Transmission Loss Factor (TLF) Determination

Summary

This describes the source and purpose of each of the data files available for download from the TLFs Determination page of the ELEXON Portal.

Please refer to the current master version of the TLFA Service Description for the format of each data file.

Introduction

The changes to BSC Section T, Annex T-2 of the BSC requires BSCCo to publish on the BSC Website, on or before 31 December each year, all input and output data from the determination of Transmission Loss Factors (TLFs) for use in the next BSC Year.

These data files are published on the TLFs Determination page of the ELEXON Portal.

We describe the source of each data file and how each input data file is used in the determination of TLFs and the purpose of each output file.

Note that all data files are as input to or output from the Load Flow Model in the production of TLFs for the specified BSC Year and will not change once published, unless a full recalculation of TLFs is required.

Input Data Flows

TLFA-I001 - Reference Network Mapping Statement

The Network Mapping Statement for a Reference Year is produced by BSCCo based upon a list of nodes supplied by National Grid, and contains the following:

(a) for each Volume Allocation Unit (VAU), other than a GSP Group, or BM Unit embedded in a Distribution System, the Node or Nodes which represent or best represent that VAU or the Boundary Points at which that VAU 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; and

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

Note that the HVDC Western Link went live on 8 December 2017. HVDC Boundary data was first used when calculating the BSC Year 2019/20 data for the Winter Season, using data from the 2017-18 Reference Year.

BSCCo issues the draft Reference Network Mapping Statement for industry consultation by 31 August each year. The Panel is invited to approve the draft Reference Network Mapping Statement for use in the subsequent BSC Year at its October meeting, taking into account any comments/representations made by Parties during the consultation period.

BSCCo then provides the approved Reference Network Mapping Statement (as the TLFA-I001) to the Transmission Loss Factor Agent (TLFA) and publishes it on the TLFs Determination page of the ELEXON Portal by 19 October each year.

BSCCo maintains a Prevailing Network Mapping Statement during each Reference Year, and publishes it from time to time on the TLFs Determination page of the ELEXON Portal. This captures any changes to the Reference Network Mapping Statement in force at the time, and becomes the draft Reference Network Mapping for the next BSC Year for industry consultation.

Any new BM Units registered between a BSC Reference Year are assigned Seasonal Zonal TLFs in accordance with the version of the Prevailing Network Mapping statement in force at the time.

The TLFA loads the TLFA-I001 into the Load Flow Model (LFM) for use, along with the other input files (TLFA-I002s, TLFA-I003s, TLFA-I004, TLFA-I005 & TLFA-I006s), in the calculation of the Nodal power flows - the first step in the determination of Seasonal Zonal TLFs.

TLFA-I002 - Load Periods and Sample Settlement Periods

The methodologies for producing Load Periods (LPs) and Sample Settlement Periods (SSPs) were approved by the Panel at its meeting in July 2017, and future approvals were delegated to the Imbalance and Settlement Group (ISG). The methodology was reviewed in July 2018 and July 2019, with BSC Parties and the National Electricity Transmission System Operator (NETSO) consulted and asked for comments.

Due to no consultation responses being received in either 2018 or 2019, the methodology has remained unchanged. ELEXON has also received approval from the ISG to only consult with industry on LPs and SSPs every two years going forward (next consultation due Summer 2021), unless the methodology changes.

The LPs and SSPs for the Reference Year are issued to our BPO Service Provider (as four Seasonal CDCA-I062s) following approval by the Panel, and issued (as four Seasonal TLFA-I002s) to the TLFA by 19 October each year.

The BPO Service Provider uses the LPs and SSPs for the Reference Year as the basis for production of the Metered Volumes for SSPs for the Reference Year which is issued to BSCCo as four seasonal CDCA-I063 files.

The TLFA loads the TLFA-I002s into the LFM for use, along with the other input files (TLFA-I001, TLFA-I003s, TLFA-I004, TLFA-I005 & TLFA-I006s), in the calculation of the Nodal power flows - the first step in the determination of Seasonal Zonal TLFs.

TLFA-I003 - Metered Volumes for Sample Settlement Periods

The BPO Service Provider provides the Metered Volumes for the SSPs for the Reference Year to BSCCo as four Seasonal CDCA-I063s, in time for BSCCo to pass them to the TLFA (as four Seasonal TLFA-I003s) by 19 October each year.

