MODIFICATION PROPOSAL

SECTION E *(version 2.0 including P82, P125 all Approved Modifications awaiting implementation)*

Amend paragraph 1.2.5 as follows:

~~TLF Determination~~	~~Transmission Loss Factor Agent~~	~~TLFA~~

SECTION H *(version 6.0 all Approved Modifications awaiting implementation)*

Amend paragraph 1.2.4 as follows:

1.2.4   Code Subsidiary Documents comprise each of the following documents:

    (a)   BSC Procedures;

    (b)   Codes of Practice;

    (c)   BSC Service Descriptions;

    (d)   Party Service Lines;

    (e)   Data Catalogues;

    (f)   Communication Requirements Documents; and

    (g)   the Reporting Catalogue.~~; and~~

    ~~(h)   the LFM Specification.~~

SECTION T *(version 10 including P82, P125 and all other Approved Modifications awaiting implementation)*

Delete paragraph 1.3.8:

~~1.3.8   Data required from the TLFA are Transmission Loss Factors for all BM Units.~~

Delete paragraph 1.8:

~~1.8   Annex T-2~~

~~1.8.1   Annex T-2 shall apply for the purposes of the determination of Transmission Loss Factors.~~

Amend paragraph 2.2.1 as follows:

2.2.1   For the purposes of the Code, the Transmission Loss Factor for each BM Unit ~~and factor~~ α, shall be as follows:

    (a) $\underline{TLF_{ij} = 0}$ ~~for~~ all BM Units; ~~and each BM Unit TLF_{ij} shall be determined in accordance with Annex T-2;~~

    (b) $\alpha = 0.45$.

Delete Annex T-2:

~~ANNEX T-2~~

~~TRANSMISSION LOSS FACTORS~~

~~1.   Introduction~~

~~1.1   This Annex T-2 sets out the basis for determining Transmission Loss Factors.~~

~~1.2   Transmission Loss Factors will be determined by the TLFA:~~

~~(a)by reference to nodal TLFs determined by the application of the Load Flow Model in accordance with paragraph 7.2, and~~

~~(b)in accordance with the further provisions of paragraph 7.~~

~~1.3   For the purposes of this Annex T-2:~~

~~(a)a **node** is a point on an 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;~~

~~(b)a **load flow model** is a mathematical model of an electrical network which represents power flows between pairs of adjacent nodes on the network, and from which nodal TLFs can be determined for each node for given power flows;~~

~~(c)a **nodal TLF**, in relation to a node on a network and a given power flow at the node, is the rate of change of electrical losses on the network with respect to change of power flow at that node, with network balance being maintained by the slack mode;~~

~~(d)the **Load Flow Model** is the load flow model established and adopted by the TLFA in accordance with paragraph 3;~~

~~(e)   the **slack node** is a node that acts:~~

~~(i)   for the purposes of a load flow model, as a sink for power flow surpluses or deficits arising from inaccuracies in the load flow model;~~

~~(ii)   in relation to adjacent nodes, as the reference node for calculating the phase angle of the power flow between the nodes.~~

~~2.   LFM Specification~~

~~2.1   The Panel shall, in consultation with the Transmission Company and other Parties and the Authority, establish (to form part of the BSC Service Description for the TLFA) a specification (**LFM Specification**) for a load flow model for the Transmission System, to~~

operate based on the data inputs specified in paragraph 7.2(d), and consistent with the requirements in paragraph 2.2.

2.2   The LFM Specification shall provide for the following assumptions and approximations to be made in the load flow model:

(a)   only electrical losses associated with power flows on circuits (forming part of the network) will be used in determining nodal TLFs;

(b)   in respect of the power flow between adjacent nodes it is assumed:

(i)   there is no Reactive Power component;

(ii)   the ratio of the change of power flow over a circuit to the injection at a given node is not dependent on overall electrical load on the network

(iii)   the sine of the voltage phase angle is equal to the phase angle (as measured in radians); and

(iv)   the power flow in a circuit is equal to the difference in the voltage phase angles across the circuit multiplied by the circuit susceptance.

3.   Load Flow Model

3.1   The TLFA shall establish, and (subject to paragraph 3.2) adopt and from time to time modify, a load flow model which implements and complies with the LFM Specification.

3.2   The TLFA shall not adopt such load flow model or a modification thereof unless the model reviewer has reported to the Panel (in such terms, and as to such materiality, as the Panel may decide) that such model or modification complies with the LFM Specification; and the TLFA shall not modify the Load Flow Model except as the Panel may instruct or agree.

