ENERGY MARKET INVESTIGATION

MODIFIED DRAFT ORDER – CONSULTATION

The Energy Market Investigation (Electricity Transmission Losses) Order 2016

Background

1. On 26 June 2014 the Gas and Electricity Markets Authority in exercise of its powers under sections 131 and 133 of the Enterprise Act 2002 (the Act) (as provided for by section 36A of the Gas Act 1986 (GA86) and section 43 of the Electricity Act 1989 (EA89)), made an ordinary reference to the Chair of the Competition and Markets Authority (CMA) for the constitution of a group under Schedule 4 to the Enterprise and Regulatory Reform Act 2013 for an investigation into the supply and acquisition of energy in Great Britain.1

2. The CMA investigated the matters referred to it pursuant to sections 131 and 133 of the Act and concluded (a) in accordance with section 134(1) of the Act that there are features of the markets for the supply and acquisition of energy in Great Britain which, either alone or in combination, prevent, restrict or distort competition; and (b) in accordance with section 134(2) of the Act, that there are adverse effects on competition (AECs). The CMA published its findings in a report under section 136 of the Act entitled Energy market investigation: Final report published on 24 June 2016 (the Report).

3. In the Report, the CMA found, amongst other things, that the absence of locational pricing for transmission losses is a feature of the wholesale electricity market in Great Britain that gives rise to an AEC (the Locational Pricing AEC), as it is likely to distort competition between generators and is likely to have both short- and long-run effects on generation and demand:

(a) In the short run, costs will be higher than would otherwise be the case, because cross-subsidisation will lead to some plants generating when it would be less costly for them not to generate, and other plants, which it would be more efficient to use, not generating. Similarly, cross-subsidies will result in consumption failing to reflect fully the costs of providing the electricity.

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1 Energy market investigation terms of reference.
(b) In the long run, the absence of locational pricing may lead to inefficient investment in generation, including inefficient decisions over the extension or closure of plant. There could also be inefficiency in the location of demand, particularly high-consumption industrial demand.

4. The CMA considered, in accordance with section 134(4) of the Act, (a) whether action should be taken by it for the purpose of remedying, mitigating or preventing the AECs or any detrimental effect on consumers; (b) whether it should recommend the taking of action by others for the purpose of remedying, mitigating or preventing the AECs or any detrimental effect on consumers; and (c) in either case, if action should be taken, what action should be taken and what is to be remedied, mitigated or prevented.

5. The CMA decided on a package of remedies to be implemented in order to remedy, mitigate or prevent the Locational Pricing AEC.

6. The draft Explanatory Note accompanying the Draft Order provides an explanation of how the Order and the licence conditions are expected to operate.
The Order

Reference and power

The CMA makes this Order in performance of its duty under section 138 of the Act for the purpose of remedying, mitigating or preventing the adverse effects on competition and any detrimental effects on consumers so far as they have resulted, or may be expected to result, from the adverse effects on competition as identified in the report of the CMA entitled Energy market investigation: Final report and published on 24 June 2016. The CMA makes this Order in exercise of the powers conferred by sections 86(1) to (5) and 87 (each applicable by virtue of section 164), 161(1), (3) and (4), paragraphs 2, 8, 10, 17 to 19, 21 and 22 of Schedule 8 to the Act. In accordance with section 15 of the Electricity Act 1989, the CMA introduces Transmission Licence Condition C3, Supply Licence Condition 11 and Generation Licence Condition 9 for the purpose of giving effect to the provisions of this Order, having had regard to GEMA's relevant statutory functions pursuant to section 168 of the Act.

Part 1

General and Interpretation

1. Title, commencement and scope

1.1 This Order may be cited as ‘The Energy Market Investigation (Electricity Transmission Losses) Order 2016’.

1.2 This Order shall come into force on [day after the order] December 2016 except Articles 3, 4 and 7, which shall come into force on 1 April 2018.