These data flows comprise of the Metered Volume from CDCA for each SSP specified in the Reference Year, divided into BSC Seasons.

The TLFA loads the TLFA-I003s into the LFM for use, along with the other input files (TLFA-I001, TLFA-I002s, TLFA-I004, TLFA-I005 & TLFA-I006s), in the calculation of the Nodal power flows - the first step in the determination of Seasonal Zonal TLFs.

TLFA-I004 - Transmission Network Data

National Grid provides the Transmission Network Data for the Reference Year to BSCCo in time for BSCCo to pass it to the TLFA (as the TLFA-I004) by 19 October each year.

This data flow comprises the Node IDs, Resistance (R) and Reactance (X) for each pair of adjacent nodes on the GB Transmission Network.

The TLFA loads the TLFA-I004 into the LFM for use, along with the other input files (TLFA-I001, TLFA-I002s, TLFA-I003s, TLFA-I005 & TLFA-I006s), in the calculation of the Nodal power flows - the first step in the determination of Seasonal Zonal TLFs.

TLFA-I005 - HVDC Metered Volume Data for Sample Settlement Periods

National Grid provides the HVDC Metered Volumes for the SSPs for the Reference Year to BSCCo in time for BSCCo to pass it to the TLFA (as the TLFA-I005) by 19 October each year.

This data flow comprises Metered Volume Data for each HVDC Boundary and each SSP in the Reference Year.

The TLFA loads the TLFA-I005s into the LFM for use, along with the other input files (TLFA-I001, TLFA-I002s, TLFA-I003s, TLFA-I004 & TLFA-I006s), in the calculation of the Nodal power flows - the first step in the determination of Seasonal Zonal TLFs.

Note that the HVDC Western Link Boundary only went live on 8 December 2017; therefore data was first used for the BSC Year 2019/20. Any commissioning/test data received before 8 December 2017 was excluded.

TLFA-I006 - Distribution Network Data

Distribution Businesses provide Distribution Network Data to BSCCo in time for BSCCo to pass it to the TLFA (as the TLFA-I006) by 19 October each year.

Distribution Network Data relates to offshore transmission systems that are connected to a Distribution System. It contains the Node IDs of the Node that connects the offshore transmission system to the Distribution System and the onshore transmission system with which this Node should be merged.

There will be one file from each Distributor that has at least one connected offshore transmission system.

The TLFA loads the TLFA-I006s into the LFM for use, along with the other input files (TLFA-I001, TLFA-I002s, TLFA-I003s, TLFA-I004 & TLFA-I005), in the calculation of the Nodal power flows -the first step in the determination of Seasonal Zonal TLFs.

TLFA-I007 - Total Delivering and Offtaking Metered Volume Data

BSCCo provides this data to the TLFA (as the TLFA-I007) by 19 October each year.

This data comprises, for each Settlement Period (not SSP) in the Reference Year:

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

The TLFA uses the TLFA-I007 data and the Seasonal Zonal TLFs calculated by the LFM to determine the Transmission Loss Factor Adjustment Values issued as the TLFA-I012 output file.

The TLFA does not use the TLFA-I007 data in the calculation of the Nodal power flows.

Output Data Flows

TLFA-I008 - Nodal TLFs

The TLFA calculates Nodal TLFs from the network power flows, in accordance with paragraph 2.3 of the Load Flow Model Specification. The TLFA uses Nodal Transmission Loss Factors in the calculation of Seasonal Zonal TLFs (TLFA-I011).

This data is published on the ELEXON Portal as the TLFA-I008 (one file per BSC Season).

TLFA-I009 - Adjusted Seasonal Zonal TLFs

These Adjusted Seasonal Zonal TLFs are the values that will be used in Settlement for the relevant BSC Year. The TLFA calculates Adjusted Seasonal Zonal TLFs from Seasonal Zonal TLFs and TLF Adjustment values.

This data is published on the ELEXON Portal as the TLFA-I009 (five files per BSC Year[1]; see the TLFA Service Description for details).

TLFA-I010 - BM Unit Specific TLFs

The TLFA calculates BM Unit Specific TLFs from Adjusted Seasonal Zonal TLFs and the Network Mapping Statement. This file is only produced for BM Units that were active during the relevant Reference Year, in accordance with the Network Mapping Statement (TLFA-I001), and will not be updated for new BM Units.

