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Service Description for Transmission Loss Factor Agent Determination

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AMENDMENT RECORD

VERSION	DATE	DESCRIPTION OF CHANGES	Change Reference	MODS PANEL REF
1.0	12/05/2017	Developed for P350	P350	Panel 266/10
1.1	06/07/2017	Amended to add clarifications and implement comments from the TLFA during development of the TLFA service	P350 Implementation	N/A
1.2	1//11/2017	Amended to implement comments from the TLFA, the Model Reviewer and clarifications to the file formats.	P350 Implementation	N/A

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RELATED DOCUMENTS

Reference 1	Load Flow Model Specification
Reference 2	Network Mapping Statement

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1. INTRODUCTION

1.1 Purpose

1.1.1 This document is the Service Description for TLF Determination, and details the functional and non-functional services provided by the Transmission Loss Factor Agent (TLFA). The TLFA is required to derive Adjusted Seasonal Zonal Transmission Loss Factors ($ATLF_{ZS}$) and BM Unit specific Transmission Loss Factors (TLF_{ij}), for application in each BSC Year, calculated by 30 November in the previous BSC Year from historical data.

1.2 Structure of this Document

1.2.1 This document is structured as follows:

- Section 2 gives an overview of the data requirements for the annual delivery of the TLFA service;
- Section 3 details the data inputs required by the TLFA to produce Transmission Loss Factor values (TLFs);
- Section 4 references the Load Flow Model (LFM) Specification and the LFM;
- Section 5 contains the equations to enable the TLFA to determine the Zonal, Seasonal Zonal, and Adjusted Seasonal Zonal TLFs;
- Section 6 details the data outputs required from the TLFA;
- Section 7 details the non-functional requirements of the TLFA;
- Appendix A contains the terms, acronyms and definitions used in this document; and
- Appendix B contains the file structures for the data outputs.

1.3 The Balancing and Settlement Code Company (ELEXON)

1.3.1 The BSC Panel is supported in the discharge of its duties and obligations under the BSC by ELEXON. ELEXON is the Balancing and Settlement Code Company (BSCCo) as created by the BSC and procures, manages and operates services and systems that enable the Balancing Mechanism and Imbalance Settlement process to operate.

1.3.2 BSCCo shall contract with the TLFA for the provision of Adjusted Seasonal Zonal TLFs and other supporting services detailed in this Service Description.

2 OVERVIEW

2.1 Data and Process Model

2.1.1 The following diagram shows the data and process model for the TLFA services and details all the data inputs, processes, and data outputs to be performed by the TLFA. Sections 3, 4, and 5 describe the requirements in detail.

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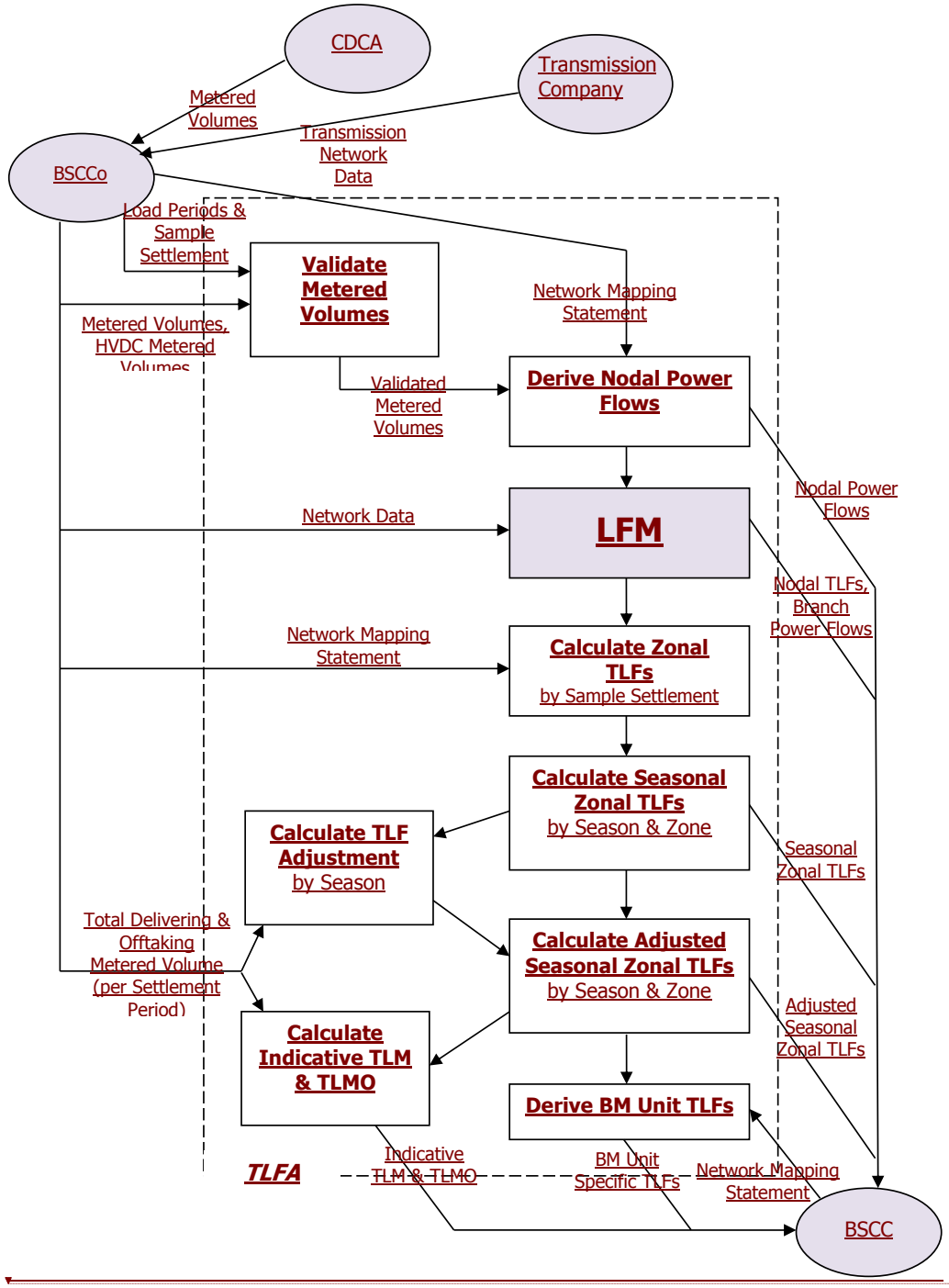

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2.1.3 The TLFA shall also calculate indicative values of Transmission Loss Multiplier (TLM_{ij}), Delivering Transmission Loss Adjustment ($TLMO^{+}_{j}$) and Offtaking Transmission Loss Adjustment ($TLMO^{-}_{j}$) for each Settlement Period in the Reference Year, in accordance with section 5.6 of this Service Description. These values are calculated for information only and are not used in settlement, but will be published by BSCCo to assist parties in understanding the impact of the TLF values on settlement cash flows.

2.2 Timetable

2.2.1 Table 1 represents the input and output data requirements for the TLFA, and the deadlines for submission or provision of data in each year. For the avoidance of doubt, TLFs are derived in advance of the BSC Year in which they are to be applied, and the scheduled dates refer to the provision of the information listed in the year preceding their application. It should be noted that the TLFA will receive all of the input data via BSCCo and before the final submission date as stated in the table below.

Table 1: TLFA Timetable

From	To	Input (I) or Output (O)	Data Type	Date Received by
BSCCo	TLFA	I	Load Periods and Sample Settlement Periods	no later than 31 August
BSCCo	TLFA	I	Network Mapping Statement	no later than 19 October
BSCCo	TLFA	I	Transmission Network Data	no later than 19 October
BSCCo	TLFA	I	Distribution Network Data	no later than 19 October
BSCCo	TLFA	I	Metered Volumes for Sample Settlement Periods	no later than 19 October
BSCCo	TLFA	I	HVDC Metered Volume Data for Sample Settlement Periods	no later than 19 October
BSCCo	TLFA	I	Total Delivering and Offtaking Metered Volume Data	no later than 19 October
TLFA	BSCCo	O	Nodal Power Flows	no later than 30 November
TLFA	BSCCo	O	Branch Power Flows[1]	no later than 30 November
TLFA	BSCCo	O	Nodal TLFs	no later than 30 November
TLFA	BSCCo	O	Seasonal Zonal TLFs	no later than 30 November
TLFA	BSCCo	O	TLF Adjustments	no later than 30 November

[1] This is called "Load Flow Model Power Flows in the BSC."

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From	To	Input (I) or Output (O)	Data Type	Date Received by
TLFA	BSCCo	O	Adjusted Seasonal Zonal TLFs	no later than 30 November
TLFA	BSCCo	O	BM Unit Specific TLFs	no later than 30 November
TLFA	BSCCo	O	Indicative TLM & TLMO Values	no later than 30 November

2.2.2 Where any dates in the above timetable fall on a non-Business Day then the TLFA shall be required to send data, or shall receive data by the preceding Business Day.

2.2.3 The TLFA shall recalculate data in accordance with the table 2 below; further information on recalculation of TLFs is described in section 6.4.

2.2.4 Between 19 October and 30 November, the TLFA shall use reasonable endeavours to recalculate partial or full sets of TLF data so that the deadline of 30 November is adhered to.

Table 2: Recalculation Timetable

From	To	Input (I) or Output (O)	Data Type	Timescale for recalculation
TLFA	BSCCo	O	Recalculated Nodal Power Flows	15 Business Days from receiving the necessary input data from BSCCo (if 5 Business Days prior notification was given).
TLFA	BSCCo	O	Recalculated Branch Power Flows[1]	15 Business Days from receiving the necessary input data from BSCCo (if 5 Business Days prior notification was given).
TLFA	BSCCo	O	Recalculated Nodal TLFs	15 Business Days from receiving the necessary input data from BSCCo (if 5 Business Days prior notification was given).
TLFA	BSCCo	O	Recalculated Seasonal Zonal TLFs	15 Business Days from receiving the necessary input data from BSCCo (if 5 Business Days prior notification was given).
TLFA	BSCCo	O	Recalculated TLF Adjustments	15 Business Days from receiving the necessary input data from BSCCo (if 5 Business Days prior notification was given).

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TLFA	BSCCo	O	Recalculated Adjusted Seasonal Zonal TLFs	15 Business Days from receiving the necessary input data from BSCCo (if 5 Business Days prior notification was given).
TLFA	BSCCo	O	Recalculated BM Unit Specific TLFs	15 Business Days from receiving the necessary input data from BSCCo (if 5 Business Days prior notification was given).
TLFA	BSCCo	O	Recalculated Indicative TLM & TLMO Values	15 Business Days from receiving the necessary input data from BSCCo (if 5 Business Days prior notification was given).

2.3 Issue Resolution2.3.1 If the TLFA identifies any errors or anomalous results during the calcuation or recalculation of the Adjusted Seasonal Zonal TLFs, the TLFA shall issue details of any error messages and/or warnings to BSCCo as soon as they become aware.

2.3.2 BSCCo shall analyse any error messages and/or warnings received from the TLFA and advise the TLFA of the actions to be taken by BSCCo and/or the TLFA within 2 business days of receipt.