3.3   The Panel shall appoint, and may from time to time reappoint or replace, an independent expert (the **model reviewer**) for the following purposes:

(a)   to inspect and test the Load Flow Model and report to the Panel as to the compliance of the Load Flow Model with the LFM Specification or any particular aspect of the LFM Specification:

(i)   before the Load Flow Model is first used for the purposes of this Annex T-1,

(ii)   upon any modification of the Load Flow Model (whether upon a change to the LFM Specification or otherwise), and

(iii) on any other occasion on which the Panel decides to obtain such a report;

(b)   to verify and report to the Trading Disputes Committee as to whether nodal TLFs were determined in accordance with the Load Flow Model, on any occasion on which it is necessary to do so for the purposes of any Trading Dispute.

3.4   Any report produced by the model reviewer on nodal TLFs for the Trading Disputes Committee shall be final and binding on all Parties (save in the case of fraud or manifest error) and if a Party refers a Trading Dispute to arbitration under Section W3.6, then save in the case of fraud or manifest error, the arbitrator(s) appointed in accordance with Section H7 shall not have the power to open up, review or in any way revise the model reviewer's report on whether nodal TLFs were, or were not, determined in accordance with the Load Flow Model.

3.5   BSCCo shall enter into a contract of engagement (for the term for which the model reviewer is appointed) with the model reviewer, which shall, inter alia:

(a)   provide terms of reference set or approved by the Panel for the model reviewer; and

(b)   require the model reviewer to enter into a confidentiality undertaking in favour of the TLFA in such terms as the Panel shall reasonably require or approve.

3.6   To ensure the integrity of the Load Flow Model:

(a)   the TLFA shall deposit a copy of the Load Flow Model in escrow with an escrow agent in such form and on such terms and conditions as the Panel may approve;

(b)   the escrow agent shall be required to hold, maintain and release the Load Flow Model in accordance with the terms and conditions (consistent with paragraph 3.7) approved by the Panel; and

(c)   the TLFA shall be responsible for the payment of all fees due to the escrow agent.

3.7   The TLFA shall be required to make the Load Flow Model (and any details thereof) available to the model reviewer and the BSC Auditor [and as may be required by the arbitral tribunal in connection with any arbitration]; but shall not be required to make available or disclose the Load Flow Model or details thereof to the Panel, any Panel Committee or Parties.

3.8   For the avoidance of doubt, once the Load Flow Model (or any modification thereof) has been adopted by the TLFA, nodal TLFs which are properly determined by the Load Flow Model shall be definitive; and accordingly:

(i) (without prejudice to any question whether such nodal LTFs were in fact properly determined) no Party may challenge or question on any grounds the validity of any nodal TLF which was so determined;

(ii) any modification of the Load Flow Model shall have effect only prospectively, that is for the purposes of determining Transmission Loss Factors in respect of BSC Years for which (at the time the modification was made) Transmission Loss Factors have not already been determined in accordance with paragraph 7.

3.9   For the purposes of paragraph 3.8(i), nodal TLFs are properly determined if they are determined by and only by the application of the Load Flow Model on the basis of data input in compliance with the further provisions of this Annex T-2.

4.   **Zones, Nodes and Mapping**

4.1   For the purposes of this Annex T-2:

(a)   a **Zone** is

(i)   the geographic area in which a GSP Group lies, determined by the Panel (applying such criteria as it shall decide in its discretion) but so that the Zones are mutually exclusive and comprise the whole of (and nothing but) the authorised area under the Transmission Licence;

(ii)   for the purposes of calculating TLFs for Interconnector BM Units associated with the Interconnector connecting the Transmission System to transmission systems in Scotland, the single additional Zone (not comprising any geographical area) in respect of which the TLFs shall be calculated by reference to:

(1)   the Zonal TLF calculated in accordance with paragraph 7 for such other Zones as determined by the Panel; and

(2)   the factor to be applied to each such Zonal TLF as determined by the Panel.

(b)   the Panel may from time to time review and upon reasonable notice to Parties change its determination of (or in relation to) any Zone(s) where there is any change in the GSP Group, or upon the application of a Party, or otherwise on its own initiative; provided that a change in the determination of (or in relation to) any Zone(s) shall be effective only in relation to BSC Years for which (at the time the change was made) Transmission Loss Factors have not already been determined in accordance with paragraph 7;

(c)   the Panel may, but shall not be required to, consult any Party on the determination of any part of the boundary of a Zone where it considers there is material doubt as to such determination;

(d)   the Panel shall publish a description of the Zones described in paragraph 4.1(a)(i) from time to time (but may do so by referring to any other document which describes or identifies the geographic areas determined by the Panel to be the Zones).