This data is published on the ELEXON Portal as the TLFA-I010 (five files per BSC Year[1]; see the TLFA Service Description for details).

TLFA-I011 - Seasonal Zonal TLFs

The TLFA calculates Zonal TLFs from the Nodal TLFs and then determines Seasonal Zonal TLFs.

This data is published on the ELEXON Portal as the TLFA-I011 (five files per BSC Year[1]; see the TLFA Service Description for details).

TLFA-I012 - TLF Adjustment

The TLF Adjustment has been introduced to remove any artificial effect of the slack node on Contracts For Difference generators by ensuring that the 14 different Zonal Transmission Loss Factor values have a zero net aggregate effect on Delivering Transmission Losses Adjustment values.

The TLFA calculates TLF Adjustment values from the Seasonal Zonal TLFs and the Total Delivering and Offtaking Metered Volume Data.

This data is published on the ELEXON Portal as the TLFA-I012 (five files per BSC Year[1]; see the TLFA Service Description for details).

TLFA-I013 - Indicative TLM & TLMO Values - Part 1 ($TLF_{ij}=0$)

The TLFA calculates Indicative TLM & TLMO Values for the Reference Year (not the BSC Year) from the Total Delivering and Offtaking Metered Volume Data using zero TLFs for all Settlement Dates.

[1] Spring files are split in to two parts: Part A is 1 April – 31 May, at the beginning of a BSC Year; and Part B is 1 - 31 March, at the end of the same BSC Year.

This data is published on the ELEXON Portal as the TLFA-I013 (one file per BSC Season in the Reference Year).

Note that the Indicative TLMO values are retrospective for the Reference Year and should not be confused with the Estimated TLMO values published on the ETLM page of the ELEXON Portal, which are prospective.

TLFA-I014 – Indicative TLM & TLMO Values - Part 2 ($TLF_{ij} \neq 0$)

The TLFA calculates Indicative TLM & TLMO Values for the Reference Year (not the BSC Year) from the Total Delivering and Offtaking Metered Volume Data using the calculated Seasonal Zonal TLF values.

This data is published on the ELEXON Portal as the TLFA-I014 (one file per BSC Season in the Reference Year).

Note that the Indicative TLMO values are retrospective for the Reference Year and should not be confused with the Estimated TLMO values published on the ETLM page of the ELEXON Portal, which are prospective.

TLFA-I015 - Adjusted Nodal Power Flows

The TLFA calculates Adjusted Nodal Power Flows from Nodal metered generation and demand data, for use in the Evaluation of network power flows, in accordance with paragraphs 2.1 and 2.2 respectively of the Load Flow Model Specification.

The TLFA uses Adjusted Nodal Power Flows in the calculation of Branch Power Flows (TLFA-I016) and for the determination of Nodal TLFs (TLFA-I008).

This data is published on the ELEXON Portal as the TLFA-I015 (one zip file per BSC Season in the Reference Year, with each zip file containing one file per SSP in the Season).

TLFA-I016 - Branch Power Flows

The TLFA calculates Branch Power Flows from the Transmission Network Data (TLFA-I004), the Distribution Network Data (TLFA-I006) and Adjusted Nodal Power Flows (TLFA-I015) for each SSP.

This data is published on the ELEXON Portal as the TLFA-I016 (one file per Season in the Reference Year).

TLFA-I017 - Absolute Nodal Power Flows

The TLFA first creates "combined metered volumes" for each SSP from the input files (TLFA-I002s, TLFA-I003s, TLFA-I004, TLFA-I005 & TLFA-I006s), and then allocates metered volumes to network nodes in accordance with the Network Mapping Statement (TLFA-I001) to determine Nodal Metered Volumes.

The TLFA then converts the Nodal Metered Volumes into Absolute Nodal Power Flows by multiplying the values by two (to convert MWh into MW), and then taking the modulus of the resultant number.

The TLFA uses Absolute Nodal Power Flows in the determination of Zonal TLFs.

This data is published on the ELEXON Portal as the TLFA-I017 (one zip file per BSC Season, with each zip file containing one file per SSP in the Season).

Further Information

For more information please contact the **BSC Service Desk** at bscservicedesk@cgi.com or call **0370 010 6950**.