CMFTP230 'CMFTP226 Minor Housekeeping Changes and Corrections'

Submission Date: 15 April 2014

Details of proposer: Tushar Singh, National Grid Electricity Transmission plc, CUSC Party

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

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Objections to be received by:	**20 May 2014**

The CUSC Panel determination : 25 April 2014

Contents

About this document

This CUSC Modification Fast Track Proposal was presented to the CUSC Panel on 25 April 2014.

Document Control

Version	Date	Author	Change Reference
0.1	15 April 2014	Code Administrator	Draft CUSC Modification Fast Track Proposal Report
0.2	28 April 2014	Code Administrator	CUSC Panel view

Any Questions?

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Proposer:
Tushar Singh
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1   Why Change

1.1   The Proposer believes that CMFTP230 meets the Fast Track Criteria because it satisfies the following conditions -

- *Correcting minor typographical errors*
- *Correcting formatting and consistency errors*

1.2   The Statement of the Balancing Services Use of System (BSUoS) Charging Methodology (in CUSC Section 14, Part 2, Section 2) 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) applicable for 2013/15.   The new incentive scheme (hence the changes to Transmission Licence) apply retrospectively from 01 April 2013.

1.4   In January 2014 a fast track CUSC Modification Proposal (CMFTP226) was raised by National Grid to mirror the changes to the Transmission Licence into CUSC Section 14. These changes were implemented in February 2014.

1.5   Following the implementation of CMFTP226 it was discovered that some housekeeping changes are required to enhance clarity and correct typographical errors. Also, references to the 'Transmission Losses Multipliers (TLM)' were removed from CUSC Section 14 owing to slight misinterpretation of the changes to Transmission Licence. These references need to be added back.

2   Solution

2.1 It is proposed that the following changes are made to CUSC Section 14, Part 2, Section 2 – The Statement of the Balancing Services Use of System Charging Methodology -

(a)   Enhance clarity by adding back Transmission Losses Multipliers and simplifying other terms in the relevant text and equations –

- Paragraph 14.30.2 – Text and equations associated with Total BSUoS charges calculation.
- Paragraph 14.30.6 – Equation for External BSUoS charges calculation
- Paragraph 14.30.14 – Equation for Internal BSUoS charges calculation
- Section 14.32: Examples of Balancing Services Use of System (BSUoS) Daily Charge Calculations, Day1 –

(i) BSUoSEXT equation under the heading – *'Calculating the External Balancing Services Use of System (BSUoS) charge for a Settlement Period j'*

(ii) BSUoSINT equation under the heading – *'Calculating the Internal Balancing Services Use of System (BSUoS) charge for a Settlement Period j'*

(b)   Table 9.1 – Row 2, Column 1, Cell no. 1 –
Change
(Incentive Target Cost – 100) < FBC < (Incentive Target Cost)
To
(Incentive Target Cost – 100) <= FBC < (Incentive Target Cost)

(c)   Table 14.31.8 – Rearrange the table as per increasing alphabetical order of the Acronyms in column 2 and add back the Acronym and definition for Transmission Losses Multipliers.

(d)   Section 14.32: Examples of Balancing Services Use of System (BSUoS) Daily Charge Calculations, Day1 – Rearrange text under the heading – *'Calculating the Internal Balancing Services Use of System (BSUoS) charge for a   Settlement Period j'* to enhance clarity.

2.2   The above mentioned changes to the CUSC have no material impact on any existing or new customers as the BSUoS charges are already being calculated in compliance with the modified Transmission Licence.

3   Proposed Legal Text

3.1   The proposed legal text can be found in Annex 1 of this document

4   CUSC Panel Determination

4.1   On 25 April 2014 the CUSC Modifications Panel considered CMFTP230 and confirmed unanimously that CMFTP230 meets the Fast Track Criteria and unanimously determined that CMFTP230 should be implemented.

The CUSC Modification Fast Track Proposal meets 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 CMFTP230 CUSC Modification Fast Track Proposal 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 5 June 2014

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 20 May 2014.

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 – Draft 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, 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:

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

Comment [t1]: 1. Added back TLM which had been removed for CMFTP226.
2. QM$_{ij}$ in the numerator replaced by QMBSUoS$_{ij}$ to aid clarity.

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

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

Comment [t2]: 1. Added back TLM which had been removed for CMFTP226.
2. QM$_{ij}$ in the numerator replaced by QMBSUoS$_{ij}$ to aid clarity.

Where:

BSUoSTOT$_j$	Total BSUoS Charge applicable for Settlement Period j
~~QM$_{ij}$~~	~~BM Unit Metered Volume **~~
QMBSUoS$_{ij}$	BM Unit Metered Volume (QM$_{ij}$)** for BSUoS Liable BM Unit~~s Metered Volume~~
TLM$_{ij}$	Transmission Loss Multiplier **

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

∗ 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

'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.