3 INPUT DATA REQUIREMENTS

3.1 Network Mapping Statement

3.1.1 The Network Mapping Statement contains the following:

(a) for each Volume Allocation Unit (other than a GSP Group, Supplier BM Unit, Interconnector BM Unit, or BM Unit embedded in a Distribution System, see Appendix A for definition), the Node which represents or best represents that Volume Allocation Unit or the Boundary Points at which that Volume Allocation Unit is connected to the Transmission System (it being recognised that one Node may represent several such points);

(b) for each Node, the Zone in which the Node lies;

(c) for each BM Unit the Zone in which the BM Unit lies;

(d) for each HVDC Boundary, the Node which represents or best represents the HVDC Boundary.

3.1.2 The data in the Network Mapping Statement shall be supplied by BSCCo (see paragraph 9.2 of Appendix B for file structure).

3.1.3 BSCCo shall send the Network Mapping Statement to the TLFA no later than 19 October of each year and on any amendment to the Network Mapping Statement required for recalculation of TLF values thereafter.

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3.1.4 Where the TLFA has not received the Network Mapping Statement by 19 October, then the TLFA shall immediately contact BSCCo to establish when the Network Mapping Statement shall be provided.

3.1.5 The TLFA shall be required to use the latest version of the Network Mapping Statement data that is effective at the time the TLFs are calculated. The TLFA shall be required to use the Network Mapping Statement data for processes detailed in sections 3.4.6, 5.1.2 and 5.5.

3.1.6 The TLFA shall translate Metered Volume data for Volume Allocation Units and HVDC Boundaries into power flows for each Node ("Nodal power flows") by applying the Network Mapping Statement, as described in section 3.4.6.

3.1.7 The TLFA shall derive a Nodal TLF for each Node (TLF_{Nj}) from the Nodal power flows, as described in the Load Flow Model Specification.

3.1.8 The TLFA shall convert Nodal TLFs into Zonal TLFs (TLF_{Zj}) by applying the mapping relationships contained in the Network Mapping Statement, as described in section 5.1.2.

3.1.9 The TLFA shall derive Seasonal Zonal TLFs (TLF_{ZS}) from the Nodal TLFs, as described in section 5.2.

3.1.10 The TLFA shall derive Adjusted Seasonal Zonal TLFs ($ATLF_{ZS}$) from the Seasonal Zonal TLFs, as described in section 5.3.

3.1.11 The TLFA shall also use the Network Mapping Statement to convert Adjusted Seasonal Zonal TLFs into BM Unit Specific TLFs (TLF_{ij}), as described in section 5.5.

3.1.12 The TLFA shall receive amendments to the Network Mapping Statement as notified by BSCCo with an effective date.

3.2 Load Periods and Sample Settlement Periods

3.2.1 A Load Period represents a division of the Reference Year into a number of different periods, which typically represent different loads on the Transmission System. For the avoidance of doubt, Load Periods are mutually exclusive and may not overlap.

3.2.2 A Sample Settlement Period is a representative Settlement Period within a Load Period. For the avoidance of doubt, a Sample Settlement Period shall only fall into one Load Period.

3.2.3 BSCCo shall supply the TLFA with the Load Periods and Sample Settlement Periods used in the calculation of the Seasonal Zonal TLFs.

3.2.4 The Load Periods and Sample Settlement Periods shall be notified to the TLFA by BSCCo, no later than 31 August in the preceding BSC Year.

3.2.5 Where the TLFA has not received the notification of the Load Periods and Sample Settlement Periods by 31 August, then the TLFA shall immediately contact BSCCo

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to establish from BSCCo when the Load Periods and Sample Settlement Periods shall be provided.

3.2.6 The file format for the Load Periods and Sample Settlement Periods for each Reference Year is contained in paragraph 9.3 of Appendix B.

3.2.7 The total number of Sample Settlement Periods and Settlement Periods in any given Load Period shall be sent to the TLFA from BSCCo in order to calculate the Seasonal Zonal TLFs, as described in section 5.2.

3.3 Transmission Network Data

3.3.1 Transmission Network data shall comprise:

(a) the identity of each pair of adjacent Nodes; and

(b) for each pair of Nodes, the values of the resistance and the reactance between the Nodes.

3.3.2 The Transmission Network Data is based on the assumption of an 'intact' network (i.e. disregarding any planned, or other, outage of any part of the Transmission System) and in accordance with any relevant assumption made in the LFM Specification.

3.3.3 One representative set of Transmission Network Data shall be provided to the TLFA from the Transmission Company via BSCCo by 19 October, and paragraph 9.5 of Appendix B contains the file structure.

3.3.4 Where the TLFA has not received the Transmission Network Data by the 19 October, then the TLFA shall immediately contact BSCCo, who will establish from the Transmission Company the cause of the lack of Transmission Network Data, and to determine when the Transmission Network Data shall be provided.

3.3.5 The TLFA shall in accordance with section 3.5 of this Service Description adjust the Network Data to connect any isolated offshore transmission systems and merge parallel circuits, before using it to calculate Nodal TLF values in accordance with the Load Flow Model Specification.

3.4 Metered Volumes for Sample Settlement Periods

3.4.1 The Metered Volume data for Sample Settlement Periods comprises data for each HVDC Boundary, and for each Volume Allocation Unit. Volume Allocation Units, for the purpose of this Service Description, are:

(i) Grid Supply Points;

(ii) Interconnectors; and

(iii) Directly Connected BM Units that are not Interconnector BM Units.

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The Network Mapping Statement contains a definitive list of all HVDC Boundaries and Volume Allocation Units for the purposes of this Service Description.

3.4.2 For each Volume Allocation Unit, the TLFA shall receive, no later than 19 October, the Metered Volume data for each Sample Settlement Period from the CDCA via BSCCo. The data will be provided by BSCCo and will contain the relevant metered data for each Sample Settlement Period. See paragraph 9.4 of Appendix B for the file format.

3.4.3 Where the TLFA has not received the Metered Volume data for Sample Settlement Periods by 19 October, then the TLFA shall immediately contact BSCCo, who will establish the cause of the lack of Metered Volume data, and to determine when the Metered Volume data shall be provided.

3.4.4 The TLFA shall validate that they have received Metered Volume data for every Sample Settlement Period and Volume Allocation Unit in the Network Mapping Statement. The TLFA shall contact BSCCo immediately if any discrepancies arise between the Network Mapping Statement data and the Metered Volume data, or if doubts regarding the integrity of the Metered Volume data arise. For example, if there is no Metered Volume data for a Volume Allocation Unit for a Sample Settlement Period then the TLFA shall contact BSCCo immediately.

3.4.5 The Metered Volume data sent to the TLFA shall be signed to indicate the direction of the energy flow, a negative quantity represents an import and a positive quantity represents an export on to the Transmission System.

3.4.6 The TLFA shall convert Metered Volume data for Volume Allocation Units into Metered Volume data per Node by applying the Network Mapping Statement. The Network Mapping Statement contains the mapping of every Volume Allocation Unit to one or more Nodes. If the situation arises whereby a Volume Allocation Unit is allocated to more than one Node then the rules for the apportionment of Metered Volume data are stated in the Network Mapping Statement in percentages. For the avoidance of doubt, the TLFA should not assume a one to one mapping of Volume Allocation Unit to Node. Metered Volume data will be aggregated per Node by summing either all or a percentage of the Metered Volume data for the corresponding Volume Allocation Units in accordance with the Network Mapping Statement. The TLFA shall assume that the Metered Volume data is constant in a Settlement Period.

3.4.7 The TLFA shall convert the Nodal Metered Volume data into Nodal power flows (QM_{Nj}) by converting all MWh values into MW by multiplying the Metered Volumes by a factor of 2.

3.4.8 The TLFA shall calculate two different values of Nodal power flow for each Node N and Sample Settlement Period j, as follows:

(a) For purposes of calculating Nodal TLF values, the TLFA shall calculate Adjusted Nodal Power Flows as described in the Load Flow Model Specification. This calculation takes into account metered volumes for all Volume Allocation Units, and for HVDC Boundaries; and

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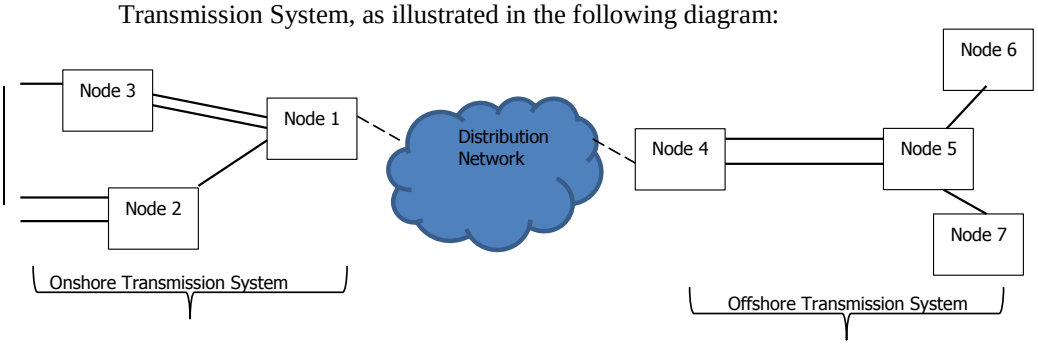
(b) For purposes of calculating Zonal TLF values in accordance with paragraph 5.1.1 the TLFA shall calculate the absolute value of the Nodal Power Flow, but taking into account only BM Units and GSP Groups (i.e. disregarding Interconnectors and HVDC Boundaries).

3.5 Distribution Network Data

3.5.1 TLFA shall receive from BSCCo the Distribution Network Data for relevant Distribution Systems no later than 19th October (for Annual Calculation of TLFs) in the current BSC Year to be used for Calculation of TLFs for the next BSC Year. See paragraph 9.7 of Appendix B for the file format.

3.5.2 Where the TLFA has not received the Distribution Network Data by the 19 October, then the TLFA shall immediately contact BSCCo, who will establish the cause of the lack of Distribution Network Data, and will determine when the Distribution Network Data shall be provided.

3.5.3 Distribution Network Data relates to offshore transmission systems that are connected to a Distribution System, and therefore isolated from the onshore Transmission System, as illustrated in the following diagram:



3.5.4 For each offshore Node connected to the Distribution Network (e.g. Node 4 in this example), the Distribution Network Data will specify the single onshore Node to which the majority of power flows (e.g. Node 1 in this example). This information will be used to join the two parts of the Transmission System (e.g. merging Node 4 with Node 1 in this example).

3.5.5 The data will be provided as a single file containing one record for each offshore transmission system that connects to an onshore distribution system. Each record will identify:

(a) The Node that connects the offshore transmission system to the Distribution System; and

(b) The Node on the onshore transmission system with which this Node should be merged.

3.5.6 Prior to calculating TLF values in accordance with the Load Flow Model Specification the TLFA shall:

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(a) Merge Nodes in the Transmission Network Data, as specified in the Distribution Network Data; and

(b) Merge any parallel circuits (e.g. the two circuits between Node 1 and Node 3 in the above diagram). Where two or more circuits join a pair of Nodes, the TLFA shall replace them with a single equivalent circuit. The TLFA shall derive the resistance and reactance for the single equivalent circuit by summing the complex admittance values (in accordance with the theory of electrical circuits):

$$1 / (R + jX) = \Sigma_i \, 1 / (r_i + jx_i)$$

Where r_i and x_i are the resistance and reactance of the i^{th} individual circuit; j is the square root of -1; Σ_i denotes summation over the individual circuits; and R and X are the resistance and reactance of the single equivalent circuit.