1.3 This Order applies to the transmission of electricity in Great Britain.

1.4 Provisions of this Order apply to the Transmission Company, or any successor body of the Transmission Company. This Order shall continue to be in force until such time as it is varied or revoked under the Act. The variation or revocation of this Order shall not affect the validity or enforceability of any rights or obligations that arose prior to such variation or revocation.

2. Interpretation

2.1 In this Order:

BM Unit has the meaning given to it in Section X-1 of the BSC.

BSC means the balancing and settlement code provided for in paragraph 1 of the Transmission Standard Licence Condition C3 (Balancing and Settlement Code (BSC)), as from time to time modified in accordance with that condition.

CMA means the Competition and Markets Authority.

GEMA means the Gas and Electricity Markets Authority established under section 1 of the Utilities Act 2000.

Generation Licence means a licence granted or treated as granted under section 6(1)(a) of the Electricity Act 1989.

Interconnector BM Unit has the meaning given to it in Section X-1 of the BSC.

Settlement Period has the meaning given to it in Annex X-2 of the BSC.

Supply Licence means a licence granted or treated as granted under section 6(1)(d) of the Electricity Act 1989.

Trading Charges has the meaning given to it in Section X-1 of the BSC.

Trading Party has the meaning given to it in Section X-1 of the BSC.

Transmission Company means National Grid Electricity Transmission plc, or any successor body, as the holder of a transmission licence in relation to which licence GEMA or the Secretary of State, where appropriate, has issued a Section C (system operator standard conditions) Direction (as defined in the Transmission Licence) and where Section C of the Transmission Licence remains in effect (whether or not subject to any terms included in a Section C (system operator standard conditions) Direction or to any subsequent variation of its terms to which the licensee may be subject).

Transmission Licence means a licence granted or treated as granted under section 6(1)(b) of the Electricity Act 1989.
Transmission Losses means the units of electricity unaccounted for on the Transmission System as allocated in accordance with the BSC and this Order.

Transmission Losses Principle means the principle provided for in Article 3.

Transmission Loss Factor means a factor used to allocate Transmission Losses on a locational basis to BM Unit i in Settlement Period j.

Transmission Standard Licence Condition means a condition of the Transmission Licence.

Transmission System has the meaning given to the term ‘national electricity transmission system’ in the Transmission Licence.

2.2 In this Order any reference to:

(a) ‘month’ means calendar month;

(b) a ‘person’ includes any individual, firm, partnership, body corporate or association;

(c) ‘written’ or ‘in writing’ includes the transmission of information or the conclusion of a process made on, by, or through the internet or by a postal service; and

(d) a government department or non-departmental public body or organisation or person or place or thing includes a reference to its successor in title.

2.3 The headings used in this Order are for convenience and have no legal effect.

2.4 References to any statute, statutory provisions or licence conditions shall be construed as references to that statute, statutory provision or licence condition as amended, re-enacted or modified, whether by statute or otherwise.

2.5 The Interpretation Act 1978 applies to this Order except where words and expressions are expressly defined in this Order.
Part 2

Transmission Losses Principle

3. Recovery of the costs of Transmission Losses

3.1 The Transmission Company shall ensure at all times that the costs of Transmission Losses are recovered from users of the Transmission System in a manner which is sensitive to the relative impact on Transmission Losses of changes to each user’s flow as a result of their location on the Transmission System.

Part 3

Implementation of the Transmission Losses Principle

4. Calculation of the Transmission Loss Factor

4.1 The Transmission Company shall ensure that Trading Charges for each Trading Party and the Transmission Company will be determined by the Transmission Company (and/or agents appointed by it) following the rules set out in Section T of the BSC and using a Transmission Loss Factor for each BM Unit calculated pursuant to Schedule 1.

4.2 In the event of any conflict between this Order and the BSC with respect to the calculation of the Transmission Loss Factor for each BM Unit (other than an Interconnector BM Unit), this Order shall prevail.

5. Implementation of the Transmission Losses Principle in accordance with the EMI Modification Proposal

5.1 The Transmission Company shall use its best endeavours to ensure that a modification proposal reflecting in all technical details the terms set out in Schedule 1 and the additional provision set out in Schedule 2 is approved and implemented no later than 1 April 2018.

