpayEXT_{365}}{NDS} * \sum_{k=1}^{d=365} PFT_k$$

$$= \frac{£16,737,500}{365} * 365$$

$$= £16,737,500$$

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Where:

NDS = Number of days in the incentive scheme

In this case the incentive payment is positive (£16,737,500) i.e. a payment to The Company. As this is the last day of the scheme this represents the overall incentive payment due to The Company i.e. with reference to the graph with Table BS1 25% of the difference between £500,000,000 and £433,050,000.

Again, the final step is to calculate today's external incentive payment ($IncpayEXT_{365}$ for day 365), shown as follows:

It has been assumed that the total incentive payments for the previous 364 days ($\sum_{k=0}^{d-1=364} IncpayEXT_k$) is £16,461,800.

$$IncpayEXT_{365} = FKIncpayEXT_{365} - \sum_{k=0}^{d-1=364} IncpayEXT_k$$
$$= £16,737,500 - £16,461,800$$
$$= £275,700$$

The costs of the external SO Settlement Period variables are as follows:

CSOBM = £14,583
BSCCV = £3,125

$RFIIR_{365}$, ROV_{365}, $BSFS_{365}$, NC_{365} and $IONT_{365}$ are all zero.

The costs of the external SO Settlement Day variables are as follows:

IncpayEXT = £275,700
BSCCA = £200,000
ET = £0
OM = £0

$$BSUoSEXT_{365} = £14,583 + £3,125 + (£275,700 + £200,000 + £0k - £0k + £0k + £0k + £0k + £0k) / 48$$
$$= £14,583 + £3,125 + £9,910$$
$$= £27,618$$

Annual internal SO costs assumed for this example have been listed in Table BS2 above.

$RPIF_t = 1$

$$BSUoSINT_{1365} = [(£75,873,280 + £18,250,000 + £18,250,000) / 365] * 1 / 48$$
$$= £6,414$$

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¶
Again, the first step is to calculate the forecast SO internal cost for day 365 (FSOINT$_{365}$). ¶
¶
To carry this out, The Company will forecast monthly incentivised SO operating costs (CSOOC) and profile them to a daily basis. For this illustration, monthly costs for the final month of the scheme (March in our example) are assumed to be **£4,000k,** profiled down to a daily forecast of **£129,032** (£4,000k divided by 31).¶
¶
If FSOINT$_{364}$ is assumed to be £52,000k, the calculation of the forecast SO internal operating cost (FSOINT$_{365}$) is shown as follows:¶
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Calculating the Total Balancing Services Use of System (BSUoS) charge for a Settlement Period j

The final step is to calculate the Total Balancing Services Use of System ($BSUoSTOT_{1365}$) for Settlement Period 1 on Settlement Day 365

$$BSUoSTOT_{1,365} = BSUoSEXT_{1,365} + BSUoSINT_{1,365}$$
$$= £27,618 + £6,414$$
$$= £34,032$$

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¶
The Internal Balancing Services Use of System (BSUoS) charge for Settlement Period 1 of Settlement Day 365 can now be calculated using the following formula:¶
¶
$BSUoSINT_{1,365} = (CSOC_{365} + I$
$*\{ \left| \sum^{+} (QM_{i1,365} * TLM_{i1,365}) \right.$
¶
¶
¶
¶
As with the external BSUoS charge, for simplicity, the BM Unit Metered Volume (QM_{ij}) is assumed to be the same in all half hour Settlement Periods in a Settlement Day (1/48).¶
¶
The Settlement Day 365 costs of the internal SO cost variables assigned to Settlement Period 1 (based on values from Table BS3) are as follows:¶
¶
$BSUoSINT_{1,365} = (£129$
¶

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Table 9.2 below summarises the annual SO Internal cost variables for Financial Year 20010/11 as set out in the Transmission Licence

Table 9.2

Internal SO Cost Variable		Annual Cost Target (£m)
CSOC*	CSOOC	55.2
	CSOCEC	16.9
NC*	NSOC	1.6
	BI	3.2
	T	2.5
	P	15.0
	ON	1.0
IAT, IONT		0.0

[* in 2010/11 prices]

Where

CSOC = CSOOC + CSOCEC

NC = (NSOC + BI + T + P + ON)

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Calculation of the daily Internal Incentive Payment ($IncpayINT_d$)