3.6 HVDC Metered Volume Data for Sample Settlement Periods

3.6.1 TLFA shall receive (no later than 19th October in the preceding BSC Year, for Annual Calculation of TLFs) from BSCCo the HVDC Boundary Data for each HVDC Boundary and each Sample Settlement Period. See paragraph 9.6 of Appendix B for the file format.

3.6.2 The Metered Volume data will be signed to indicate the direction of energy flow; a positive sign indicates export on to the system and a negative sign indicates import from the system.

3.7 Total Delivering and Offtaking Metered Volume Data

3.7.1 TLFA shall receive (no later than 19th October in the preceding BSC Year, for Annual Calculation of TLFs) from BSCCo a single file containing the following data for each Zone 'Z' and Settlement Period 'j' in the Reference Year:

Total Losses	the total transmission losses in the Settlement Period, equal to $(\Sigma^{+}QM_{ij} + \Sigma^{-}QM_{ij})$. Note that this value is a national total, and will therefore the same for each Zone.
$ZQM^{+}(non\text{-}I)Z_j$	the Total Metered Volume for non-Interconnector BM Units in delivering Trading Units; and
$ZQM^{-}(non\text{-}I)Z_j$	Total Metered Volume for non-Interconnector BM Units in offtaking Trading Units

See paragraph 9.8 of Appendix B for the file format.

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4 LOAD FLOW MODEL SPECIFICATION AND LOAD FLOW MODEL

4.1 Requirements

4.1.1 The LFM Specification contains the requirements, obligations, assumptions and approximations to be supported by the LFM and forms part of this Service Description.

4.1.2 The TLFA shall establish and adopt a LFM, which implements and fully complies with the LFM Specification, in the opinion of the Model Reviewer as approved by the Panel.

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4.1.3 The TLFA shall adhere to the requirements and obligations of the LFM Specification.

4.1.4 The TLFA shall immediately notify BSCCo of any errors in the LFM or LFM Specification.

4.1.5 The TLFA shall receive confirmation from BSCCo that the Panel has approved the Model Reviewer's report with respect to the LFM being compliant with the LFM Specification in the following circumstances;

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(i) before the TLFA shall first use the LFM; and

(ii) before the TLFA shall use the LFM following amendment of the LFM.

4.1.6 For the avoidance of doubt, the TLFA shall not amend or use the LFM without prior notification from BSCCo that the Panel has approved the Model Reviewer's report.

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4.1.7 The TLFA shall disclose to the Panel the existence and nature of all assignments of the TLFA with the Model Reviewer, for the carrying out of the role of the TLFA.

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4.1.8 The TLFA shall be required to make the LFM, personnel, data, software, information and records available to the Model Reviewer to ensure compliance of the LFM with the LFM Specification (see section 4.1.5).

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4.1.9 The TLFA shall load the Network Data and the Nodal power flows (QM_{Nj}) for each Sample Settlement Period into the LFM in order to run the LFM and derive Nodal TLFs (TLF_{Nj}) for each Sample Settlement Period.

4.1.10 The TLFA shall notify BSCCo of any anomalous Nodal TLF values which are either greater than 1 or less than -1.

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5 DETERMINATION OF TRANSMISSION LOSS FACTORS

All TLFs are calculated by 30 November in each year, for application in the following BSC Year (1 April to 31 March). The LFM produces Nodal TLFs and this data is then used to calculate BM Unit specific TLFs through a number of interim steps, as detailed in the sections below.

5.1 Calculate Zonal Transmission Loss Factors

5.1.1 For each Sample Settlement Period the TLFA shall determine the Zonal TLF (TLF_{Zj}) for each Zone according to the following formula:

$$TLF_{Zj} = \Sigma_N (TLF_{Nj} * QM_{Nj}) / \Sigma_N QM_{Nj}$$

where for that Settlement Period, and for each Node in that Zone (determined by the TLFA on the basis of the Network Mapping Statement):

TLF_{Nj} is the value of Nodal TLF;

QM_{Nj} is the absolute value of the Nodal power flow, disregarding any power flows to or from an Interconnector or an HVDC Boundary; and

Σ_N is summation by Node in a Zone.

5.1.2 The TLFA shall determine which Node lies in which TLF Zone from the Node to TLF Zone allocations stated in the Network Mapping Statement.

5.2 Seasonal Zonal Transmission Loss Factors

5.2.1 The TLFA shall determine the Seasonal Zonal TLF (TLF_{ZS}) for each Zone according to the following formula:

$$TLF_{ZS} = \Sigma_p ((\Sigma_s TLF_{Zj} / S_{pS}) * J_{pS}) / \Sigma_p J_{pS}$$

where:

S_{pS} is the number of Sample Settlement Periods within a Load Period which fall within the relevant BSC Season;

J_{pS} is the total number of Settlement Periods falling within the Load Period which fall within the relevant BSC Season;

Σ_s is summation by Sample Settlement Periods within a Load Period which fall within the relevant BSC Season; and

Σ_p is summation by Load Period within the relevant BSC Season.

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5.3 Transmission Loss Factor Adjustment values

5.3.1 Unless otherwise directed by BSCCo, the TLFA shall determine the Transmission Loss Factor Adjustment value ($TLFA_S$) in accordance with the following formula:

$$TLFA_S = - \Sigma_j \{ \Sigma_Z (ZQM^+_{(non\text{-}I)Zj} * TLF_{ZS} * 0.5) / \Sigma_Z ZQM^+_{(non\text{-}I)Zj} \} / N$$

where:

$ZQM^+_{(non\text{-}I)Zj}$	is the Total Metered Volume for non-Interconnector BM Units in delivering Trading Units.
Σ_j	denotes summation over all Settlement Periods j (not just Sample Settlement Periods) in a BSC Season within the Reference Year;
Σ_Z	denotes summation over all Zones; and
N	is the total number of Settlement Periods in that BSC Season of the Reference Year.

5.4 Adjusted Seasonal Zonal Transmission Loss Factors

5.4.1 The TLFA shall determine the Adjusted Seasonal Zonal TLF ($ATLF_{ZS}$) for each Zone and each BSC Season according to the following formula:

$$ATLF_{ZS} = (TLF_{ZS} * 0.5) + TLFA_S$$

where $TLFA_S$ is a TLF Adjustment calculated for each Season S, in accordance with the following formula:

5.5 BM Unit Specific Transmission Loss Factors

5.5.1 The BM Unit specific TLFs shall be the Adjusted Seasonal Zonal TLF ($ATLF_{ZS}$) for the Zone in which that BM Unit is located determined by the TLFA by applying the Network Mapping Statement. The TLFA shall apply the Network Mapping Statement, which details all BM Units and the TLF Zone within which they reside, to derive a TLF_{ij} value for every BM Unit for each BSC Season.

5.6 Indicative Values of TLM and TLMO

5.6.1 The TLFA shall use the Total Delivering and Offtaking Metered Volumes to calculate two indicative sets of Transmission Loss Multiplier (TLM_{ij}), Delivering Transmission Loss Adjustment ($TLMO^+_j$) and Offtaking Transmission Loss Adjustment ($TLMO^-_j$) for each Settlement Period in the Reference Year. As further explained in paragraphs 5.6.2 and 5.6.3 below, the calculation shall be performed in accordance with Section T2.3.1 of the BSC, except that:

(a) One indicative data set will be calculated using zero values of TLF; and

(b) The other indicative set will be calculated using the Adjusted Seasonal Zonal Transmission Loss Factor ($ATLF_{ZS}$) values calculated for the forthcoming BSC Year.

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5.6.2 For each Settlement Period in the Reference Year, the TLFA shall calculate indicative values of $TLMO^{+}_{j}$ and $TLMO^{-}_{j}$ according to the following formulae:

$$TLMO^{+}_{j} = -\{\alpha(\Sigma^{+}QM_{ij} + \Sigma^{-}QM_{ij}) + \Sigma^{+}_{(non\text{-}I)}(QM_{ij} * TLF_{ij})\} / \Sigma^{+}_{(non\text{-}I)} QM_{ij};$$

$$TLMO^{-}_{j} = \{(\alpha-1)(\Sigma^{+}QM_{ij} + \Sigma^{-}QM_{ij}) - \Sigma^{-}_{(non\text{-}I)}(QM_{ij} * TLF_{ij})\} / \Sigma^{-}_{(non\text{-}I)} QM_{ij};$$

where:

- α is a constant value, equal to 0.45;
- $(\Sigma^{+}QM_{ij} + \Sigma^{-}QM_{ij})$ is the total transmission losses, provided to the TLFA by BSCCo in accordance with paragraph 3.7;
- $\Sigma^{+}_{(non\text{-}I)} QM_{ij}$ can be calculated as $\Sigma_Z ZQM^{+}_{(non\text{-}I)Zj}$, where $ZQM^{+}_{(non\text{-}I)Zj}$ is provided to the TLFA by BSCCo in accordance with paragraph 3.7, and Σ_Z denotes summation over all Zones;
- $\Sigma^{+}_{(non\text{-}I)}(QM_{ij} * TLF_{ij})$ is the total energy allocated by applying TLF values to non-Interconnector BM Units in delivering Trading Units, and can be calculated as $\Sigma_Z (ZQM^{+}_{(non\text{-}I)Zj} * TLF_{Zj})$, where TLF_{Zj} is the relevant TLF for the Zone and Settlement Period (determined in accordance with paragraph 5.6.1(a) or 5.6.1(b) above);
- $\Sigma^{-}_{(non\text{-}I)} QM_{ij}$ can be calculated as $\Sigma_Z ZQM^{-}_{(non\text{-}I)Zj}$, where $ZQM^{-}_{(non\text{-}I)Zj}$ is provided to the TLFA by BSCCo in accordance with paragraph 3.7, and Σ_Z denotes summation over all Zones; and
- $\Sigma^{-}_{(non\text{-}I)}(QM_{ij} * TLF_{ij})$ is the total energy allocated by applying TLF values to non-Interconnector BM Units in offtaking Trading Units, and can be calculated as $\Sigma_Z (ZQM^{-}_{(non\text{-}I)Zj} * TLF_{Zj})$, where TLF_{Zj} is the relevant TLF for the Zone and Settlement Period (determined in accordance with paragraph 5.6.1(a) or 5.6.1(b) above).

5.6.3 For each Zone and Settlement Period in the Reference Year, the TLFA shall calculate indicative values of TLM_{ij} according to the following formulae:

$$\text{Delivering } TLM_{ij} = 1 + TLF_{ij} + TLMO^{+}_{j}$$

$$\text{Offtaking } TLM_{ij} = 1 + TLF_{ij} + TLMO^{-}_{j}$$

where:

- TLF_{ij} is the relevant TLF for BM Units in that Zone and Settlement Period (determined in accordance with paragraph 5.6.1(a) or 5.6.1(b) above); and
- $TLMO^{+}_{j}$ and $TLMO^{-}_{j}$ are the indicative values determined in accordance with paragraph 5.6.2.