4.2   For the purposes of this Annex T-2:

(a)   a **Node** is a node on the Transmission System;

(b) the Transmission Company shall:

(i)   identify each Node and prepare, keep up to date, and maintain, a list of all Nodes, each identified or capable of being identified geographically; and

(ii)   provide to BSCCo the list of Nodes as from time to time updated.

4.3   BSCCo shall:

(a)   prepare (consistent with any determination of the Panel under paragraph 4.4) and maintain a statement (the **network mapping statement**) of the following:

(i)   for each Volume Allocation Unit (other than a GSP Group or BM Unit embedded in a Distribution System), and other than the Volume Allocation Unit that represents the Interconnector connecting the Transmission System to transmission systems in Scotland, the Node which represents or best represents that Volume Allocation Unit or (as the case may be) the Boundary Point(s) at which that Volume Allocation Unit is connected to the Transmission System (it being recognised that one Node may represent several such points);

(ii)   for the Volume Allocation Unit that represents or best represents the Interconnector connecting the Transmission System to transmission systems in Scotland, the Node which represents or best represents the Volume Allocation Unit or (as the case may be) the Boundary Point(s) at which that Volume Allocation Unit is connected to the Transmission System (it being recognised that one Node may represent several such points) and the proportion of such representation;

(iii)   for each Node, the Zone in which the Node lies or should best be considered to lie, provided that no Node shall lie in the Zone described in paragraph 4.1(a)(ii);

(iv)   for each BM Unit, the Zone in which the BM Unit lies, on the basis of the same correspondences as have been established under paragraphs (i),(ii) and (iii), except that:

(1)   Interconnector BM Units lie in the Zone in which (in accordance with paragraph (iii)) the Node for the relevant Interconnector lies;

(2)   Supplier BM Units and other BM Units embedded in a Distribution System lie in the Zone which represents the geographical area of the corresponding GSP Group;

(3)   Interconnector BM Units associated with the Interconnector connecting the Transmission System to transmission systems in Scotland shall be deemed to lie in the Zone described in paragraph 4.1(a)(ii);

(v)   the Zones to be used for the purposes of the calculation of the Zonal TLF for the Zone described in paragraph 4.1(a)(ii); and

(vi)   the factor to be applied to each of the Zonal TLFs for each of the Zones referred to in paragraph (v);

(b)   from time to time update the network mapping statement to take account of any determination by the Panel under paragraph 4.4, any change in the list of Nodes, any change in the definition of any Zone, any changes in respect of BM Units, Transmission System Boundary Points or Systems Connection Points, any change to the proportion referred to in sub-paragraph (ii) of paragraph 4.3(a) and any changes in the Zones or factors referred to in paragraph (a)(iv) and(v);

(c)   provide a draft of the network mapping statement and any revision thereto to the Panel and each Party, wherever practicable at least 30 days before the statement or revision is to become effective, and submit any representations or comments on the draft to the Panel;

(d)   provide the network mapping statement and each revision thereof to the TLFA, the Transmission Company, the Panel and each Party.

4.4   Any question or dispute as to the matters in sub paragraphs (i) (ii) and (iii) of paragraph 4.3(a) shall be determined by the Panel in its discretion, after consultation with the Transmission Company and the Lead Party(ies) of the BM Unit(s) affected by such question or dispute, having regard (so far as appears to the Panel to be relevant) to the parts of the Transmission System in which power flows are typically most influenced by changes in power flows at the relevant Node or (as the case may be) the relevant BM Unit.

4.5   The Transmission Company and each Distribution System Operator and the CRA/CDCA shall cooperate with and provide information as may be required to BSCCo and the Panel in connection with the preparation of the network mapping statement and the determination of any question or dispute under paragraph 4.4.

5.   Network Data

5.1   For the purposes of this Annex T-2:

(a)   **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, values of the resistance and the reactance between the Nodes;

(b)   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.

5.2   The Transmission Company shall determine Network Date in good faith and based on its operational knowledge of the Transmission System, and in accordance with any relevant assumption made in the LFM Specification, but in the absence of a manifest error no Party may challenge or question the validity or correctness of the Network Data determined by the Transmission Company.