In respect of each Settlement Day d, $IncpayINT_d$ is calculated as the difference between the overall total incentive payment ($FKIncpayINT_d$) due to that date and the overall incentive payment made up to the previous day ($\xi_{k=0\equiv d-1} IncpayINT_k$) plus the daily cost of Manifest Errors and Special Provisions:

$$IncpayINT_d = \left(FKIncpayINT_d - \sum_{k=0}^{d-1} IncpayINT_k \right) + MESP_d$$

The forecast incentive payment made to date (from the commencement of the scheme) ($FKIncpayINT_d$) is calculated as the ratio of total forecast internal incentive payment across the duration of the scheme (FYIncpayINT): the number of days in the scheme, multiplied by the sum of the profiling factors to date.

$$FKIncpayINT_d = \frac{FYIncpayINT_d}{NDS} * \sum_{k=1}^{d} PFT_k$$

The Company daily Internal incentive payments ($IncPayINT_d$) are calculated by comparing the Daily Incentivised internal operating costs ($FSOINT_d$) against the Daily Internal Scheme Target (PTint) to set the Sharing Factor (SFint). Table 9.3 shows the respective values of these variables (in 2010/11 forecast prices).

$$FYIncPayINT_d = (PT\,\text{int} - FSOINT_d) * SF\,\text{int}$$

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Table 9.3

$FSOINT_d$ (£)	**PTint (£)**	**SFint**
$FSOINT_d$ < 55,262,715	55,262,715	0.15
$FSOINT_d$ => 55,262,715	55,262,715	0.15

In respect of each Settlement Day d, the forecast incentivised internal controllable System Operator operating cost ($FSOINT_d$) will be calculated as follows:

$$FSOINT_d = \frac{\sum_{k=1}^{d} CSOOC_k}{\sum_{k=1}^{d} PFT_k} * NDS$$

Where:
NDS: Number of days in Scheme.

The SO incentivised internal capital expenditure associated with balancing services activities (CSOCEC) is subject to fixed sharing factors at 15% upside and downside, to be applied each year to capital expenditure incurred which could then be added to the internal regulatory asset value (RAV).

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Manifest Errors and Special Provisions for IT system failures

The Company may, in certain circumstances, be required to pay compensation to BSC Parties as a result either of Manifest Errors or Special Provisions (collectively referred to as Contingency Provisions). For the avoidance of doubt charges for calling a manifest error are excluded.

An incentivised cost-recovery mechanism for such costs has been included within the internal System Operator BSUoS charge element. This cost-recovery mechanism operates on a monthly basis and provides that The Company is exposed to 40% of any Contingency Provision costs invoiced to it in any month, subject to an overall monthly cap on its exposure of £250,000*.

Thus, if the Contingency Provision costs incurred exceed £625,000* (£250,000*/0.4) in any month, The Company will be allowed to recover 60% of the costs it incurs up to £625,000*, and all the costs

* Subject to the indexation provisions given in the Transmission Licence

in excess of £625,000*. If costs are less than £625,000* then The Company will recover 60% of these costs.

The Company will calculate any allowable revenue associated with Contingency Provisions based on the invoices received in any particular month. The monthly revenue will then be recovered equally over the days in the following month. An invoice for the final month of the incentive scheme will be recovered in via the following incentive scheme in the next Financial Year.

The monthly cost associated with Manifest Errors and Special Provisions (CP_m) are subject to a monthly incentivised cost recovery mechanism based on a monthly Contingency Provision sharing factor (CSF_m) and an offset for Contingency Provisions (OS_m). The daily cost ($MESP_d$) is calculated as follows:

$$MESP_d = \frac{(1 - CSF_m)(CP_m - OS_m)}{NDM}$$

NDM = Number of Settlement Days in the calendar month over which these costs are recovered.

The values for the 2010/11 scheme, in 2007/08 forecast prices as given in the Transmission Licence, are shown in the table below.

Table 9.4

CP_m	**CSF_m**	**OS_m**
0 <= CP_m < £625,000	0.4	£0
CP_m > £625,000	0	£250,000

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Calculation of the Daily Internal SO Incentive Scheme Payment

To carry this out, The Company will forecast monthly incentivised SO operating costs (CSOOC) and profile them to a daily basis. For this illustration, monthly costs for the first month of the scheme (April in our example) are assumed to be **£4,500k,** profiled down to a daily forecast of **£150k** (£450,000k divided by 30).