5.2 The BSC, including those provisions introduced pursuant to Article 5.1 (and Schedules 1 and 2) of this Order, may subsequently be modified provided that the Transmission Company continues to comply with Article 3 of this Order.

5.3 Article 4 shall cease to have effect upon implementation of a modification proposal reflecting in all technical details the terms set out in Schedule 1 and the additional provision set out in Schedule 2.
Part 4

Certain amendments to licence conditions

6. Amendments to Condition C3 of the Transmission Licence

6.1 Condition C3 of the Transmission Licence is amended in accordance with Schedule 3.

7. Amendments to Condition 11 of the Supply Licence and Condition 9 of the Generation Licence

7.1 Schedule 4 shall have effect on 1 April 2018.

Part 5

Monitoring and compliance

8. Directions by the CMA as to compliance

8.1 The CMA may give directions falling within Article 8.2 to:

(a) a person specified in the directions; or

(b) a holder for the time being of an office so specified in any body of persons whether incorporated or unincorporated.

8.2 Directions fall within this paragraph if they are directions:

(a) to take such actions as may be specified or described in the directions for the purpose of carrying out, or ensuring compliance with, this Order; or

(b) to do, or refrain from doing, anything so specified or described which the person might be required by this Order to do or refrain from doing.

8.3 In Article 8.2 above, ‘actions’ includes steps to introduce and maintain arrangements to ensure that any director, employee or agent of the Transmission Company carries out, or secures compliance with, this Order.

8.4 The CMA may vary or revoke any directions so given.

9. Supply of information

9.1 Any person to whom this Order applies is required to provide any information and documents required by the CMA for the purposes of enabling the CMA to
monitor the carrying out of this Order or any provisions of this Order and/or to review the effectiveness of the operation of this Order, or any provision of this Order.

9.2 Any person to whom this Order applies may be required by the CMA to keep and produce those records specified in writing by the CMA that relate to the operation of any provisions of this Order.

9.3 Any person to whom this Order applies and whom the CMA believes to have information which may be relevant to the monitoring or the review of the operation of any provisions of this Order may be required by the CMA to attend and provide such information in person.

9.4 Subject always to Part 9 of the Act, the CMA may publish any information or documents that it has received in connection with the monitoring or the review of this Order or any provisions of this Order for the purpose of assisting the CMA in the discharge of its functions under or in connection with this Order.
Schedule 1 – Calculation of Transmission Loss Factors

1. For the purpose of this Schedule 1, all defined terms have the same meaning as in the BSC except where words and expressions are expressly defined in this Schedule or in the Order.

2. For the purposes of Article 4.1 above, Schedule 1 sets out how the Transmission Loss Factor for each BM Unit (‘TLFs’) must be calculated by the Transmission Company, or any third party appointed by the Transmission Company for that purpose, and contains certain actions that may be taken by the Transmission Company, or any third party appointed by the Transmission Company for that purpose. For the purposes of Article 5.1 above, Schedule 1 sets out the technical details that must be reflected in the modification proposal.

3. Transmission Loss Factors will be determined by reference to Nodal TLFs determined by the application of the Load Flow Model in accordance with paragraph 17 of this Schedule.

4. For the purposes of this Schedule:

(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) the ‘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 a change of power flow at that Node, with network balance being maintained by the slack node;

(d) the ‘LFM Specification’ is a specification for a load flow model for the Transmission System to operate based on the data inputs specified in paragraph 17(b).

(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 as a source for power flow deficits arising from inaccuracies in the load flow model; and
(ii) in relation to each pair of adjacent Nodes in a load flow model, as the reference node for calculating the phase angle of the power flow between the Nodes;

(f) in relation to a BSC Year, BSC Spring shall be considered to be the periods 1st April to 31st May and 1st March to 31st March in that BSC Year.

5. The LFM Specification shall provide for only electrical losses associated with power flows between adjacent Nodes (forming part of the network) (‘Load Flow Model power flows’) to be used in determining Nodal TLFs.