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

6.   **Sample Settlement Periods**

6.1   For each BSC Year, Transmission Loss Factors shall be determined by reference to nodal TLFs for sample Settlement Periods in the 12 month period (a **Reference Year**) ending 30 September in the preceding BSC Year.

6.2   For the purposes of so determining Transmission Loss Factors, the Panel, after consultation with the Transmission Company and other Parties:

    (a)   shall divide the Reference Year into a number of different periods (each a **Load Period**), representing (in the opinion of the Panel) typically different levels of load on the Transmission System, defined by time of day, day of week, season and such other factors as the Panel considers relevant, such that every Settlement Period in the Reference Year falls into one and only one Load Period;

    (b)   shall specify, for each Load Period, a representative (in the opinion of the Panel) number of sample Settlement Periods (each a **Sample Settlement Period**) within that Load Period; and

    (c)   will revise the specification or Load Periods or Sample Settlement Periods for each BSC Year.

6.3   BSCCo shall, not later than 5th October in the preceding BSC Year notify the specification of each Load Period and the Sample Settlement Periods to the TLFA, the Transmission Company and the CDCA.

7.   **Determination of TLFs**

7.1   For each BSC Year Transmission Loss Factors for each BM Unit shall be determined in accordance with this paragraph 7.

7.2   For each Sample Settlement Period:

    (a)   the Transmission Company shall, not later than 5th November in the preceding BSC Year, send to the TLFA the Network Data;

    (b)   the CDCA shall, not later than 5th November in the preceding BSC Year, send to the TLFA Metered Volumes for each Volume Allocation Unit (other than GSP Groups and BM Units embedded in a Distribution System);

    (c)   the TLFA shall translate the Metered Volume data submitted by the CDCA to power flows (on the assumption they are constant in a Settlement Period) for each Node by applying the network mapping statement;

    (d)   the TLFA shall input into the Load Flow Model the Network Data under paragraph (a) and Nodal power flow data under paragraph (c) and apply the Model to derive a nodal TLF for each Node (Nodal TLF).

7.3   For each Sample Settlement Period the TLFA shall determine the Zonal TLF (TLF_z) for each Zone (described in paragraph 4.1(a)(i)) 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 for Zones established in accordance with paragraph 4.1(a)(i);

QM_{Nj} is the magnitude of the value of the Nodal power flow;

and where Σ_N is the summation by Node in a Zone.

7.4 For each BSC Year the TLFA shall determine the Annual Zonal TLF (TLF_{Zy}) for each Zone (described in paragraph 4.1(a)(i)) according to the following formula:

$$TLF_{Zy} = \Sigma_P ((\Sigma_s TLF_{Zj} / S_P) * J_P) / \Sigma_P J_P$$

where:

S_P is the number of Sample Settlement Periods for a Load Period

J_P is the total number of Settlement Periods falling within the Load Period

Σ_s is summation by Sample Settlement Periods within a Load Period

Σ_P is summation by Load Period within the Reference Year.

7.5 For each BSC Year, the TLFA shall determine the Adjusted Annual Zonal TLF ($ATLF_{Zy}$) for each Zone (described in paragraph 4.1(a)(i)) according to the following formula:

$$ATLF_{Zy} = TLF_{Zy} / 2$$

7.6 For each BSC Year BSCCo shall:

(a) determine the Adjusted Annual Zonal TLF ($ATLF_{Z'y}$) for the Zone (described in paragraph 4.1(a)(ii)) according to the following formula:

$$ATLF_{Z'y} = \Sigma_z P_z * ATLF_{Zy}$$

where:

Σ_z is summation by Zone as provided in the network mapping statement.

P_z is the weighting factor (described in paragraph 4.3(a)(ii) and shall be equal to the proportion of the Volume Allocation Unit that flows into a Node(s) within a relevant Zone;.

(b) not later than three Business Days prior to 1st December in the preceding BSC Year, send such Adjusted Annual Zonal TLF to the TLFA.

7.7 For each BSC Year:

(a)   ~~the Transmission Loss Factor (TLF~~$_{ij}$~~) for each BM Unit shall be the Adjusted Annual Zonal TLF (ATLF~~$_{Zy}$ ~~and ATLF~~$_{Z'y}$~~) for the Zone in which that BM Unit is located (determined by the TLFA on the basis of the network mapping statement);~~

(b)   ~~the TLFA shall, not later than 1st December in the preceding BSC Year, send such Transmission Loss Factors to the BMRA and the SAA.~~

SECTION V *(version 11 including P82, P125 and all other Approved Modifications awaiting implementation)*

Delete existing paragraph 3.1.7 and renumber existing paragraph 3.1.8:

~~3.1.7   The TLFA shall provide the reports in accordance with Table 9 in Annex V-1.~~

~~3.1.8~~3.1.7   The reporting requirements referred to in paragraphs 3.1.1 to ~~3.1.7~~3.1.6 are without prejudice to any further reporting requirements set out in the Code or any Code Subsidiary Document.