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6 DATA OUTPUTS

The TLFA shall provide all data outputs by the 30 November annually, and in accordance with the timescales detailed in 2.1.3 following a Trading Dispute, manifest error or fraud resolution. For the avoidance of doubt, where 30 November falls on a non-Business Day, then the TLFA shall make such TLFs available by the end of the previous Business Day.

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6.1 Nodal Transmission Loss Factors

6.1.1 The TLFA shall provide the Nodal TLFs (TLF_{Nj}) to BSCCo so that this data can be provided to Parties on request. This data is required by 30 November annually, see paragraph 9.9 of Appendix B for file structure.

6.2 Provision of Adjusted Seasonal Zonal Transmission Loss Factors

6.2.1 The TLFA shall provide the Adjusted Seasonal Zonal TLFs ($ATLF_{ZS}$) to BSCCo. This data is required by 30 November annually, see paragraph 9.10 of Appendix B for file format.

6.3 BM Unit Specific Transmission Loss Factors

6.3.1 The TLFA shall provide BM Unit specific TLFs by no later than the 30 November each year. This data shall be provided to the BSCCo in the file structure specified in paragraph 9.11 of Appendix B.

6.3.2 The TLFA shall send BM Unit specific TLFs to BSCCo in the file format specified in Appendix B. For the avoidance of doubt, there shall be a TLF for every BM Unit in accordance with the Network Mapping Statement for use in every Settlement Period in the BSC Year.

6.3.3 The TLFA shall be required to validate BM Unit specific TLFs (TLF_{ij}) against all the BM Units listed in the Network Mapping Statement to ensure that all BM Units have been assigned a TLF_{ij}. The TLFA shall contact BSCCo immediately in the event of any discrepancies.

6.4 Recalculation of Transmission Loss Factors

6.4.1 The TLFA shall recalculate previously derived TLFs in accordance with the effective dates for the amendments as specified by BSCCo and in accordance with any amended data provided by BSCCo for the situations described in 7.4.

6.4.2 The TLFA shall be required to use the Network Mapping Statement for the calculation of the TLFs at all times. For the avoidance of doubt, the TLFA may be required to use a previous version of the Network Mapping Statement.

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6.4.3 The TLFA shall make the relevant amendments and provide the recalculated TLFs to the appropriate bodies in accordance with the timetable defined in table 2 in section 2.2.3.

6.4.4 For any recalculation request outside of the period set out in section 2.2.4, BSCCo will give the TLFA 5 additional working days' notice.

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7 NON-FUNCTIONAL REQUIREMENTS

7.1 Audit Requirements

7.1.1 The determinations and calculations made by the TLFA for the provision of TLFs, and the extent to which such determinations and calculation comply with the LFM contained in the LFM Specification, shall be subject to regular audit by the BSC Auditor, in accordance with the BSC Audit.

7.1.2 The TLFA shall, as a condition precedent to its appointment, execute a confidentiality undertaking with the BSC Auditor.

7.1.3 The TLFA shall be able to re-perform calculations in accordance with the data retention requirements in 7.3.1, producing the same results from the same input data.

7.1.4 All processes operated by the TLFA in respect of the provision of TLFs must be verifiable. This means that:

(a) processes must be documented such that they can be verified by the BSC Auditor;

(b) all processing must be recorded and these records must contain such cross-references as are necessary to allow verification by tracing data through processing, both forwards and backwards.

7.1.5 The TLFA must make available at all reasonable times input data and other related documentation (including procedures and evidence of operation of controls) used in the derivation of TLFs for inspection and copying (including electronically) by the BSC Auditor, in accordance with the data retention requirements in 7.3.1.

7.1.6 The TLFA must also make its staff available at all reasonable times to provide explanations and answer any questions arising from the audit that the BSC Auditor may require.

7.1.7 BSCCo shall instruct the TLFA to carry out such corrective action at its own cost as may be required by BSCCo consequent on receipt of the BSC Auditor's Report. The TLFA shall take such corrective action as may be necessary.

7.2 Helpdesk Service

7.2.1 The TLFA is required to appoint a single point of contact as a helpdesk service, which shall be available between the hours of 09:00 to 17:00 on Business Days only.

7.2.2 The single point of contact shall receive incoming calls from BSCCo on matters that affect the service described in this service requirement.

7.2.3 The single point of contact shall include:

(a) logging of all incidents notified including;

(i) allocation of a unique call reference number;

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(ii) a description of the problem;

(iii) details of the source of the problem, how widespread the problem is; and

(iv) the likely duration of the problem.

(b) a call back and progress reporting mechanism.

7.2.4 The TLFA shall respond to all incoming calls within 4 Business Hours as detailed below:

Type of Incident	Severity Level	1st Call Back to caller	Follow-up Calls to caller
Any operational incident that will prevent timely Annual Data Submission in accordance with the time-scales set out in 3.1.1 or recalculation in accordance with the time-scales set out in 3.1.2	1	Within 15 minutes	Within time-scale agreed with caller
All Other Enquiries	2	Within 4 Business Hours	Within time-scale agreed with caller

7.2.5 The TLFA shall contact BSCCo via their single point of contact for the purposes of the services set out in this Service Description and the table above. The TLFA shall tell BSCCo immediately if data is not received or of any issue impacting the delivery of the TLFA service.

7.3 Data Retention and Transfer

7.3.1 In respect of Audit requirements and disputes, the TLFA is required to retain data for at least 40 months from the last Settlement Day the data was used in the Settlement calculations.

7.3.2 The TLFA is required to retain all the following datasets:

(i) all data inputs used in the production of the Nodal TLFs sent to BSCCo; and

(ii) all output data sets sent to BSCCo.

7.3.3 The TLFA is required to retain the above data sets in the file formats specified in Appendix B.

7.3.4 The TLFA shall be required to transfer the datasets in section 7.3.2 on the appointment of a new TLFA, and this obligation endures the termination of the TLFA contract.

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7.4 Upheld Trading Disputes, Trading Queries, Manifest Errors and Fraud

7.4.1 The TLFA shall be required to recalculate TLFs and other output data sets as necessary, where a Trading Dispute or manifest error has been raised and a partial or full re-run of the process is required.

7.4.2 A Trading Dispute may be raised by a BSC Trading Party, the Transmission Company, BSCCo or by the TLFA when they believe that any TLF calculations have been undertaken using erroneous data. The TLFA may raise a Trading Dispute on behalf of BSC Trading Parties if errors in calculations or data are detected or suspected for BSC Years for which the TLFA has already derived TLFs. Recalculation would be required under the following circumstances:

(i) Trading Disputes against the Network Mapping Statement which require recalculations of TLFs;

(ii) Trading Disputes raised from manifest errors or fraud in respect of the LFM or LFM Specification; and

(iii) Trading Disputes raised against the Settlement calculations that specifically relate to TLF derivation and use (see section 5.2 to 5.4).

7.4.3 The TLFA shall, when requested by BSCCo, undertake evaluation or analysis if requested, of a Dispute, manifest error or fraud to determine the facts and its materiality.

7.4.4 The TLFA shall, when requested by BSCCo submit written evidence concerning a particular Dispute, to the Trading Disputes Committee.

7.4.5 The TLFA shall notify BSCCo promptly if it becomes aware of any matter, which would or might reasonably be expected to give rise to a Trading Dispute.

7.5 Change Management

7.5.1 The TLFA Service Description and LFM Specification are Code Subsidiary Documents and therefore BSC Parties can raise Change Proposals (BSCP40) and Modification Proposals (BSC Section F) that may have an impact on these documents.

7.5.2 The TLFA shall provide a Change Management service in accordance with BSC Procedure BSCP40 "Change Management" as amended from time to time. The latest version of BSCP40 will be made available to the TLFA by BSCCo.

7.5.3 Any amendment to the Load Flow Model or Load Flow Model Specification resulting from a Change Proposal or Modification shall be applied prospectively and shall only take effect for BSC Years for which TLFs have not been determined at the time the amendments are made.

7.5.4 Any amendments to the LFM shall not be implemented until the model reviewer has reported compliance of the LFM with the LFM Specification to the Panel, and the Panel has approved BSCCo to instruct the amendments to the LFM and/or LFM

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Specification (see section 4.1.5). The effective dates of the amendments shall be provided by BSCCo, following Panel approval, at the time of instructing the amendments.

7.6 Consultancy Service

7.6.1 The TLFA shall make available a consultancy service providing business and technical consultancy relating to the provision of TLFs or other subject matter as may be directed by BSCCo.

7.6.2 The consultancy service shall have the capability to analyse existing business needs and business processes relating to the provision of TLFs, or other subject matter as directed by BSCCo. The consultancy service shall produce proposals, specify requirements, produce business case justifications and deliver additional, new or changed business processes as may be required.

7.7 Security and Controls

7.7.1 The TLFA shall use reasonable endeavours to maintain the physical and logical security of all hardware and software used by it, and all data and other information acquired or held by it as the TLFA in order to prevent data loss or corruption.

7.7.2 The TLFA shall provide evidence of adequate controls processes to include such areas as:

(i) access to operations area;

(ii) access to application (e.g. passwords, audit log, spot checks);

(iii) prevention of unauthorised changes to the software;

(iv) authorisation process for software changes; and

(v) defect correction process, which shall include processes to ensure that the TLFA shall not deploy changes without notifying BSCCo of the defect and its severity level so that the TLFA can agree the timing of the resolution with BSCCo.

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8. APPENDIX A – TERMS, ACRONYMS AND DEFINITIONS

Appendix A is a table of Terms, Acronyms and Definitions used in this document.