6. For the purposes of this Schedule a ‘Zone’ is the geographic area:

(a) in which the following lie:

(i) a GSP Group (there being no more than one GSP Group in any one Zone);

(ii) any part of an Offshore Transmission System which connects directly to that GSP Group; and/or

(iii) any part of an Offshore Transmission System which connects to the onshore Transmission System at a point within the geographic area of that GSP Group; and

(b) which is determined so that the Zones are mutually exclusive and are contained within the area specified in Schedule 1 of the Transmission Licence.

7. The determination of any Zones may be reviewed and changed from time to time provided that a change in the determination of 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 17.

8. A description of the Zones shall be published from time to time.

9. A list of all Nodes, each identified or capable of being identified geographically shall be prepared, kept up-to-date, maintained and published.

10. For the purposes of this Schedule:

(a) a ‘network mapping statement’ is a statement of the following:
(i) for each Volume Allocation Unit (other than a GSP Group, or BM Unit embedded in a Distribution System), 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 each Node which represents or best represents a Volume Allocation Unit in accordance with paragraph (i), the Zone in which the Node lies or should best be considered to lie; and

(iii) for each BM Unit, the Zone in which the BM Unit lies, in accordance with what has been established under paragraphs (i) and (ii), except that:

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

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

(b) in relation to each BSC Year:

(i) the ‘reference network mapping statement’ is the version of the network mapping statement approved pursuant to paragraphs 11 and 12;

(ii) for the purposes of determining Nodal power flows the reference network mapping statement shall be used;

(iii) the ‘prevailing network mapping statement’ is the reference network mapping statement as from time to time updated;

(iv) the prevailing network mapping statement shall be used to determine the Zone in which each BM Unit is located for the purposes of determining from time to time the Transmission Loss Factor applicable to such BM Unit.

11. For each BSC Year, a draft reference network mapping statement shall be prepared (on the basis of data relating to the Reference Year, and taking account of the prevailing network mapping statement for the preceding BSC Year).
12. The reference network mapping statement (or prevailing network mapping statement as the case may be) shall be updated from time to time so as to reflect any changes to, or in respect of, the list of Nodes, the definition of any Zone, BM Units, Transmission System Boundary Points or Systems Connection Points.

13. For the purposes of this Schedule:

(a) ‘Transmission Network Data’ means the following data relating to the Transmission System:

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

(ii) for each such pair of Nodes, values of the resistance and the reactance between the Nodes; and

(b) Transmission 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.

14. For the purposes of this Schedule:

(a) ‘Distribution Network Data’ means the following data showing power flows from an Offshore Transmission Connection Point to other Grid Supply Points on a Distribution System:

(i) the identity of each Node that represents an Offshore Transmission Connection Point (an ‘Offshore Transmission Connection Point Node’);

(ii) the identity of each Node on a Distribution System (representing a Grid Supply Point) to which power flows from an Offshore Transmission Connection Point Node (a ‘corresponding Node’); and

(iii) the percentage of net energy received by each corresponding Node, of the total energy flowing from the Offshore Transmission Connection Point Node, as an estimated average value for each Reference Year;

(b) Distribution Network Data shall be established on the assumption of an ‘intact network’ that is disregarding any planned or other outage of any part of a Distribution System.

15. For each BSC Year, Transmission Loss Factors shall be determined by reference to Nodal TLFs for sample Settlement Periods in the Reference Year ending 31st August in the preceding BSC Year.
16. For the purposes of so determining Transmission Loss Factors:

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

   (b) for each Load Period, a representative number of sample Settlement Periods (each a 'Sample Settlement Period') shall be specified within that Load Period; and

   (c) the specification of Load Periods or Sample Settlement Periods shall be revised (if required) for each BSC Year.

17. For each BSC Year, Transmission Loss Factors for each BM Unit shall be determined in accordance with this paragraph:

   (a) For each Sample Settlement Period, the Metered Volume data shall be translated to power flows (on the assumption they are constant in a Settlement Period) for each Node by applying the reference network mapping statement ('Nodal power flows').