Amend paragraphs 3.2.1, 3.2.2, 3.2.3 and 3.2.4 as follows:

3.2.1   Each of Tables 2 to 7 ~~and 9~~ in Annex V-1 sets out:

(a)   the name of each report to be provided by the relevant BSC Agent;

(b)   a summary description of the data to be contained in each such report;

(c)   the frequency with which each such report is to be provided;

(d)   the persons and bodies to which each such report is to be provided.

3.2.2   For the purposes of Tables 2 to 7 ~~and 9~~ in Annex V-1:

(a)   "**Relevant Party**" indicates that the data in question is to be provided to the Party or Trading Party or Supplier to which the data relates (and not to other Parties, except for BSCCo);

(b)   "**Any Party (on request)**" indicates that the data in question (irrespective of the Party or Parties to which it relates) is to be provided to any Party which requests receipt of the same pursuant to paragraph 3.2.3;

(c)   "**All Suppliers**" indicates that the data in question is to be provided to all Suppliers in the GSP Group to which the data relates;

(d)   "**Any person (on request)**" indicates that, subject to paragraph 3.2.7, the data in question (irrespective of the Party or Parties to which it relates) is to be provided to any person (whether or not a Party) which requests receipt of the same pursuant to paragraph 3.2.3.

3.2.3   In respect of each of the Tables 2 to 7 ~~and 9~~ in Annex V-1 and in relation to all (but not some) of the data for which the 'Recipient' column in any such Table includes:

    (a)   'Any Party (on request)', each Party shall be entitled to receive all such data if it notifies BSCCo to that effect in accordance with BSCP41;

    (b)   'Any person (on request)', any person shall be entitled, subject to paragraph 3.2.7, to receive all such data if it notifies BSCCo to that effect in accordance with such procedures as BSCCo may establish for such notification.

3.2.4   Tables 2 to 7 ~~and 9~~ provide a general description of the data to be contained in each report; details of the data to be contained in each report are set out in the Reporting Catalogue.

Delete Table 9 at Annex V-1:

<center>~~**Table 9 – TLFA Reporting**~~</center>

~~Name of report~~	~~Frequency~~	~~Recipient~~	~~General Description~~
~~Transmission Loss Factors~~	~~Annually~~	~~Any Party on request~~	~~For each Node, a report providing nodal TLFs for the relevant BSC Year~~

SECTION X *(version 4 including P82, P125 and all other Approved Modifications awaiting implementation)*

Delete the following definitions from Annex X-1:

~~"Load Flow Model"~~	~~Has the meaning given to that term in paragraph 1.3 of Annex T-2~~
~~"Load Flow Specification"~~	~~Has the meaning given to that term in paragraph 2.1 of Annex T-2~~
~~"Load Period"~~	~~Has the meaning given to that term in paragraph 6.2 of Annex T-2~~
~~"Network Data"~~	~~Has the meaning given to that term in paragraph 5.1 of Annex T-2~~
~~"Node"~~	~~Has the meaning given to that term in paragraph 4.2 of Annex T-2~~
~~"Reference Year"~~	~~Has the meaning given to that term in paragraph 6.1 of Annex T-2~~
~~"Sample Settlement Period"~~	~~Has the meaning given to that term in paragraph 6.2 of Annex T-2~~

"Zone"	~~Has the meaning given to that term in paragraph 4.1 of Annex T-2~~

Amend Table X – 2 in Annex X – 2 as follows:

~~Adjusted Annual Zonal TLF~~	~~$ATLF_{zy}$~~		~~The factor determined in accordance with Annex T-2.~~
~~Annual Zonal TLF~~	~~TLF_{zy}~~		~~The factor determined in accordance with Annex T-2.~~
~~Nodal TLF~~	~~TLF_{nj}~~		~~The factor specified in Annex T-2.~~
~~Transmission Loss Factor~~	~~TLF_{ij}~~		~~The factor determined in accordance with Annex T-2~~
~~Zonal TLF~~	~~TLF_{zj}~~		~~The factor determined in accordance with Annex T-2.~~