Term	Definition
BSC	Balancing and Settlement Code.
BSC Year	each successive period of 12 months beginning on 1st April in each year.
Boundary Point	Is as defined in Section X, Annex X-1 of the BSC
Business Hours	the hours from 09:00 to 17:00 on any Business Day.
Business Day	means a day (other than a Saturday or a Sunday) on which banks are open in London for general interbank business in Sterling and, in relation to payment in Euro, any such day when in addition the Trans European Automated Real-time Gross Settlement Express Transfer System is operated.
Code Subsidiary Documents	means any document referred to in Section H1.2.4 of the Code as modified from time to time in accordance with Section F of the Code.
Distribution System	Is as defined in Section X, Annex X-1 of the BSC
Distribution Network Data	data provided by a Distribution System Operator to identify the onshore Node to which an offshore Transmission System should be treated as connected (for the purposes of calculating Transmission Loss Factors)
HVDC	High Voltage Direct Current
HVDC Boundary	means the point at which the Transmission System is connected to the HVDC Transmission System
Indicative TLM & TLMO Values	Values calculated by the TLFA in accordance with section 5.6 of this Service Description
Load Flow Model (LFM)	mathematical model of an electrical network (the GB network) which represents power flows between adjacent Nodes on the network, and from which Nodal Transmission Loss Factors can be determined.
Metered Volume	has the meaning given to that term in Section R1.2 of the BSC
Load Periods	Division of the Reference Year into a number of different periods representing typically different levels of load on the Transmission System. Every Settlement Period in the Reference Year falls into one and only one Load Period.
NETA	New Electricity Trading Arrangements

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Term	Definition
Network Data	means the following data relating to the Transmission System: (i) the identity of each pair of adjacent Nodes; (ii) for each such pair of Nodes, value of resistance and reactance between the Nodes; Network data shall be established on the assumption of an 'intact network', that is disregarding any planned or other outage of any part of the Transmission System.
Network Mapping Statement	Means the reference network mapping statement defined in Section X, Annex X-1 of the BSC.
Nodal Transmission Loss Factors / Nodal TLFs / TLF_{Nj}	A factor representing the incremental effect on total transmission losses of additional demand at a Node. For example, a TLF value of 0.015 indicates that an additional MWh of demand will cause an additional 0.015 MWh of losses (and conversely an additional MWh of generation will reduce losses by 0.015 MWh). This value is calculated for every Sample Settlement Period and shall be made available to BSCCo.
Node	a node is a point on the electrical network at which: (i) a power flow on to or off the network can occur, or (ii) two or more circuits (forming part of the network) meet. A Node refers to nodes on the Transmission System.
Reference Year	the 12 month period ending on the 31 August in the preceding BSC Year.
Sample Settlement Periods	a representative Settlement Period within a Load Period.
Settlement Period	a period of 30 minutes beginning on the hour or the half-hour. There are normally 48 Settlement Periods in a day.
Season	Spring: 01 March to 31 May Summer: 01 June to 31 August Autumn: 01 September to 30 November Winter: 01 December to 28/29 February
Transmission Loss Factor (TLF)	is the factor applied to a BM Unit in a Settlement Period in order to adjust for Transmission Losses.
Transmission Loss Factor Agent (TLFA)	the BSC Agent responsible for producing Nodal Transmission Loss Factors, Zonal Seasonal Transmission Loss Factors and BM Unit specific Transmission Loss Factors.
Transmission System	Is as defined in Section X, Annex X-1 of the BSC

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Term	Definition
Volume Allocation Units	are: (a) BM Units other than Interconnector BM Units and Supplier BM Units; (b) Interconnectors; (c) Grid Supply Points; and (d) GSP Groups. Each Volume Allocation Unit other than a GSP Group or BM Unit embedded in a Distribution System are included in the Network Mapping Statement.
Zonal Transmission Loss Factors / Zonal TLFs	For each Sample Settlement Period the Transmission Loss Factor value for each Zone according to the following formula: $TLF_{Zj} = \Sigma_N (TLF_{Nj} * QM_{Nj}) / \Sigma_N QM_{Nj}$
Zone	a geographic area in which a GSP Group lies, determined by the Panel but so that the zones are mutually exclusive and comprise of the whole of (and nothing but) the authorised area under the Transmission Licence.

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9. APPENDIX B – INTERFACE DETAILS

9.1 Interface Details

Details of the content of interfaces are included in this version of the Service Description for guidance only. Definitive interface specifications will be agreed with the Service Provider during implementation (taking into account the Service Provider's proposed solution architecture), and these will take precedence.

9.2 Network Mapping Statement (Input): TLFA-I001

Manual/Automatic:	**Frequency:**	**Volumes:**
Manual	Once a year plus ad hoc (if required)	Single data set of about 4,800 records currently. One file per reference year.

Interface Description:

TLFA shall receive from BSCCo the Network Mapping Statement no later than 19th October in the preceding BSC Year (for Annual Calculation of TLFs).

Network Mapping Statement contains three sets of data:

(i) Volume Allocation Unit (Directly Connected BM Units, Grid Supply Points, Interconnectors) and HVDC Boundary to Node;

(ii) Node to TLF Zone (for those Nodes that have demand or generation connected to them); and

(iii) BM Unit (Directly Connected BM Units, Embedded BM Units, Supplier BM Units, Interconnector BM Units) to Zone.

The following information shall be included in the interface:

GSP to Node (Identifier that it is Grid Supply Point Mapping)

Grid Supply Point Identifier

Node ID

Percentage of Metered Volume[2]

GSP Name (optional)

BM Unit to Node (Identifier that it is BM Unit Mapping)

Directly Connected BM Unit Identifier

Node ID

Percentage of Metered Volume**Error! Bookmark not defined.**

BM Unit Name (optional)

Interconnector to Node (Identifier that it is Interconnector Mapping)

Interconnector Identifier

Node ID

[2] A number between -100 and +100, with up to 5 decimal places, but with no trailing zeroes

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Percentage of Metered Volume Error! Bookmark not defined.

Interconnector Name (optional)

HVDC Boundary to Node

HVDC Boundary Identifier

Node ID

Percentage of Metered Volume Error! Bookmark not defined.

HVDC Boundary Name (optional)

Node to Zone

Node ID

TLF Zone Identifier

Node Name (optional)

BM Unit to Zone

BM Unit Identifier

TLF Zone Identifier

BM Unit Name (optional)

Current volumetrics are as follows (although for design purposes it should be assumed that total volumes could increase by up to 100% over the life of the contract):

- 360 GSP to Node mappings
- 400 BM Unit to Node mappings
- 4 Interconnector to Node mappings
- 2 HVDC Boundary to Node mappings
- 550 Node to Zone mappings
- 3000 BM Unit to Zone mappings

Physical Interface Details:

- Proposed structure is Comma Separated Values (CSV), each record starting with a three-character code identifying the record type:
- "HDR" for the header
- "GTN" for GSP to Node
- "BTN" for BM Unit to Node
- "ITN" for Interconnector to Node
- "HTN" for HVDC Boundary to Node
- "NTZ" for Node to Zone
- "BTZ" for BM Unit to Zone
- "FTR" for footer

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Header Information:
Record Type Fixed String "HDR"
File Identifier Fixed String "T011001"
Reference Year Fixed String "YYYYMMDD-YYYYMMDD"
Timestamp Datetime
Footer Information:
Record Type Fixed String "FTR"
Record Count Count of body records + 2 (1 header and 1 footer)

Any trailing spaces (or other whitespace characters) at the end of Node Ids and other Identifier fields should be ignored.

- The filename will be: "TLFA-I001_NMS.csv".

Example

```
HDR,T011001,20160901-20170831,20170831115906
GTN,ABHA1,ABHA10,33.33333,Abham
BTN,M_ACTLLU_C,WISD60,100,LU Acton Lane Supply
ITN,BRITNED,GRAI41,-50,BRITNED
HTN,HVDC_G,CONQ40,100,Western Link South
NTZ,ABHA10,11,Abham
BTZ,2__AALTI000,1,2__AALTI000
FTR,8
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9.3 Load Periods and Sample Settlement Periods (Input): TLFA-I002

Manual/Automatic:	Frequency:	Volumes:
Manual	Once a year plus ad hoc (if required)	There are approximately 1,000 Sample Settlement Periods over a number of Load Periods for the full Reference Year. One file per Season (i.e. four separate files will be provided each year).

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Interface Description:

TLFA shall receive the specification of each Load Period and Sample Settlement Periods for the latest Reference Year from BSCCo, via a manual interface.

TLFA shall receive this data for the latest Reference Year (in 4 separate files, one for each Season), no later than no later than 31st August in the preceding BSC Year (for Annual Calculation of TLFs).

The following information shall be included in the interface:

- Load Period Name
- Settlement Date
- Settlement Period
- Total number of Sample Settlement Periods in Load Period within the relevant BSC Season
- Total number of Settlement Periods in Load Period within the relevant BSC Season

The above format allows all of the Load Periods and associated Sample Settlement Periods to be included in one iteration of the report, by use of the 'repeating group' structure.

An additional point of note is that the format of the report allows only one Season (and Reference Year) to be reported in one iteration of the report. This is to avoid confusion and to allow an easy identification of the contents of a report.

Physical Interface Details:

- Proposed structure is Comma Separated Values (CSV), each record starting with a three-character code identifying the record type:
- "HDR" for the header
- "SAM" for details of the Load Period / Sample Settlement Period

Load Period Name

Settlement Date

Settlement Period

Total number of Sample Settlement Periods in Load Period

Total number of Settlement Periods in Load Period

- "FTR" for footer

Header Information:

Record Type Fixed String "HDR"

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File Identifier	Fixed String "T021001[3]"
Reference Year	Fixed String "YYYYMMDD-YYYYMMDD"
Season	Fixed String – one of "Spring", "Summer", "Autumn" or "Winter"
Timestamp	Datetime
Footer Information:	
Record Type	Fixed String "FTR"
Record Count	Count of body records + 2 (1 header and 1 footer)

The filename will specify the relevant Season

Example: "TLFA-I002_LP_SSP_Summer.csv".

Example

```
HDR,T021001,20160901-20170831,Summer,20170831115906
SAM,LP53W,20151203,38,5,190
SAM,LP53W,20151204,41,5,190
SAM,LP54NW,20151205,11,6,96
SAM,LP54NW,20151205,17,6,96
FTR,6
```

[3] This file is also used by ELEXON's BPO service provider who requires that this File Id is used

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9.4 Metered Volume Data for Sample Settlement Periods (Input): TLFA-I003

Manual/Automatic:	Frequency:	Volumes:
Manual	Once a year plus ad hoc (if required)	There are approximately 1,000 Sample Settlement Periods for the full Reference Year. For each Sample Settlement Period, there are Metered Volume Data for each GSP and Interconnector and 750 Volume Aggregation Units. One file per Season (i.e. four separate files will be provided each year).

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Interface Description:

TLFA shall receive (no later than 19th October in the preceding BSC Year, for Annual Calculation of TLFs) from BSCCo verified Metered Volume Data for Sample Settlement Periods as a file of comma separated values (other than GSP Groups and BM Units embedded in a Distribution System. The following information shall be included in the interface:

Grid Supply Point Metered Volume Data

Grid Supply Point Identifier

Settlement Date

Settlement Period

Meter Volume

Interconnector Metered Volume Data

Interconnector Identifier

Settlement Date

Settlement Period

Meter Volume

BM Unit Metered Volume Data

BM Unit Identifier

Settlement Date

Settlement Period

Meter Volume

The Metered Volume data will be signed to indicate the direction of energy flow; a positive sign indicates export on to the system and a negative sign indicates import from the system.

Physical Interface Details:

- Proposed structure is Comma Separated Values (CSV), each record starting with a three-character code identifying the record type:
- "HDR" for the header
- "BUV" for BM Unit Metered Volume
- "GPV" for GSP Metered Volume
- "ICV" for Interconnector Metered Volume

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- "FTR" for footer

This data will be sorted by:

- Settlement Date
- Settlement Period
- Data Type

Header Information:

Record Type	Fixed String "HDR"
File Identifier	Fixed String "T031001[3]"
Reference Year	Fixed String "YYYYMMDD-YYYYMMDD"
Season	Fixed String – one of "Spring", "Summer", "Autumn" or "Winter"
Timestamp	Datetime

Footer Information:

Record Type	Fixed String "FTR"
Record Count	Count of body records + 2 (1 header and 1 footer)

The filename will specify the relevant Season

Example: "TLFA-I003_Metered_Volumes_Spring.csv".

Example