The calculation of the forecast SO internal operating cost for day one ($FSOINT_1$) is shown as follows:

$$FSOINT_1 = \frac{\sum_{k=1}^{d=1} CSOOC_k}{\sum_{k=1}^{d=1} PFT_k} * NDS$$

$$= \frac{£150k}{1} * 365$$

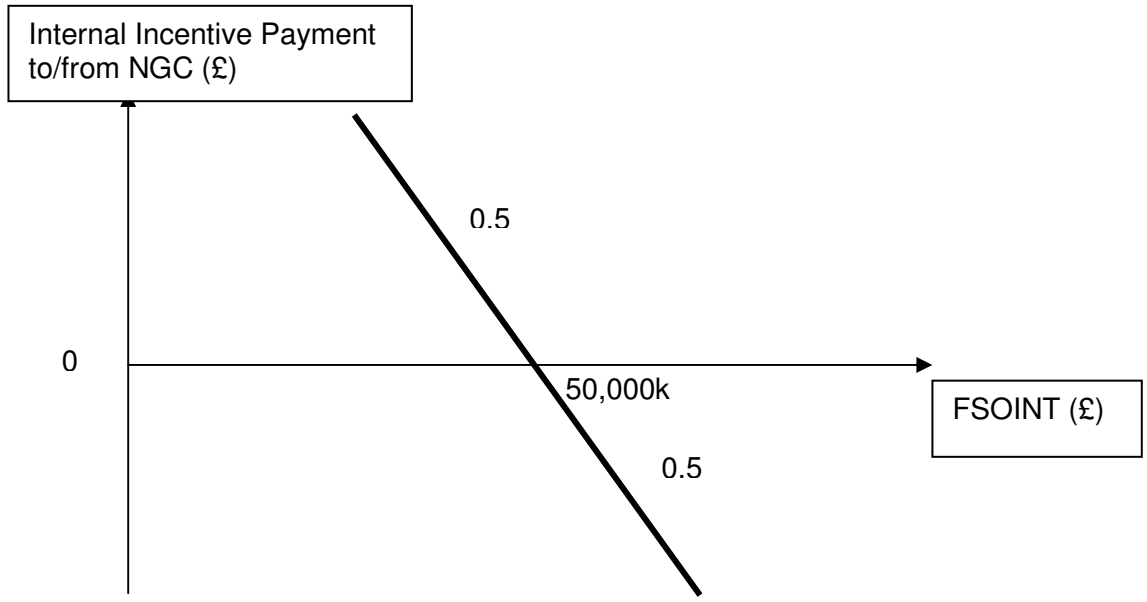
$$= £54{,}750k$$

The relevant value of the **internal** incentive payment ($FYIncpayINT_1$) can then be calculated by reference to Table BS2 (figures shown for illustration only) and the selection and application of the appropriate sharing factors and offset dependent upon the value of the forecast incentivised internal SO operating cost (FSOINT).

Table BS2

FSOINT	Ptint	SFint
FSOINT < £50,000k	£50,000k	0.5
FSOINT = £50,000k	£50,000k	0
FSOINT > £50,000k	£50,000k	0.5

The table describes the internal incentive scheme which can also be illustrated by the graph below.



Using the forecast internal operating cost for day one ($FSOINT_1$), the internal incentive payment for the duration of the scheme ($FYIncpayINT_1$) is calculated as follows:

$$FYIncPayINT_1 = (PT\,\text{int} - FSOINT_1) * SF\,\text{int}$$
$$= (£50{,}000k - £54{,}750k) * 0.5$$
$$= -£2{,}375k$$

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The forecast internal SO incentive payment for the duration of the scheme ($FYIncpayINT_1$) can then be used to calculate the forecast incentive payment to date ($FKIncpayINT_1$), shown as follows:

$$FKIncpayINT_1 = \frac{FYIncpayINT_1}{NDS} * \sum_{k=1}^{d=1} PFT_k$$
$$= \frac{-£2{,}375k}{365} * 1$$
$$= -£6{,}507$$

The final step is to calculate the Internal incentive payment ($IncpayINT_1$ for day one):

$$IncpayINT_1 = (FKIncpayINT_1 - \sum_{k=0}^{d-1=0} IncpayINT_k) + MESP_1$$
$$= (£6{,}507 - £0) + £0$$
$$= -£6{,}507$$

The costs associated with Manifest Errors and Special Provisions for day 1 ($MESP_1$) are assumed to be zero.