   (b) For each Sample Settlement Period, the Transmission Network Data and the Distribution Network Data and Nodal power flows shall be included into the Load Flow Model, and the Model shall be applied to derive a nodal TLF for each Node ('Nodal TLF').

   (c) For each Sample Settlement Period, the Zonal TLF (TLF_{Z}) ('Zonal TLF') shall be determined for each Zone according to the following formula:

   \[
   TLF_{ZJ} = \sum_{N} (TLF_{NJ} \ast QM_{NJ}) / \sum_{N} QM_{NJ}
   \]

   where for that Settlement Period, and for each Node in that Zone (determined on the basis of the reference network mapping statement):

   (i) TLF_{NJ} is the value of Nodal TLF;

   (ii) QM_{NJ} is the absolute value of the Nodal power flow disregarding any power flows to or from an Interconnector or any part of the Transmission System used for the transmission of high voltage direct current; and

   (iii) \( \sum_{N} \) is summation by Node in a Zone.
(d) For each BSC Season (the ‘relevant BSC Season’) in each BSC Year, the Seasonal Zonal TLF (TLF\text{SZ}) (‘Seasonal Zonal TLF’) shall be determined for each Zone according to the following formula:

\[ TLF_{SZ} = \sum_p \left( \sum_i \frac{TLF_{Zi}}{S_p} \cdot J_{pi} \right) \cdot \sum_j I_{ps} \]

where (in relation to the Reference Year):

(i) \( S_p \) is the number of Sample Settlement Periods within a Load Period which fall within the relevant BSC Season;

(ii) \( J_{pi} \) is the total number of Settlement Periods falling within a Load Period which fall within the relevant BSC Season;

(iii) \( \sum S_i \) is summation by Sample Settlement Periods within a Load Period which fall within the relevant BSC Season; and

(iv) \( \sum p \) is summation by Load Period within the relevant BSC Season.

(e) For each BSC Year, not later than 30th November in the preceding BSC Year, the Adjusted Seasonal Zonal TLF (ATLF\text{SZ}) shall be determined for each Zone and each BSC Season according to the following formula:

\[ ATLF_{SZ} = (TLF_{SZ} \cdot 0.5) + TLFA \]

where TLFA is the Transmission Loss Factor Adjustment, a value which is to be determined annually for each BSC Season in order to ensure that, as far as possible, the Adjusted Seasonal Zonal TLF values have a zero net aggregate effect on Delivering Transmission Losses Adjustment values.

(f) Not later than 31st December in the preceding BSC Year, the Adjusted Seasonal Zonal TLF (ATLF\text{SZ}) shall be published for each Zone and each BSC Season.

(g) For each BSC Season in each BSC Year the Transmission Loss Factor (TLF\text{B}) for each BM Unit shall be the Adjusted Seasonal Zonal TLF (ATLF\text{SZ}) for the Zone in which that BM Unit is located (allocated on the basis of the prevailing network mapping statement) and for that BSC Season.
Schedule 2 – Provision to be included in a modification proposal for the purposes of Article 5

1. The modification proposal referred to in Article 5 of this Order must contain provisions allowing the Transmission Company to assume responsibility for the calculation of the Transmission Loss Factors if the BSCCo (as defined in the BSC) and/or any agent appointed for that purpose fails to perform its duties within this context.

2. These provisions must reflect the following principles:

(a) Upon giving prior written notice, the Transmission Company shall assume responsibility for the determination of Transmission Loss Factors until such time as it gives notice that it intends cease.

(b) The Transmission Company will assume the powers, functions and duties of the Panel, BSCCo and, to the extent requested, Transmission Loss Factor Agent.

(c) The Transmission Company will comply with the provisions of the BSC when calculating Transmission Loss Factors.