```
HDR,T031001,20160901-20170831,Summer,20170831115906
BUV,M_CAS-BEU01,20151201,25,25.584
GPV,ALNE_P,20151203,16,-1.819
BUV,M_CAS-BEU01,20151203,38,33.872
BUV,M_CAS-BEU01,20151204,41,20.838
GPV,ALNE_P,20151204,41,15.695
ICV,FRANCE,20151204,41,617.391
GPV,ALNE_P,20151205,11,17.541
ICV,FRANCE,20151205,11,73.727
ICV,MOYLE,20151205,11,99.15
GPV,ALNE_P,20151205,17,0.483
ICV,FRANCE,20151205,17,617.49
ICV,MOYLE,20151205,17,93.1
FTR,14
```

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9.5 Transmission Network Data (Input): TLFA-I004

Manual/Automatic:	Frequency:	Volumes:
Manual	Once a year plus ad hoc (if required)	Single data set per reference year for the GB Transmission Network.

Interface Description:

TLFA shall receive from BSCCo the Transmission Network Data no later than 19th October (for Annual Calculation of TLFs) in the current BSC Year to be used for Calculation of TLFs for the next BSC Year.

TLFA shall cooperate so as to ensure that the form and medium in which Transmission Network Data is provided by the BSCCo is compatible with the Load Flow Model and the BSC Agent System on which the Load Flow Model operates.

The following information shall be included in the interface:

- Node ID (one of the two adjacent nodes for a circuit)
- Node ID (the other of the two adjacent nodes for a circuit)
- Resistance (R)
- Reactance (X)

Resistance and Reactance values in the Transmission Network Data file are given in per unit in %, per 100MVA Base.

Example of Network Data sent by the BSCCo

NODE1	NODE2	R	X
HARK41	HUTT4A	0.163	1.561
DEES42	PENT41	0.095	1.413
HEYS41	QUER4A	0.02	0.193
HEYS41	QUER4B	0.02	0.189
CARR4A	DAIN41	0.003	0.038
DEES42	TREU4A	0.023	0.265
TRAW41	TREU4A	0.135	1.234

Physical Interface Details:

- Proposed structure is Comma Separated Values (CSV), each record starting with a three-character code identifying the record type:
- "HDR" for the header
- "ND" for Network Data
- "FTR" for footer

Header Information:

Record Type	Fixed String "HDR"
File Identifier	Fixed String "T041001"
Reference Year	Fixed String "YYYYMMDD-YYYYMMDD"

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Timestamp	Datetime
Footer Information:	
Record Type	Fixed String "FTR"
Record Count	Count of body records + 2 (1 header and 1 footer)
The filename will be: "TLFA-I004_Transmission_Network_Data.csv".	

Example

```
HDR,T041001,20160901-20170831,20170831115906
ND,HARK41,HUTT4A,0.163,1.561
ND,DEES42,PENT41,0.095,1.413
ND,HEYS41,QUER4A,0.02,0.193
ND,HEYS41,QUER4B,0.02,0.189
ND,CARR4A,DAIN41,0.003,0.038
ND,DEES42,TREU4A,0.023,0.265
ND,TRAW41,TREU4A,0.135,1.234
FTR,9
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9.6 HVDC Metered Data for Sample Settlement Periods (Input): TLFA-I005

Manual/Automatic:	Frequency:	Volumes:
Manual	Once a year plus ad hoc (if required)	There are approximately 1,000 Sample Settlement Periods for the full Reference Year. For each Sample Settlement Period there are Metered Volume Data for each HVDC Boundary. The number of HVDC Boundaries is expected to be either zero or two initially. The system design should allow for an increase up to 20 over the contract life. One file per Season (i.e. four separate files will be provided each year).

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Interface Description:

TLFA shall receive (no later than 19th October in the preceding BSC Year, for Annual Calculation of TLFs) from BSCCo the HVDC Boundary Data for each HVDC Boundary and each Sample Settlement Period as a file of comma separated values.

The following information shall be included in the interface:

HVDC Metered Volume Data

HVDC Boundary Identifier

Settlement Date

Settlement Period

Metered Volume

The Metered Volume data will be signed to indicate the direction of energy flow; a positive sign indicates export on to the system and a negative sign indicates import from the system.

Physical Interface Details:

- Proposed structure is Comma Separated Values (CSV), each record starting with a three-character code identifying the record type:
- "HDR" for the header
- "HVM" for HVDC Metered Volume (for a Sample Settlement Period)
- "FTR" for footer

Header Information:

Record Type	Fixed String "HDR"
File Identifier	Fixed String "T051001"
Reference Year	Fixed String "YYYYMMDD-YYYYMMDD"
Season	Fixed String – one of "Spring", "Summer", "Autumn" or "Winter"
Timestamp	Datetime

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Footer Information:	
Record Type	Fixed String "FTR"
Record Count	Count of body records + 2 (1 header and 1 footer)
The filename will specify the relevant Season. Example: "TLFA-I005_HVDC_Metered_Volumes_Autumn.csv".	

Example

```
HDR,T051001,20160901-20170831,Summer,20170831115906
HVM,HVDC_D,20150602,28,-233.371
HVM,HVDC_G,20150602,28,220.7514286
HVM,HVDC_D,20150602,34,-429.1693333
HVM,HVDC_G,20150602,34,413.7526429
HVM,HVDC_D,20150602,43,-267.1746667
HVM,HVDC_G,20150602,43,254.0721857
HVM,HVDC_D,20150604,6,-271.066
HVM,HVDC_G,20150604,6,257.9079286
FTR,10
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9.7 Distribution Network Data (Input): TLFA-I006

Manual/Automatic:	Frequency:	Volumes:
Manual	Once a year by 19th October plus ad hoc (if required)	Single data set per reference year for each of the 14 GB Distribution Networks with off-shore Transmission Network(s) connected to them – expected one per distributor (i.e. up to 14 files).

Interface Description:

TLFA shall receive from BSCCo the Distribution Network Data for relevant Distribution Systems no later than 19th October (for Annual Calculation of TLFs) in the current BSC Year to be used for Calculation of TLFs for the next BSC Year.

Distribution Network Data relates to offshore transmission systems that are connected to a Distribution System, and therefore isolated from the onshore Transmission System, as illustrated in the following diagram:

For each offshore Node connected to the Distribution Network (e.g. Node 4 in this example), the Distribution Network Data will specify the single onshore Node to which the majority of power flows (e.g. Node 1 in this example). This information will be used to join the two parts of the Transmission System (e.g. merging Node 4 with Node 1 in this example, as presented in paragraph 3.5.3).

The data will be provided as a single file containing one record for each offshore transmission system that connects to an onshore distribution system. Each record will identify:

- Node ID of the Node that connects the offshore transmission system to the Distribution System
- Node ID of the Node on the onshore transmission system with which this Node should be merged

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Physical Interface Details:

- Proposed structure is Comma Separated Values (CSV), each record starting with a three-character code identifying the record type:
- "HDR" for the header
- "DND" for Distribution Network Data
- "FTR" for footer

Header Information:

Record Type	Fixed String "HDR"
File Identifier	Fixed String "T061001"
Reference Year	Fixed String "YYYYMMDD-YYYYMMDD"
Timestamp	Datetime

Footer Information:

Record Type	Fixed String "FTR"
Record Count	Count of body records + 2 (1 header and 1 footer)

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The filename will appropriately distinguish between 1 to 14 distributors.

Example: "TLFA-I006_Distribution_Network_Data_DNO1.csv".

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Example

```
HDR,T061001,20160901-20170831,20170831115906
DND,BOSW11,HEYS10
DND,CLTO3,BRFO10
DND,RICH1,CANT10
DND,RORW11,HARK10
DND,RORE11,HARK10
DND,SALL1,NORW10
FTR,8
```


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9.8 Total Delivering and Offtaking Metered Volume Data (Input): TLFA-I007

Manual/Automatic:	Frequency:	Volumes:
Manual	Once a year plus ad hoc (if required)	Note that each file contains data for all Settlement Periods in the BSC Season Each file will contain approximately 62,000 records (= 14 * 48 * 365 / 4) All other input data provided to the TLFA contains data only for approximately 1,000 Sample Settlement Periods in the Reference Year. One file per season.

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Interface Description:

- TLFA shall receive (no later than 19th October in the preceding BSC Year, for Annual Calculation of TLFs) from BSCCo a single file containing the following data for each Zone 'Z' and Settlement Period 'j' in the Reference Year, sorted by Settlement Day, Settlement Period and Zone:

Total Losses	the total transmission losses in the Settlement Period, equal to $(\Sigma^{+}QM_{ij} + \Sigma^{-} QM_{ij})$
$ZQM^{+}_{(non\text{-}I)Zj}$	the Zonal Total Metered Volume for non-Interconnector BM Units in delivering Trading Units; and
$ZQM^{-}_{(non\text{-}I)Zj}$	the Zonal Total Metered Volume for non-Interconnector BM Units in offtaking Trading Units

Physical Interface Details:

- Proposed structure is Comma Separated Values (CSV), each record starting with a three-character code identifying the record type:
- "HDR" for the header
- Settlement Date
- Settlement Period
- Zone - may be one of 1 – 14 inclusive
- "TDO" for Total Delivering and Offtaking Metered Volume Data
- "FTR" for footer

Header Information:

Record Type	Fixed String "HDR"
File Identifier	Fixed String "T071001"
Reference Year	Fixed String "YYYYMMDD-YYYYMMDD"
Season	Fixed String – one of "Spring", "Summer", "Autumn" or "Winter"
Timestamp	Datetime

Footer Information:

Record Type	Fixed String "FTR"
Record Count	Count of body records + 2 (1 header and 1 footer)

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The filename will specify the relevant Season.

Example: "TLFA-I007_Total_Zonal_Metered_Volume_Data_Winter.csv".

Example

```
HDR,T071001,20160901-20170831,Autumn,20170831115906
TDO,20160901,1,1,311.214,662.414,-1135.31
TDO,20160901,1,2,311.214,613.542,-516.05
TDO,20160901,1,3,311.214,609.07,-619.26
TDO,20160901,1,4,311.214,378.522,-412.84
TDO,20160901,1,5,311.214,661.560,-722.47
TDO,20160901,1,6,311.214,532.338,-772.444
TDO,20160901,1,7,311.214,682.81,-516.05
TDO,20160901,1,8,311.214,892.231,-733.478
TDO,20160901,1,9,311.214,757.04,-825.68
TDO,20160901,1,10,311.214,679.813,-766.31
TDO,20160901,1,11,311.214,666.666,-434.84
TDO,20160901,1,12,311.214,713.413,-714.454
TDO,20160901,1,13,311.214,922.331,-1032.1
TDO,20160901,1,14,311.214,757.04,-1238.52
FTR,16
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9.9 Nodal Transmission Loss Factors (Output): TLFA-I008

Manual/Automatic:	Frequency:	Volumes:
Manual	Once a year plus ad hoc (if required)	There are approximately 1,000 Sample Settlement Periods for the full BSC Year and for each there are Nodal Transmission Loss Factors for each node with either generation or load demand One file per season (i.e. four separate files will be provided each year, each containing ~400,000 records, for ~1600 Nodes and ~250 Sample Settlement Periods).