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NSOC	30
P	1
BI	4
ON	3
IAT, IONT	0

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Calculation of the Daily Internal SO Incentive Scheme Payment

The first step is to calculate the forecast SO internal cost for day two ($FSOINT_2$). The same forecast of **£150k** for daily incentivised SO operating costs (CSOOC) used for day one is used for day two.

The calculation of the forecast SO internal cost ($FSOINT_2$) is shown as follows:

$$FSOINT_2 = \frac{\sum_{k=1}^{d=2} CSOOC_k}{\sum_{k=1}^{d=2} PFT_k} * NDS$$

$$= \frac{(£150{,}000 + £150{,}000)}{2} * 365$$

$$= £54{,}750k$$

Using the forecast SO internal cost ($FSOINT_2$), the forecast internal SO incentive payment for the duration of the scheme ($FYIncpayINT_2$) can be calculated as follows (with reference to the values in Table BS2).

$$FYIncPayINT_2 = (PT\,\text{int} - FSOINT_2) * SF\,\text{int}$$

$$= (£50{,}000k - £54{,}750k) * 0.5$$

$$= -£2{,}375k$$

The forecast internal SO incentive payment for the duration of the scheme ($FYIncpayINT_2$) can then be used to calculate the forecast incentive payment to date ($FKIncpayINT_2$), shown as follows:

$$FKIncpayINT_2 = \frac{FYIncpayINT_2}{NDS} * \sum_{k=1}^{d=2} PFT_k$$

$$= \frac{-£2{,}375k}{365} * 2$$

$$= -£13{,}014$$

The final step is to calculate the Internal incentive payment ($IncpayINT_2$ for day two).

$$IncpayINT_2 = (FKIncpayINT_2 - \sum_{k=0}^{d-1=1} IncpayINT_k) + MESP_2$$

$$= (-£13{,}014 - -£6{,}507) + £0$$

$$= -£6{,}507$$

The costs associated with Manifest Errors and Special Provisions for day 2 ($MESP_2$) are assumed to be zero.

As all of the internal cost variables are the same on day 1 as on day 2 the incentive payments for each of these days are identical.

<u>Calculating the External Balancing Services Use of System (BSUoS) charge for a Settlement Period j</u>

The External Balancing Services Use of System (BSUoS) charge for Settlement Period 1 of Settlement Day 2 can now be calculated using the following formula:

$$BSUoSEXT_{12} = CSOBM_{12} + BSCCV_{12} + [\ (IncpayEXT_2 + BSCCA_2 + ET_2 - OM_2)$$
$$*\{\ \left|\sum^{+}(QM_{i12} * TLM_{i12})\right| + \left|\sum^{-}(QM_{i12} * TLM_{i12})\right|\ \} / \sum_{j\in 2}\{\ \left|\sum^{+}(QM_{ij2} * TLM_{ij2})\right| + \left|\sum^{-}(QM_{ij2} * TLM_{ij2})\right|\ \}\ ]$$

As with day one, for simplicity, the BM Unit Metered Volume (QM_{ij}) is assumed to be the same in all half hour Settlement Periods in a Settlement Day. Therefore the daily BSUoS charge will be evenly allocated to each Settlement Period (1/48).

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Calculating the Internal Balancing Services Use of System (BSUoS) charge for a Settlement Period j

The Internal Balancing Services Use of System (BSUoS) charge for Settlement Period 1 on Settlement Day 2 can now be calculated using the following formula:

$$BSUoSINT_{12} = (CSOC_2 + IncpayINT_2 + NSOC_2 + IAT_2 + BI_2 + ON_2 + IONT_2)$$
$$*\{\ \left|\sum^{+}(QM_{i12} * TLM_{i12})\right| + \left|\sum^{-}(QM_{i12} * TLM_{i12})\right|\ \} / \sum_{j\in 2}\{\ \left|\sum^{+}(QM_{i12} * TLM_{i12})\right| + \left|\sum^{-}(QM_{i12} * TLM_{i12})\right|\ \}$$

As with the external BSUoS charge, for simplicity, the BM Unit Metered Volume (QM_{ij}) is assumed to be the same in all half hour Settlement Periods in a Settlement Day (1/48).