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

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

$$\sum_{j \in d} \Big\{ \; \Big| {\sum}^+ (QMBSUoS_{ij} * TLM_{ij}) \; \Big| + \Big| {\sum}^- (QMBSUoS_{ij} * TLM_{ij}) \Big| \; \Big\} \; \Big]$$

> **Comment [t3]:** 1. Added back TLM which had been removed for CMFTP226 in the above equation.
> 2. Subscript 'd' removed from all the terms in the 3rd line of the above equation to aid clarity.

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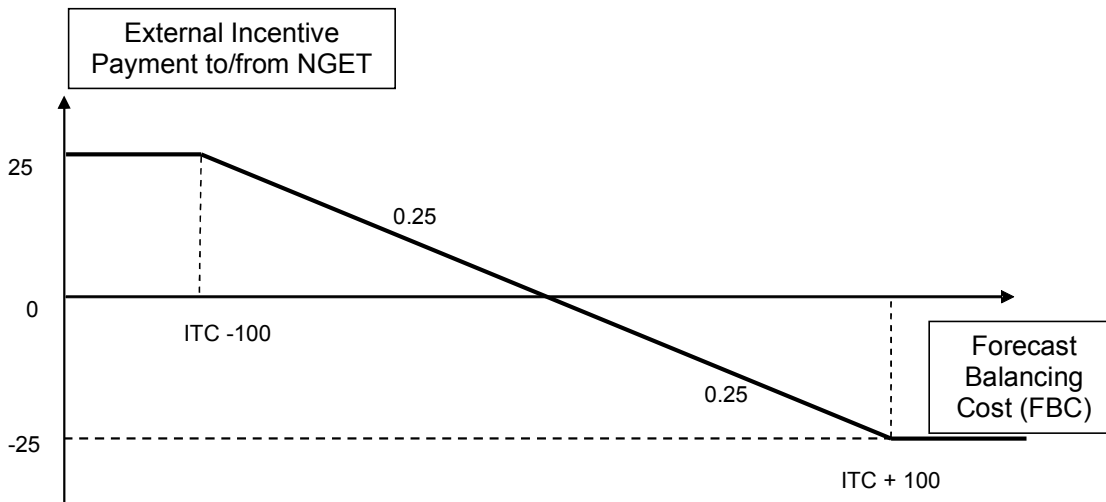
$$FYIncpayEXT_d = SF_t * (M_t - FBC_d) + CB_t$$

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).

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

Comment [t4]: Typographical error. Added '=' sign.

External Incentive Payment to/from NGET

25

0

-25

0.25

0.25

ITC -100

ITC + 100

Forecast Balancing Cost (FBC)

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:

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

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.

$$BSUoSINT_{jd} = \left[(SOPU_d + SOMOD_d + SOTRU_d) * RPIF_t \right]$$

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

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

> **Comment [t5]:** 1. Added back TLM which had been removed for CMFTP226 in the above equation.
> 2. Subscript 'd' removed from all the terms in the 3rd line of the above equation to aid clarity.

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 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.

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.

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
Black Start Feasibility Costs	BSFS	£	As defined in the Transmission Licence
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
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

Comment [t6]: 1. Table re-arranged in ascending alphabetical order of Acronyms. 2. TLM_{ij} definition added back to the table.

EXPRESSION	ACRONYM	Unit	Definition
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
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
Wind Forecast Incentive Cost	RFIIR		As defined in the Transmission Licence
System Operator Innovation Roll-Out Value	ROV		As defined in the Transmission Licence

Comment [t6]: 1. Table re-arranged in ascending alphabetical order of Acronyms. 2. TLM_{ij} definition added back to the table.

EXPRESSION	ACRONYM	Unit	Definition
Retail Price Index Adjustment Factor	RPIF		As defined in the Transmission Licence
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
Incremental change from SO Opening Base Revenue Allowance	SOMOD		As defined in the Transmission Licence
SO Opening Base Revenue Allowance	SOPU		As defined in the Transmission Licence
Revenue Adjustment with respect to actual and assumed RPI values	SOTRU		As defined in the Transmission Licence
Tax Allowance	T	£	As defined in the Transmission Licence
Transmission Loss Multiplier	TLM_{ij}		As defined in the BSC
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~~

Comment [t6]: 1. Table re-arranged in ascending alphabetical order of Acronyms. 2. TLM_{ij} definition added back to the table.

EXPRESSION	ACRONYM	Unit	Definition
~~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~~

Comment [t6]: 1. Table re-arranged in ascending alphabetical order of Acronyms. 2. TLM_{ij} definition added back to the table.