Interface Description:

TLFA shall send to BSCCo the Nodal Transmission Loss Factors no later than 30th November (for Annual Calculation of TLFs), or for the Recalculation of TLFs, within 15 Business Days from receiving the necessary input data from BSCCo (if 5 Business Days prior notification was given).

The following information shall be included in the interface:

Nodal TLFs

Record identifier "NTF"

Settlement Date

Settlement Period

Node ID

Nodal TLF (calculated in accordance with paragraph 3.1.7)

Physical Interface Details:

A physical structure is defined for this manual interface because it will be processed automatically.

The field delimiter will be a single comma (i.e CSV format) with no comma at the end of a line. A header and footer record will be included in the file, as follows:

Header Information:

Record Type	Fixed String "HDR"
File Identifier	Fixed String "T081001"
Reference Year	Fixed String "YYYYMMDD-YYYYMMDD"
Season	Fixed String – one of "Spring", "Summer", "Autumn" or "Winter"
Creation Datetime	Fixed String YYYYMMDDHHMMSS

Footer Information:

Record Type	Fixed String "FTR"
Record Count	Count of body records + 2 (1 header and 1 footer)

The filename will specify the relevant Season.

Example: "TLFA-I008_NTLF_Spring.csv".

Example

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```
HDR,T081001,20160901-20170831,Summer,20170831115906
NTF,20150601,9, BEAU1Q,-0.00956282032540217
FTR,
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39.10 Adjusted Seasonal Zonal Transmission Loss Factors (Output): TLFA-I009

Manual/Automatic:	Frequency:	Volumes:
Manual	Once a year plus ad hoc (if required) no later than 30th November	For each Season there are 14 Adjusted Seasonal Zonal Transmission Loss Factors. One file per season.

Interface Description:

TLFA shall send to BSCCo the Adjusted Seasonal Zonal Transmission Loss Factors for each Zone and each BSC Season no later than 30th November (for Annual Calculation of TLFs), or for the Recalculation of TLFs, within 15 Business Days from receiving the necessary input data from BSCCo (if 5 Business Days prior notification was given).

The following information shall be included in the interface:

Adjusted Seasonal Zonal Transmission Loss Factors

Record identifier "ZTF"

TLF Zone ID

Adjusted Seasonal Zonal TLF (ATLFZS) (calculated in accordance with paragraph 5.4, and submitted in Number(8,7)[4] format).

Effective From Settlement Date

Effective To Settlement Date

Physical Interface Details:

A physical structure is suggested for this manual interface.

The field delimiter will be a single comma (i.e CSV format) with no comma at the end of a line. A header and footer record will be included in the file, as follows:

Header Information:

Record Type	Fixed String "HDR"
File Identifier	Fixed String "T091001"
Reference Year	Fixed String "YYYYMMDD-YYYYMMDD"
Season	Fixed String – one of "Spring", "Summer", "Autumn" or "Winter"
Creation Datetime	Fixed String YYYYMMDDHHMMSS

Footer Information:

Record Type	Fixed String "FTR"
Record Count	Count of body records + 2 (1 header and 1 footer)

For the "Spring" Season, there will be two files:

- the first file ("Part A") will contain data with the Effective From Date = 1 April to 31 May;
- the second file ("Part B") will contain data with the Effective From Date = 1 March to 31 March

The filename will specify the relevant Season and, for Spring, Part A or Part B.

Example: "TLFA-I009_ASZTLF_Spring_A.csv"

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Example

```
HDR,T091001,20160901-20170831,Summer,20170831115906
ZTF,6,0.0017917,20150401,20160331
FTR,3
```


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9.11 BM Unit Specific Transmission Loss Factors (Output): TLFA-I010

Manual/Automatic:	Frequency:	Volumes:
Manual	Once a year plus ad hoc (if required) and if Network Mapping Statement changes	Equal to number of BM Units. One file per season.

Interface Description:

TLFA shall send to BSCCo the BM Unit Specific Transmission Loss Factors no later than 30th November (for Annual Calculation of TLFs), or for the Recalculation of TLFs, within 15 Business Days from receiving the necessary input data from BSCCo (if 5 Business Days prior notification was given).

The following information shall be included in the interface:

BM Unit Specific TLFs

Record identifier "BMU"

BM Unit Identifier

BM Unit Specific TLF (calculated in accordance with paragraph 5.5, and submitted in Number(8,7)4 format)

Effective From Settlement Date

Effective To Settlement Date

The data should be sorted by BM Unit Identifier.

Physical Interface Details:

A physical structure is suggested for this manual interface as follows:-

The field delimiter will be a single comma (i.e CSV format) with no comma at the end of a line. A header and footer record will be included in the file, as follows:

Header Information:

Record Type	Fixed String "HDR"
File ID	Fixed String "T101001"
Reference Year	Fixed String "YYYYMMDD-YYYYMMDD"
Season	Fixed String – one of "Spring", "Summer", "Autumn" or "Winter"
Creation Datetime	Fixed String YYYYMMDDHHMMSS

Footer Information:

Record Type	Fixed String "FTR"
Record Count	Count of body records + 2 (1 header and 1 footer)

For the "Spring" Season, there will be two files:

- the first file ("Part A") will contain data with the Effective From Date = 1 April to 31 May;
- the second file ("Part B") will contain data with the Effective From Date = 1 March to 31 March

The filename will specify the relevant Season and, for Spring, Part A or Part B.

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Example: “TLFA-I010_BM_ ASZTLF_Spring_B.csv”.

Example

```
HDR,T101001,20160901-20170831,Summer,20170831115906
BMU,2__AECOA000,0.0052723,20150401,20160331
FTR,3
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9.12 Seasonal Zonal TLFs (Output): TLFA-I011

Manual/Automatic:	Frequency:	Volumes:
Manual	Once a year plus ad hoc (if required) no later than 30th November	For each Season there are 14 Seasonal Zonal Transmission Loss Factors One file per season.

Interface Description:

TLFA shall send to BSCCo the Seasonal Zonal Transmission Loss Factors for each Zone and each BSC Season no later than 30th November (for Annual Calculation of TLFs), or for the Recalculation of TLFs, within 15 Business Days from receiving the necessary input data from BSCCo (if 5 Business Days prior notification was given).

The following information shall be included in the interface:

Record identifier "SZT"

TLF Zone ID

Seasonal Zonal TLF (TLF_{ZS}) (calculated in accordance with paragraph 5.2, and submitted in Number(8,7)4 format)

Effective From Settlement Date

Effective To Settlement Date

Physical Interface Details:

A physical structure is suggested for this manual interface.

The field delimiter will be a single comma (i.e CSV format) with no comma at the end of a line. A header and footer record will be included in the file, as follows:

Header Information:

Record Type	Fixed String "HDR"
File Identifier	Fixed String "T111001"
Reference Year	Fixed String "YYYYMMDD-YYYYMMDD"
Season	Fixed String – one of "Spring", "Summer", "Autumn" or "Winter"
Creation Datetime	Fixed String YYYYMMDDHHMMSS

Footer Information:

Record Type	Fixed String "FTR"
Record Count	Count of body records + 2 (1 header and 1 footer)

For the "Spring" Season, there will be two files:

- the first file ("Part A") will contain data with the Effective From Date = 1 April to 31 May;
- the second file ("Part B") will contain data with the Effective From Date = 1 March to 31 March

The filename will specify the relevant Season and, for Spring, Part A or Part B.

Example: "TLFA-I011_SZTLF_ Spring_A.csv".

Example

```
HDR,T111001,20160901-20170831,Summer,20170831115906
SZT,6,0.0017927,20150401,20160331
```

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9.13 TLF Adjustment (Output): TLFA-I012

Manual/Automatic:	Frequency:	Volumes:
Manual	Once a year plus ad hoc (if required) no later than 30th November	For each Season there is 1 TLF Adjustment One file per Season.

Interface Description:

TLFA shall send to BSCCo the Transmission Loss Factor Adjustment for each BSC Season no later than 30th November (for Annual Calculation of TLFs), or for the Recalculation of TLFs, within 15 Business Days from receiving the necessary input data from BSCCo (if 5 Business Days prior notification was given).

The following information shall be included in the interface:

Record identifier "TLA"

TLF Adjustment (calculated in accordance with paragraph 5.3, and submitted in Number(8,7) format)

Effective From Settlement Date

Effective To Settlement Date

Physical Interface Details:

A physical structure is suggested for this manual interface.

The field delimiter will be a single comma (i.e CSV format) with no comma at the end of a line. A header and footer record will be included in the file, as follows:

Header Information:

Record Type	Fixed String "HDR"
File Identifier	Fixed String "T121001"
Reference Year	Fixed String "YYYYMMDD-YYYYMMDD"
Season	Fixed String – one of "Spring", "Summer", "Autumn" or "Winter"
Creation Datetime	Fixed String YYYYMMDDHHMMSS

Footer Information:

Record Type	Fixed String "FTR"
Record Count	Count of body records + 2 (1 header and 1 footer)

For the "Spring" Season, there will be two files:

- the first file ("Part A") will contain data with the Effective From Date = 1 April to 31 May;
- the second file ("Part B") will contain data with the Effective From Date = 1 March to 31 March

The filename will specify the relevant Season and, for Spring, Part A or Part B.

Example: "TLFA-I012_TLF_Adjustments_ Spring_B.csv"

Example

```
HDR,T121001,20160901-20170831,Summer,20170831115906
TLA,0.0017945,20150401,20160331
FTR,3
```


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9.14 Indicative TLM & TLMO Values - Part 1 (Output): TLFA-I013

Manual/Automatic:	Frequency:	Volumes:
Manual	Once a year plus ad hoc (if required) no later than 30th November	For each Settlement Period in the Reference Year there is one value each of $TLMO^+$ and $TLMO^-$, and one value each of Indicative Delivering TLM and Indicative Offtaking TLM per Zone. One file per season.

Interface Description:

TLFA shall send to BSCCo the Indicative TLM, $TLMO^+$ and for $TLMO^-$ for each Settlement Period in the Reference Year no later than 30th November (for Annual Calculation of TLFs), or for the Recalculation of TLFs, within 15 Business Days from receiving the necessary input data from BSCCo (if 5 Business Days prior notification was given).

For Part 1, the Indicative TLM, $TLMO^+$ and for $TLMO^-$ will be calculated using zero values of TLF (in accordance with paragraph 5.6.1(a)).

The following information shall be included in the interface:

Record identifier "TVS"

Settlement Date

Settlement Period

Indicative $TLMO^+$

Indicative $TLMO^-$

Record identifier "ITL"

Settlement Date

Settlement Period

Zone

Indicative Delivering TLM

Indicative Offtaking TLM

Physical Interface Details:

A physical structure is suggested for this manual interface.

- The field delimiter will be a single comma (i.e CSV format) with no comma at the end of a line, and each record starting with a three-character code identifying the record type:
- "HDR" for the header
- "TVS" for the Indicative $TLMO^+$ and $TLMO^-$ (per Settlement Period)
- "ITL" for the indicative Delivering TLM and the indicative Offtaking TLM (per Settlement Period and Zone)
- "FTR" for the footer

A header and footer record will be included in the file, as follows:

Header Information:

Record Type	Fixed String "HDR"
File Identifier	Fixed String "T131001"

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Reference Year	Fixed String "YYYYMMDD-YYYYMMDD"
Season	Fixed String – one of "Spring", "Summer", "Autumn" or "Winter"
Creation Datetime	Fixed String YYYYMMDDHHMMSS
Footer Information:	
Record Type	Fixed String "FTR"
Record Count	Count of body records + 2 (1 header and 1 footer)

The filename will specify the relevant Season.

Example: "TLFA-I013_TLM_TLMO_Spring_calculated_from_zero_TLF.csv"

Example