The Settlement Day 2 costs of the internal SO cost variables assigned to Settlement period 1 (based on values from Table BS3) are as follows:

$$BSUoSINT_{12} = (£150k + (-£6507) + £24,657 + £13,699 + £82,192 + £2,740 + £0 + £32876 + £0 + £0 +$$
$$= £6414$$

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Calculation of the Daily Internal BSUoS Charge

Again, the first step is to calculate the forecast SO internal cost for day 365 ($FSOINT_{365}$).

To carry this out, The Company will forecast monthly incentivised SO operating costs (CSOOC) and profile them to a daily basis. For this illustration, monthly costs for the final month of the scheme (March in our example) are assumed to be **£4,000k,** profiled down to a daily forecast of **£129,032** (£4,000k divided by 31).

If $FSOINT_{364}$ is assumed to be £52,000k, the calculation of the forecast SO internal operating cost ($FSOINT_{365}$) is shown as follows:

$$FSOINT_{365} = \frac{\sum_{k=1}^{d=365} CSOOC_k}{\sum_{k=1}^{d=365} PFT_k} * NDS$$

$$= \frac{£52{,}000k + £129{,}032}{365} * 365$$

$$= £52{,}129{,}032$$

Using the forecast SO internal operating cost ($FSOINT_{365}$), the forecast internal SO incentive payment for the duration of the scheme ($FYIncpayINT_{365}$) can be calculated as follows:

$$FYIncPayINT_{365} = (PT\,\text{int} - FSOINT_{365}) * SF\,\text{int}$$

$$= (£50{,}000{,}000 - £52{,}129{,}032) * 0.5$$

$$= -£1{,}064{,}516$$

The forecast internal SO incentive payment for the duration of the scheme ($FYIncpayINT_{365}$) can then be used to calculate the forecast incentive payment to date ($FKIncpayINT_{365}$), shown as follows:

$$FKIncpayINT_{365} = \frac{FYIncpayINT_{365}}{NDS} * \sum_{k=1}^{d=365} PFT_k$$

$$= \frac{-£1{,}064{,}516}{365} * 365$$

$$= -£1{,}064{,}516$$

In this case the incentive payment is negative (-£1,065k) i.e. a payment from The Company. As this is the last day of the scheme this represents the overall incentive payment due from The Company i.e. with reference to the graph with Table BS2 50% of the difference between £50,000k and £52,129k.

The final step is to calculate the Internal incentive payment ($IncpayINT_{365}$ for day 365). It has been assumed that the total incentive payments for the previous 364 days ($\xi_{k=0\equiv364} IncpayINT_k$) is £1,056,145.

$$IncpayINT_{365} = (FKIncpayINT_{365} - \sum_{k=1}^{d-1=364} IncpayINT_k) + MESP_{365}$$

$$= (-£1{,}064{,}516 - -£1{,}056{,}145) + £0$$

$$= -£8{,}371$$

The costs associated with Manifest Errors and Special Provisions for day 365 ($MESP_{365}$) are assumed to be zero.

<u>Calculating the External Balancing Services Use of System (BSUoS) charge for a Settlement Period j</u>

The External Balancing Services Use of System (BSUoS) charge for Settlement Period 1 of Settlement Day 365 can now be calculated using the following formula:

$$BSUoSEXT_{1365} = CSOBM_{1365} + BSCCV_{1365} + [\,(IncpayEXT_{365} + BSCCA_{365} + ET_{365} - OM_{365})$$
$$* \{\,\left|\sum{}^{+}(QM_{i1365} * TLM_{i1365})\right| + \left|\sum{}^{-}(QM_{i1365} * TLM_{i1365})\right|\,\} / \sum_{j \in 365} \{\,\left|\sum{}^{+}(QM_{ij365} * TLM_{ij365})\right| + \left|\sum{}^{-}(QM_{ij365} * TLM_{ij365})\right|\,\}$$

As with day one, for simplicity, the BM Unit Metered Volume (QM_{ij}) is assumed to be the same in all half hour Settlement Periods in a Settlement Day (1/48).