(d) The BSC Panel and BSCCo will provide such assistance to the Transmission Company as it reasonably requests including ensuring that the Transmission Loss Factor Agent provides assistance.
Schedule 3 – Amendment to the Transmission Licence

1. The Transmission Licence is amended as follows.

2. In Condition C3 of the Transmission Licence, after paragraph 1D, insert

   **1E.** As from 1 April 2018, the balancing and settlement arrangements in the BSC shall comply with the Transmission Losses Principle.

   **1F.** As from 1 April 2018, the licensee shall ensure that the imbalances referred to in paragraph 2(b)(ii) below are calculated in compliance with Article 4 of The Energy Market Investigation (Electricity Transmission Losses) Order 2016.

   **1G.** The licensee shall use its best endeavours to ensure that the BSC is modified in accordance with the EMI Modification Proposal and implemented no later than 1 April 2018.

   **1H.** Notwithstanding paragraph 1G the BSC, including any provisions introduced in accordance with the EMI Modification Proposal, may thereafter be modified from time to time in accordance with the provisions of paragraphs 4 and 5 so as to further the objectives in paragraph 3.

   **1I.** Paragraph 1F will cease to have effect once the EMI Modification Proposal has been implemented.

3. In Condition C3 of the Transmission Licence, for paragraph 3 there shall be substituted–

   **3.** The objectives referred to in paragraph 1(b) are:

   (a) the efficient discharge by the licensee of obligations imposed upon it by this licence;

   (b) the efficient, economic and co-ordinated operation of the national electricity transmission system;

   (c) promoting effective competition in the generation and supply of electricity, and (so far as consistent therewith) promoting such competition in the sale and purchase of electricity;

   (d) promoting efficiency in the implementation and administration of the balancing and settlement arrangements described in paragraph 2;

   (e) compliance with the Electricity Regulation and any relevant legally binding decision of the European Commission and/or the Agency;
(f) implementing and administering the arrangements for the operation of contracts for difference and arrangements that facilitate the operation of a capacity market pursuant to EMR legislation; and

(g) compliance with the Transmission Losses Principle.

4. In Condition C3 of the Transmission Licence,

(a) insert in paragraph 14

‘EMI Modification Proposal’ means a modification proposal reflecting the terms set out in Schedule 1 and Schedule 2 to The Energy Market Investigation (Electricity Transmission Losses) Order 2016;

‘Transmission Losses’ means the units of electricity unaccounted for on the national electricity transmission system as allocated in accordance with the BSC and The Energy Market Investigation (Electricity Transmission Losses) Order 2016;

‘Transmission Losses Principle’ means the principle that the licensee shall ensure at all times that the costs of Transmission Losses are recovered from users of the national electricity transmission system in a manner which is sensitive to the relative impact on Transmission Losses of changes to each user’s flow, according to their network location;

(b) and reorganise paragraph 14 alphabetically.
Schedule 4 – Amendment to the Supply Licence and Generation Licence

1. The Supply Licence and Generation Licence are amended as follows.

2. In Condition 11 of the Supply Licence,
   
   (a) insert at the beginning of paragraph 11.2:

   ‘Subject to paragraph 11.2A’; and

   (b) insert after paragraph 11.2:

   **11.2A** In the event of any conflict between the Energy Market Investigation (Electricity Transmission Losses) Order 2016 and the Balancing and Settlement Code with respect to the calculation of the Transmission Loss Factor (as defined in the Balancing and Settlement Code), the licensee’s imbalance charges shall be calculated in accordance with the provisions set out in Schedule 1 to the Energy Market Investigation (Electricity Transmission Losses) Order 2016.

3. In Condition 9 of the Generation Licence,

   (a) insert at the beginning of paragraph 7:

   ‘Subject to paragraph 7A’

   (b) insert after paragraph 7:

   **7A** In the event of any conflict between the Energy Market Investigation (Electricity Transmission Losses) Order 2016 and the BSC with respect to the calculation of the Transmission Loss Factor (as defined in the BSC), the licensee’s charges shall be calculated in accordance with the provisions set out in Schedule 1 to the Energy Market Investigation (Electricity Transmission Losses) Order 2016.

   (c) renumber paragraph 8 as paragraph 9.