```
HDR,T131001,20160901-20170831,Summer,20170831115906
TVS,20161201,1,-0.009485000966940133,0.011730325589498672
ITL,20161201,1,1,0.9905149990330598,1.0117303255894987
ITL,20161201,1,2,0.9905149990330598,1.0117303255894987
ITL,20161201,1,3,0.9905149990330598,1.0117303255894987
ITL,20161201,1,4,0.9905149990330598,1.0117303255894987
ITL,20161201,1,5,0.9905149990330598,1.0117303255894987
ITL,20161201,1,6,0.9905149990330598,1.0117303255894987
ITL,20161201,1,7,0.9905149990330598,1.0117303255894987
ITL,20161201,1,8,0.9905149990330598,1.0117303255894987
ITL,20161201,1,9,0.9905149990330598,1.0117303255894987
ITL,20161201,1,10,0.9905149990330598,1.0117303255894987
ITL,20161201,1,11,0.9905149990330598,1.0117303255894987
ITL,20161201,1,12,0.9905149990330598,1.0117303255894987
ITL,20161201,1,13,0.9905149990330598,1.0117303255894987
ITL,20161201,1,14,0.9905149990330598,1.0117303255894987
FTR,17
```

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<#>the first file ("Part A") will contain data with the Effective From Date = 1 April and the Effective To Date = 31 May; ¶
<#>the second file ("Part B") will contain data with the Effective From Date = 1 March and the Effective To Date = 31 March¶

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9.15 Indicative TLM & TLMO Values - Part 2 (Output): TLFA-I014

Manual/Automatic:	Frequency:	Volumes:
Manual	Once a year plus ad hoc (if required) no later than 30th November	For each Settlement Period in the Reference Year there is one value each of $TLMO^+$ and $TLMO^-$ and one value each of Indicative Delivering TLM and Indicative Offtaking TLM per Zone. One file per Season.

Interface Description:

TLFA shall send to BSCCo the Indicative TLM, $TLMO^+$ and for $TLMO^-$ for each Settlement Period in the Reference Year no later than 30th November (for Annual Calculation of TLFs), or for the Recalculation of TLFs, within 15 Business Days from receiving the necessary input data from BSCCo (if 5 Business Days prior notification was given).

For Part 2, the Indicative TLM, TLMO+ and for TLMO- will be calculated using the Adjusted Seasonal Zonal Transmission Loss Factor (ATLFZS) values calculated for the forthcoming BSC Year (in accordance with paragraph 5.6.1(b)).

The following information shall be included in the interface:

Record identifier "TVS"

Settlement Date

Settlement Period

Indicative $TLMO^+$

Indicative $TLMO^-$

Record identifier "ITL"

Settlement Date

Settlement Period

Zone

Indicative Delivering TLM

Indicative Offtaking TLM

Physical Interface Details:

A physical structure is suggested for this manual interface.

- The field delimiter will be a single comma (i.e CSV format) with no comma at the end of a line, and each record starting with a three-character code identifying the record type:
- "HDR" for the header
- "TVS" for the Indicative $TLMO^+$ and $TLMO^-$ (per Settlement Period)
- "ITL" for the indicative TLM (per Settlement Period and Zone)
- "FTR" for the footer

A header and footer record will be included in the file, as follows:

Header Information:

Record Type Fixed String "HDR"

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File Identifier	Fixed String "T141001"
Reference Year	Fixed String "YYYYMMDD-YYYYMMDD"
Season	Fixed String – one of "Spring", "Summer", "Autumn" or "Winter"
Creation Datetime	Fixed String YYYYMMDDHHMMSS
Footer Information:	
Record Type	Fixed String "FTR"
Record Count	Count of body records + 2 (1 header and 1 footer)

The filename will specify the relevant Season.

Example: "TLFA- I014_TLM_TLMO_ Spring_calculated_from_non_zero_TLF_.csv".

Example

```
HDR,T141001,20160901-20170831,Summer,20170831115906
TVS,20161201,1,-0.008651952511557096,0.006040210210064515
ITL,20161201,1,1,0.9997711528739766,1.0144633155955982
ITL,20161201,1,2,0.9952188808583662,1.0099110435799878
ITL,20161201,1,3,1.0107127259534323,1.025404888675054
ITL,20161201,1,4,0.9920283946327169,1.0067205573543385
ITL,20161201,1,5,1.004345094983681,1.0190372577053026
ITL,20161201,1,6,0.9823563476489963,0.9970485103706179
ITL,20161201,1,7,0.9855970205200105,1.0002891832416323
ITL,20161201,1,8,1.0069529720282626,1.0216451347498843
ITL,20161201,1,9,1.0045589346655794,1.019251097387201
ITL,20161201,1,10,0.989328398620848,1.0040205613424698
ITL,20161201,1,11,1.0015470957155264,1.0162392584371148
ITL,20161201,1,12,0.9860305873924965,1.0007227501141183
ITL,20161201,1,13,0.9753055374354141,0.9899977001570358
ITL,20161201,1,14,0.9649875999692257,0.9796797626908473 FTR,17
```

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<#>the first file ("Part A") will contain data with the Effective From Date = 1 April and the Effective To Date = 31 May; ¶
<#>the second file ("Part B") will contain data with the Effective From Date = 1 March and the Effective To Date = 31 March¶

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9.16 Adjusted Nodal Power Flows (Output): TLFA-I015

Manual/Automatic:	Frequency:	Volumes:
Manual	Once a year plus ad hoc (if required)	One file per Sample Settlement Period, the size is related to the number of nodes in the Network Model.

Interface Description:

TLFA shall send to BSCCo the Adjusted Nodal Power Flows no later than 30th November (for Annual Calculation of TLFs), or for the Recalculation of TLFs, within 15 Business Days from receiving the necessary input data from BSCCo (if 5 Business Days prior notification was given).

The following information shall be included in the interface:

Nodal Power Flows (NPF)

Record identifier "NPF"

Node ID

Node number

Adjusted Nodal Power Flow value (calculated in accordance with paragraph 3.4.8(a)) in [MW]

Physical Interface Details:

The field delimiter will be a single comma (i.e CSV format) with no comma at the end of a line. A header and footer record will be included in the file, as follows:

Header Information:

Record Type	Fixed String "HDR"
File Identifier	Fixed String "T151001"
Reference Year	Fixed String "YYYYMMDD-YYYYMMDD"
Creation Datetime	Fixed String YYYYMMDDHHMMSS

Footer Information:

Record Type	Fixed String "FTR"
Record Count	Count of body records + 2 (1 header and 1 footer)

The filename will specify the relevant Season, and the Settlement Date and Settlement Period specifying the Sample Settlement Period.

Example: "TLFA-I015_NPF_Spring_20170301_01.csv".

Example

```
HDR, T151001,20160901-20170831,Spring,20170831115906
NPF,ABNE3-,6,-30.83521360417364
NPF,ABTH11,7,-288.91749987530653
NPF,ABTH12,8,0.0
NPF,ABTH13,9,0.0
NPF,ABTH21,10,1015.3982809381394
NPF,ABTH22,11,518.737630374737
NPF,ACHR1R,12,1.8860229788518954
FTR,9
```


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9.17 Branch Power Flows1 (Output): TLFA-I016

Manual/Automatic:	Frequency:	Volumes:
Manual	Once a year plus ad hoc (if required)	One file per season, the size relates to number of branches in the Complete and Consolidated Network Model and number of Sample Settlement Periods for that season.

Interface Description:

TLFA shall send to BSCCo the Branch Power Flows no later than 30th November (for Annual Calculation of TLFs), or for the Recalculation of TLFs, within 15 Business Days from receiving the necessary input data from BSCCo (if 5 Business Days prior notification was given).

The following information shall be included in the interface:

Branch Power Flows (BPF)

Record identifier "BPF"

Settlement Date

Settlement Period

Node 1 ID

Node 2 ID

Node 1 Number

Node 2 Number

Power Flow in per unit per 100MVA

Physical Interface Details:

The field delimiter will be a single comma (i.e. CSV format) with no comma at the end of a line. A header and footer record will be included in the file, as follows:

Header Information:

Record Type	Fixed String "HDR"
File Identifier	Fixed String "T161001"
Reference Year	Fixed String "YYYYMMDD-YYYYMMDD"
Creation Datetime	Fixed String YYYYMMDDHHMMSS

Footer Information:

Record Type	Fixed String "FTR"
Record Count	Count of body records + 2 (1 header and 1 footer)

The filename will specify the relevant Season.

Example: "TLFA-I016_BPF_Spring.csv"

Example

```
HDR,T161001,20160901-20170831,Spring,20170831115906
BPF,20161201,40,IROA11,CAMA12,775,212,-4.828064224817164e-16
BPF,20161201,40,IROA11,OLDS12,775,1085,-1.1044512779876277
BPF,20161201,40,IROA12,OLDS12,776,1085,1.1044512779876248
BPF,20161201,40,USKM11,USKM12,1442,1443,-0.026380986804817458
```

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9.18 Absolute Nodal Power Flows (Output): TLFA-I017

Manual/Automatic:	Frequency:	Volumes:
Manual	Once a year plus ad hoc (if required)	One file per Sample Settlement Period, the size is related to the number of nodes in the Network Model.

Interface Description:

TLFA shall send to BSCCo the Absolute Nodal Power Flows no later than 30th November (for Annual Calculation of TLFs), or for the Recalculation of TLFs, within 15 Business Days from receiving the necessary input data from BSCCo (if 5 Business Days prior notification was given).

The following information shall be included in the interface:

Absolute Nodal Power Flows (APF)

Record identifier "NPF"

Node ID

Node number

Absolute Nodal Power Flow value (calculated in accordance with paragraph 3.4.8(b)) in [MW]

Physical Interface Details:

The field delimiter will be a single comma (i.e CSV format) with no comma at the end of a line. A header and footer record will be included in the file, as follows:

Header Information:

Record Type Fixed String "HDR"

File Identifier Fixed String "T171001"

Reference Year Fixed String "YYYYMMDD-YYYYMMDD"

Creation Datetime Fixed String YYYYMMDDHHMMSS

Footer Information:

Record Type Fixed String "FTR"

Record Count Count of body records + 2 (1 header and 1 footer)

The filename will specify the relevant Season, and the Settlement Date and Settlement Period specifying the Sample Settlement Period.

Example: "TLFA-I017_APF_Spring_20170301_01.csv".

Example

```
HDR, T171001,20160901-20170831,Spring,20170831115906
NPF,ABNE3-,6,30.574
NPF,ABTH11,7,286.47
NPF,ABTH12,8,0.0
NPF,ABTH13,9,0.0
NPF,ABTH21,10,1024.0
NPF,ABTH22,11,523.132
NPF,ACHR1R,12,1.902
FTR,9
```

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