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

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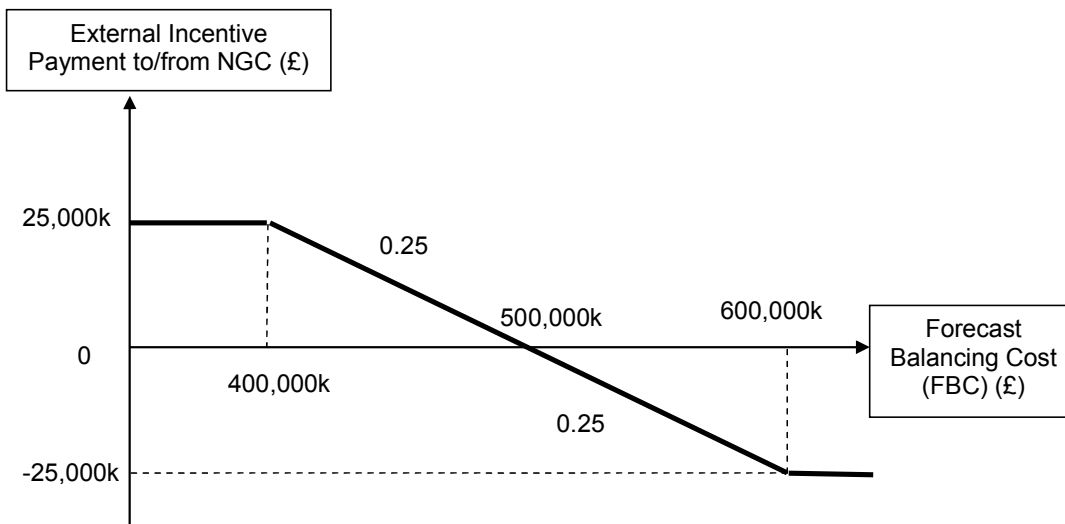
Using the values set out in the table above, the external SO incentive payment for the duration of the scheme (FYIncpayEXT) can be calculated as follows:

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

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:

$$BSUoSEXT_{11} = CSOBM_{11} + BSCCV_{11} + [(IncpayEXT_1 + BSCCA_1 + ET_1 - OM_1 + RFIIR_1 + ROV_1 + BSFS_1 + NC_1 + IONT_1)$$
$$* \{ \left| \sum{}^+ (QM_{i1,1} * TLM_{i1,1}) \right| + \left| \sum{}^- (QM_{i1,1} * TLM_{i1,1}) \right| \} / \sum_{j \in 1} \{ \left| \sum{}^+ (QM_{ij} * TLM_{ij}) \right| + \left| \sum{}^- (QM_{ij} * TLM_{ij}) \right| \}]$$

For simplicity, the BSUoS applicable BM Unit Metered Volume (QMBSUoS$_{ij}$) * TLM$_{ij}$) 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.

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

> **Comment [t7]:** 1. Added back TLM which had been removed for CMFTP226 in the equation above.
> 2. Added a comma (,) to the subscripts of first 2 terms in the second line of the above equation to aid clarity. The terms in the equation now contain *i1,1* instead of *i11*.
> 3. Deleted '1' from the subscripts of last 2 terms of the above equation to aid clarity. The terms in the equation now contain *ij* instead of *ij1*.

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

$$BSUoSEXT_{11} = £16,667 + £5,208 + [(-£45,034 + £500,000 + £0 - £0 + £0 + £0 + £0 + £0 + £0) / 48]$$
$$= £16,667 + £5,208 + £9,478$$
$$= £31,353$$

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

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

$RPIF_t = 1$

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:

$$BSUoSINT_{11} = \left[\{ (SOPU_1 + SOMOD_1 + SOTRU_1) / NDS \} * RPIF_1 \right]$$
$$* \left\{ \left| \sum{}^{+} (QM_{i1,1} * TLM_{i1,1}) \right| + \left| \sum{}^{-} (QM_{i1,1} * TLM_{i1,1}) \right| \right\} / \sum_{j \in 1} \left\{ \left| \sum{}^{+} (QM_{ij} * TLM_{ij}) \right| + \left| \sum{}^{-} (QM_{ij} * TLM_{ij}) \right| \right\}$$

As with the external BSUoS charge, for simplicity, the BSUoS applicable BM Unit Metered Volume (QMBSUoS$_{ij}$ * TLM$_{ij}$) 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).

Comment [t8]: 1. Added back TLM which had been removed for CMFTP226.
2. Added a comma (,) to the subscripts of first 2 terms in the second line of the above equation to aid clarity. The terms in the equation now contain *i1,1* instead of *i11*.
3. Deleted '1' from the subscripts of last 2 terms of the above equation to aid clarity. The terms in the equation now contain *ij* instead of *ij1*.

~~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~~

~~$RPIF_t = 1$~~

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

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.

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

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:

$$FKIncpayEXT_2 = \frac{FYIncpayEXT_2}{NDS} * \sum_{k=1}^{d=2} PFT_k$$

$$= \frac{£15,500,000}{365} * 2$$

$$= £84,932$$

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

$$BSUoSEXT_{12} = £12,500 + £2,083 + \left[(£129,966 + £150,000 + £0 - £0k + £0 + £0 + £0 + £0 + £0)/48 \right]$$

$$= £12,500 + £2,083 + £5,833$$

$$= £20,416$$

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

RPIF$_t$ = 1

$$BSUoSINT_{12} = \left[(75,873,280 + 18,250,000 + 18,250,000)/365 \right] * 1/48$$

$$= £6,414$$

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.

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

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 calculate 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

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

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

RPIF$_t$ = 1

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

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

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